

WDCAG 2025 Tkemlúps te Secwépemc (Kamloops)

66th Annual Meeting Western Division of the Canadian Association of Geographers

Thompson Rivers University Kamloops, British Columbia

March 6 - 8, 2025



https://www.wdcag2025.org





"Second Red Bridge, looking east" (Kamloops Museum & Archives #7324, used with permission.)

Bridging

The theme for this year's conference is "bridging." In September 2024 the historic red bridge that crosses the South Thompson River connecting Tkemlúps te Secwépemc and the City of Kamloops burned down, impacting businesses, commuters and people wanting to walk, bike, or drive the short distance from downtown Kamloops to the Mt. Paul business park on the other side of the river.

The impact of the loss of the bridge provided the conference theme with the organising committee seeing the reverberations of this loss in many different geographical forms. Not only are the immediate transportation issues evident, but it also illustrated more philosophical avenues of thought: How does geographical research bridge between people and ideas? Where do we need more bridging in real-life geographic problems? How do we envision bridging communities? How are geographers bridging the physical and human divides and why is this important?

The papers, poster, workshops, fieldtrips and panel discussions show a breadth of reflection on the conference theme and highlight how important the bridges in our lives impact our research, communities and environments.

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Land Acknowledgement

Thompson Rivers University acknowledges the Tk'emlúps te Secwépemc (Kamloops campus) and the T'exelc (Williams Lake campus) within Secwépemc'ulucw, reside on the traditional and unceded territory of the Secwépemc. TRU also acknowledges the territories of the St'át'imc, Nlaka'pamux, Tŝilhqot'in, Nuxalk, and Dakelh Peoples, on whose traditional territories we are privileged to live, work, and play. Through our work we are committed to incorporate Indigenous epistemologies, pedagogies and ontologies into our actions and understandings, supporting decolonization, reconciliation, and Indigenization.



Dean of the Faculty of Arts' Welcome

Welcome, Way', Weytkp

It is my pleasure to welcome all delegates to the 2025 Annual Conference of the Western Division of the Canadian Association of Geographers here at Thompson Rivers University (TRU) in Kamloops.

The Geography and Environmental Studies program at TRU has a long history of involvement with WDCAG Conferences, hosting the conference last in 2015 – exactly 10 years ago. The theme from that conference, 'Contested Economies and Environments', still resonates today and clearly links to this year's conference theme of 'bridging' where the organising committee have suggested that we look to how we can bridge and overcome contestations and recognise new ways of seeing, researching and understanding the social and environmental world around us.

As a researcher who focuses on communication and public understanding, I see conferences such as WDCAG as an important part of scholarly community building. Events like this bring together faculty, scholars and students in a collaborative, welcoming environment in which to share and learn more about the things that matter most to us. With this in mind, it is clear that geography's role in providing spaces of engagement to advance knowledge across the sciences, social sciences and arts remains critical and I am a strong advocate of deepening our connections between the Faculty of Arts here at TRU and our wider scholarly and local communities.

On behalf of the Faculty of Arts, and the wider university, I thank everyone for joining us and wish you all a wonderful conference. Enjoy the fieldtrips, workshops and panel sessions. Ask questions of those who have provided posters. Have fun at the various social activities and more importantly, meet new people, make new connections and enjoy our campus and our city.



Mark Wallin, PhD Dean, Faculty of Arts

Photo Credit: TRU

We gratefully acknowledge the following sponsors for their generous support of this conference:





Schedule of Events: Thursday

Room

16:00 -	Registration check-in and a mingling event	AE 362
22:00		

Schedule of Events: Friday

		Room
Various Times	Filed Trips – see pages 10 and 11	
08:00	Registration Desk Opens	AE 151
16:30	Pizza and Mingling Event	OM 3732
	Sponsored by TRU Enviro Collab	
17:30	Keynote Address	OM 3732



Schedule of Events: Saturday

begins:	ends:		
8:00		Registration desk opens	OM 3772
9:00	10:30	Concurrent Oral Presentations: Session 1 1A – Special Session: Bridging the Gap Between Biology and Geography Through Student Research. Chair: Tara Duncan	OM 3612
		 1B – Wildfire and Climate. Chair: Gillian Krezoski 1C – Workshop: Bridges to Your Career: Creating a Successful Transition from University to Career. 	OM 3632 OM 3732
10:30	11:00	Coffee and Poster Session 1 Sponsored by the TRU Faculty of Science and Enviro Collab.	Atrium (3 rd Floor OM)
11:00	12:15	Concurrent Oral Presentations: Session 2 2A – Special Session: Coloniality and the Decolonial Promise of Radical Relationality. Chair: Corrie Shoemaker	OM 3612
		2B – Water and Ice. Chair: Darryl Carlyle-Moses 2C – Urban Planning and Revitalization. Chair: Daniel Brendle-Moczuk	OM 3632 OM 3782
12:15	13:30	Lunch Executive Meeting	Atrium (3 rd Floor OM) OM 3772
13:30	14:45	Concurrent Oral Presentations: Session 3 3A – Geographic Pedagogy and Ways of Knowing. Chair: Robin Westland	OM 3612
		 3B – Biophysical Environments. Chair: Zubair Raja 3C – Bridging, Boosting and Impacts: Land and the Law. Chair: Corrie Shoemaker 	OM 3632 OM 3782
14:45	15:15	Coffee and Poster session II Sponsored by the Office of the Vice-President Research, TRU	Atrium (3 rd Floor OM)
15:15 16:30	16:15 17:30	WDCAG AGM Keynote Address	OM 3612 OM 3732
18:30		Dinner	Nandi's Kitchen and Bar*

*Nandi's Kitchen and Bar – 340 Victoria Street #102. Located on the north side of Victoria St mid-way between Third Ave and 4th Ave, downtown Kamloops.

Friday Field Trips

1. Mines, Mountains, Water and Wine: Bridging Bedrock with Beings

-- Dr. Nancy Van Wagoner (nvanwagoner@tru.ca)

Start: 830 am, Meet at the Science Building S233 to pick up PPE and safety briefing Finish: 430 pm, Science Building S233 to drop off PPE

Cost: \$55, plus wine tastings (optional) \$5.00 paid at the Monte Creek Winery. There will be a lunch stop and opportunity to buy food along the way, or bring your own lunch and WATER Note: Field trip stops may be adjusted depending on the weather, time and interest of the participants.

Maximum number of participants: 24 Register on the CAG website.

This full day field trip takes participants on a tour of the Paleozoic to Recent geology and geomorphology of parts of south-central BC, and its relationship to natural resources, natural hazards, agriculture, manufacturing, commerce and business. Stops include Kamloops Lake with evidence for glaciation, and mass wasting, Steelhead Provincial Park to view the margin of the Deadman Creek delta/alluvial fan system, and then through Cache Creek and Ashcroft, to the manufactured landscapes of Canada's largest open pit mine, the High Valley Copper mine and tailings facility. We stop for lunch nearby at Logan Lake, referred to as an "Instant Town", and then back track to Kamloops. As time allows, we will take short walks to a landslide scarp near Home Depot and a water storage facility. The journey continues with a drive through the glacial and fluvial modified landscapes of the South Thompson River valley, admiring older geologic terranes and Eocene volcanics that enabled the LaFarge Cement plant. The final stop is the Monte Creek Winery for a tour of their sustainable agriculture practices and wine tasting (optional for a reduced fee of \$5) while pondering those aspects of the geological heritage that made it possible.

2. Snowshoeing -- Dr. Gilles Viaud (weather dependant) (gviaud14@gmail.com).
 Start: 9am, AE 151
 Finish: 1 pm, AE 151
 Cost: Free, involves carpooling. Maximum number of participants: 4-10
 Register on the CAG website.

To Lodgepole Lake: about 25 minutes by car (toward Lac Le Jeune). We will snowshoe about 5-6 km. This trip involves carpooling – Gilles can take 4 passengers. Please email Gilles at the address above if you can provide transportation. Lunch at a pub when we return to town.

3. Campus tour -- Tom Waldichuk (twaldichuk@tru.ca)

Start: 9am, Arts and Education (AE) Room 151 (Geography Lab)
Finish: 12 noon, AE 151.
Cost: free. Maximum number of participants: 20
Register on the CAG website.
i. AE building, solar compass
ii. Horticultural gardens
iii. Trades buildings
iv. outside HL190, TRUFA House to Open Learning Building
v. Culinary Arts, Meat Store
vi. Clock Tower, Guerin Creek
vii. Old Main back to AE 151

4. Sinkholes and Silt Bluffs: The suburban legacy of deglacial beachfront properties in

Kamloops – Associate Prof. Crystal Huscroft (<u>chuscroft@tru.ca</u>) Start: 1 pm, AE 151 Finish: 4 pm, AE 151 We will travel by bus from the TRU campus to Juniper Ridge, a residential area on the east side of Kamloops. Two stops require walking up either a steep silt gully or along and a rocky river shore. Hiking boots (recommended) or shoes with good tread required. Cost: \$15 Maximum number of participants: 23 Register on the CAG website.

5. Walk from TRU campus to Chinese cemetery, Nicola Wagon Road, to old

courthouse downtown -- Tom Waldichuk (twaldichuk@tru.ca)

Start: 130pm, AE 151.
Finish: 430pm, AE151.
Cost: \$6, Maximum number of participants: 20
Register on the CAG website.

i. TRU campus to Upper College Heights
ii. Powers Additions
iii. Chinese cemetery
iv. Nicola Wagon Road to downtown
vi. old courthouse to St. Andrews on the Square
vii. Catholic Cathedral, Royal Inland Hospital, bus back to TRU campus
(N.B., although this walk is largely downhill, it is approximately 4 km long. Registration includes a free bus pass.)

Friday, March 15 Keynote Speaker: 17:30 – 18:30 OM 3732

Dinyar Minocher, Director, TRU Wildfire (Research, Innovation, Education)

Beyond Destruction: Discussing The Ecological Roles of Fire

Fire is often seen as either entirely devastating (wildfire) or as the silver bullet that will save us from ourselves (prescribed fire). In reality, as with most things, the truth lies somewhere in between. Dinyar Minocher will explore the ecological role of fire, highlighting its complex and essential functions in natural landscapes and when its application can be beneficial. The talk will also introduce the emerging TRU Wildfire Initiative at Thompson Rivers University, in partnership with BC Wildfire Service, emphasizing collaborative efforts to advance fire preparedness, response, and recovery in a changing world.



Dinyar began his career as a biologist before transitioning to wildfire, serving on Alberta's Rapattack crew and later as a fire management officer with Parks Canada. In recent years, he was one of the founders and led the development of Canada's first Prescribed Fire Exchange, fostering collaboration in fire stewardship among peripheral communities within the wildfire space, including land managers, communities, and conservation groups. Now, as Director of TRU Wildfire: Research, Innovation, and Education, he works to integrate research, education, and practice, building capacity for collaborative and inclusive wildfire management in British Columbia and beyond.

Saturday, March 16 Keynote Speaker: 16:30 – 17:30 OM 3732

Dr. Roland Neave

Wonders of Wells Gray Park: A Journey through the Clearwater Valley



Roland Neave

Roland and Anne Neave

Roland's parents introduced him at an early age to the pleasures of mountain climbing and these experiences often appeared in high school essays. His first book, *Hiking the High Points*, was published at age 17. Roland began working on a book about Wells Gray Park which was first published in 1974 and the 7th edition in 2023. His summers during university were devoted to organizing bus tours of Wells Gray Park and, after graduation, he expanded this service into a year-round business called Wells Gray Tours. Roland's company is now British Columbia's largest outbound tour operator and arranges group holidays to all seven continents. Roland and his wife Anne were thrilled to receive honorary doctorates from Thompson Rivers University in 2022 in recognition of their work in Wells Gray Park.

Workshop Saturday 9:15 – 10:45 am, OM 3732

Bridges to Your Career: Creating a Successful Transition from University to Career.

TRU Career Services and Robin Westland (support); Katelin Pietrusinski, Sarah Gibson

This workshop, Career Planning and Education-leveraging for Geography Students, is designed to help geography students transform their academic knowledge and skills learned in the classroom into resume-worthy skill highlights and career opportunities. The session will explore career pathways in fields such as environmental consulting, urban and environmental planning, GIS analysis, policy and planning and sustainable development, focusing on supporting students in identifying their own career paths and how to leverage their academic knowledge to get them there. This workshop assumes that students will go into the workforce with a BA first – and empowers students to recognize the value of their BAs in Geography outside of academia.

Concurrent Session 1:

1A Special Session: Bridging the Gap Between Biology and Geography Through Student Research. Session Chair: Tara Duncan

OM 3612

- 1. O'Neil, Hannah. The Geographies of the Nature-Culture Interface: A Holistic Evaluation of Kamloops Gardens. Page 16
- 2. Fernandez Ayala, Hazel. Cultural Roots and Botanical Diversity: Exploring the Origins and Richness of Plants in Mexico's House Gardens. Page 17
- 3. Jones, Maggie. Is iNat All That: Ground Truthing Community Science Plant Observations with Standard SamplingTechniques. Page 18
- 4. Widyaratne, Thamindu. A Comparison of GPS and Accelerometer Data in the Tracking of Animal Activity. Page 19
- 5. Mapili, Mariano, Imneet Brar, Amir Saleh Zahedi. Bridging student engagement, municipal by-laws, and provincial agencies in the GIS modeling of blueberry farm risk to predation by European starlings (Sturnus vulgaris). Page 20

1B Wildfire and Climate. Session Chair: Gillian Krezoski

OM 3632

- 1. Asadolah, Saba, Peter L. Jackson. Assessing Climate-Driven Variability in Fire Activity and Emissions in Canadian Boreal Wildfire Regimes (2003–2023). Page 21
- 2. Gattafoni, Apryl N. Warm & Dry: An Analysis of the Influence of Drought on Fire Size in Southern British Columbia. Page 22
- 3. Kleiner, Makenna L. Will variations in burn severity affect model boreal bird species following the 2023 paskwa fire, a meta-analysis approach. Page 23
- Krizan, Natalie M., Laura Chasmer, Chris Hopkinson & Raphaël Chavardès. Soil Burn Severity of the 2022 Chetamon Fire in Jasper National Park: Comparing Multispectral Imagery Burn Severity Indices to Depth of Burn Measurements from Lidar Data. Page 24
- Samoil, Michael S., Phil Owens, Faran Ali, and Brendan Miller. Assessing Post-Wildfire Hillslope Runoff and Erosion in the Nechako Watershed, BC, using a Rainfall Simulator. Page 25

1C Workshop: Bridges to Your Career: Creating a Successful Transition from University to Career.

