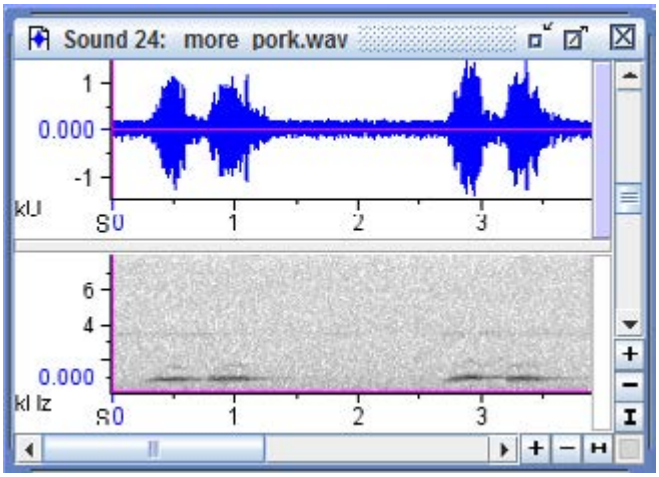
NZ LANDCARE TRUST

TECHNOLOGY: GROWING CITIZEN SCIENCE RESEARCH AND PUBLIC ENGAGEMENT

New ways of collecting audio, visual and environmental data coupled with the rise of social media have played a major role in expanding the scope and nature of citizen science projects.

Snapshot

- Technology will continue to shape and grow new citizen science initiatives
- Increasing capability and decreasing costs enable communities to lead data capture and analysis
- Many technologies are likely to be most effective when coupled with human categorisation skills



Ruru/morepork sound file. Photo www.avianzmassey.ac.nz

Our world is changing...

Technology plays a key role in facilitating data capture at previously unimagined temporal and spatial scales, analysing increasingly complex data sets as well as sharing information through multi-layered social networks.

Smartphone apps for pest control monitoring

Applications in the field of environmental restoration (terrestrial and aquatic) have significant benefits to community environmental groups and data end users. For the first time, trap-line, bait-line and tracking tunnel data can be efficiently entered and stored in online databases. Data can be compared over time, within and between projects. This greatly enhances the ability to measure progress toward Predator Free 2050 goals. Tools include Trap.NZ (Groundtruth and WWF-NZ) and CatchIT (University of Auckland). Downloaded to a smartphone, both have offline capabilities for field use and simple dropdown lists to standardise data entry between sites/projects. Other apps have been developed to monitor key indicator species such as kōkako.

Map of projects currently using Trap.NZ technology

Sensors for real time observations

Basic sensors can be attached to traps triggering instant notifications when and where traps have been sprung. While adding efficiency to trap management, social enterprise the Squawk Squad realised the potential for drawing in wider audiences. A crowdfunding platform to purchase sensor-connected traps for nominated projects was established. Project coordinators/volunteers and funders receive real time notifications, building a larger network people both actively involved (i.e. on ground volunteers) and passively involved (i.e. financially supporting) in restoration.

Drones for high resolution photopoints...

Low-cost drones able to take high resolution images can be used for photopoints that measure the success e.g., of weed eradication, restoration planting and infilling drains to restore water levels in wetlands. Drone can be repositioned at the same point in the air to take oblique images, building a visual narrative of environmental change over time. Although ground-based photopoints can do the same, they can quickly become redundant when vegetation becomes too dense and point markers can become obscured or become inaccessible as restoration sites mature.

Drones and public engagement at the Lake Rotopiko BioBlitz. Photo: Briar Taylor-Smith

... and maps

High-resolution orthomosaic images from drones can be taken into the field on a smartphone. When combined with GIS waypoints can be marked, routes tracked in real time and photos attached or polygons drawn on (see links to charity NZ GIS for Conservation in 'Further information'). Drop-down lists of species monitored and other site details can also be added, giving much higher functionality overall than current freeware allows.

Online databases for crowdsourced observations

Crowdsourced citizen science usually refers to dispersed members of the public contributing data. Many projects are only possible through technology with high levels of smartphone ownership facilitating broad public participation. NatureWatch NZ is an online platform, housing observations of flora, fauna, fungi and environmental phenomena. It enables projects to be developed (e.g., within a specific locality, or for individual species/genera) and is becoming widely used for BioBlitz events. When photos are uploaded, image recognition tools provide a list of suggested species. An active online community of experts also verifies the species identification. The Myrtle Rust Reporter was developed to monitor the spread of this invasive organism via NatureWatch, with more applications in the pipeline specifically targeted at crowdsourcing data on suites of unwanted organisms.

Artificial intelligence for analysing image and sound files

Volunteers analysing images from cameras traps and footage from acoustic recorders are well-established citizen science activities. Advances in image and sound-pattern recognition are rapidly making progress in species identification. However, humans have an incredible ability to match patterns, especially when sounds are overlaid, or images are taken at different angles. The future may well lie in a hybrid human-software approach where identification processes play to the strengths and capabilities both of humans and technology.

Further information

www.trap.nz

www.stat.auckland.ac.nz/~fewster/CatchIT/

www.squawksquad.co.nz

www.naturewatch.org.nz

www.greatkererucount.nz

www.naturewatch.org.nz/projects/myrtle-rust-reporter

www.flightworks.nz

www.nzgic.org

Ministry for the Environment
Manatū Mō Te Taiao

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