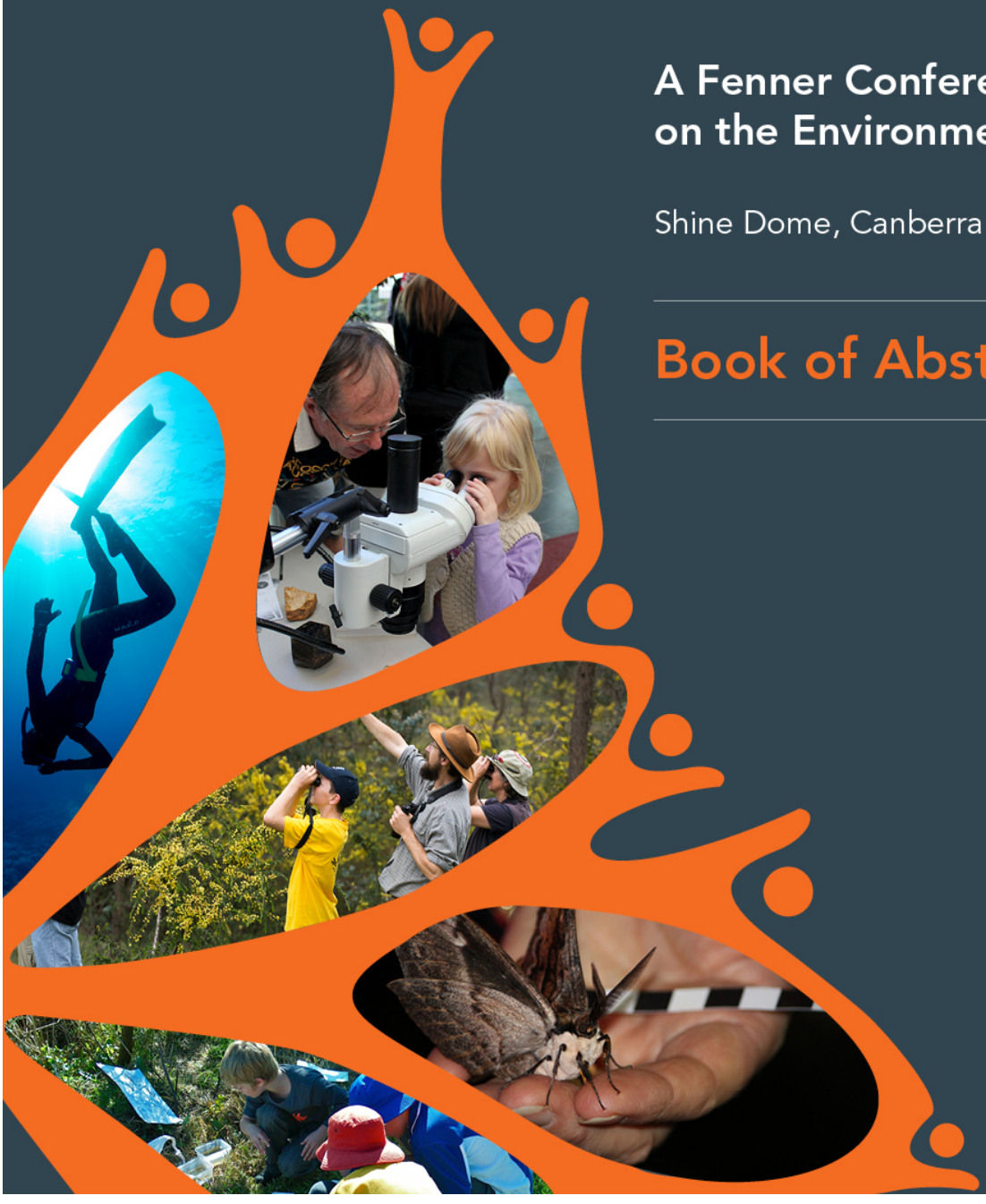
Australian Citizen Science Association

Maximising the Capacity of Citizen Science for Science and Society

A Fenner Conference on the Environment

Shine Dome, Canberra | 23-24 July, 2015

Book of Abstracts



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Association

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Conference Program

DAY 1 – Thursday July 23

08:00	Registration
08:30	**Welcome to Country**
08:40	**Welcome from Inspiring Australia**
08:50	**Official Opening: Ian Chubb, Chief Scientist**
09:00	**KEYNOTE SPEAKER: Maximising the capacity of citizen science for science and society. Rick Bonney** (Cornell University)
09:30	Morning Tea
10.00	Learn about and discuss designing citizen science projects to achieve outcomes for participants, science and society… ***SPEED TALKS AND WORKSHOP 1: Deliberate design of citizen science projects.*** *International and Australian examples will underpin an interactive workshop about best practices in citizen science, including defining and documenting project aims, and implementation of a design framework. Led by Jennifer Shirk (Cornell University) and Carla Sbrocchi (University of Technology, Sydney)*
11.55	**Film preview** - Maratus: one photo can change your life. How a citizen scientist discovered a new spider species.
12.00	Lunch
12.30	Share your project and learn about the diversity in citizen science in Australia… ***POSTER AND NETWORKING SESSION 1: Citizen Science projects in Australia.*** *Practitioners of citizen science will present posters about their projects.*
14:30	Afternoon Tea
15:00	Learn about and discuss advances in data collection and management… ***SPEED TALKS AND WORKSHOP 2: Data – collection and management.*** *An interactive discussion about the methods and tools for collecting and managing data in citizen science projects, including QA practices and standards, and the process of sample design. Session led by Luigi Ceccaroni (1000001 Labs) with Piers Higgs (Gaia Resources) and John La Salle (Atlas of Living Australia)*
17:00	Share your ideas and learn about the latest advances in citizen science… ***POSTER AND NETWORKING SESSION 2 (with drinks and nibbles): Innovations in Citizen Science.*** *Posters related to novel outcomes of citizen science, new techniques or tools for supporting projects*
17:15	**ADDRESS: Chair of the Board of the Australian Citizen Science Association: Suzanne Miller**
20.00	Close of day 1

Conference Program

DAY 2 – Friday July 24

07:00	Registration
07:30	**Annual General Meeting: Australian Citizen Science Association**
08:30	**KEYNOTE SPEAKER: New ways of thinking for integrating social and ecological systems. John Williams FTSE** (Former Chief, CSIRO Land and Water)
09:00	Learn about innovative citizen science projects across a wide range of fields… ***PANEL DISCUSSION: The many forms of citizen science.*** *Panel members:* • Andrew Robinson on gaming projects (e.g. Questagame) • Arnold Van Vliet on health-related projects (e.g. Allergy Radar, Mosquito Radar and Tick Radar) • Julie Banfield on Astronomy projects (e.g. Radio Galaxy Zoo) • Luigi Ceccaroni on environmental monitoring projects (e.g. 1000001 LABS) • Paul Flemons on crowdsourcing projects (e.g. DigiVol)
10:00	Morning Tea
10.30	Learn about and discuss strategies for data validation and analysis … ***SPEED TALKS AND WORKSHOP 3: Data – Validation and Analysis.*** *Presentations on established, robust and novel techniques will inform a workshop on validating and analysing the data from citizen scientists. Session led by Rick Bonney (Cornell University) and Peter Walsh (Institute for Marine and Antarctic Studies)*
12:15	Lunch
13:00	Learn about and discuss innovative ways to increase the impact of your projects on individuals and communities… ***SPEED TALKS AND WORKSHOP 4: The social impacts of citizen science.*** *An interactive discussion underpinned by global examples of formal and informal education, promoting connections to nature, developing skills, and changing attitudes and behaviours. Session led by John Tweddle (Natural History Museum, London) and Philip Roetman (Discovery Circle initiative, University of South Australia)*
14:45	Afternoon Tea
15:15	Learn about and discuss how and why to evaluate your citizen science projects… ***SPEED TALKS AND WORKSHOP 5: Evaluating project effectiveness.*** *Talks and a workshop focussing on program evaluation and documenting the outcomes of citizen science projects. Session led by Nancy Longnecker (University of Otago) and Gretta Pecl (Institute for Marine and Antarctic Studies)*
17:00	Close of Day 2

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WORKSHOP 1: Deliberate design of citizen science projects

Citizen Science in High Performance Computing

Alexander Beckley[1], Kirsten Gottschalk[1], Kevin Vinsen[1]

[1]International Centre for Radio Astronomy Research, alex.beckley@icrar.org

Biography:

Alex has been involved in science communication for 8 years first as a science presenter at the Scitech Discovery Center and more recently as the lead web developer for theSkyNet project (www.theskynet.org) where he utilises web programming and science communication skills to excite and enthuse potential volunteers to increase participation in theSkyNet.

Abstract:

TheSkyNet utilises the spare processing power of hundreds and thousands of volunteer computers together to process incredible amounts astronomy data. At any given time, day or night, almost 30,000 computers from around the world are contributing to theSkyNet initiative. This adds up to a distributed network capable of performing more than one million processing tasks per week, placing theSkyNet on par with a supercomputer with between 70 and 100 TFLOPs of compute power, or just shy of a top 500 supercomputer. Since the project's launch in 2011, theSkyNet has been recognised for its ability to produce real research outcomes for astronomers, whilst also being an innovative and effective method to engage the public in astronomy. Over 27,000 people have processed data for theSkyNet since its launch in 2011 and more than 98,000 unique visitors to the website. Citizen Science on a computing platform carries unique challenges due to the nature of our medium; such decreased person to person contact and an increase in ‘set and forget’ users. As the first distributed computing project from Australia utilising the BOINC software, we have learnt many lessons relating to the use of computing for citizen science, including attracting and retaining audience interest, volunteer motivations and how to maintain momentum on a scantily resourced citizen science project. We’ll share all these lessons and more!

Key Words

theSkyNet, ICRAR, Radio Astronomy, Distributed Computing, UWA, BOINC, High Performance Computing, Citizen Science, Astronomy

Engaging community and stakeholders to better inform decision making on estuary health

Rose Herben[1]

[1]Corangamite Catchment Management Authority, rose.herben@ccma.vic.gov.au

Biography:

Rose completed her Bachelor of Science at the University of Melbourne in 2006. It was after completing her study that she was introduced to citizen science. Looking for work experience in her field of study, Rose signed up as an EstuaryWatch volunteer in her home town of Anglesea and a Hooded Plover monitor at Point Roadknight. Both community monitoring programs were a great opportunity to learn new skills, make industry contacts and, most importantly, contribute data to better inform natural resource management. Rose is now the State Coordinator for the EstuaryWatch program, a community estuary monitoring program.

Abstract:

There are more than 100 estuaries in Victoria. Many of these estuaries close intermittently as a result of sand building up at the estuary entrance. The closure of an estuary entrance can result in the inundation of adjacent land. The social and economic costs associated with flooding from estuaries can be reduced by artificially opening the estuary entrance to allow the excess water to flow out to sea. However there can be detrimental environmental effects of artificially opening an estuary. In Victoria artificial estuary openings are regulated by waterway managers who are responsible for issuing approval under the Water Act 1989. There is limited long-term estuary condition data available to assist waterway managers in approving estuary openings and providing advice on the risks associated with an opening. In 2006, in response to a groundswell of public interest in estuary health and in an effort to meet waterway managers information needs, EstuaryWatch was initiated at the Corangamite Catchment Management Authority. The program, which is aimed at monitoring the indicators of estuary health, has over 100 dedicated volunteers across the state monitoring estuary mouth condition and physical/chemical parameters of the estuarine waters accordance with quality assurance quality control (QA/QC) procedures. Waterway managers can access EstuaryWatch data from an online database. EstuaryWatch utilises the data collected by community volunteers to determine estuary condition prior to an artificial opening and in the days after an estuary opening. EstuaryWatch is an example of the deliberate design of a citizen science project to inform and make better estuary management decisions.

Key Words

Citizen science, EstuaryWatch, estuaries, Victoria, volunteers, quality assurance quality control and data.

Three components to designing successful citizen science

Piers Higgs[1]

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Abstract:

A successful Citizen Science project requires three primary components to be successful. Firstly, a compelling research topic focussed on an issue comprehensible by the broader community; secondly, an engagement strategy that communicates the issues and creates partnerships with scientists and the community; and thirdly, efficient, flexible technology to implement the program. Three Citizen Science projects in Western Australia illustrate various aspects of this design - Coastal Walkabout, Dolphin Watch and Prawn Watch. Each of these projects addresses conservation or environmental issues of interest to both researchers and the broader community, and each has identified methods to enable citizen scientists to learn and contribute to the outcomes of the project. In each case, the development of a mobile app has both enhanced the user experience and improved both quantity and quality of data being contributed to the project. Ultimately, data is a key outcome of a successful citizen science project. Not only must it be of high quality when captured but it must be easily accessible subsequently to both contributors and scientists. For community members this can complete a feedback loop and allow them to see the results of their efforts in a broader context. For scientists, the data must be available in a form fit for further analysis. A standard app design model and a shared standards-based data repository can also allow data to be integrated across projects.

Key Words

Citizen science, Design, Research Topic, Engagement, Technology

Development of Biodiversity Indicators and Effective Monitoring Programs for Community Based Carbon Credit Reforestation and Afforestation Projects – with Application in Ethiopia

Gregory Kerr[1]

[1]Natural Resources Eyre Peninsula, Greg.Kerr@sa.gov.au

Biography:

Greg is a behavioural ecologist who is working as the Regional Ecologist for Eyre Peninsula. As a part of this work he has developed and implemented a long term citizen science project to monitor bird diversity and abundance within bushland condition monitoring sites across EP. This has involved running ten week training programs for interested community members. Prior to this Greg work as a consultant ecologist. As part of this work he developed a citizen science biodiversity monitoring program that would address the needs of carbon credit programs implemented by World Vision. He subsequently applied this approach in Ethiopia.

Abstract:

World Vision Australia is involved in a range of community based carbon credit reforestation and afforestation projects, which as part of their compliance regime, require monitoring and reporting on impacts to local biodiversity over a 30-50 year project life. They sought a monitoring program that addressed practicalities of monitoring in a low budget cost effective manner in tropical regions with high, but poorly understood biodiversity, limited local knowledge and few specialist skills, while providing a scientifically valid outcome. For the communities to receive carbon credit payments they needed to demonstrate no nett negative impact on biodiversity every five years to meet Clean Development Mechanism (CDM) or Climate, Community and Biodiversity (CCB) standards. An effective monitoring program had not previously been developed to address these standards and employing consulting specialist to carry out surveys was cost prohibitive. World Vision needed a collaborative program that trained local stakeholders who remained involved in the medium to long-term, in turn training others, and which provided for effective data storage and interpretation, and reporting outcomes. The citizen science based model was subsequently implemented in two carbon credit projects in Ethiopia (Humbo and Soddo). The training program was effective in developing skilled local community members who carried out surveys using innovative avian monitoring protocols that addressed variable knowledge and skill levels among surveyors. Linking biodiversity to ecotourism and payment for ecosystem services (carbon) shifted how communities valued avian biodiversity. Three years of ongoing monitoring have resulted in the first payments of carbon credits to both communities.

Key Words

Project design, carbon credits, indicator taxon, MacKinnon List methodology, bird survey, community training, majority countries, tropical biodiversity, cross cultural challenges, data storage and analysis

Deliberate design must include audience research: Key considerations for marine citizen science projects in Australia

Vicki Martin[1], David Lloyd[1], Gretta Pecl[2], Les Christidis[3]

[1]Southern Cross University, vicki.martin@scu.edu.au
[2]Institute for Marine and Antarctic Studies, University of Tasmania
[3]National Marine Science Centre, Southern Cross University

Biography:

A social scientist with 20 years' experience in conducting social research on environmental impact and management issues, Vicki began her career at the CRC Reef Research Centre. Following this, she worked as a research consultant for universities and Crown Research Institutes for 15 years in New Zealand. Vicki is now undertaking her PhD in science communication, and is particularly interested in understanding the potential for public engagement in marine citizen science. For her research on this topic Vicki has conducted 110 interviews in 4 regions of Australia, followed by a national online survey which was completed late April 2015.

Abstract:

There is no citizen science without an engaged public. Yet little, if any, research has been done to determine how much public interest there is to participate. With increasing resources and effort going into citizen science projects, it is important to first understand if, why and under what circumstances or conditions the public want to become involved. This paper reports on an Australia-wide survey of 1145 marine users about their interest in marine citizen science. Using theories from social psychology and science communication, the online survey explored the interests, drivers and barriers for public participation in marine research. The results reveal very high interest, although differences between groups exist, and over 80% willing to volunteer several days (or more) a year to assist research. The type of research activities people were most interested in helping were collecting data, communicating findings, and analysing findings although between-group differences were found. Some of the perceived benefits were increasing my own knowledge, and increasing scientific knowledge. Other important considerations for project leaders include the ease of use of websites and apps, feedback from scientists, and which organisation the data is being collected by. Audience research such as this is usually overlooked but is an essential first step for the deliberate design of projects to enhance their effectiveness and engage broader audiences. By better understanding the interests of the target audience, along with their communication needs and preferences, citizen science planners will be able to tailor projects which result in greater impact for their investment.

Key Words

Public participation, social research, science communication, science engagement, marine science

The challenge of using citizen science to engage and empower a concerned community

Dave Mossop[1], Carolyne Boothman[2]

[1]EPA Victoria, david.mossop@epa.vic.gov.au
[2]EPA Victoria

Biography:

Over the past ten years I have established a career in ecological research across the private, not-for-profit and government sectors. My research has focused on freshwater and marine ecology, threatened flora and fauna, and the impacts of pollutants and land use on receiving environments. Through community engagement my appreciation of the value of citizen science grew significantly.

I have recently taken up the opportunity to establish and coordinate the EPA Victoria Citizen Science Program. The program centres on co-creating projects with citizens to provide new and meaningful data streams, leading to real and positive outcomes for the environment and community.

Abstract:

In February - March 2014, the Latrobe Valley in eastern Victoria was impacted by a serious coal mine fire at the Hazelwood Power Station. Burning for six weeks, the fire produced ash and smoke which affected several communities. Residents were very concerned about immediate and ongoing human health and environmental impacts, and questioned the way their local environment was being monitored. EPA Victoria received funding to conduct environmental monitoring following the fire to determine if there were any ongoing impacts. A citizen science program with affected communities within the Latrobe Valley was part of this monitoring program. The need to co-design the citizen science program with the community was identified from the outset to develop trust and empower people with the ability to design and conduct a citizen-based environmental monitoring program. A community reference group was established and through several workshops we jointly developed a project design incorporating mutual objectives for the community and EPA. To strengthen this partnership, co-monitoring of the environment has been achieved by EPA staff also conducting monitoring, which ultimately enabled co-interpretation of results involving comparisons of data. Engaging with a concerned community is likely to occur at the more challenging end of the citizen science spectrum. In this instance the challenge centred on finding what the community cared about and how citizen science could empower them. To maximise relevancy and participation, the key was to engage in an open and transparent way which allowed citizens to co-design a project that best suited their needs.

Key Words

EPA, engagement, empowerment, co-design, pollution, concerned community

A citizen science framework for biosecurity management

Natasha Porter[1], Sorada Tapsuwan[1], Iain Walker[1]

[1]CSIRO, Natasha.Porter@csiro.au

Biography:

Natasha Porter, BSc (NRM) Hons., UWA 1997, has been a Social Scientist with CSIRO since 1998. Her research topics have included the development of regional land and water management plans, climate change and catchment management, the influence of climate forecasting on land use planning, understanding decision-making in irrigation practices, drinking water aesthetics and satisfaction, creating a new water culture in major cities and behavioural intention for water reuse. These studies have focused mainly on developing social theory as well as integrating within multidisciplinary projects. Her expertise covers qualitative data collection and quantitative data analysis including attitudinal modelling.

Abstract:

Citizen scientists can be involved in biosecurity management many ways, including the early detection of an invasive species, and monitoring changes in an environment experiencing an incursion or where eradication activities are taking place. We reviewed six citizen science frameworks for environmental management – including the Guide to Citizen Science, the Citizen Science Toolkit and the Guide for Growing Extension Volunteer Monitoring Programs. These frameworks were chosen as they all provided a step-by-step guide to conducting a citizen science project. All were available online (as guides, toolkits, journal articles or reports), thus widely available to researchers, groups or individuals interested in citizen science. The framework structure was similar, with a combination of the following stages appearing in all - Planning, Development, Promotion and Publication, Recruitment and Training, Data Management, Feedback and Celebration. These frameworks are solid, having been developed over time, tested and adopted successfully in the area of environmental management. For greater applicability to the field of biosecurity management we suggest several additional aspects to be considered when planning a citizen science project: 1) understanding the motivational factors behind volunteer participation; 2) having a research platform where information about hotspots or incursions can be exchanged; 3) having a framework for rapid response action; and 4) having a code of conduct for managing citizen science programs. We propose a citizen science program framework that addresses these issues and increases the applicability of these citizen science frameworks in the area of biosecurity management.

Key Words

Citizen science, early detection, invasive species, motivation, rapid response, volunteer

POSTER SESSION 1: Citizen Science projects in Australia

School of Ants Australia

Kirsti Abbott[1], Nigel Andrew[1], Mark Elgar[2]

[1]University of New England, kabbott6@une.edu.au
[2]University of Melbourne

Biography:

Kirsti is an ant ecologist and science educator at University of New England in Armidale, NSW. After spending many years looking at tiny insects on tropical islands she now coordinates School of Ants Australia, an international node of the successful US project. In 2015 she is travelling around Australia with School of Ants and her family. To get her going on a good rant, ask her about the amount of time primary school kids get outside looking and learning about nature and science, or the general lack of enthusiasm for invertebrates these days.

Abstract:

School of Ants is a national citizen science project connecting citizens to their local ecology and generating new information on the diversity, distribution and diet of ants in Australian towns and cities. Ants are everywhere. Every Australian interacts with ants on a daily basis, which makes them a perfect candidate for citizen science. We lament the 'little black ants' in the garden, but those who most need to understand these ants cannot reliably pin an identity or ecological role on these ants across Australia; we rid our houses of what we perceive as pest ants, but what services are they really providing us, and which ants should we really be killing? School of Ants aims to embed into our idea of an education, academic scientific research and information about ants and their role in our urban ecosystems while citizens collaborate on the research themselves. To this end, we have an ongoing opportunity for collection of ants from food baits – anytime, anywhere across Australia. But we have also smaller, discrete projects, engaging with schools, individuals and organisations to help collect and analyse ecological information about ants in their backyards, school grounds and public spaces. In 2015 the School of Ants project is on tour. Schools and individuals conduct monthly synchronous collections and we deliver educational days to 10 schools across Australia. We've engaged directly with more than 60 students so far, received more than 200 samples and have registered collectors in all states of Australia. Join us at http://schoolofants.net.au/

Key Words

Ants, education, ecology, macronutrients, synchronous, little black ants.

Project Manta: partnering citizen science and manta ray research

Amelia J Armstrong[1], Asia O Armstrong[1], Michael B. Bennett[1], Lydie I. E. Couturier[1], Fabrice R. A. Jaine[2], Anthony Richardson[3,4], Kathy Townsend[2], Scarla Weeks[5]

[1]School of Biomedical Sciences, The University of Queensland
[2]Biophysical Oceanography Group, The University of Queensland
[3]Oceans and Atmosphere Flagship, CSIRO Marine and Atmospheric Research, EcoSciences Precinct
[4]Centre for Applications in Natural Resource Mathematics (CARM), The University of Queensland
[5]Moreton Bay Research Station, The University of Queensland

Biography:

Asia Armstrong recently graduated from The University of Queensland with a Bachelor of Marine Studies, Honours Class I. Her honours research looked at the feeding environment for manta rays at an aggregation site in the Great Barrier Reef and utilised a long term dataset provided by citizen scientists. Asia also maintains the database of sightings for manta rays in eastern Australian waters, engaging citizen scientists within this region.

