EXPLORING THE HISTORY OF NEW ZEALAND'S LAKES

New Zealand's lakes are essential ecosystems. When healthy, they sustain aquatic life, support social and economic needs, provide recreational opportunities, and are culturally and spiritually important. It is estimated about 50% of lowland lakes larger than 1 hectare are in poor ecological health. However, the majority of New Zealand's 3800 lakes remain unstudied, and there is limited scientific data about their current condition. To protect and restore these important taonga (treasures), we need to understand their histories and how and why they have changed before and since human arrival.

USED FOR

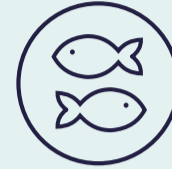- RECREATION
- DRINKING WATER
- IRRIGATION
- POWER GENERATION

VALUED

- CULTURALLY
- ECOLOGICALLY
- ECONOMICALLY

Lakes are important to New Zealand. However, we have very little scientific knowledge about their current and historic health. To gain a greater understanding some detective work is required.

WHAT CLUES SHOULD BE USED?

Everything that enters a lake is called an input, and over time inputs sink to the bottom of the lake. The four key types of inputs are pictured below.

ATMOSPHERE INPUTS
Charcoal, chemicals, volcanic ash, dust and pollen suspended in the atmosphere fall on the lake's surface and sink over time.

GROUNDWATER INPUTS
Nutrients and toxins from the land filter through the soil into the groundwater. The groundwater seeps into the lake.

CATCHMENT INPUTS
Rivers wash soil, nutrients, toxins, human-made materials such as plastics, and natural materials into lakes.

LAKE INPUTS
Dead plants and organisms which once lived in the lake sink to the bottom where they start breaking down.

FINDING THE CLUES

All the inputs eventually sink and combine to form sediment on the lake bed. These sediments are a treasure trove of information that scientists can use to understand how the health of the lake and surrounding land has changed through time.

EXTRACTING THE CLUES

Tubes of mud known as sediment cores are removed from the lake. Like a compost pile, the newest deposits are at the top, and the oldest at the bottom. Small amounts of sediment are sampled down the length of the core so pollen, plant remains and DNA can be identified and tested.

POLLEN
Pollen from trees and plants are identified and counted. This provides an indication of how vegetation has changed over time for example from native forest to grasslands.

PLANT REMAINS
Natural materials like wood are tested, providing an approximate age of the sediment.

DNA
DNA from plants, bacteria and fish is used to identify species that have lived in the lake.

HOW CAN THE EVIDENCE BE USED?

The results from the sediments show how the lake and the surrounding landscape has changed over time. These results provide a better understanding of current lake health and what we need to do to take care of these precious taonga.
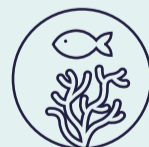
PROTECT
Lakes that have animals, plants or rare species that are at risk can be identified and protected.

PREDICT THE FUTURE
New information helps predict how lakes will change if temperatures increase, land use around a lake changes, or if new organisms are introduced.

MANAGE RESOURCES
The results will help assess how the management of resources such as food and drinking water, irrigation and power generation can be improved for the future.

When we understand the histories of our lakes we will be better placed to protect and improve them for the future. www.lakes380.com