Takiwā Lakes – Fact Sheet

LERNZ
Lake Ecosystem Research New Zealand

Linking lake research with end users for positive environmental outcomes
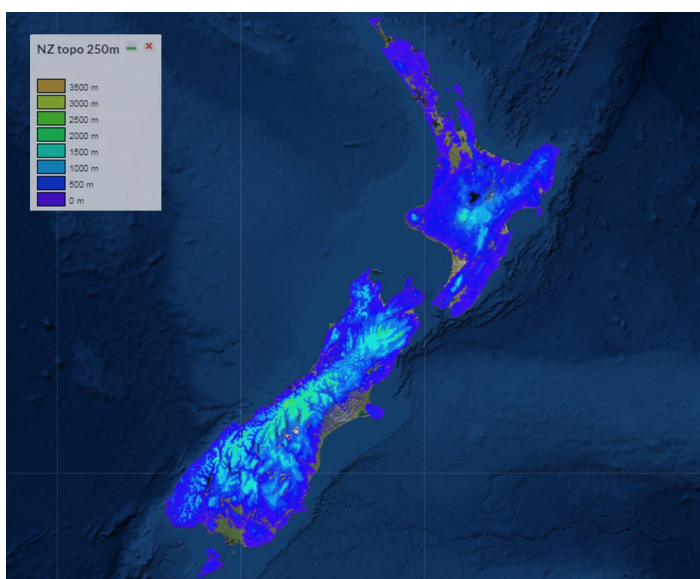
What is Takiwā Lakes?

Takiwā Lakes is a site for storing lake data in visual format based on its location; a 'geospatial database'. It has been developed as part of a collaboration between LERNZ and Waiora Pacific Ltd (a company providing specialist services in data visualization). Together, LERNZ and Waiora Pacific have realised an opportunity to visualise lake data by integrating comprehensive national environmental databases, routine and high-frequency data, and 'big data' from other sensors, into a single platform. Takiwā Lakes therefore contains diverse information related to climate, soils, land use, stream networks, lake morphology, lake water quality, literature (reports and other publications) and native and introduced species abundances in lakes.

URL: https://lakes.takiwagis.com/login

Figure 1. Example of output from Takiwā: topography of New Zealand (Land Information New Zealand).

Content in Takiwā Lakes

Takiwā has data organized as a series of layers. Some of these layers are demonstrated in this Fact Sheet to provide examples of the form of data visualization. The data consist of layers containing:

- Lake bathymetry (shape and depth) and catchment boundaries
- Land topographic information (Land Information New Zealand) (Fig. 1)
- Land use and capability (Land Cover Data Base 4)
- River and stream networks and order (River Environment Classification)
- Soil properties and types (S-map)
- Freshwater fish database (NIWA)
- Raw data files on physical, chemical and biological variables (LERNZdB)
- Satellite remote sensing images
- High-frequency data from lake buoys
- Lake nutrient and chlorophyll concentrations, Trophic Level Index and comparisons against the National Objectives Framework standards
- Modelled predictions of lake trophic state based on catchment nutrient loads
- Catchment nutrient and sediment loads (CLUES)
- 'Vital statistics' on lakes including depth, area, trophic state, etc.
- Predictions of coarse fish invasion and establishment potential
- Over 600 publications specific to a lake or area (georeferenced).

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Why the Need for Takiwā Lakes?