Abstract:

Manta rays (*Manta alfredi*) are among the largest fishes in the world and are present throughout subtropical and tropical oceans. They occupy large home ranges, migrate seasonally and aggregate at predictable locations. Aggregation sites are convenient areas for data collection, where the animals use critical habitat and can be easily approached by divers. This provides a unique opportunity for scientists to work with many divers across multiple locations to answer questions associated with their movement and population dynamics. Tourism businesses such as dive operators have proven to be exceptionally useful, actively encouraging divers to become citizen scientists, and contributing to the collection of regular, long-term sighting and behavioural data at key aggregation sites. Manta ray species possess distinct ventral markings, unique and lifelong for each individual, providing the opportunity for non-intrusive mark recapture monitoring with the use of underwater photography. This characteristic, combined with the rise in affordability of compact underwater camera systems, the ease of image exchange across social media platforms, and the charismatic nature of manta rays, is ideally suited to engaging citizen scientists. In eastern Australia This mutually beneficial relationship between science and industry has led to the identification of >850 individual rays in the *M. alfredi* east coast population, enabling Project Manta to describe the distribution, seasonal movements and population dynamics for this species. Future work will engage tourism operators who frequent the outer reefs of the Great Barrier Reef and combine genetic techniques with current methods to estimate population size and movement.

Key Words

Mobulidae, Manta Ray, *Manta alfredi*, photo-identification, seasonal movements, aggregation, abundance, citizen science.

South Australian Conservation Research Divers (SACReD): Marine Species Research through Citizen Science Projects

Baker, Janine[1]

[1]Founder and Manager of South Australian Conservation Research Divers. jannebaker@bigpond.com

Biography:

Janine Baker has worked as a marine scientist in South Australia since 1990, in numerous fields of government and non-government research. In 2007, Janine founded the marine citizen science group South Australian Conservation Research Divers (SACReD), to assist grant-supported projects on rarely recorded marine species in South Australia. Janine was the South Australian coordinator for the national Marine Education Society of Australasia (MESA) for 3 years, until MESA ceased operation as an independent organisation. Janine has Bachelor of Science and Master of Environmental Studies degrees from University of Adelaide, and almost completed a PhD in marine ecology before turning her direction towards primary education. Janine is now in the 4th year of a part-time Masters of Teaching degree, and aims to specialise in curriculum development, special needs education teaching and tutoring, and cross-curriculum oceans education.

Abstract:

This poster discusses examples of research undertaken by marine citizen science group South Australian Conservation Research Divers (SACReD), a community-based group of divers and marine photographers which has been undertaking marine species research in South Australia since 2007. The group records rarely known marine benthic fishes and invertebrates in reef habitats, and produces illustrated, publicly available reports on the survey results. In recent years SACReD has grown to more than 30 members and associates, and collaborates with several citizen scientists from the Marine Research Group (MRG) in Victoria. Joint field trips between SACReD and MRG are run annually. Results of recent SACReD projects have included records of invertebrates not previously recorded anywhere else (i.e. “new”, undescribed species); tropical and subtropical species not previously recorded in SA; geographic range extensions for rarely recorded species previously known from very few records; and range extensions for south-eastern and western species not previously known from SA. Invertebrate specimens on loan, which represent new species found during SACReD’s field work, are being described by taxonomists from museums and other research institutions in various parts of Australia, Europe and USA. The main objective of SACReD’s projects is scientific discovery, which can contribute to public awareness, marine education and conservation of marine habitats. The group’s current projects aim to help foster a broader, public conservation interest in marine invertebrates, particularly reef-associated species, which are a large and little known group. Through research comes education, through education comes understanding, and through understanding comes appreciation.

Key Words

Marine citizen science, marine invertebrates

Coastal Citizen Science in Moreton Bay

Alix Baltais[1], Emma Watson[1], Simon Baltais[1], Debra Henry[1]

[1]Wildlife Preservation Society, debrahenry@wildlife.org.au

Abstract:

Situated in South-East Queensland, Moreton Bay is home to a diverse range of marine ecosystems including seagrass and mangrove communities. Whilst there is a growing awareness amongst the wider community of the value of ecosystems and their health and resilience, there is still substantial room for improvement. One strategy to overcome this is through citizen science initiatives; volunteer based citizen science pairs the collection of data with the education of the wider community, through the use of scientifically rigorous methods. Wildlife Queensland Coastal Citizen Science (WQCCS) is an amalgamation of multiple citizen science programs within Moreton Bay. WQCCS facilitates seagrass and mangrove monitoring programs whilst providing a platform for collaboration with the scientific community. The data obtained from these activities is frequently used in decision making for development approvals, in an annual report card on the health of waterways within the region, and has been widely requested by professional consulting bodies and other community groups. Though there are a number of challenges facing the growth of citizen science, there is a growing demand for the use of data collected through such initiatives. Identifying options to overcome these challenges can prove difficult, however WQCCS has initiated a number of activities utilising readily available technology, and are currently focusing on that already available to smart phone users. Citizen Science is an exceptionally rewarding area to be a part of, and the networks which WQCCS has formed in recent years are presenting some exciting opportunities for region wide collaboration in the future.

Key Words

Moreton Bay, Mangroves, Seagrass, Volunteers, MangroveWatch, JCU TropWater, Moreton Bay 2012 Data Summary, Brisbane Airport Corporation, Technology

Kangaroo Island / Victor Harbor Dolphin Watch -Citizen Science in action

Tony Bartram[1]

[1]Kangaroo Island / Victor Harbor Dolphin Watch

Biography:

The author, Tony Bartram, is a former teacher and school principal who retired to devote his life to protecting the marine environment and Cetaceans in particular, in the waters around Kangaroo Island. As well as coordinating the award winning Kangaroo Island/ Victor Harbor Dolphin Watch project for over 9 1/2 years, he has worked as a project officer for Whale and Dolphin Conservation: a leading global charity committed to Cetacean welfare. He has made presentations to a number of international conferences including the 2014 ICMMPA, WEEC, IPMEN and Australian Marine Mammals Symposium and various stakeholder groups nationally.

Abstract:

Dolphin Watch is an award winning community project in partnership with Whale and Dolphin Conservation, monitoring dolphin populations on Kangaroo Island since 2005 and Victor Harbor since 2011. Developing understandings of custodianship of these fascinating creatures and their habitats, dolphins are monitored unobtrusively, minimising impacts and behavioural change, collecting vital baseline data to inform management.

Scientists and dedicated volunteers of all ages collaborate on effective “Citizen Science” in surveys on Eco Tourism vessels or landbased monitoring. Using world’s best practice non - invasive photographic identification techniques, images and video identify individuals by distinctive dorsal fins and body markings. Vital data is recorded on movements and habitats, creating sustainable, longitudinal studies of extraordinary international significance.

Most species of dolphins are data deficient on IUCN lists with little understanding of home range, movements etc. hindering conservation efforts. They are very much at risk because of human impacts and data is needed to inform conservation efforts to ensure sustainability. Significant findings including mainland to island connectivity, changes to feeding regimes and prey species, non seasonal calving etc. are generating further questions and issues, with frequent new identifications indicating Kangaroo Island could be viewed as a “traffic island” in the middle of a migratory highway.

This is a brilliantly adaptable model which has been successfully replicated elsewhere, creating a common focus for galvanising cooperative effort. Focussing on an iconic, umbrella species allows for broadscale education about impacts and how to collaborate to mitigate anticipated effects.

Volunteers, scientists and dolphins……. truly a magical mix.

MicroBlitz. Science everyone can dig!

Deborah Bowie[1], Benjamin Moreira Grez[1], Deepak Kumaresan[1], Andrew Whiteley[1]

[1]The University of Western Australia, deborah.bowie@uwa.edu.au

Biography:

Deborah Bowie has been with the MicroBlitz project since its inception in March 2013 and is primarily responsible for the overall design, day to day operations and community engagement aspects of the project. Deborah is a passionate and creative educator who started her working life as a science teacher in the 1980's. Her career journey has taken her far beyond the traditional classroom setting and seen her involved in areas such as adult and indigenous education, curriculum writing and teacher mentoring. Immediately prior to joining MicroBlitz, Deborah was managing a United Nations, Education for Sustainable Development, project.

Abstract:

MicroBlitz engages citizen scientists, at base level, to register and receive a soil sampling kit, take a soil sample and send it back to the laboratory at the University of Western Australia where DNA sequencing and analysis reveals the amazing biodiversity that lays 'hidden' underground. Beneath one footprint it is estimated that there are 10, 000's of different bacterial species and 10 trillion individual cells.

The MicroBlitz poster presentation will include an overview of the project, detailing the following areas:

- What is MicroBlitz?
- The main aims of MicroBlitz
- How to participate in the MicroBlitz and what is involved.
- The main activities of MicroBlitz – including what happens in the lab.
- A sneak peak at results yielded so far.

Key Words

MicroBlitz, citizen science, collaboration, soil science, community engagement, DNA sequencing)

Volunteers supporting fisheries science in Western Australia

Joshua Brown[1], David Fairclough, Kim Smith, Karina Ryan

[1]Department of Fisheries Western Australia, Joshua.brown@fish.wa.gov.au

Abstract:

Monitoring fish stocks along Western Australia's large coastline of more than 20,000 km is a major challenge. As many fishery independent methods are too costly and logistically challenging to implement, the Department engages with recreational fishers, who volunteer their time to research projects within the Department of Fisheries' Research Angler Program (RAP). For the past 21 years, more than 100 fishers have contributed to the Tailor Angling Program by catching and releasing juvenile tailor in the Swan River, from which a juvenile recruitment index has been derived as a measure of relative abundance. For the past 10 years, more than 1,100 recreational fishers have recorded their catch and effort data for the Research Anglers' Logbook program and recently, around 6,000 recreational fishers were involved in two phone-diary surveys of their fishing catch and effort to produce state-wide estimates of recreational catch. For the past five years, over 500 fishers have voluntarily donated more than 20,000 fish skeletons of key species from their catch to the Send Us Your Skeletons program for biological analysis and stock assessment by scientists. In addition, recreational fishers have contributed to a number of fish tagging projects over the past 20 years that have provided valuable information on fish species stock structure, movement, growth and mortality. The successful engagement with the recreational fishing community created by the RAP, allows them to make a valuable contribution to the sustainable management of WA's aquatic resources, improves their understanding of the Department's work and creates a two-way exchange of information between the Department and the community.

Mapping essential habitat for the threatened Glossy Black-Cockatoo using citizen science data

Guy Castley[1], Liz Gould[2]

[1]Griffith University
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Biography:

Liz is passionate about all things wild and wonderful in South East Queensland, and the world! A childhood spent exploring overseas,created inspiration and appreciation for Australian wildlife; values Liz endeavours to instill into her children.

Over 25 years experience working with community, governments and industry, has also led to a strong belief in collaborative partnerships and a great appreciation of the role individual citizens have in advocating for and participating in environmental science.

Liz has led the development and implementation of many exciting initiatives that protect threatened species and habitats, and that achieve broader biodiversity conservation outcomes.

Abstract:

The Glossy Black-Cockatoo, *Calyptorhynchus lathami*, is a threatened species with a relatively widespread distribution across eastern Australia. The species has very specialised habitat requirements and definition of these areas is critical to informing conservation and management. In 2010 the Glossy Black Conservancy established an online data portal to improve knowledge and understanding of the distribution of this species in south-east Queensland and north-east New South Wales through the collection of citizen science data. The data portal enables citizen scientists to report sightings of birds as well as evidence of their feeding activities, as these are also reliable indicators of habitat use. Each record submitted is validated before being released on a scalable mapping platform. Validation is completed by Conservancy members who contact recorders, but also through an auto-validation process once citizen scientists are recognised as being reliable in their species identification. Almost 1900 records have been submitted online by over 450 citizen scientists since 2010, including sightings of more than 6000 Glossy Black-Cockatoo and over 200 feed trees. The data portal has improved the spatial accuracy of these citizen science data by automating the capture of location information. The improved database allows more complete analysis of cockatoo demographics. These records and high precision records from other databases have been used to develop essential habitat maps for the south-east Queensland bioregion. Complementary citizen science initiatives, such as the annual Glossy Black-Cockatoo Birding Day, assist to raise awareness, engage citizen scientists and provide a regional snapshot of cockatoo numbers and distribution.

Key Words

Glossy Black-Cockatoo, data, citizen science, bird, habitat, mapping, models, community

The South Australian Murray Darling Basin citizen science program - taking it from the masses

Sylvia Clarke[1], Renata Rix[1]

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Biography:

Sylvia Clarke has been the Project Officer - Citizen Science with Natural Resources SA Murray Darling Basin since January 2015. She came to this role after working with a range of community groups and Natural Resource Management Boards and having experience in data analysis of community collected data, plus a PhD in ecology looking into the potential use of terrestrial invertebrates (ants and spiders) as indicators of habitat recovery in semi-arid environments.

Abstract:

A plethora of valuable environmental data is collected by groups and individuals across the South Australian Murray Darling Basin but its potential for environmental impact and resource condition monitoring has not yet been realised. Data has been stored on a range of media, in various locations, with little sharing of information or data analysis and evaluation. Through the provision of equipment and training in data collection and analysis, and the development of on-line data portals, a vibrant and purposeful citizen science program is emerging. Current projects see the public collecting data on surface water quality and macroinvertebrates, as well as bird and bat species distribution across the region. Data is self-entered on-line, is vetted by a moderator, can be viewed and downloaded through the internet, and ultimately becomes part of state and commonwealth government databases including the Atlas of Living Australia and Bureau of Meteorology. This provides participants with instant feedback and awareness of their role in region-wide projects. Data is also analysed periodically and reports are sent to participants to review and decide on relevant actions. Systems are now being established with organisations such as the Environmental Protection Authority to enable participants to trigger authorities into action to protect their local environment. The level of interest and capacity for involvement in environmental monitoring in this region is staggering. The challenge is to ensure the projects deliver data of use to community members, the Natural Resource Management Board, and any other interested parties.

Key Words

Citizen Science, Birds, Bats, Water Quality

Canberra Nature Map – collection, management and validation of citizen plant data

Aaron Clausen[1], Michael Mulvaney[2],

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[2]Environment and Planning Directorate, ACT Government, michael.mulvaney@act.gov.au

Biography:

Dr Michael Mulvaney has a thirty year history of working for all levels of government providing environmental advice within development and planning decisions. Such advice needs to relate to a knowledge of what wildlife may be affected, either in a negative or positive way. Citizen science can significantly add to that knowledge, as evidenced by the 1,500 rare plant records reported in the ACT as part of a community -government program, that Michael, together with Aaron Clausen has overseen during the past year.

Abstract:

A challenging issue of citizen science is to engage as many people as possible, but in such a way that all contributors feel that they are up to the task, while still retaining a high level of confidence in the validity of the data. CanberraNatureMap was originally established to collate ACT rare plant records, from about 150 people with a range of expertise, including novices. An observation is reported by uploading an image from a smartphone or GPS enabled camera. The GPS location, date and author are automatically obtained during the upload. An observer also records abundance data and can suggest identification or leave it as unknown. Thirty-five experts moderate data entry and species identification for either a particular area (e.g. Black Mountain) or a plant group (e.g. Ferns). An observer is notified by email once an identification is confirmed. Various mapping and database tools enable contributors to track their own records, view species distributions, or receive records for a particular reserve. 4,500 records have been lodged in the first trial year, including 1,500 well validated rare plant locations (30% of the total number of records from the last 100 years). Identifications include dozens of plant not reported in the ACT for at least 50 years, first time records of high risk weeds and new populations of rare ACT endemic species. Community use and request has seen the site extend to cover all plants, reptiles and frogs. Butterflies and birds are next in line.

Key Words

Citizen wildlife data, collection, management, validation

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Caught on camera, monitoring the response of mammals to fire

Ms Christine Connelly[1], Ms Caitlin Griffith[1]

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Biography:

Christine Connelly is the NatureWatch Coordinator at the Victorian National Parks Association. Christine works part-time coordinating volunteers to undertake community-based monitoring projects at various locations in Victoria. She works with scientists, land managers and local community groups to ensure that the projects are scientifically robust, relevant to land managers and engaging to the community. Christine was a volunteer Team Leader with NatureWatch since it began in 2007. In her spare time Christine is pursuing her own research interests, completing a PhD in wildlife ecology.

Abstract:

In Australia, our understanding of the impacts of fire on fauna is limited and we need to improve our knowledge of these impacts. 'Caught on Camera' is a community-based project exploring the response of mammals to fire in Wombat State Forest and Bunyip State Park in Victoria. Bunyip State Park was extensively affected by the 2009 Black Saturday wildfire.

The project was established in 2012 to run for over 10 years and was developed collaboratively with scientists, land managers and community groups. Citizen science volunteers use motion-sensing cameras to monitor mammals at these locations annually. Volunteers from VNPA and local community groups are trained in monitoring techniques and manage 50 monitoring sites where cameras are set-up and left for 3 week periods. Data is catalogued by volunteers, analysed by project scientists and provided to land managers. The fascinating images also provide material for engaging wider audiences through social media and publications.

Our collaborative approach has enabled a robust project design with committed partners. While the project is focussed on long term outcomes not yet realised, our current achievements include the first records of Southern Brown Bandicoots (EPBC listed) in Bunyip State Park since 1981, resulting in protection of key habitat areas; development of immediate report back systems to land managers for feral and threatened species; production of three scientific reports; training and participation of over 100 volunteers; and high quality data collected on the response to fire of 15 native and 7 exotic mammals.

Key Words

Collaborative research design, Motion sensing cameras, Mammals, Fire, Bunyip State Park, Wombat State Forest

A health check-up for the corals of the Solitary Islands by the medical staff from SURG

Robert Edgar[1], Nicola Fraser[1]

[1]SURG

Biography:

Nicola has recently completed her first university degree: Bachelor of Marine Science and Management, with Honours, through Southern Cross University. She has been involved in citizen science since first joining SURG in 2006 and this inspired her to enrol at university. Marine science has developed into a serious passion for Nicola and she has spent most of the past 12 months researching biodiversity on rock platforms in the Solitary Islands Marine Park.

Abstract:

The Solitary Islands Underwater Research Group Inc. (SURG) is comprised of citizen scientists from the Coffs Harbour area and the Clarence Valley. SURG was funded by the NSW Environmental Trust to research the health of coral communities in the Solitary Islands Marine Park. The CoralWatch protocol, developed by the University of Queensland, was used to conduct 12,805 assessments of coral colonies. Coral health can be readily observed and monitored by well-trained citizen scientists using this protocol. Coral communities at 25 sites adjacent to five islands were surveyed from summer 2012 to summer 2015 inclusive and 59 community members spent approximately 1400 person-hours undertaking activities related to the study. In common with other studies, inshore sites supported healthier corals than offshore islands for three of the families studied: the Acroporidae, Pocilloporidae and Poritidae. Additionally, a clinal gradient was evident in the health of corals in the Pocilloporidae and Poritidae families. Corals in these families were generally healthier in the south and less healthy towards the north end of the surveyed area. There was no evidence of widespread bleaching events in the Solitary Islands Marine Park and all common coral families were generally in good condition, with the exception of the Pocilloporidae and some members of the Poritidae at offshore islands during summer 2015. However, the recent prediction of a prolonged and intense El Niño event commencing later in 2015 does not bode well for local coral communities, with lengthy periods of high water temperatures potentially leading to a severe and widespread bleaching event.

Key Words

CoralWatch, citizen science, coral bleaching, El Niño, Solitary Islands Marine Park

The Canberra Ornithologists Group's (COG) Gang-gang cockatoo survey - Citizen science in action

Ms Kathy Eyles[1] Chris Davey [2]

[1]Fenner School of Environment and Society Australian National University, kathy.eyles@anu.edu.au
[2]Canberra Ornithologists Group

Biography:

Kathy is a PhD student undertaking social research in Canberra exploring how urban people value nature. She is a member of the Canberra Ornithologists Group and was engaged on a part-time basis to manage the communication and community engagement for the Gang-Gang cockatoo survey. Learnings from local community engagement in the survey will form part of Kathy's PhD research. Prior to embarking on her research, Kathy has worked as an environmental planner, policy analyst and natural resource management facilitator. Kathy is an active community volunteer with experience in social housing organisations, neighbourhood fire units and urban landcare groups.

Abstract:

The Gang-gang cockatoo survey is a citizen science project initiated by the Canberra Ornithologists Group (COG) in 2014 to celebrate 50 years of birding in the ACT. The Gang-gang is the ACT's bird and faunal emblem and the emblem of COG and the ACT Parks Service. Surprisingly, little is known about this popular bird and due to habitat loss across its range, the Gang-gang is listed as vulnerable in NSW. This ambitious project sought to shed light on the population and distribution of the Gang-gang in the COG region, covering the ACT and immediate surrounds in NSW.

The survey ran for 12 months and involved over 500 participants. The survey had 2 parts: observers reporting daily sightings of Gang-gangs; and four blitz style week-long 'Muster' counts held in May, August, November 2014 and February 2015 to record the presence and/or absence of Gang-gangs at a site chosen by the observer. Community participation in the survey was enabled by the development of a web portal in the CSIRO's Atlas of Living Australia. This allowed participants to map and enter their sightings online. Paper data forms were available as an alternative. The survey was communicated in a fun and positive light with good coverage in print media and on local radio and TV.

The survey has yielded important information about the distribution of the Gang-gang and its habitat and also learnings about community engagement. Survey reporting will consider the implications for habitat management and potential for future biological research about the Gang-gang cockatoo.

Key Words

Citizen, science, survey, community, habitat

MyPestGuide – Building the 'BEST' Biosecurity Engagement and Surveillance Tool

Laura Fagan[1], Rob Emery[1], Rosalie McCauley[1], Darryl Hardie[1], Nichole Hammond[1], David Cook[1], Dominie Wright[1], Jeff Russell[1,2], Nicolas Garel[3]

[1]Department of Agriculture and Food Western Australia, Laura.Fagan@agric.wa.gov.au
[2]Plant Health Australia
[3]ngperceptive

Biography:

Laura is a consistent contributor of extension and development material delivering scientific information to the WA biosecurity sector and is currently supporting the development of the Royalties for Regions e-surveillance and diagnostic systems for the WA grains and grape industries which will deliver data to support export market access and facilitate investigations of new or exotic pests and diseases. She has wide experience in ecological and applied entomology as well as integrated pest management studies in the agricultural and horticultural industries within Australia, New Zealand and Canada.

Abstract:

The MyPestGuide mobile app is a simple and cost effective community engagement and surveillance tool. It was developed to encourage people to report observations of common, unusual or suspected exotic pests to the Department of Agriculture & Food in Western Australia (DAFWA). MyPestGuide includes a comprehensive pest identification guide and a reporting tool linked to an online database which is monitored by DAFWA staff. Responses which confirm the identification and risks posed by the pest are communicated back to the user's device and email, giving the user direct communication with DAFWA's experts as they are helped to identify and manage pests commonly affecting export industries, including the beneficial species that may help to control pests, species that appear similar to exotic pests, as well as species which are a biosecurity threat to Australia's overseas markets. The archived information is used to support farm biosecurity and protect the natural environment. In addition, to ensure access to overseas markets is maintained and to build our access to new markets, MyPestGuide reports are also used to infer Australia's pest-free trading status, supporting claims of freedom from certain pests and diseases. These markets provide the greatest gains for the Australian agricultural sector, for example, and are therefore critical to an industry which provides over $3 billion to the Western Australian economy. Since its launch in August 2015, 450 reports were verified by the MyPestGuide team of experts, including the detection of one new exotic pest to Western Australia and one new exotic pest to Australia!

Tree Huggers: citizen science in forest carbon studies

Nick Fitzgerald[1]

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Biography:

Nick Fitzgerald established the Community Carbon Accounting project while working as science coordinator at The Wilderness Society Tasmania. He has since continued to coordinate the data collection and analysis in a voluntary capacity. Nick has worked as a conservation planner and ecologist for government and NGOs. He is currently undertaking a full time PhD at the University of Tasmania on the plant ecology of subantarctic Macquarie Island.

Abstract:

Forest carbon studies typically rely on measurements of trees and coarse woody debris. In heterogeneous mature forests such as Tasmania's tall wet forests a large number of measurements are required to account for spatial variability and structural complexity. This data collection is laborious and often challenging due to site conditions including masses of coarse woody debris.

The Wilderness Society (Tasmania)'s Community Carbon Accounting project has engaged volunteers to make and record measurements in the forest, using a well-defined methodology. Data standards are established by basic training and ongoing supervision. With up to 30 people working in small teams, hundreds of trees and fallen logs could be systematically measured in a day. The on ground work effort required to collect a useful amount of data in these structurally complex forests is well suited to a participatory field work model such as this.

Participants have measured thousands of trees and logs in more than 40 plots. The data were analysed using standard procedures to estimate carbon stocks and subsequently published in the scientific literature. This work provides an important contribution to the relatively data poor understanding of carbon stocks in these tall wet forests, which are amongst the highest values recorded globally.