OM 3732 – Page 14

1A Special Session: Bridging the Gap Between Biology and Geography Through Student Research

The Geographies of the Nature-Culture Interface: A Holistic Evaluation of Kamloops Gardens O'Neil, Hannah¹

¹Thompson Rivers University

In urban landscapes, gardens are sites of complex co-creation by plants and gardeners. A garden's botanical composition is influenced by its physical, climatic, and geographic characteristics, as well as the opinions and attitudes of its gardener. This research investigates the complex social, cultural, and ecological realities present in Kamloops' urban gardens. Through plant sampling and on-site interviews, a cross section of Kamloops' gardens were assessed for their biodiversity and to understand the nature of the relationship between garden and gardener(s). Overall, 757 species were found in the 12 gardens studied. No correlation was found between species richness and Shannon Entropy with lot size or elevation. The failure of quantitative factors to fully explain urban gardens reinforces the need to explore gardens using other methods. Each of the gardeners interviewed donated a plant specimen. To explore the individual story of each garden and gardener, art pieces were created. Gardener interview quotes and plant history were layered over botanical illustrations, and juxtaposed with herbarium specimens. Each art piece is intended to be a self-aware representation of the plant it depicts, conscious of the fact that it does not speak for an entire species, or depict the entire story of a single plant. Plant sampling, herbarium specimens and labelling, and botanical illustration are tools of colonialism. This research explores what can be learned by applying postcolonial thought to colonial practices. This combination of quantitative and qualitative research with artistic approaches provides a rich data set to investigate urban gardeners and their gardens.

Cultural Roots and Botanical Diversity: Exploring the Origins and Richness of Plants in Mexico's House Gardens

Fernandez Ayala, Hazel¹ ¹Thompson Rivers University

Biodiversity in domestic gardens plays a crucial role in managing ecosystems by supporting pollinators and preserving native species. In Mexico's domestic gardens, biodiversity patterns are influenced by the size of the garden, cultural traditions, ecological factors, and historical processes, particularly colonialism. This study aims to investigate species richness across domestic gardens of different sizes in Mexico, as well as address the effects of colonialism by focusing on the balance between native and introduced plants within the floristic realms. Field surveys were conducted across three different cities in Mexico, and species richness was analyzed using statistical methods. Results showed a weak relationship between garden size and species richness; however, they also indicate significant variation of species among floral realms, which also varied between locations, and with introduced species dominating the gardens. These findings highlight the ongoing impact of colonialism on Mexican garden biodiversity and opens the discussion for potential strategies to preserve native species in gardens. This study contributes to the understanding of the ecological and cultural dynamics that shape urban biodiversity in human-dominated landscapes.

Is iNat All That: Ground Truthing Community Science Plant Observations with Standard Sampling Techniques

Jones, Maggie¹

¹ Thompson Rivers University

In the era of rapid climatic change, monitoring biodiversity is essential to understanding how species are adapting to new conditions. Species may need to undergo range shifts latitudinally or elevationally to continue to survive. However, governments and NGOs often have limited time and money, making it difficult to track changes in biodiversity. iNaturalist is an online community science program that organizations increasingly use to crowdsource biodiversity estimates without the expense of field crews. Few doubt that iNaturalist observations are biased but the nature of iNaturalist's biases as a sampling technique is less understood. To date, evaluations of iNaturalist efficacy have focused on the accuracy of individual observations or have compared iNaturalist datasets to those of herbarium specimens rather than to estimates of diversity obtained with traditional ecological sampling techniques. Certainly, as iNaturalist collects presence-only rather than absence or abundance data, it may be less sensitive to changes than traditional sampling techniques. Although iNaturalist can collect data across large areas or in high densities, it is unclear if some taxa (i.e., small or nondescript species) are systematically under sampled. The interior of British Columbia is experiencing worsening effects of climate change, including increased fire risk and variability in precipitation. The dry forests and grasslands around Kamloops provide a unique opportunity to compare the efficacy of iNaturalist observations with traditional sampling methods in assessing plant species diversity and abundance in and around a moderately dense city. Assessing the diversity of these communities is relevant to understanding changes in the ecosystem functions and services they provide.

A Comparison of GPS and Accelerometer Data in the Tracking of Animal Activity

Widyaratne, Thamindu¹ ¹Thompson Rivers University

Animal activity patterns are a useful measure for conservationists when monitoring the health and behaviour of a population. Changes in activity patterns reflect the status and recovery of endangered populations, including their response to human management, invasive species, and land-use practices. Traditionally, researchers have used geospatial analysis to track animal movement and activity. To do so, GPS collars are used to document the location of an animal at set intervals, with activity patterns extrapolated from observable changes in the animal's movement. Since GPS data only documents the spatial position of animals, it may be missing stationary actions such as feeding and nesting in its calculation of activity. This research project explores the effectiveness and validity of using geospatial analysis for tracking animal activity.

To test the validity of geospatial analysis as a measure of animal activity, I have compared it to data collected using accelerometers, devices that record all movements of the animals they are attached to. This was done by assessing the correlation between concurrently gathered GPS and accelerometer data from a variety of datasets covering a diverse array of species. I have also analyzed how activity profiles change over daily and seasonal intervals, and how this variation affects the accuracy of geospatial analysis. The results of my research can be used to determine when geospatial analysis is appropriate for tracking animal activity, and when more direct methods such as accelerometry may be preferred.

Bridging student engagement, municipal by-laws, and provincial agencies in the GIS modeling of blueberry farm risk to predation by European starlings (Sturnus vulgaris)

Mapili, Mariano¹, Imneet Brar¹, Amir Saleh Zahedi¹ ¹University of the Fraser Valley

Berry farms in the Fraser Valley of British Columbia face significant economic losses due to predation by European starlings (Sturnus vulgaris). To deter this invasive species, farmers continue to use propane cannons, which result in noise complaints from residents to municipal by-law enforcers. In response, the Blueberry Council of BC funded a University of the Fraser Valley (UFV) project to explore alternative solutions. The study's results were utilized by several sections of students in BIO/GEOG 357 – Conservation GIS, culminating in a final GIS exercise. This presentation reports on the analysis of five years of student modeling work.

Each student's methodology involved a systematic workflow beginning with the collection of spatial data from the BC Agricultural Land Use Inventory (ALUI), mapping the locations of noise complaints from the City of Abbotsford's by-law office, and incorporating the results of a previous field study. The study found that different types of land use and land cover of parcels adjacent to blueberry fields result in varying levels of predation risk. Students were tasked with applying their knowledge and experience to assess the attractiveness of various land uses and covers to starlings.

This research underscores the importance of bridging gaps among stakeholders, the value of GIS as a modeling tool for engaged students, the use of existing BC ALUI data, actual city by-law data, and results from previous field studies. The student models provide valuable insights that can be used by various stakeholders to develop more focused solutions to the noise problem.

1B Wildfire and Climate

Assessing Climate-Driven Variability in Fire Activity and Emissions in Canadian Boreal Wildfire Regimes (2003–2023)

Asadolah, Saba¹, Peter L. Jackson¹

¹ University of Northern British Columbia Faculty of Environment, Natural Resources and Environmental Studies

Wildfire activity in the Canadian Boreal Forest is altering carbon dynamics, shifting the region from a carbon sink to a carbon source. Climate variables drive this shift, influencing fire frequency, intensity, and emissions. This study examines wildfire patterns and their climatic drivers from 2003 to 2023, using fire emissions data from the Global Fire Emissions Database (GFED) and burned area estimates from MODIS (Moderate Resolution Imaging Spectroradiometer) and VIIRS (Visible Infrared Imaging Radiometer Suite). These datasets support an analysis of seasonal and geographic wildfire hotspots, quantification of fire-climate relationships, and evaluation of lagged climatic conditions, including winter snowpack, spring soil moisture deficits, and drought.

Extreme fire years, such as 2023, are analyzed to examine deviations from historical patterns and assess links to climatic events, including heatwaves and precipitation anomalies. The study also investigates potential geographic shifts in wildfire-prone regions, including the possible northward migration of fire activity. By integrating wildfire and climate datasets, this research identifies key environmental drivers influencing seasonal and interannual fire activity and examines how lagged climatic conditions contribute to fire severity and timing.

Predictive modeling using Random Forest regression quantifies relationships between wildfire activity, burned area, fire intensity, and CO₂ emissions with climatic factors. This approach supports efforts to further predict future wildfire behavior and assess the carbon balance of the boreal forest under changing climatic conditions. These findings will contribute to wildfire risk assessment, carbon budget evaluations, and future scenario projections, providing a foundation for improved wildfire modeling, adaptation strategies, and climate mitigation planning.

Warm & Dry: An Analysis of the Influence of Drought on Fire Size in Southern British Columbia

Gattafoni, Apryl N.¹, ¹University of Lethbridge

Climate change has a major influence on the increased fire activity in North America. Current climate has led to warmer, longer wildfire seasons, earlier snowmelt, and lower precipitation in some areas (Westerling et al., 2006). Climate change may also be increasing the occurrence of drought conditions (Naumann et al., 2018). An increase in the proportion of drought conditions in Canada has a myriad of potential implications, including negative effects on forest ecosystems. How are warmer air temperatures and drought conditions impacting the fire regime in western Canada? In this study, we determined if there was a connection between the severity of drought as defined by the Canadian Drought Monitor and the size of fires (ha), per year for an area of southern British Columbia.

Data were consolidated for the years 2014 to 2023 inclusive, to form a 10-year dataset of fire and drought relationships. Three statistical tests were run on the sets of data. The Kolmogorov-Smirnov test of normality, the KW test for independent measures, and then, classes were compared individually for consistency using the Mann-Whitney U Test. For the 10-year set, we observed significant differences for the combination of "No Drought" to all classes except "Exceptional Drought". This indicates that fire size in hectares is significantly smaller for areas of no drought than it is for the other classes. Additionally, all classes with a characteristic of drought conditions have mean values greater than 200ha, while areas with no drought see a mean size of <200ha. This illustrates that under conditions of drought, fires may be more likely to be "large area fires".

This research bridges the understanding between the consequences of climate change that citizens of British Columbia are already noticing and applying them to the very real threat of wildland fire encroaching into human infrastructure.

References:

Naumann, G., Alfieri, L., Wyser, K., Mentaschi, L., Betts, R. A., Carrao, H., Spinoni, J., Vogt, J., & Feyen, L. (2018). Global changes in drought conditions under different levels of warming. Geophysical Research Letters, 45(7), 3285-3296. https://doi.org/10.1002/2017GL076521

Westerling, A. L., Hidalgo, H. G., Cayan, D. R., & Swetnam, T. W. (2006). Warming and earlier spring increase western U.S. forest wildfire activity. Science (American Association for the Advancement of Science), 313(5789), 940-943. https://doi.org/10.1126/science.1128834

Keywords: Drought, Wildland Fire

Will variations in burn severity affect model boreal bird species following the 2023 paskwa fire, a meta-analysis approach

Kleiner, Makenna L.¹ ¹University of Lethbridge

Wildfire burn severity is increasing in intensity across the boreal region, accompanied by a noticeable shortening in fire return intervals, likely attributed to anthropogenic climate change. These shifts pose significant threats to biodiversity, where ecological impacts on a species-specific scale are poorly understood. This study aims to assess the impacts of altered fire regimes on boreal bird populations following the 2023 Paskwa fire, in northern Alberta using a meta-analysis approach. An extensive literature review was conducted to compile species-specific habitat preferences and fire-response behaviours for the Black-backed Woodpecker, a fire specialist, and three New World Warblers; the Cape-May Warbler, Canada Warbler and the Myrtle Warbler, all having diverse old-growth successional ecological needs. Using the results from the meta-analyses, along with site specific variables such as NDVI and dNBR, derived from Landsat 9, a matrix table was developed to predict possible speciesspecific post- fire responses across varying burn severity categories within the study area. The metaanalysis predicted that Black-backed Woodpeckers would experience the greatest increase in habitat suitability compared to pre-fire conditions. In contrast, all three New World Warbler species were predicted to experience substantial decreases in habitat suitability compared to pre-fire conditions. Among the warblers, the Cape May Warbler is projected to have experienced the most significant decline in habitat suitability, with potential extirpation from the area due to post-fire conditions. These predictions, based on previously developed habitat preferences, behaviour and fire responses highlight the critical need for focused research on species-specific management to develop hypotheses on how fire regime changes are leading to possible negative implications on avian biodiversity in the boreal region. These insights are critical when designing adaptive management strategies, that not only aim to maintain habitat heterogeneity across the landscape to support the diverse biota within the boreal biome but incorporate anthropogenic industry and demand within this region.

Soil Burn Severity of the 2022 Chetamon Fire in Jasper National Park: Comparing Multispectral Imagery Burn Severity Indices to Depth of Burn Measurements from Lidar Data

Krizan, Natalie M.¹, Laura Chasmer¹, Chris Hopkinson¹ & Raphaël Chavardès¹ ¹University of Lethbridge

The 2022 Chetamon Fire in Jasper National Park, Alberta, Canada was one of the most severe fires in the park over the last century. Many North American montane forests have been significantly altered by decades of anthropogenic fire suppression and exclusion. This has caused vegetation (fuel) to accumulate, which likely corresponds to increased burn severity.

Burn severity is defined as soil and vegetation biomass loss due to combustion. Accurately assessing burn severity at multiple forest strata (e.g., ground, subcanopy, and canopy), is important for understanding and predicting potential impacts. For example, high soil burn severity (SBS) damages seed banks, alters local hydrology, and releases carbon to the atmosphere.

