



**TRENT SCHOOL OF ENVIRONMENT
GEOG/SAFS/ERST/ERSC**

Community-Based Research Projects Available for Fall 2023

with Trent Community Research Centre and U-Links.

The latest project listings and student application forms may be found on the TCRC and U-Links websites:

www.trentu.ca/tcrc and www.ulinks.ca/available-projects.

#5090 – Sustainable Garden Practices: Soil Management

Tecasy Ranch is a private property featuring a community garden that grows and distributes food to those most vulnerable to food insecurity. The organization is seeking support for a series of projects intended to maximize the food production of their garden while maintaining an eco-friendly and sustainable approach. The student undertaking Tecasy's Soil Management Project would collect and analyze soil samples to assess the quality and would conduct research to identify strategies and best practices that support the growth of a variety of crops. This project should consider environmentally responsible practices and erosion-control measures to maximize crop yields.

#5091 – Sustainable Garden Practices: Pests and Pollinators

Tecasy Ranch is a private property featuring a community garden that grows and distributes food to those most vulnerable to food insecurity. The organization is seeking support for a series of projects intended to maximize the food production of their garden while maintaining an eco-friendly and sustainable approach. Recognizing the impact that both insect pests and pollinators can have on crop yield, Tecasy Ranch is interested in better understanding the methods that can be used to control pests, or limit the impact of pests, while supporting pollinators. The student undertaking this project would assess the expected presence and absence of insects on Tecasy Ranch and would conduct research to identify and propose best practices for insect management on the Ranch.

#5118 Indigenous History and Relations at Ashburnham Memorial Park

The Ashburnham Memorial Stewardship Group (AMSG) was founded in June 2021 in order to advocate for positive changes to Ashburnham Memorial Park, known locally as "Armour Hill." AMSG is composed of citizen volunteers who are advocating to and working with various City of Peterborough departments to drive conservation, stewardship, and recreation in Ashburnham Park.

AMSG is committed to a collaborative and inclusive approach and is seeking to improve its understanding of Indigenous history associated with this key local landmark. The student undertaking this project will engage with local Indigenous communities and available historical resources to explore this history, and to help build relationships that will improve collaboration in a respectful and meaningful way.

#5120 Public Use and Perceptions of Ashburnham Memorial Park

The Ashburnham Memorial Stewardship Group (AMSG) was founded in June 2021 in order to advocate for positive changes to Ashburnham Memorial Park, known locally as "Armour Hill." AMSG is composed of citizen volunteers who are advocating to and working with various City of Peterborough departments to drive conservation, stewardship, and recreation in Ashburnham Park.

AMSH is seeking to better understand how Ashburnham Memorial Park is perceived and used by the public. The student undertaking this study would explore existing survey data and would seek to collect additional data to address this need. Analysis of the data collected will help to inform future actions to increase stewardship and safety within the park.

#6007 - Feasibility study for low/no-waste wool production in Ontario

Mariposa Woolen Mill processes natural fibres including sheep's wool, alpaca, and mohair into artisanal textile materials. The organization strives to use ecofriendly soaps and sustainable practices to offer customers earth-friendly products. They are working to expand the uses and applications for wool as a natural alternative to many synthetic materials within different industries.

The student undertaking this project will explore the feasibility of a zero to low-waste manufacturing facility for the production of wool, with the goal of improving the environmental sustainability of existing manufacturing processes.

#6034 - Baxter Creek Benthos Survey

The Baxter Creek Watershed Alliance has proposed a project to assess the Baxter Creek watershed through collection of data on benthos species. This opportunity will provide students with a hands-on learning experience, as well as being trained and demonstrate their Ontario Benthos Biomonitoring Network (OBBN) certified skills. Students will determine the identification of benthic species and then used benthos baseline data to determine associations with water quality and habitat assessment within the watercourses and water bodies on the Baxter Creek subwatershed. This data collection will further the current knowledge of the site and will aid in creating a stream rehabilitation action plan to help preserve the area for generations to enjoy.

#6035 - Baxter Creek Watershed Forest Resource Analysis

This project is a spatial analysis workflow and analysis to develop a forest resource Canopy Height Model (CHM) and other forest derivatives using remote sensing methods and data. The student undertaking this project will complete a LiDAR point cloud classification update and developing an initial normalized Digital Surface Model (nDSM). This project will benefit long-term watershed planning for the Baxter Creek Watershed Alliance and inform conservation planning initiatives.

