Oral Presentation Abstracts – Alphabetical by Presenting Author

Prioritizing Activity Sectors: An assessment of the impact of activity sectors on climate targets in 256 Canadian Municipalities

Laura Tozer[1], Kagan Akiyama[1]

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Human-generated greenhouse gases (GHGs) are rapidly altering the communities in which we live. While municipalities are key accelerating forces in global climate mitigation, there is a critical empirical gap in evidence-based understanding of which specific interventions lead to successful GHG reductions. This study aims to address this by analyzing novel, expert-derived survey data from 256 Canadian municipalities collected through the Municipal Net-Zero Action Research Partnership (N-ZAP).

This study aims to investigate the relationship between the implementation status of sector-specific climate interventions (e.g., in transportation, buildings) and a municipality's progress toward its GHG reduction targets. The methodology involves a two-phase correlational analysis, utilizing Chi-Squared Tests of Independence and Cramer's V to assess the association between target trajectory and both activity sectors and policy levers (voluntary action, price signals, public investments, mandates). To explain observed variance, external socio-economic and political variables will be integrated into a multivariate regression model.

This research moves beyond localized case studies to provide a robust, national-scale quantitative assessment. The resulting publications and policy briefs will offer decision-makers actionable insights for evidence-based resource allocation, directly guiding successful pathways to achieving net-zero communities and securing a sustainable future

Graduate Student / Undergraduate Student

Graduate

Assessing Presence of Migjigj (Turtles) in Central Gespe’gewa’gi (Northern New Brunswick), Using Two-Eyed Seeing and Environmental DNA

Katelyn Augustine[1], Carole-Anne Gillis[2], Charles Sacobie[1], Graham Forbes[1], Shaylyn Wallace[3], Allen Beck[2], Billie Chiasson[2], Valerie Delisle-Gagnon[2], Craig Isaac[2], Gullege Isaac[2], Travis Wysote[2]

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Turtles are culturally significant to the Mi’gmaq People. All turtle species in New Brunswick are listed under the Species at Risk Act. There is a limited number of recorded turtle populations in northern New Brunswick. Contrary to this Mi’gmaw Knowledge indicates that wood turtles had once and may still inhabit a certain watershed in northern New Brunswick that has no recorded turtle populations. There are also reported individual sightings of eastern painted turtles and common snapping turtles on this watershed. This project interweaves Mi’gmaw Knowledge and Western Science through an Etuaptumumg (Two-Eyed Seeing) framework to assess the presence of turtle species on the watershed of focus. Interviews will be conducted with Mi’kmaq Elders and Knowledge Holders to collect place-based Knowledge. Which will be used to guide the timing and locations of environmental DNA sampling. Mi’gmaw Knowledge will be interwoven with Western Science to assess past, current, and potential threats to turtle populations in northern New Brunswick. Environmental DNA (eDNA) will be used to assess the presence of turtle species on the watershed. eDNA is a non-invasive method of detecting species presence by amplifying species-specific sequences of DNA from environmental samples such as water and soil. DNA is amplified through polymerase chain reaction (PCR) techniques. eDNA analysis will be conducted using quantitative polymerase chain reaction (qPCR) as it is sensitive to small amounts of DNA. qPCR is crucial to the project as turtles shed limited amounts of DNA due to their keratinized skin.

Graduate Student / Undergraduate Student

Graduate

Developing Lithium-Ion Batteries with Long Lifetime and Low Cost for Renewable Energy Storage

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Reliable grid energy storage is essential to electrification; current batteries cannot be produced to meet carbon neutral goals. One method to reduce battery emissions is to improve battery lifetime. Using Lithium Iron Phosphate (LFP) cells, the market-dominant battery chemistry for Li-Ion, we attempt to improve battery lifetime by changing additive compounds and salt mixtures in the cell's electrolyte. Cells were received dry as 40-20-35 mm sized pouch cells, and were filled with electrolyte, containing several electrolyte additive formulations, including novel, unpublished additives. Cells underwent a first formation cycle at 40°C, and were then subjected to a reference performance test (RPT) which involved short-term cycling at 20°C and long-term storage at 55°C. Several cells were also tested using long-term cycling at 70°C. Temperature is variable in this study as low temperatures typically cause lithium plating, whereas high temperatures cause internal resistance growth. Non-destructive measurements of resistance to charge transfer (R_{ct}; i.e., internal resistance) were taken in between each RPT and storage cycle. This data was used to determine correlation between capacity fade and increasing R_{ct}. Additives were then compared to benchmark cells of well-studied electrolyte composition; both in terms of capacity retention and R_{ct} growth. Additionally, cells were opened and inspected after testing to view any lithium plated during testing. Successful additive combinations retain 2-4% more capacity over comparator cells, allowing more uses before cell failure and offering potentially superior energy storage for renewables.

Graduate Student / Undergraduate Student

Undergraduate

Age Validation in Slimy Sculpin (Cottus cognatus): A Comparison of Traditional and Otolith Microchemical Methods

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Slimy Sculpin (*Cottus cognatus*) are small-bodied, freshwater benthic fish widely used as a sentinel species in environmental monitoring. As this species lacks scales, aging relies on otoliths (ear bones); however, age estimates are typically accurate only to ±1 year, which is problematic given their relatively short lifespan of 5-7 years. Traditional ageing techniques were compared with otolith microchemistry (analysis of elemental concentrations within the otolith) to assess agreement between age estimates produced by each method and to determine whether recurring seasonal elemental patterns could support a more objective and reproducible approach to ageing Slimy Sculpin. Across two field seasons, Slimy Sculpin were collected from four sites within the Nashwaak River watershed using backpack electrofishing. During each site visit, approximately 50 individuals were tagged with visible implant elastomer (VIE) and immersed in a 50 ppm Alizarin Red S solution for 24 hours. A total of 456 sculpin were tagged and marked, with 52 recaptured individuals sacrificed for otolith extraction and validation of ageing techniques. Additionally, 60 untagged and unstained individuals were sacrificed to serve as control specimens. One otolith from each fish was randomly assigned to microchemistry analysis and the other to traditional ageing. Microchemistry-based age estimates were derived from annual oscillations in elemental concentrations or element ratios, while traditionally aged otoliths were prepared using standard techniques and assessed blindly. Results will evaluate agreement between methods and explore the potential of otolith microchemistry as a more objective and biologically consistent tool for ageing fish with difficult-to-read otoliths.

Graduate Student / Undergraduate Student

Graduate

UAV-LiDAR Area-Based Approach for Boreal Forest Stand Inventory in Slave Lake, Alberta

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[1]University of New Brunswick

Accurate estimation of stand attributes is fundamental to forest monitoring, offering a basis for sustainable forest management, yet traditional inventories remain spatially limited and resource-intensive. This study evaluates a high-density UAV-LiDAR pipeline (185 pts/m²) as a foundational phase of a multi-sensor research framework near Slave Lake, Alberta. An Area-Based Approach (ABA) was implemented using 542 million LiDAR returns, applying DEM-based normalization and reservoir sampling. Pipeline integrity was assessed through agreement between LiDAR point cloud metrics and Canopy Height Model (CHM)-derived height summaries, yielding $r = 0.755$ ($p < 0.0001$, $n = 180$ grid cells) at the grid scale and $r = 0.979$ ($n = 21$) at the polygon scale. Exact field polygon boundaries were extracted from georeferenced ArcMap PDFs, enabling direct linkage between remote sensing metrics and field measurements. CHM mean height was the strongest predictor of basal area ($r = 0.783$, $p < 0.001$), average height ($r = 0.815$, $p < 0.001$), and average diameter at breast height (DBH; $r = 0.817$, $p < 0.001$, $n = 45$ polygons across three blocks). Within the primary block, LiDAR height skewness (zSkew) predicted average height ($r = 0.503$, $p = 0.020$) and DBH ($r = 0.497$, $p = 0.022$, $n = 21$), consistent with structural heterogeneity in boreal mixedwood stands. These results confirm workflow robustness while identifying effective structural Indicators for operational boreal stand inventory. Scaling this framework to additional blocks will support stand-level volume prediction, extend spatial coverage, and contribute to more efficient operational forest inventory and management.

Graduate Student / Undergraduate Student

Graduate

Quantifying the mercury:calorie ratios of aquatic invertebrates from two lakes in Kejimkujik National Park and National Historic Site, Nova Scotia

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Mercury (Hg) is a toxic contaminant that bioaccumulates in organisms and biomagnifies through food webs. Kejimkujik National Park and National Historic Site (KNPNHS) is situated in southwestern Nova Scotia and has been identified as one of several biological Hg hotspots in Eastern Canada. Aquatic invertebrates are important food sources within lacustrine food webs. Hg accumulates in aquatic invertebrates and biomagnifies to toxic concentrations in higher trophic level animals. Aquatic invertebrates with high Hg concentrations and low caloric content values may be significant sources of Hg to predators. The objective of this project was to quantify the MeHg:calorie ratios of aquatic invertebrates in KNPNHS to reveal which aquatic invertebrates pose the greatest Hg risk to higher trophic level animals in this ecosystem. Twenty-one aquatic invertebrate families were collected from two lakes with contrasting water chemistry characteristics in KNPNHS to be analyzed for total mercury (THg), methylmercury (MeHg), and caloric content. MeHg concentrations ranged from 24.7 ng/g to 1469.2 ng/g (n = 136). Our data suggest that MeHg and THg concentrations have remained stable in dragonflies, mayflies, and caddisflies over the past 10-15 years at this study site. Significant differences in both MeHg and THg concentrations were found between families, feeding groups, and lakes. Three families had sufficient mass for caloric content analysis and MeHg:calorie ratios were similar among these families. Therefore, calories were not a major variable affecting mercury accumulation for the families tested in this study.