Many burn severity indices derived from multispectral imagery effectively detect ecosystem change. However, these optical indices have limitations as uncertainty exists around exactly which ecosystem features are being detected. To overcome these limitations, a structural approach (lidar) might be suitable.

For this project, pre- and post-fire lidar data of the Chetamon Fire area was used to quantify depth of burn, and results were compared to the commonly used multispectral index, the differenced Normalized Burn Ratio (dNBR). The driving questions were:

1) How does a structural assessment of depth of burn compare to multispectral remote sensing indices of burn severity?

a) Does the measured depth of burn vary significantly across dNBR burn severity classes?

2) How does burn severity correspond to influential pre-fire environmental variables?

This project relates to the theme of bridging in multiple ways. Past fire management policies are bridged with their future consequences. As well, remote sensing techniques are bridged to investigate the suitability of different approaches for detecting change in forest ecosystems.

Keywords: Burn Severity, Depth of Burn, Chetamon Fire, Remote Sensing, Lidar, dNBR

Assessing Post-Wildfire Hillslope Runoff and Erosion in the Nechako Watershed, BC, using a Rainfall Simulator

Samoil, Michael S.¹, Phil Owens¹, Faran Ali¹, and Brendan Miller²

1 University of Northern British Columbia, ²BC Ministry of Forests

2

With wildfire seasons becoming increasingly severe in recent years across British Columbia, the amount of disturbed soil that is prone to runoff and erosional processes is also increasing. Being able to understand how these processes are occurring and how they are impacting the local hydrological system are important requirements for protecting water resources and aquatic habitats. While the initial impacts of a wildfire are obvious, a need to understand the secondary impacts is also required to help with mitigating long term impacts and to increase the recovery of the local system. The field work was completed one year after a 2023 wildfire in central BC. This research looked into how runoff and soil erosion on hillslopes varied between different soil burn severities and steepness of slopes by using a field-portable rainfall simulator. The collected erosion samples were then analyzed to determine particle size composition, organic matter content, and geochemical (e.g., metals) content. This will create an understanding of how much runoff and erosion occurs after a fire and what material is eroded from the surface as a result. With this information, a hazard map will be produced to highlight where potential issues may occur due to runoff and erosion near riparian areas and infrastructure such as roads. Preliminary results suggests that there is an increase in both runoff and erosion with increasing soil burn severity and slope steepness. The final results of this work will contribute to better understanding some of the secondary impacts and provide support for local communities to better assess and recover from wildfires.

Keywords: Wildfire, erosion, rainfall simulator, hazard mapping

Concurrent Session 2:

2A Special Session: Coloniality and the Decolonial Promise of Radical Relationality. Session Chair: Corrie Shoemaker

OM 3612

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2B Water and Ice. Session Chair: Darryl Carlyle-Moses

OM 3632

- 1. Friesen, Corbin R, Philip Bonnaventure. An examination of the spatial distribution of rock glaciers in Jasper National Park Alberta. Page 28
- 2. Parmar, Kainen. Hydrometeorological Analysis of Stream Temperature Mediation Within Gravel Beds in the Quesnel River Watershed. Page 29
- 3. Marnik, Emma R. Geospatial Investigations of Groundwater Geochemistry and Monitoring Network Coverage in the Yukon Territory, Canada. Page 30
- 4. MacLean, Sophie, Philip Bonnaventure, Nick Noad. Creating a Hybrid Permafrost Model: Whati NT. Page 31

2C Urban Planning and Revitalization. Session Chair: Daniel Brendle-Moczuk

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2A Special Session: Coloniality and the Decolonial Promise of Radical Relationality

Coloniality and the Decolonial Promise of Radical Relationality

Mónica Sanchez-Flores¹, Neha Singh¹, Laura Viventi¹, Jospeh Kruger¹ ¹Thompson Rivers University

We explore how coloniality informs and forms relations of power in various areas. Four presenters will address: How paintings of women in the nineteenth century represent either colonial nationalist superiority, power, and imperial destiny, or orientalist hyper-sexualization, thrills, danger, and racialized landscapes; with terra nullius at the core of colonial imagination (Viventi). How anti-vaxxer sentiment has become entangled with the political ideology of the transnational far right and hijacked emancipatory narratives, preventing access to vaccines for the most vulnerable members of populations and aggravating wicked problems such as global pandemics (Kruger). How colonial, capitalist and extractive ideologies embed themselves in our minds, souls, and bodies that relationality with the land and through food and community can bridge and heal (Singh). How racialization of human bodies entails processes of power in late global capitalism tied to national histories, and the power of vulnerability and mindfulness for racial healing (Sánchez-Flores). The decolonial promise of radical relationality is a bridge to awareness of deep entanglement with each other and with nature.

2B Water and Ice

An examination of the spatial distribution of rock glaciers in Jasper National Park Alberta

Friesen, Corbin R¹, Philip Bonnaventure¹ ¹University of Lethbridge

Rock glaciers are relatively common geomorphic features commonly found in cold alpine environments, such as the Canadian Rockies. To date, minimal research has been undertaken to document their status or their contributions toward local hydrological systems.

Many large alpine regions, including the Rockies, do not have a rock glacier catalogue, so their true influence on local environments remains a mystery. This study bridges this lack of knowledge by providing the first comprehensive inventory of rock glacier counts, locations, and elevation attributes within Jasper National Park. It demonstrates that Jasper National Park is plentiful with rock glaciers, suggesting that their combined effect on the Athabasca River is more substantial than was previously thought.

The exterior of rock glaciers acts as a shield against climatic changes, preserving their ice for much longer than exposed glaciers. As exposed glaciers continue to recede in a warming climate, other hydrological drivers will need to be studied to reliably predict future output of Northern rivers. Given the potential impact of rock glaciers on local hydrology, it is important that their effect on the Athabasca River system is determined. Northern communities, farmland, and ecosystems reliant on consistent hydrological output from these river systems will be affected from these predicted changes in the system.

Without efforts like this study, future work in this field would not be able to be performed, and the change in the Athabasca River output could remain unknown until its output is under supplying the demand. Keywords: Rock Glacier, Jasper, Hydrology

Hydrometeorological Analysis of Stream Temperature Mediation Within Gravel Beds in the Quesnel River Watershed

Parmar, Kainen¹ ¹University of Northern British Columbia

The Quesnel River Watershed in British Columbia supports several Pacific salmon species, including Chinook, Coho, and Sockeye, which are ecologically, culturally, and economically important. However, salmon populations are declining due to multiple stressors, including rising stream temperatures and changing hydrological patterns. This study examines the relationship between stream and gravel bed temperatures, focusing on how they are influenced by air temperature, discharge, and diurnal patterns. Field data collected by the Northern Hydrometeorology Group (NHG) in 2024, with my assistance as an undergraduate field technician, along with streamflow data from the Water Survey of Canada, are used to analyze temperature dynamics in the Horsefly River, McKinley Creek, and Quesnel River. By bridging hydrometeorological processes with aquatic ecosystem health, this research provides insights into how climate change impacts salmon habitat within the watershed.

Keywords: Quesnel River Watershed; stream temperature; gravel beds; salmon habitat; hydrometeorology; climate change.

Geospatial Investigations of Groundwater Geochemistry and Monitoring Network Coverage in the Yukon Territory, Canada.

Marnik, Emma R¹ ¹ Univeristy of Lethbridge Subtitle : Well well, what do we have (or not) here?

GIS is an important tool for environmental monitoring and management. Groundwater is a major source of water in north-western Canada, and a large concern in environmental assessments; making knowledge of background and baseline groundwater quality crucial. Conventional assessment of groundwater resources is costly, logistically complex, and time consuming. The use of GIS for environmental monitoring of groundwater resources can help prioritize network efficiency and the knowledge of a region's groundwater resources.

In Canada's Yukon, the Yukon Government's department of Environment's Water Resources Branch has operated an observational well network since 2001, the Yukon Observational Well Network (YOWN). This study assessed the application of GIS analysis on YOWN to predict and describe groundwater. Assessment of the YOWN groundwater monitoring program was designed to a) determine how groundwater geochemistry can be predicted in regions of suitable data density, and b) identify regions of sparse groundwater monitoring well density to improve the overall network's coverage.

Two regions of high well density were selected to assess geochemistry predictions using interpolation methods. Interpolations yielded varied results, based on location and form applied. The overall network was examined for coverage gaps and suggestions made for wells to adopt and prioritized locations to assess for installation. The network coverage analysis resulted in three expansion forms, adoptions, primary installation, and secondary installation.

GIS is not commonly the method of groundwater assessment. Bridging the uncommon pairing of Groundwater and GIS analysis provides important insight to the current network, and what will be needed to reach future network goals. The use of GIS optimizes time and resources for network expansion and design by informing on groundwater quality in areas of interest and connecting the current to the future of the monitoring network.

Creating a Hybrid Permafrost Model: Whati NT

MacLean, Sophie¹, Philip Bonnaventure¹, Nick Noad¹ ¹University of Lethbridge

Arctic amplification is causing the Arctic to warm significantly faster than the rest of the globe. This impacts many aspects of the northern ecosystem, especially permafrost. Accurate estimation of permafrost distribution has proven to be difficult due to the complex interactions between air and ground thermal regimes and the surrounding vegetation and topography. Large scale maps presenting permafrost extent have been produced within Canada, but these maps often do not accurately estimate permafrost distribution at local scales, especially in discontinuous permafrost zones. As Northern communities continue to expand, the need for more accurate local permafrost distribution maps is becoming more important. By connecting with Northern communities and sharing the results of permafrost research, communities are better able to implement strategic planning for future growth. Permafrost research provides a bridge between local peoples and land underlain by permafrost, benefiting both communities. This in turn leads to a better understanding of changes occurring within the North to more completely understand what the future holds. This research centers in on Whati, NT building off two studies previously completed in the community. The first produced a model using a binary logistic regression while the second produced at temperature at the top of permafrost (TTOP) model surface. This study aims to combine the two prior studies by producing a predictive model using a binary logistic regression that is calibrated with cryotic assessment sites. This allows the model to consider thermal variables within the ecosystem that can then be adjusted for future climate warming regimes. This will give the people better insight into the future changes that can be expected within their community.

Keywords: Permafrost, permafrost Modelling, Binary logistic regression

2C Urban Planning and Revitalization

Shaping Tomorrow's Cities: The Sustainable Potential of Micromobility

Mundangepfupfu, Rufaro N. A.¹ ¹ Thompson Rivers University

This presentation examines the potential of micromobility to transform urban environments, with a specific focus on Canadian university towns like Kamloops, Abbotsford and Prince George, BC. By exploring these towns, which are microcosms of larger urban systems, this research provides insights that can inform sustainable city planning on a broader scale. The study employs a mixed-method approach, incorporating surveys, expert interviews, focus groups, and case analyses. Data was collected from residents, students, and stakeholders to understand public perceptions, attitudes, and behaviors related to micromobility. The aim is to identify key drivers and barriers to micromobility adoption and explore how these insights can integrate micromobility into smart city frameworks.

Survey results from these mid-sized cities indicate a growing public interest in reducing private car usage, with a significant majority expressing a desire to increase their use of bicycles and other micromobility options. The findings highlight several factors driving this shift, including cost savings, convenience, environmental concerns, and the appeal of more active travel options. However, safety concerns, lack of dedicated infrastructure, and insufficient integration with existing public transit systems were also identified as barriers needing to be addressed.

The research demonstrates that when integrated into a broader smart city plan, micromobility can play a pivotal role in reducing emissions, improving urban mobility, and contributing to the United Nations Sustainable Development Goals (UNSDGs) related to climate action, sustainable cities, transportation, and health. Attendees will gain a comprehensive understanding of factors influencing micromobility adoption and practical insights into how municipalities can support the growth of these solutions through targeted policies and infrastructure development. By highlighting the transformative potential of micromobility, this presentation aims to inspire urban planners, policymakers, and community leaders to consider these solutions as part of efforts to build greener, more connected, and resilient cities.

Strategies to include Atlantic Rainforest into urban planning in Joinville – Brazil

Warming, Flaiva¹ ¹University of Northern British Columbia

Due to human development, the Brazilian Atlantic rainforest lost around 75% of its original coverage, mainly on the east coast. To address this problem and implement forest recovery, the Brazilian federal government made a federal law indicating that all municipalities in the Atlantic rainforest biome must include forest fragments in their urban planning and appoint areas for conservation and forest connections. In this context, Joinville is a municipality in south Brazil in the Atlantic Rainforest Biome. The city has about 600.000 inhabitants, and around 60% of the territory is forested. However, the forest coverage represents a reasonable amount of the town faces forest fragmentation and biodiversity loss. Joinville implemented its Plan for Conservation and Forest Restoration through a two-year collaborative effort involving several government sectors: planning, housing, infrastructure, and environment. Firstly, we mapped all remaining forest coverage and overlapped it with information on restricted and conservation areas. Then, we held several workshops with the community to construct a thematic map indicating areas for preservation and conservation and the potential regions to connect the fragments. This plan includes short- and long-term actions to ensure municipal development and forest resilience and several thematic maps. This topic is relevant and enriching to the conference in two main points: first, to address the complexity of environmental and urban planning and second, to show the collaborative planning process in the Brazilian context; it may bring insights and constructive discussions towards environmental and urban planning in Canada.

Enhancing Financial Gains through Strategic Assets: Engaging Visible Minorities and First Nations in the Mission Waterfront Revitalization

Raja, Afia¹, Zubair, Ali ¹University of the Fraser Valley ² Thompson Rivers University

The University of the Fraser Valley (UFV) and the City of Mission partnered to engage Visible Minority and First Nations groups, explicitly seeking their input on the municipality's plans to revitalize the waterfront. This collaboration plays a key role in introducing the team to new stakeholders involved in Waterfront Development, as well as the surrounding economic sectors relevant to the project. By exploring strategies to optimize financial returns from valuable waterfront land, the researchers analyzed the multifaceted considerations that highlight modern-day development projects. Information was collected by conducting workshops, surveys and interviews with visible minority and First Nation groups to explicitly inquire about their views on the City's plan for revitalization of the waterfront. Moreover, through examining best practices in waterfront development, deepening their understanding of key subjects, and identifying site-specific challenges and opportunities, the researchers crafted actionable recommendations and implementation plans. The final summary and recommendations include uncovered insightful pieces of information which aims to guide the City of Mission toward actualizing a sustainable and inclusive vision for its waterfront revitalization.