The need for geospatial databases such as Takiwā is increasing as the ability to collect larger volumes of environmental information expands and the questions posed about assessing and managing the environment become more complex. A key part of the LERNZ programme is sensor deployments, either in situ (within lakes) or from satellites (Fig. 2), producing large volumes of data. Scientists, stakeholders, managers and the community increasingly demand that the data are accurate, accessible and easily integrated to generate knowledge and predictions about how lakes respond across the landscape and to environmental cues. Datasets in Takiwā will allow predictions to be made about the future state of lake ecosystems and inform scenarios of effects of different land-use management practices on lake water quality. This type of information is important to better understand how lakes comply with the National Objectives Framework of the National Policy Statement for Freshwater Management.
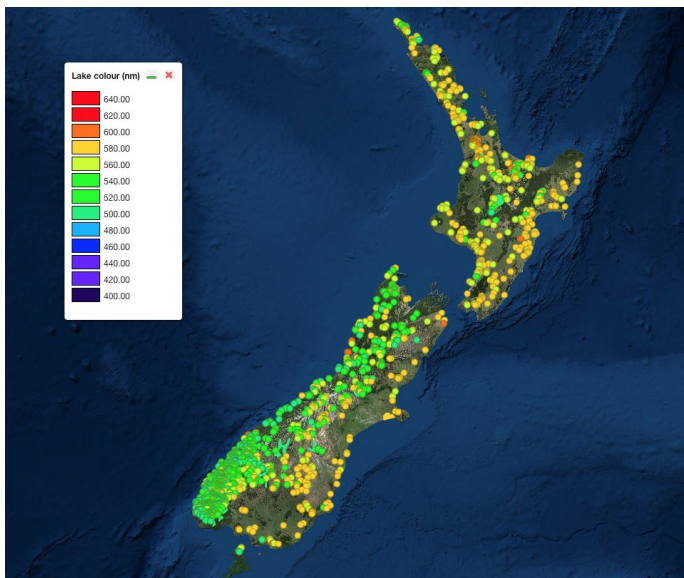

Figure 2. Example of output from Takiwā: colour of 1400 New Zealand lakes expressed as dominant wavelength.

The Future of Takiwā Lakes

Takiwā has been set up to provide a scalable and persistent visualization database to benefit a diverse range of stakeholders throughout New Zealand (see example outputs in Fig. 3). One of the central tenets of Takiwā is to make data fully open and accessible through the remaining duration of the LERNZ programme, until 2019. The ability to continue Takiwā beyond this time will depend on 'buy in' from stakeholders depending on their perceptions of the usefulness of the platform as a freshwater data repository and visualization tool.
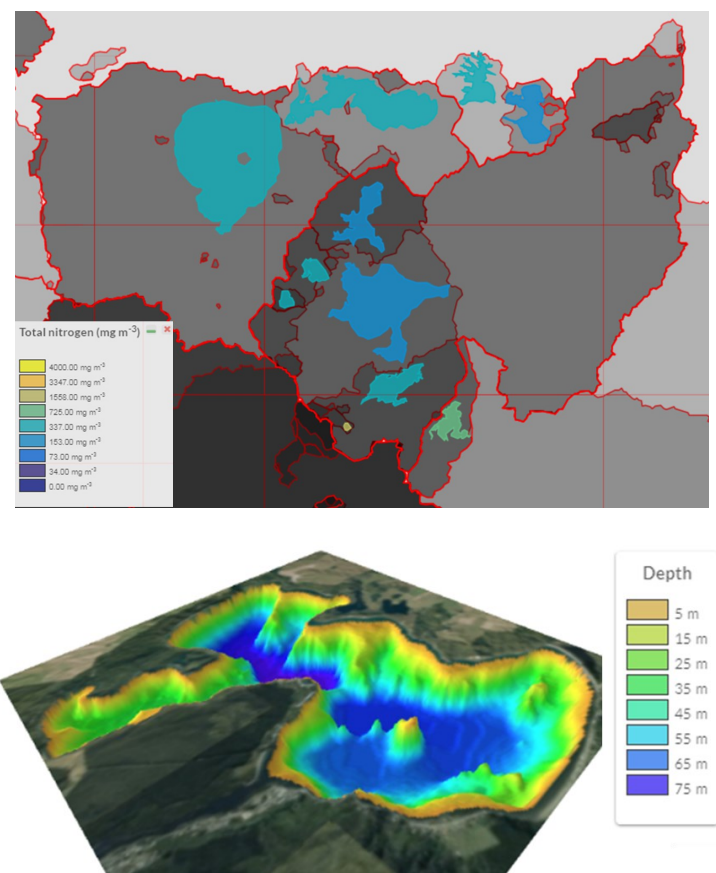

Figure 3. Example outputs from Takiwā. Top: total nitrogen concentrations and catchment boundaries for the Rotorua/Te Arawa lakes. Bottom: depth contours for Lake Rotomā (Te Arawa lakes).