Key Words

forest, carbon, data collection

Developing guidelines towards a nation-wide Citizen Science koala conservation project

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Biography:

Emily Flower is an Honours student currently studying at Griffith University in Brisbane, Queensland. During her thesis, she looks to develop guidelines for a successful Citizen Science project at a regional-scale, with the intention of refining these specialised guidelines and applying them at a national scale. Emily is creating her own Citizen Science project to test the success of these guidelines, improving on them with each iteration. The project aims to understand more about the presence of koalas in the Greater Brisbane region and to help address the causes for their population change.

Abstract:

Due to the rapid decline of koala numbers in northern NSW and southern QLD, the Australian Government has recently listed koalas as “vulnerable to extinction” in this bioregion. Koalas tend to have an unevenly clumped distribution, which combined with specialised habitat requirements, relatively low population numbers and their low detection rate, poses challenges when monitoring population and distribution trends. Citizen Science may prove to be useful for monitoring species with a sparse distribution, such as the koala, by attracting a large number of volunteers capable of monitoring at a broad spatial range and collecting more data in less time than professional scientists.

Through a critical assessment of multiple Citizen-Science projects, this study will create specific guidelines for the implementation of a regional-scale Citizen Science project, including, but not limited to, the addition of new technologies and scientific feedback for the volunteers; with an interest in retaining participants for future studies. This project will run over a longer period than previous studies to allow for the collection of a greater dataset, in addition to the analysis of historical data for koala distribution comparisons.

Citizen Science should be considered when studying animals like the koala, which are easily identified but difficult to locate due to their sparse distribution. The iterative nature of this project, owing to the feedback loop with volunteers, should enable these developed guidelines to be refined and applied to koala projects at a national scale.

Key Words

Citizen Science guidelines, Koala distribution, Koala monitoring

Empowering the Citizen to become Scientists - Observations from a Citizen Science Experiment

Ria Follett[1]

[1]Macquarie University

Biography:

Ria Follett has a B Sc (Hons 1) from Sydney University and a PhD on artificial intelligence from University of NSW. Following a successful career in the Health Information Industry, including being involved in two start-up companies, she has returned to her research roots at Macquarie University. Her current interest is to encourage citizens to think more like scientists, and she is running a citizen science project in aquaponics to investigate how citizens research individually by conducting their own experiments as well as how they research as a group using shared data.

Abstract:

Many citizens experiment with new technology, and their interests in these technologies can be harnessed in citizen science projects with the potential of creating new knowledge. Aquaponics is a method of growing fish and plants together in a mutually beneficial relationship. Although most aquaponic systems are small and built with the aim of providing fresh home grown fish and vegetables, this technology has the potential of transforming the aquaculture and hydroponics industries so that together these industries can become more sustainable. As only a few scientific studies in aquaponics have been published, knowledge about this technology relies on citizens experimenting at home and sharing information in blogs and forums. A citizen science project was developed to collect structured data from individuals experimenting with aquaponics so that various claims could be tested. A survey determined what plants and fish were growing successfully and a diary was kept of system inputs and outputs in order to determine the overall sustainability. Citizens from 9 countries grew 39 different species of plants, mostly successfully, with basil, tomatoes and lettuce being the most common. Fish included both edible fish such as trout, barramundi and catfish, as well as ornamental fish such as goldfish and koi. The diaries showed that aquaponics required a third less water than conventional agriculture, suggesting its future place in the agricultural landscape.

Key Words

Aquaponics, Citizen Science, Home based Experimentation

The Evolution of Reef Watch SA

Alex Gaut[1]

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Biography:

Alex is currently the Biodiversity Program Manager at Conservation SA, managing multiple award-winning conservation programs, including two marine conservation programs and is a senior manager at CCSA. She has a background in marine science, marine education and marine conservation and undertaken a variety of roles in ecotourism, on-ground conservation, collection management, marine mammal autopsies, grant assessment, research, teaching (school and university) and science communication. Alex has experience on a range of committees for conferences, fisheries, education, community engagement, coastal water quality and as an award judge. Alex believes that alone we are a drop but together we are an ocean.

Abstract:

Reef Watch SA was one of the first marine citizen science programs in Australia and, almost 20 years later, is still running. It is a multi-award winning program with great respect and renown in South Australia. Since 1997 when it started with only subtidal monitoring, it has also developed an intertidal monitoring program and the 'Feral or In Peril' program. As the program's scope has expanded from subtidal reef monitoring to intertidal monitoring to marine biosecurity and threatened marine species, and from monitoring to engagement, so has its stakeholder base expanded from divers, to boat owners, recreational fishers and other volunteers and agencies interested in coastal and marine areas. Reef Watch SA has also assisted and worked with other marine citizen science programs due to its longevity and experience. The program has continued to refine its methodologies to increase data quality, whilst maintaining data contiguity and adhering to non-destructive, internationally accepted survey techniques. Significant achievements include a major ten year report and data analysis, a PADI-accredited training course, winning multiple awards, numerous media stories, finding the first marine pest on Kangaroo Island, contributing data to the planning of SA's marine park network, exposure to more than 30,000 people, involving more than 10,000 volunteers and more than 15,000 dive hours; all of which has been achieved on less than $2 million funding. Challenges have included scientific support, funding, relevance, recruiting and retaining volunteers, data management and competing with a growing number of citizen science programs.

Key Words

Marine, temperate reefs, divers, marine pests, Reef Watch, SA

The River Guardians Program – using technology to connect people with the Swan Canning Riverpark, Western Australia

Marnie Giroud[1], Piers Higgs[2]

[1]Swan River Trust
[2]Gaia Resources

Biography:

Marnie Giroud is the River Guardians Program Manager at the Swan River Trust. Her 13 year career as a teacher specialising in environmental education, art and media assists her current role educating and engaging with community on river conservation.

Her passion for wildlife is evident through her extensive voluntary commitments spanning 15 years including:

- assisting Perth Zoo as a Docent and education consultant
- rehabilitating and researching native wildlife
- forest and wildlife rescue in the Amazon jungle
- producing and presenting the Wild Things TV segment for the Foxtel network, airing across two countries

Abstract:

River Guardians connects members with the Swan Canning Riverpark and the people and programs protecting our rivers. Members can take part in free river events, training to help protect our rivers, or volunteer as a citizen scientist for our flagship project - Dolphin Watch. The program and projects are underpinned by recognised scientific (both biological and social), environmental education and behaviour change principles.

The Dolphin Watch project presented in this paper is a partnership between the Swan River Trust, Murdoch and Curtin Universities. Developed as a collaborative, citizen science research and education project, it feeds into the Coastal and Estuarine Dolphin Research Project. Dolphin Watch has trained close to 1000 citizens to monitor dolphins and is the first community project monitoring dolphins in the Riverpark.

The project uses information and communication technologies (ICT) as a core method to reconnect people with the Riverpark. Citizens are engaged and trained to monitor the estuary using mobile phones, specifically tailored mobile applications (“apps”) and online web forms. Data reliability is a priority and new technologies are helping to reduce errors in reporting using GPS and error reporting built into operating systems.

Dolphin Watch volunteers attend events and activities designed to foster a strong sense of community. The project has received more than 15,000 volunteer reports and the data received to date – along with the research into the use of the technologies – has been successful in reclaiming the sense of place amongst participants in this digital age.

Key Words

Behavioural change, biological science, collaborative, citizen science, data, environmental education, Mobile App, social science

Penguin Watch

Tom Hart[1], Caitlin Black[1], Colin Southwell[2], Jane Younger[3]

[1]University of Oxford
[2]Australian Antarctic Division
[3]University of Tasmania, Jane.Younger@utas.edu.au

Biography:

Jane is a PhD candidate at the Institute for Marine and Antarctic Studies, researching the impacts of climate change on emperor and Adelie penguins. She is also a conservation officer and committee member for BirdLife Southern NSW. The poster on the Penguin Watch project is presented on behalf of colleagues from the Australian Antarctic Division and the University of Oxford.

Abstract:

There are numerous threats to marine predators in the Southern Ocean: namely climate change, fisheries, and direct human disturbance. In locations away from scientific bases, data on populations of predators is scarce and, consequently, huge gaps remain in our understanding of the Antarctic ecosystem.

By establishing a camera network in the Southern Ocean we aim to study penguin populations that have never before been observed because of their remote locations. However, along with the infinite possibilities of cameras as a monitoring tool, comes an enormous amount of data in the form of hundreds of thousands of images. Citizen science has allowed us to convert this massive database of information into a data set that we can use to answer hypotheses.

Launched in September 2014, Penguin Watch asks the public to go online and count penguins in images taken by remote cameras at 100 colonies. The public response has been astounding. In just six months, nearly two million image classifications have been completed by 19,000 volunteers. The project has already led to new insights into penguin behaviour, such as the discovery that penguins' dark guano facilitates melting of ice, allowing nesting sites to be established earlier in the spring. In addition to the scientific outcomes, Penguin Watch has been very successful at involving the community in conservation. Our citizen scientists are highly engaged and interested, with volunteers actively participating in discussion boards in which they ask questions about the images and can flag interesting or unusual behaviours.

Key Words

Penguins, Antarctica, conservation, camera monitoring

CoralWatch - citizens as end users of coral bleaching data

Kyra Hay[1], Diana Kleine[1], Justin Marshall[1]

[1]CoralWatch, Queensland Brain Institute, The University of Queensland, k.hay@uq.edu.au

Biography:

Since completing my PhD in Marine Science at the University of Queensland I have worked in different locations and roles within coral reef science. Through these experiences, I have developed a keen interest in the education and engagement of the community in marine science. I joined the CoralWatch team on a casual basis in 2014 and am excited to now move into the broader role of Project Manager. My personal research interests include the role of herbivory in marine environments and the ecology of mesophotic coral reefs.

Abstract

CoralWatch integrates citizen science monitoring of coral bleaching with education about reef conservation. CoralWatch developed a tool that standardises changes in coral colour, providing a simple way for people to quantify coral bleaching without formal training: the Coral Health Chart. The chart was developed using laboratory and field validation techniques in 2003. Since then, CoralWatch citizen scientists, school groups, conservation groups, dive centres and scientists have collected data from 70 countries. This data is freely available from the CoralWatch database and the capacity of the database to accurately determine bleaching events has been validated. Additionally, CoralWatch has produced a range of educational materials. Through the combined distribution of the Coral Health Chart and educational resources, the CoralWatch project aims to provide citizen scientists and other end users with a simple and accurate tool to monitor coral reefs and interpret their own data. Unlike the majority of citizen science project designs, in which citizens collect data for scientists to analyse, CoralWatch has been designed to provide users with a flexible tool that can be used in a variety of ways by all end users, from citizens through to scientists. This approach does not fit the usual modal of citizen science projects and poses unique challenges and rewards that will be discussed.

Key Words

CoralWatch, project design, end users, education.

The Atlas of Life in the Coastal Wilderness - a regional biodiversity project

Libby Hepburn[1]

[1]Atlas of Life in the Coastal Wilderness

Biography:

Libby has been a teacher, business advisor and entrepreneur. She has established and managed a fishermen's co-op of 60 boats and built the biggest shellfish purification tanks in Europe (that was a while ago). Since coming to Australia she worked for 8 years establishing the Sapphire Coast Marine Discovery Centre and more recently the Atlas of Life in the Coastal Wilderness project. Currently on the Establishment Board for ACSA she continues to work for the widespread engagement of community with scientists in science and environmental stewardship and enjoys snorkelling, bioblitzes and working meaningfully with good people.

Abstract:

Begun as a quest to engage the community and create long term coastal species records, on deciding to use the capabilities of the Atlas of Living Australia(ALA) database, this project developed to encompass records of all biodiversity in our region. The project is an exemplar for other regional communities of interest, having developed a suite of initiatives and successful collaborations in the first three years of its life.

The poster will show the aims and structure of the project and its sub-projects, the data collection processes, the network of collaborating organisations, scientists and communities engaged, education and training successes (eg. Bioblitzes) and database interface issues. This is a regional project that has the potential to create a powerful dataset of species records and to engage communities of interest over the long term to build a meaningful resource, valuable to scientists and our community. The power and sophistication of the ALA is an exciting yet cumbersome tool for a community group.

There are people who are interested in biodiversity in all communities. Our project will be of value to others as it demonstrates the possibilities and pleasures of coming together for long term contribution of records, and indicate some of the successes and barriers to growth that are likely to occur. If it encourages others to undertake similar projects, we can develop a network of biodiversity recording hubs that will be even more valuable to scientists over time and encourage them to work more with us.

Key Words

long term recording, wide community engagement, sophisticated database, valuable scientific resource

Growth Monitoring of 90 Species of Trees: quality Control, Analysis and Diversity of Volunteers.

Roger Hnatiuk[1] and Cris Brack[2]

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[2]Australian National University

Abstract:

The National Arboretum Canberra, at less than 10 years age, provides a unique opportunity to study tree growth in a changing climate. There are over 120 tree species in 104 Forests, focussing on rare, threatened or iconic species. Documenting their early growth stages, which has seldom been done, while setting up a framework for monitoring over the coming decades and centuries is the focus of this project. These growth rates and sizes are important characteristics of species of use in urban horticultural settings: street trees, urban parks and home gardens. This was an immediate practical issue of the Arboretum. Setting up a system that would answer visitor and management questions about how large, how fast and how well the trees were growing was a needed outcome. With just under 50% of the species ranked as threatened in the IUCN Red Book, performance of these ex situ populations needs to be closely followed. 90 Forests, amounting to about 2700 individuals, are being monitored annually, using a rigorous statistical framework, by teams of about 40 volunteers and students. Procedures for controlling the quality of field procedures and data collected by so many people is an important issue in this Citizen Science project. In just the last 5 years, changes in digital image and data recording via apps are providing opportunities and challenges. Making data and results publicly available is now essential.

Key Words

Citizen Science, National Arboretum Canberra, quality control, changing technology, tree growth, climate change

Volunteer monitoring plays a vital role in community-based landscape restoration project

Sarah Hnatiuk, Ian Rayner[1]

[1]Greening Australia, sarahhnatiuk@yahoo.com.au

Biography:

Sarah Hnatiuk has maintained a lifelong interest in native vegetation, and for the last ten years has volunteered her skills and enthusiasm to several organisations including Greening Australia and Parkcare groups in tasks such as vegetation assessment, monitoring, data entry, analysis and reporting.

Abstract:

In January 2003, bushfires burned through the forests of the ACT and into the suburbs of Canberra, taking the lives of four people, destroying homes and burning over two-thirds of the ACT. Following these fires, Greening Australia and the ACT Government formed a partnership to engage the Canberra community in regreening the fire-affected areas. Over the past decade 15,000 volunteers from the ACT region have helped plant over 500 hectares with 306,343 seedlings.

Greening Australia undertook to monitor the survival of the seedlings to establish how successfully volunteers are able to carry out large-scale rehabilitation. The monitoring itself was also carried out by volunteers, testing their capacity to collect, manage, analyse, and report on data.

108 monitoring sites have been established across the catchment, tracking the progress of 2160 individual seedlings.

The seedlings were monitored for the first three years after planting. The results demonstrated that volunteers could be motivated to collect, manage and analyse data over the long term. Their efforts showed that:

- the greatest mortality occurred during the first year after planting
- we achieved average survival of 77.9% after 1 year across all plantings 2005-2012
- there was variation among species in how well they survived
- there was natural regeneration of native shrubs and some weeds, particularly blackberry.

This project shows what a fantastic resource volunteers are, both for landscape-scale revegetation and from a citizen science perspective.

Key Words

Volunteers, monitoring, landscape restoration

The Weed Spotters' Network Queensland: involving citizen scientists in the early detection of new and emerging weeds

Melinda Laidlaw[1], Ailsa Holland, Gordon Guymer

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Biography:

Melinda Laidlaw coordinates the Weed Spotters' Network Queensland, a citizen science collaboration between the Queensland Herbarium and Biosecurity Queensland. Weed spotters are community members trained to detect new and emerging weed threats in their regions.

Abstract:

Weeds cost the Australian economy $4 billion each year in lost agricultural production, management and control activities. Our natural ecosystems, flora and fauna are also adversely impacted, as is human and animal health. A significant time lag can exist between the initial naturalisation of a non-native species and its expansion to cause significant economic, environmental and social impacts. Detection of a new weed in the early phases of expansion via active surveillance can make the difference between achieving eradication or inheriting an ongoing, costly and time consuming management issue.

Members of the Weed Spotters' Network Queensland are involved in active surveillance for new and emerging weed threats across the state. Members are trained to help find, collect and document new occurrences of potential and existing weeds at an early stage. Weed specimens are sent by members to the Queensland Herbarium for formal identification and where appropriate, incorporation into the Herbarium collection. This allows new weed incursions to be identified, mapped and notified to Biosecurity Queensland and local government staff so that appropriate and timely action can be taken. This data also allows spatial and temporal monitoring of weed incursions. The network currently has 21 volunteer regional coordinators and over 900 members across the state. Members contribute to the notification of incursions of between 50 and 100 declared weeds, as well as the incorporation of many hundreds of specimens into the Queensland Herbarium's collection each year.

Key Words

active surveillance, declared weeds, early detection, eradication

Can Abalone stock assessment be improved with the use of citizen science?

Grant Leeworthy[1]

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Abstract:

Constraints on the certainty of abalone assessments often revolve around the assumption that these fisheries must be 'data poor'. Considering recent success in crowd sourced image analysis in the scallop fisheries in Eastern USA, we look at ways we can engage citizen science in increasing certainty of estimates for abalone abundance and therefore the confidence in direct management decisions.

Evolution of the Reef Check volunteer reef health monitoring program in Australia

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Biography:

Jennifer has been working on environmental science, community engagement and science communication for more than a decade. Inspired by her first Indo-Pacific experience in Palau, she moved to Australia to pursue a career that unites science and education to protect our oceans and has been involved with Reef Check Australia since 2008. Since then, she has successfully implemented a new subtropical rocky reef monitoring program in South East Queensland; seen the expansion of RCA monitoring coverage to more than 40 new reef sites; designed volunteer training and data collection materials and supported the development of multiple marine citizen science initiatives.

Abstract:

Reef Check was launched in 1996 as a volunteer, community-based monitoring program designed to measure the health of coral reefs on a global scale. The Australian teams are part of a worldwide network of thousands of trained volunteers who monitor and report on reef health in more than 90 countries using the standardised Reef Check scientific survey method.

This presentation will outline a brief summary of the ongoing evolution of the Reef Check Australia volunteer reef health monitoring program. Established in 2001, the global Reef Check program was reviewed and revised to adapt to the unique circumstances of Australia, with the goal to maintain protocol cohesiveness for comparison, but also include additional indicators relevant to the unique science and management context. The case study will offer examples of the benefits and challenges of global monitoring protocols, discuss the RCA process of moving from data collection to data applications and highlight the need for strategic flexibility to adapt to stakeholder needs.

Key Words

Reef, monitoring, citizen science, reef health

Upper Murrumbidgee Waterwatch – CHIPing away at a better reporting system

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[2]University of Canberra

Biography:

Ms Woo O'Reilly is the regional facilitator for the upper Murrumbidgee Waterwatch program. It has been running in the ACT region since 1995 and covers the Murrumbidgee catchment upstream of Burrinjuck Dam near Yass, an area of more than 13,000km^2.

Abstract:

Waterwatch has long been known in the citizen science community for its role in engaging the community to monitor, raise awareness, and protect our local waterways. A key output for Upper Murrumbidgee Waterwatch (UMWW) in the ACT region is the annual Catchment Health Indicator Program (CHIP) report. This provides a numerical score of waterway health using data collected by Waterwatch volunteers.

In 2013, UMWW commissioned the University of Canberra (UC) to review the strengths and weaknesses of their water quality data as well as revise its CHIP approach. The result was not only a validation of the quality of Waterwatch data but a new way of reporting and displaying the data that would improve its usability and broaden its audience.

The new CHIP displays the data in smaller sections of waterway, known as 'reaches' with a minimum of two Waterwatch sites required for each reach. This finer scale reporting will detect change more effectively over time as well as highlight unsampled areas of the catchment. Data to generate a score is comprised of water quality, macroinvertebrates and (as of 2014/15) riparian assessments. To provide greater context to the reach scores, a report card is also provided with background information on the catchment and available anecdotal data such as platypus, frogs and feral fish.

The Waterwatch 2013/14 CHIP report for the upper Murrumbidgee was released in early 2015. Over 160 volunteers recorded 1,184 water quality surveys and 78 macroinvertebrate surveys across 184 Waterwatch sites. This sampling enabled the defining of 63 reaches, spanning a total catchment area of 8,600 km^2.It is designed to be both a communication tool as well as a management tool.

Key Words

Waterwatch, data quality, water quality, ACT, community based monitoring

The birds in backyards program: sharing spaces - connecting birds with people

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Biography:

Holly is BirdLife Australia's Birds in Backyards (BIBY) Program Manager and has been involved in Birds in Backyards on and off since it began back in 1999. Her background is in urban avian ecology, completing a PhD examining the effect of urbanisation on Superb Fairy-wrens. Through BIBY she uses citizen science and environmental education to promote people's connection with nature and provides recommendations on creating and managing urban habitats for birds.

Abstract:

In 2000, 20 per cent of Australia's bird species were assessed as being either Threatened or Near Threatened in The Action Plan for Australian Birds. For those of us who love and value birds, these figures are appalling. However, for many in the general community they have little meaning. The Birds in Backyards program (BIBY) was conceived and designed primarily in an effort to make these potential bird losses meaningful to the 85 per cent of Australians living in urban and regional areas, as well as gathering data to help clarify the issues. The design and approach of BIBY is based around citizen science and fits closely with current adult education modalities. BIBY encourages place-based learning (backyard and/or local area) and participants can slot in at their level of knowledge with no pre-requisites. Information is provided primarily on the website currently, and users are stimulated cognitively, visually and aurally. Hands-on learning comes through formal direction (survey entry), self-direction (gardening design etc.), and skills acquisition (observational), at the computer and in outside spaces (garden, parks etc.). The website is designed for easy data entry, requiring only basic computer skills. We recognise that data received may not be fully accurate and factor this into our results. Still, it provides us with information on trends in urban bird populations throughout the country. This information is fed back to participants through newsletters and updates on the website, as well as being factored into education resources and recommendations for managing urban bird habitats.

Key Words

Urban, bird, education, engagement, surveys

Streamwatch - How our community gets involved

Ms Karen Player[1]

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Biography:

Karen Player is the Museum Outreach Manager and has worked at the Australian Museum for the last 16 years. Karen has a background in environmental science and education and has a commitment to outreach and Citizen Science programs. Last year 170 Streamwatch volunteers tested at 150 sites generating 5000 data points.

Abstract:

The Australian Museum took over the Streamwatch water quality monitoring program from Sydney Water in 2012. Streamwatch monitoring continues to act as an early warning system for pollution events, while the data provides a historical record of how waterway health has tracked over time. This amazing program is driven by the grass roots commitment of citizen scientists.

Over the last 3 years we have been evaluating the Streamwatch program to ensure we meet the changing need of our community. The Australian Museum currently has 170 registered volunteers monitoring water quality at 160 sites across Sydney, the Blue Mountains and the Illawarra with great results.

Our Volunteers feel custodianship over their sampling sites because they choose them in consultation with Museum; they work with the Museum on site assessments and set their own goals within the parameters of the program. This is a great example of collaborative planning, where the museum takes an active role in involve them in the decision making process. We work together to plan training, tours, talks and events that compliments the Streamwatch program.

Once isolated, our volunteers are now part of a large community that invest their time not only in Streamwatch endeavours but in other citizen science programs too. Our Streamwatch community is also part of the larger Australian Museum family providing access to the Museum's collections and research.

Key Words

Streamwatch, water quality, community engagement

The Impact of Urbanisation on Bird Biodiversity: A Case Study of the Greater Adelaide Region

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Biography:

I'm a PhD candidate working with the Discovery Circle initiative from the School of Natural and Built Environments at the University of South Australia, based at Mawson Lakes. My research is looking at the impact of increasing urbanisation on biodiversity. My research will look at different urban growth models and what the associated impacts on biodiversity are likely to be, with the ultimate goal of building a model that can be used for other cities in other parts of the world.

