

Citizen science in Queensland

A review of the current landscape



#31767-1118

Office of the Queensland Chief Scientist

 www.chiefscientist.qld.gov.au

 +61 7 3215 3739

 info@chiefscientist.qld.gov.au

Engage with science

   [#qldscience](https://twitter.com/qldscience)

 medium.com/queensland-science

Prepared by: Office of the Queensland Chief Scientist, Department of Environment and Science

© State of Queensland, 2018.

The Queensland Government supports and encourages the dissemination and exchange of its information. The copyright in this publication is licensed under a Creative Commons Attribution 3.0 Australia (CC BY) licence.

Under this licence you are free, without having to seek our permission, to use this publication in accordance with the licence terms.

You must keep intact the copyright notice and attribute the State of Queensland as the source of the publication.

For more information on this licence, visit <http://creativecommons.org/licenses/by/3.0/au/deed.en>

Disclaimer

This document has been prepared with all due diligence and care, based on the best available information at the time of publication. The department holds no responsibility for any errors or omissions within this document. Any decisions made by other parties based on this document are solely the responsibility of those parties. Information contained in this document is from a number of sources and, as such, does not necessarily represent government or departmental policy.

If you need to access this document in a language other than English, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone Library Services on +61 7 3170 5470.

This publication can be made available in an alternative format (e.g. large print or audiotape) on request for people with vision impairment; phone +61 7 3170 5470 or email library@des.qld.gov.au.

Acknowledgements

This report was prepared by Dr Emma Livingstone and Ms Jessie Oliver. The Office of the Queensland Chief Scientist thanks them for their contribution, along with members of the Australian Citizen Science Association executive committee for reviewing this report.

November 2018

#31767-1118

Executive summary

Citizen science, defined by the Australian Citizen Science Association as ‘public participation and collaboration in scientific research with the aim to increase scientific knowledge’, benefits society by encouraging members of the general public to be active participants in scientific research.

By taking advantage of the help of the community, scientists can create projects that cover wide geographic areas and time periods that have never before been possible. This has been made even more achievable and convenient given recent advances in technology.

The purpose of this report is to provide a snapshot of citizen science projects in Queensland and those that have an impact on Queensland.

In addition, this report will outline where Queensland currently has capacity (and whether this can be increased) and where citizen science groups have the potential to collaborate and develop partnerships. The report is an action under the *Queensland Citizen Science strategy*.

A desktop review identified 138 citizen science projects, covering a range of topics, with potential to positively impact Queensland.

While many projects focused on biodiversity, other projects related to broader sciences including climate change, space and human health.

The ability to recruit participants and documentation of project outcomes varied widely between projects, with the most common methods of volunteer recruitment and engagement being through social media, traditional media, and specific project websites.

Approximately 63% of projects identified are listed on a citizen science project database (Australian Citizen Science Project Finder or SciStarter Project Finder).

Based on these findings several recommendations were made to increase Queenslanders’ participation in citizen science and to assist project leaders in developing projects that produce data that make a meaningful contribution to Queensland.

Organisations such as the Australian Citizen Science Association advocate for citizen science.

The newly-formed Queensland Chapter of the Australian Citizen Science Association will work to increase networking, resource sharing, and knowledge exchange between scientists, individuals and community groups to create Queensland communities that are informed, engaged and passionate about science.



Background

Almost three in four (68%) Queenslanders recently surveyed are somewhat or very interested in science,¹ however, only 3% of survey respondents had heard the term ‘citizen science’ and when prompted with a definition, this increased to 18%. This indicates an opportunity to engage more Queenslanders in science providing them with ways to learn and actively participate in scientific research projects.

While several definitions have been developed for citizen science around the world, this report adopts the current definition developed by the Australian Citizen Science Association:

Public participation and collaboration in scientific research with the aim to increase scientific knowledge.



Citizen science has rapidly diversified in scientific topics, particularly with advances in technology that make communication, cooperation and contribution to scientific research easier. Citizen science is sometimes described as *community science*. What separates citizen science from other activities such as science communication, science outreach, and science education, however, is that citizen science is *a form of scientific research*.

Citizen science projects are well-designed, and have scientific objectives and outcomes that are easy for members of the public to take part in. Citizen science projects will often have different levels of science outreach, educational and training components depending on intended participant groups (e.g. school children vs adults) and the level of knowledge required to take part in a project. There are projects for nearly every interest in science and skill level.

