



Journal Articles - Conference Proceedings Articles
Dissertations - Books & Chapters

From the moderator

Thank you to everyone who contributed to this issue of the ACSA Publications Listing.

The ACSA Publication Listing is a quarterly electronic listing of publications in the field of citizen science within the Australian community. The listing is intended to share information with those interested in the Australian citizen science community.

If you are interested in obtaining a copy of one of the papers below, you can email the lead author who may send you a copy at their discretion.

Colleen Foelz

Abstracts of recently published journal articles

Aligning citizen science with best practice: Threatened species conservation in Australia

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Well-designed citizen science projects can improve the capacity of the scientific community to detect and understand declines in threatened species, and with the emergence of frameworks to guide good design, there is an opportunity to test whether projects are aligned with best practice. We assessed the current landscape of citizen science projects for threatened species conservation via a content analysis of the online communiques of citizen science projects across Australia. Only 2% of projects stated clear research questions,

although approximately 86% had implied project objectives aimed at threatened species conservation. Most projects were focused on field-based monitoring activities with half using structured ecological survey methods. Most reviewed projects (65%) shared data with open access biodiversity databases and the vast majority use at least one social media platform to communicate with potential and existing participants (up to 81%). Approximately 50% present citizen-sourced data summaries or publications on their websites. Our study shows there is a very strong foundation for public participation in threatened species conservation activities in Australia, yet there is scope to further integrate the principles of citizen science best practice. Improved integration of these principles will likely yield better outcomes for threatened species as well as for the citizen scientists themselves.

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Social license through citizen science: a tool for marine conservation

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Active and meaningful public engagement is necessary to foster informed and publicly accepted natural resource management. Citizen science presents an important avenue by which to achieve such engagement. Citizen science is the active involvement of the public in science to address scientific questions, often of common interest or concern, by collecting and analyzing data, and publishing and communicating science via diverse outlets. Here, we explore whether and how citizen science can also play a role in generating social license for marine conservation, using European marine citizen science as a case study. Social license is a concept that reflects community views and expectations on the use and management of natural resources. To date, social license in the marine space has largely focused on public perceptions of industrial and extractive uses of the marine environment, and limited research has explored social license for conservation. We highlight important linkages between social license and citizen science that can work synergistically to support conservation. We use in-depth qualitative interviews and a semiquantitative online survey of marine citizen science coordinators to investigate how citizen science can play a role in enhancing social license and the mechanisms through which it can occur. Our findings indicate that citizen science can enhance social license by improving ocean literacy and marine citizenship. We demonstrate that marine citizen science has considerable potential to generate and develop social license for marine conservation in Europe and elsewhere.

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Citizen science and the United Nations Sustainable Development Goals

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Traditional data sources are not sufficient for measuring the United Nations Sustainable Development Goals. New and non-traditional sources of data are required. Citizen science is an emerging example of a non-traditional data source that is already making a contribution. In this Perspective, we present a roadmap that outlines how citizen science can be integrated into the formal Sustainable Development Goals reporting mechanisms. Success will require leadership from the United Nations, innovation from National Statistical Offices and focus from the citizen-science community to identify the indicators for which citizen science can make a real contribution.

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Identifying technology solutions to bring conservation into the innovation era

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Innovation has the potential to enable conservation science and practice to keep pace with the escalating threats to global biodiversity, but this potential will only be realized if such innovations are designed and developed to fulfill specific needs and solve well-defined conservation problems. We propose that business-world strategies for assessing the practicality of innovation can be applied to assess the viability of innovations, such as new technology, for addressing biodiversity conservation challenges. Here, we outline a five-step, “lean start-up” based approach for considering conservation innovation from a business-planning perspective. Then, using three prominent conservation initiatives – Marxan (software), Conservation Drones (technology support), and Mataki (wildlife-tracking devices) – as case studies, we show how considering proposed initiatives from the perspective of a conceptual business model can support innovative technologies in achieving desired conservation outcomes.