Abstract:

Currently, just over half of the world's population live in urban places, but this is expected to increase to two thirds by 2050. The world is experiencing rapid urbanisation, and a frequent consequence of this is biodiversity decline as the surrounding landscapes are altered to become less natural. This research is assessing the impact of increasing urbanisation on biodiversity, using the Greater Adelaide Region in South Australia as a case study. We are building on work done in Brisbane, but building a more fine-scale model and utilising a citizen science approach to enable data collection over broader scales (spatially and temporally). The research aims to determine the most appropriate form of urban development to adopt which will maximise biodiversity outcomes associated with projected population increase over the next 30 years. So far, little research has been undertaken for city wide and regional areas (the Greater Adelaide Region is approximately 9 000 km^2 in area). Bird occurrence will be used as one indicator for biodiversity, and citizen scientists experienced in bird identification are being recruited for field data collection. The study area will be stratified into sub regions representing varying levels of urbanisation, with each sub region being sampled four times over the next year for the presence of various bird species. A range of key environmental variables will also be measured for each site. Data will then be used to predict the likelihood of finding various bird species across the region as urbanisation levels increase.

Key Words

Citizen science, urban biodiversity, urban ecology, urban design

Evaluating the effectiveness of BioBlitzes as a means to engage the community in environmental research

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Biography:

Erin works as a senior scientist for the NSW Office of Environment and Heritage and is involved in both the coordination and implementation of citizen science within the agency.

Abstract:

There is growing recognition that effective science communication should not only assist in addressing scientific literacy but must also open dialogue between scientists and the public, improve relationships by building trust, and increase public participation through a variety of platforms. Citizen science offers a useful approach for science communicators to address many of these key aims. Here we discuss the role of a citizen science activity (a BioBlitz) as a tool for science communicators to increase participation from a wider public audience in environmental science. We explore the BioBlitz concept, learnings and outcomes based on a case study of a BioBlitz held during the 2014 IUCN World Parks Congress in Sydney, Australia. The World Parks Congress BioBlitz was attended by over 500 participants from around the world, recorded over 233 individual species and has resulted in many unique opportunities to communicate and promote the event using a mix of media. Surveyed participants rated the event highly with over half agreeing that participation in the BioBlitz changed their perception of science or the natural world. The event was promoted across social media channels, websites, television and print media. The BioBlitz registration page had over 1,800 total views over a four week period, with the event webpage having 1700 unique views over a four month period. We argue that BioBlitzes are an effective tool for science communicators; can contribute to environmental research; employ a diversity of media platforms and audiences; and facilitate conversations with the public about biodiversity and conservation more broadly.

Key Words

BioBlitz; citizen science; engagement; environmental research; community

Using WomSAT (Wombat Survey and Analysis Tools) to learn about factors affecting wombat (Vombatidae) populations

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Biography:

Candice completed a Bachelor of Natural Science (Animal Science) in 2014 at the University of Western Sydney (UWS). Candice is now completing her Honours year and has devised her project around a new citizen science tool called WomSAT (Wombat Survey and Analysis Tools) which was developed by UWS. During her undergraduate degree Candice was actively involved with university life. She co-ordinated a student club called Animal ARC, was part of the prestigious UWS Aspire leadership program, participated in university soccer and completed a semester in Hong Kong through the Australian Government's New Colombo Plan.

Abstract:

Wombats are Australia's largest burrowing mammal. They are ecological engineers, recycling soil nutrients and creating habitats for other animals. They are impacted by human-related interactions and the disease, sarcoptic mange. Sarcoptic mange is caused by an infestation of a mite (*Sarcoptes scabei*) among bare-nosed (*Vombatus ursinus*) and southern hairy-nosed wombats (*Lasiorhinus latifrons*). It causes severe irritation resulting in abrasions, crusting of the skin, hair loss, increased energy demand and secondary diseases. If left untreated, sarcoptic mange will lead to the death of the infected wombat. Mange poses potential negative implications for the conservation of the species. To learn more about the current prevalence and incidence of sarcoptic mange in wombat populations, and raise public awareness, the University of Western Sydney established a new citizen science tool called WomSAT (Wombat Survey and Analysis Tools) in February 2015. WomSAT is an online mapping tool where citizens can log on to record wombat and burrow sightings from their computer or mobile device. In doing so, citizens can provide information on a wombat's status (alive or dead), record a mange score and other circumstances surrounding the sighting. WomSAT actively involves members of the public in wildlife monitoring. In doing so, broad, real-time geographical data can be collected on wombats. WomSAT has been used to report wombats across NSW, Victoria, Tasmania and South Australia.

Key Words

Wombats, sarcoptic mange, online mapping, Australia

Development of a citizen science community bird monitoring program on Eyre Peninsula, South Australia

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Biography:

Greg is a behavioural ecologist working as a landscape ecologist on Eyre Peninsula in South Australia providing technical advice to the Eyre Peninsula Natural Resource Management Board's Regional Management Team and district leaders in the context of whole-of-landscape planning and management. The role takes a regional perspective to prioritise investment, evaluate program outcomes and identify ecological research needs. In this role he developed a citizen science program to facilitate regional monitoring. Previously as a consultant Greg worked with World Vision in community based carbon credit reforestation and afforestation projects to develop cost-effective and scientifically valid monitoring program for the Clean Development Mechanism (CDM), Climate, Community & Biodiversity (CCB) Standard and CarbonFix Standard (CFS) certification requirement. This citizen science program was designed for a variety of projects around the world, and was implemented in the Soddo and Humbo regions in Ethiopia.

Abstract:

In order to assess medium to long-term landscape scale biodiversity change on Eyre Peninsula arising from factors such as changes to land management practices and climate, there was a need to develop a scientifically valid, cost-effective, long-term and broad-scale monitoring program. Previous monitoring programs were ad hoc, expensive, reliant upon specialist skills, project specific and not at a regional scale. Furthermore, existing data entry and storage was compromised by high data entry costs and complexities in storage, and subsequently rarely analysed.

Natural Resources Eyre Peninsula has facilitated the establishment of a citizen science bird monitoring project to develop a new generation of skilled bird observers. The project aims to foster a skilled body of citizen scientists across Eyre Peninsula capable of carrying out bird surveys to facilitate a long-term monitoring program. Successful implementation of both programs has required a range of challenges to be overcome, including low population density (0.65 people/km^2), an extensive area (65 000 km^2) of poorly studied fauna with limited understanding of distribution, habitat use and species demographics, and limited bird identification or survey expertise.

To date, 105 volunteer community members have completed a free 40 hour course and are now contributing to the program. Data is stored securely in an Atlas of Living Australia online portal, providing community ownership of the full data set. The project has also supported the formation of several new community-based groups.

Key Words

Eyre Peninsula, birds, citizen science, monitoring, biodiversity, natural resource management

Tried and True – Community Water Quality monitoring bringing about change

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Biography:

Jane is a founding member of the Community Environment Network and the Executive Officer for 15 years. Jane is an Environmental Educator with over 23 years experience in both formal and informal environmental education sector. She has qualifications in Education and a Masters in Scientific Studies. Jane is also a founding member of the Central Coast Marine Discovery Centre, a partnership with the University Newcastle focused on education and research in marine and coastal environments.

Abstract:

Waterwatch is a national water quality monitoring program involving schools, community groups and landholders. It was established by the Australian Government during 1993 and in 2007 reported over 3000 Waterwatch groups monitoring water quality at over 7000 sites throughout 200 catchments. Volunteers conduct biological and habitat assessments plus physical and chemical water tests. Although there is some reluctance in the scientific community to accept community data as valid, the Waterwatch program has established elements of a successful citizen science program including scientific protocols, standardised methods and equipment, training and support for volunteers, data verification and a procedure for quality assurance. The success of this long term program is also demonstrated by real world examples where volunteers and community data contribute to the identification of water quality problems and the implementation of actions to address them. The Waterwatch program has been operating on the Central Coast of NSW since 1997. This poster will describe a number of instances where community water quality data and volunteers have identified problems within local catchments and undertaken actions to address those problems. Where the Long Jetty Waterwatch group has been monitoring over thirty stormwater drains entering Tuggerah Lake over the past five years, deteriorating water quality prompted the group to take action. After further investigation, the group found that some of the results could be attributed to runoff from a local golf course. Action has since been taken by the council and golf course to rectify this problem and the group continues to monitor.

Key Words

Water quality monitoring, citizen science, Central Coast, Waterwatch, Tuggerah Lake

Green Nomads claim bragging rights at Cairns Esplanade BioBlitz

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Abstract:

Voluntourism, an emergent form of tourism, is often expensive, involves large time commitments and lacks the short-term immediate feed-back and “bragging rights” that young people and tourists demand. Cairns is a backpackers' mecca, and an internationally significant biodiversity hotspot - a mega-diverse region with two UNESCO world heritage sites side by side, an outstanding learning landscape.

BioBlitz is a hands-on, fun event, designed around making discoveries, learning, gathering field data that is published in real-time in a globally accessible repository, the Atlas of Living Australia ALA. The Cairns Esplanade BioBlitz on June 19th 2015 from 2pm to 8pm has been deliberately designed and developed to present a unique opportunity to engage the community and tourists under the Green Nomads banner. QWaLC partnered with Terrain NRM, Cairns Regional Council, JCU, WTMA, tourism, special interest, Indigenous monitoring and conservancy groups. There was particular interest from 20 scientists, 5 special interest groups, 2 indigenous monitoring groups and 200 volunteers to collect data for 4 diurnal hours and 2 nocturnal. All species identified will be uploaded to ALA.

The Cairns Esplanade BioBlitz responded to the need for a very short-term snappy citizen science event, where participants can see progress immediately and volunteer-generated and scientifically verified results are published in real-time on ALA. The BioBlitz experience appeals to younger people and tourists as it is results-based with a defined beginning, middle and end. Green Nomad type tourists see their contribution makes a difference immediately so that they can claim social media bragging rights.

Key Words

BioBlitz, tourists, voluntourism, Cairns, Esplanade, QWaLC, Green Nomads, citizen science,

DigiVol

Rhiannon Stephens[1], Leonie Prater[2]

[1]Australian Museum, [2]Australian Museum

Biography:

Leonie Prater and Rhiannon Stephens are the DigiVol coordinators at the Australian Museum. They have been working on the DigiVol program since its conception in 2011. Together with the help of many volunteers they have facilitated the digitisation of many of the Australian Museum's collections.

Abstract:

DigiVol is an innovative citizen science program at the Australian Museum which adds considerable value to the digitisation of our vast Collections by accelerating the Museum's capacity to help staff capture the collection data in digital form and to facilitate a broader appreciation and understanding of the Museum to the wider community.

DigiVol consists of two distinct phases of citizen science engagement. The first is onsite at the Museum where citizen scientists image and capture data for specimens and labels in the digitisation lab. The second phase is online where citizen scientists capture scientific data through transcribing, georeferencing and researching text from the images captured in the first phase. This data is then imported into the Museum's collection database and made available on websites, such as Atlas of Living Australia and Global Biodiversity Information Facility.

DigiVol demonstrates how a citizen science program significantly helps a major cultural institution digitise their huge collections with too few staff resources available.

This data has many uses, including:

- understanding the relationships between species (important in determining potential agricultural pests or potential medical applications);
- the distribution of species (for understanding how best to conserve individual species or ecosystems);
- identification of species from morphological or genetic characters (for example being able to identify birds involved in aircraft incidents).

By helping us capture this information into digital form, citizen scientists are helping scientists and planners better understand, utilise, manage and conserve our precious biodiversity.

Waterwatch citizen science data and its potential use in waterway management: a pilot study

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Biography:

Stephanie Suter studied BSc Environmental Management & Ecology (Honours) and completed her PhD in 2014. She has a passion for freshwater ecology and science communication. She now works as a Waterwatch Facilitator at the Corangamite CMA, delivering the Waterwatch school education program and supporting community Waterwatch volunteers in the Corangamite catchment area, South-West Victoria.

Abstract:

In Victoria, riparian restoration works are carried out by Catchment Management Authorities (CMAs) and water authorities, in an effort to improve river health. In 2013, 606 Waterwatch volunteers collected and assessed water quality data at 1066 sites across Victoria. As an established program (began 1993), many of these sites have long term data sets spanning greater than 10 years. With QA/QC protocols in place since 1998, data confidence has increased and has the potential to be utilised by waterway managers.

As a pilot study, a short term monitoring project (1 month) was developed, along a single waterway (Barham River), to determine if Waterwatch data could be used as part of broader CMA assessments. Waterwatch monitors performed habitat and macroinvertebrate assessments, along with routine water chemistry testing. Light and temperature loggers were also used, giving continuous measurements over the monitoring period. This more holistic approach gave physical, chemical and biological data to assess river health at 4 sites, each with varying degrees of riparian works.

Clear differences were revealed, particularly between sites where willow removal and revegetation works had occurred, compared to the heavily degraded, and natural sites. This approach gave Waterwatch monitors exposure to new monitoring techniques, along with the opportunity to contribute to river health management. The data collected could be directly relevant to CMA works. Through the results and reporting of this assessment, we hope to achieve greater use of Waterwatch data by river managers in assessing the effectiveness of on-ground works into the future.

Key Words

Waterwatch, river health, water quality monitoring, citizen science, volunteers, Victoria, evaluation

Unplugged: Reconnecting the Disconnected

Patrick Tegart[1]

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Biography:

Patrick studied a Bachelor of Marine Biology at UTS, followed by an Honours focusing on tropical fish inhabiting temperate rock pools. This interest for environmental science has led to a drive to further community awareness and education about the importance of Australia's unique terrestrial and marine ecosystems and their inhabitants. Recently I have been involved with citizen science events in New South Wales and Queensland.

Abstract:

The understanding, observation and recording of biodiversity on multiple spatial and temporal levels is a vitally important element of environmental science, particularly considering potential threats to regional and global ecosystems from an expanding human population. In a country as diverse and sparsely populated as Australia, scientific resources often face funding and personnel constraints. This is further compounded by a societal trend that is becoming increasingly more connected with technology and disconnected with nature. Rather than taking this as a negative, an opportunity exists to create and further push projects that are able to collect valuable biodiversity data and increase the Australian public's connection to science and nature. Citizen science events such as BioBlitzes are one avenue for scientist and public collaboration to achieve an environmental goal. Panboola BioBlitz, held on the Far South Coast of New South Wales, hosted 23 environmental experts that conducted 39 surveys focusing on plants, birds, bats, fish and a variety of other organisms. Targeting a rehabilitated wetland, this two day event drew in over 200 community members, who were able to help with the successful recording of 686 species. Community enthusiasm generated by the event has translated into a strengthening of networks and led driving numbers to an ongoing marine ecology study. Rewarding projects such as the Panboola BioBlitz should persist to take place in regional and urban areas to further reconnect society back with nature.

Key Words

Biodiversity, BioBlitz, citizen science, nature

Measuring fish with smartphones: a citizen science approach to monitoring Queensland's recreational fisheries

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[2]The University of Queensland

Biography:

Daniella is fisheries scientist at Fisheries Queensland where she works in the Recreational Fishing Monitoring Unit. This unit's research encompasses many dimensions of recreational fishing, from large state-wide surveys of catch and effort, to the socio-economic implications of recreational fisheries and, more recently, citizen science. A focus of Daniella's work is finding ways to engage fishers in the monitoring and management of state's recreational fisheries.

Abstract:

Fisheries management decisions depend critically on scientifically tenable data. Fish length frequency is one metric important in stock assessment models because it informs estimates of a stock's fishing mortality. However in the case of Queensland's recreational fisheries, these data are lacking for many species. Under current sampling regimes, fish length data are collected by fisheries technicians (e.g. at boat ramps), which by necessity restricts data collection to the most popular species and regions. Consequently, informed management decisions are limited for some stocks. Citizen science presents a promising tool to address this issue, but its utility has been hindered by concerns about the accuracy of length measurements taken by recreational fishers. In response, we have developed a prototype smartphone application through which fishers submit scaled photographs of their catch, negating their need to take measurements. By adhering to a simple three-step process, fishers photograph each harvested fish alongside a purpose-made scale bar. Fish lengths are digitally measured from the photographs by fisheries scientists, and are subsequently adjusted by a correction factor according to the fish's body size and shape. Initial testing has shown that this method provides measurements with a mean error rate of 1 – 2%, which is not significantly different from measurements taken by fisheries technicians (ANOVA $p > 0.05$). Because stock models require time-series data, participant retention will be pivotal to the application's success once publically available. If this is achieved, this application has the potential to greatly improve the oversight and management of Queensland's recreational fisheries.

Key Words

Fisheries, citizen science, volunteer monitoring, management, policy, smartphone application.

Harnessing community interest and enthusiasm to collect data on the Strzelecki Ranges Koala population in South Gippsland, Victoria

Nicole Walsh[1,2,3]

[1]South Gippsland Landcare Network
[2]Federation University
[3]Hancock Victorian Plantations

Biography:

Nicole presently works as a Landcare Project Officer with the South Gippsland Landcare Network, based at Leongatha. One of her major projects is to manage the Habitat for Life (Friends of Strzelecki Koalas) Project. She also manages a number of smaller projects relating to biodiversity and sustainable agriculture in the South Gippsland Region and the hillier parts of the Westernport catchment. Nicole has a background in natural resource management and conservation area planning. She is passionate about land rehabilitation at the landscape scale to restore ecosystem function to benefit both biodiversity and sustainable farming enterprises in the region.

Abstract:

The Koala population occurring in the Strzelecki Ranges of South Gippsland is believed to be genetically distinct from all other Koala populations across Victoria. Recent genetic studies from Koala scats (faecal pellets) would appear to confirm this.

In recognition of its conservation significance the Victorian Government has funded the Habitat for Life (Friends of Strzelecki Koalas) Project which is being delivered by the South Gippsland Landcare Network over four years. This project aims to engage with landholders to protect koala habitat through fencing and weed control; create native vegetation corridors to improve habitat connectivity across the Strzelecki region and engage with the broader community to increase awareness and understanding of koala conservation needs.

A key component of this project is a Citizen Ecologist Program which seeks to engage the community at a number of different levels to collect data on the Strzelecki koala population. Data collection occurs at three different levels with increasing levels of complexity and time commitment:

1. Community register on a dedicated website and records koala sightings;
2. Community volunteers collect koala scats and submit for genetic analysis to PhD student at Federation University (Gippsland campus);
3. Community volunteers undertake training in Regularised Grid based Spot Assessment Technique in order to undertake surveys of koalas on their own properties or area of public land

We have run a number of training sessions in these areas to increase the capacity of our volunteers to undertake these activities. It is hoped the data collected will increase our knowledge of the species throughout the Strzelecki Ranges.

FeralScan community mapping of Australia's worst pest animals

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Biography:

Peter West is a Research Officer with NSW Department of Primary Industries Vertebrate Pest Research Unit. He has over 15 years' experience in coordinating research projects on native wildlife and pest species, focusing on providing tools and solutions for the community and pest managers. He is a Project Leader with the Invasive Animals Cooperative Research Centre, and currently manages a number of projects including mobile app development, and community-led action to map pest animals and their impacts.

Abstract:

Enhancements in mobile technology, web-mapping and digital media have greatly supported improvements in the way landholders, community groups and land managers can access resources, share information and work together in pest animal management. Collectively these resources offer an effective and timely method of communicating pest animal threats.

The FeralScan (www.feralscan.org.au) project, coordinated by the Invasive Animals CRC, provides a free web and smart phone mapping facility for landholders, community groups, landcare groups, pest control organisations, and local governments. Anyone can use FeralScan to record sightings, damage and control activities for foxes, rabbits, wild dogs, feral pigs, mice, feral goats, feral camels, cane toads, pest birds (including Indian myna birds) and pest fish – all of which cause significant impacts to our environment and agricultural production. FeralScan now contains over 30,000 community records of pests and their impacts.

By recording pest animal data, participants keep their local community informed about pest populations; can identify priorities for local control, and can measure the outcomes of management actions. Recent enhancements to FeralScan puts new platform technology directly into the hands of landholders and communities; brings innovation to pest management by connecting people online; increases accessibility of real-time data, and increases connectivity of end-users with pest control information.

New capabilities include alert-style notifications to automatically inform landholders about local impacts (such as wild dogs attacks on livestock), data sharing with regional authorities, and a register of local community programs. Future directions include evaluating the effectiveness of FeralScan for improving community-led action and reducing pest impacts.

Key Words

FeralScan, pest animals, mobile apps.

The Powerful Owl Project: understanding Sydney's nocturnal residents

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Biography:

Caroline Wilson completed her PhD in 2013 with Melbourne University and the Australian Research Centre of Urban Ecology; she studied the habitat requirements of microbats across Melbourne. One of the research partners that contributed towards Caroline's PhD project was Earthwatch Australia; Caroline worked with Earthwatch, managing volunteers that helped with her microbat research and educating them about microbat conservation and urban ecology. Caroline currently works as a Project Officer at BirdLife Australia, where she manages and works on a number of citizen science and education projects including the Powerful Owl Project, the Threatened Bird Network and Swift Parrot surveys.

Abstract:

Powerful Owls are found in eastern Australia and, despite their Vulnerable status, can survive within major cities, although increasing urbanisation is likely to impact their long-term persistence. Using citizen science, the Powerful Owl project has monitored Powerful Owls in Sydney for the last five years, providing detailed information on breeding success, habitat use, mortality rates and diet. The information gained from this study is used to inform the conservation status and management of the Powerful Owl.

Since 2011, Powerful Owls were located at 60 breeding sites across Greater Sydney, and had an average fledging rate of 1.22 chicks/year. Breeding sites had greater tree cover, and more hollow-bearing trees and prey, compared to non-breeding sites. Foraging habitat was widespread within leafy northern Sydney, and the diet of Powerful Owls varied seasonally. Car strikes were the main cause of Powerful Owl mortalities. The Powerful Owl Project is an important community engagement tool and has incorporated 333 volunteers, reached over 2500 people through community talks, and over 1,000,000 people through media channels.

The Powerful Owl Project has educated the community about Powerful Owls, and driven management recommendations for their continued survival in urban areas. This project has also highlighted the gaps in our knowledge, including the foraging behaviour of Powerful Owls and their movements across the urban landscape. There is limited information on other nocturnal birds using urban habitats. Further research on urban Powerful Owls, and other nocturnal species, will provide a more complete picture of the ecology of these urban birds.

Key Words

Powerful Owl, urban, Sydney, nocturnal

WORKSHOP 2: Data – collection and management

Standardizing the collection of microbiological data in citizen oceanography

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[2]Indigo V Expeditions
[3]Macquarie University

Biography:

Associate Professor Lauro was born and raised in Venice, Italy. He graduated from the University of Padua and went on to obtain his PhD at Scripps Institute of Oceanography (SIO) at the University of California in San Diego, California (UCSD).

As a scientist, he has pioneered skills in both experimental and computational sciences. He is also a champion sailor winning both the Australian and Italian National Championships. In the past few years he has merged his passion for science and sailing by developing Indigo V Expeditions, the world leading organisation for citizen microbial oceanography.

Abstract:

In every drop of seawater there are millions of bacteria, which drive the Earth's biogeochemical cycles. This unseen ecosystem of microscopic organisms, collectively known as the marine microbiome, is vast and dynamic, thus requiring millions of observation points to fully understand. Yet collecting the water samples required to properly examine microbial communities has long been a highly restrictive exercise. Traditional oceanography is constrained to large, very expensive ocean going vessels that can cost more than $30,000 per day to operate.

Thousands of private ocean-going vessels are cruising around the world's oceans every day. By harnessing modern technology, it is possible to crowdsource the collection of data into the hands of the blue water cruiser. Private cruisers use long established sail routes that are dictated by the global wind current year after year.

Sailors are inherently concerned about the oceans and are very willing to help, especially when it leads to the scientific preservation and stewardship of our oceans and fisheries. However, to be useful, microbial data collection requires standardized data collection and precise geolocation, which is accomplished by equipping cruisers with the Ocean Sailing Microbiology Observatory (OSMO) auto-sampling device.

Equipped with an OSMO, everyday cruisers turned 'citizen oceanographers' are able to collect robust datasets on an unprecedented physical scale, providing the quantum of biological observations required for predictive, whole ecosystem models of ocean dynamics. We will present the preliminary results of Indigo-V first wave of cruisers, highlighting the challenges of data collection and standardization.

