08 Sep 2018
Author: Blanche Clark
Article type: Publication
Page: 126
Herald Sun, The
Readership: 1261000
AVE: $28854.55
Circulation: 330766

BRAINS TRUST

People-powered research has evolved from counting frogs and stars to hi-tech projects that are boosting our understanding of biodiversity, etymology and the origins of the universe. Citizen scientists are having a big impact

BLANCHE CLARK

ELLIE, 5, wanders along Kew Billabong collecting leaves and bark to make a habitat for the local frogs. Her mother, zoologist Christina Renowden, says the family's involvement in Melbourne Water's Frog Census has given her daughter a deep connection to nature.

"It's great for them to have that first-hand experience of nature, hearing frogs call or seeing them, because there is often a disconnection between being outside and being stuck on screen time," says Renowden, who also runs programs for children through educational organisation Leap into Nature. "They learn a bit about the local frogs, which are often brown and jump around. They are not like the green tree frogs in Queensland, which are big and charismatic. They are little brown blobs."

THEY CAN HAVE A GO AT GUESSING WHAT THE SPECIES IS WHEN THEY SEND IN A FROG REPORT

Renowden has been a volunteer for the Frog Census since 2004, when recordings were done with cassette tapes and the details written on forms that were mailed to Melbourne Water.

Melbourne Water data shows that since the program began in 2001, volunteer numbers have gone from an average of 250 a year to more than 1000 when the app was introduced in 2016.

Renowden recently discovered three species — the pobblebonk frog, the common eastern froglet and southern brown tree frog — that hadn't been previously recorded in Glen Eira.

Frog Census co-ordinator James Frazer says data collected by citizen scientists becomes part of a wider data set that informs Melbourne Water's waterway planning. The data is also incorporated into the Victorian Biodiversity Atlas and Atlas of Living Australia.

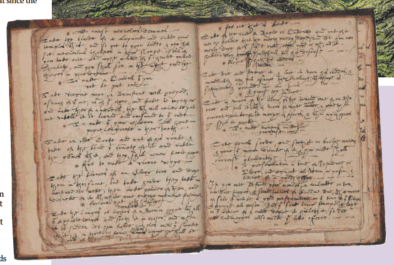
"The information captured by members of the community has been valuable and has included important data on endangered frogs like the growling grass frog, southern toadlet and Bibron's toadlet," Frazer says.

The endangered growling grass frog has been found in backyards, school frog ponds, suburban wetlands and on the edge of a cricket pitch.

He says in return the citizen scientists gain skills and knowledge.

"They can have a go at guessing what the species is when they send in a frog report, but we also identify it professionally for them," Frazer says. "After about a year they are getting 90 per cent plus correct when they put in a report."

MELBOURNEWATER.COM.AU/COMMUNITY-AND-EDUCATION/HELP-PROTECT-ENVIRONMENT/FROG-CENSUS



SHAKESPEARE'S WORLD

THE arts are also making use of people power.

Shakespeare's World on the Zooniverse platform invites lovers of literature to transcribe documents to increase understanding of the English language and the times in which Shakespeare lived.

Zooniverse humanities lead Samantha Blickhan says since the project launched in 2015, about 3500 volunteers have transcribed 6200 pages of text, including letters, recipes and newsletters. She says there have been several breakthroughs.

"Some of my favourites include an antedating of the phrase 'white lie'," Blickhan says. "The earliest usage was once thought to be 1741, but a Shakespeare's World participant found the phrase used in a letter from 1562."

Use of the term "partner" to mean "spouse" was discovered in a document 100 years earlier than recorded in the *Oxford English Dictionary*, previously from John Milton's 1667 poem *Paradise Lost*.

The site averages 100-300 visitors from more than 200 countries a week, with the majority based in the UK and US.

"Many people will only transcribe a few words and then leave, but this is true of most crowdsourcing projects," Blickhan says. "A small core group of volunteers will end up producing most of the work because of varying motivations, including genuine interest in the subject matter."

Folger Shakespeare Library's curator of manuscripts Dr Heather Wolfe says volunteers have not only transcribed thousands of documents and contributed to the *Oxford English Dictionary*, there have been successful experiments with historical recipes, including "shaking pudding", and mutton with oysters, lemon and white wine.

Wolfe says the project has drawn together a global community of people interested in history and old handwriting.

SHAKESPEARESWORLD.ORG

Back to nature: Zoologist Christina Renowden and daughter Ellie make friends with Jasmine, the pobblebonk frog (inset).

PICTURES EUGENE HYLAND

EARTHWATCH

EARTHWATCH CEO Cassandra Nichols says citizen science "empowers change".

"When you're immersing people in nature and involving them in something completely different from their everyday activities, this creates transformational experiences that enable long-term behaviour change," Nichols says.

She says some people question the validity of citizen science.

"It comes down to how much training you give to those people and the types of activities you choose," she says. "There are many publications that come out of citizen science. It is peer-reviewed science. It's definitely valid."