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Citizen science and social licence: Improving perceptions and connecting marine user groups

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Marine stakeholder groups have diverse relationships with the ocean and life within it, which can create conflict and distrust between them. Citizen science and social licence present

promising means to develop dialogue between these diverse marine stakeholders and improve outcomes for marine management. Citizen science can be defined as public engagement in scientific research and activities and amongst other benefits, has been demonstrated to improve communication and relationships amongst resource management and stakeholder groups. Social licence is a concept that reflects unwritten permission from the public for others to use and manage natural resources, and has become an important theme for development in the marine realm. We explore a case-study of the marine citizen science programme Redmap Australia, utilising a mixed-methods approach to understand community perceptions of other marine user groups. We explore how marine users legitimise one another, and how this relates to building relationships and developing social licence. Our results show that participation in citizen science can allow users to display their marine citizenship and shared concern about the marine environment, and that this can allow them to earn trust from other user groups. We conclude that participation in citizen science improves perceptions of trustworthiness and can enhance social licence for marine user groups, with positive implications for marine and coastal management. These outcomes provide fruitful insights on marine resource user groups' perceptions that can help to advise future developments in the growing fields of citizen science practice and citizen science research.

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A Call for International Leadership and Coordination to Realize the Potential of Conservation Technology

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Advancing technology represents an unprecedented opportunity to enhance our capacity to conserve the Earth's biodiversity. However, this great potential is failing to materialize and rarely endures. We contend that unleashing the power of technology for conservation requires an internationally coordinated strategy that connects the conservation community and policy-makers with technologists. We argue an international conservation technology entity could (1) provide vision and leadership, (2) coordinate and deliver key services necessary to ensure

translation from innovation to effective deployment and use of technology for on-the-ground conservation across the planet, and (3) help integrate innovation into biodiversity conservation policy from local to global scales, providing tools to monitor outcomes of conservation action and progress towards national and international biodiversity targets. This proposed entity could take the shape of an international alliance of conservation institutions or a formal intergovernmental institution. Active and targeted uptake of emerging technology can help society achieve biodiversity conservation goals.

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Abstracts of recently published Conference Papers

Listening to Save Wildlife: Lessons Learnt from Use of Acoustic Technology by a Species Recovery Team

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An increasing variety of technologies are being developed to support conservation of endangered wildlife; however, comparatively little attention has been devoted to their design. We undertook three years of ethnographic fieldwork and design research with the recovery team of an endangered Australian bird (the Eastern bristlebird) to explore the team's culture and practices, as well as their perspectives on including collection and analysis of environmental acoustic recordings into their conservation praxis. Through thematic analysis, we identified the team's collective goals, culture, conservation activities, and technology use. We found that acoustic technologies have promise for supporting conservation of furtive and vocal Eastern bristlebirds. Trialing acoustic technologies also revealed that the team had strong interest in their use. We identified knowledge gaps, time constraints, and technology aversion as barriers to be overcome with future interaction design research. We offer an initial set of practical guidelines for designing technologies to support conservation.

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Modelling Workflows for More-than-Human Design: Prosthetic Habitats for the Powerful Owl (*Ninox strenua*)

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Anthropogenic degradation of the environment is pervasive and expanding. Human construction activities destroy or damage habitats of nonhuman lifeforms. In many cases, artificial replacement habitats become necessary. However, designing for the needs and

preferences of nonhuman lifeforms is challenging. Established workflows for this type of designing do not exist. This paper hypothesises that a multi-scale modelling approach can support inclusive, more-than-human design. The case-study project tests this approach by applying computational modelling to the design of prosthetic habitats for the powerful owl (*Ninox strenua*). The proposed approach simulates owls' perception of the city based on scientific evidence. The tools include algorithmic mapping, 3D-scanning, generative modelling, digital fabrication and augmented-reality assembly. Outcomes establish techniques for urban-scale planning, site selection, tree-scale fitting, and nest-scale form-making. The findings demonstrate that computational modelling can (1) inform more-than-human design and (2) guide scientific data collection for more inclusive ecosystem management.

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Abstracts of recently published dissertations
