AI for the Environment Hackathon Festival 2023

Live Q&A 24 July 2023 | New Problems to Solve

Recording Restoration Activities - at Baring Head, Wainuiomata, and beyond

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New Zealand has two web-based databases and apps that allow people in restoration groups to record vital information, and that we use at Baring Head:

- Inaturalist, which is used to record biodiversity observations
- TrapNZ which is used to record trap locations and catches.

Inaturalist is an international system, with the NZ system run by a charitable trust. It can be accessed through https://inaturalist.nz/.

Individual observations are added through the website or the app. Experts look at those and provide identifications. Projects can be set up within the system (e.g. for a specific place), and it can be used for specific activities (e.g. the recent city nature challenge). Location of rare species can be hidden, but otherwise the data is all available to anyone to use for any purpose. jon.sullivan@lincoln.ac.nz is the site administrator and can answer questions on how the system is maintained, links to the international system, etc.

Having all the groups use these has some major advantages:

- There is a single system that agencies can invest in, rather than having investment spread across a lot of competing systems.
- By having everyone put their data in these, others can easily access that data and use it for other purposes. For example, someone may put an observation on inaturalist because they want an ID, but it then becomes part of the overall record of where that species is in NZ and what species are in the place it was found.
- Data isn't lost when restoration groups fold or change personnel.
- Where linked to an international system, we get their expertise and observations as well.
- There are some other national systems recently developed or in development, such as one for recording fish passage barriers.

Problem to Solve #1 - Recording Restoration Activities

What we don't have is a good system for recording activities we do – planting, weed surveillance (that fails to find anything), weed control, installation of equipment, and so on. The council as landowner has developed a system for mapping the work we do, but it is bespoke and only they can access and add to the maps. And adjacent groups are presumably using their own systems (or not recording), so there's no way to look at the whole catchment and what has been done.

This makes the data for or project less secure and harder to collect. But it also means there is no easy way to compile data from a lot of groups (e.g. for international convention reporting purposes).

It also makes it very difficult for those involved to see the impact of their actions over time – and for us to celebrate that.

Problem to Solve #2 - Recording progress

Increasingly, we are setting objectives for biodiversity, catchment restoration, and community outcomes, that will be delivered through multiple actions by multiple parties.

To efficiently track progress towards these objectives, we need to:

1. **Translate the objective into actions.** For example, the objective might to be to reduce sediment in a river by 80%, but the actions might be to have 60% of the riparian margin in woody vegetation. We have some algorithms that allow that to be done, but probably need more. We want to have the actions deliver the objectives at lowest possible cost. For example, you might get more benefit from planting headwater tributaries rather than the main river. So algorithms or models need to address that as well.

   Walk Score is an interesting example of how an objective (walkability) can be measured using existing data. This international system uses publicly available data to provide a "walkability" score for every property in a lot of countries. That takes into account things like access to public transport, and even to things like coffee shops. For example my apartment has a walk score of 91/100 and a transit score of 79/100. The methodology can be found here https://www.walkscore.com/methodology.shtml. It breaks down the walk score according to things like access to parks, groceries, etc.

   In **Freshwater Ecosystems of NZ**, DOC (John Leathwick) developed algorithms to relate easily identified parameters like woody tree cover to likely river condition.

2. **Have an easy way to measure whether the actions have been done.** That gets away from every landowner or volunteer group having to say what they have done, and instead have an annual survey of overall change. For example, using drone footage, satellite data (e.g. LCDB), etc.

3. **Have a place that the progress is recorded**, so people can celebrate, look at trends over time, and look at where effort is still needed.

Problem to Solve #3 - Recording progress towards an objective

In many cases, the same system can be used for multiple places that have a related objective (e.g. multiple rivers that need sediment reduction, multiple cities that want to increase people's access to green spaces). So we should develop the system once and make it available.

Examples for Wainuiomata River and Baring Head:
For our Wainuiomata River whole catchment process, it would be great to be able to track riparian vegetation and overall closed canopy vegetation in the catchment. For Baring Head to be able to track coverage of native plants that have achieved canopy closure.