Graduate Student / Undergraduate Student

Undergraduate

Intraspecific Brood Parasitism as a Strategy to Increase Reproductive Success for European Starlings (Sturnus vulgaris) Raising Concurrent Broods

Sarah Chiasson[1], Colleen Barber[1]

[1]Saint Mary's University

Intraspecific brood parasitism (IBP) is a reproductive strategy used by certain bird species whereby a female lays an egg in a conspecific nest. This strategy may be used by females to increase reproductive success beyond their own broods. It has been suggested that, in this context, female parasites would be of high quality as they are able to incur the cost of additional egg laying. It has also been suggested that parasites may choose host nests based on the quality of potential host parents. European Starlings (*Sturnus vulgaris*) have a mixed reproductive strategy which includes IBP. My study examined a nestbox-breeding population of European Starlings located on the campus of Saint Mary's University to determine whether female starlings engage in IBP while raising concurrent broods. I also compared the body condition of parasitic females and their female host(s) and compared the body condition of adults from parasitized and non-parasitized nests. IBP nestlings were identified through microsatellite DNA analysis and parentage was assigned whenever possible (36 broods). Adults were measured to calculate body condition. Female starlings were found to engage in IBP while raising concurrent broods, and female parasites were found to be in significantly greater condition than the females they parasitized. Female and male body condition did not differ significantly between parasitized and non-parasitized nests. These results suggest that IBP is a strategy used by high quality female starlings to increase reproductive success beyond their broods, and that body condition alone does not influence host selection in European Starlings.

Graduate Student / Undergraduate Student

Undergraduate

Melodies to Mates: The Effect of Male Song Complexity on Social and Genetic Mate Choice in European Starlings, Sturnus vulgaris

KC Collings[1], Colleen Barber[1]

[1]Saint Mary's University

Male songbirds sing to defend their territory and attract mates. They raise offspring with social mates but sire offspring with genetic mates. Previous studies have identified a relationship between song complexity and reproductive success, but this relationship is highly variable among species. European starlings, *Sturnus vulgaris*, are a passerine species that sing long, complex songs that often incorporate mimicry. Both repertoire size and song bout length have been positively correlated with social mate attraction, early pairings and reproductive success. However, the role of mimicry remains unclear. Although starlings are socially monogamous, they have several reproductive strategies, one of which is extra-pair paternity where males mate outside their pair bond, producing offspring who are genetically unrelated to their social mate. No studies exist on the relationship between song and either genetic mate choice or total reproductive success (number of young within their nest and that of others). This study aims to examine the relationship between repertoire size, song bout length and mimicry and both social mate choice and genetic mate choice in male European starlings.

Graduate Student / Undergraduate Student

Graduate

Modelling fire behaviour in hurricane-impacted stands of Prince Edward Island

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The Canadian Forest Fire Behaviour Prediction System (FBP) is currently undergoing a revision to address shortcomings in predictive efficacy regarding vegetation fuel types not represented in the current model. These include fuel types commonly found in the Maritimes that were not historically prone to fire relative to other fuel types in western Canada. Anthropogenic climate change is expected to increase the frequency and intensity of fires in the region. The current FBP also does not accurately represent several fuel types in disturbed stands, e.g. hurricane blowdown or hemlock woolly adelgid, that are present in the Maritimes. The fuel types are input into fire behaviour models that support effective fire management planning and monitoring of long-term effects of fire on forest dynamics. In this work, forest fuel data was collected from eight plots in hurricane-impacted stands on the north shore of Prince Edward Island during 2025 according to the sampling protocol for the Next-Generation Canadian Forest Fire Danger Rating System. The fuels data was modelled using the Forest Vegetation Simulator with the Fire and Fuels Extension under five local fire-weather scenarios. Results including flame length and fire type were analyzed and compared to FBP outputs using the REDapp interface. The results will be discussed in terms of implications on fire suppression capabilities and risk, and the potential influence on post-fire forest dynamics. Ultimately, we hope the results from this study can support fire management policy in the Maritimes.

Graduate Student / Undergraduate Student

Undergraduate

Improving Non-lethal Identification of Freshwater Mussels Through a Morphometric-Based Random Forest Model

Alex Crawford[1], Michelle Gray[1]

[1]University of New Brunswick

Freshwater mussels play an important role in aquatic ecosystems, filtering large quantities of water, they help reduce excess nutrients and turbidity. Through such filtration, mussels may serve as bioindicators, reflecting the health of the ecosystem they inhabit. However, accurate species identification can require specialized expertise or invasive confirmation methods, which can limit the scalability and accessibility of monitoring efforts. Improving non-lethal, field-based identification tools could expand participation in mussel monitoring and support broader conservation initiatives. Variation in shell morphology, size, and trait expression increases the potential for misidentification due to subtle interspecific differences. Confirmation of species identity may require invasive DNA extraction or lethal examination of internal shell features and tissue. To develop a more accurate and non-lethal identification approach, I collected morphometric and shell characteristic data on 3,701 mussels from Grand Lake, New Brunswick and developed a Random Forest classification model in R to predict species-level identity. Predictor variables included shell length, width, and height, as well as qualitative traits such as ray prominence, umbo prominence, posterior slope, ventral margin indent, and overall shell shape. The data were divided into 80% calibration and 20% validation to train the model. The model had an out-of-bag error of 74% and showed clear differences in classification accuracy across species. The differences in species classification accuracies are attributed to phenotypic overlap between morphologically similar species. Further refinement and expansion of this modelling framework could support the development of practical, field-deployable tools for freshwater mussel identification.

Graduate Student / Undergraduate Student

Graduate

Correlations Between Methane Fluxes, Vegetation Type, and Microbial Community Compositions in the Degraded Quince Bog

Julia Crean[1], Jaime Burns[1], Jesse McNichol[1], Graham Clark[1]

[1]Saint Francais Xavier University

Peatlands store about 21% of the global soil carbon, even though they only make up 3% of land area. A high water table in natural peatlands creates anoxic conditions that allow peat to accumulate. Drainage of peatlands creates oxic conditions that allows aerobic bacteria to break down the organic matter and release carbon dioxide (CO_2) to the atmosphere. Herbaceous plants are a major source of CH_4 emissions from a peatland due to their aerenchyma and supply of labile carbon to the soil. In degraded peatlands, measured surface CH_4 fluxes can vary greatly within the span of a few meters. In peat, methane can be produced by methanogenic Archaea and consumed by methanotrophic Bacteria. This study aims to explore the correlations between methane fluxes, vegetation type, and microbial community compositions by analyzing gas flux measurements, water table level measurements, and 16S rRNA metabarcoding. Results show that methane and carbon dioxide fluxes were greater from the disturbed site than from the reference site on July 9 and July 23. Methane fluxes from sedges were greater than from grasses. NMDS plots do not show clustering of samples from grasses and sedges, indicating that their microbial community compositions are not unique to vegetation type, despite differences in methane emissions. However, microbial community compositions cluster strongly by the disturbance level of the site and the position relative to the water table. Future research should investigate clustering of samples by vegetation type, with samples from further below the surface.

Graduate Student / Undergraduate Student

Undergraduate

Echoes of Bell: Investigating bumblebee foraging acoustics at Beinn Bhreagh Estate

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[1]Cape Breton University

Ecoacoustics provides a non-invasive approach to studying pollinator behaviour and plant-pollinator interactions. Bumble bees (*Bombus* spp.) produce characteristic foraging frequencies that may vary among species and in response to floral identity and environmental conditions. This study examined whether the fundamental and peak frequencies of foraging bumble bees differ among species, flowering plant taxa within the families Rosaceae and Fabaceae. Field recordings were conducted at Beinn Bhreagh in Baddeck, Nova Scotia, the historic estate of Alexander Graham Bell. The site offers both diverse floral resources and historical significance in acoustic science. Bell's invention of the telephone, designed to transmit sound, provides a meaningful connection to this research, which uses modern smartphone technology—an evolution of Bell's work—to record and analyze pollinator acoustics in a natural setting. Recordings were collected from actively foraging bumble bees using an iPhone paired with a RODE Reporter microphone equipped with a wind cover. A total of 149 recordings were analyzed, representing seven *Bombus* species foraging on six flowering species (three per plant family). Fundamental and peak frequencies were extracted using Audacity. Linear mixed models were used to compare frequencies among bee species, plant taxa, and environmental variables including wind speed, temperature, flower color, and time of day. Both fundamental and peak frequencies varied among *Bombus* species and flowering taxa, with additional patterns linked to environmental conditions. These findings demonstrate that foraging acoustics are shaped by species identity, floral resources, and abiotic factors, highlighting the value of ecoacoustics for understanding pollinator-plant interactions.

Graduate Student / Undergraduate Student

Undergraduate

Propagation and spore isolation of arbuscular mycorrhizal fungi from Bay of Fundy, Nova Scotia salt marshes

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The Bay of Fundy contains over half of the Maritime provinces' salt marsh ecosystems. Salt marshes are important intertidal wetlands that offer many ecosystem services but are in decline due to changes in climate and anthropogenic influences. These ecosystems' resiliency is reliant on the vegetative communities as they drive sediment accretion, carbon accumulation, and erosion resistance. Salt marsh *Sporobolus* grass species harbor arbuscular mycorrhizal fungi (AMF), which are symbiotic obligate biotrophs that provide a variety of beneficial services (primarily phosphorus assimilation) to the associated host plant. The goal of this study was to propagate, isolate, and identify AMF in association with vegetation in the three salt marsh elevation zones for future bioinoculant development. This study included AMF harvesting and propagation from salt marsh sediment in coastal Nova Scotia marshes. Three salt marshes in the Bay of Fundy were sampled, and trap cultures were used to propagate AMF by growing plants in collected sediment containing pre-existing fungal propagules. Spores were isolated using a wet sieving and sucrose centrifugation technique after 2 and 4 months of plant growth under controlled conditions. Spore densities were calculated per site and vegetation zone, and DNA-based identifications of AMF fungi were attempted. This work will support the future formulation of a bioinoculant which will be applied to salt marsh vegetation to aid in plant establishment and health, contributing to the success of coastal wetland restoration.