Key Words

Marine Microbiology, Oceanography, Biogeochemical Cycling, Data Collection Bottleneck

Introducing PPSR_CORE: Standardizing metadata to support a growing community

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[3]Cornell Lab of Ornithology
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Biography:

Anne Bowser co-directs the Commons Lab at the Woodrow Wilson International Center for Scholars, a think tank in Washington, D.C. In this capacity she conducts and sponsors research to advance the practice of citizen science, particularly within U.S. government agencies. She is also a PhD candidate at the University of Maryland, where her dissertation focuses on identifying how new technologies such as games can motivate new groups of citizen science volunteers. Her research also examines how volunteers articulate privacy concerns, and what projects may do to support volunteer privacy through policy, technology, and education.

Abstract:

With the proliferation of citizen science, a number of organizations are cataloguing projects to offer support, network practitioners, and/or track important outcomes. Accurate and 'up-to-date' information about citizen science projects is valuable to project leaders, volunteers, and researchers, but the task of entering and maintaining this information in multiple repositories is cumbersome. Furthermore, without standardized metadata to help articulate the practice of citizen science, the potential for researchers and volunteers to compare different projects is limited.

Four organizations- Scistarter.com, CitizenScience.org, Citsci.org, and The Wilson Center- have reached a landmark agreement to collaboratively define and share data and metadata about citizen science projects. This collaboration will be implemented through the continued development of the PPSR_CORE Program Data Model. This protocol is designed to facilitate easy and standardized data sharing, and to develop a common vocabulary for discussing the different components of citizen science. In the United States, PPSR_CORE will be launched with SciStarter as the canonical database and the Citizen Science Association maintaining technical administration. These standard protocols will be open for other collaborators or researchers to adopt.

This agreement will benefit the citizen science community because: (1) basic project information can be shared and synchronized automatically across participating databases, (2) project leaders will be able to add and edit information about their projects in a single place of their choosing, (3) project updates in one database will be reflected across other databases serving different, and (4) individuals searching for projects can be confident that results contain the most up-to-date information.

Key Words

Data, metadata, data sharing, collaboration, evaluation

“Who is using my data?” Methods for data tracking in Citizen Science

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[1]Institute of Marine Sciences
[2]CREAF
[3]Ecology Unit (BABVE)
[4]1000001 Labs

Biography:

Dr Jaume Piera has more than 15 years of experience in environmental observing systems. During the last years he has focussed on Citizen Observatories, developing new systems to observe nature, in particular in Coastal Environments. CITCLOPS (www.citclops.eu) is the current Citizen Science EU-FP7 project in which he is participating. He is also member of the European Citizen Science Association (ECSA) in which he is the chair of the "Data, Tools and Technology" Working Group.

Abstract:

In Citizen Science, citizens should be able not only to access the data they are providing, but also to know who is using them and how. Data-use tracking is of interest not only for the citizens who provided them, but also for research institutions that maintain Citizen Science infrastructures. The first requirement to track a particular data set is to identify and locate it. Today, this is accomplished with digital object identifiers (DOIs) and uniform resource identifiers (URIs), but, in the context of Citizen Science, the use of DOIs and URIs is not practical: Citizen Science contributions could be generated by many different participants who may want to be identified individually. When carrying out queries on Citizen-Science data-repositories, it is not practical to acknowledge all contributions with a list of hundreds (if not thousands) of DOIs or URIs in each result. The way to overcome this problem is to develop a new service that will provide meta-identifiers. There are the two following advantages with this approach. (a) Reproducible research: through the meta-identifier, it will be possible to identify (and retrieve) the data used in previous research, and to reproduce the results. (b) Data use indicators: individuals and research institutions (i.e. data providers) will be able to track the use of their own data and this will allow development of indicators to evaluate the impact of datasets. This service could also be part of the strategy to ensure long-term engagement of citizens.

Key Words

Data sharing, Meta-Identifiers, DOI, URI, reproducible research, data tracking systems

Streamwatch - How to manage 25 years of data

Karen Player[1]

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Biography:

Karen Player is the Museum Outreach Manager and has worked at the Australian Museum for the last 16 years. Karen has a background in environmental science and education and has a commitment to outreach and Citizen Science programs. Last year 170 Streamwatch volunteers tested at 150 sites generating 5000 data points.

Abstract:

Streamwatch water quality monitoring continues to act as an early warning system for pollution events, while the data provides a historical record of how waterway health has tracked over time.

The Australian Museum took over the Streamwatch program from Sydney Water in 2012 and has been managing the quality of new data sets and analysing historical data. The Australian Museum currently has 170 registered volunteers monitoring water quality at 160 sites across Sydney, the Blue Mountains and the Illawarra.

In the last 25 years over 195,000 data points have been uploaded creating a large dataset to manage and interpret. In the last 12 months alone, 896 uploads to the Streamwatch database represents the efforts of citizen scientists taking 5000 water quality measurements annually. The challenges of a large data set for the Streamwatch program are related to the database and data quality. This talk will inform on how we manage data quality and training sessions and how we are overcoming the many challenges of our current database.

Key Words

Streamwatch, water quality, data collection

Data deficiency in Australia and the role of citizen science

Chris Sanderson[1]

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Biography:

Chris has spent 10 years as an environmental professional, working with government, industry and NGOs. He has volunteered extensively in citizen science projects across the country, and ran a major citizen science initiative for Birdlife Australia called Atlassing in NRM Regions. He has spent the past five years as an environmental consultant conducting extensive field work trapping and observing fauna. He is now conducting research in the Environmental Decisions Group at the University of Queensland looking at threatened species policy and data deficiency in Australia.

Abstract:

Australia is a megadiverse country, with an extremely high level of endemism in its native species. Despite being a wealthy first world nation, many of our species are highly data deficient. Australia's governments do not list threatened species that are data deficient, and do not provide them with protection. As a result of this, many of Australia's threatened species are not protected because we don't know enough about them. Citizen science has the potential to address this issue through a variety of approaches. This talk will discuss some areas that are in desperate need of attention and some of the ways in which citizen science may be employed to assist filling in these knowledge gaps.

Key Words

citizen science, data deficiency, threatened species

POSTER SESSION 2: Innovations in Citizen Science

Questacon's Q Lab: Inspiring Scientific Citizens

Michael Bennett[1], Ms Angie Good[1]

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Abstract

Citizen science usually focusses on scientific researchers engaging the general public to help collect or interpret data, expanding the data set for a given problem. In Questacon's Q Lab, the constraints of a given problem are absent; there is no data set. The goal is simply to engage the general public with the scientific process – consciously or otherwise – whilst visiting Questacon, and then ideally have them apply those principles to their everyday life.

MicroBlitz. Dig a little. Discover a lot

Deborah Bowie[1], Benjamin Moreira Grez[1], Deepak Kumaresan[1], Andrew Whiteley[1]

[1]The University of Western Australia, deborah.bowie@uwa.edu.au

Biography:

Deborah Bowie has been with the MicroBlitz project since its inception in March 2013 and is primarily responsible for the overall design, day to day operations and community engagement aspects of the project. Deborah is a passionate and creative educator who started her working life as a science teacher in the 1980's. Her career journey has taken her far beyond the traditional classroom setting and seen her involved in areas such as adult and indigenous education, curriculum writing and teacher mentoring. Immediately prior to joining MicroBlitz, Deborah was managing a United Nations, Education for Sustainable Development, project.

Abstract:

MicroBlitz engages citizen scientists, at base level, to register and receive a soil sampling kit, take a soil sample and send it back to the laboratory at the University of Western Australia where DNA sequencing and analysis reveals the amazing biodiversity that lays 'hidden' underground. Beneath one footprint it is estimated that there are 10, 000's of different bacterial species and 10 trillion individual cells.

Dig a little further into the MicroBlitz story and you'll discover a lot more hidden 'gems'; stories of how vision, collaboration, persistence and serendipity have dynamically shaped the project.

The deliberate decision to embed a citizen science component within Winthrop Professor Whiteley's successful Western Australian Premier's Research Fellowship (2012) research model, was two pronged. A widespread army of samplers serves the overarching aims of the meta-research project to map soil-based microbial diversity over the vast scale of Western Australia. By design, it also creates an effective, interactive communication conduit between research scientists and local communities.

From the outset MicroBlitz has embraced a collaborative approach. The the initial 12 months were dedicated to working with various community sectors developing promotional strategies, designing kits and protocols, and establishing network links and feedback loops.

Since taking the project live in March 2014, we have an expanding registration base of 800+ volunteer samplers, distributed over 3800 sampling kits, have processed 2500 samples and been involved in numerous and varied community and media events, including the 2014 and 2015 Perth Caravan and Camping Shows and Channel 9's GreenFingers Show.

Key Words

MicroBlitz, citizen science, collaboration, soil science, community engagement, DNA sequencing)

Designing technology for motivation with NatureNet and Floracaching

Anne Bowser[1], Jennifer Preece[1]

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Biography:

Anne Bowser co-directs the Commons Lab at the Woodrow Wilson International Center for Scholars, a think tank in Washington, D.C. In this capacity she conducts and sponsors research to advance the practice of citizen science, particularly within U.S. government agencies. She is also a PhD candidate at the University of Maryland, where her dissertation focus on identifying how new technologies such as games can motivate new groups of citizen science volunteers. Her research also examines how volunteers articulate privacy concerns, and what projects may do to support volunteer privacy through policy, technology, and education.

Abstract:

For citizen science to succeed, projects must recruit and retain enough participants to achieve their research goals. Volunteer motivation is therefore an important consideration in project design. While some practitioners believe that new technologies may support motivation, research is needed to understand which technologies are motivating in which contexts. Furthermore, few practitioners have involved volunteers directly in the process of technology design.

We report on the development of two tools for biodiversity data collection, namely NatureNet and Floracaching. NatureNet is a set of applications including mobile apps, a tabletop, and a website that enable volunteers to record biodiversity data in national parks which they can share with others. These applications were created through a crowdsourcing approach that involved park visitors and naturalists in ideation, voting on and selecting design ideas, and then implementing and modifying the evolving designs. Floracaching is a mobile geocaching game where players share plant phenology data. Floracaching was designed through a cooperative approach, where a target population of university students helped design the gamified interface and create content.

Through the design of NatureNet, we aim to discover whether an inclusive technology design process can motivate volunteers by involving them as invested stakeholders, creating a sense of co-ownership. By designing Floracaching, we found that game elements can motivate university students through mechanisms like fun and discovery, and by illustrating a clear data collection process. These findings suggest that involving volunteers in technology design may be motivating in itself, and can also identify how design may motivate volunteers.

Key Words

Technology, mobile, tabletop, games, motivation

Can sound be as engaging as sight for a citizen scientist when helping to make ecological discoveries?

Jessica Cappadonna[1], Margot Brereton[1], Paul Roe[1]

[1]Queensland University of Technology, Garden Point Campus

Biography:

Throughout her career, Jessie Cappadonna, has been passionate about avian ecology and public engagement. In recent years, this led her to contribute on a wide variety of projects with the U.S. Geological Survey (Hawai`i), the U.S. Fish and Wildlife Service (Hawai`i), Point Blue Conservation Science (California), and the Cornell Lab of Ornithology (New York). Upon return to Australia, Jessie worked with University of Queensland's Environmental Decisions Group, and also became heavily involved with the Australian Citizen Science Association. Now she is embarking on a PhD investigating the use of bioacoustics in citizen science projects at the Queensland University of Technology.

Abstract:

Several studies have evaluated how citizen scientists engage with projects that rely on viewing animals either in the field or through photographic means. Few projects, however, have explored whether volunteers could review acoustic data to identify animals, and whether volunteers would find this activity to be as engaging and rewarding as more traditional methods. This new and unique citizen science methodology may provide advantages in collecting and analysing acoustic data. One of the key benefits of acoustic sensing is that field recordings can be made continuously and over long periods, which provides researchers a greater likelihood of detecting shy and cryptic species. With recent advances in technology, acoustic devices have become available at a relatively low cost. Recorded data also have the additional benefit of being a permanent record that can be listened to or analysed repeatedly. It is not possible, however, for a small team of researchers to evaluate the vast amounts of data generated by recordings. Thus, it is important to explore whether projects involving acoustics would be interesting to citizen scientists, how interest can be sustained, and how acoustic data can be made accessible to participants who may not be familiar with vocalisations of particular animal species. If such questions can be answered, then citizen scientists and researchers alike have an opportunity to vastly increase our knowledge of species diversity in various habitats across Australia.

Key Words

Citizen science; community engagement; soundscape ecology; bioacoustics; acoustic sensing

Gaia Resources Citizen Science Hub

Alex Chapman[1]

[1]Gaia Resources

Biography:

Alex has worked as a botanist and bioinformatics specialist in Australia and European herbaria over the last 30 years. He has also worked on various national and international committees with a focus on biological data standards. Since 2014, as Consulting Scientist with Gaia Resources he leads their citizen science project team.

Abstract:

Citizen Science has become a major trend in conducting certain types of scientific research due to its ability to engage with a large audience and maximise the potential for capturing or processing observational data beyond the capacities of the core research team. While this can be a successful strategy, connecting the community with science projects can be difficult, from both perspectives. By creating a Citizen Science Hub, Gaia Resources intends to provide a point of contact to facilitate community members finding a project they might like to join, as well as providing groups and agencies with a robust tool-set for building and managing a successful citizen science project. The Citizen Science Hub utilises Gaia Resources experience at engaging with agencies running citizen science programs, building mobile apps to enable the community to reliably capture data, providing back-end infrastructure for storing, managing and accessing contributed data and enabling the data to contribute to future research.

Key Words

Citizen science, data, mobile, technology, infrastructure

The Biological Data Recording System (BDRS)

Alex Chapman[1], Anthony Jones[1]

[1]Gaia Resources

Biography:

Alex has worked as a botanist and bioinformatics specialist in Australian and European herbaria over the last 30 years. He has also worked on various national and international committees with a focus on biological data standards. Since 2014, as Consulting Scientist with Gaia Resources, he has been leading their citizen science project team.

Abstract:

Data is the key outcome for a successful citizen science project - it must be both of high quality when captured and easily accessible subsequently to both contributors and scientists. For community members, completing the feedback loop allows them to see their efforts in a broader context. For scientists, the data must be available in a form fit for further analysis. And for the future this data should be stored using recognised data standards which allow for both reliable integration with other data sets and aggregation into larger data sets for potential re-use at broader scales. Gaia Resources originally constructed the Biological Data Recording System (BDRS) for the Atlas of Living Australia in 2009 to provide the backend repository for reliably managing millions of point-based data records contributed by Australian research institutions. Since that time it has been further enhanced to support data contributions coming directly from mobile devices using citizen science apps. By using the same backend architecture not only can individual projects store, aggregate and access their data, but the data can easily be contributed to larger integrative data repositories. For example, data contributed to the Coastal Walkabout project, where citizen scientists contribute observations of fauna common along the Australian coastline, can be harvested by the Atlas of Living Australia using web services. In this way observations from local citizen science projects can be aggregated at regional, national or global scale to enhance and extend existing data and contribute to larger-scale research questions.

Key Words

citizen science, data, management, mobile, technology, infrastructure

CSIRO Maker: A novel technical citizen science initiative in collaboration with Hobart Hackerspace

Pascal Craw[1], David Craig[2], Michael Emery[2], Leo Fabey[2], Daniel Suchefort[3]

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[2]Hobart Hackerspace Inc.
[3]Suchefort.de

Biography:

I am a bioengineer working for CSIRO Oceans & Atmosphere developing automated, in-situ DNA quantification systems to further our understanding of microbial life in the oceans. Microbes are the dominant life in the oceans by mass and number. Their resistance to culture methods and difficulties observing them in the ocean means that, despite their ubiquity, little is known regarding their role in biological and physical ocean systems. This project employs engineering, microbiology & bioinformatics to develop instruments to probe the abundance of microbial genes that mediate biogeochemical cycles in the oceans.

Abstract:

The Earth's oceans are dominated in both biomass and number by microorganisms. Our understanding of the role these ubiquitous organisms play in physical ocean systems, biogeochemical cycles, food webs and climate change is poor. Our limited knowledge of these organisms stems from our restricted ability to make frequent and high density analyses of marine microbes. The Microbial Oceanography Biosensing Instrument (MOBI) project based at CSIRO Marine Laboratories, Hobart is undertaking an ambitious project to develop autonomous instruments capable of in situ DNA analysis of marine microbes.

To increase the diversity of skills being applied to the ambitious MOBI project a collaboration with the Hobart Hackerspace (HHS) has been established to explore the use of technically skilled citizens as a resource for advancing research and engaging the local community. HHS is a community-operated workspace where people with common interests, often in computers, technology, science, digital art or electronic art, can collaborate.

This CSIRO & HHS collaboration has accelerated the progress of the MOBI project by engaging a pool of technically skilled citizens to contribute to the technical design and fabrication of scientific instrumentation. We believe skilled members of the community to be an underused resource for current scientific research. In addition to the advancement of scientific goals, the experience gained by collaboration members leads to further skill diversification and professional experience. It is hoped that this novel technical citizen science collaboration between Australia's national science organisation, one of the largest and most diverse scientific research organisations in the world, and skilled citizens from Hobart Hackerspace, will serve a model for further use of citizen scientists as valuable resource beyond data collection in CSIRO and further afield.

Key Words

Technical citizen science, Hackerspace, Microbial oceanography, DNA sensors

Partnership between an authority and citizen scientists delivers unexpected results

Priya Crawford-Wilson[1], Edward Tsyrlin[1],

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Biography:

Priya has double degree in Social and Environmental science. She works with community groups across Melbourne through the Healthy Waterways Waterwatch program and coordinates the Community Macroinvertebrate Monitoring program, training volunteers and collecting macroinvertebrate data across Melbourne's waterways. Priya is very interested in all aspects of Social Science and it can be incorporated into Melbourne Water's day to day activities.

Abstract:

Citizen science has been widely utilized for research and community engagement by universities and government in recent years. These partnerships provide increased data collection opportunities for the coordinating bodies. Melbourne Water as a water authority represents a new kind of partner to citizen scientists. The authority has sustained monitoring needs to protect and enhance waterways from an asset management perspective.

This paper will assess both the costs and benefits associated with citizen science projects the authority and citizen scientists using the example of Melbourne Water's Community Macroinvertebrate Monitoring Program. We will demonstrate that there are benefits that go beyond the value of the data collected, when an authority partners with citizen science instead of traditional data collection avenues. Common concerns around citizen science, such as data quality and training, are addressed to demonstrate that citizen scientists and authorities can form useful and effective long term partnerships.

Key Words

Citizen science, cost, benefit, authority, community, data.

The Atlas of Living Australia - supporting Citizen Science

Peter Doherty[1], Peter Brenton[1]

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Biography:

Peter Doherty has been the Program Manager for the Atlas of Living Australia since June 2009 and has a background in the design and delivery of large IT systems.

Peter Brenton is an experienced IT Project Manager/Analyst with the Atlas of Living Australia and is responsible for data capture tools. Peter also has a background in Conservation and Natural Resource Management.

Abstract:

The Atlas of Living Australia (ALA) is fully committed to supporting and promoting Citizen Science. We have a number of tools already available for Citizen Scientists and also quite a few coming available very soon. This poster will give a brief overview of the ALA's overall vision for Citizen Science and demonstrate these tools – both current and future.

The poster will include the overall vision for crowdsourced identification. There are multiple options available on the web to have a species in an image identified and how data and knowledge from data providers can assist.

FieldData is the ALA'a second generation data capture tool and is behind the ALA's "Citizen Science Central" concept. The poster will briefly introduce the tool and discuss ALA's directions in supporting a range of Biodiversity projects across the country.

Key Words

Citizen science, Tools, Vision, Data capture

Evaluating citizen science in the museum context

Ellie Downing[1]

[1]Macquarie University / Australian Museum

Biography:

Ellie is employed by the Australian Museum in Lifelong Learning, working on program development and stakeholder evaluations for the Australian Museum Science Festival. She is currently completing her second masters at Macquarie University looking at citizen science in museums, and has a background in museum studies, and library and knowledge management.

Abstract:

Running a citizen science program within a museum, such as the Australian Museum, introduces new stakeholders and expectations to the program, linked to the museum's role within the community. Traditional evaluations of citizen science programs tend to be concerned with data quality and use, and do not allow for participants to give feedback on how the program can be developed and improved. Participants of citizen science programs within museums are called volunteers, yet the relationship with them is often not managed and evaluated in the same way as other museum volunteers.

When evaluating programs, if you make the assumption that participants are just as concerned about the quality and functionality of the data as research scientists are, then the insights gained from volunteer feedback have the potential to make citizen science programs more effective and streamlined. This simultaneously increases participant involvement and loyalty to the program. This talk will discuss the findings of my study that explored the expectations of citizen science participants to see if they align with research scientists, and museum administration and management, and will discuss the ultimate suitability for museums to be the host of citizen science programs.

Spot the Leopard Shark: Thailand. Monitoring a threatened species through citizen science.

Christine Dudgeon[1], Kongkiat Kitiwattanawong[2]

[1]University of Queensland, c.dudgeon@uq.edu.au
[2]Phuket Marine Biological Centre

Biography:

My research interests centre on the ecology and evolution of marine populations and species and their application to conservation and fisheries management. I employ a suite of techniques including citizen science, genetics, acoustic telemetry, conventional and natural tagging (mark-recapture), and statistical modelling to investigate what comprises a population for marine species and how this changes in space and time, as well as identifying species and speciation processes. I have worked across taxa from corals to whales with my current focus primarily on elasmobranchs and bony fish.

Abstract:

Spot the Leopard Shark: Thailand (STLST) is a community-based project that monitors populations of threatened leopard shark *Stegostoma fasciatum* in Thai waters through the public contribution of photographs, to inform science and promote conservation. Adult leopard sharks display unique markings that can be used to identify individuals. Studies in Australia have shown that these markings are stable for at least 10 years in wild sharks and therefore provide non-intrusive means to monitor individuals in the wild. This project collects data on individuals in Thailand from the photographic contributions of SCUBA divers. Photos are primarily contributed through the online social media forum Facebook, which facilitates an interactive space between the researchers and citizen scientists and other interested public.

Key Words

Conservation, abundance, philopatry, education, awareness

Breathing life into fisheries stock assessments with citizen science

David Fairclough, Joshua Brown[1], Ben Carlish, Brett Crisafulli, Ian Keay

[1]Department of Fisheries Western Australia, joshua.brown@fish.wa.gov.au

Abstract:

Citizen science offers a potentially cost-effective way for researchers to obtain large data sets over wide spatial scales. However, it is not used widely to support biological data collection for fisheries stock assessments. Recently, significant management controls were introduced to recover stocks of demersal fishes from overfishing along the west Australian coast. This diminished opportunities for Department of Fisheries' scientists to collect the required biological samples essential for stock assessment of key species using traditional sampling methods. In addition, concerns about an effort shift onto nearshore species as a result of management changes required a greater understanding of the stock status of these species. As fishery-independent methods would be too expensive and logistically-challenging to implement for a diverse number of species, a citizen science program, Send Us Your Skeletons (SUYS), was developed. SUYS asks recreational fishers to voluntarily donate fish skeletons of key demersal and nearshore species from their catch to help monitor these stocks. After three years of the SUYS program in operation, large increases occurred in recreational fisher involvement, sample sizes and spatial and temporal representativeness. Additionally, SUYS has allowed scientists to more cost effectively monitor the status of these stocks than through traditional methods of sampling recreational catches. This program is therefore ensuring sampling objectives for stock assessments are achieved via fishery-dependent collection. This has led to more comprehensive information for management of these resources and importantly, improved knowledge among the fishing community as well as developed a sense of stewardship of the local resource.

Connecting Land Management Agencies with Communities: Reporting on a Citizen Science Project

Martin Fluker[1], Naomi Augar[1],

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Biography:

Dr Martin Fluker has been the Chief Investigator of the www.FlukerPost.com community-based environmental monitoring project for the past 7 years.

Abstract:

In Victoria, the Department of Land, Environment, Water and Planning (DELWP) is charged with creating liveable, inclusive and sustainable communities. In order to facilitate such outcomes for this and other Land Management Agencies (LMAs), the concepts of community-engagement, long-term community-based environmental monitoring (CBEM) and education are explored and developed in a new and innovative citizen science project that connects LMAs with primary school students. A 7 year old CBEM system has been extended for use in this project. The CBEM system comprises wooden posts that community members and students use as photo points within selected natural environments. The posts are adjacent to areas of interest to LMAs. Individuals can support environmental management by taking a photo via the post and emailing it to the administrator who shares it with the broader community online and directly with the LMA contact. The LMA can then consider adjusting land management approaches based on changes observed in the environment via the photos submitted. A new website that connects students with Land Managers and Scientists is being piloted with three primary schools to enhance science curriculum and connect LMAs with the community while supporting environmental management. Students, teachers and parents will be surveyed at the beginning and end of each school year in order to measure changes in values and behaviours related to the environments being studied after having been involved in the project. Expressions of interest are currently being sought from researchers in other states of Australia for project expansion.

