



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato



PhD Scholarship Available

Vulnerabilities of cultural keystone species to climate change in Te Arawa lake ecosystems

Overview

Whakahohetia Ngā Wai Kāinga is a focus study within the Toitū Ngā Taonga Waimāori research programme (see below) that aims to support Te Arawa's place-based prioritisation and implementation of adaptation interventions that will support the resilience of their cultural keystone species and iwi/hapū communities under a changing climate.

The **Te Arawa Lakes** were formed up to 140,000 years ago by a series of volcanic eruptions that led to formation of craters and damming of river valleys. The geological area in and around the lakes is still geothermally active, and some of the lakes are influenced by geothermally heated surface inflows, which can be naturally high in concentrations of phosphorus and a range of metals. Some of the lakes have been increasingly affected by human activities such as urbanisation and farming, resulting in eutrophication, whereas others have been more or less unaffected resulting in trophic states ranging from oligotrophic to highly eutrophic and mixing regimes from monomictic to polymictic. The lakes provide an ideal opportunity to conduct comparative studies across various gradients of lake and catchment sizes and environmental stressors. It is anticipated that climate change will result in increased stratification events in duration and severity with potentially altering ecosystem functioning (including metal speciation and mobilisation, bottom water oxygen demand) that affects the habitat quality and quantity for biota.

Predictive modelling tools are needed by Te Arawa iwi/hapū to help unravel the impacts of climate change on key ecological parameters, from heavy metal mobilisation to hypoxia, and guide their decision making in the Te Arawa Lakes. The learnings from the Whakahohetia Ngā Wai Kāinga focus study (which includes this PhD, a MSc and other workstreams) will inform a freshwater-focused climate change adaptation toolbox for the benefit of Te Arawa lakes and iwi/hapū.

About this PhD opportunity

Our team is seeking a highly motivated and skilled PhD candidate to work on this collaborative project with the University of Waikato, Te Arawa Lakes Trust, Kusabs & Associates and the National Institute of Water and Atmospheric Research (NIWA). Aquatic ecosystem modelling will play a pivotal role in this doctoral study, facilitating climate impact simulations of key variables affecting culturally significant species. There is also considerable opportunity to develop field campaigns and experiments in support of modelling endeavours.

PhD supervision will be provided by Associate Professor [Deniz Özkundakci](#) and Dr [Megan Grainger](#), with support from Dr Ian Kusabs and Te Arawa Lakes Trust where needed.

Skillsets

We are seeking a candidate with a strong background in aquatic ecosystem modelling and one or more of the following: habitat suitability modelling, aquatic geochemistry and metal speciation, habitat restoration, and a passion for interdisciplinary work alongside iwi/hapū. A Master's degree in a related field and an excellent academic record are essential. Proficiency in programming languages such as R, MATLAB or Python, will be viewed favourably.

Any experience running lake ecosystem model simulations or analysing model output (like PCLake or GLM-AED) would be highly beneficial.

Entry Requirements

To be eligible, you need to meet the [enrolment requirements](#) of the University of Waikato. Ideally you will be ready to commence study as soon as possible. Both domestic and international students are eligible and encouraged to apply. At Te Whare Wānanga o Waikato, the University of Waikato, we embrace equity and diversity; therefore, we strongly encourage applicants with the relevant capabilities from all backgrounds to apply.

Scholarship details

Value & duration

To provide financial support throughout this PhD journey the successful candidate will receive a stipend of NZ\$30,000 per year, plus full tuition fees, for 3.5 years. Te Whare Wānanga o Waikato will provide access to world-class research facilities and opportunities for professional development.

Location

The successful candidate will be based at Te Whare Wānanga o Waikato in Hamilton.

Application process

To apply for this opportunity, please submit the following documents to Dr Deniz Özkundakci (deniz.ozkundakci@waikato.ac.nz):

- A captivating cover letter outlining your thematic interest in relation to the project, showcasing your motivation and profile (maximum 2 pages).
- Your comprehensive CV, highlighting your achievements and relevant experience.
- Academic transcripts that demonstrate your educational background.
- A sample of your academic writing, such as a working paper or a thesis chapter, which reflects your research capabilities.
- Contact details for at least two referees.

Review of applicants begins as soon as possible and will continue until the vacancy is filled. Deniz Özkundakci will let you know whether they have shortlisted you for this vacancy and will advise you of next steps.

Interviews will be conducted either in person or via video conferencing. Upon approval from the selection committee that will include the above supervisors, Soweeta Fort-D'ath (Te Arawa Lakes Trust), Dr Ian Kusabs, and/or Dr Erica Williams (NIWA), the successful applicant will be guided through the Doctor of Philosophy enrolment process at the University of Waikato.

Key contacts

Dr Deniz Özkundakci, deniz.ozkundakci@waikato.ac.nz

About Toitū Ngā Taonga Waimāori

The overarching vision of the Toitū Ngā Taonga Waimāori research programme is to co-develop climate change vulnerability assessments and predictive decision support tools that are able to reflect freshwater cultural keystone species, and the place-based cultural practices, knowledge systems and behaviours of iwi/hapū/whānau. This evidence-base will inform the spatiotemporal design of priority actions, plans and policies needed by iwi/hapū to support rangatiratanga, kaitiakitanga, increase food security, biodiversity and the resilience of CKS regionally and nationally under a changing climate.