Graduate Student / Undergraduate Student

Undergraduate

Modelling the effects of climate change on the forests of Nova Scotia using a novel landscape simulation approach

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[1]University of New Brunswick, [2]Nova Scotia Department of Natural Resources

Nova Scotia's forests are a blend of coniferous-dominated boreal forests and temperate deciduous forests. Some of the boreal tree species approach their southernmost range limits in Nova Scotia. Climate change will likely affect their distribution and abundance, altering future forest composition and resources. Predictive ecosystem modelling offers forest managers a tool to anticipate these changes and develop adaptive management strategies. The objective of my research is to simulate and compare the possible effects of climate change on local forest vegetation types and ecosystem dynamics across several large landscapes. To date, I have used iLand, a process-based forest landscape model, to simulate a 40,000-hectare landscape encompassing most of Kejimkujik National Park. The landscape simulations were run 50 years into the future under three climate scenarios: a 30-year historic baseline and the two projected socioeconomic pathways SSP2-4.5 and SSP5-8.5. iLand outputs of tree counts and plant biomass within predefined forest stands were used to assess the relative abundance of 14 tree species identified in the current forest inventory. The results were compared among scenarios in the years 2050 and 2075. This approach provided a simple yet comprehensive way to estimate changes in the relative abundance of the most prevalent species and to inform predictions about how tree species composition is likely to change across the landscape. The findings of this project may be used to guide forest conservation and management plans in Nova Scotia, particularly regarding tree species whose populations are likely to decline in the next 50 years under climate change.

Graduate Student / Undergraduate Student

Graduate

Artificially Recreating Freshwater Nova Scotian Turtle Nest Scents for Olfactory Misinformation Applications

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Turtles and tortoises are one of the most at-risk vertebrate groups in the world, with more than half of all being threatened globally. Nest predation accounts for most nest failures, with some populations experiencing losses of up to 100%. This makes nest protection strategies essential to sustain future reproductive cohorts of freshwater turtles.

This project seeks to advance the knowledge of olfactory misinformation as a potential turtle nest protection strategy by utilizing scent cues to reduce predatory behaviours. The objective of the study is to apply an artificial turtle nest scent that resembles natural nest odours, and to determine whether the artificial scent elicits comparable behavioural responses from mammalian predators as natural nest scents.

The research goals are to identify a concentration of artificial scent that elicits investigative behaviours in mammalian predators by deploying false nests with varying concentrations of scent and monitoring predator responses. Scent-matching trials using dogs trained to track turtles will determine whether our concentrations are detectable at biologically relevant levels. Finally, we will conduct habituation-dishabituation trials with captive raccoons. Trail cameras will monitor behavioural responses to artificial, natural, and control scents, allowing us to determine whether raccoons discriminate between real and artificial nest scents.

Results will determine the most effective formulation and concentration of artificial scent for future olfactory misinformation applications to protect turtle nests in the wild. Findings from this project could inform future conservation strategies for at-risk turtle populations by providing more context on the use of olfactory misinformation as a nest protection strategy.

Graduate Student / Undergraduate Student

Undergraduate

Using Cladoceran Remains to Determine Environmental Changes at Nictau and Naskwaak Lakes

Marissa Emberly[1], Catherine Minnaar[1], Brenell Enman[1], Joshua Kurek[1], Fernanda Charqueno[1], Nicks Shoom[1]

[1]Mount Allison

Anthropogenic-driven environmental change is altering lake ecosystems, including their ecological structure and functions. Legacy pesticides such as dichloro-diphenyl-trichloroethane (DDT), threaten the health of hundreds of New Brunswick lakes, due to its widespread use between 1952 and 1968. I investigated (1) the timing and nature of changes in cladoceran assemblages at Nictau and Nashwaak lakes, and (2) the environmental drivers of the identified changes. Sedimentary total ΣDDTs were also measured to compare with cladoceran assemblages. A clear shift in the pelagic taxa at Nictau Lake began in ~1950 CE. Assemblages have changed from being dominated by *Daphnia* sp., a larger bodied taxon, to being dominated by smaller bodied *Bosmina longirostris*. This phenomenon is likely due to Nictau's elevated exposure to DDT coinciding with the period of aerial DDT spraying. Nashwaak Lake experienced an increase in *Bosmina sp*. since ~1900 CE, however a shift in *Daphnia sp*. abundance was not identified. Future efforts will focus on determining the role of DDT in altering cladoceran assemblage structure and its implications for the aquatic food web.

Graduate Student / Undergraduate Student

Undergraduate

Tracking Response of a Reference Lake to Environmental Change in New Brunswick, Canada

Brenell Enman[1], Josh Kurek[1], Fernanda Charqueño[1]

[1]Mount Allison University

Algal blooms and resulting water quality issues have become a common phenomenon in lakes across Canada, sometimes even pristine, remote lakes. Conditions favourable to the manifestation of harmful algal blooms are often the result of long-term environmental changes, e.g. land-use change and climate. We studied aquatic insect bioindicators within the dated sediments (~1860 CE to present) of Ayers Lake to infer conditions in a remote lake within a protected watershed of ecological significance. Ayers Lake serves as a strategic reference lake for a regional study of five other low-nutrient lakes experiencing late-summer algal blooms. The timing of a shift in chironomid assemblages that began in the 1970s may indicate a response to past widespread use of the pesticide dichloro-diphenyl-trichloroethane (DDT). Relative abundances showed a trend of decreased profundal taxa (low oxygen tolerant species) and increased littoral taxa (high oxygen preferred), which suggests impacts to profundal habitat. Timing of assemblage shifts will be further compared to historical air temperature data to understand potential influences by climate change. This study contributes to our larger understanding of anthropogenic impacts on lake ecosystems and our ability to better manage lakes for future conditions expected from a warming world.

Graduate Student / Undergraduate Student

Undergraduate

A lipidomic survey of marine microbial diversity across a North Atlantic transect

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The North Atlantic is comparatively rich in photosynthetic activity, responsible for roughly one-third of the world's net carbon dioxide uptake. A significant driver of this activity is thought to be the disruption of ocean stratification by turbulent interactions of strong warm- and cold-water currents, which are projected to weaken due to anthropogenic warming of seawater. How the microbial communities that sustain this productivity are responding to such a shift is thus far poorly understood. Last summer, the One Ocean Expedition's transatlantic cruise brought together scientists from around the world to measure ocean productivity markers and compare them to satellite data. From this cruise, our group collected a total of 26 surface water and water column filtrate samples from 10 stations along a transect between Iceland and Spain. We are currently using lipids—extracted from the filtrate samples using a modified Bligh-Dyer technique and quantified using mass spectrometry—as cellular proxies to resolve the identity and relative abundance of various microorganism types throughout the transect. Particular focus is placed on recording the occurrence of chlorophyll and its derivative pheophytin, indicators of photosynthetic communities, as well as the occurrence of archaeol and GDGT-class lipids, indicative of archaeal communities. This dataset, when fully quantified and combined with additional data taken from the cruise, should provide a clear snapshot of how microbial communities are stratified along our transect, which can then be related to known current structures in the North Atlantic to better understand the impact of changing circulation patterns.

Graduate Student / Undergraduate Student

Undergraduate

Bioaccumulation of Hg and As in freshwater invertebrates from Ponhook Lake, Nova Scotia: effects of historical gold mine tailings

Ben Gooley[1], Ian Spooner[1], Nick Hill[2], Nelson O'Driscoll[1]

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Historic artisanal and small-scale gold mining in Nova Scotia has left a legacy of mercury (Hg) and arsenic (As) contamination in lacustrine ecosystems across the province. These contaminants pose a significant risk to environmental health due to their toxicity and ability to bioaccumulate (Hg, As) and biomagnify (Hg). Our research at a tailings site on the northern shore of Ponhook Lake, Queen's Co., NS, is focussed on quantifying Hg and As concentrations in benthic communities and shoreline sediments. In the summer of 2025, we collected sediment samples along a 10 km transect of Ponhook Lake's northern shoreline, as well as a 1 km reference transect of the southern shore. These sediments were dried and reduced to silt-clay sized sediment using a 200 μm stainless steel sieve. The sorted sediments were analyzed for total mercury (THg) and total arsenic (TAs) using a NIC MA-3000 direct mercury analyzer and Epsilon 1 X-Ray Fluorescence for As. Preliminary analyses have shown elevated levels of THg concentrations (ranging 2.7-5787.6 ng g^{-1}; mean = 494.7 ng g^{-1}; Std Dev. = 1049.6 ng g^{-1}; n = 58) and TAs (ranging 11.1-1060.1 μg g^{-1}; mean = 108.5 μg g^{-1}; Std Dev. = 183.3 μg g^{-1}; n = 60) at Ponhook Lake. THg concentrations near the mine tailings exceed the Canadian interim sediment quality guidelines (ISQGs) of 170 ng g^{-1}. TAs concentrations exceed the ISQG of 5.6 μg g^{-1} in all samples collected due to local geologic influences.

Graduate Student / Undergraduate Student

Graduate

Tissue Culturing Balsam Fir in Atlantic Canada

Tatijana Hayes[1, 2, 3]

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Abies balsamea (Balsam fir) holds a dear spot in the hearts of Atlantic Canadians, with Lunenberg county known as ‘The Balsam fir Christmas tree capital of the world’. It is in the best interest of farmers to provide the best possible trees. Due to the changing climate, farmers are faced with many issues, including needle loss, foliage dieback after late spring frosts, and rising summer temperatures. The Christmas Tree Council of Nova Scotia (CTCNS) has partnered with the Nova Scotia Community College (NSCC) and Environment and Agriculture Technology Lab to use tissue culture to propagate trees with favourable genetics. The main goal is to provide a stronger, greener, and longer lasting tree for consumers worldwide. Through the implementation of somatic embryogenesis (generating many embryos from somatic tissue), ideal trees can be mass produced to meet the demands of industry, as well as provide information needed to confirm if a selected line is a viable investment. By cultivating the best selections, there may be increased interest in using real, traditional Christmas trees. As the Balsam fir project is still in the early stages, protocol optimization and data collection are ongoing, but the collaboration of CTCNS, NSCC, and consultants from Dalhousie and Acadia Universities shows the research strength within Atlantic Canada. Perhaps, together, we can provide our Christmas tree farmers with climate-adapted trees to better meet the needs of consumers.