Concurrent Session 3:

3A Geographic Pedagogy and Ways of Knowing. Session Chair: Robin Westland

OM 3612

- 1. Striegler Klassen, Siobhan. Using art to explore Indigenous and Western ways of understanding a landscape: Chilcotin case study. Page 36
- 2. Wysocki, Koral, Richmond, Chantelle, Lewis, William. Bridging Colonial Divides: Structural Pathways to Reconciliation as Pedagogy. Page 37
- 3. Waldichuk, Thomas, Madelene Kajusa. Engaging virtual field trips: The use of Google Earth in post-secondary regional geography courses. Page 38
- 4. Brendle-Moczuk, Daniel. To (formally) index Western Geography or not? That is the question. Page 39

3B Biophysical Environments. Session Chair: Darryl Carlyle-Moses

OM 3632

- 1. Ghafarian, Parvin, Peter, Jackson, Stephen J., Déry. Sensitivity Analysis of the Wind Field in the Quesnel Lake Basin Using the WRF Model to Boundary Layer and Surface Schemes. Page 40
- 2. Boyde, Nicole A. The Influence of Adaptive Silviculture in Shaping Understory Vegetation Communities. Page 41
- 3. Rankin, James R. Philip N. Owens, Faran Ali. Constructing a fine-grained sediment budget for a major salmon spawning river in the Quesnel watershed. Page 42
- 4. Mapili, Mariano, Jasleen Nijjar. Spatial distribution of fungi in alpine soils in the traditional territories of the Stó:lō peoples and Ts'elxwéyeqw Tribe through eDNA: Bridging Ecology, Indigenous Knowledge, and GIS. Page 43

3C Bridging, Boosting and Impacts: Land and the Law. Session Chair: Corrie Shoemaker

OM 3782

- 1. Coulthard, Clayton. Boosting Busy Beavers: Bolstering Beautiful British Columbia's Watersheds by Building Beaver Dam Analogues. Page 44
- 2. Dhunna, Ramneek K., Afia Raja. Socio-economic and Environmental Impacts From Secondary Suites on Agriculture Land Reserves in Abbotsford. Page 45
- 3. Bergmann, Luke R., David, O'Sullivan. Crafting projections to bridge between places and perspectives. Page 46
- 4. Kajusa, Madelene. The Regional Geography of South Sudan. Page 47

3A Geographic Pedagogy and Ways of Knowing

Using art to explore Indigenous and Western ways of understanding a landscape: Chilcotin case study

Striegler Klassen, Siobhan¹ ¹University of Northern British Columbia

Art provides a medium to make sense of our world. In this presentation, I discuss my use of visual art to integrate scientific and cultural perspectives on landscapes I studied on a physical geography field school in mountain regions throughout British Columbia and Alberta in May 2024. The field school culminated in a week spent at the Tatlayoko Lake Field Station in the Chilcotin, on the traditional territory of the Tŝilhqot'in people. During this week, we learned about Tŝilhqot'in culture, history, and practices, and about the physical processes that formed the landscape. Additionally, we learned about the formation of the Coast Mountains, which border the Chilcotin Plateau, as well as the geology of Anahim Peak, local hydrology, and the formation of Nagwentled (Farwell Canyon). Comparisons were drawn between the Tŝilhqot'in stories of landform formation and the western, physical geography story of landform formation. Inspired by the beauty of the place the Tŝilhqot'in people call home and their stories about how that place came to be, I chose to create an art piece for my final project for the field school. I wove together impressions I drew from the Tŝilhqot'in stories with my knowledge of landform and landscape formation through geologic time, and created a physical, multi-media art piece that represented my learning. The piece brings together mountains, families, geomorphic agents, legends, acrylic paint and vesicular basalt, and attempts to bridge a gap between cultural, spiritual knowledge and western, scientific ways of characterizing a landscape.

Key terms: Traditional ecological knowledge; geomorphology; landscape interpretation; arts-based knowledge dissemination
Bridging Colonial Divides: Structural Pathways to Reconciliation as Pedagogy

Wysocki, Koral¹, Richmond, Chantelle¹, Lewis, William¹ ¹Western University

Recent scholarship and institutional mandates call for reconciliation initiatives that go beyond symbolic gestures, urging universities to engage directly with Indigenous communities to address colonial structures. This presentation examines an Indigenous-led "Winter School" program hosted by local First Nations in Southern Ontario and an urban Friendship Centre, offering participants from a major Canadian university opportunities to learn from Indigenous peoples in Indigenous spaces. Drawing on doctoral research and qualitative interviews, I show how reconciliation as pedagogy can be achieved through intentional structural supports that bridge physical, epistemic, and relational divides. Central to this approach is learning in place—on reserves, in community centers, through ceremonies and storytelling—challenging settler norms that confine education to classrooms. In these land-based settings, power is reclaimed by Indigenous hosts who define the learning agenda. However, for these learning outcomes to remain viable, non-Indigenous allies must restructure their relationships with Indigenous peoples both within and beyond the university. Certain institutional structures more readily sustain these outcomes: committed leadership, formalized partnerships recognizing Indigenous sovereignty, and sufficient financial and administrative resources for community-led protocols. Furthermore, the labor of Indigenous staff "bridging" multiple worlds must be acknowledged, compensated, and protected to avoid reproducing colonial burdens. By focusing on these structural pillars, the Winter Schools demonstrate how environments are shaped by relational structures. This lens offers a powerful approach to advancing reconciliation, reconfiguring knowledge production, centering Indigenous voices, and fostering transformative relationships. It also informs broader efforts to decolonize higher education and reshape institutional settings through reconciliation as pedagogy.

Engaging virtual field trips: The use of Google Earth in post-secondary regional geography courses

Waldichuk, Thomas¹, Madelene Kajusa¹ ¹Thompson Rivers University

Fostering student engagement is important in teaching (e.g., Gibbes and Skop, 2022; Kinzie et al., 2008; Kuh, 2008; Monti et al., 2011). Group work, for example, can increase engagement in learning (Kuh, 2008). Related to engagement, geovisuals such as Google Earth and Esri's Arc GIS Story Maps have been used to create interactive virtual field trips. McDaniel's (2022) research demonstrates that using online Google Earth "projects" (tours) as a major term assignment engages students' learning about countries, regions, and places. In our study we also inquired about using Google Earth in a major assignment and its effects on engagement.

In the fall of 2024, we distributed paper and online questionnaires to students in a third-year regional geography of Japan class and a second-year regional geography of British Columbia and Yukon course. The first questionnaire asked students about their previous experiences using Google Earth or Google maps and whether Google Earth tutoring in the course increased their confidence in using the software. The second questionnaire focused on students' experiences using Google Earth in the two courses, e.g., whether it affected their engagement in learning. The preliminary results are that approximately half the students were both very engaged due to using Google Earth and, similar to McDaniel (2022), liked the online Google Earth project as an alternative to a term essay. Moreover, almost two thirds of students responded that working with another person increased their engagement. Finally, several students mentioned that they needed more or better instruction on how to use Google Earth in the assignment. The principal conclusion is that when Google Earth is incorporated into a major class assignment with adequate instruction engagement increases.

To (formally) index Western Geography or not? That is the question.

Brendle-Moczuk, Daniel¹ ¹University of Victoria

Researchers and writers have many more choices of where to publish in the 2020s than in 1990 when Western Geography, the academic refereed journal of the WDCAG, began. Some Researchers and authors commented to this presenter, the managing Editor of Western Geography, that they would like to publish in Western Geography because of its specific focus but alas, Western Geography is not indexed, that is, its volumes and contents are not in any commercial publisher literature database (or indexing database).

While some web crawlers have crawled and indexed some articles from Western Geography, none of the articles listed in Google Scholar are from the Western Geography site hosted at UVic Department of Geography. WDCAG Executive, Western Geography Editorial Board and WDCAG members need to think about whether Western Geography should be indexed by a journal literature indexing database service such as the Directory of Open Access Journals or commercial services such as Gale Canadian Periodical Index-CPI or ProQuest Canadian Business Current Affairs-CBCA.

Come and join the discussion whether Western Geography should be formally indexed and where. Western Geography is your/our journal.

Sensitivity Analysis of the Wind Field in the Quesnel Lake Basin Using the WRF Model to Boundary Layer and Surface Schemes

Ghafarian, Parvin¹, Peter, Jackson¹, Stephen J. , Déry¹ ¹UNBC

In this study, the Weather Research and Forecasting (WRF) model version 4.5.1 was employed to simulate the surface wind field over Quesnel Lake, a region characterized by steep slopes, with some areas exceeding an 80-degree incline. The simulation utilized two boundary layer schemes, MYJ and YSU, with four nested domains and resolutions of 9 km, 3 km, 1 km, and 333 m. The simulation spanned 14 days, from 1 to 14 November 2018, with a 15-minute time step.

Data from seven meteorological stations in the Quesnel Lake basin—Browntop Mountain, Dock Point, Goose Point, Long Creek, Plato Point, Quesnel River Research Centre, and Spanish Mountain—were used for evaluation. Wind speed was adjusted to a height of 10 m considering roughness length, with geographic data from United States Geological Survey (USGS), Moderate Resolution Imaging Spectroradiometer (MODIS), and the Shuttle Radar Topography Mission (SRTM). Statistical parameters BIAS, Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and Standard Deviation (STDE) were used for comparison. Results indicated that, for most stations, the model overestimated wind speed for both boundary layer schemes. Goose Point and Plato Point showed the least bias. Performance varied, with the YSU scheme performing better at some stations and the MYJ scheme excelling at others. Overall, the MYJ scheme demonstrated superior performance in simulating wind speed in the study area.

The Influence of Adaptive Silviculture in Shaping Understory Vegetation Communities

Boyde, Nicole A.¹ ¹University of Northern British Columbia

Climate Change is impacting forest ecosystems. Understory vegetation, which is sensitive to disturbance, can be used to predict transformations in ecosystem functions caused by climate change. Understanding plant variability and its responses to climate change can be used in mitigation efforts for forest management practices. Understory vegetation can act as a bridge between local land management for adaptive silviculture and future climate change impacts on forest ecosystems, connecting present and future ecological conditions and demonstrating the influence of harvesting.

An Adaptive Silviculture for Climate Change (ASCC) Trials were established at the John Prince Research Forest to evaluate how silviculture can be used to potentially mitigate the negative impacts of climate change on forest ecosystems. The ASCC Trials provide an alternative harvesting method of adaptive silviculture to sustain diversity and ecosystem functions to ensure that forests remain resilient as they adapt to a shifting climate. Understory vegetation structure was sampled following harvest in five treatment types in the ASCC Trials. The five treatments work along a gradient of different levels of retention, including the Control Treatment, Resilience Treatment, Resistance Treatment, Transition Treatment and Clear-cut Treatment. This retention gradient of harvesting allows an evaluation of how varying levels of logging influence understory vegetation dynamics, emphasizing the role of silviculture in managing forest ecosystems under climate change. There was little difference in overall species richness and diversity, but there were significant changes to percent cover and composition. These results demonstrate that adaptive silviculture will result in shifts in vegetation communities in boreal forest ecosystems, which needs to be considered in ecosystem services for forest resilience to climate change.

Key words: Understory vegetation; Harvesting; Climate Change; Forest ecology; Adaptive Silviculture

Constructing a fine-grained sediment budget for a major salmon spawning river in the Quesnel watershed

Rankin, James R.¹ Philip N. Owens¹, Faran Ali¹ ¹University of Northern British Columbia

The Horsefly River, located in the Cariboo region of British Columbia, is a major tributary of the Quesnel River watershed and provides critical spawning habitat to three populations of anadromous salmon of the Fraser River. Within the watershed, biophysical processes and anthropogenic land uses at the landscape level have created conditions where sediment erosion and deposition have degraded critical spawning reaches of the Horsefly River. Within the research undertaken, sediments have been collected, processed, and analyzed to establish a sediment budget in an effort to understand the inputs and fluxes of fine-grained sediment movement throughout the system. Automatic water and sediment samplers were installed at several existing discharge monitoring stations operated by Water Survey of Canada. The water samples were used to determine suspended sediment concentration, which, when paired with the discharge data, enabled us to estimate suspended sediment loads. In addition, time-integrated samplers were used to collect bulk samples which were analyzed for particle size composition, and the concentrations of nutrients and metals to estimate the flux of fine-grained sediment and associated chemicals, and their delivery to downstream spawning habitat, including the watershed outlet to Quesnel Lake, an important salmon nursery lake. Other components of the sediment budget (e.g., floodplain sedimentation, channel bank erosion and channel bed storage) were also evaluated. This research bridges knowledge gaps between biophysical processes at the landscape level and ecosystem services and functions, including productive fisheries and healthy watershed features.

Keywords: Fine sediments, sediment erosion, sediment budget

Spatial distribution of fungi in alpine soils in the traditional territories of the Stó:lō peoples and Ts'elxwéyeqw Tribe through eDNA: Bridging Ecology, Indigenous Knowledge, and GIS

Mapili, Mariano¹, Jasleen Nijjar¹ ¹University of the Fraser Valley

Initiated in 2021, this ongoing study investigates the distribution and viability of soil fungi in the alpine zones of British Columbia's Fraser Valley. Soil samples have been collected alongside corresponding environmental data. Environmental DNA (eDNA) analysis has been conducted to classify the fungi present at the phylum, class, order, family, genus, and species levels. Current efforts focus on culturing fungi to assess their viability, alongside the construction of a phylogenetic tree and heatmap to visualize fungal distribution and relationships. We hypothesize that environmental factors such as elevation, aspect, moisture, temperature, and surface vegetation will significantly influence the composition and survival of fungi in alpine soils.

