SUPervisor/S: Tanya O’Neill and Megan Grainger

Project Title: Unravelling the impacts of legacy mining contaminants in the Tararu Valley, Thames Coast, New Zealand

Field: Environmental Science/Chemistry

Division/School: HECS - School of Science

Project Location: Hamilton

Project Abstract:
Mining activities can lead to the generation of large quantities of metal laden waste, which if released into the environment, can cause widespread and long-term adverse effects. This summer scholarship project is part of a larger initiative to investigate the impact of legacy mining contaminants on the ecological health of the Tararu Stream and tributaries, Tararu Valley, north of Thames. The valley was a hive of mining activity during the gold boom of the late 1800s and there is still evidence of historic machinery, tailings and mine workings.

The project will involve deploying diffuse gradients in thin-films (DGT) devices to measure labile metal species in the stream and its tributaries, providing a time-averaged mean metal concentration over deployment. Data will be used to identify sources of contamination of heavy metals, and compared with data collected from these sites during winter 2021 to identify seasonal variation in heavy metal loading. Grab samples and measurements of water quality parameters will also be collected during field trips (e.g. pH, conductivity, temperature). Results will be compared with the ANZECC guideline values for water quality in aquatic ecosystems.

The successful student will enjoy a good mix of field and lab-based work, and laboratory work will include preparing samples for elemental analysis by ICP-MS and analysing anions by ion chromatography. This project also has the potential to develop into an exciting MSc project.

Student Skills:
- Willing and physically able to carry out field work
- Careful and accurate laboratory skills
- Prepared to undertake repetitive tasks
- Confident to use equipment and instrumentation
- Excellent record keeping skills and attention to detail
- Able to work will large datasets and capable with Excel
- Willingness to take responsibility and work independently

Project Tasks:
- Assist with preparation of sample collection gear and analysis equipment for field trips
- Assist with field trips to deploy and collect DGTs, collect water samples and take field measurements
- Prepare collected samples for ICP-MS and ion chromatography
- Work with supervisors to analyse and collate collected data
- Deliver a written a report of findings by end of placement

Expected Outcomes:
- Student’s Research Poster (as per clause 6 of the Scholarship regulations)
- Successfully deploy, collect and analyse DGTs
- Analyse water samples (grab samples) at each deployment site
- The student will gain experience and good laboratory skills using ICP-MS and IC
- Generate data that will contribute to a publication and for use in a grant application
- The student will also gain experience in research methods such as experimental design, data analysis, result interpretation and writing skills
- Results from the project will help develop an understanding of the utility of DGT in monitoring metal loading in streams in historic mining areas