#6036 - Groundwater Review of Former Millbrook Jail Lands and Watershed

The former Millbrook Correctional Centre lands (locally known as the "old Millbrook jail lands" or "Jail Hill") was a maximum security correctional centre from 1955 to 2003. There has been numerous technical studies completed on the property assessing potential chemical contamination of the surficial geology of the property which is located within the Wellhead Projection Area of the village. This project will bring that period of records together and make it fully accessible through the BCWA website in a dedicated webpage with an annotated summary of each report for the community. This will help provided support that the lands should be conserved and protected from high intensity residential development.

#6037 - An Assessment of Options for the Needlers' Mill Lands and Former Community Arena in the Village of Millbrook, ON

Located in the village of Millbrook, beside the Baxter Creek and its dam is a parcel of municipal land occupied by the Village's historic Needler's Mill, a parking lot and a former (old) Community Arena needing extensive upgrades if its use is to continue. A new community centre has been constructed 1 km north of this old Arena. For the benefit of community residents and Council, the project is to provide a social, cultural, environmental and economic impact assessment of two options for the lands: (a) restoration of the (old) Community Arena (b) demolition of the (old) Community Arena and transformation of the area into a multi use municipal park tentatively named Needler's Common Town Square.

#6038 - Baxter Creek Watershed Nutrient and Chemistry Study

There is a long-term period of record for the water quality sampling of the Baxter Creek, at three main locations of Baxter Creek (Hutchinson Drive, Cedar Valley, and Zion Line). The station at Zion Line is actively sampled, last sampled in 2019. It is understood that Trent Biology has been sampling stream water of Baxter Creek in Cedar Valley for approximately the last 15 years. The purpose of this project is to obtain the raw PWQMN data and Trent Biology sample data (if possible) to complete an analysis of the data and report. Some discussion of potential source activities (in general, not point source locations) should be included. This project should also present an additional forward looking proposal of how to approach a fully distributed water quality monitoring program using in-site sensors and telematics or field sampling. The report should include a public facing plain language summary for upload to the BCWA web page along with a copy of the report. It will help inform the community and our local government of the importance of environmental monitoring to provide a baseline control of our activities and the impacts of our activities on water quality.

#6039 - Baxter Creek Watershed Study: Watershed Assessment to Support UN Biodiversity Plan for Protecting 30% of Earth by 2030

BCWA has embarked on a multi-year initiative to provide collaborative support for the design and implementation of a subwatershed study for the Baxter Creek Watershed. The primary first step of completing a subwatershed study is the gathering of foundational geospatial data and the initial characterization of a watershed. A watershed study is a multi-step, multi-year initiative which can be used to inform a subwatershed plan. This project is the first phase of a subwatershed planning process following the draft Ontario Ministry of the Environment, Conservation and Parks Draft Subwatershed Planning Guide, January 2022. We are suggesting to localize the UN Biodiversity Plan for this Impact Assessment component by completing a biodiversity inventory, assessment and initial ecosystem service valuation. The Township of Cavan Monaghan and County of Peterborough have expressed interest in completing a subwatershed plan for each subwatershed and this project will provide the required community based environmental organization input.

#6044 - Feasibility of Hydroponics for Blueberry Propagation

Blueberries propagate under specific conditions, usually in peat moss. Rates of successful rooting can be quite low, especially for hard cuttings. Some anecdotal evidence suggests that hydroponic propagation may lead to a higher rate of root generation, if successful this propagation method would eliminate the use of peat moss in propagation. This project may start with a literature review and interviews with other professionals who use hydroponics for propagation, and then the student may use experimental design to attempt to propagate cuttings.

U-LINKS PROJECTS:

#5030 Watershed Mapping Profile and Protocol for the Haliburton Highlands Land Trust

The Haliburton Highlands Land Trust has as its mandate “to conserve plants, wildlife and clean water of Haliburton County to ensure a legacy of forests, fields and wetlands, and the species they nurture.” To achieve this goal the HHLT is acquiring lands of ecological and cultural significance for conservation purposes. Informed and science-based decision-making is necessary to acquire and manage these landscapes in perpetuity as is the main responsibility of HHLT. Analytical landscape evaluation processes and tools are seen to be key to HHLT decision-making for new acquisitions, land management, monitoring and stewardship endeavours.

This project entitled Watershed Mapping Profile and Protocol has as one its purposes to develop a spatial context of the HHLT properties and Haliburton Highlands surrounding areas in terms of their watershed composition. Watershed mapping in simple terms uses elevation and flow data to define catchment areas of water systems. Geographic information science is applied to generate the watershed maps. The protocol piece of the project has as its purpose the development of a workflow for using the watershed mapping products for such endeavours as habitat and land conservation.