Earthwatch has dozens of projects to choose from, including investigating threats to chimps in Uganda and trailing penguins in Patagonia. Volunteers pay between $950 and $5595 for their working holiday, depending on the location and length of the project.

Closer to home, Earthwatch has week-long expeditions to the Great Barrier Reef twice a year. Eight participants get the chance to help Dr David Bourne and his team from James Cook University monitor the effects of black band disease, a virus destroying reefs around the world.

The team dives daily, also examining the reef's recovery since Cyclone Yasi in 2011.

"Over the past five years, the teams have uncovered the drivers of black band disease," Nichols says. "They have confirmed that environmental factors of increased light and increased temperature are key drivers and climate change is at the core of these changing conditions. They have also determined the microbiology of the disease."

She says researchers are now trialling the potential of phage therapy, in which a different virus is used to kill the negative disease-causing bacteria: "These are the types of things that can come out of citizen science. It can accelerate scientific discoveries."

AU.EARTHWATCH.ORG

PICTURE TOURISM AUSTRALIA QUEENSLAND

ATLAS OF LIVING AUSTRALIA

THE Australian Citizen Science Association was set up in 2014 to share knowledge, collaborate, access funding and provide information to government groups.

Victorian chair David Mossop says the benefits of citizen science are significant to the scientific community.

"There is a lot of local knowledge out there, and some of these people might know their patch of land and their local area better than any scientist," he says. "It's great to be able to access that information."

As program co-ordinator for citizen science at the Environment Protection Authority Victoria, Mossop was involved in the Caring for Waterhole Creek project in the Latrobe Valley.

"That involved water-quality monitoring with community members over about a year, doing fortnightly sampling and an assessment of the pollutants in the water, too," he says.

Mossop says participants valued learning about research methods and environmental science and connecting with like-minded individuals.

But not every project is suitable for citizen science.

"You have to pick a project you know the community has an interest in, and also think through their capabilities," Mossop says.

"It's a balance of having rigorous data but also making it appealing and engaging. That is where technology, like smartphones, can be an advantage."

Anyone interested in volunteering can visit the Atlas of Living Australia, which lists hundreds of scientific projects.

ALA.ORG.AU

URBAN MICROCLIMATE PROJECT

CLIMATE scientists predict the number of extreme hot days will increase over the next 20-30 years and citizen scientists are being enlisted to help the planning of councils and policymakers.

The cities of Melbourne, Port Phillip, Hume and Moreland are among 22 councils that will each recruit 100 volunteers to measure outdoor areas and surfaces to determine local hot spots.

The two-year, $355,000 project, a collaboration between Sustainable Building Innovation Laboratory (SBi Lab) at RMIT University and the High Performance Architecture (HPA) Research Cluster at the University of NSW, is funded by the Department of Industry, Innovation and Science.

"The outdoor microclimate is very dynamic," RMIT Associate Professor Priyadarsini Rajagopalan says. "We do a lot of research into measuring buildings inside for air quality and comfort, but once you go outdoors, it's very complex, especially with the Melbourne climate; it changes every minute.

"Most of the time the researchers are involved in highly scientific research and the local governments are engaged in policy development, but there is no translation of what we do into the government and then to the citizens."

Rajagopalan, director of SBi Lab, says researchers have developed an experimental kit for citizen scientists to use that includes sensors to measure temperature, humidity, mean radiation temperature and wind speed.

Preliminary findings from a pilot program at Hume City Council revealed the rubber surface in a children's playground was the hottest surface in that area.

Rajagopalan says citizen scientists will receive online training before joining researchers for testing in one of three areas selected by their local council.

"There will be different teams of people walking around different urban layouts with different street configurations, green areas such as parks, and seeing how much the temperature changes, for example, as they go away from the middle of the park to the edge," she says.

CITIZENSCIENCEPROJECT.ORG.AU

ASTROQUEST

ONE of Australia's most successful citizen science projects has been Galaxy Explorer.

Over three years more than 21,000 people have helped astronomers classify more than 214,000 galaxies through the Galaxy Explorer website.

Astrophysicist Dr Luke Davies says the aim of the project has been to accurately measure the light coming from each of the galaxies.

He says computers do a lot of the work, but in some cases, things go amiss and astronomers have to correct the data by hand.

"When you have millions of galaxies, it's just not feasible for astronomers to look at all of the data and fix it all themselves," he says.

Davies is the project scientist for WAVES (Wide Area Vista Extragalactic Survey) and overseeing the citizen science sequel to Galaxy Explorer, called AstroQuest.

The WAVES project is helping build a new instrument and telescope in Chile.

"What we are now doing is getting the citizen scientists to look at the complicated shape that the computer thinks the light from the galaxy is covering and to edit that shape using a tool like Microsoft Paint," he says. "Once they've decided they've got a good answer, where the light is coming from the galaxy, they send that to us and in return we will tell them how far away the galaxy is, how many stars it contains and how many new stars are forming and what was going on in the years the light from that galaxy left it."

Quality control is achieved by only taking results when at least five people have come up with the same answer.

ASTROQUEST.NET.AU/HS