



Al Martin HCTF Conservation Fellowships Recipient 2023



Alessandro Freeman

Alessandro Freeman is a M.Sc. student of Ecological Restoration at Simon Fraser University and the British Columbia Institute of Technology under the supervision of Dr. Douglas Ransome. He holds a Bachelor of Science (Honours) in Natural Resources Conservation from the University of British Columbia.

Alessandro was born and raised in Vancouver where he grew up volunteering with the Vancouver Aquarium and their Marine Mammal Rescue Centre and developed a passion for nature conservation. During his bachelor's degree, he worked with Fisheries and Oceans Canada analyzing policy that included sustainable salmon policy. After completing his B.Sc., Alessandro worked in environmental consulting with a heavy emphasis on fish and fish habitat assessments, which led him to pursue an M.Sc. in ecological restoration. During a class trip, he visited a large river on Denman Island that was completely dry for the first time in recorded history. The instructor discussed the importance of finding nature-based solutions to retain perennial flow of BC watercourses in the face of climate change. This experience led Alessandro to choose a research project working with American beavers to find solutions to this problem. Beavers are ecosystem engineers who provide a variety of ecosystem services such as the creation and conservation of aquatic habitat and water retention.

Alessandro's research project titled "Determining the Accuracy of the BRAT Model for Identifying North American Beaver (*Castor Canadensis*) Habitat in Central Interior British Columbia" is assessing the Beaver Restoration Assessment Tool (BRAT) – a GIS-based model developed in Utah, and its ability to accurately determine watercourses of high and low quality for potential damming by beavers to create wetlands. The BRAT model classifies 300 m reaches of a watercourse into one of five dam classification categories that determine how many dams per kilometer the watercourse could theoretically hold. Assessing the accuracy of BRAT will consist of fieldwork and hydrological modeling. The project is partnered with Ducks Unlimited Canada (DUC), which is interested in studying the viability of using beavers to conduct wetland restoration and conservation projects. The goal of the research is to help develop a more reliable method of identifying beaver habitat to help maintain perennial flow in watercourses, and the conservation of habitat for aquatic and riparian species.

Pre-fieldwork modeling includes working with DUC's GIS team to convert the BRAT model to use Canadian and provincial datasets in place of the American datasets it was originally designed for. Once converted to use Canadian data sets the model can be used across the entire Cariboo region of BC. Fieldwork consists of sampling 15 stream reaches categorized by BRAT (three of each dam classification) and completing a habitat suitability scorecard. When encountered, beaver dams are assessed for their size and active/inactive status. Beaver presence is also recorded both by animal sightings and

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signs of habitation, such as gnawed trees, droppings, and beaver trails. The data gathered will be used to ground-truth the BRAT model's prediction and as baseline inputs for the hydrological model. Hydrological modeling will use publicly available data on the streams (and their associated watersheds) and the field data to help determine if the disparity between the BRAT's stream classification and the habitat suitability scorecard can be accounted for by also factoring the physical habitat features of the stream through the hydrological model.

Using a combination of the BRAT model, the hydrological model, and field data, the project will ideally determine if the combination will create a more reliable method to identify preliminary watercourses for beaver-facilitated restoration. The research will also ideally help DUC develop a procedure to partner with beavers to create and maintain habitat for waterfowl and other wetland species.



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