Graduate Student / Undergraduate Student

Undergraduate

Leveraging groundwater level data from Nova Scotia to support national monitoring recommendations

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Groundwater is the largest source of liquid freshwater in Canada, with 30% of Canadians relying on groundwater as a domestic water source. In 2023, volunteers from the International Association of Hydrogeologists - Canadian National Chapter (IAH Canada) formed the Committee for Groundwater Advocacy to advocate for the meaningful inclusion of groundwater in communications and policy development in Canada. In 2024, CGA submitted the IAH Canada brief to the House of Commons Standing Committee on Environment and Sustainable Development: Study on Freshwater with five recommendations for strengthening federal freshwater management through groundwater considerations. The recommendations were to: 1) include groundwater in federal communications related to water, 2) establish national groundwater monitoring under the Canada Water Act, 3) report on groundwater quantity and quality trends, 4) include groundwater experts in freshwater management, and 5) educate the public and decision-makers about groundwater. In this presentation, we aim to support two of these recommendations: establish and report on trends from a national groundwater monitoring network. We compared existing provincial and territorial networks in Canada to the U.S. Geological Survey groundwater monitoring network. We then developed an R-based script to automate groundwater hydrograph analysis. As an illustrative example, we applied the script to groundwater hydrographs in Nova Scotia to demonstrate how this data can be leveraged to provide insight into recharge drivers, trends, and aquifer properties. We found that recharge efficiency was higher in the winter. This method can be used to classify wells and identify gaps or redundancies in existing monitoring networks.

Graduate Student / Undergraduate Student

Graduate

SeaGrassGuard: Fisher-led Seagrass Restoration for Coastal Protection and Climate Resilience in Halifax, Canada

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[1]University of New Brunswick

Climate change is increasingly reshaping Canada's Atlantic coastline through rising sea-levels, intensifying storms, chronic flooding, and accelerating shoreline erosion. These changes pose significant risks to vulnerable coastal communities, critical infrastructure, and port dependent economic systems, particularly in urban harbours, such as that of Halifax. As a major maritime gateway for trade and regional services, Halifax Harbour requires adaptive and feasible solutions that enhance coastal resilience while engaging multiple stakeholders. To address these challenges, this proposal introduces SeaGrassGuard, a nature-based coastal resilience initiative that restores seagrass meadows through a fisher-led deployment model using biodegradable seed pods (seed balls). Local fishers, who possess regular access to nearshore environments and practical ecological knowledge, will deploy standardized seed pods in priority restoration zones identified through GIS-based spatial analysis. The project integrates ecological modeling and scenario planning to account for uncertainties related to sea-level rise, storm disturbances, turbidity fluctuations, and human pressures, such as anchoring and dredging. SeaGrassGuard delivers a comprehensive resilience strategy comprising five key components: (1) Habitat suitability mapping and restoration zoning, (2) A fisher-led stewardship deployment program, (3) Protective policies to safeguard restored areas, and (4) A blended financing mechanism aligned with municipal, port, and private-sector interests. A collaborative governance framework, the Port City Community Resilience Compact, will coordinate implementation while ensuring meaningful participation of coastal workers and vulnerable communities. Overall, SeaGrassGuard offers a scalable, science-informed, and community-driven model that strengthens coastal protection, enhances marine biodiversity, and generates measurable blue carbon benefits within a real-world Canadian coastal setting.

Graduate Student / Undergraduate Student

Graduate

The Missing Links: Modelling Habitat Connectivity for Canada Lynx (Lynx canadensis) in Cape Breton

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[1]Saint Mary's University

The Canada lynx (*Lynx canadensis*) is provincially listed as an endangered species in Nova Scotia, with a breeding range limited to Cape Breton Island. Maintaining habitat connectivity is essential for the continued viability of this small population. The Nova Scotia Lynx Recovery Plan lists better understanding lynx habitat conditions as necessary for the recovery of the Nova Scotia lynx population. This study aimed to contribute to that understanding. Specifically, this research used geographic information systems (GIS) to assess habitat suitability and connectivity for lynx in Cape Breton, and to compare connectivity between 1993 and 2008, both within and outside Cape Breton Highlands National Park. To achieve this, a habitat suitability model was created in ArcGIS Pro using spatial layers representing forest composition, forest height, non-forest land cover, and elevation. This was then used as a base layer to calculate effective mesh size, a connectivity metric that identifies the probability that two random points will be located within the same habitat patch. A moving window approach was used to create a connectivity surface of effective mesh size values across Cape Breton. Effective mesh size, representing connectivity, and habitat suitability were both found to be greater in 2008, and inside the national park. Connectivity showed a greater increase between the two years than habitat suitability only for areas outside the national park. The increased understanding of lynx habitat connectivity across Cape Breton provided by these results is beneficial for lynx conservation efforts and understanding how connectivity trends may change in the future.

Graduate Student / Undergraduate Student

Undergraduate

The Impacts of Clearcutting on Ectomycorrhizal Fungi

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Mycorrhizal fungi are one of the most important groups of organisms that exist in soil communities. A majority of plants species in the environment form a symbiotic relationship with these fungi, which is responsible for the trade of nutrients and information between the plant and fungi, as well as other individual plants. There is a natural variance in fungal community structure and composition between different ecosystems which depend on a variety of environmental factors. However, disturbances of an ecosystem can also disturb fungal communities, causing changes to composition and structure. Factors that influence how the mycorrhizal fungal community changes because of a disturbance include changes to the soil nutrients, plant cover, and carbon availability. Clear-cutting causes major changes to the environment. As such, changes to the fungal community can also be expected. After clear-cutting occurs, it is expected that more light will reach the forest floor, causing an increase in herbaceous plant cover. Additionally, there will be an input of carbon and other nutrients into the soil from woody debris. These environmental changes could cause an increase in biomass for the fungal community due to an increase in soil water, nutrients like carbon and nitrogen, and pH.

Graduate Student / Undergraduate Student

Undergraduate

Influence of Nitrogen Availability on Growth Allocation in Boreal Forests Across Different Harvest Sites

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Nitrogen plays a key role in regulating tree growth, nutrient allocation, and forest productivity. Forest harvesting alters nitrogen cycling by removing nitrogen-rich biomass, affecting long-term growth patterns. This study aims to explore how nitrogen availability influences trade-offs between vertical and radial growth across three harvesting treatments: control (C), stem-only (SO), and whole-tree (WT) harvest. Nitrogen availability was assessed using soil nitrogen, foliar nitrogen, chlorophyll content, while growth responses are measured using DBH, annual ring width, tree height, and annual height increase. We hypothesize that increased nitrogen availability favors radial growth over height growth, reflecting greater carbon investment in secondary growth. We further predict that WT harvesting will have reduce lower radial growth due to nitrogen depletion and increased investment in root development. This study examines how harvesting intensity shapes nitrogen distribution within trees and alters growth allocation patterns in boreal forest stands. If harvesting shifts nitrogen availability enough to alter growth patterns, it may influence forest health and stability, carbon storage and nutrient cycling, and long-term timber sustainability.

Graduate Student / Undergraduate Student

Undergraduate

Integrating geospatial data into acoustic receiver array planning in the Southern Gulf of St. Lawrence

Julia MacFarlane[1]

[1]Dalhousie University

Acoustic telemetry uses transmitters and receivers to remotely monitor animal movement. Receivers are commonly deployed on the seafloor in an array, with the configuration varying depending on study objectives and logistical constraints. The data collected by receivers rely on accurate placement, yet there is currently no clear methodology to determine optimal placement locations, particularly at broad scales. This study investigates how a Geographic Information Systems network analysis can be used to identify optimal locations for large-scale acoustic receiver arrays that maximise animal detections and minimise risks to the infrastructure. The southern Gulf of Saint Lawrence represents a model study site, wherein a range of environmental variables (bathymetry, Marine Protected Areas and bottom substrate) and anthropogenic variables (bottom trawling, underwater cables, and an unexploded charge) can be considered. For each of the variables, a suitability criterion was established, and weightings were defined based on a literature review. A 10 by 10 km grid tessellation was generated, with each data layer represented as a standardized cost surface. These layers were combined to produce a cumulative cost surface for the study area. By applying a least-cost scoring and suitability analysis, locations with the highest suitability scores can be identified. Preliminary results suggest that areas with steep slope, and pelitic bottom substrate - such as those observed along shorelines, and the Northumberland Strait - result in higher cost, reducing the overall suitability of those locations. This network analysis integrates geospatial data into array planning, providing a novel perspective within aquatic telemetry research.

Graduate Student / Undergraduate Student

Undergraduate

Comparing the Health of Mummichog (Fundulus heteroclitus (Linnaeus, 1766)) in Open Hearth Park after remediation, to various reference estuaries

Brett MacKinnon[1]

[1]Cape Breton University Biology Department

The Sydney Tar Ponds (formerly Muggah Creek) in Sydney, Nova Scotia, was historically one of Canada's most contaminated estuarine systems due to more than a century of steel production. Following large scale remediation efforts completed in 2013, the site was transformed into Open Hearth Park, raising important questions about the ecological recovery of the reconstructed estuary. This study evaluates the health of mummichog (*Fundulus heteroclitus*), from the remediated Tar Ponds in 2025 and compares them to individuals collected from two reference estuaries in Cape Breton: the Mira River and the Sydney River. In addition, contemporary samples are compared to pre-remediation data collected in 2007 to assess long-term ecological change. Mummichog were collected using standardized minnow trapping techniques, and 30 individuals per site were retained for laboratory analysis. Health was assessed using multiple indicators, including morphometric measurements (total length and body weight), Fulton's condition factor (*K*), bilateral fin ray symmetry (pectoral and pelvic fins), and qualitative assessments of external abnormalities. Fin ray counts were obtained following clearing and staining procedures using potassium hydroxide and Alizarin Red S to reveal calcified structures. By integrating condition indices, fin symmetry, and qualitative comparisons this study aims to determine whether mummichog health at the remediated Tar Ponds points to ecological recovery of the estuary and whether present-day individuals more closely resemble those from minimally impacted reference estuaries. These findings will contribute to understanding the long-term biological impacts of contaminated estuaries and provide valuable insight for future environmental monitoring and management of restored aquatic ecosystems.

