

Post-bushfire environmental recovery: Citizen scientists capture thousands of observations

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Ferns send up new shoots after the bushfires in January 2020. Credit: Casey Kirchoff

More than 200 citizen scientists have contributed thousands of post-

bushfire observations to UNSW's Environment Recovery Project.

The data helps scientists understand how some areas recover better than others, and which animals and plants come back first—information that can help inform recovery plans.

The paper published in the journal *Science of the Total Environment* presents first results from the [Environment Recovery Project](#). Lead author of the paper Casey Kirchhoff, a Ph.D. candidate at the UNSW Centre for Ecosystem Science (CES), founded the project after the Morton bushfire destroyed her Wingello home in January 2020. The fire started from a single lightning strike, becoming what was named the Currowan fire, before growing to impact 144,000 ha and destroy many houses, including Casey's.

Mrs Kirchhoff's passion for the environment and natural curiosity inspired her to start tracking the post-fire recovery of the environment surrounding her property, despite her loss.

"I realized I was probably among a handful of scientists collecting this information. So, I thought, why not ask [citizen scientists](#) to share their photos? The bushfires have burnt such a large area; it's impossible to properly survey it with our current resources," she said.

"The more observations we can collect, the more we will know about the impact of the fires on our environment—particularly in the major bushfire areas in southeastern Australia up to Queensland and right across to the southwest."

The researchers said the unprecedented scale of the fires in eastern Australia in 2020 provided a clear example of the challenges faced by scientists and conservation biologists as climate changes.

"The paper highlights how people, using their mobile phones to monitor and upload information, can provide [accurate data](#) on the recovery of bushfire-affected plants and animals over huge scales," Mrs Kirchhoff said.

240 participants submitted over 3200 observations in fire-affected areas of Australia, spanning a study area of nearly 51 million hectares. Observations included plants, animal and fungi, totalling 688 identified species.

Perhaps one of the clearest findings was identifying just how useful and important citizen scientists can be in responding to landscape-scale disturbances.

"Although the data require more analysis, there were initial examples of the utility of citizen science data for understanding recovery," says co-author and fire ecologist Dr. Mark Ooi.

"For example, resprouting plant species—one of the clearest observations of recovery, as new shoots sprout from tree limbs and shrubs—were slower to recover after extremely hot burns, compared to those burnt during cooler stages of the fires."

Citizen scientists also uploaded observations of the severity of the fires that had impacted the areas they visited, which provided an accurate comparison of remotely-sensed satellite data.

Observations to inform research into the future

Co-authors of the paper, Associate Professor Will Cornwell, Dr. Corey Callaghan and Dr. Mark Ooi, also from CES, said this initiative was essential for rapid, large-scale sampling to make informed decisions and prioritize management.

"Citizen science will play a key role in biodiversity monitoring for these and future fires of this magnitude—citizen scientists are already spread out across the impacted areas, and they have better knowledge of local [fire](#) effects compared to governments or university. By bringing all this local expertise together we can really make progress," A/Prof. Cornwell said.

"A key feature of the project worth highlighting is that the data are available on a public platform and can be downloaded and analyzed by other scientists and the public," Dr. Callaghan said.

Dr. Ooi said citizen science provided an opportunity to work at scales difficult to reach rapidly. "The sheer scale of the fires this season makes it very difficult for researchers just working on individual research programs. We need the help of citizen scientists to do this," he said.

A key lesson learnt through developing, implementing, and running the project was that community engagement was essential. Citizen scientists needed to know that the project existed and so opportunities to publicize the [project](#) on mainstream media and social media were important.

A large number of co-authors, including Professor Richard Kingsford, Director of the UNSW Centre for Ecosystem Science, and Centre researchers Professor David Keith, Dony Indiarso, Guy Taseski, Dr. Mark Ooi, Tom Le Breton and Thomas Mesaglio, ensured wide engagement via social media. However, there were even more significant spikes in engagement following stories on mainstream media.

The team at CES aims to continue to build a complete picture of how Australia's ecosystems bounce back from these unprecedented fires.

"We will continue to use people's observations for future research into understanding how some areas recover better than others, as well as

understanding which animals and plants come back first," Prof Kingsford said.

Want to get involved? Here's how

The Environment Recovery Project continues to run as an ongoing initiative to assess long-term [recovery](#).

To contribute data, participants need no scientific knowledge or camera skills—they simply download the [mobile app](#) attached to the Environment Recovery Project, which is available via the global citizen science platform [iNaturalist](#), take a photo and upload the image to the app.

Mrs Kirchhoff said people should only walk through a bushfire-affected area if it was safe to do so.

"Have a look through burnt bushland and take a photo of a plant, animal or fungus and upload it to the Environment Recovery Project," she said.

"If you can identify the species do so, but even if you can't, the photos are still valuable because other people will be able to help. The app will read the image location and allow researchers to identify the particular animal or plant.

"It would be amazing if thousands of citizen scientists uploaded their images—and it feels great after all that's happened to be able to make a contribution by watching the bush recover."

Visit the [Environment Recovery Project](#) for more details, including how to become a [citizen](#) scientist.

More information: Casey Kirchhoff et al. Rapidly mapping fire

effects on biodiversity at a large-scale using citizen science, *Science of The Total Environment* (2020). [DOI: 10.1016/j.scitotenv.2020.142348](https://doi.org/10.1016/j.scitotenv.2020.142348)

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