Even before the professionalisation of citizen science, members of the public have contributed to our understanding of the natural world, from ocean tides to bird migrations.² In Queensland, sightings of shorebirds by citizen scientists revealed sharp declines in some species that prompted protective measures to be put in place and several new species of peacock spiders have been discovered by dedicated citizen scientists in Queensland and across Australia.

Queenslanders are also taking part in citizen science virtually by annual online projects unveiled each year by the ABC during National Science Week.

Locals have, for example, transcribed historical weather logs from 1890s and 1900s as weather detectives, looked for kelp and urchins as seafloor explorers, inspected beautiful images from outer space as galaxy explorers, and reviewed images from Australian wildlands as wildlife spotters. Anyone can also now explore the Great Barrier Reef online via the Queensland-based National Science Week project Virtual Reef Diver.

Citizen science projects fall into three categories:

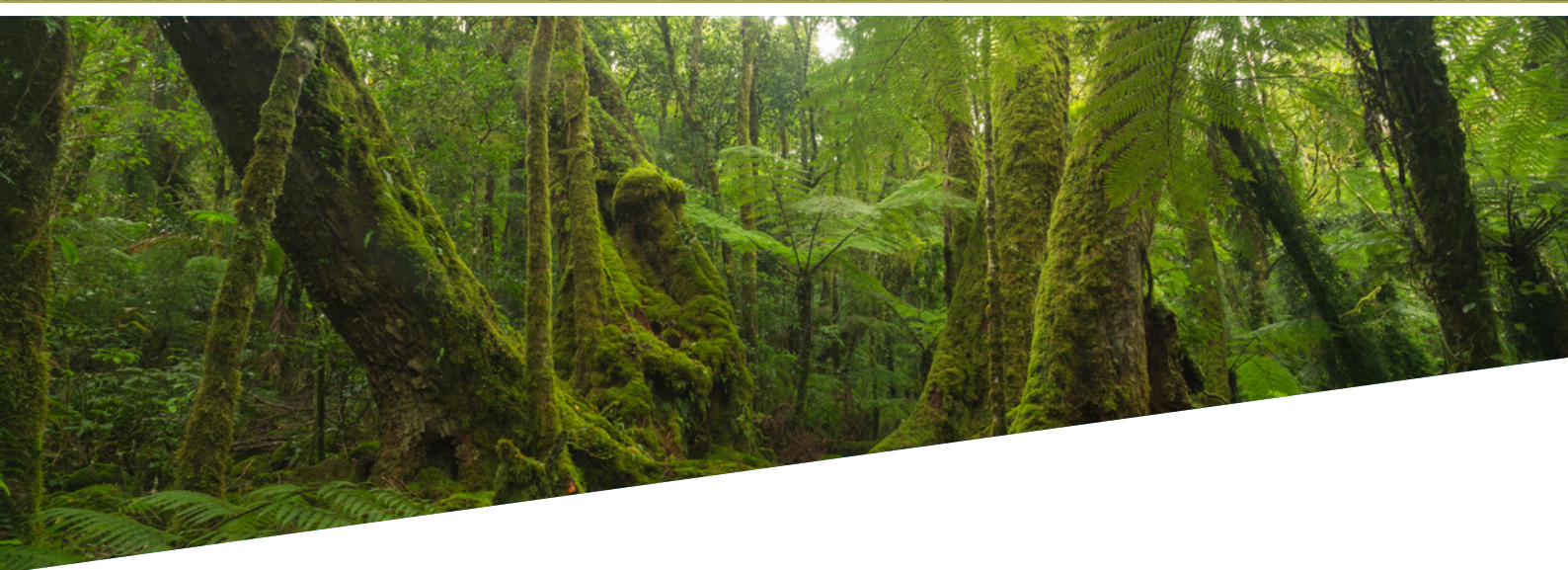
- **Contributory**—citizens collect or process data for professional scientists
- **Collaborative**—citizens are involved in work beyond data collection or processing such as project design, analysis or communication
- **Co-created**—citizens and scientists work together in all aspects of the scientific process.

By working together, citizen scientists and scientists can engage with civic society, make scientific discoveries and inform policy makers with high quality data, in response to local challenges.

It is an exciting time for citizen science. Everything learned to date is informing the rapid diversification of projects, the way science is represented and how citizen scientists take part in projects.

Groups are now forming to advocate for citizen science, sharing methods to overcome barriers, ensure best practices, and inform policy.

Globally, there are citizen science associations in Europe, the United States and Australia, with associations also emerging in China and Africa.



