
Thank you for submitting
ARC Fund Final Report

Our team may reach out to you with follow-up requests for clarification regarding your submission.

Review your submission responses below:

Researcher First Name: **Martha**

Researcher Last Name: **Nelson-Flower**

Department: **Biology**

Other Department:

Department Head's Email: **mhamilton@langara.ca**

Project Title: **Managing Recreation Impacts on Species at Risk in the Shannon Basin, Howe Sound Biosphere**

Start semester: **5/1/2025**

End Semester: **10/1/2025**

Introduction - Please introduce yourself and include pertinent background information as it relates to your project's research area. **I am a faculty member of the Biology Department and have taught first and second year Biology classes at Langara College for the past 7 years. I was actively involved in molecular ecology research from 2000-2018 when I started teaching full time.**

Please discuss your educational background and your work experience as it relates to this project. If possible, include a quote that helps define your interest in the project. **Previously, I have used molecular biology approaches to better understand population ecology and life history in birds in a variety of study systems. I have also explored chloroplast genomics in dinoflagellates. I was interested in this project because it used lab-based**

techniques to better understand and address challenges in the wild.

Please summarize your project in plain language that others not in your field could understand. The Shannon basin is a recreation area near the Chief in Squamish. Stakeholders have been concerned that some trails are impacting vulnerable species in the area. We were able to use molecular ecology tools to investigate the presence of rare coastal-tailed frogs in the local waterways. Specifically, we were able to detect this frog's DNA in environmental DNA isolated from water samples. This information will be used to help conserve this vulnerable species.

Identify the project goals and objectives. Explain how the results may be used to solve a problem or inform further research in the field. Goals and objectives: identify the waterways which contained coastal-tailed frog. These frogs are rare and very difficult to observe, hence the need of molecular biology surveillance techniques. Use of results: results will be used to reroute trails which venture too close to identified waterways.

Briefly explain the steps taken (methods used) to conduct the research, and describe the key findings. The data will be used by the Shannon Basin Management Team to form a picture of the entire Shannon Basin and its ecological requirements as far as recreation impacts. I would like to continue my involvement in research at Langara, but I am looking for a new project. I would also like to be involved in the lab space somehow to help make it more welcoming in the future to new projects and new faculty researchers and their students.

Who was involved in this project (eg. faculty, students, community partners)? How did their involvement contribute to the project's success? Were there any challenges to overcome? This project involved Newsha Khedri at Langara College and myself. Ji Yang was also involved by providing logistical support. This project was in collaboration with Capilano University and the main collaborator was Dr Tom Flower and his students, which collected the samples. Equipment in the field was supplied by UNBC. The Shannon Basin Management plan (Megan Harris) was a partner. Partners also included the Squamish Nation and the Ministry of Forests. This project could not have been conducted without the involvement of the CapU partners, who conducted the difficult and exhausting work of visiting the remote sites and collecting the filtered samples. Challenges to overcome: The lab research space was crowded and there were some interpersonal difficulties to overcome in that space. The space needs a someone to coordinate purchase of general lab supplies for researchers with short-term or small projects. Some areas/resources in the shared lab space were off-limits to some researchers, but this was not clearly communicated ahead of time. It was difficult to navigate purchase of equipment and supplies on my own, even with the help of ARC staff.

Please share any personal stories that made this research experience memorable/valuable.

It was very exciting to see my student Newsha gain new skills and confidence. Even though the specific technique and approach we followed was new to me, we were able to get the results we needed in a reasonable timeframe.

What are the next steps for this project and for you as a researcher?

Methods: 1. Filter water samples at identified sites and carefully conserve filters. 2. Isolate environmental DNA (eDNA) from the filters. 3. Use the eDNA in a technique called quantitative PCR (qPCR) which allows researchers to detect a fluorescent signal when a particular product has formed. In this case, the fluorescent signal was only seen when the coastal-tailed frog was present in the eDNA. Key findings: Coastal-tailed frogs are present in some of the waterways but not all. This project is ongoing and the information will be used (as well as camera-trap data on land) to inform recreation trail planning.

Please upload any images that will help to showcase your project.

By submitting, I consent to uploading my ARC Fund final report to the Langara Institutional Repository (The Lair).

True

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