#5029 Delineating the Velocity of Climate Change in the Haliburton Highlands for the Haliburton Highlands Land Trust

The Haliburton Highlands Land Trust has as its mandate “to conserve plants, wildlife and clean water of Haliburton County to ensure a legacy of forests, fields and wetlands, and the species they nurture.” To achieve this goal the HHLT is acquiring lands of ecological and cultural significance for conservation purposes. Informed and science-based decision-making is necessary to acquire and manage these landscapes in perpetuity as is the main responsibility of HHLT. Analytical landscape evaluation processes and tools are seen to be key to HHLT decision-making for new acquisitions, land management, monitoring and stewardship endeavours.

This project has as one its purposes to critically review one method available for estimating the velocity of climate change in the Haliburton Highlands region. A second purpose is to recommend how this method can be applied by the HHLT for achieving its mandate of landscape conservation.

#5064 Virtual Adaptation of Abbey Gardens on-site Sprouts to Snacks Program

Abbey Gardens is a non-for-profit organization with a mission to create opportunities to learn about living more sustainably, including learning about local food, gardening, energy, sustainable construction techniques, heritage agricultural animals, land restoration, and cooking techniques. The "Sprouts to Snacks" program ran successfully on site for two years with a local elementary school, engaging children in growing, harvesting, and preparing local food.

The effects of COVID-19 and increased bussing fees has prevented the program from occurring on-site. The purpose of this project is to create a hands-on, mostly virtual version of the "Sprouts to Snacks" program, and offer a hybrid on-line/on-site program, where it is accessed and used by educators in a school setting, and concludes with a field trip to Abbey Gardens.

#5080 Grace Lake Wetland Assessment

The Grace Lake Association (GLA) exists to represent the interests of the property owners on Grace Lake by advocating for the sustained good health of the lake, including the Grace Lake Wetland. GLA would like student researchers to collect data through research and fieldwork to determine what species are present, the ecological and cultural services, and the major water sources and boundaries of the wetland. The data collected can be used to initiate an Environmental Impact Assessment and help GLA to better advocate for the protection of Haliburton's beautiful and vital wetlands.

#5070 Baseline Inventory Report for the Dahl Forest

The project objective is to incorporate data from the previously established Permanent Sample Plots (PSPs) in the Dahl Forest to create a Baseline Inventory Report of the forest. Students will also develop a database that is spatially relatable to the existing GIS framework. Having a baseline will make room for additional data collection such as vegetation and soil data for each of the PSPs.

#5094 Underground Greenhouse Feasibility Study for Haliburton County

The purpose of this project is to research the feasibility of building an underground greenhouse/walipini for growing food in Haliburton County 12 months a year. How can sustainable features such as fishpond irrigation, geothermal and ceramic wood heat be integrated into the design? What innovative, local, or green engineering and construction features can be used? This project would aid in sustainability and self-sufficiency for growing food in Haliburton County and provide an ongoing educational component to the area.

#5081 Serenity Wetland Assessment

Many of the wetlands in Haliburton County remain unclassified, with their provincial significance unknown. The Serenity Wetland Alliance (SWA) is a volunteer group dedicated to the protection of the Serenity Wetland in Highlands East, ON. The purpose of this project is to gather relevant data and complete an inventory of species present through research and fieldwork, to initiate an Environmental Impact Assessment. The results of this project will promote the awareness of wetlands and their importance, and support other groups and organizations who are considering seeking protections for wetlands in their communities.

#5115 Lakeshore Capacity Study of Gull Lake

The Lakeshore Capacity Assessment Handbook (LCAH) was prepared by the Ministry of the Environment in partnership with the Ministries of Natural Resources and Municipal Affairs and Housing. It was developed to provide guidance to municipalities and other stakeholders responsible for the management of development along the shorelines of Ontario's inland lakes within the Precambrian Shield. A Lakeshore Capacity Assessment can be used to predict the level of development that can be sustained along the shoreline of an inland lake on the Precambrian Shield without exhibiting any adverse effects related to high phosphorus levels. The last time a Lakeshore Capacity Study was completed for Gull Lake was nearly 10 years ago. Since then, cottagers have increased their time spent at the lake and short-term rentals have continued to escalate. Gull Lake has populations of lake trout which is one of the circumstances used to trigger a Lakeshore Capacity Study. The purpose of this study is to determine the Lakeshore Capacity of Gull Lake by incorporating changes in development and nutrient inputs since the last assessment.

#5122 Plant Monitoring - Success Study on Rehabilitated Shorelines

Abbey Gardens has transformed a spent gravel pit into a green space providing economic and recreational opportunities for the community. There are 4 large ponds on the Abbey Gardens property with shoreline restoration activities currently happening on two of them. The purpose of the project is to develop a long-term monitoring plan to assess the survival and growth rates of shoreline plants installed in 2022; research and recommend planting techniques/timing, stock selection (bare root vs. potted), plant spacing, species selection and more can be incorporated into interpretive signage on site, as well as implemented at future shoreline planting sites.