Graduate Student / Undergraduate Student

Undergraduate

Enhancing Coastal Resilience: Marsh Elder (Iva frutescens) as a nature-based solution

Allison MacNeil[1]

[1]Saint Mary's University

As climate change progresses, it becomes increasingly important to mitigate the hazards that threaten coastal communities. Living shorelines are a type of nature-based solution that attenuates waves, mitigates erosion, and reduces storm surges. While these systems are effective at increasing coastal resiliency, dieback of aboveground biomass creates vulnerability in winter months. *Iva frutescens* (*Iva*) is a shrub that occurs in salt marshes in Nova Scotia, found exclusively in the Minas Basin and Yarmouth regions. It has the potential to increase shoreline resiliency as it preserves most of its aboveground biomass year-round, however, little is known about its ecological niche in Nova Scotia or planting success in living shorelines. This research classified *Iva*'s ecological niche (inundation frequency, soil characteristics, vegetation communities), compared how *Iva* differed morphologically between regions, and tested transplanting methods. *Iva* exhibited niche conservatism across sites and regions, where its distribution within the marsh seemed to be primarily driven by tidal influence. Morphological characteristics were also similar across all sites despite considerable differences in nutrient availability. Planting success seemed to vary most with site characteristics, where time after construction appeared to heavily influence survival. This is the first study to quantify *Iva*'s ecological niche in Canada and the first study on *Iva* for restoration purposes. This research provides the fundamental knowledge needed to incorporate *Iva* into living shorelines in Nova Scotia.

Graduate Student / Undergraduate Student

Graduate

Variations in Compost Maturity Testing: Implications For Canadian Agriculture

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Compost has many benefits when used as a soil amendment; however, compost maturity guidelines are needed because immature composts can negatively impact plant growth. Compost in Nova Scotia must be tested and categorized according to the 2005 CCME Guidelines For Compost Quality, which, among other criteria, states that composts that are sold and distributed must be mature and stable. To be considered as such, compost must meet one of three respiration-based thresholds (oxygen respiration rate, carbon dioxide evolution rate, or compost temperature rise) that can be evaluated using different respirometric test methods. This research tested five compost samples (four from a facility and one control which was expected to be mature and stable) using the TMECC CO_2 evolution test, the Dewar self-heating test, and an independently developed modified BOD test for measuring oxygen uptake in order to study how the variation between tests impacted composts passing (or failing) the CCME thresholds. This study found that, with the exception of samples 1 (the least mature) and 5 (the control), whether or not a compost passed the CCME thresholds depended on the test method used. This study also found that the modified BOD test may be a more sensitive measure of compost maturity, and highlights the impacts that “false positives” may have on Canadian agriculture. Further research is necessary to standardize the modified BOD test and to examine other factors that may be influencing the apparent sensitivity of the test.

Graduate Student / Undergraduate Student

Undergraduate

Sable Island horses and their effects on microbial biomass and soil nutrients

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[1]Saint Mary's University, [2]Dalhousie University

Grazing animals are known to have significant impacts on the vegetation and soil in their environment. Sable Island is a unique island ecosystem off the coast of Nova Scotia, where introduced horses are the dominant herbivore. The large population of horses currently present on the island may be impacting biodiversity and ecosystem functioning on the island, but impacts on the soil microbiome have yet to be studied. We conducted a five-year study that excluded horses from grazing in 1 ha areas. Each fenced exclosure plot was paired with a nearby control plot, which was chosen based on similarities in vegetation density and species composition. There was a total of eight pairs of plots. Horse excreta and grazing was hypothesized to have an effect on microbial biomass and soil nutrients due to nutrients in excreta and reduction in plant biomass. Soil samples were taken from all of the plots and microbial biomass was analyzed with fumigation/non-fumigation method and spectrophotometer in a lab setting. Microbial biomass was not found to be significantly different between enclosures and controls. Soil properties were measured at the NS Department of Agriculture analytical lab. Similarly, there were no significant differences between exclosure and control plots for pH, CEC, OM, or P2O5. Overall, horses did not significantly affect microbial biomass or the soil properties examined, but work is ongoing to incorporate effects of differences in vegetation across plots into the analyses. In the future, we hope to further investigate impacts of horses on microbes by conducting enzyme assays.

Graduate Student / Undergraduate Student

Undergraduate

Metal(loid) concentrations in honey: A Nova Scotia case study and global literature review

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Toxic metal(loid)s can accumulate in the environment and pose risks to both human and environmental health. Honey has increasingly been used as a bioindicator of environmental health due to the foraging behaviour of honeybees (Apis mellifera), which integrate contaminants across multiple sources. Honeybees forage up to 5km from their hives, allowing honey to reflect contaminants present in the surrounding environment. During the 2025 season, honey samples were obtained from volunteer beekeepers across Nova Scotia (NS), as well as from 10 Canadian brands of commercial honey. All samples were analyzed using inductively coupled plasma mass spectrometry and MA-3000 mercury analyzer to determine concentrations across a full metal(loid) suite. In NS honey samples, mean metal(loid) concentrations followed the decreasing order: P > Ca > Mg > K > Na > Mn > Al > Zn > Fe > Se > Cu > Ba > Pb > Ti > Pb > Hg. Metal(loid)s reported below detection limits: Li, V, Cr, Co, Ni, As, Ag, Cd, Sb, Ce, and U. Most toxic metal(loid)s were below detection limits; however, localized exceedances of the 100 µg/kg guideline value for Pb were identified at isolated NS locations and in two commercial products. A rapid global literature review conducted alongside the Canadian analysis revealed substantial variability in metal(loid) reporting practices and a lack of standardized international thresholds for most metals in honey. Together, these findings support the use of honey as a tool for environmental monitoring while highlighting the need for improved reporting standardization and regulatory alignment.

Graduate Student / Undergraduate Student

Graduate

Quantifying changes in mercury bioaccumulation and biomagnification in invertebrate food webs across a river-ocean continuum

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Estuarine river systems transport mercury between land and sea, and changing biogeochemical processes influence its retention, speciation, and biological uptake along that continuum. Methylmercury (MeHg) is of principal concern due to its high bioaccumulation and biomagnification potential; however, changes in MeHg bioaccumulation dynamics in these systems are poorly quantified. In this study, we use aquatic invertebrate functional feeding groups (FFGs), stable isotopic ratios, and MeHg concentrations to interpret changes in MeHg food web dynamics across the Jijuktu'kwejk river and mudflats surrounding its outflow to the Minas Basin, Bay of Fundy. A total of 56 invertebrate taxa were collected and grouped into freshwater, brackish, and coastal ecosystem types. The MeHg concentrations of freshwater invertebrate FFGs increased from primary consumers to predators, where predatory taxa (mean MeHg 226.8 ± 136.0 and 105.8 ± 51.5 ng/g dry weight (dw)) frequently exceeded the Canadian guideline for the protection of wildlife consumers (137.6 ng/g dw). There was no trend in MeHg bioaccumulation among FFGs for brackish and coastal ecosystems, and mean MeHg concentrations (19.1 ± 23.3 and 15.7 ± 12.1 ng/g dw, respectively) were ~10 times below the guideline (202.5 ng/g and 161.9 ng/g dw, respectively). Additionally, trophic magnification slopes and factors (TMF) were significantly different between ecosystems ($p < 0.001$), where only the freshwater invertebrate community showed significant MeHg biomagnification (TMF >1). These data highlight high MeHg biomagnification potential in freshwater invertebrate communities relative to marine-influenced regions and furthers our knowledge of MeHg food web dynamics across highly connected but functionally distinct ecosystem networks.

Graduate Student / Undergraduate Student

Graduate

Evaluating the Effectiveness of Ocean and Climate Change Education in Nova Scotia's Science Classrooms: Impacts on Knowledge, Attitudes, and Action

Kerri McPherson[1]

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Climate change and the health of the ocean are complex, multidimensional global problems, rooted in science with wide-reaching social, economic, and political implications. With climate change and declining ocean health, there is widespread recognition that education plays a pivotal role in building the knowledge, skills, and motivation needed to address these challenges The ocean-climate nexus is one of the most significant issues that youth in Nova Scotia will face in the future and is an area that requires considerable rethinking of how these concepts are addressed within the education system as a whole. This research examines the role of ocean and climate change educational initiatives in moving beyond knowledge transmission towards transformational change in student attitudes, knowledge, and youth agency. Situated within grade 7 - 12 educational contexts, the study explores how structured educational experiences can raise awareness and support sustained engagement and environmental stewardship. Providing students with the opportunity to engage with ocean and climate change topics through inquiry, hands-on, and reflexive approaches, this study aims to identify pedagogical practices and resources that best support educators in delivering complex topics. This research will provide a comprehensive evaluation of how ocean and climate change education is currently delivered and received in Nova Scotia secondary science classrooms. Analysis of educational initiatives will offer evidence-based insights into how ocean and climate literacy can be more effectively cultivated in youth. Results will inform the future development of resources, curriculum, and professional learning for educators in Nova Scotia.

Graduate Student / Undergraduate Student

Graduate

Chironomids as bioindicators of environmental change at Yoho Lake in New Brunswick, Canada

Catherine Minnaar[1], Joshua Kurek[1], Fernanda Charqueno-Celis[1], Marissa Emberly[1], Brenell Enman[1]

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Lake deoxygenation and harmful algae blooms are increasingly common issues worldwide in temperate freshwater lakes. These conditions are typically observed in lakes with high nutrient loading, however Yoho Lake in New Brunswick, Canada, is a low-nutrient lake that since at least 2020 has experienced algae blooms and possibly deep-water deoxygenation. Chironomid head capsules preserved in dated lake sediments were used to assess historical dissolved oxygen levels and compare them to potential drivers, such as land-use change and mean air temperature. Relative abundances of low-oxygen taxa doubled since the pre-1800s, while high-oxygen taxa decreased by 0.7 times. Changes in chironomid assemblage composition (NMDS1) positively correlated with increases in mean air temperature from the 1870s to 2024. The timing of more human settlements around the lake correlates with a 1.5 times increase in sedimentary chlorophyll-*a* concentrations from 1950-present, suggesting greater primary production. The goal of this study is to contribute to a larger understanding of when and how land use and climate change have altered oxygen conditions within the lakes of New Brunswick's Wolastoq watershed.