All these groups are working together to increase the impact of citizen science on a global scale, by collaborating on global working groups, exchanging knowledge, trading experiences and sharing resources. In Australia, the Australian Citizen Science Association is advocating for citizen science, providing networking opportunities for members nationally, and recently approved the start of a regional Australian Citizen Science Association Queensland Chapter.

Groups like the Queensland-based Reef Citizen Science Alliance are working to increase impacts of citizen science relating to the health of coastal and

marine habitats by uniting all related projects via the alliance that was formed in 2013 in response to a scoping study by the Great Barrier Reef Foundation.

The Queensland Government, through the Office of the Queensland Chief Scientist, understands the importance of creating a Queensland community that is engaged in and supports science.

The Office of the Queensland Chief Scientist created the *Advance Queensland Engaging Queenslanders in Science strategy* in 2016 with the goals of increasing student science, technology, engineering and maths (STEM) participation, public

engagement in science, scientist engagement, and public awareness of science.

The Office of the Queensland Chief Scientist recognises the role of citizen science in achieving these goals and as a result has developed the *Queensland Citizen Science strategy*. One action of the strategy is the development of this desktop research report to 'map' projects relevant to Queensland and discuss implications.

Landscape of citizen science in Queensland

Across Queensland there are more than 100 projects that involve members of the public actively participating in scientific research as citizen scientists. Many of these participants lack formal scientific training, but are making substantial contributions to scientific investigations by taking part in activities such as collecting, categorising or analysing data.

These citizen science projects cover a breadth of topics ranging from documenting biodiversity such as koala observations, understanding elements of our natural environment such as water quality and coral bleaching, exploring our understanding of the cosmos by classifying images from outer space, investigating human perceptions and wellbeing, to reducing mosquito-borne diseases using the latest scientific investigation methods.

Snapshot of citizen science projects

A project was identified as citizen science if it self-identified as such or if it fit the Australian Citizen Science Association definition of citizen science. Projects in which participants were the subject rather than an active participant

in the research, such as providing biological samples for scientific study, were not included.

Information on citizen science projects in Queensland was obtained by snowball sampling experts and citizen science community members, as well as by conducting citizen science database searches including the Australian Citizen Science Project Finder and SciStarter along with internet searches.

In this survey, 138 citizen science projects with potential to positively impact Queensland were identified. For the purpose of this study a project was defined as having potential to impact Queensland if it is either based in Queensland (51.4%) or based in Australia with outcomes affecting Queensland (48.5%). International online projects that benefits Queensland were deemed beyond the scope of this study.

The majority of projects investigate biodiversity (77.7%), with the remainder of projects investigating topics such as climate change, human health, water quality and outer space (Figure 1).

There is a particular interest in the Great Barrier Reef (5.8% of projects) and Australian animals (12.2% of projects).

Previous research into the motivations of citizen scientists highlighted ‘connection to place’—the emotional, cultural, and material connection or attachment that people have for the place in which they live—as a significant motivating factor.³

Approximately 25% of projects have been running for more than 10 years. The citizen science landscape is also growing, with 14.4% of projects less than one year old.

The increase in prevalence of smartphone technology has made citizen science projects more broadly accessible. Approximately 10% of projects surveyed have a smartphone app (Apple and/or Android) such as Eye on the Reef, Aussie Backyard Bird Count, QuestaGame and Weed Spotters Network Queensland, and several new projects such as Wild Orchid Watch have an app in development.

