NZ LANDCARE TRUST

FRESH DIRECTIONS FOR VOLUNTEER WATER QUALITY MONITORING

Momentum is building around freshwater quality monitoring with community members all around the country getting their hands (and feet) wet in pursuit of new knowledge and skills.

Snapshot

- Community interest in measuring condition and trends in freshwater quality continue to grow
- New legislation has been developed to maintain and improve freshwater quality
- Toolkits and a new national citizen science programme support volunteer freshwater monitoring
- Studies show comparability between volunteers' data and data collected by professionals

It's been nearly 15 years since the Parliamentary Commissioner for the Environment (PCE) raised the alarm for widespread declines in freshwater water quality related to land use intensification. Since then, the dairy industry has promoted riparian fencing to limit stock access to waterways, and a multi-stakeholder Land and Water Forum was brought together to develop a shared vision and pathway forward for freshwater management in New Zealand. A National Policy Statement for Freshwater Management (NPS-FM, 2014) followed, developed to maintain or improve overall freshwater quality in a region. Now, a new NIWA-led citizen science programme is building the capacity of community groups for monitoring their local streams. In the future, volunteer-generated data may play a greater role in supporting research and guiding management planning for our freshwater resources.

Freshwater monitoring workshop in Waitahuna. Photo: Craig Simpson, NZ Landcare Trust

Data quality: How reliable are volunteers' data?

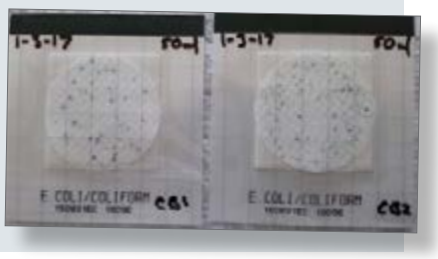
Two studies set out to test whether there were differences in data collected by volunteers compared to professionals. Dr Richard Storey and team (NIWA) found volunteers' data most reliable for water temperature, electrical conductivity, visual water clarity and thick periphyton cover (i.e. algae, cyanobacteria, microbes and detritus attached to submerged surfaces). Volunteers' data were less reliable for indicators of stream ecological 'health' (i.e. macroinvertebrate/bug monitoring) and E. coli though still provided information of general use. In another study, Emma Moffett (Auckland Council) and environmental scientist Martin Neale investigated the difference between macroinvertebrate data collected by volunteers who used a simplified method for species identification. The researchers found the volunteer data had the ability to detect long-term trends in ecological health and was comparable to professional data (despite professionals using standard national protocols). They concluded that **'volunteer data could be used to support professional monitoring programmes'.**

Toolkits

The Stream Health Monitoring and Assessment Kit (SHMAK) and the Auckland Waicare programme are both toolkits specifically designed for communities. SHMAK (developed in by NIWA scientists in 2002) is now being revitalised through a citizen science programme led by Dr. Richard Storey. Until recently, Waicare coordinators actively worked with community members and school children to collect data on their local waterways and provide educational experiences (Waicare is now moving to a community-led model). Both SHMAK and Waicare cover macroinvertebrate identification and tools for measuring variables (e.g., water clarity, conductivity, pH, temperature and flow), guides for assessing stream characteristics (e.g., substrate type) as well as habitat characteristics (e.g., riparian condition). Altogether, the measures made using these toolkits can provide a valuable record of stream and surrounding habitat health as well as raising the ecological literacy of toolkit users.

E. coli counts

Community group Friends of the Matai River (with Nelson City Council and NIWA) set up an experiment to compare Petrifilm plates (supplied by NIWA) and Sanita-kun kits (supplied by Ngaio Diagnostics) to determine the best for community-led monitoring of E-coli. They found that Sanita-kun plates often smudged and were difficult to read, while using a combination of the Sanita-kun filtering method and Petrifilm plates at low concentrations of E. coli produced the best results.



Examples of trials to grow E.coli bacteria colonies (dark purple growths) Photo: Philippa Eberlein

The RiverWatch Water Tester in action. Users can upload data onto their smartphone via the RiverWatch app. Photo: RiverWatch

Technology for the community

Wairarapa farmer Grant Muir has developed an affordable monitoring device that can be anchored in rivers, lakes or streams. The bread loaf-sized RiverWatch Water Tester floats and takes regular measurements (dissolved oxygen, conductivity, turbidity, temperature and pH) for several days at a time. GPS data are downloaded via Bluetooth and automatically sent to the WaiNZ website to appear (once approved) on the website's map. These data will eventually build an information-rich picture showing changes over time in water quality. Grant emphasises that putting an affordable water quality measuring device into the hands of the public is central because ultimately, **'Water quality is not a political issue, it's one that we all share… it's something that affects us all'.**

Further information

Stream Health Monitoring and Assessment Kit/ SHMAK **www.niwa.co.nz**

www.waicare.org.nz

www.WaiNZ.org.nz

www.friendsofthemaitai.org.nz

Storey, R. et al. 2016. *Volunteer stream monitoring: Do the data quality and monitoring experience support increased community involvement in freshwater decision making?* Ecology and Society, 21(4)

Moffett, E. & Neale, M. 2015. *Volunteer and professional macroinvertebrate monitoring provide concordant assessments of stream health.* New Zealand Journal of Marine and Freshwater Research, 49(3), 366-375

Ministry for the Environment

This resource is one of a series of case studies generated as part of NZ Landcare Trust's Citizen Science Meets Environmental Restoration project, funded by MFE's Community Environment Fund - www.landcare.org.nz/CitizenScience