Graduate Student / Undergraduate Student

Undergraduate

Assessing the effects of long-term temperature change on a wild Nova Scotian breeding population of European Starlings (Sturnus vulgaris)

Janine Mombourquette[1], Colleen Barber[1]

[1]Saint Mary's University

Birds in North America are facing steep population declines. This trend has been attributed to several anthropogenic factors, and climate change is at the forefront. Many bird species now breed earlier and for longer, causing mismatches with food availability. Longer breeding seasons extending into the summer can cause increased nestling overheating, reducing their condition and increasing mortality. Higher temperatures have led some birds to increase extra-pair mating, potentially choosing reproductive strategies that improve their success in harsher environmental conditions. Temperature effects vary by geographic location, making localized studies necessary to understand impacts on species within a region. European Starlings (*Sturnus vulgaris*), an urban-thriving passerine, are declining rapidly in North America. Their mixed reproductive strategies, multiple broods per season, and use of nestboxes on the Saint Mary's University campus, make them an ideal study species for exploring the effects of climate change on avian reproductive success. From 2023-2026, data on egg lay dates, nestling condition, and fledge success will be collected in the field during starling breeding seasons. To determine the reproductive strategies and overall reproductive success of adults, DNA genotyping will be performed to assign parentage to nestlings. Ambient temperatures during the female fertile period will also be measured. The data will be compared to that collected in 2007-2011 to assess changes in this population over time. Our long-term study aims to provide insight into how birds in Nova Scotia are responding to climate change.

Graduate Student / Undergraduate Student

Graduate

Drought and Recovery Dynamics Across the Hydrologic Cycle in a Cold, Humid Coastal Region

Armita Motamedi[1], Nicole LeRoux[1], Audrey Hill[1], Rob Jamieson[1], Lauren Somers[1], Barret Kurylyk[1]

[1]Dalhousie University

Precipitation sustains surface water and groundwater systems and supports both ecological and human water needs. However, spatiotemporal changes in precipitation patterns, such as shifts in seasonal totals, phase, frequency, or intensity, can disrupt this balance, impact groundwater storage, and increase drought sensitivity. These impacts are especially relevant in Nova Scotia, where increasing winter precipitation and higher air temperatures are already evident, a trend that is expected to intensify. The overall goal of this study is to investigate hydrometeorological and hydrogeological drought through combined analyses of linked atmosphere, aquifer, and stream drought responses in Nova Scotia. Accordingly, we investigated spatiotemporal trends in meteorological (net precipitation), hydrogeological (groundwater level), and hydrological (baseflow) variables. Results indicate that more intense droughts are becoming more frequent and spatially extensive in Nova Scotia, with statistically significant trends particularly evident in the fall. Using standardized indices (Standardized Precipitation Evapotranspiration Index (SPEI), Standardized Groundwater Index (SGI), and Standardized Baseflow Index (SBFI)), we explored how drought signals propagate across the atmosphere-aquifer-stream continuum. We further assessed the strength and timing of cross-system relationships, as well as the duration of drought events and recovery periods. The findings suggest a strongly interconnected atmosphere-aquifer-stream system. In most observation wells, SGI responded with short lag times (< 1 month) and strong correlations with SPEI and SBFI, although this connectivity decreased with greater well depth. Drought onset and duration were generally synchronized across the province (late summer to early winter), but recovery times varied substantially, with groundwater taking up to 51 months to recover.

Graduate Student / Undergraduate Student

Graduate

Sustainable Forestry in Nova Scotia

Sophia murphy[1]

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Soils in the Central Uplands of Nova Scotia are highly degraded due to prolific deforestation and reforestation efforts around the ecodistrict. Deforestation alters natural soil properties through the removal of organic material and soil compaction which results in soil degradation. Later reforestation techniques, however, can restore degraded soils to their properties post-disturbance. This study aims to compare the impact of reforestation techniques: artificial plantations, pre-commercial thinning, and natural regeneration on soil health indicators over twenty-five years to soil of a natural forest. Soil samples are collected from pieces of land that have been reforested by each reforestation technique in 2020, 2010, and 2000 and from forests that have been left undisturbed for thirty years which is considered as a natural forest. Samples are collected at two soil depths, incrementally 0-15 and 15-30 cm, in a randomized complete block design. The study will attempt to explain how TC, TN, POM, POX, Sand, Silt, Clay, pH, Base Saturation, CEC, and cations Ca, Mg, K, NH, and H change as a function of reforestation technique and soil depth, with time. Statistical tests will be used to determine whether one reforestation technique is significantly better than another reforestation technique at returning those soil health proxies to those of a natural forest. The results of this research will provide the first foundational understanding of how best to protect soil in the Central Uplands to ultimately encourage a more sustainable forestry industry for Nova Scotia.

Keywords: soil degradation; soil restoration; reforestation; deforestation; forestry practices; sustainable forestry

Graduate Student / Undergraduate Student

Undergraduate

Tree Vulnerability Assessment of the Halifax Public Gardens

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Urban forests need protection from climate change specific to their landscapes, and a vital part of that protection is adaptation and management. One way to adapt urban forests to climate change and other threats, is by conducting urban tree vulnerability assessments. I am conducting an urban tree vulnerability assessment on an important urban forest in Halifax, Nova Scotia: The Halifax Public Gardens. I aim to investigate the vulnerability of trees in the Halifax Public Gardens to climate change (temperature and precipitation), wind, and insect pests and diseases, including which trees are most vulnerable and to which threats. I will achieve this by investigating how tree species bio-physiological traits and size influence vulnerability and conclude by making recommendations for adaptation based on the results. In this urban tree vulnerability assessment, I have used a qualitative approach. First, a thorough literature review was conducted on past tree vulnerability examples, the effects of the stressors/exposures previously listed, the history of the Halifax Public Gardens for context about the gardens and how it was designed, and future climate scenarios for the years 2070-2100 based on the IPCC pathways. Then, the identity and trunk diameter of all the trees in the Gardens were listed and measured. I am currently looking into the individual bio-physiological traits for each tree species identified to determine the conditions to which they would be at risk. Some preliminary patterns are already appearing, and this study will provide a better understanding of how to manage the trees of the Halifax Public Gardens.

Graduate Student / Undergraduate Student

Undergraduate

Assessing the impacts of river-based carbon sequestration: effects of river alkalinity enhancement on dissolved metal concentrations in the West River, Nova Scotia

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Low pH conditions in the West River, Pictou Co, Nova Scotia that are a result of both natural and anthropogenic processes have resulted in elevated dissolved metal concentrations which are toxic to aquatic life. River alkalinity enhancement (RAE) is a process that has been applied where crushed alkaline minerals are added to the river and has the potential to sequester atmospheric carbon dioxide. RAE also enhances habitat quality by raising river pH which theoretically reduces dissolved metals. In this study, two years (2024-2025) of water quality data were collected from three sites along the West River to analyze whether RAE had impacts on the concentration of dissolved aluminum, iron, manganese, copper, and zinc. Sites were selected upstream of the addition location, directly downstream of the addition location, and at the head of tide. Towards the end of winter 2025 (March through May), data was collected while RAE was being added to the river. Water samples were collected and submitted to the Dalhousie Clean Water Lab where metal concentration was measured using ICP-MS. Temperature, pCO2, pH and conductivity data were collected using autonomous in-situ sensors. Preliminary year-to-year comparisons show changes in concentration of dissolved metals. However, the lack of significant change between upstream and downstream collection sites demonstrates that RAE for carbon dioxide removal does not have a pronounced effect on the concentration of dissolved metals. Data indicates that the 2025 drought had an impact on dissolved metal concentrations. These results provide transportable risk assessment guidance for RAE projects.

Graduate Student / Undergraduate Student

Undergraduate

Public Perceptions of Hemlock Woolly Adelgid Management in an Urban Park

Petra Ottenbreit-Born[1]

[1]Dalhousie

Hemlock Woolly Adelgid (HWA) is an invasive forest pest threatening Eastern hemlock (*Tsuga canadensis*), a foundation species that supports forest structure, biodiversity, and microclimatic regulation in Nova Scotia. Since its detection in the province, HWA has spread into urban and recreational forests, extending the need for management efforts beyond privately managed woodlots. While the ecological effectiveness of these interventions is well documented, far less is known about how the public understands and evaluates them, particularly in urban parks where forests hold strong ecological, recreational, and cultural value. This study examines public perceptions of HWA management in Hemlock Ravine Park, Halifax, Nova Scotia, with a focus on awareness, attitudes toward treatment options, perceived risks, and willingness to support hemlock conservation. An interception survey method approach is being used with an on-site, self-administered survey. The survey is collecting quantitative data on knowledge and treatment preferences, alongside qualitative responses aiming to capture values, concerns, and reasoning of the park users' perceptions on treatment options. Quantitative responses will be analyzed using descriptive statistics to assess patterns in awareness, attitudes, and treatment preferences, while open-ended responses will be examined through inductive thematic analysis to identify recurring values and concerns. By integrating these approaches, the study aims to document the public perspectives of park users in an urban park in the Halifax Regional Municipality to inform transparent, socially informed invasive species management in urban forest settings.