Key Words

Community-based environmental monitoring, community engagement

Enthusiasm for Tree Health Citizen Science

Hilary Geoghegan[1]

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Biography:

Lecturer in Human Geography, researching enthusiasm in tree health citizen science in the UK and Australia.

Abstract:

In 2012, the first case of Chalara dieback of ash in the UK was confirmed by government scientists. Chalara has the potential to decimate the UK's ash tree population. Citizen science is heralded as an important element in the response to the disease. Civil society was called upon through projects such as Ashtag, the OPAL Tree Health Survey, and Observatree to act as 'eyes and ears' on the ground in the detection, monitoring and surveillance of the disease. In the UK, efforts have been made to coordinate citizen science efforts in the field of tree health. Enthusiasm – a strong emotional affiliation – has been central to the successful establishment of a Tree Health Citizen Science Network in the UK. This presentation/poster introduces the Network and the role of enthusiasm in citizen science.

Key Words

Citizen science, social science, tree health, UK, surveillance, pests and diseases, non-natives

Helping people be right.

John Gooderham[1]

[1]The Waterbug Company Pty Ltd, flatworm@ozemail.com.au

Biography:

John is a freshwater ecologist with The Waterbug Company Pty Ltd. John is co-author of "The Waterbug Book: A Photographic Guide to the Freshwater Macroinvertebrates of Temperate Australia." (CSIRO, 2002). The Waterbug Book was the precursor to a set of taxonomic keys designed to help people identify live waterbugs from S E Australia using Agreed Level Taxonomy (ALT). The ALT keys were recently released as part of The Waterbug App. Its main intent is to make it possible for people to identify live waterbugs without microscopes or years of training. It was developed with assistance from Waterwatch.

Abstract:

Identification tools are an important part of citizen science as they are often the principal source of information used by citizens in the absence of direct help from specialists. While developing the Agreed Level Taxonomy (ALT) program, we uncovered a suite of different ways that misidentifications can happen. Analysing each of the misidentification tendencies individually reveals generic patterns in misidentifications that can be used more broadly, to improve identification resources and to implement quality control mechanisms when these tools are transferred to apps and databases. We have crafted the keys associated with the ALT program (which are used for identifying waterbugs by groups such as waterwatch and streamwatch) to best avoid these misidentifications. This poster outlines some of the more common ways to be wrong and how best to sidestep them.

Key Words

Identification Tools, App, Waterbugs, Dichotomous Keys, Education

The NRM Planning Portal: Matching regional and local priorities to identify partnership opportunities in catchment management

Michelle Graymore[1], Peter Dahlhaus[1], Robert Milne[1], Andrew Macleod[1], Helen Thompson[1], Angela Murphy[1], Birgita Hansen[1]

[1]Federation University Australia

Biography:

Michelle Graymore is an environmental sociologist focused on understanding what makes rural and regional communities sustainable, in particular social change processes, social capital and community resilience. Much of Michelle's research has focused on the social dimensions of environmental issues including climate change, water allocation and demand management and environmental management on private land. Her current research is focused on the social dimensions of water management, particularly in small towns, methods for understanding community resilience, and the value of local knowledge in decision making.

Abstract:

The implementation of effective knowledge management strategies is critical for organisations where knowledge and information generation is at the core of their business. Thus, the Natural Resource Management (NRM) Planning Portal, was developed by the Centre for eResearch and Digital Innovation (CeRDI) in collaboration with Corangamite Catchment Management Authority (CCMA), to test the utility of online mapping for effective NRM planning in the Corangamite region.

Spatial data, information and knowledge were compiled into a single point-of-access online planning tool that: filters data to particular geographic areas or topics; allows the user to add resources, data, observations and knowledge in any form (e.g. images, text, videos); allows data download (subject to the data custodian's consent) and printing and; spatially locates and draws plans for on-ground works and then develops proposals guided by templates. The Woady Yaloak Landcare Group participated in the pilot program and, under the guidance of CeRDI technical staff, digitised and uploaded as GIS layers their on-ground works and areas for future activity. This process successfully identified where the landcare group and the CCMA strategic priorities overlapped, thus better targeting complementary priority areas for future NRM activity. The planning tool is now being implemented with other regional landcare groups.

The NRM Planning Portal project has established a new approach for collaborative planning as well as building a considerable knowledge base of spatial data, information and community NRM findings. This will assist regional and local organisational planning, priority setting and decision making in areas such as NRM investment.

Key Words

knowledge management, Natural Resource Management Planning, Landcare, FedUni Spatial

NatureWatch: A collaborative approach to citizen science

Ms Caitlin Griffith[1], Ms Christine Connelly[1]

[1]Victorian National Parks Association, caitling@vnpa.org.au

Biography:

Caitlin is an experienced practitioner in citizen science. She developed the VNPA NatureWatch community monitoring project over 2007 to 2015 and has successfully built a citizen science program with over 200 active volunteers and multiple project partners and stakeholders at 7 locations in Victoria. Caitlin developed the NatureWatch model, which involves working closely with local land managers, community groups and scientists. Caitlin is also experienced in training volunteers and team leaders, running community events and managing volunteer activity and data. Caitlin is particularly passionate about collaborative project design and working with local communities.

Abstract:

Citizen scientists provide an ideal resource for capturing critical long-term ecological monitoring data. Under the NatureWatch program, we have developed monitoring projects in eight locations in Victoria that research the effects of fire on small mammals, the value of revegetation for fauna, grassland threatened species, and the impacts of soil pathogen *Phytophthora cinnamomi*. NatureWatch projects follow a number of key design principles. Each project is developed collaboratively, with input from scientists, community and land managers. Together we develop site-specific project designs and conduct pilot projects to test our methods and community capacity. We also prepare implementation plans with agreed outcomes and measures of success. After projects are established, we review the aims and methodology and prepare long-term plans. This ensures our projects have strong, enabling partnerships are scientifically robust and contribute meaningfully to improving land management. It also encourages community ownership. Our collaborative model has been very successful. We have a range of projects in various stages of progress – our Grass Tree monitoring in the Brisbane Ranges National Park is now in its eighth year, and our newer camera-trapping project is carried out at four locations across Victoria. We have collected a vast array of data that builds on existing knowledge and have prepared a number of scientific reports, sharing project outcomes with the broader community. The community groups, volunteers, scientists and land managers involved are committed to the projects in the long-term. Our volunteer citizen scientists are enthusiastic and appreciate the value of the long-term nature of our projects.

Key Words

Collaborative research, long-term ecological monitoring, community ownership, Victoria, motion-sensing cameras, mammals, fire, revegetation, threatened species, *Phytophthora cinnamomi*

The sleeping giant of citizen science

Libby Hepburn[1]

[1]Atlas of Life in the Coastal Wilderness

Biography:

Libby has been a teacher, business advisor and entrepreneur. She has established and managed a fishemen's co-op of 60 boats and built the biggest shellfish purification tanks in Europe (that was a while ago). Since coming to Australia she worked for 8 years establishing the Sapphire Coast Marine Discovery Centre and more recently the Atlas of Life in the Coastal Wilderness project. Currently on the Establishment Board for ACSA she continues to work for the widespread engagement of community with scientists in science and environmental stewardship and enjoys snorkelling, bioblitzes and working meaningfully with good people.

Abstract

At a moment in human history when we most need scientifically literate, concerned and engaged populations, science in Australia is underfunded, under resourced and consistently devalued by short term political agendas. At this point in time neither scientists nor citizen science in Australia appear to have the capacity to contribute in a significant national sense to looming critical issues that we face yet the combined resources of these groups could be very powerful and offers the greatest potential input and influence available to science in the foreseeable future.

There are many examples of valuable individual citizen science initiatives in Australia (eg. Redmap, Backyard Explorer) but efforts are largely uncoordinated and disparate. Significant achievements in the field of citizen science that have been made in other countries (via European Citizen Science Association ECSA) are referenced to demonstrate how we might fast track the practice and enhance overall contribution of citizen science here. A scenario is proposed that shows what strength can be developed by working collaboratively and for citizens and scientists to develop their expertise and understanding together to become partner developers in creating networks and information which will be vital to decision making for the future.

Citizen science is at an early stage of development in Australia so this presentation describes how the development of the Australian Citizen Science Association (ACSA) can be pivotal to bring together and support the development of a national community of practice and demonstrate its potential.

Key Words

under resourced, looming issues, greatest potential for science, strength from collaboration, national community of practice

Australian Citizen Science Association - ACSA - building a community of practice

Libby Hepburn[1], Suzanne Miller[2], John La Salle[3], Chris Gillies[4], Jessie Cappadonna[5], Rebecca Johnson[6]

[1]Atlas of Life in the Coastal Wilderness
[2]Queensland Museum
[3]Atlas of Living Australia
[4]The Nature Conservancy
[5]University of Queensland
[6]Australian Museum

Biography:

Libby has been a teacher, business advisor and entrepreneur. She has established and managed a fishermen's co-op of 60 boats and built the biggest shellfish purification tanks in Europe (that was a while ago). Since coming to Australia she worked for 8 years establishing the Sapphire Coast Marine Discovery Centre and more recently the Atlas of Life in the Coastal Wilderness project. Currently on the Establishment Board for ACSA she continues to work for the widespread engagement of community with scientists in science and environmental stewardship and enjoys snorkelling, BioBlitzes and working meaningfully with good people.

Abstract:

There are more and more citizen science projects happening all over Australia and the world. It is evident than many people recognise the potential, power and importance of a community engaged in science and science in which community collaborates. Last year a forum was held in Brisbane where the 200 delegates agreed to establish an Australian Citizen Science Association. Australia is now formalising this emerging scientific discipline in a national association.

This poster will describe how the Association has been established. It will also outline the development of the Vision, Mission and Principles for the Association, collaboratively developed through working groups. It will outline ACSA's incorporation structure and will show the Goals and Strategies that have been developed from the Brisbane workshops, by the establishment Board and the Strategy working group. This Strategic Plan shows priorities for the next year and three years and the working groups needed to action the plan.

The poster will give information and act as a taster for the ACSA meeting on Saturday 25th where it is hoped the plan will be endorsed and working group volunteers recruited. This visual representation of the first year of the Association will provide a basis for discussion for conference delegates.

Key Words

Emerging scientific discipline, national association, structure, strategy, working groups

Environmental Identity and Citizen Science - New Research Project

Nina James[1], Sandra Taylor[1], Philip Roetman[1]

[1]University of South Australia, whinl001@mymail.unisa.edu.au

Biography:

Nina is a PhD student in the Discovery Circle Research Group at the University of South Australia, where she is focussing on the engagement and participation of citizen scientists in scientific research. Nina has a background in Natural Resource Management, Adult Education and Community Engagement and is particularly interested in the relationship between people and the environment. Nina and her husband Jay have five children, and if she can find any spare time between her PhD and an incredibly busy household, you'll find her sketching portraits, painting landscapes, or making up ditties on her harmonica.

Abstract:

How much do we know about the identity of the citizen scientist, or why people participate or don't participate in citizen science? Who is the citizen scientist that is driven to participate repeatedly; who is the part-time, one-time or first-time citizen scientist; and who is the potential citizen scientist, someone who has been discouraged from participating or who has been 'missed' by current recruitment techniques? This new research project is about the personal and social environmental identity of the adult citizen scientist and non-citizen scientist: the relationship between people, communities and the environment, sense of place and belonging, the influence of environmental experience in youth on the development of strong environmental identity in adulthood, and the personal and social factors that inhibit or foster participation in citizen science.

Commencing mid-2015, the project will seek insights from citizen science practitioners, citizen scientists and non-citizen scientists using multiple methods, and will focus on a variety of Australian citizen science projects and the communities where those projects occurred or are occurring. The findings will provide citizen science practitioners with a greater understanding of who is participating in their projects and why, as well as who is not getting involved and what it is that is holding them back. This information will support the design, development and implementation of participation strategies, and contribute new insights to citizen science as a field of research.

Key Words

Environmental identity, community, participation, engagement

Citizen Science as a Tool for Reversing Decline in Migrant Birds Species; The Case of the West Gonja District in Ghana

Felix Kwabena Donkor[1]

[1]University of Witswaterstrand, felixdonkor2002@yahoo.co.uk

Abstract:

The value in linking concepts of conservation with enhancing livelihoods and culture of people has gained global momentum in contemporary times. Explaining conservation in terms that are meaningful to local peoples enhances impact of conservation education and reduces hostility of local communities. A qualitative research methodology was employed in the West Gonja District of Ghana, in the Mole National Park, to help produce a wealth of culturally specific and contextually rich data crucial to devising holistic social interventions. Data collection on the park was based on literature review of current park management reports, juxtaposed with independent reports from the EU's Africa Protected Areas Assessment and design of the study was guided by the sustainable livelihood theory. These were studied against the backdrop of the Millennium Ecosystems Assessment and the UNEP-CMS Migratory Birds Flyways publications, coupled with key informant interviews. Results indicate the park is of historical and socio-cultural significance to the fringe communities, who trace their history to this site. The site encloses traditional shrines and other sacred sites, and local culture is replete with significance of birds in religion, medicine and other traditional rites. However there is low level of knowledge on the need for conserving birds or biodiversity in general, even though rural agriculture is dependent on sustaining critical ecosystem services derived from the area. This calls for conservation education to exploit the significance of birds in local lore and link it with the importance of biodiversity. This helps also to develop local ecotourism.

Key Words:

Sustainable livelihoods, rural agriculture, migrant birds, indigenous knowledge

Innovations: Digital Communication Tools

Jane Lambert[1]

[1]Ecocene Solutions

Biography:

Jane Lambert is an independent consultant from Ecocene Solutions, based in Sydney, Australia. She holds a Bachelor of Commerce and a Masters of Environmental Management (UNSW, 2014), and has over 15 years' experience as a communications and project management professional. Ecocene Solutions provides a range of strategic support services for conservation organisations, including campaign development, content optimisation, and social media outreach. Jane is particularly interested in the use of digital communication tools to improve environmental education.

Abstract:

Technological innovations have spurred the increasingly popularity of citizen science projects. GIS-enabled web applications allow the collection of large volumes of data; smart phones enable observations to be validated by digital photos; and online portals provide free data sharing. A raft of free online resources also allows rapid and inexpensive project initiation. This poster session will showcase new techniques and tools to support citizen science projects. It builds on a desktop-based research project conducted as part of a Masters of Environmental Management completed in 2014.

I will share examples of how citizen science projects are using innovations in communication technology to:

- Collect data
- Verify and validate data
- Visualise project results
- Recruit and engage volunteers
- Build online communities

The aim is to spark ideas and discussion about how conference attendees can leverage the power of technology tools for their own projects.

Key Words

Technology, Digital Communication, Social Media, Online Communities, Data Visualisation

Making incidental science work

Duncan Leadbitter[1,2], Daryl McPhee[3]

[1]Australian Aerial Patrol
[2]Australian National Centre for Ocean Resources and Security, dleadbitter@fishmatter.com.au
[3]Bond University

Abstract:

The Australian Aerial Patrol (AAP) has conducted beach safety flights over the Illawarra and Shoalhaven beaches for almost 60 years. A key component of beach safety is managing the potential risks to humans from sharks. On-board observers log the location and number of sharks during flights and we have almost completed an analysis of 17 years of data retrieved from the Patrol base.

Sharks are of major conservation significance due to the population declines of many species. However, there are few long term monitoring programs in place that are not based on catching the sharks and hence contributing further to population declines. The NSW Beach Meshing Program has decades of data based on culling sharks. Such programs no longer have strong public support and are questionable in terms of enhancing bather safety. Commercial fishery logbooks provide a variable source of information, as does the Gamefish Tagging Program, but there is no state-wide independent monitoring program, meaning that decisions about shark management rely on a variety of data sources. AAP data may well be a valuable source and no less problematic than existing data sets.

Aerial Patrol data are not collected for scientific reasons and we have embarked on a program of improving our understanding of their potential value and limitations. Key components of generating acceptance of the data include submitting analyses for peer review and seeking input from scientific experts in order to improve the data collection without compromising our primary function.

Key Words

Aerial patrol, sharks, shark cull, meshing, beach safety

The role of citizen science in the management of the Great Barrier Reef

Petra Lundgren[1], Melissa Rogers[1]

[1]Great Barrier Reef Foundation, petrablundgren@gmail.com

Biography:

Petra has been professionally involved with Great Barrier Reef since 2007. She did her postdoc at AIMS, where she studied genetic adaptation to climate change in corals, followed by various roles at the Great Barrier Reef Marine Park Authority. Since 2013, she works as an independent consultant and has recently commenced a contract with the Great Barrier Reef Foundation as coordinator of the Great Barrier Reef Citizen Science Alliance. When not coordinating CS, she maintains her conservation genetics interests trough a contract with the Centre for Mined Land Rehabilitation at the University of Queensland.

Abstract:

Citizen science groups have an increasingly important role to play, not only for advocacy and engagement, but also for scientific and management outcomes. A demand for large scale and long term environmental monitoring data coupled with budget and time constraints across all levels of Government and science have turned the spotlight onto citizen science. Coupled with the proven link between uptake and application of citizen science data and volunteer satisfaction and retention, this is a timely and exciting development. However, a clear line of sight between citizen science groups and the application of information and data to management calls for a coordinated approach to improve utility, up-take and accessibility of Citizen Science data.

The Great Barrier Reef Citizen Science Alliance (GBR-CSA) was established in 2013 by the Great Barrier Reef Foundation, with the support of corporate partner Boeing. It aims to advocate citizen science on the GBR through capacity building, networking, collaboration and collective gap and needs analyses. After an initial focus on networking and capacity building, we have recently expanded our focus to include the uptake and utilisation of citizen science data by managers. Our goals are to document, visualise and communicate citizen science data and develop methods for volunteer engagement and training as well as tool kits for data requirements and requests.

In addition to the above, we are exploring various concepts of “off- reef’ engagement using photographic, video and satellite imagery, which will enable people without proximity to the Reef to engage from their computer screens.

Key Words

Citizen science, collaboration, Great Barrier Reef, networks

A portal to a better world: improving beach-nesting birds conservation through real-time data capture

Grainne Maguire[1]

[1]BirdLife Australia

Biography:

Dr Maguire completed her PhD at The University of Melbourne on the behavioural ecology and genetics of a threatened Australian coastal bird. During her research, she engaged heavily with volunteers, which would become the basis of her role at BirdLife Australia heading the Beach-nesting Birds Program from 2006 onwards. She has overseen the evolution of this program from a small case-study research project that involved coordinating less than 100 participants, to a national multi-faceted program of research, education and citizen science.

Abstract:

Struggling to raise their young in a habitat loved by all Australians for recreation, beach-nesting shorebirds are at a major disadvantage. They are widely dispersed, experience a myriad of threats and are incredibly cryptic. Their conservation relies on having enough eyes on the ground to monitor the birds, their threats, and responses to management investment. Fundamental to successful conservation outcomes is not merely volunteer involvement but ensuring data is collected along the way and in a consistent way. BirdLife Australia's Beach-nesting Birds program has operated over nine years, evolving its data collection and management during this time, and developing an online data portal MyBeachBird, which has revolutionised the program. The portal allows for data to be viewed in real time and used by land managers to trigger on-ground management responses. With over 4000 entries a season, the portal acts as a communication and coordination tool, as well as allows for enhanced adaptive management. It includes an induction training module for rapidly assessing the knowledge new volunteers have taken onboard. The challenge still remains however in impressing upon citizens with a non-scientific background the true value of data and the power of measuring your actions and investment. Recruiting volunteers for participation in a science-based program is easy relative to taking them the next step toward becoming true 'citizen scientists'.

NSW Soil Knowledge Network; new directions in citizen science.

Sally McInnes-Clarke[1], Brian Jenkins

[1]NSW Office of Environment and Heritage, sally.mcinnesclarke@environment.nsw.gov.au

Biography:

Sally McInnes-Clarke is a Senior Soil Scientist with the NSW Office of Environment and Heritage. She has over 20 years' experience in soil health monitoring, post fire soil risk assessment and recovery, land assessment, soil survey and mapping.

Abstract:

The NSW Soil Knowledge Network Inc. (SKN) was established in late 2013, and is a group of 12 retired soil specialists from NSW. The members of the SKN are widely recognised as experts in their field and are raising the profile of community participation in science. The group is sought after for their soil knowledge and wish to mentor and inspire the next generation of soil specialists.

This project is a new direction for citizen science in NSW and aims to mitigate the loss of critical soil knowledge. In recent years there have been restructures and dwindling resources in the NSW public sector, leading to a significant loss of soil specialists, through retirement and redundancies.

The SKN is an independent group and a valuable bridge between community and government, whose long term goal is to promote the importance of soils and the use of quality soil knowledge and expertise.

The SKN has several current projects –

1. Adoption of an effective State Soil Policy is the first priority in 2015 the International Year of Soils;
2. The first is an educational video series which are an exciting and dynamic way to capture soil knowledge and presenting it in a way which easily accessible to a wide audience. Already being played in several high schools and universities, we expect that these videos will become an invaluable resource for our customers in the years to come;
3. Technical soil workshops with agency and community partners; and
4. Updates to soil landscape mapping.

NSW Soil Knowledge Network Inc.; educational video series

Sally McInnes-Clarke[1], Brian Jenkins

[1]NSW Office of Environment and Heritage, sally.mcinnesclarke@environment.nsw.gov.au

Biography:

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Abstract:

The NSW Soil Knowledge Network Inc. (SKN) was established in late 2013, and is a group of 12 retired soil specialists from NSW. The members of the SKN are widely recognised as experts in their field and are sought after for their soil knowledge. They are people who can't get the passion for soils out of their blood and wish to mentor and inspire the next generation of soil specialists.

This project is a new direction for citizen science in NSW and aims to mitigate the loss of critical soil knowledge. In recent years there have been restructures and dwindling resources in the NSW public sector, leading to a significant loss of soil specialists, through retirement and redundancies.

The flagship project for the SKN is the educational video series. Six videos have been produced to date

1. Why soils are so important
2. Saline and sodic soils – the difference
3. Your soils from top to bottom
4. Paddock tests for soil health
5. Who we are
6. Our purpose

These videos are an exciting and dynamic way of capturing soil knowledge and re-packaging it to a new and broader audience. The target audience is wide and includes NRM professionals, community groups and landholders. Future topics include:

1. Organic matter and carbon for soil health
2. Soils ARE biodiversity
3. Adaptive soil management and climate change

A review of off-the-shelf sky cameras and cloud technology for Citizen Science

Christopher Mesiku[1,2], Mani Abedini[2], Rahil Garnavi[2]

[1]University of Queensland/ IBM Research Australia, c.mesiku@uq.edu.au
[2]IBM

Biography:

Christopher Mesiku is a Doctoral Candidate at University of Queensland. He has over 15 years of experience in science communication around Physics and Astronomy concepts. He has worked with citizens in Kenya Nairobi as part of the International Center for Research in Agroforestry. One of his focus areas is in leveraging data analytics and machine learning to encourage citizen science.

Abstract:

One of the key challenges halting the full inclusion of solar energy into the electricity grid is its unpredictable nature. The main causes of solar-energy uncertainty are the amounts of aerosols and the unpredictable velocity, formation and dissipation of clouds. The increased public awareness campaigns surrounding solar energy have encouraged researchers to investigate ways to calculate and/or predict the levels of aerosols and clouds. It has been demonstrated that solar irradiance can be predicted using research grade fisheye cameras.

Various researchers have since utilised these dedicated sky cameras to forecast solar irradiation. Chow et al from UC San Diego have shown that it is possible to use sky images to predict cloud impact on the amount of solar energy. Samuel West's team from CSIRO recently used fisheye security cameras to image the day sky and predict clouds and their instantaneous impact on solar power output.

Though very important, there are not enough researchers to collect the amount of data required to give a complete view of instantaneous global solar irradiation. With the continued reduction of off-the-shelf sky camera prices, citizens have a real opportunity to help collect data for real time prediction of solar energy. Citizens may be able to use these specially engineered sky cameras to improve existing climate models.

Key Words

Solar, short-term Irradiance, Clouds, Total Sky Imagery, Whole Sky Camera, Solar Forecasting, Circumsolar region, solar-obstruction.