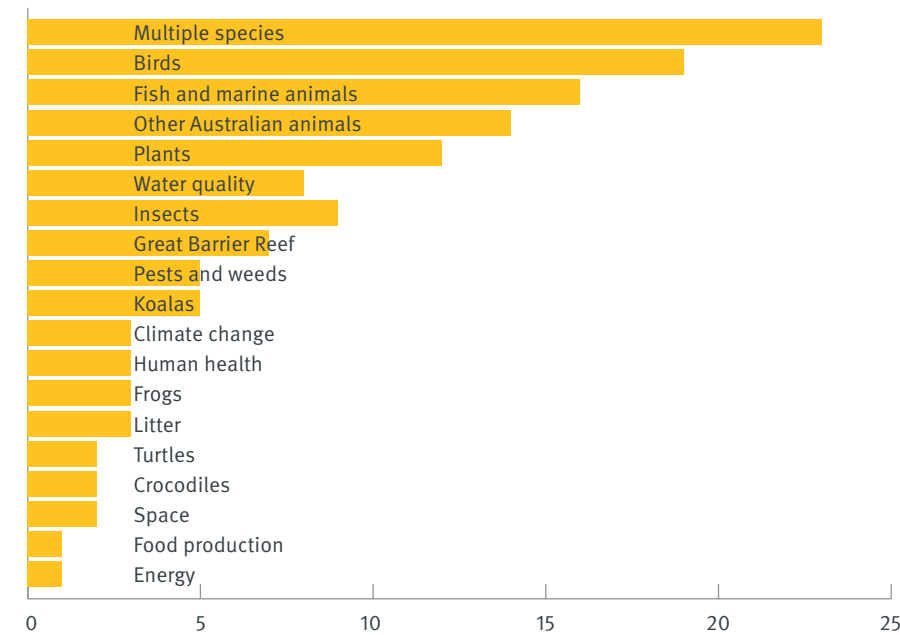
Project objectives and outcomes

Multiple projects often have the same or similar objectives (e.g. report koala sightings). Where project goals are similar, collaboration and data sharing has potential to enhance data quality of respective projects overall and avoid unnecessary duplication of effort and expenditure of limited resources.

The specific research outcomes were unclear for the majority of projects (66.6%). It appears those projects that reported outcomes rarely did so in reports and peer-reviewed, academic publications (3–5% of projects in this survey).

Other times, project outcomes were communicated via project website updates to the community and government groups to increase awareness or contribute to policy-making. For example, a study from the Centre of Excellence for Environmental Decisions about ReefBlitz 2016 showed that citizen science programs positively influence stewardship; participants reported a willingness to share reef conservation information (91%), increased support for marine science and conservation (87%), and intention to adopt a new conservation behaviour (51%).

Types of citizen science projects



The DuneWatch project organisers say that litter collection data collated by citizen scientists has been shared with councillors, and they have seen policy and management actions implemented at a regional level as a result.

The BRAE Walks 2017 Project resulted in the Councillor for Northgate, Adam Allan, instructing action to be taken by his Council Parks team, the Transport Planning and Strategy Branch and the Field Services Team to repair and/or improve surrounding parklands, footpaths, and roadways to better facilitate walking in their local neighbourhood.

Media engagement

Traditional media and social media can be effective tools to engage potential and current participants, as well as inform project participants and the broader citizen science community of project outcomes.

Social media presence was determined by identifying accounts on common social media platforms dedicated to a particular project by name.

Projects that rely on use of affiliate pages (e.g. pages of host universities, government agencies, museums and

other partners) rather than specific project pages were not included in this assessment.

Of the projects surveyed, only 83 (or 60.1%) had at least one dedicated project-specific social media account. Of those 83 projects with social media accounts, Facebook was the most commonly used social media platform (70 projects or 84.3%), and 56 of those projects (or 40.6%) use more than one platform. Traditional media was also used to engage the public in citizen science; this was most commonly used to launch a new project or announce results.

Of the projects surveyed, 29.5% were featured in at least one online news article, often in *ABC Science* or *The Conversation*. Each year *ABC Science* promotes a citizen science project during National Science Week.

Databases with Australian citizen science projects

The Atlas of Living Australia, in collaboration with the Australian Citizen Science Association, hosts the Australian Citizen Science Project Finder online database, with over 600 projects across Australia.