Graduate Student / Undergraduate Student

Undergraduate

Finding connection: Environmental drivers of Atlantic salmon (Salmo salar) predicted distribution in Napu'saqnuk (St. Mary's River)

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[1]Dalhousie

Napu'saqnuk (St. Mary's River) is an ecologically significant watershed that supports one of the few Atlantic salmon (*Salmo salar)* populations that consistently return to their natal rivers on mainland Nova Scotia, Canada. Regardless, Napu'saqnuk populations have experienced steep declines, leading to their current designation as "endangered". Threats like forestry, agriculture, acidification, altered hydrology, climate change, and road development continue to disturb and fragment salmon habitat across the watershed. Little information exists on the environmental and spatial drivers of salmon distribution, and current methods of modelling these drivers in freshwater life stages remain limited. Species distribution models (SDMs) are valuable tools for predicting species occurrence and informing conservation decisions, yet no SDM has been developed for Atlantic salmon in Napu'saqnuk. This study aims to identify high-value salmon habitat, determine key environmental variables influencing predicted distribution, and identify major connectivity barriers to these critical habitats across Napu'saqnuk. Using a Maximum Entropy Model (MaxEnt), I will combine presence-only salmon occurrence data with key environmental variables to generate a predictive, correlative map of predicted occurrence probability. I will create a connectivity layer from known culvert locations to incorporate existing barriers to high-value habitat and identify priority barriers for remediation. The results of this research will delineate the extent of high-value salmon habitat across Napu'saqnuk and recommend priority culverts for remediation to effectively restore connectivity. These outcomes can guide efficient conservation resource allocation, support targeted habitat restoration, and contribute to the potential designation of Napu'saqnuk as Canada's first Ecologically Significant Area under the *Fisheries Act*.

Graduate Student / Undergraduate Student

Undergraduate

Arsenic accumulation in alder trees at a legacy gold mine tailings impoundment in southwest Nova Scotia: Implications for environmental risk

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Heavy metal contamination from gold mine tailings poses significant ecological risks, particularly through the bioaccumulation of elements such as arsenic in local vegetation. We investigated patterns of arsenic and other heavy metal accumulation in alder trees (Alnus spp.) growing near legacy gold mine tailings sites in southwestern Nova Scotia. Alder has been chosen as the target species due to their ecological importance as a food source, tolerance to disturbed environments, and to better understand their potential as a phytostabilizer. Field sampling involved collecting alder tissues including leaves, catkins, and branches, as well as associated soil and water samples, which were analyzed for metal concentrations using X-ray fluorescence (XRF) and inductively coupled plasma spectrometry (ICP-MS).

Arsenic levels in tailings (430 – 3200 ppm) and associated groundwater (350 – 5600 ppb) were elevated above both baseline values and CCME guidelines. Alder catkins have the highest arsenic concentrations (1300 ppb) and branches the lowest (290 ppb) and greatly exceed concentration in non-tailings samples. Though alder is not considered to be arsenic hyperaccumulators, our data suggest that on contaminated tailings alder may be a vector for As bioaccumulation, most notably for birds that feed on catkins.

Graduate Student / Undergraduate Student

Undergraduate

Avian Biodiversity in bogs after the Barrington 2023 wildfire

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With the projected increase of wildfires in the Atlantic Provinces, understanding the impacts of fire on avian communities is extremely important for conservation and management. Wetland communities are especially important, as they have been demonstrated to be biodiversity hotspots, hosting a wide range of species including multiple species at risk. The Barrington wildfire was one of the largest wildfires in the history of Nova Scotia, destroying approximately 25 000 ha of land. Point counts were conducted and autonomous recording units were placed in four bogs of the Barrington fire, two burned and two unburned, during the breeding season for birds. The objectives of this study are to examine the species composition of burned and unburned wetlands, to compare the vegetation structure between wetlands, and to determine differences in point counts and ARU methods for determining species composition.

Graduate Student / Undergraduate Student

Undergraduate

Evaluation of Phosphorous Acid as a Control Strategy for Potato Pink Rot (Phytophthora erythroseptica).

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Potato pink rot, caused by the oomycete *Phytophthora erythroseptica*, is a major soilborne disease responsible for significant losses in both field and storage. While non-chemical management practices can reduce disease incidence, they are typically supplemented with fungicides for effective control. The phenylamide fungicide Metalaxyl-m (Ridomil Gold®) has historically been used to manage pink rot; however, the emergence of resistant strains has created a need for alternative chemical options. This study evaluated the phosphorous acid fungicide Confine® Extra as part of a pink rot management strategy. A field trial using cv. Red Norland was conducted at the Harrington Research Farm in a randomized complete block design with four replications per treatment. Nine treatments were tested, including one to six foliar applications of Confine® Extra at 250 L ha^{-1}, and three or five applications at 60 L ha^{-1} to simulate aerial application volumes. Inoculated and non-inoculated controls were included. Except for non-inoculated controls, plots were inoculated in-furrow at planting with a mycelium/oospore slurry of a local *P. erythroseptica* isolate grown on V8 agar and blended before application. Disease incidence was assessed at harvest by determining the proportion of infected tubers. Post-harvest wound and zoospore inoculations were also performed to evaluate tuber susceptibility. Disease severity was measured as percent surface infection and depth of internal rot. Data will be analyzed to determine the effects of application timing, frequency, and spray volume on pink rot incidence and severity. Results from this study will provide direction for incorporating phosphorous acid into pink rot management strategies.

Graduate Student / Undergraduate Student

Graduate

River geomorphology shapes fish morphological diversity worldwide

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Despite freshwater environments accounting for a small fraction of global aquatic habitat, freshwater fish are highly diverse. A key facet of this diversity is morphology. Freshwater fish possess a range of unique shapes derived from their evolutionary histories and the environmental constraints imposed by freshwater systems. River geomorphology may play a crucial role in driving this diversity, as it defines the hydrology, habitat structure, and resource availability in freshwater environments. However, the contributions of these mechanisms to fish morphological diversity have not yet been well explored. To address this, we analysed the relationship between river geomorphology and global freshwater fish morphological diversity, with a specific focus on the impact on morphospace. We combined publicly accessible data on fish morphological ratios, fish observations, and river geomorphology, accounting for ~11,000 freshwater fish species, to construct linear models of morphospace versus geomorphology. Our initial analysis suggests the physical structure of rivers plays a key role in shaping freshwater fish morphology. We identified significant relationships between geomorphology and morphospace and found that these patterns are consistent between biogeographical realms. Presently, the geomorphology of rivers is being greatly altered by human activities such as dam construction, mining, and droughts due to anthropogenic climate change. Our findings will expand our understanding of how these changes impact fish morphological diversity, giving insight into the resilience of freshwater fish populations, globally. Furthermore, these results can inform which rivers and geomorphological features should be targeted by conservation and restoration efforts to maximize preservation of freshwater fish morphological diversity.

Graduate Student / Undergraduate Student

Undergraduate

Mercury and arsenic bioaccumulation in frogs inhabiting wetlands contaminated by legacy gold mine tailings in Nova Scotia, Canada

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Wetlands in Nova Scotia (NS) have been contaminated by legacy gold mine tailings containing mercury (Hg) and geogenic arsenic (As). These toxic elements have persisted in these ecosystems, bioaccumulating in organisms and transferring through aquatic food webs. Frogs are particularly susceptible due to several aspects of their physiology and ecology including their diet, limited home ranges, habitat preferences, positions in the food web and the permeability of their skin. During 2024-2025, we sampled the former gold mining districts of Goldenville, Waverley and Oldham for frogs inhabiting tailings-impacted wetlands. Adult green frogs at contaminated sites generally accumulated over 50% more Hg and 5000% more As compared to individuals from reference sites. Since frogs are common prey for several predators, including endangered species of fish, birds, and turtles, understanding their contaminant loads is critical. Given their widespread presence at legacy tailing sites and ecological sensitivity, green frogs show strong potential as biomonitoring species for assessing risks to freshwater vertebrates. This research contributes to a broader understanding of the long-term ecological impacts of historical gold mining on freshwater ecosystems.

Graduate Student / Undergraduate Student

Graduate

Pollinators and Nutrition: linking wild bees to the nutritional value of wild blueberries across Unama'ki

Gianna Sheppard[1], Alana Pindar[1]

[1]Cape Breton Univeristy

Wild bee pollination plays a critical role in many crops, including lowbush blueberries (*Vaccinium angustifolium*). Research from mainland NS, has shown that effective pollination increases seed set and improves overall fruit quality. Despite their importance, the diversity and functional contributions of native blueberry pollinators in Cape Breton remain poorly understood. The objectives of this study were to (1) characterize wild bee community composition across lowbush blueberry fields in Cape Breton, and (2) determine how variation in wild bee abundance and species diversity influences both berry fresh weight and nutritional quality, measured as anthocyanin (malvidin-3-glucoside) concentration. Across five study sites, 433 individual bees representing 44 wild bee species were collected, and bee community composition differed among sites. Fresh berry weight varied significantly between sites and was positively correlated with both wild bee abundance and species diversity, demonstrating that more diverse bee communities contribute to increased fruit mass. Nutritional quality, assessed using ultra-performance liquid chromatography, followed a similar pattern: anthocyanin concentrations were lowest at sites with low wild bee abundance and diversity and highest at the site with the greatest bee abundance and diversity. Store-bought (highbush) blueberries exhibited higher anthocyanin concentrations than low-diversity lowbush sites but lower concentrations than the high-diversity lowbush site, further highlighting the nutritional benefits associated with diverse wild bee communities. These results demonstrate that diverse wild bee communities contribute to increased yield and enhanced nutritional quality of lowbush blueberries, underscoring the importance of conserving native pollinators to support sustainable crop production and reduce reliance on managed pollinators

Graduate Student / Undergraduate Student

Undergraduate

Block by Block: A Decadal Assessment of the Duncan-Lawrence-Allan Street Trees

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Urban forests are a valuable asset to the cityscape, they contribute aesthetically and indispensably provide diverse ecological and social benefits to the urban population. Street tree populations are dynamic systems; subject to ongoing processes of growth, mortality, and replacement that can shape the urban canopy structure and ecosystem service delivery over time. In order to thoroughly comprehend these changes there is a need for longitudinal, neighborhood-scale studies that track individual trees and species composition. This study aims to understand and conceptualize the forest stand that makes up the Duncan-Lawrence-Allan street tree canopy in Halifax, Nova Scotia. Through evaluating the temporal changes using a 10-year long dataset, there can be a definitive understanding of the dynamics and potential ecosystem services these trees provide for the community. Parameters, such as diameter at breast height and tree species identification, were collected in 2015, 2020, and 2025. This established a comprehensive dataset that is being analyzed to provide understanding of basal area (m2), stem count, abundance, and richness of the tree species diversity. The software iTree Eco is then applied to quantify the environmental benefits provided by the street trees. I will attempt to examine if the street tree dynamics between 2015 and 2025 influenced the delivery of ecosystem services within the Duncan-Lawrence- Allan neighbourhood. The results will reveal the significance of street trees in a local neighbourhood and create a baseline understanding of how these dynamics evolve over a short-time period.

