

# SUMMER RESEARCH 2024/25

## PROJECT ABSTRACT



THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

### PROJECT # 57

<b>SUPERVISOR/S:</b>	Dr Andrew Barnes
<b>PROJECT TITLE:</b>	Warming and drought impacts on belowground faunal communities in geothermally warmed soils
<b>FIELD:</b>	Terrestrial Ecology
<b>DIVISION/SCHOOL:</b>	HECS - Te Aka Mātuatua School of Science
<b>PROJECT LOCATION:</b>	Hamilton

#### PROJECT ABSTRACT:

Climate change is imposing multifaceted effects on organisms and ecosystem processes. While many studies have explored the ecological consequences of global warming, few have investigated whether rising temperatures jeopardize the ability of ecosystems to withstand other disturbances, like drought. Soil ecosystems are extremely complex and particularly vulnerable to climate change. However, we do not know how global warming will affect the capacity of soil ecosystems to resist and recover from disturbance. This project aims to explore the impact of warming on soil invertebrate communities and associated ecosystem processes using unique, naturally heated geothermal gradients as a model for global warming and rainout shelters to mimic an extreme drought event. In this project, the student will help to establish a drought experiment and collect soil samples across a number of sites containing a geothermal hotspot, from which they will extract, count, and identify soil invertebrates (e.g. mites, springtails, spiders, and insects) and quantify associated ecosystem functions carried out by these fauna (e.g. decomposition, herbivory, and predation). We are working closely with Ngati Whaoa-Ngati Tahu who are kaitiaki of these sites and we seek permission before any sampling takes place and will do so in this project. These data can then be used to determine how long term climate warming (simulated by geothermally warmed soils) could interact with extreme weather events (in this case, an experimental drought) to alter belowground biodiversity and associated ecosystem functions carried out in grassland soils.

#### STUDENT SKILLS:

- A good level of fitness and the general ability to work in the field is essential.
- A strong attention to detail while working with samples containing very small organisms.
- Some experience in terrestrial ecology or soil science would be preferred.
- Experience working in a laboratory.
- Excellent organisational skills and experience working with biological samples.

#### PROJECT TASKS:

1. Field data collection, including taking soil core samples at a research farm near Rotorua with geothermal hotspots.
2. Help to establish a drought disturbance experiment and measure a range of soil properties.
3. Lab extraction of soil invertebrates from cores using both wet and heat extraction techniques.
4. Data entry and organisation.

#### EXPECTED OUTCOMES:

- Student's Research Poster (as per clause 6 of the [Scholarship regulations](#))
- The student will gain experience in field collection methods used for investigating soil invertebrate food webs and ecosystem functioning.
- Complete lab-based extraction of invertebrates from the samples collected in the field.
- Learn to measure a range of soil physicochemical properties.