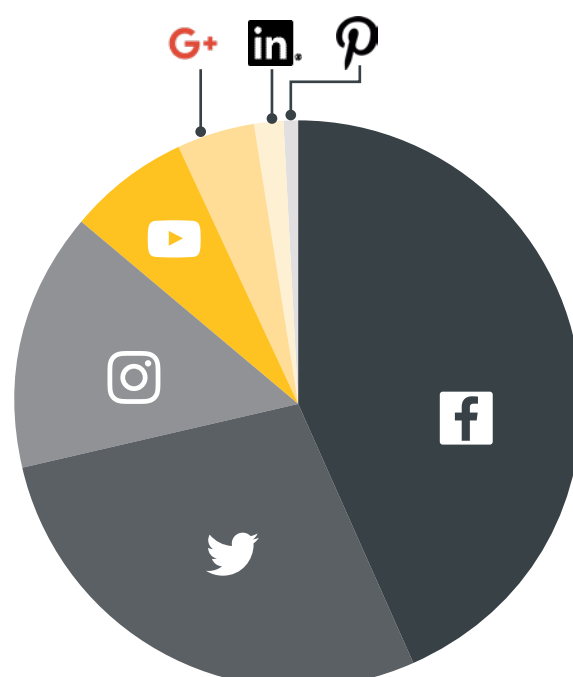
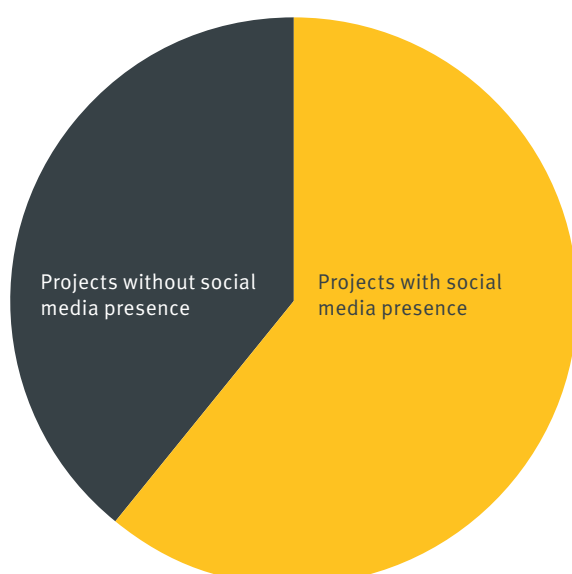
This database allows prospective participants to find projects, project leaders to advertise projects, and the citizen science community to identify gaps and/or potential collaboration partners.

Some Australian citizen science projects have also been uploaded to the USA-based SciStarter project finder. The project information in the Atlas of Living Australia and SciStarter are exchanged as each respective database deems geographically and topically relevant.

Of all projects surveyed, 88 (or 63.8%) are on a project finder. Of those 88 projects, 64 projects (or 73%) use only the Australian Citizen Science Project Finder, one project (or 1%) uses only SciStarter, and 23 projects (or 26%) use both.

For the majority of projects, information on participation rates and data collected was unavailable from project finders or respective project websites.

Projects with social media



Findings

This preliminary review and mapping of the landscape of citizen science in Queensland is an action under the *Queensland Citizen Science strategy*.

The outlook for citizen science in Queensland is positive given that the majority of Queenslanders who participated in a recent survey indicated an interest in science.

Queenslanders have also contributed to citizen science for a long time (even if not known by that term), and there is clear evidence citizen science is on the rise, providing a greater potential to positively impact Queensland.

Since only 3% of Queenslanders know what citizen science is, there is potential for even more members of the community to get involved in scientific research projects and for more scientists to consider using the community for their research. The formation of the Queensland Chapter of the Australian Citizen Science Association will be a catalyst for greater coordination and growth of the citizen science community.

To foster citizen science further in Queensland, the findings of this preliminary review and mapping of citizen science in Queensland highlight the need to:

1. **Make it easy to find projects:** only

60% of citizen science projects included in this survey use social media platforms.

Existing project finders such as the Australian Citizen Science Project Finder are not consistently used by the citizen science community.

It is recommended that scientists, individuals and community groups include the project name, location, description, methods of participation and number of participants as well as links to the relevant website and social media accounts.

2. **Communicate and collaborate:** communication between citizen science project leads, host organisations and volunteers could be improved to minimise unnecessary duplication of projects and resources.



Mechanisms should also be developed to foster collaborations between citizen scientists and professional scientists in industry, government and academia to create new projects. Collaborations should also be formed with educators to increase classroom engagement in citizen science.

3. **Share data:** as part of communication, projects should adopt an open data policy whenever possible and aim to widely publicise the results of citizen science projects both with those who participated in the project as well as the wider Queensland community.



Social media could be used to highlight the results of these projects and link to data sources.



Office of the Queensland Chief Scientist

 www.chiefscientist.qld.gov.au
 +61 7 3215 3739
 info@chiefscientist.qld.gov.au

Engage with science

   #qldscience
 medium.com/queensland-science



Footnotes

1. Bishop R and Knight S. 2018. *Queenslanders' Perceptions and Attitudes to Science Research Report*. Prepared for: Office of the Queensland Chief Scientist. Kantar Public Consultants, Job no.: 263404246, April 2018.
2. *How Ordinary People are Changing the Face of Discovery*. Gerald Duckworth & Co., London, 304 pp.
3. Newman G, Chandler M, Clyde M, McGreavy B, Haklay M, Ballard H, Gray S, Scarpino R, Hauptfeld R, Mellor D and Gallo J. 2017. *Leveraging the power of place in citizen science for effective conservation decision making*. *Biological Conservation* 208:55–64.