This research integrates scientific analysis with Indigenous knowledge, recognizing the ecological and cultural significance of fungi in traditional land-use practices. By collaborating with Indigenous communities, this study fosters the co-production of knowledge, bridging Western science with traditional ecological understanding. Aligned with the WDCAG 2025 theme of Bridging, this project demonstrates the intersection of GIS, scientific analysis, and Indigenous perspectives. Our findings contribute to ecological conservation, land management strategies, and Indigenous-led environmental initiatives. This presentation will discuss our methodologies, preliminary results, and the broader implications of bridging scientific and Indigenous knowledge systems in environmental research.

3C Bridging, Boosting and Impacts: Land and the Law

Boosting Busy Beavers: Bolstering Beautiful British Columbia's Watersheds by Building Beaver Dam Analogues

Coulthard, Clayton¹

¹Department of Geography & Environment, University of Lethbridge

Beaver Dam Analogues (BDAs)—human-made structures designed to mimic natural beaver dams—offer a costeffective solution for restoring and enhancing watersheds. Beavers are vital ecosystem engineers, constructing dams that enhance water retention, restore wetlands, and support biodiversity. However, historical overhunting and habitat loss have significantly reduced their populations, limiting their ecological impact. BDAs provide an alternative means of reintroducing beaver-modified hydrology to areas where beaver populations are sparse or absent. Effective implementation of BDAs requires precise site selection and hydrological assessment to optimize their ecological benefits.

This project, conducted in collaboration with the British Columbia Wildlife Federation, employed advanced geospatial analysis to support BDA site selection and hydrological modeling. Aerial LiDAR data and photogrammetryderived structure-from-motion point clouds were used to generate digital elevation models for simulating water inundation at potential BDA sites. Hydrological modeling techniques—including relative elevation modeling and flow accumulation analysis—assessed water flow direction and floodplain dynamics. Python scripting and GIS tools facilitated automated segmentation of inundation zones, ensuring precise hydrological impact predictions. These data products were instrumental in securing regulatory approvals and guiding conservation planning. Analysis results indicate that BDAs significantly increase water retention without exceeding flood risk thresholds. Modeled inundation zones provide essential insights for land managers, supporting adaptive wetland restoration strategies. More broadly, these findings contribute to scalable, evidence-based watershed restoration, reinforcing the role of BDAs in climate resilience and habitat conservation.

This work aligns with the conference theme of "Bridging" by integrating geospatial analysis with ecological restoration, conservation practice, and policy. The methodologies developed contribute to scalable, data-driven wetland restoration, reinforcing the role of collaborative conservation in addressing environmental challenges.

Socio-economic and Environmental Impacts From Secondary Suites on Agriculture Land Reserves in Abbotsford

Dhunna, Ramneek K.¹, Afia Raja¹ ¹University of the Fraser Valley

Farmlands in agriculture are strongly connected to livelihoods and the natural environment in Abbotsford. However, population growth has increased the development of more urbanized areas, including secondary suites on agricultural land. Therefore, the Agriculture Land Reserve (ALR) was established to protect farmland for farming purposes only. Decisions made by the Agriculture Land Commission (ALC) for changes in ALR lands are based on how the change will help to sustain the long-term development of agriculture, not for landowner benefits. The ALC is a provincial agency that protects agricultural land and restricts any changes to ALRs, protecting from land speculation and urban sprawl. However, land speculation is a challenge ALRs face, and therefore, the ALR regulation is arguably described by many researchers as contentious. ALRs bring more than just crop production; they provide wildlife habitat, flood control, water recycling, and agri-tourism opportunities while supporting local food security, green spaces, and cultural values.

This study evaluates and addresses the socio-economic and environmental effects that secondary suites cause in Abbotsford using ArcMap analysis and literature review. The results showcased secondary suites significantly impacting sensitive ecosystems, addressing the need to create flood mitigation programs and urban development such as transit systems and fire services to sustain the growing population in Abbotsford. The results highlight the need for future planning initiatives in Abbotsford through recommendations of strengthening ALR policies and implementing measures to secure ALR lands from non-farm uses to ensure the protection of farms in Abbotsford.

Crafting projections to bridge between places and perspectives

Bergmann, Luke R.¹, David, O'Sullivan² ¹University of British Columbia, ² University of Auckland

Geographical discourse involving space is rich and varied. Yet the range of spatial concepts and language employed by geographers remains substantially broader than what has been commonly represented formally within computation and maps. Here, we report on our efforts to bring various geographical spaces into conversation with one another digitally, drawing not only on paths mostly-not-taken from the early quantitative revolution of Tobler and Bunge, but also on notions more common to recent critical geography. We take our computational departure from the cartographic notion of the projection, in which two spaces are bridged. We have been developing generalized forms of projections. These 'discrete projections' can represent more traditional projections, from the Mercator to the Spilhaus. But they can equally provide the basis to engage other spaces, such as those of imagination or those where distances are measured in other units, including travel time and cost. We sketch some technical challenges and opportunities of such work in progress, but also hope to offer intuition into what is thereby made possible, including by providing examples of application **The Regional Geography of South Sudan** Kajusa, Madelene¹ ¹Thompson Rivers University

The Regional Geography of South Sudan was part of my directed studies research at TRU (Thompson Rivers University) in Kamloops BC, Canada. Directed studies at TRU allow students to undertake a specific topic with a supervisor. My supervisor was Professor Dr. Tom Waldichuk. As a future educator with South Sudanese origins, I want to be a role model and leader for my community and all people. This directed studies research explores the emergence of South Sudan as a distinct space through the organizing concepts of regional geography, human geography, cultural geography, feminist geography, the sociological perspective, and cross-cultural interaction. There is a huge population of South Sudanese people in Canada in larger cities like Vancouver, Calgary, and Edmonton. However, South Sudanese people are not always portrayed in a positive light. This research helps people to have a better understanding of the South Sudanese people, our history, geography, intergenerational trauma, first-generation struggles etc. By using the United Nations' Sustainable Development Goals as the framework for this research, I was able to look at global issues universally from watersheds, poverty, and gender inequalities etc. This works helps people to have a better view of South Sudan and Africa and not a negative view and stereotypical view. When we teach students about Africa it can change their perspective of the world around them. This can bridge the gaps and create social change to show we are more globally connected than we think we are. South Sudan is the youngest country in the world and got its independence in 2011. If Canada is a multicultural society then we need to encourage South Sudanese history and teachings within our Canadian school system education. I proud of this work and hope it can help bridges the gaps and helps us look at South Sudan from a new perspective to create changes and make this world a better place for everyone.



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Poster Session II (Afternoon) Pages 79 - 108

Posters Session I

Bridging the Gap: Prioritizing the Safety of Children in the Built Environment

Andreschefski, Deanna¹ ¹University of Lethbridge

The Town of Cochrane, Alberta, has dedicated its last two decades of growth to a goal of widespread connectivity between communities. This priority has been made clear in recent years with the grand opening of the Jack Tennant Memorial Bridge in 2020, the ongoing expansion of a vast pathway network, and the completion of major upgrades along the Highway 1A corridor in 2024. However, the latest of these infrastructure projects has overlooked the safety of child pedestrians travelling between Downtown Cochrane and one of the town's central neighbourhoods, Cochrane Heights.

Cochrane Heights is the home to more than 700 residents, three public schools, a public arena, and a childcare centre. Less than half a kilometre uphill from Downtown, this is a lively neighbourhood year-round; summer camp children and students of all ages alike attend walking fieldtrips into the downtown core, and those in grade seven and up are permitted by their schools to walk down the hill to buy lunch from one of the many nearby businesses. Cochrane Heights was once regarded as one of the best neighbourhoods for its location and walkability, but the completion of the Highway 1A upgrade has unintentionally created a hostile environment to pedestrians.

What was once a two-lane road has double to four lanes, and five crosswalks reduced to two. In addition to the built environment frequently failing to include the needs of children, it is well documented that wider roads produce more reckless drivers and therefore a heightened risk of a catastrophic incident between a child and a vehicle. Maintaining a safe route for children between Cochrane Heights and Downtown should be prioritized and can be accomplished by installing a pedestrian bridge above Highway 1A. Such a project would prove the Town of Cochrane's commitment to bridging communitie

Glacial Footprints Preserved in Lichen: Reconstructing Late Holocene Glacial Activity in the Western Lillooet Icefield

Arich, Elizabeth L.¹, Ben Milligan¹, Madison Carlson¹, Jackson Jones¹, Gillian Krezoski ¹ ¹University of Victoria

Glacier retreat serves as a critical indicator of climate change, with significant impacts on ecosystems, freshwater resources, and sea levels. Given current warming trends in British Columbia and potential natural hazards associated with rapid glacier melt (e.g. glacial lake outbursts, etc.), it is imperative to understand the dynamics of glacial recession in the Coast Mountain Range. This study employs lichenometry and dendrochronology to reconstruct the late Holocene glacial retreat of an unnamed glacier, referred to as Assini Glacier, located in the western Lillooet Icefield of British Columbia, Canada. Using Rhizocarpon geographicum thalli measurements along terminal, lateral, and push moraines, combined with air photo analysis and tree-ring dating, we estimate the glacier's retreat chronology. The dynamic lichen growth curve of Mt. Edith Cavell (42 mm/century for the first 110 years, 11.2 mm/century thereafter) was chosen due to its similar elevation and aspect. Initial results from lichenometric dating indicated deglaciation dates of approximately 1750 AD for the terminal moraine and 1977 AD for the toe moraine, aligning with previous Little Ice Age maximum dates and historical air photos, respectively (Matthews & Briffa, 2005). Dendrochronological analysis supported these findings, indicating a deglaciation window between 1956 and 1989 for a lateral moraine proximal to the current glacier's position. Results suggest slow glacial retreat during the Little Ice Age, followed by a more rapid recession in the late 20th century. These findings contribute to understanding the response of coastal alpine glaciers to past and ongoing climate change.

Keywords: Glaciology, Lillooet Ice Field, Lichenometry, Glacial Recession, Dendrochronolog

Poster Station 2

Quantifying Burn Depth and Belowground Carbon Loss in Managed Peatlands: Insights for Future Climate Scenarios

Bakalarczyk, Amanda¹, Laura Chasmer¹, Chris Hopkinson¹, Sophie L. Wilkinson² ¹Department of Geography and Environment, University of Lethbridge, ²School of Resource and Environmental Management, Simon Fraser University

Wildfires are increasing in size and frequency across the boreal region, and are the most prevalent and significant disturbance affecting boreal peatlands. Peatlands cover approximately 25% of Canada's boreal landscape and play a critical role in terrestrial carbon storage and climate regulation. However, their resilience to fire is increasingly compromised, particularly in managed peatlands, where drainage and harvesting disrupt ecohydrological feedbacks. These disturbed systems serve as analogues for the potential future state of natural peatlands under climate-driven drought conditions. Despite their significance in the global carbon cycle, belowground carbon emissions from peat combustion and the factors controlling burn depth remain poorly understood. This study aims to (a) quantify carbon loss from belowground combustion in managed boreal peatlands, (b) analyse the variation in burn depth and carbon loss across different peatland types and management practices, and (c) identify the key environmental and biophysical drivers influencing burn severity. Field-based peat core measurements, combined with pre- and post-fire lidar data, are used to estimate burn depth and associated carbon loss in two managed peatlands in the boreal plains ecozone of Alberta. Statistical modelling identifies the dominant controls on belowground carbon loss across landcover types in the study area. It is hypothesized that burn depth and carbon loss are primarily controlled by peat properties, hydrological conditions, and vegetation structure, with deeper burning occurring in areas with lower moisture availability and higher fuel loads. Findings from this study enhance the understanding of peatland fire dynamics and contribute to improved carbon emissions modelling and fire management strategies.

Keywords: peatlands, wildfire, carbon loss

Quantifying Burn Depth and Belowground Carbon Loss in Managed Peatlands: Insights for Future Climate Scenarios

Bakalarczyk, Amanda¹, Chasmer, Laura¹, Hopkinson, Chris¹, Wilkinson, Sophie L.² ¹University of Lethbridge, ² Simon Fraser University

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Does the Cadejo Bark in Beacon Hill Park? The Role of Legends, Myths, and Folktales in Shaping the Latin American Diaspora's Cultural Identity and Sense of Belonging Barrios-Stewart, A-C¹, Rose-Redwood, CindyAnn¹

¹University of Victoria

This study examines the role that legends, myths, and folktales play in shaping Latin American diaspora communities' sense of cultural identity and belonging on the West Coast of British Columbia. These types of stories are place-based and shift throughout cultural contexts. This study considers what happens when the people who carry these stories move to a different cultural landscape, and how these stories continue through them. Several studies suggest that there is a common feeling of severance among members of the Latin American diaspora throughout Canada, including feelings of placelessness, yearning for community, and identity crisis. However, there is a lack of literature about sense of place and belonging for those in the Latin American community in BC. Using narrative research methods, this study draws upon in-person conversational interviews with members who identified as being part of the Latin American diaspora to their roots and to each other, and that these conversations have acted as a way of carving out a cultural space to share a sense of identity within the diaspora.

Hyperspectral Characterization of a Reclaimed Wellsite in Lethbridge, Alberta

Barthel, Bethany¹, Quinton Pierson¹, and Natalja Polzin¹ ¹University of Lethbridge

Multispectral satellite imagery is a crucial data source for monitoring site reclamation, such as that of abandoned wellsites. A key factor in the reclamation of these sites is vegetation recovery, which depends on the degree to which both native species and noxious weeds are established. To obtain this information from the mixed pixels derived from spaceborne sensors, Spectral Mixture Analysis must be conducted. This requires the comparison of mixed spectra against the spectral signatures of endmembers expected in the area, which are generally stored in a spectral library. However, spectral libraries for plant species in Southern Alberta are limited. This project created a spectral library of all endmembers present at a reclaimed native grassland wellsite in Lethbridge, Alberta to inform the spectral unmixing of satellite imagery for such sites. The spectra of native plant species, noxious weeds, and other land cover types such as soil and animal burrows were collected with a field spectroradiometer and a purposive sampling technique. Spectral responses were then converted from radiance to reflectance and displayed on scatterplots. This project was conducted as a work-integrated learning opportunity within a field remote sensing course, thereby bridging two gaps: that between classroom and applied learning and that between multispectral and hyperspectral data in the context of environmental reclamation.

