Citizen Science Strategy

NSW Forest Monitoring and Improvement Program

Acknowledgment of Country

The Natural Resource Commission and the Australian Citizen Science Association acknowledges and pays respect to all the Traditional Owners and their Nations. The Commission recognises and acknowledges that the Traditional Owners have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters. We value and respect their knowledge of natural resource management and their contributions of earlier generations, including the Elders.

Citizen Science Strategy

The NSW Government has committed to maintain the economic, social and ecological benefits and services provided by forests under the NSW Forest Management Framework (the Framework) and Regional Forest Agreements. The Framework also commits NSW to ongoing improvement of reporting and management through monitoring and research.

The NSW Natural Resources Commission (the Commission) oversees the design, implementation, review and continuous improvement of a state-wide Forest Monitoring and Improvement Program (the Program). The Program will improve the evidence-base for decision-making for forest management across tenures. This will be done by focusing on the information needs of decision makers, stakeholders and the broader community to achieve outcomes for NSW forests.

A cross-agency steering committee helps guide delivery as well as lead and coordinate reviews of the Program. The committee is chaired by the Commission and includes NSW government agency representatives and independent scientific experts[1].

The Program has established 9 state-wide evaluation questions to guide program investment. These evaluation questions cover the ecological, social, cultural and economic outcomes sought under the Program and will provide benefits for current and future generations.

The Program seeks to collaborate with citizen science initiatives across the state to:

- Increase the Program's ability to gather robust data in a cost-effective manner across a greater spatial and time scale;
- Increase the ability of the NSW community to contribute data towards the state-wide evaluation questions, and informing recommendations for decision making;
- Allow the Program to establish strong and productive relationships with the citizen science community; and
- Provide the Program with a mechanism for open and transparent communication and accessible data.

As the leading peak body for citizen science in Australia, the Commission has engaged the Australian Citizen Science Association to support the design and implementation of a sound and contemporary approach to citizen science to support the Program for its duration.

Attachment 1 contains an overview of citizen science.

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[1]   Includes agency representatives from Department of Regional NSW, Department of Planning, Industry and Environment, National Parks and Wildlife Service, Aboriginal Affairs and Heritage, Environment Protection Authority, Forestry Corporation of NSW and independent experts including Prof. Patrick Baker, Prof. Phillip Gibbons, Ass. Prof. Jackie Schirmer and Dr. Peter Hairsine.

The Strategy

As part of the NSW Forest Monitoring and Improvement Program, the Steering Committee aims to identify and actively support citizen science initiatives that can help address the Program's state-wide evaluation questions, while facilitating public engagement and improving public confidence in the Program.

The purpose of the Citizen Science Strategy (the Strategy) is to outline the approach the Program will undertake to engage with and facilitate citizen science for capturing and sharing data that will support recommendations for improved forest management across tenures. The Strategy will look to leverage and build upon other citizen science strategic and delivery approaches, and build upon the Program's Stakeholder Engagement Strategy and Aboriginal Stakeholder Engagement Plan.

Vision

To harness the power of citizen science to advance the knowledge base for   achieving forest management outcomes.

Outcomes

1. Meaningful community partnerships, social capital and trust

2. Increased capacity and processes for incorporation of citizen data

3. Enhanced ability for citizen science communities and their research to contribute to and influence evidence-based decision making.

Objectives

1) **CONNECT THE DATA -** Connect and integrate existing citizen science data with the Program's forest monitoring, analysis and evaluation;

2) **SCALE-UP THE IMPACT -** Scale-up and invest in citizen science projects or tools to complement the Program's forest monitoring, analysis and evaluation; and

3) **CONNECT THE COMMUNITY -** Strengthen and evaluate citizen science communities' influence in evidence-based decision making.

Principles

- Roles - clarifying and communicating relationship roles and expectations (both science and citizen);
- Inclusive - maximising opportunities to participate from a diverse range of people, stakeholders, organisations, skills and disciplines;
- Meaningful - reinforcing that participant contributions are meaningful and necessary;
- Partnership – developing partnerships with equity, transparency and mutual benefit;
- Trust - building mutual trust and respect;
- Learning – creating an atmosphere of learning and innovation, together with a sharing of skills; and
- Science output - ensuring there is a science output and that the science is valid and relevant and has some measurable outcomes.

Approach

The table on the following page outlines the Program's approach for delivering the three objectives. At the core of each of these objectives and subsequent actions are open communication and engagement with the citizen science community.

Reporting and Evaluation

The Commission will take an adaptive approach to delivering this Strategy. It will leverage findings and inputs from other strategic plans as well as feedback from the citizen science community. Reporting and evaluation will follow the schedule set out in the Program and will include recognition to any contributions by citizen scientists and corresponding projects.

Objective 1: CONNECT THE DATA - Connect and integrate existing citizen science data with the Program's forest monitoring, analysis and evaluation

1. Engage and build trust in and awareness of the Program with the NSW citizen science community.

2. Identify potential citizen science data and data sharing pathways.

3. Embed the necessary resources and processes to facilitate easy data sharing.

4. Integrate citizen science data into the Program and make it openly accessible where appropriate.

5. Promote the use of citizen science data for helping to inform the Program and influence evidence-based decision making.