#6018 Evaluation of Haliburton County Lake Associations on Water Quality Testing Data and Protocols

In 2021, the Woodlands and Waterways EcoWatch (WWEW) and several Lake Associations in Haliburton County began discussing a Water Quality monitoring program that encompasses the entire County, as there is no such program that exists. Currently, water quality is measured by organizations such as the Lake Partner Program (LPP), the Ministry of Environment, Conservation and Parks, or individually by the Lake Associations. In 2022 WWEW initiated a Pilot Water Quality Monitoring Program that is being conducted in partnership with 10 Lake Associations (23 lakes) with plans to be extended out to county in the future.

As part of this initiative, WWEW has begun collecting historical WQ data from other monitoring organizations for the 10 Pilot Lake Associations. The purpose of this project is to categorize the findings and develop a cohesive way to analyze and share this data with the Lake Association partners. Student(s) will review historic water quality data, generate a database, and identify any gaps. Students can also conduct analysis and provide insight into any trends.

#6020 Microplastics Analysis in Haliburton County Lakes

The Woodlands and Waterways EcoWatch and several Lake Associations in Haliburton County began discussing a Water Quality monitoring program that encompasses the entire County. As part of this initiative, water samples were collected to monitor the presence of microplastics in the Lakes. The purpose of this project is to begin to analyze these samples and identify if there are plastics pollution and what their possible sources may be. By identifying the sources, cottage owners can adapt their current practices to mitigate further pollution.

#5110 Haliburton County Agriculture and Food Production Assessment

Local agriculture and food production are significant parts of the Haliburton County economy and support access to healthy foods in the area. The purpose of this project is to assist the Haliburton County Farmer's Market Association and Harvest Haliburton in identifying barriers and opportunities for small farmers and food producers in the county. Student researchers will conduct surveys and interviews with local agriculture and food producers and identify best practices from similar small-scale operations in Canada and abroad.

#6049 Watershed Management Protocols and Practices

The Woodlands and Waterways EcoWatch is environmental-based programming facilitated by U-Links Centre for Community Based Research. WWEW was established to facilitate environmental initiatives in the Haliburton region to help fill the data gap relating to ecosystem health.

Watersheds are basins that catch precipitation and drain into streams, wetlands, lakes, or groundwater aquifers, whose borders are delineated by local geography. Haliburton County falls within 5 tertiary watersheds, all part of the Great Lakes – St. Lawrence River Watershed. Watershed management encompasses the local natural environment as well as human-environment interactions. WWEW currently monitors water quality in lakes and tree health in our forests, however there are many other parameters to investigate for a complete overview of the health of the entire watershed. The purpose of this project is to identify monitoring protocols for all ecosystem types, that lead to proper watershed management.

#6058 Ground Beetle Monitoring on a Tall Grass Prairie Restoration Site – PHASE II

Abbey Gardens has transformed a spent gravel pit into a green space providing economic and recreational opportunities for the community. Part of the property has been restored into a tall grass prairie, once abundant in Ontario. The purpose of this project is to look at insect abundance and diversity in response to restoration of the site. It will involve monitoring ground insects, specifically beetles, to understand the current level of biodiversity from introducing native plants. Several field and lab days will be required to collect, preserve, and

identify beetles down to species level. This project will build on previous research conducted in 2022 where surveys could only take place in the fall. A more in-depth survey in the summer will provide more insight to the species within the site.

#6059 Seed Bank Feasibility Study of Norah's Island

Norah's Island is a 22-acre pristine island on Kennisis Lake. The seclusion, and limited access to visitors, makes the island an area where the old growth trees have not been ravaged by current diseases or disturbed by humans. The purpose of this study is to preserve the local flora for generations to come. Specifically, by completing a seed bank a feasible study for Norah's Island. Students will visit the island to begin the seed collection process and inventory analysis for current plant and tree species.

(Several Projects) Benthic Macroinvertebrate Assessments for Haliburton County Lakes

Benthic macro-invertebrates ("benthics" or "benthos") are aquatic, spineless organisms that live on the bottom of water bodies. Since the late 1980's they have been used as biological indicators for common aquatic pollutants as they spend part or the entirety of their lives in the water. The use of benthics as an indicator of water quality is now used throughout the world and has been widely used in Ontario since the early 2000's. These community-based research projects are ideal for an undergraduate student as a full-term project and will include field work early in the fall. These projects can also be completed in the winter semester, which includes a lab component but no field work. Students are recommended to have OBBN certification or other previous field work experience.