Keywords: hyperspectral data, site reclamation, spectral library, field remote sensing, vegetation spectral signatures

Poster Station 6

Vegetation Dynamics in Icelandic Grazing Commons: Principal Component Analysis as a Method for Assessing Multitemporal NDVI Trends

Bell, Bronte¹, Boulanger-Lapointe, Noémie¹ ¹University of Victoria

Abstract: Icelandic grazing commons face considerable challenges from grazing pressures, soil erosion, and climate change, yet our understanding of vegetation dynamics in these areas remains incomplete. This study aims to address this gap by producing a classification map of greening, degrading, and stable areas within Icelandic grazing commons. Using MODIS NDVI data (250 m) from July and August between 2000 and 2025, we employed a Principal Component Analysis (PCA) to analyze multitemporal NDVI trends. The resulting principal components were used to classify environmental states, quantifying the proportion of greening, degrading, and stable pixels within each common, while highlighting areas with extreme trends. Our results reveal an overall degradation trend, with rapid deterioration occurring in northern mountainous regions. This contrasts other Arctic and sub-Arctic vegetation patterns, where climate change has led to an overall increase in vegetation. This deviation can be attributed to Iceland's unique history and environmental factors, including volcanic activity, long-term livestock grazing, and low-productive environments. These preconditioning factors influence ecosystem transitions and determines how ecosystems respond to management actions and disturbances. Despite restoration efforts, vegetation degradation remains a widespread issue and without informed decision making, current degradation trends could continue. This analysis successfully bridges the gap between remote sensing technology and land management by connecting vegetation dynamics with administrative grazing boundaries. By doing this, we were able to provide valuable insights to support land management and restoration efforts in Icelandic grazing commons.

Soil Organic Matter Variability Proximal to Sxótsaqel (Chilliwack Lake): A Result of Spatial, Elevation, and Forest Health Dissimilarities as an Indicator of Forest Health

Bergen, Matthew¹ Aysha McConkey¹, Mariano Mapili¹, Steven Marsh¹, Keri Ardell², Dr. Dave Schaepe³, Jillian Spies³, Raymond Kobes³, Dr. Stefania Pizzirani¹, Kevin Webber², Laurie Benton², Colin Green³, Karen Brady³, Lisa Davidson³

¹University of the Fraser Valley, ²Ts'elxwéyeqw Tribe Management Ltd., ³Stó:lō Research and Resource Management Centre, S'ólh Téméxw Stewardship Alliance

The organic matter (OM) content within soil horizons is one of the key properties vital towards soil development and sustainability. It has been attributed to enhanced soil structure, increased microbial activity, greater water infiltration, and other relationships with soil parameters. Forested environments in any stage of development harbour nonhomogeneous soils with OM levels that reflect their location, elevation, and age. Based on the combination of its prominence and variability, OM can be considered an indicative proxy for soil and broader environmental health. The vast forests surrounding the shores of Sxótsaqel (Chilliwack Lake) are not only spatially impressive, but also host varying elevations and are differentiated via anthropogenic logging. As such, they act to make regional OM content dynamic to a high degree. Soil collection and subsequent laboratory analysis at nine Sxótsaqel-proximal forest sites with contrasting location, elevation, and flora development characteristics in summer 2024 yielded OM values spanning a ~32% range. This value reflects the notion that soil composition varies around Sxótsaqel, promoting a need to study drivers of their health. The Indigenous significance of the lake as the Ts'elxwéyeqw Tribe's ancestorial home further adds importance to bridge the gap and inspire collaboration with Indigenous peoples. Together, efforts to understand soil health would act to preserve the environment and support a healthier ecological underpinning at Sxótsaqel and beyond.

WDCAG 2025 "Bridging" Statement: This research was conducted by researchers from the University of the Fraser Valley in collaboration with researchers from both the Stó:lō Research and Resource Management Centre and Ts'elxwéyeqw Tribe Management Ltd. Perhaps the most important aspect of this work relates to the building of a partnership between a western institution and local Indigenous organizations. This is a gap that is continuing to be bridged as a sign of ongoing reconciliation with Indigenous peoples. Together, we can accomplish more.

Keywords: Soil organic matter (OM), variability, forest health, Sxótsaqel, Indigenous collaboration

Poster Station 8

Housing Crisis in Victoria, and Bellingham: A Cross-Border Comparison

Colin, Yakira C.¹, Gabrielle, Emanuels¹ ¹Western Washington University

Our research addresses the problem of housing availability in Bellingham, Washington, and Victoria, British Columbia. The cities are both facing a housing crisis, with units becoming scarce and increasingly expensive. This paper analyzes the housing needs and approaches Bellingham and Victoria have used and will use in the future to attempt to address them. This research was done through comparative literature research between published works on housing information in Victoria and Bellingham. The research methodology is primarily from written sources by the cities of Victoria and Bellingham including city reports, research papers, and housing data. This research paper also addresses the legislative policies and housing initiatives for the cities to meet the housing demand. There are great similarities between the needs and strategies of both cities, with all reports stating low-income families and people of color are the most affected by the lack of available and affordable housing and newly constructed units should be prioritized in these areas. Parallels were found in the solutions that Bellingham and Victoria are employing to solve their housing crises. This research presents the housing crisis on both side of the border as an opportunity for them to work together and share strategies due to their similar struggles.

Keywords: Housing Availability, Borderlands, Housing Crisis

Pixels vs Pests: Spectrally Sensing the Spread of Invasive Species

Coulthard, Clayton¹, Jack Henderson¹, and Tanishq Khatri¹ ¹Department of Geography & Environment, University of Lethbridge

Invasive plant species pose significant threats to biodiversity by displacing native flora and altering ecosystems. This research investigates the potential of high spatial resolution (~10 cm) and high spectral resolution (1 nm) hyperspectral point-based data to distinguish invasive species from native vegetation in Lethbridge's Oldman River Valley. Traditional ground surveys for invasive species are time-intensive and susceptible to observer error; our study aims to address these limitations through remote sensing techniques.

Field data were collected using an ASD FieldSpec spectroradiometer, a field remote sensor, calibrated with a Spectralon white reference panel, to derive plant reflectance. Over 90 spectral samples were obtained from both invasive and native species. Data processing involved reflectance calibration, spectral mixture analysis, and statistical comparison of mean spectral signatures. Our results revealed key spectral reflectance differences in visible, near infrared, and shortwave infrared bands, particularly in chlorophyll absorption and water absorption regions, that enable reliable discrimination between species. The spectral library developed in this study provides a foundation for integrating aerial drone and satellite-based remote sensing for broader-scale invasive species monitoring.

This research demonstrates the feasibility of hyperspectral remote sensing for ecological conservation and invasive species management. By bridging field-based spectral analysis with airborne and satellite data, this study aligns with the conference theme of "Bridging", linking ground observations with large-scale environmental monitoring strategies. Additionally, this project fosters collaboration between students, researchers, municipal agencies, and environmental organizations—bridging academic research at the University of Lethbridge with conservation initiatives led by the City of Lethbridge Parks Department and the Helen Schuler Nature Centre. This interdisciplinary approach strengthens partnerships between institutions and communities. Future work will refine classification algorithms and expand spectral datasets for improved species differentiation.

Keywords: Remote Sensing, Spectral Analysis, Invasive Species Mapping, GIS, Conservation

Urbanization at the Rural-Urban Fringe: A Comparative Analysis of Lethbridge, Alberta, and Springfield, Missouri Through the Lens of Sustainable Development

Craven, Anna¹, Gavin, Reis¹ ¹Thompson Rivers University

As cities expand into surrounding agricultural and undeveloped lands, residential development at the rural-urban fringe presents significant challenges for sustainable growth. This study examines urbanization patterns in Lethbridge, Alberta, Canada, and Springfield, Missouri, USA, focusing on landuse change, economic shifts, and governance strategies that shape urban expansion. Guided by the principles of Sustainable Development Goal 11 (Sustainable Cities and Communities), the research utilizes Google Earth historical imagery, policy planning, and demographic data to assess both cities' efforts to provide accessible housing while promoting sustainable urban growth. Springfield has sought to preserve its vibrant green neighbourhoods, parks, and trails while managing urban expansion. To achieve this, the city has encouraged infill development and brownfield redevelopment, creating complete neighbourhoods near amenities and services while maintaining its natural character. In contrast, Lethbridge has faced farmland fragmentation as residential expansion converts agricultural land into mixed housing developments, necessitating policies that encourage greater housing density at the fringe. Results indicate that both cities face challenges in managing sustainable residential development at the rural-urban fringe, emphasizing the need for adaptive urban planning. The study concludes that integrating SDG 11's emphasis on inclusive, safe, resilient, and sustainable urbanization is essential for mitigating land-use conflicts and ensuring long-term environmental and economic resilience.

The Geography of Buddhism: Understanding the Global Spread of Buddhism Through Trade, War and Missionary

Craven, Anna¹, Jasper, Edge¹ ¹Thompson Rivers University

Buddhism is one of the world's major recognised religions, with over 487 million followers, comprising approximately seven percent of the global population. Originating in Bodh Gaya, a town in Northeastern India in the 6th century BCE, Buddhism was founded by Shakyamuni who was born into a royal family but at the age of 29 he left his life of privilege to seek enlightenment. After reaching Nirvana (enlightenment) in Bodh Gaya, he shared his knowledge and way of life for another four decades until his death. From its origins, Buddhism expanded along historic trade networks, most notably the Silk Road, facilitating its transmission through central Asia. In later centuries, migration played a key role in its spread to North America, first through Chinese immigrants during the mid-19th century Gold Rush, followed by Japanese immigrants who established temples and missionaries. In the modern era, Buddhism continues to expand, however through more intangible pathways. These include social and digital media, movements around mindfulness, as well as an increasing global interconnectedness through travel and tourism. The object of this research was to examine the global spread of Buddhism through trade, war and missionary routes. By examining these historical and contemporary processes, this research explores how Buddhism's diversity has been key to its sustained global presence. In order to do this we used academic literature, historical case studies and demographic data to analyse key mechanisms of Buddhist diffusion.

Key Words: Buddhism, Global diffusion, Trade networks, Missionary activity, Cultural adaptation

Exploring Biological Hotspots in a British Columbian Interior Salmon Nursery Lake

DaSilva, Kyle A. D.¹ Ellen Petticrew¹ Daniel Selbie¹ ¹University of Northern British Columbia

A local surplus of nutrients in freshwater ecosystems can create conditions that favour biological growth - these sites are known as "nutrient hotspots". A nutrient essential, and often limiting, to life in freshwater environments is phosphorus. Excess dissolved phosphorus is used by algae for growth, creating a surplus of primary producers. In turn this can support an abundance of secondary producers, for example, zooplankton which are a keystone species essential to food webs of aquatic ecosystems worldwide. They are important because they bridge the flow of nutrients from primary producers to higher trophic levels. A local abundance of primary and secondary producers can be described as a "biological hotspot". Quesnel Lake is a deep, oligotrophic interior British Colombian lake; it's Caribou Island sill is potentially a nutrient and biological hotspot due to its influence on physical mixing of Quesnel Lake's basins. This study will examine the variation in phosphorus, chlorophyll, and zooplankton population and diversity across various basins of Quesnel Lake and the Caribou Island sill to evaluate if the sill is a biological hotspot. Identifying and characterizing biological hotspots should aid in the conservation of at-risk species of salmon. This is part of a larger project evaluating climate change impacts on freshwater systems and their effects on salmon habitats; the project integrates physical, chemical, and biological sciences to aid in bridging gaps in maintaining salmon stocks for the people of BC.

Acknowledgements:

This project is a collaboration between the University of Northern British Colombia (1) and Fisheries and Oceans Canada (DFO) (2) and funded in part by the BCSRIF and Oceans Canada (DFO) (2) and funded in part by the BCSRIF.

Key words: Algae, Zooplankton, Phosphorus, Biological Hotspot, Salmon

Expansion on the Urban Fringe: Golf Courses in BC and WA

Fox, Jackson¹, Jack, Jorgenson¹ ¹Western Washington University

Comparison of the Tobiano Golf Course and the North Bellingham Golf Course was the main objective of this project. We sought to investigate the similarities and differences in urban expansion practices across the United States-Canada border, focused on Bellingham, Washington, and Kamloops, British Columbia. We chose these two golf courses because both exist within the same geographical region, while being divided by an international border. This study focuses on two main locations; one in Washington, and one in British Columbia, with implications reflecting the unique urban expansion and zoning strategies of the Washington Growth Management Act and the British Columbia Agricultural Land Reserve. The Tobiano Golf Course in BC is around 10 Km from the city limits of Kamloops. The North Bellingham Golf Course is just North of Bellingham, straddling the city's legal limits. Analysis for this study was conducted via a mixture of contacting city governments, county governments, companies, and landowners for data and information regarding the attempted annexation of the golf courses, as well as using peer-reviewed literature for the development and synthesis of our comparison. Due to the differences in approach to urban development between Washington State and British Columbia, both golf courses' annexation requests were overseen and executed differently by their respective governments. The Tobiano and North Bellingham golf courses present an uncommon example of comparable urban expansion on both sides of the international border with varied outcomes despite the similarities of how their state/province approaches urban expansion.

Women with Disabilities in Mexico: Education and Access to Rehabilitation

Gonzalez Flores, Diana¹, ¹Okanagan College

This GIS project seeks to address a critical gap in educational access for women with disabilities in Mexico. Through geospatial analysis and data visualization, the poster highlights women with disabilities and illiteracy and the current governmental rehabilitation centers. The map portrays three layers: 1) the population of women with disabilities, 2) illiteracy rates among women over 15 years of age, and 3) the locations of public rehabilitation centers.

In many regions of Mexico, women with disabilities face higher illiteracy rates and barriers to access to rehabilitation services, which leads to reduced chances of having educational success. This project identifies through multivariate mapping, patterns of inequality that often go unnoticed. By using ArcGIS, the poster illustrates how rehabilitation centers need to be distributed more efficiently to meet the needs of women with disabilities in Mexico. It also reveals where educational interventions and support are necessary to improve access to education. Ensuring that the right resources and people can assist this historically marginalized group.