1. Steering Committee with support from Australian Citizen Science Association and other citizen science groups (ongoing)

2. Commission led with support from Australian Citizen Science Association (By end 2020 and ongoing)

3. Steering Committee (By mid-2021)

4. Steering Committee and relevant agencies (Demonstrated by mid-2021)

5. Steering Committee with support from Australian Citizen Science Association and other citizen science groups (Ongoing)

Objective 2: SCALE-UP THE IMPACT - Scale-up and invest in citizen science projects or tools to complement the Program's forest monitoring, analysis and evaluation

1. Map current and new citizen science initiatives in NSW to identify projects and tools to potentially scale up and complement Program objectives.

2. Promote, engage with and invest in projects that meet priority Program needs.

3. Assess the impact of and demonstrate how citizen science initiatives are supporting the Program and adaptive management.

1. Commission with support from the Australian Citizen Science Association (By end-2020; ongoing)

2. Steering Committee (As required)

3. Commission with support from the Australian Citizen Science Association and other citizen science groups (Annually and end-of-program)

Objective 3 - CONNECT THE COMMUNITY- Strengthen and evaluate citizen science communities' participation in evidence-based decision making as part of the Program's community engagement and reporting

1. Connect with partner citizen science groups to share and evaluate key learnings at Program forums

2. Engage partner citizen science groups on Program insight reports and Commission recommendations.

3. Acknowledge and report on the contributions of citizen scientists to the Program and adaptive management.

1. Steering Committee (Ongoing; annually)

2. Commission (Ongoing)

3. Steering Committee (Ongoing; annually)

Attachment 1: What is Citizen Science?

Citizen science is defined by the Australian Citizen Science Association (ACSA) as "*public participation and collaboration in scientific research with the aim to increase scientific knowledge*". It provides a way for members of the public, 'citizen scientists', to actively engage with science and contribute to research initiatives, while acquiring new skills and knowledge, building communities, and advancing social relationships and enjoyment. Distinct within volunteering; citizen science enables members of the public to contribute to research as partners in knowledge generation.

Public participation in citizen science varies depending on the project and research questions. Tasks can involve recording biodiversity or weather observations, mapping invasive plants, monitoring the health of waterways and reporting environmental hazards. Some citizen science projects engage participants in more complex scientific tasks such as data analysis and defining research questions.

Citizen science in Australia and NSW

Presently there are hundreds of citizen science projects operating throughout Australia, engaging over 100,000 participants in monitoring, recording, curating and reporting scientific data. The majority of current citizen science projects in Australia focus on the collection of biodiversity and environmental data. NSW is part of this trend with a growing number of citizen science projects established to help facilitate public participation in research. These projects have been coordinated by State and local government agencies, research organisations, not-for-profits and community groups.

What is a Citizen Scientist?

Anyone is welcome to become a citizen scientist (a citizen science participant). Participation does not require scientific training or extensive scientific knowledge. It is open to people of all ages and backgrounds and invites everyone to take part in scientific development. The variety of citizen science projects enables each citizen scientist to find projects appropriate or relevant for them and contribute as much or as little as they choose.

Barriers to participation in citizen science mirror inequalities in society (e.g. access to digital technologies, bandwidth and digital literacy, access to research sites, project accessibility). Mitigating these barriers is part of good design, planning and evaluation of citizen science projects. Ultimately, citizen science should be striving to encourage broad and meaningful participation of society in citizen science, thereby enabling the public to become genuine partners in science.

How are citizen scientists engaged?

Citizen scientist engagement varies depending on the project and tasks associated with the data collection and/or analysis needs. Some projects involve participants mainly in pre-defined data collection tasks, while others involve participants in many or all stages of the research process and co-design their tasks and responsibilities.

Understanding the motivations of citizen scientists (e.g. relationship with place or interest in the subject matter) as well as barriers to participation (e.g. available time, access to resources,

physical abilities and technology proficiencies) helps retain and sustain citizen scientist involvement throughout a project's life cycle.

Maintaining engagement and communication with citizen scientists is vital and it should be supported by the provision of project collateral material (e.g. newsletters, training material and reports) and acknowledgement of their efforts. Many projects will also provide open access to data which is presented online in the form of interactive maps, charts, or tables and often are downloadable.

Good practice principles behind citizen science

While citizen science is a diverse practice which can be adapted and applied in many situations and disciplines, some key principles which underlie good practice in citizen science have been developed to form a consistent, transparent, and shared approach. This includes ACSA's Ten Principles of Citizen Science[2] as well as the FAIR[3], and CARE[4] principles for data sharing in a way that enables maximum, responsible and ethical data use.

Successful citizen science initiatives can also:

- Embed International Association for Public Participation (IAP2) spectrum principles in how they engage with citizen scientists and other stakeholders;
- Use digital interfaces, platforms and apps to extend the reach and frequency of communication and engagement as well as simplify data collection, transcription and analysis tasks;
- Provide training and other educational opportunities to citizen scientists to build skill sets, increase awareness and scientific literacy as well as strengthen the connection to the project; and
- Build communities of practice and social connections through collaborative learning.

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[2] Australian Citizen Science Association (2018) Ten Principles of Citizen Science
https://citizenscience.org.au/wp-content/uploads/2018/09/10-Principles-of-Citizen-Science.pdf
[3] Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Sci Data 3, 160018. https://doi.org/10.1038/sdata.2016.18
[4] Research Data Alliance International Indigenous Data Sovereignty Interest Group. (2019). "CARE Principles for Indigenous Data Governance." The Global Indigenous Data Alliance. GIDA-global.org