Graduate Student / Undergraduate Student

Undergraduate

Assessing Vulnerability of Salt Marshes to Coastal Squeeze and Simultaneous Relative Sea Level Rise, via GIS-Based Case Study of West Chezzetcook, Nova Scotia

Kate Sparling[1]

[1]Dalhousie University

Coastal salt marshes are highly productive ecosystems that provide critical services, including carbon storage, nutrient cycling, shoreline stabilization, and wildlife habitat. In Nova Scotia, these marshes are central to coastal resilience but face increasing threats from relative sea-level rise (RSLR) and coastal squeeze, where human infrastructure restricts natural landward migration. Despite extensive research on sea-level rise impacts, there remains a lack of spatially explicit, locally grounded analyses that integrate inundation exposure with migration constraints to inform adaptation planning.

This research develops a geospatial framework to evaluate salt marsh vulnerability under projected RSLR, using the greater West Chezzetcook area of Halifax Regional Municipality as a pilot study site. High-resolution digital elevation models, land-cover data, and infrastructure mapping are integrated with worst-case flooding projections for 2050 and 2100 to identify areas of potential inundation and constrained migration. Spatial intersection techniques are used to delineate zones where marshes are simultaneously exposed to rising water and restricted from inland transgression.

Preliminary results indicate that marsh surfaces experiencing water-level increases of 0.65 m or more are at high risk of drowning, often converting to mudflats or open water. Spatial analysis also identifies areas where existing infrastructure coincides with potential migration pathways, illustrating how barrier presence influences the distribution of projected coastal squeeze. These findings provide spatially explicit vulnerability mapping and demonstrate a scalable methodology for broader coastal assessment and planning.

Graduate Student / Undergraduate Student

Undergraduate

Methodology development for microplastic extraction from bees

Amanda Tracy[1]

[1]Acadia University

Since large-scale manufacturing of plastics began in the 1950s, millions of metric tonnes of plastic waste have been mishandled and released to the environment, producing small microplastics (particle <5 mm) that have made their way through a variety of environmental matrices. Animals, such as insects, are likely to encounter and ingest these particles, and this contamination can have negative physiological consequences. However, our understanding of the degree to which insects encounter and accumulate microplastics in the wild is limited and requires quantification in different species across different environments. Further, the complex nature of microplastics has resulted in many different extraction techniques depending on accessibility and substrate type. To produce the widespread data needed to find patterns in plastic contamination in insects, we thus need standardized methods of collecting, extracting, and quantifying plastics. Extraction methods involving the application of hydrogen peroxide and chitinase are promising due to their ability to degrade organic matter without interacting with potential microplastic particles. In this study, I explored the efficacy of chitin degradation paired with hydrogen peroxide by spiking wild-caught bees with known amounts of plastic and examining the degree of digestion of the sample and recovery of microplastics. Overall, this study will provide insight into efficient methods for plastic extraction from bees, allowing future studies to explore contamination in these important pollinators.

Graduate Student / Undergraduate Student

Undergraduate

Investigating the relationship between litter and environmental factors in a northern port city

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Litter can have a detrimental impact on our planetary and human health; however, aspects related to sources, quantities, and chemical compositions are poorly understood. Municipal understandings of how mismanaged waste can leak into the environment from managed waste streams is especially important in port cities like Halifax. Weekly surveys were conducted at six sites on the Halifax Peninsula from June to November 2025. Using a citizen science mobile application, Marine Debris Tracker, litter items were collected and attributes like GPS coordinates, time of collection, quantity, litter category, and material type were recorded. We assessed if environmental variables such as pedestrian activity, weather, infrastructure, and day of week were assessed for associative relationships to within and between sites. Of the 11,288 items collected, 67% were primarily made of plastic. The most abundant litter categories were tobacco products (50%), and food-related paper or wood products (21%). Generalized additive modelling (GAM) indicated pedestrians per day had a strong associative relationship with litter densities. Certain sites have been identified having opportunities of improvement following recommendations informed by the study. By furthering our understanding of litter pathways and sinks, we will be better equipped to produce effective future prevention and mitigation strategies.

Graduate Student / Undergraduate Student

Undergraduate

Epibiont and Endobiont Communities of Freshwater Mussels: Implications for Translocation Planning

Joseph Villo[1]

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Translocation, the deliberate movement of organisms from a source population to augment declining populations or establish new ones in suitable habitat, is considered a conservation tool when natural recovery is unlikely for at-risk species. In Nova Scotia, the Yellow Lampmussel (Lampsilis cariosa) persists in only three lakes and is provincially listed as Threatened and federally as Special Concern under the Species at Risk Act. In Blacketts Lake, recruitment has ceased following the illegal introduction of Chain Pickerel (Esox niger), which eliminated the mussel's required fish host, White Perch (Morone americana), through predation. Although aging adult Yellow Lampmussels, which can live approximately 25 years, persist in the lake, local extirpation is expected within a decade, prompting consideration of translocation as a recovery action. However, translocation may unintentionally transfer associated organisms, including parasites, pathogens, commensals, and symbionts, potentially altering disease dynamics and ecosystem function at recipient sites. This study documents epibiont and endobiont communities associated with Yellow Lampmussel and co-occurring Eastern Elliptio (Elliptio complanata) and compares sampling approaches to inform pre-translocation risk assessment. We sampled mussels from Blacketts Lake and two additional lakes in separate watersheds. Yellow Lampmussel were sampled non-lethally, whereas Eastern Elliptio were also sampled lethally to assess tissue communities. Samples were examined microscopically, photographed, assigned voucher IDs, categorized into morphotypes, and analyzed using metabarcoding. By documenting associated organism communities and evaluating sampling methods, this study contributes to the development of evidence-based protocols for assessing biological transfer risk prior to freshwater mussel translocation in Nova Scotia.

Graduate Student / Undergraduate Student

Undergraduate

The Effects of Ocean Alkalinity Enhancement on MSX Disease in PEI Oysters

Amelia Walker[1], Devon Lynn[2]

[1]Student, [2]Professor

Ocean acidification has been identified as a potential global threat to marine animals as a symptom of climate change. Invertebrates that use calcification to make shells such as oysters have been shown to be particularly sensitive to changes in water acidity. One proposed method for counteracting ocean acidification is Ocean Alkalinity Enhancement (OAE), which has been suggested to increase shellfish growth rates. Oyster populations on PEI are also currently facing population decline due to Haplosporidium nelsoni (the causative agent of MSX disease) infection. This study proposes to test methods of OAE on MSX-infected oysters to analyse the interaction between disease progression and ocean pH. We will do so by using laboratory mesocosms, live testing of oyster filtration rates, and post-mortem cellular parasite identification. Oysters from regions of PEI with different MSX prevalence will be tested against controls to evaluate how increasingly infected oysters will be affected by OAE. The results of this study will give insights into MSX pathology as well as oyster response to OAE.

Graduate Student / Undergraduate Student

Undergraduate

The Impact of Macroalgal Richness on Biodiversity: an Artificial Reef Study

Mandarin Alexis Walker[1]

[1]UPEI

As an ecosystem engineer, macroalgae is often associated with increased biodiversity. This study aims to test the effect of macroalgae diversity on the local community structure and associated species' biodiversity in Brackley Bay, Prince Edward Island. An artificial reef was created using concrete blocks placed in the shallow subtidal seabed. The artificial reef contained four levels of algal diversity to evaluate the effects on biodiversity. To examine the influence of the number of marine algae present in a module over the associated species biodiversity, a bi-weekly monitoring was conducted during the summer months of 2024 and 2025. This monitoring used Baited Remote Underwater Video capture (BRUV) to record epifaunal species, sediment core sampling to analyse sedimentary animals, and also assessed macroalgal growth by measuring biomass.

Based on research that was previously conducted, the expectations were as followed: 1) A diverse assemblage of macroalgae will result in a more diverse ecosystem by providing additional physical structure and food availability for herbivore species, which is expected to cascade and benefit other trophic levels, improving the overall richness of epifaunal and pelagic animals. 2) There may be a positive correlation between seaweed diversity, abundance, and richness that is driven by complementarity between each macroalgal species. 3) Both infaunal and epifaunal organisms should make evident a possible link between macroalgae and animal biodiversity.

Graduate Student / Undergraduate Student

Undergraduate

Factors Influencing Earthworm Distribution in Finland

Daniel Wilson[1], Erin Cameron[1]

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Earthworms are globally known as ecosystem engineers that can transform soil structure, nutrient cycling, and organic matter dynamics. Earthworm communities are shaped by a combination of soil properties, climate, land use history, species traits, and human-induced dispersal. Their distributions, specifically in northern post-glacial landscapes, depend entirely on recolonization and anthropogenic influences. The aim of this Honours project is to analyze the key factors influencing earthworm distributions across Finland and to further the understanding of how environmental factors and anthropogenic activities impact the spread of earthworms beyond their native ranges. Based on existing research, I expected that soil pH, precipitation, temperature, distance to the nearest road, population density, and land cover would impact earthworm distributions in northern regions. Data for the project was collected across Finland by researchers from the University of Helsinki in 2015, and through a citizen science initiative called Matoseuranta from 2017-2021. Using generalized linear models (GLMs), the two datasets were analyzed independently to examine effects of different combinations of the aforementioned factors on earthworm presence and abundance. None of the factors in either presence model were significant and only mean annual temperature was significant in the abundance models, with abundance decreasing as temperature decreased. Earthworm presence may be driven in part by rare long distance introduction events that were not represented by the variables we tested. Furthermore, the importance of temperature as a predictor of earthworm abundance suggests that climate warming may be associated with increases in earthworm abundance in this region in the future.

Graduate Student / Undergraduate Student

Undergraduate