In this way, the project embodies the WDCAG theme for this year's conference by "bridging" the gap between social welfare, education, and geography. It shows how GIS can be interconnected with education and social welfare, helping improve the quality of life for women with disabilities in Mexico. This research aims to commence a meaningful change, ensuring better educational and rehabilitation services are available for women in Mexico.

Keywords: Women with disabilities; Educational access; Geospatial Analysis; Rehabilitation services; Multivariate mapping

Poster Station 15

Recreational vs. Agricultural Focus: How Bend's Recreational Appeal is Driving Accelerated Urban Expansion, and a Less Sustainable Fringe Compared to Lethbridge's Rural Landscape Goodall, Emerson¹, Tyler, Houlb¹

¹Thompson Rivers University

The rural-urban fringe is a transitional zone between rural and urban areas, constantly expanding and ever-changing. The expansion of the rural-urban fringe is an intricate idea that delves into the complex relationship between sustainability concerns and the world's increasing population. The objective of our poster and presentation was to explore and compare the rural-urban fringe of two small cities (approximately 100,000 population size): Bend, Oregon and Lethbridge, Alberta. We explored two main elements of each city's fringe: the sustainability of the city's growth as well as the urban expansion within the fringe. Through the examination of information provided by Google Earth Imagery, city land planning documents, and sustainable growth development strategies and policies, we discovered that the expansion in Bend, Oregon, has implications for a less sustainable future versus that of Lethbridge Alberta. In this context we discussed that since Bend is a recreational and tourism-focused city, the expansion and growth are more severe than that of Lethbridge, a city that hosts a substantial portion of Alberta's irrigated land. In conclusion, we have determined that over the last thirty years (1990-2020) Bend's rural-urban fringe has undergone a more accelerated urban expansion than Lethbridge.

The Akwesasne Reservation: a Sovereignty Split in Half

Greenleaf, Eliott L.¹, Pike, David¹, Sievers, Kay¹ ¹Western Washington University

The Mohawk Nation at Akwesasne is a Mohawk reservation that crosses the border of the United States and Canada, as well as the border between the Canadian provinces of Quebec and Ontario. Geographically, it is situated along the St. Lawrence River at the meeting point of Southwestern Quebec, Southeastern Ontario and Northeastern New York. The Akwesasne Mohawk people originally chose to live here because of its status as a traditional territory as well as a center for trade and diplomacy. As one may expect, this split caused by the border affects the lives of those in the Akwesasne territory. This project is an investigation of the implications of the reservation being split between America and Canada on Mohawk sovereignty in Akwesasne through a literature search. The main findings of this literature search include details on the extensive negative impacts on food sovereignty and freedom of movement for Akwesasne residents caused by the reservation's split across the border, as well as how 'reporting-in' policies have a deleterious effect on the Akwesasne community, including wait-times on ports of entry, tolls and rules that discourage relationships between the Mohawk people of the reservation and the broader populations of the United States and Canada. To counteract these negative impacts, the governmental bodies of both the United States and Canada should take steps to increase the mobility and sovereignty of the Mohawk Nation at Akwesasne. Possible specific solutions include involving Akwesasne residents as key decision makers for large-scale decisions that could have large implications on the reservation, or possibly giving the Mohawk Nation at Akwesasne jurisdictional authority of the entire territory.

Poster Station 17

Navigating Water Sovereignty: A Comparative Study of Water Rights in the Lummi and Secwépemc Nations

Guariento, Daniela C.¹, AJ , Denton¹ ¹Western Washington University

The historical context surrounding tribal nation water rights in Canada and the United States of America reveals a complex and intertwined narrative particularly since the onset of colonization in North America. This research explored the divergent historical timelines and legislative frameworks that have contributed to the contemporary conditions of water rights for the Lummi Nation of Washington State and the Tk'emlúps te Secwépemc Nation of British Columbia.

The Lummi Nation is located in western Whatcom County, Washington, Their land stretches across a peninsula. It is west of Bellingham and south of Ferndale. The Secwépemc (Shuswap) Nation is located in the interior of British Columbia, Canada. Their traditional territory spans the Selkirk Mountains, the Columbia River, and the Cariboo Plateau. The two nations are separated by (500 km in space) and, more importantly, the Canadian-American Border. Both are located in the Pacific Northwest and Coast and Interior Salish Region.

The comparative literature research done in this project uncovered similar challenges in both histories of the Secwépemc and Lummi Nations battle over water rights, with differing outcomes between both tribes due to a divergence in Indigenous land use and resource regulations between the two countries over time. We conclude the different water right land use and regulations reflect the historical and cultural values of their respective countries.

Comparing Public Transit in the Rural-Urban Fringe Between Red Deer, AB and St. George, UT

Guenther, Corbin M.¹, Nolan, Goller¹ ¹Thompson Rivers University

As cities and populations continue to grow, development and regulations in the rural-urban fringe continue to be less of a priority. This project examined and compared public transportation within the rural-urban fringe of two small cities, through the lens of Sustainable Development Goal #11 (SDG #11). As both cities are continuously growing, a need for better public transit to the fringe is important. Research was conducted on public transit, the rural-urban fringe, and land use policies and development guidelines of the two chosen cities of Red Deer, Alberta, and St. George, Utah. Our methods for defining the need for public transit involved the analysis of urban growth based on historical landscape imagery, bus routes, and development plans. Additionally, general information regarding the rural-urban fringe was studied to further develop an understanding of the subject. Comparing the varying strategies deployed in urbanization practices highlights the need for tailored approaches to ensure sustainability in different regional contexts. The current gaps in public transit in both cities were determined and scrutinized. This project examined the distinct challenges both cities face, while evaluating the fringe in the context to the SDG #11. The results indicated that public transit in the fringe lacked behind that which was found in the established urban core of both cities, emphasizing the pressing concern of sustainable development to bridge the gap between the urban core and the rural-urban fringe. Keywords: Peri-urban, Public Transportation, Urbanization, SDG #11

Tracking Urban Biodiversity using Citizen Science in Lethbridge, Alberta

Henderson, Jack S.¹, Rhys, Williams^{1,} Anna, Larney², Chelsea, Sherbut³ ¹ University of Lethbridge, ² City of Lethbridge, ³ Helen Schuler Nature Centre, Lethbridge

Tracking biodiversity in urban environments allows people within urban areas to have a greater connection to their local environment. Within Alberta, interest in biodiversity is mainly concentrated around parks and rural areas. While these areas are highly important for the health of regional ecosystems, they are distant from human settlements. Raising awareness of the importance of biodiversity can be done through educating people about the wide range of biodiversity that can be found within their local community.

Few existing organizations are focused on urban biodiversity and thus, most data collection occurs in rural regions. Therefore, data for this project originated from citizen science data sources iNaturalist and eBird, as well as supplementary data collected by the City of Lethbridge, University of Lethbridge, and Lethbridge Polytechnic. We assembled heatmaps of select species, including those considered "at risk" in Alberta. Extrapolation based on existing data points to create species ranges allowed us to identify which species are found in which parks, identifying hotspots within the urban landscape. Similar characteristics of these parks were identified to advise future planning of parks for recreation and conservation purposes.

Our exploration into the biodiversity of Lethbridge is informative to the community's creation of a comprehensive biodiversity plan. Additionally, this project showcases the ability of publicly available data in urban areas to advise how to effectively conserve and raise awareness of biodiversity within urban settings.

In terms of relevance to the conference theme, our project is looking to bridge the gap between rural and urban biodiversity awareness from the public and governmental perspectives. Furthermore, with our partnership with the City of Lethbridge, we are integrating our scientific conclusions with the practical applications of local management, forming a bridge between these organizations for future collaboration.

Poster Station 20

Reconstructing glacial lake evolution in the interior plateau of British Columbia: a case study using a Glacial Isostatic Adjustment model

Higgins, Rachel A¹ ¹University of Victoria

As the last ice sheets covering North America receded, large lakes on the margins of these ice sheets were common. Minimal attention has been given to the dynamics of these lake-terminating ice sheets when compared to marine or terrestrial-terminating ice sheets. Glacial lake terminating margins are set to become a pressing issue in the face of climate change, as modern glacial ice retreats and glacial lakes form in once-glaciated basins. One region where glacial lake evolution is particularly poorly understood is associated with the retreat of the last Cordilleran Ice Sheet, over British Columbia. For this region, we update a previously published ice loading history Glacial Isostatic Adjustment model using the newly available ice margin model, based on geological evidence, known as the North American Deglaciation Isochrones (NADI-1) of Dalton et al. (2023). Using these variables, we produced an updated glacial lake reconstruction to determine the evolution of glacial lakes at the margin of the Cordilleran Ice Sheet during the final stages of deglaciation (18,000-12,000 years BP). We then compare our updated reconstruction to a regional scale database of glacial landform features and previously published ancient lake footprints to explore the potential differences between the modelled reconstruction and the physical environment. This study is intended to be a preliminary test of the newly reconstructed model for the Cordilleran Ice Sheet, which we hope will identify key areas for future field and simulation studies while simultaneously bridging the gap between ancient and modern climate change.

Keywords: Cordilleran ice sheet, proglacial lakes, glacial isostatic adjustment, deglaciation

The Retreat of Caltha Peak's Glacier

James, Kenneth T¹ ¹Thompson Rivers University

The Caltha Peak has glacier is a small cirque glacier that feeds through the Stein Valley through the Stein Lake and the Stein River within the Stein Valley Nlaka'pamux Heritage Park. It is located about 50 km Southwest of Lytton, BC, on a convergence of 4 Indigenous territories. The Stein Valley is a very culturally significant place to the Nlaka'pamux people because it is part of the territory that their ancestors used to reside. Unfortunately, the glacier on Caltha Peak has been retreating at an alarming rate and is at risk of going extinct. To measure the rate of retreat, we used Google Earth's historical satellite imagery and to calculate the accumulation area ratio (AAR) of the glacier, we used Sentinel-2 false colour imagery. The results of the measurements show that the glacier toe facing Tundra Lake is receding approximately 2.03 meters per year and that the toe facing Stein Lake is receding at an average rate of 12.3 meters per year between (insert dates). The Sentinel-2 Imagery measurements show that the glacier in summer 2024 was approximately 0.16 km2 , whereas the accumulation area ratios to glacial retreat suggest that this glacier will likely cease to exist if it continues to retain so little annual snow accumulation, which in turn will have an impact on surrounding and downstream ecosystems as well as local Indigenous culture.

Comparing Development in the Rural-Urban Fringe: Looking Through the Lens of SDG #11 to Compare Chico, California and St. John's, Newfoundland

James, Kenneth Timothy¹ ¹TRU

The principal objective of this research is to observe, assess and compare the development of the Rural-Urban fringes (RUF) of two cities: one in the US and the latter in Canada. It is important to note that both cities roughly house a population of 100,000, however the physical locations are vastly different; Chico is in a generally flat and dry part of Northern California surrounded by farmland. St. John's is a port city with direct access to the Atlantic Ocean, located on the East coast of Newfoundland, and its environment is rainy, rocky, and hilly. Our goal is to compare each city's respective RUF development with regards to how well each has aligned with the UN's Sustainable Development Goal #11 (SDG #11). The observations will be made using Google Earth to distinguish what development has occurred in each area's RUF since 1985, and how the municipal boundaries have changed over time. To properly compare the RUF development and form a conclusion, we must analyze each of the city's development and development plans to relate our findings to information found in relative peer-reviewed literature. We hypothesize that Chico's RUF development will be closer to meeting the goals of SDG #11, because they face less physical environment challenges than St. John's does.

Twin Cities in the Fraser Valley; the growth and development of Lynden and Aldergrove.

Kuester, Matthew¹, Mark, Dettman¹ ¹Western Washington University

The investigation of Lynden and Aldergrove and their subsequent development over the last decade from 2010 to 2024. Our objective is to investigate the growth, population, land use, and zoning of Lynden and Aldergrove from a geospatial perspective, by using the publicly available information on Aldergrove's Arc online webpage and by submitting a PRR (Public Record Request) for Lynden. Using peer-reviewed articles and journals as literary evidence we plan to create a poster presentation exploring the differences in development, population, and land use between the two cities. Both cities sit in the Fraiser River valley. Aldergrove acts as a suburb of Vancouver, the largest metropolitan center in the region. Lynden sits on the Washington state side of the border, the largest city in the area is Bellingham. Bellingham is significantly smaller than Vancouver, and less pressure for growth is put on Lynden than Aldergrove. We plan to use ARC GIS and literary peer-reviewed searches to find the required information for our presentation. We expect our findings to be that Aldergrove is growing faster and denser than Lyden due to its agricultural land reserve and its proximity to Vancouver pressuring urban development. Our poster shows the differences in the development between the two cities with a combination of Maps and statements across the board. We hope to show our findings about Aldergrove and Lynden and how their agricultural land use policies and their proximity to their respective major metropolitan areas impact their growth, population, land use, and development.
Rethinking the endangerment threshold: centering Indigenous knowledge and place-based relationships in the Species at Risk Act

Lardière, Zoé R. J.¹, Danika G. Larson¹ ¹University of Victoria

Canada's Species at Risk Act (SARA), exists to protect wildlife in Canada from extinction, to manage recovery of at risk species, and to prevent species of special concern from endangerment. SARA, and the assessing body, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), identifies species that are endangered, or otherwise at risk using traditional western science methods. There have been efforts to include Traditional Ecological Knowledge (TEK) in the COSEWIC framework of species recovery, but little attention has been paid to the relationships that are at risk when species are threatened. Indigenous peoples have also identified that approaches to including TEK, or comanagement agreements, have been unsuccessful, tending towards tokenism rather than meaningful participation and lacking a place-based approach.

This analysis focuses on the contrasts between the colonial government's plan for managing species at risk, and the impacts of loss of relationships by Indigenous peoples. While the colonial government has developed a threshold for declaring species endangered, and management plans as such, we argue that cultural relationships to species which are in the process of change or degradation should be taken into account. These changing relationships should be taken seriously, and we propose that reports of this nature should expedite the assessment process. We advocate for a decentralized, place based assessment process that allows for the individual needs of communities to be addressed.