Citizen Science in the Classroom - the Fun and the Failures

Michelle Neil[1]

[1]Australian Citizen Science Association

Biography:

Michelle is a scientist volunteering with CSIRO's Scientists in Schools program. Ever since she found out about Citizen Science in Australia she has been an enthusiastic CitSci instigator within the Science Clubs that she runs at 2 schools. She loves how excited the kids get when they investigate the macro to the micro (solar system to ants). She can be found on weekend playing sax in a 20 piece big band or doing citizen science with her 2 young boys and scientist hubby. In her spare time she works in a forensics laboratory in Brisbane.

Abstract:

Many Australian teachers are unfamiliar with Citizen Science, how it is related to the National Curriculum and how they can fit it in to their science class.

Citizen Science, at its basic level, fits perfectly into the national curriculum under the areas of “Science as a Human Endeavour” (exploring and observing the world) as well as “Science Enquiry Skills” (make observations, processing and analysing data).

Both students and teachers are amazed at the possibilities when told about them and are eager and excited. But it isn’t all fun and games. Sometimes there is difficulty with the school structure itself or the area in which a school is situated in. How do we tell teachers about citizen science and the wonderful ipad apps they can use in their classroom when schools are 1. new to apps / ipads and 2. new to citizen science?

The Fun:

- Showing students how to take a picture correctly. (This is often overlooked on Citizen Science portal’s training sessions)
- Exploring the macro and micro scales (Bowerbird)
- Discussing the ecology of a stream or even the school oval (birds and bugs)

The Failures:

- No school wifi signal down at the watercourse / creek / school oval to upload results
- Blurry pictures from enthusiastic students
- OH&S requirements of the school system (permission slips, hazard forms etc.)
- Cameras disabled on ipad / tablets
- Tablets / ipads not used at the school
- Emailing teachers who can’t receive HTML format or picture files

This poster aims to be an informative look from the other side of Citizen Science – The Citizen.

The magic of Citizen Science policy

Stuart Pearson[1], Anna Carr[2]

[1]University of New South Wales, S.Pearson@unsw.edu.au
[2]Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture

Biography:

Stuart works at the University of New South Wales Australian Defence Force Academy educating officers for the Navy, Army and Air Force in geography and environmental management. This continues a career in education of people who make a difference. Prior to that he worked in research investment roles to achieve public good outcomes in natural resource management. One of those investments with Earthwatch grew to become Climatewatch. Stuart has insights into evaluation of investment and policy-making.

Abstract:

The rapid growth in citizen science this decade engages citizens as amateurs and volunteers while supporting developments in professional science. New policy and investment (the authors have been involved in both) have enabled growth in citizen science. There is political and community pressure for a more active role in the focus, practice and use of ecosystem science for natural resource management in particular. Professional scientists also recognise the benefits of efficient data gathering and sustained engagement and have been key enablers of the growth of citizen science. Most recently the rapid spread of internet technology has sought to engage people in efficient data collation. However, wishful (magical) thinking has placed some unrealistic and unreasonable expectations on citizen science. Citizen scientists cannot realistically be expected to achieve massive transformation in ecosystem function. Nor can they be held responsible for gathering long-term and dispersed data, synthesising specialist knowledge and resolving wicked environmental problems. Citizen science is a necessary but insufficient condition for global environmental change and it is very unlikely to deliver the type of broad-scale ecosystem changes that both citizens and policy makers hope for. There are serious consequences for over-reliance and under-investment in citizen science that we will explain in this paper.

Key Words

Citizen science, policy, evaluation, natural resource management, knowledge, realistic expectations

Redmap: Large-scale approaches to ecological monitoring and community engagement through citizen science

Gretta Pecl[1], Jemina Stuart-Smith[1], Martha Brians[2], Dianne Bray[3], Michael Burgess[4], Gary Jackson[4], Natalie Moltschaniwskyj[5], Keith Rowling[6], Marcus Sheaves[2], Peter Walsh[1]

[1]Institute for Marine and Antarctic Studies, University of Tasmania, Gretta.Pecl@utas.edu.au
[2]Centre for Tropical Water & Aquatic Ecosystem Research, James Cook University,
[3]Museum Victoria
[4]WA Fisheries and Marine Research Laboratories
[5]University of Newcastle

Biography:

Gretta is an ARC Future Fellow, a previous Fulbright Fellow, and the Deputy Associate Dean of Research at the Institute for Marine and Antarctic Studies. Her recent research activity spans a wide range of topics from theoretical to applied ecology, including assessment of species range shifts, population and fishery responses to climate change, development and evaluation of adaptation options to respond to climate change, and on using citizen science approaches for ecological monitoring and engagement (e.g. www.redmap.org.au). Gretta leads several large National and regional marine climate change projects at IMAS and has a strong commitment to science communication with the public and industry.

Abstract:

Participants in citizen science projects have the capacity to record observations of their environment with high precision and accuracy, however, challenges remain in making large-scale collection and verification of species data by the (potentially) untrained public a robust long-term endeavour. Redmap (Range Extension Database and Mapping project, www.redmap.org.au) invites members of the Australian public to submit photographs and data about unusual observations of marine species made while undertaking marine activities like fishing, diving, boating, and beachcombing. Citizen science projects aimed at ecological monitoring can be programs that have a small number of highly trained contributors where the data obtained can be as accurate as that from professional scientifically trained observers, through to those with a comparatively larger number of contributors but with a (generally) lower level of training. Projects that operate at a larger scale, and without extensive formal training of contributors, are often criticised regarding the scientific rigour of observations submitted. Adoption of such datasets may be hindered by a perception they are of low quality in comparison to those collected by scientists. Redmap has designed a distributed data verification system to allow a 'managed crowdsourcing' of scientists for data verification and processing of every observed submitted. Each species in the Redmap database is linked directly to one or more of 80 scientific experts around the country and each observation location (provided by the user) is compared to the pre-identified and pre-defined distribution for a species. The Redmap model provides a unique and semi-automated framework for efficiently collecting, collating, verifying, sharing and utilizing geo-referenced species observational data.

The role of the Australian Museum in creating Citizen Science Communities

Fara Pelarek[1]

[1]Australian Museum, fara.pelarek@austmus.gov.au

Biography:

Fara Pelarek is the Head, Life Long Learning, managing the Australian Museum's on and offsite education programs as well as Citizen Science initiatives and postgraduate students. Previously, Fara managed the Museum's Visitor Services unit for 13 years and was responsible for visitor experience

Abstract:

Citizen Science is a large and growing movement in Australia and the role that museums play in in supporting communities to be involved is becoming crucial and an increasingly important way to engage with the community. The Australian Museum has a long history of citizen science initiatives is involved in many projects that involve the community in the collection, processing and interpretation of data. The Australian Museum has taken on the Streamwatch program, a long running water quality monitoring program. The Museum also runs a Digitation Project, Digivols, where volunteers make the collection label data accessible without needing to go to the physical collection. This talk will discuss how these projects came to be, how they have impacted on the work of the museum, and the lessons we have learned. The Australian Museum wants to tap into the great amount of community interest in the science activities of the Museum and in this presentation we outline the future direction of Citizen Science and Australian Museum.

Key Words

Museum, engaging communities, volunteers

Creating deliberation online: Developing a Citizen Science Strategy 2020 for Germany

Lisa Pettibone[1]

[1]Helmholtz Centre for Environmental Research / German Centre for Integrative Biodiversity Research

Biography:

Lisa Pettibone holds a PhD in Environmental Policy from the Freie Universität Berlin. Her study investigated how leading U.S. and German cities define sustainability and incorporate it into policymaking processes. In the past, Lisa worked for the nonprofit organization Citizens For Europe, and in the U.S. Senate and the German Bundestag. She holds a master's degree in public administration from George Washington University. Her research interests are Citizen Science, Urban Sustainability and citizen engagement.

Abstract:

Citizen science is an increasingly popular approach to science, one that brings professional scientists together with volunteer scientists, scientific clubs, or interested laypeople. Citizen science has recently gained the attention of science policymakers, increasing the importance of developing a strategy to promote and support citizen science projects. Following the approach used by Socientize at the European level, the GEWISS (BürGEr schaffen WISSen, or "Citizens create knowledge") project conducts an online consultation process to aid development of a strategy for citizen science in Germany in 2020. This poster presents the conceptual underpinnings of GEWISS's deliberative approach and discusses the possibilities and challenges of using online deliberation methods for strategy development.

Key Words

Citizen Science Strategy, deliberation methods, strategy development

Learning from relationships: a social network analysis of citizen science programs

Anett Richter[1], Jennifer Hauck, Aletta Bonn

[1]Helmholtz Centre for Environmental Research / German Centre for Integrative Biodiversity Research

Biography:

Anett holds a degree in Nature Conservation and Landscape Planning from Germany and received her PhD in Applied Science from the University of Canberra inn 2010. During her PhD on the effects of grasslands fragmentation and modification on insect diversity, Anett initiated and coordinated a WWF funded Citizen Science Project in Canberra. Anett is a postdoc within the department for ecosystem services and project coordinator for the German Citizen Science Capacity Building Project, GEWISS. Her research involves the study of the impacts of social networks on citizen science programs.

Abstract:

Most successful citizen science projects are those characterized by locally appropriate and adaptive structures to the community with a functional network of coordination and established mechanism for information delivery. The network of scientists, administrators and citizen scientists enables a real time communication and face to face interactions and consequently allows the growth of a program. Further, these relationships between the various actors are an important part of the act of learning and “doing science at a local level”. Over the last ten years, the German Butterfly Monitoring Scheme has operated on the basis of a network of local participants, regional butterfly experts and national coordinators to manage appropriate responses between scientists and citizen scientists. Here, we present our initial results on the analysis of the functionality of networks in citizen science projects and the impact of social relationships on people’s learning, thinking and behavior processes. The aim of our study is to better understand why people engage in citizen science projects and how engagement impacts on their lives.

Key Words

Social Network Analysis, German Butterfly Monitoring Scheme, Engagement, Learning

Maximising citizen engagement after an unexpected event: Fireballs in the Sky and the Perth Daytime Fireball

Jay Ridgewell[1], Leonie Rennie[1], Phil Bland[1]

[1]Curtin University, Jay.ridgewell@curtin.edu.au

Biography:

Jay Ridgewell is a science outreacher who's presented travelling science shows and workshops with Scitech, Questacon and the Edinburgh International Science Festival. She loves finding out how and why things work and is communications and outreach guru for the Desert Fireballs Network as part of her job as Geoscience Outreach Officer at Curtin University. She also loves to travel and takes every opportunity to get out and share science with everyone she can find. She studied biochemistry and primary teaching at the Queensland University of Technology and science communication at the Australian National University in Canberra.

Abstract:

On Monday 9 March 2015 at 9:26am something extraordinary happened. Through a clear blue sky a fireball streaked and exploded over the skies of Perth WA. Media coverage of the Perth Daytime Fireball was immediate. Dash-cam videos were aired, witness accounts were on every radio station and the Fireballs in the Sky team seized the opportunity to engage with a significant science event.

Fireballs in the Sky is a citizen science project established in 2012 by Curtin University and supported by Inspiring Australia. Centred around a successful smartphone app (over 12 000 downloads internationally), it enables people who observe a meteor to report their sighting by submitting a simple simulation into a real-time database. This report documents the Perth Daytime Fireball event, the Fireballs in the Sky team response and our efforts to maximise citizen engagement with planetary sciences.

Citizen responses via the app provided initial data for the Fireballs in the Sky team to calculate a preliminary path and landing site of the fireball. This presentation features the issues relating to data quality from the app and how to best utilise citizen engagement. It reports on media involvement, use of the app to pinpoint meteorite landing zones and citizen engagement through public interactions, web updates and social media.

This case study shows how to capitalise on an unexpected local event and how to encourage mainstream media to engage their audiences in your science. Having a responsive team and clear, open communication channels helps maximise the potential for effective citizen engagement.

Key Words

Citizen Science, Citizen Engagement, Fireballs in the Sky, Desert Fireball Network, Smartphone App, Science Outreach, Curtin University, Media Coverage, Social media, Australia-wide, International, Meteor, Meteorite, Geology, Science

'Scaling up' learnings from the locals to inform national evaluations of natural resource management program effectiveness

Cathy Robinson[1], Nathan Sibley[2], Mitch Jeffery[3], Peter Brenton[4]

[1]CSIRO – Australia
[2] Monitoring and Reporting, Biodiversity Conservation Division
[3]MERIT and Indigenous policy, Dept Environment
[4]Atlas of Living Australia

Biography:

Cathy Robinson is a senior scientist at CSIRO who is also part of a collaborative team dedicated to enabling local knowledge and learnings to be meaningfully 'scaled up' to evaluate NRM effectiveness.

Abstract:

Australia has embarked on an exciting albeit challenging effort to capture local and regional natural resource management (NRM) programs and activities through a national monitoring, evaluation, reporting and improvement tool (MERIT). This paper reflects on a research collaboration with the MERIT team to consider the potential applications and pathways for 'scaling up' integrated assessments of the benefits and effectiveness of local Indigenous and non-Indigenous NRM activities and efforts.

Cat Tracker: an international citizen science project exploring the movement and management of cats

Philip Roetman[1], Heidy Kikillus[2], Roland Kays[3,4], Troi Perkins[3,4], Rob Dunn[3,4], Holly Menninger[3,4], Hayley Tindle[1], Carla Litchfeild[1], Sarah Davidson[5]

[1]University of South Australia Philip.Roetman@unisa.edu.au
[2]Victoria University of Wellington
[3]North Carolina State University
[4]North Carolina Museum of Natural Sciences
[5]Max Planck Institute for Ornithology

Biography:

Philip has been involved in running citizen science projects and events since 2007. He is now the lead researcher of the Discovery Circle (www.discoverycircle.org.au). This initiative engages communities in activities to learn about and connect with local natural environments. The Discovery Circle is running citizen science projects, interactive workshops and generating online content to promote learning and engagement. Current projects include BioBlitzes, Cat Tracker, Birding the 'burbs, Little Corellas, FlukerPosts and Goanna Watch.

Abstract:

Cats are one of most popular pets worldwide, providing their owners with enjoyment and companionship, but can also be a nuisance to neighbours and may have a negative impact on native wildlife. The ways cats are managed by their owners could influence the behaviour and ecological impact of cats, but there is a lack of data that can address these complex cross-disciplinary issues and guide decision-making. We have initiated a citizen science project 'Cat Tracker' to collect both environmental and social data exploring the relationships between cat management and cat behaviour. The project combines a social survey and GPS tracking to turn cat owners into researchers. It aims to help better understand the cats' home range, how much time they spend in different kinds of habitat, and how owners can manage pet cats to reduce their impact on wildlife.

This project was established in the USA and has expanded through collaborators in Australia and New Zealand. Citizen scientists send the raw movement data to researchers, who process and upload the data to Movebank.org, a publically-available online tracking database. The project is ongoing, and aims to track thousands of cats around the world. Analysis of environmental data will focus on the movement-range of tracked cats related to natural or built environments and local predator populations. Social data will be analysed to explore links between the management of cats and their movement patterns. The international collaboration will allow us to compare results in diverse environmental and social settings.

Key Words

Cats, international collaboration, interdisciplinary

Volunteers Engaging Our Communities

Peter Saunders[1], Michelle Stook[1]

[1]Bush Heritage Australia, michelle.stook@bushheritage.org

Biography:

Michelle Stook has over a decade of experience working and coordinating volunteers in a myriad of programs. Currently she is the National Program Coordinator for Bush Heritage Australia. Previously she managed the Queensland component of Red Cross's National Voluntary Service program reforms for the 5000 Queensland Volunteers. Prior to this she managed the Queensland Volunteer Program that facilitated the United Nations contract to resettle newly arrived refugees and asylum seekers to Queensland and was a Project Manager implementing new strategies to support a Buddhist Palliative Care organisation and their volunteers, nurses, social workers and spiritual carers.

Abstract:

Bush Heritage is a national not-for-profit conservation organization that aims to secure and protect Australia's biodiversity and natural landscapes. We do this through acquiring land of outstanding conservation value to manage as conservation reserves and helping others to achieve better conservation outcomes on their land. Together with our partners, we manage over 5 million ha for conservation.

Bush Heritage benefits from the dedication and expertise of approximately 500 volunteers across the country and across all aspects of our work – land management, ecology and monitoring, administration and fundraising. Our collaborations have allowed us to support citizen science programs with various groups and agencies inclusive of Conservation Council Climate Change Observatory, the Commonwealth Bush Blitz Species Discovery Program, Ornithological Group bird surveys, Friends of Grassland monitoring, Birdlife Australia (NQ) bird monitoring and reptile monitoring. Volunteers are passionate about the work they contribute to with the collection of baseline data and evaluation leading to improved conservation outcomes of our reserves.

We have recruited a cohort of skilled volunteers who are experts in their fields and who want to engage and inspire others. The model we have developed enables volunteers to lead other volunteers in order to increase knowledge and awareness of conservation tools, methodologies and outcomes. The connection to land and others and the advancement of scientific evidence to support the work that we do, produces positive effects in our volunteers. Connecting with nature and natural landscapes, experiencing a sense of wellbeing and fulfilment is sensed from contributing to a common goal, and feeling part of something bigger that supports Australia's natural heritage.

Key Words

Volunteers, conservation, engagement

Understanding intellectual property in citizen science

Teresa Scassa[1], Haewon Chung[1], Anne Bowser[2], Elizabeth Tyson[2]

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[2]Woodrow Wilson International Center for Scholars, anne.bowser@wilsoncenter.org

Biography:

Anne Bowser co-directs the Commons Lab at the Woodrow Wilson International Center for Scholars, a think tank in Washington, D.C. In this capacity she conducts and sponsors research to advance the practice of citizen science, particularly within U.S. government agencies. She is also a PhD candidate at the University of Maryland, where her dissertation focus on identifying how new technologies such as games can motivate new groups of citizen science volunteers. Her research also examines how volunteers articulate privacy concerns, and what projects may do to support volunteer privacy through policy, technology, and education.

Abstract:

Citizen science projects are designed to achieve outcomes including advancing scientific research through publication, and engaging broad audiences in data collection, analysis, or science-based advocacy. Practitioners must understand intellectual property (IP) to achieve stated outcomes, and also to avoid unanticipated consequences related to data use or abuse.

Intellectual property considerations, including copyright, patenting, and database rights, are functions of the nature of participants' contributions. For example, different IP concerns are evoked by activities such as data classification or transcription; different types of data collection, participating in citizen science as a research subject, and problem solving or ideation. IP considerations are also shaped by relevant national and in some cases international laws. Finally, involving third party websites, such as mapping applications or social media platforms, may raise additional IP considerations beyond those that exist between projects and volunteers.

Understanding the IP considerations that participation may raise is crucial to deliberate project design. In addition to understanding relevant IP issues, projects should host data policies such as terms of use that communicate their IP decisions to current and prospective volunteers and to the public at large. Data policies describing how intellectual property is handled will protect projects from potential harm such as litigation, and will allow volunteers to make informed decisions about whether to participate in a project and what sorts of data to share. Finally, transparency supports trust between projects and volunteers. As such, understanding, developing and articulating IP policies is a legal, ethical, and practical concern.

Key Words

Intellectual property, copyright, patent, data, database

Under the wharf - Monitoring the Little Penguins of Manly and supporting the Penguin wardens

Jacob Sife[1]

[1]Kuringai Council

Biography:

Jacob is an ecologist, environmental practitioner and project manager with experience in both the private and public sector. He has a love for wildlife and nature and is inspired by the dedication of others to sustainability and conservation.

Abstract:

Under the wharf in Manly Harbour is a poorly kept secret, a breeding pair of Little Penguins. Despite the odds, the ferries and motor boats, the human impacts, the rubbish, the noise, the development and the unleashed dogs, a breeding pair of Little Penguins, who predominantly inhabit bays of the peninsula and extend into the National Park, have maintained a presence under the wharf. A dedicated and knowledgeable group of volunteers monitor the penguins and help protect them from some of the threats. Manly Council installed a remote camera under the wharf, and provided real time access to specific members of the penguin warden and conservation community. Whilst the camera was a proof of concept, it proved to be useful and controversial. Seen as a support to the work of the conservation community by some, and as a hindrance by others. This presentation will look at what was accomplished, how the community responded, and where to from here, for the penguins and the citizens.

Jelly-beans-in-a-jar versus Expert-observers - the multiple pathways to crowd sourced data confidence

Michael Sharman[1], John Gooderham[2]

[1]The Code Sharman, michael@thecodesharman.com.au
[2]The Waterbug Company

Biography:

Over 15+ years' experience in the software development industry, Michael is the lead programmer behind "The Water Bug" mobile app which aims to build a tool useful for citizen science to discover freshwater invertebrates.

Abstract:

Crowd sourced data confidence can be attained through all sorts of mechanisms, from the "Jelly-bean-in-a-jar" to the "Expert-observers" models depending on the subject matter and number and diversity of people available to participate. This poster investigates different models, when they are appropriate and the collection of tools that can be used to re-inforce the strengths and ameliorate the weaknesses inherent in these data collection scenarios.

Key Words

App, Data Quality, Education

Volunteer recruitment and retention: Understanding the psychology behind their motivations

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[1]CSIRO. Sorada.Tapsuwan@csiro.au

Biography:

Sorada is a Resource Economist with the Adaptive Social and Economics Sciences Group of CSIRO Land and Water Flagship in Western Australia. Her work centres on the application of social and economic instruments to assist in efficient and equitable management of scarce natural resources and to help households, local governments and state governments to adapt to climate change. Sorada also holds an Adjunct Lecturer position at the School of Agricultural Resource Economics, University of Western Australia. Sorada has extensive experience in water demand and supply management and has published a number of papers in this field.

Abstract:

Volunteer programs, such as citizen science, benefit environmental management. Volunteers do tedious, difficult, and time-consuming activities, often at their private expense. Lengthy projects are particularly problematic, and the need to continually train new participants, due to loss of interest or fatigue, is time-consuming and costly. Despite all this, some volunteers remain engaged because what the program offers is in line with their values, motivations and expectations. Our review of current citizen science frameworks suggests that little is understood about the 'values' that underpin volunteer motivations and expectations. The volunteerism literature suggests that people volunteer in environmental programs because they want to contribute to the community, to care for the environment, and/or to interact with others. Underpinning these motivations lies a deeper 'environmental values orientation' (Stern et al., 1993). Those with egoistic value orientations engage in pro-environmental behaviour for 'self-interested' reasons. Those with altruistic valuation orientations behave pro-environmentally due to 'societal concerns'. Those with biospheric value orientations weigh the costs and benefits of pro-environmental behaviour against ecological changes. These values are orthogonal to the principles of scientific inquiry and the motivations of the science professionals running the programs. Better understanding the value orientations of volunteers can help those running science volunteer programs select, train, and retain volunteers.

Keywords

Citizen science, environmental values orientation, volunteer retention, pro-environmental behavior

Love and loss: exploring the human-companion animal bond with citizen science

Sandra Taylor[1], Philip Roetman[1]

[1]University of South Australia

Biography:

Dr Taylor is an Adjunct Senior lecturer in Urban Ecology at the University of South Australia and a researcher/research supervisor associated with the Discovery Circle. Her current research is concerned with urban biodiversity conservation, environmental history, citizen science and Australian nature writing. Through the Discovery Circle, she supervises research on the factors influencing participation in citizen science projects and assists Dr Philip Roetman with Cat Tracker. She is a plant ecologist, but has a keen interest in the conservation of endangered animal species, which she expressed in her spare time by volunteer guiding at both Monarto and Adelaide Zoos.

Abstract:

The Discovery Circle's Cat Tracker project aims to investigate domestic cat behaviour and management using a two part citizen science methodology. The first part is a social survey asking South Australians about their attitudes towards and management of domestic cats (both owned and semi-owned). The second part is a cat tracking study using GPS units attached to cat harnesses.

The social survey includes an open-ended section where participants are encouraged to "tell us your cat's story". Previous social surveys on urban wildlife in South Australia have shown that the stories people tell about animals can reveal a great deal about the nature of their affectional bond with animals they know as individuals.