Some other examples of where NZ could benefit from this sort of system are:

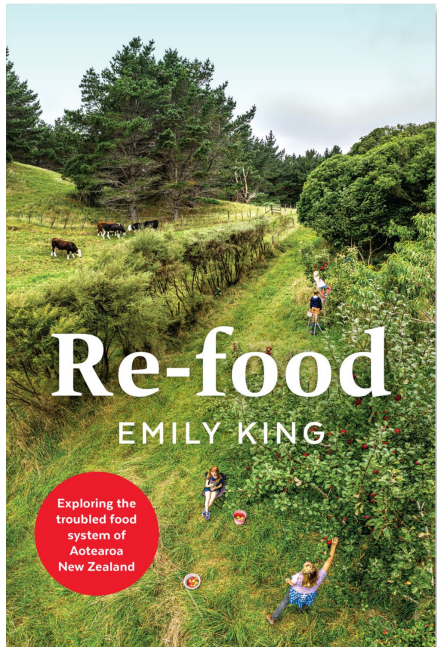
- Catchment vegetation.
- River edge that doesn't have major modifications (rock wrap, stop banks, channelisation).
- Extent of weed cover (e.g. for wilding pines, broom).
- Urban tree cover.
- Access of people to certain types of recreation/wellbeing opportunities, such as children's play areas, green space.
- Impervious surface equivalence (i.e. how much of the rainfall hitting a city goes directly into natural water bodies via stormwater drains, rather than being soaked in stormwater gardens, green roofs, water harvesting systems, etc.). It is considered that if there is more than about 7-10%, urban streams will be severely impacted.
- Wilding pine coverage.
- Range reduction of a new incursion – so recording where it has been searched for and not found, and where it is known to be, hoping that over time it will be present in fewer places.

ReFood

Emily King's new book Re-Food looks at the fundamentals for food producing nations like New Zealand - and where we are failing.

She also looks at land use and provides the historical context for how and why we use our agricultural resources in the way we do.

Emily has posed 4 vey different challenges for us to consider.



1. Food waste and measurability/data

Municipalities/councils are increasingly needing to measure and calculate the impact of their food system within their boundaries. One challenging area for this is calculating food waste in the manufacturing sector.

Data is not perfect but is collected better at the primary production (farming and growing) and the consumer end of the food system (via supermarkets and retailers' data sets). Assumptions can be crudely made in those data sets to understand what an areas' impact is. However when it comes to food manufacturing, the data collection or availability of it for researchers, is lacking.

How can we measure and therefore quantify the impact of food waste in our food factories and manufacturing plants and then make that data readily available for researchers to get a clearer picture?

2. Food affordability

Food prices just hit a 36 year high in New Zealand. Globally the cost of food is rising each quarter at the moment. People need to eat 7 + servings of vegetables and fruits a day to meet their nutritional needs.

How can we reduce the cost of fruits and vegetables to make sure they are more accessible to everyone, while ensuring that our farmers and growers get a fair price for their produce?

3. Traceability and transparency

The food system is complex and ingredients travel across countries and continents before being combined to make your food.

Currently in New Zealand country of origin labeling is limited to fresh fruit and vegetables, meat and fish. The complexities in the supply chain make it challenging to be able to identify more links in the chain.

How can food businesses better track and trace their ingredients and therefore their supply chains to make it clearer to people where their food comes from?

4. Climate impact of food

It's challenging for food businesses to accurately state the climate impact of the food they are making, yet consumers of that food are increasingly demanding to understand the impact of what they eat on the climate (in terms of greenhouse gas emissions).

How can a food business measure and potentially 'offset' or reduce it's climate impact, then communicate that to customers?

AI Hackathon 2023 News / Update

- **Auckland | 11-12 August 2023 | academyEx and She Sharp**

Venue: academyEx | Manuka Room | 99 Khyber Pass Road, Grafton | Auckland
Registrations close 10 August.

- **Wellington | 14-15 August 2023 | AWS**

Venue: AWS Wellington | Level 21/157 Lambton Quay | Wellington Central
Registrations close 11 August.

- **Auckland | 15-16 August 2023 | NZME and Google**

Venue: NZME | iHeart Lounge | 2 Graham Street | Auckland CBD
Registrations close 14 August.

- **Christchurch | 15-16 August 2023 | Callaghan Innovation**

Venue: Callaghan Innovation, 5 Sheffield Crescent, Burnside.
Registrations close 14 August.

New Venue:

- **Taranaki | 15-16 August 2023 | PowerCo**

Venue: PowerCo | 35 Junction St, New Plymouth.
Registrations close 14 August.

New Dates:

- **Waikato | 19-20 August 2023 | University of Waikato**

Venue: AI Institute, School of Computing & Mathematical Sciences, University of Waikato, Gate 8, The University of Waikato, Hillcrest Road.
Registrations close 17 August.


AI Hackathon
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www.hackathon.nz