The nature of the human-companion animal bond is now a major focus of research in the field of human-animals studies, particularly in relation to the therapeutic benefits of an affectional relationship with a companion animal, the grief experienced by people on the loss of a companion animal, and therefore the need to include companion animals in disaster management strategies and in the provision of care for elderly owners of companion animals, especially in the retirement and nursing home environment. We hope our content analysis of the stories provided by Cat Tracker participants will contribute to these research agendas

Although our social survey is still on-going and our research results are very preliminary, our poster will feature examples of stories that will demonstrate the value of these narratives as a research tool in human-animal studies.

Key Words

Human-animal studies, citizen science, companion animals, domestic cats, narrative content analysis.

Evaluation of volunteer participation in threatened bird recovery projects

Janelle Thomas[1], Meghan Cullen[1], Danielle Hedger[1], Caroline Wilson[1]

[1]BirdLife Australia, janelle.thomas@birdlife.org.au

Biography:

Janelle Thomas has completed an Honours Degree at Monash University and a Masters in Wildlife Management from Macquarie University. She has worked in conservation for 19 years on various projects involving volunteers, such as platypus research in urban Melbourne, biodiversity conservation on Kangaroo Island and as a team leader for volunteers undertaking on-ground conservation. Janelle currently manages the Threatened Bird Network at Birdlife Australia, a national project that engages citizen scientists in threatened bird conservation. She has also managed and worked on other projects at BirdLife Australia including the Orange-bellied Parrot Project, Australian Painted Snipe Project and Beach-nesting Birds Project.

Abstract:

The Threatened Bird Network (TBN), established in 1996, is a national volunteer based program aimed at encouraging community participation in threatened bird recovery projects. TBN links community members with a range of opportunities (e.g. bird surveys, recovery programs, training workshops) to build the capacity and skills of volunteers and enhance the efforts of bird conservation projects. In October 2013, an anonymous survey was sent out to all TBN members to evaluate current member demographics, level of involvement and volunteering motivation and preferences.

A total of 551 members responded to the survey. Survey results demonstrated that members were enthusiastic to participate, and a majority of respondents had previously volunteered with TBN projects. A large proportion of survey respondents were between 55 and 74 years old, and most had a good level of volunteering experience. One of the strongest motivators for volunteer participation was ‘making a difference to the environment’. Volunteering preferences included: short-term (one day) activities, field-based activities, short travel distance, and more regional or local volunteer opportunities.

The information from this survey highlights the importance of volunteer evaluation, in improving projects such as TBN to enhance volunteer experiences, provide rewarding volunteer opportunities, and continue to effectively engage the community in conservation. Results from this survey will guide the future direction of both TBN and its partner threatened bird projects, and thereby helps improve conservation outcomes for threatened species conservation.

Key Words

Threatened, bird, volunteer, motivation, community

A Tourism Network to Assist Wildlife Research

Peter Wood[1], Ronda Green[1]

[1]Wildlife Tourism Australia, peter.wood@ozemail.com.au

Biography:

Peter Wood is a committee member for Wildlife Tourism Australia Inc since 2012. A GIS professional, he is also Secretary for Great Barrier Reef Legacy Inc. He was co-editor for the Journal of Ecotourism Field Notes in 2013/14. He completed a PhD in research tourism via the James Cook University in 2011.

Abstract:

Wildlife Tourism Australia is an Australian national body (incorporated 2002) focusing on sustainable non-consumptive wildlife tourism in all its forms, but with a major focus on native free-ranging wildlife. Its mission is to promote the sustainable development of a diverse wildlife tourism industry that supports conservation.

We are developing a wildlife research and tourism network (WRTN) to assist communication between tourism personnel (e.g. owners and staff of tour companies, ecolodges and wildlife parks) and generate significant wildlife research outcomes. This poster highlights how tourism operators and tourists can participate in wildlife research and how research, conservation, and tourism can benefit.

WRTN plans will be guided by an empirical framework for research tourism combining research, conservation, community involvement, hospitality, and features of better known tourism types such as wildlife tourism, educational, adventure, alternative, and volunteer tourism. This poster introduces this framework.

Key Words

Wildlife, tourism operator, research, network, benefits, volunteer, adventure

WORKSHOP 3: Data – Validation and Analysis

Evaluating protected area effectiveness using bird lists in the Australian Wet Tropics

Megan Barnes[1,2], Judit K Szabo[1,2], William K Morris[3], Hugh P Possingham[1,2]

[1]Australian Research Council Centre of Excellence for Environmental Decisions, School of Biological Sciences, The University of Queensland, megan.barnes@uq.edu.au
[2]National Environmental Research Program, Environmental Decisions Hub, The University of Queensland
[3]Research Institute for the Environment and Livelihoods, Charles Darwin University

Abstract:

Protected areas are the cornerstones of global conservation management, but in many cases it is unclear whether they are effective in maintaining their biodiversity values. Long-term systematic population monitoring data is exceptionally rare, but critical for determining species and community level changes in natural values. In Queensland this data exists only for a tiny fraction of all species. Long-term, increased monitoring is urgently required, but meanwhile, insufficient data exist with which to make adequate informed decisions. Conversely, species list data is common, especially for birds. We use Birds Australia atlas data and apply logistic regression within a Bayesian framework and List Length Analysis to evaluate changes in prevalence for over 100 bird species in the Wet Tropics since 1998 to investigate whether protected areas in the Wet Tropics region are effective in maintaining their biodiversity values. We also examine the influence of habitat type and species ecological traits on changes in abundance. The influence of protection varied among species and correlations with other variables were also idiosyncratic, but for some species clear trends are evident. Where systematic monitoring data is not available, List Length Analysis can be a valuable substitute to evaluate biodiversity status, identify monitoring priorities and inform policy and adaptive management.

Key Words

Australian Wet Tropics, birds, citizen science, conservation evaluation, impact evaluation, protected areas

DigiVol – data validation

Paul Flemons[1]

[1]Australian Museum, paul.flemons@austmus.gov.au

Biography:

Creator of DigiVol and Biodiversity Informatics specialist from the Australian Museum. Head of the recently created Australian Museum Centre for Citizen Science.

Abstract:

The DigiVol programme involves volunteers helping digitise biodiversity and cultural collections through image capture, transcription, data entry and georeferencing. This range of activities provides volunteers with considerable scope for interpreting and applied research activities in relation to a range of subjects including collectors and locations across specimen/object collection events and diary entries. To ensure the resultant data is commensurate with an acceptable level of data quality we have implemented a number of processes to validate and normalise data. This includes manual volunteer based validation of transcriptions that engages the volunteers themselves in maximising the accuracy of the transcriptions that come out of DigiVol, combined with a semi-automated approach to normalising the resultant transcriptions to better present the data in a form for use in research and collection management. Qualitative feedback from comparable projects around the world indicates our combination of human and machine is comparatively more effective than techniques used by others.

Key Words

Crowdsourcing, digitising, DigiVol, museums, collections, online, data quality, validation, research

Gateways and gatekeepers: issues around the identification bottleneck for citizen science observations of fungi

Tom May[1]

[1]Fungimap / Royal Botanic Gardens Melbourne, tom.may@rbg.vic.gov.au

Biography:

Tom May is a Senior Mycologist at Royal Botanic Gardens Melbourne with research interests in the taxonomy, ecology and conservation of larger fungi. He is involved in several international fungi groups, including as current Secretary of the Nomenclature Committee for Fungi. Tom also has an active role in community natural history organisations, and is a past President of the Field Naturalists Club of Victoria and current President of Fungimap Inc. His contributions in setting up and fostering Fungimap were recognised by award of the Australian Natural History Medallion in 2014.

Abstract:

Fungimap has been active since 1995 in mapping selected Australian fungi, with a focus on those readily recognisable in the field. In the last decade, there has been a rapid increase in the quantity, quality and web-accessibility of digital photographs of fungi. However, few of these photographs are directly submitted to Fungimap, and many lack geographic data. At present, images submitted to Fungimap are identified in-house by a small pool of experts; with feedback on identification provided only to the photographer. Along with the rapid increase in images is a multiplication of websites that provide venues for identifications of fungi, with and without the facility for discussion. There are structured approaches with community moderation of identification, as exemplified by Mushroom Observer and BowerBird and unstructured approaches, such as comments posted on Facebook and photo-sharing sites such as Flickr. Fungimap observations are provided to the Atlas of Living Australia, which also allows direct submission of fungi records. Not all websites that collate fungi images have mandatory provision of geographic coordinates. There are few experts available to identify fungi, and the time they can spend on-line is limited. However, on-line discussion has the potential to improve identification skills among non-experts, and to leave a trail for future reference. The utility and practicality of various systems and workflows of image identification is discussed, taking into account issues of expert availability, user expectations, and the end use of image metadata.

Key Words

Fungi, observations, digital images, mapping, identification, experts.

Credible data: The Waterwatch Victoria Quality Assurance Program

Deirdre Murphy[1]

[1]Corangamite CMA

Biography:

Deirdre Murphy's post graduate studies were in aquatic colloid at the Water Studies Centre, Monash University. During her working life prior to university, she was a general nurse. After university she worked with engineers and chemists at Kodak Research Laboratories in Coburg. She has enjoyed working in the Waterwatch program for 11 years.

Abstract:

The Waterwatch Victoria program commenced in 1993 and has developed a quality assurance (QA) program to collect useful and credible data. In this citizen science program, data has been collected by community volunteer monitors to evaluate water quality through physico-chemical tests and surveys of habitat and aquatic biota.

Community collected data monitoring can be a long term commitment, and to recruit and retain community monitors, the monitors need to be assured their data is fit for purpose. Waterwatch programs are delivered at a regional scale with support from CMAs, water authorities, councils etc. The stakeholders have an interest in data for waterway management and therefore it must be of suitable standard and easily accessible.

Waterwatch identifies the confidence limits of community data through the Victorian data confidence framework, which informs regional data confidence plans. These plans outline regional activities such as training opportunities, manuals, equipment and resources necessary to obtain data from standard 1 to 4 (lowest to highest standard).

Data management software has QA features to filter reports, according to data standard, to increase the transparency of Waterwatch monitoring activities. The data portal is accessible from the Waterwatch Vic website to allow public access to Waterwatch data.

Waterwatch Victoria provides an annual QA mystery sample program across all participating CMA regions and tests electrical conductivity, pH, turbidity, and reactive phosphorus

These projects support regional community networks of river health monitors to ensure their efforts continue to be valued, useful and meaningful.

Key Words

Waterwatch, Victoria, waterway health, water quality, monitoring, quality assurance, QA, database

WORKSHOP 4: The social impacts of citizen science

Prawn Watch: Engaging fishers in science, restocking and sustainable management of an iconic species that has declined in abundance

Kerry M. Trayler[1], James R. Tweedley[2], Greg I. Jenkins[3]

[1]Swan River Trust
[2]Centre for Fish and Fisheries Research, Murdoch University
[3]Australian Centre for Applied Aquaculture Research, Challenger Institute of Technology

Biography:

Kerry is an experienced and qualified environmental practitioner with a demonstrated record of knowledge and achievements relative to wetland, river and estuarine environments spanning 25 years. She has worked in research, education and government fields prior to her current role, as Principal Scientist with the Swan River Trust. Kerry has interests in ecotoxicology, environmental monitoring and assessment, improved natural resource management and science to management communication.

Abstract:

The Western School Prawn was the focus of an historic fishery in the Swan Canning estuary of Perth, Western Australia. As prawn abundance declined, the commercial fishery ceased and the popular community past-time of prawning waned. A restocking programme was initiated in 2012 alongside Prawn Watch, a citizen science initiative aimed at engaging the community in the sustainable management of the estuary and the fishery. Prawn Watch has since recruited 180 volunteers and participants show improved understanding of issues facing the river and fishery regulations. Community log their catch into a web-based database and these data complement fishery independent monitoring of prawn populations in the estuary. Analysis of the complementary datasets for species distribution and relative abundance of recreational prawn species provides a level of confidence in the citizen dataset. The use of traditional hardcopy log books vs a smart phone application to support community monitoring are discussed.

Prawn Watch is linked to a prawn restocking project through the collection of broodstock for culture purposes. Since 2012, volunteers have contributed some 800 hours of their time to this task and thereby helped to facilitate the restocking of just over 2.5 million juvenile prawns back into the depleted recreational fishery. Prawn Watch provides an excellent example of how a citizen science project can serve to not only educate and engage people, but also provide valuable information and facilitate action on issues that are important to them and have wider value for their community and the environment.

Key Words

Citizen Science, prawns, phone app, sustainability, restocking

Turning the tide: changing beach user behaviours to overcome human-wildlife conflict

Grainne Maguire[1]

[1]BirdLife Australia, Deakin University

Biography:

Dr Maguire completed her PhD at The University of Melbourne on the behavioural ecology and genetics of a threatened Australian coastal bird. During her research, she engaged heavily with volunteers, which would become the basis of her role at BirdLife Australia heading the Beach-nesting Birds Program since 2006. She has overseen the evolution of the program from a small case-study research project that involved coordinating less than 100 participants, to a national multi-faceted program of research, education and citizen science.

Abstract:

The struggle faced by Australia's beach-nesting birds is one of the best examples of a human-wildlife conflict. These highly camouflaged birds attempt to breed in habitats loved by all Australians for recreation. Their unique behaviours make them highly susceptible to disturbance. Resolving this conflict for beach habitat has involved an army of volunteers trained to interpret bird behaviour, find cryptic nests and educate other beach users. These 'citizen scientists' have to be at the top of their game so as to not be damaging in their efforts to assist. They also need to collect and report data along the way which is critical to adaptive management responses. BirdLife Australia's Beach-nesting Birds program has been highly effective at building capacity of volunteers to implement and lead social change in their communities and among beach users more broadly. Protecting nesting sites and informing beach users has turned the tide for these beach birds, boosting their breeding success and stabilising population numbers. Long term effectiveness is measured in terms of the behavioural change among recreationists. Research projects led by scientists and students have operated alongside citizen science involvement to make this a multi-faceted conservation success story.

Who's living on my land?

Margot Law[1], Grainne Cleary[1]

[1]National Parks Association of NSW Inc.

Biography:

Margot is the citizen science officer at the National Parks Association of NSW where she manages the "Who's living on my land?" program which engages large rural landholders with nature. She studied ecology at The University of Sydney and completed her honours on the effect of urbanisation on canopy dwelling arthropods.

Abstract:

Private land often provides the essential connections between the patchily distributed National Parks reserve system. Therefore it is critical that landholders are encouraged to protect or support native wildlife on their property. The National Parks Association of NSW, in partnership with the Great Eastern Ranges Initiative, has been running a citizen science project for two years called “Who’s living on my land?” that aims to engage large rural landholders with the animal species on their property using motion detector infra-red cameras. Landholders attend a camera training workshop where they learn the basics of camera trapping and site selection and then are loaned a camera to conduct a two week wildlife survey on their property. Workshops are run within the Great Eastern Ranges landscape to maximise the positive impact of community engagement. Post survey, they receive a report of “Who’s on their land” in the context of other land holders in their region and often there are some surprises install for landholders as much of Australia’s wildlife is cryptic or nocturnal. We have found that our participants often feel more responsible for the animals on their property after seeing the photographs of them and subsequently take up conservation initiatives like pest control or habitat restoration. The “Who’s living on my land?” project has found that using the cameras is a valuable tool for community engagement in regions where there is generally a low participation rate in nature conservation as it is a novel technology that landholders are interested in learning about.

A Co-Created Citizen Science Approach to Environmental Public Health Research and Risk Communication at Hazardous Sites

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Biography:

Dr. Ramirez-Andreotta's research interests include environmental contamination and food quality and phytotechnologies to improve soil and air quality. In parallel, she is building citizen science programs to increase public participation in environmental health research, developing low cost environmental monitoring tools to improve exposure estimates, and designing effective risk communication and report-back strategies that will improve environmental health literacy. She is dedicated to early academic outreach to underrepresented students and engaging underserved communities whose lives are affected by environmental health issues with increasing prevalence.

Abstract:

To date, only a limited number of co-created citizen science projects, which are jointly developed by members of the public and scientists and where community members are involved in most or all steps of the scientific process, have been initiated at contaminated sites and even less in conjunction with risk communication. Spurred by questions and concerns from community members, the Gardenroots program examined possible contamination of garden soil by arsenic and heavy metals from a neighbouring Superfund site, where the residential area is sandwiched between a mine tailings pile and a smelter. Using low-cost sampling kits and an informal science learning continuum, community members collected samples and together characterized the uptake of arsenic by their home-grown vegetables near a Superfund site. This presentation will: 1) discuss methods in which to work alongside communities neighbouring contamination to assess and communicate risk and 2) demonstrate the benefits of a community-academic co-created citizen science program in addressing the complex problems that arise in communities neighbouring contamination. By building a co-created citizen science program and including a cultural model of risk communication, this project produced exposure and risk data in a form that was directly relevant to the participant's lives and aimed to increase their capacity when working with regulatory agencies that use risk analysis to inform clean-up. Such a project design increased the community's involvement in risk assessment and environmental decision-making, which ultimately has the potential to help mitigate exposure and thereby reduce associated risk.

Key Words

Environmental health, public health, co-created, risk communication, soils, gardens, metals, contamination, mining, hazardous waste

Optimising benefits to both scientific knowledge and education through citizen science monitoring programs

Erin Roger[1], Hugh Jones[1], Eren Turak[1]

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Biography:

Erin works as a senior scientist for the NSW Office of Environment and Heritage and is involved in both the coordination and implementation of citizen science within the agency.

Abstract:

There is a need to increase collaboration between educators and scientists. This can lead to new forms of education and increase both the magnitude and public appreciation of scientific output. Citizen science has been identified as a tool that can provide opportunities to bridge education and science through providing firsthand experience through participation. Here we discuss the convergence between science and education in Warrumbungle National Park, New South Wales Australia. In 2014, a program was established to involve local school students in monitoring one aspect of how the Park is recovering following a severe bushfire in 2013. The goal of the project is to introduce school students to the concept of citizen science and demonstrate to them how they can help collect and contribute meaningful data to help the Office of Environment and Heritage assess stream health. The second aim of the project is to empower the local community to participate in studies of their local environment, thus creating a sense of stewardship for the area and increased connection to the natural environment. Here we discuss the results of the program to date, including a summary of the resources developed in order to deliver the program as well as examples of the data collected and how it compares to expert collected data. We also propose a framework for adopting both science and education objectives in citizen science in order to embed citizen science projects into the education curriculum.

Key Words:

Education; stewardship; water quality; decision making; monitoring

WORKSHOP 5: Evaluating project effectiveness

Changes to Land Management Agency Policy and Practice resulting from Community-Based Environmental Monitoring

Martin Fluker[1], Werner Hennecke[2]

[1]Victoria University

Biography:

Dr Martin Fluker is an academic from Victoria University and has been the Chief Investigator in the www.FlukerPost.com project.

Abstract:

Evidence suggests that Land Management Agencies (LMA's) are increasingly turning to community-based environmental monitoring (CBEM) in an effort to develop longitudinal information on the changes occurring to specific natural environments. As this occurs, the question of "what changes to policy and practice result from such activities?" arises. By evidencing the practical outcomes of such CBEM projects, their costs, benefits and applications to certain situations may be better understood. Using a case study approach, this study reports on an existing CBEM project that has been in operation with 10 LMA's in Australia and the USA for periods of up to 7 years. The CBEM project involves the use of wooden posts that, in essence, become fixed photo points in the field. Signs on each of the currently 100 posts in the field ask people walking past to place their own camera (eg. their smart phone) in the camera cradle provided, take a photo of the given scene (the same scene is recorded each time), and then email it in for chronological inclusion in a publicly accessible web album. To date, over 3,500 photos from over 600 volunteers have been collected. This study will report on progress made in conducting structured interviews with each of the LMA's involved in the project. Information regarding specific changes to policy and practice will be categorized and discussed in terms of specific changes to both policy and practice occurring, and the possible application of such CBEM projects to other environments with other LMA's.

Key Words

Land management agency, community-based environmental monitoring

Does biodiversity education work? An evaluation of the birds in backyards program

Holly Parsons[1]

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Biography:

Holly is BirdLife Australia's Birds in Backyards (BIBY) Program Manager and has been involved in Birds in Backyards on and off since it began back in 1999. Her background is in urban avian ecology, completing a PhD examining the effect of urbanisation on Superb Fairy-wrens. Through BIBY she uses citizen science and environmental education to promote people's connection with nature and provides recommendations on creating and managing urban habitats for birds.

Abstract:

Effective urban community education with subsequent engagement is essential if Australia is to become sustainable in the future. Birds in Backyards (BIBY) encourages people to learn in their own space in order to establish an initial connection with the natural world in a somewhat unnatural setting. In 2011 we conducted a “Does biodiversity education work” project, funded by the NSW Environmental Trust, to evaluate BIBY as an education tool, and develop strategies for improvement and strengthening of the program. Surveys revealed that BIBY participants were different to the general public. They had a higher level of knowledge about biodiversity and issues facing bird life, were more likely to feel that their wellbeing was dependent on the wellbeing of the natural world, and were more likely to be involved in other conservation activities. Importantly, participants were taking direct action for birds: 66% reported having made at least one change to their behaviour and/or garden as a result of participating in BIBY and 80% felt that by submitted an online survey they were contributing to knowledge about our urban birds. Findings from this project have assisted us to target projects at different demographics and shaped the content in our resources and on our website. Further to this we have created a ‘how to’ guide for evaluating citizen science/environmental education projects.

Key Words

Urban, bird, education, engagement, surveys, evaluation

Evaluating the Success of Mildew Mania: An Agricultural Citizen Science Project for Schools

Leonie Rennie[1], Gina Pearse[1]

[1]Curtin University

Biography:

Gina's science training was in biology and she completed a Master in Science Communication at ANU. As a Science Outreach Officer at Curtin University, she has worked on several projects, including a three-year role as project officer for the Primary Industry Centre for Science Education where she organised activities that connected teachers and students with science based primary industries and careers. Currently she coordinates the citizen science project Mildew Mania. Prior to joining Science Outreach at Curtin, she was involved in the evaluation of free-choice learning environments, and has also worked as an explainer at Scitech (WA's science centre).

Abstract:

Citizen science projects offer students the rare opportunity to be involved in real scientific research beyond the classroom. It is often assumed that such experiences will lead to a greater interest in and understanding of science. There have been few robust efforts, however, to measure the success of citizen science projects in engaging people, including students, in meaningful science activities. Mildew Mania is a state-wide, citizen science project related to the control of "powdery mildew," a persistent plant pathogen affecting the yield and quality of barley crops in the grain growing areas of Western Australia costing $30 million in losses annually. Schools in both rural and metropolitan areas were asked to grow barley, determine the presence of mildew and send samples to the plant scientists at Curtin University for analysis. This case study explored teachers' perceptions of how students' experiences during the project contributed to their learning about science. Teachers completed a pre-participation survey and a select group of teachers were also surveyed by email (given their wide geographic distribution) post-project. Teachers reported that students performed curriculum-relevant, inquiry-based science activities in a context made meaningful because it contributed to a "real-life" significant project beyond their classroom. Experiencing how science was used in agriculture, and the uncertainties of weather and crop infestation, encouraged students to recognise the multidisciplinary and social nature of real world science.

Key Words

Evaluation, school, case study

Indigenous science, citizen databases and the need for collaborative data monitoring and management approaches

Cathy Robinson[1], Rod Kennett[2], Ruth Wallace[3], Stephen Garnett[3], Micha Jackson[4], Pethie Lyons[1], Beau Austen[3]

[1]CSIRO - Australia
[2]AIATSIS
[3]Charles Darwin University
[4]NAILSMA

Biography:

Dr Cathy Robinson is part of a growing community of practice that is focused on the data governance and knowledge owning and sharing issues related to Indigenous people's participation in citizen science databases and participatory monitoring and evaluation processes and frameworks.

Abstract:

In this paper we open up key opportunities and challenges involved with engaging Indigenous people and knowledge in citizen science technologies to provide holistic understanding of global issues surrounding climate change, habitat and biodiversity presence and loss, biosecurity risks, and ecosystem health and degradation. We draw on work with I-Tracker, Atlas of Living Australia the international Participatory Monitoring and Management Partnership, and other cross-cultural collaborative projects to challenge dominant citizen science paradigms and argue for the cultivation of mutually conducive and appropriate principles, protocols, and practices. We outline why and how the purpose and practice of citizen science must address Indigenous rights and responsibilities for Indigenous knowledge and country if skills and interests of Indigenous people can be better aligned with other citizens, scientists, NGOs and government partners who share responsibility for building resilient Indigenous land and seascapes in the midst of rapid environmental change.

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