Destined to Decline? An Examination of the David Glacier

Loughton, Kathleen I.¹ ¹ Thompson Rivers University

The David Glacier is a glacier on the edge of British Columbia and Alberta, Canada. In this study, the glacier's approximate length, recent rate of retreat, and accumulation area ratio (AAR) zone were measured with the use of Google Earth-hosted satellite imagery, and Sentinel-2 false colour imagery. By analyzing these aspects of the David Glacier, its likelihood of persisting through the current climate can be determined. The likelihood of a glacier's survival can be inferred through examining the relative size of its accumulation zone; if this glacier's accumulation area ratio is consistently more than 64%, it is expected to persist. The David Glacier's accumulation area ratio (AAR) in 2024 was below the percentage requirement and has thus aided in the glacier's decline. Over the course of 27 years, more rock outcroppings have appeared, and the glacier has retreated approximately 469.5 m, an average of 17.4 m/y. This result indicates that if there is no effort made to ensure the David Glacier's livelihood, it will disappear. It is important to address the shrinking of glaciers and prioritize their preservation as they are important components in the earth's ecosystem.

Poster Station 26

Fires in Proximity to Shallow Groundwater : Effects of Moisture on Burn Severity

Marnik, Emma R¹, Laura Chasmer¹ ¹University of Lethbridge

Fires burn where water is depleted. Decreased water availability creates drier ecosystems as environmental moisture levels are strongly related to the moisture of an ecosystem, and fuel moisture levels have large effects on the way fires burn in a landscape. The processes which affect moisture availability are increasingly important to understand in Canada as drier environments drive recordbreaking fires.

Groundwater stores water with variation in residency time and movement through the landscape. Shallow groundwater can be accessed by plants, and therefore affect the available moisture of an area. As such, depleted shallow groundwater can have large effects on the water availability in an environment. By assessing the groundwater trends in burned areas, the effects of depleted shallow groundwater on burn severity of a given year's fire(s) can be quantified.

This study assessed the relationship between groundwater and fires in the boreal region of Northern Alberta. Shallow Groundwater Monitoring wells from the Alberta Government's Groundwater Observational Well Network were assessed in the context of large fires that occurred during the period of groundwater record. This determined if the groundwater conditions leading up to the ignition of fires in close proximity was depleted compared to the overall monitored trends in the wells. The relationship between groundwater trends and fires were examined using visual, qualitative, and quantitative methods.

Five well sites with a corresponding 19 fires were assessed. Two wells showed strong relationships between depleted groundwater and fire, two wells showed moderate relationships, and one well had no trend. Determining the associations required for establishing connections between groundwater and fires bridges the important problems of; predicting fires and realistic methods, the relationships between above and below- ground processes, and scientific use of publicly available information.

Poster Station 27

Geography of Modern Islam

McArthur, Kelsey B.¹, Paula, Arango Mercado¹ ¹Thompson Rivers University

Islam is the fastest-growing religion in the world, and is projected to overtake Christianity as the largest world religion within the century. This expansion is influenced by but not limited to, changes in global population, changes to geopolitical climates, shifts in religious demographics, and migratory factors. This poster explores the spread and projections of the global Islamic population, from the years 2010- 2060. This is done by examining global distribution, spatial dimensions, and sacred spaces involved in the Islamic expansion.

Distribution of Islam was explored by examining global immigration trends in addition to birth and deaths rates of the Islamic population, both current and projected. Islamic population trends were compared to that of the global population and Christianity. Spatial dynamics was examined in the context of Islam as a whole and then further broken down into the differences between the Sunni and Shia denominations and their relations to religious hearths. Sacred spaces was compared on a universal and local level. In addition to this comparison, traditions involved in the maintenance of the sites and the practices that occur at them were also investigated.

Our methodology included the use of various literature reviews, maps, images, and other relevant data to illustrate our key points. Ultimately, through this presentation we hope to provide an overview and rational for Islam's growth, presence, impact across different regions, and what we can expect in the years to come.

Posters Session II

An Invasives Paradise: Is Swílhcha' (Cultus Lake) Susceptible to Zebra Mussels (*Dreissena polymorpha*)?

McConkey, Aysha¹, Matthew Bergen¹, Mariano Mapili¹, Steven Marsh¹, Keri Ardell², Dave Schaepe³, Jillian Spies³, Raymond Kobes³, Stefania Pizzirani¹, Kevin Webber², Laurie Benton², Colin Green³, Karen Brady³, Lisa Davidson³

¹University of the Fraser Valley, ²Ts'elxwéyeqw Tribe Management Ltd., ³Stó:lō Research and Resource Management Centre, S'ólh Téméxw Stewardship Alliance

Swilhcha', also known as Cultus Lake, is one of the most popular lake destinations in the Lower Mainland of British Columbia, Canada. Located in the Stó: lo territory, it is estimated that two to three million people make a trip to the region from May to September alone. Due to the high volume of tourists, the introduction of invasive species, like small mouth bass (*Micropterus dolomieu*), Eurasian Watermilfoil (Myriophyllum spicatum), and Pumpkinseed Sunfish (Lepomis gibbosis) threatens the lake's native ecosystem. However, another invasive, if introduced, could greatly jeopardize the ecological balance of Cultus Lake, and that is the Zebra Mussel, Dreissena polymorpha. The first report of D. polymorpha, in North America was in 1986 in Lake St. Clair, a part of the Great Lakes region. Since their introduction, they have spread throughout 24 states of America and Eastern Canada by human-induced movement, with Manitoba now being the Western-most province to been invaded by D. polymorpha. These invasive mussels are filter feeders that attach themselves to any solid surface and are able to breed rapidly with females capable of releasing up to one million eggs each breeding season. Dreissena polymorpha poses a significant threat to freshwater habitats by out-competing with native species for food, reduce drinking water quality, and can cause economic damage in the tourism and recreation industry. To investigate the potential for *D. polymorpha* to colonize Cultus Lake, we monitored the water quality in 2024 by collecting and recording the pH levels, dissolved oxygen, calcium levels, and temperature, as these are the best-studied environmental variables that have been correlated with D. polymorpha distribution and abundance. With the knowledge of previous distribution and abundance surveys, our results show that it is highly probable for the survival and rapid growth of *D. polymorpha* if they were to be introduced into Cultus Lake.

WDCAG 2025 "Bridging" Statement:

This study was conducted by researchers from the University of the Fraser Valley in collaboration with researchers from both the Stó:lō Research and Resource Management Centre and Ts'elxwéyeqw Tribe Management Ltd. I would also like to acknowledge the Sto:lo people whose unceded land the research sites were located.

Keywords: water quality, calcium, dissolved oxygen, Swílhcha', zebra mussel, invasive invertebrates

Cows Across Borders: Dairy Farms in Whatcom County and Lower Mainland B.C

McKibbin, Piper S.¹, Kylie, Fremin¹ ¹Western Washington University

The objective of this study is documenting impacts of the international border on dairy farms through policies (federal or local) in the Fraser Lowland Border Region, and their impacts to their climate. While there may be a shift in policy regarding the dairy industry due to the shift in power in both countries, we are attempting to make the most accurate and up-to-date report by synthesizing the data. Our methodology for the comparative study consists of literature research, statistical analysis, and field work with local farmers. This paper addresses transcending social factors such as genealogical inheritance and community relationships; as well as economic differences such as farm sizes, subsidized milk, and quotas thresholds. Differing policies affect the expected longevity of the industry. In the United States, farmers have more labor and economic freedom to do what they must, but in Canada, farmers have more security and better access to efficient equipment.

The Growth and Disaster Resilience of Nanaimo B.C. and Savannah GA: Comparing Urban Growth, Fringe Sprawls, and Preparedness

Melville, Desiree G.¹, Lucas, Lochrie¹ ¹Thompson Rivers University

The growth of the rural urban fringes is a fascinating case, especially in association with their resilience, sustainability, and planning as related to hazards they may face. We compared the sprawl of Nanaimo BC and Savannah GA in the rural urban fringe, with a focus on their population densities, rural disaster preparedness, and their respective distances to the mainland and shoreline. The purpose of this study is to review both of these areas and to determine their growth and disaster resilience relative to the open ocean. The methods we employed include the review of available literature regarding these areas, their historical growth and density rates, their natural disaster risks, and related policy documents. Most documentation found regarding Nanaimo related to minor stormwater management, and little plans for the changing climate, though sustainability was readily highlighted. We also found that the cities distance relative to the open ocean and continental sides seemed to impact their respective industries, which may be the root of differing population densities. Nanaimo historically operated with lumber and coal with a recent turn to the cruise ship industry, while Savannah is comprised of more international traffic similar to Vancouver. In conclusion, the rural urban sprawls of these two areas face many of the same growing concerns regarding population growth, sustainability, and natural disaster risk management, but they have taken to different methods in order to remedy these concerns. The principal conclusion of our study found that Savannah has significant documentation available and policy in place to help prevent natural disasters in both rural and urban areas, as well as planned structures to prevent them in the future.

Key words: peri urban, hazard mitigation, built environment, population density, sustainable growth

Landscape Iconography of Downtown Kamloops, B.C. Canada: Stickers, Signage, And Their Significance

Melville, Desiree G.¹ ¹ Thompson Rivers University

Rarely does one pay close attention to the finer details of their environment unless specified to do so, such as the design choices of signs indicating hiking trails or vandalism in sticker form, but that does not decrease the value of these finer points of our landscape and what they communicate. Downtown Kamloops is an area of particular significance in this concern due to its concentration of both cultural expression and population, which consequently leads to the increased volume of messages conveyed there and the reactions to them. The purpose of this presentation is to review the stickers and signage of downtown Kamloops, draw conclusions on the messages they convey, and the indirect conversations occurring in the area due to their presence. The methods employed primarily consist of observations of the built environment of downtown Kamloops, supplemented by literature review in order to put findings into a broader context. Through these methods, it was found that the signs in downtown Kamloops are clearly cultivated for specific audiences, rather than the entire populace who lives and works among them. It was also found that there are clear marks of both opposition and conversation occurring between community members, showing that people care enough to speak up on subjects that impact them through the altercations of their environment. Stickers and signage are active cultural traits that represent local values, political landscapes, and personal beliefs, and together they offer an insight into how people navigate, shape, and respond to the spaces they inhabit, and how receptive these spaces are to their respective lives.

This work connects to the conference theme of bridging in that it highlights the significance of the bridging occurring between people who never meet face to face, rather instead they only communicate though marks left behind by the other.

Keywords: Landscape iconography, cultural discourse, urban signage, stickers, community interaction

Comparative Observations of the Peri-Urban Fringe Landscape Change in Thunder Bay, Ontario, and Santa Maria, California

Miyagawa-Holmes, Ai¹ and Penney Brianne¹ ¹Thomposn Rivers University

The research explores the impact of urban development and sustainability in Thunder Bay and Santa Maria with a focus on downtown revitalization and contributes to sprawl. This can be connected with Sustainable Development Goal 11 on impacts of housing density in the rural-urban fringe. The primary objective is to examine the consequences of urban expansion on housing, infrastructure, and economic patterns while looking at efforts trying to revitalize downtown. The methods included analysing historical and present aerial Google Earth imagery to track residential density, land use, and commercial activities. The research further looks at analyzing related scholarly literature, including works on housing production and sprawl by Boukari and Long (2023) and investigation of high-density urban structures conducted by Ahlfeldt and Barr (2021). Findings suggest that investments are currently being made in core areas downtown, such as the Thunder Bay waterfront redevelopment projects, but suburbanization is still the prime trend. This outward growth from both cities have led to inaction within urban cores and commercial sectors are relocating and furthering the decline of business districts. These findings suggest that suburbanization presents a challenge to urban sustainability by diverting resources from urban cores, and ultimately impeding efforts toward the creation of more integrated, sustainable, and livable environments.

Keywords: Peri-urban, Urban expansion, Sustainable development, Urban sprawl, Planning policies

Queneesh Glacier in Retreat: A Call to Action

Miller-Badesha, Waylon M.¹, Crystal Huscroft¹ ¹ Thompson Rivers University

The Comox Glacier, named Queneesh in the language of the K'ómoks First Nation, is an iconic landmark on Vancouver Island. It provides freshwater to multiple surrounding lakes and is a significant symbol of the region's Indigenous natural heritage. This study examines the impact of climate change on the glacier by analyzing the relative size and characteristics of its accumulation area using Sentinel-2 false color images to assess late summer snow cover and measuring the glacier's recent rate of retreat using historical satellite imagery from Google Earth.

These methods reveal that the glacier's margins have receded at an average rate of 2m per year between 2014 and 2023, and the overall area of the glacier has been reduced by 27.2%. Additionally, the size and discontinuities in its accumulation zone from 2018 to 2024 suggest that the rate of retreat will accelerate. Average long-lasting snowfall has decreased by 50%, with snow coverage dropping from over 80% in 2014, putting the glacier at risk of disappearing entirely.

This retreat poses a threat to downstream ecosystems and water availability while also being culturally significant to the K'ómoks First Nation. The significance of this research is to provide further justification for urgent action to support environmental conservation and cultural preservation.

Poster Station 6

Glacial Retreat and Environmental Reconstruction: Insights from a Push Moraine Analysis at Assini Glacier, British Columbia

Mortimer, Talia S.¹, Bloemink, S.¹, Brulot-Sawchyn, A. ¹ University of Victoria

Alpine glaciers serve as key indicators of climate change, with their dynamics reflecting shifts in temperature and precipitation over time. This study analyzes push moraine features to reconstruct the late Holocene glacial retreat of the unnamed glacier, referred to in this study as 'Assini' lacier after the nearest peak, located in the Coast Mountains of British Columbia. By examining the spatial distribution and characteristics of these features along four transects in the Assini Glacier valley, we reconstruct the glacier's retreat since the end of the last Little Ice Age around 860 AD (Wanner et al., 2022). Using GPS, rangefinder measurements, and absolute dates acquired from historic airphotos, we surveyed the glacier's terminal moraine, seasonal push moraines along the northern lateral moraine, and the area between the terminal moraine and the glacier's sent day toe to track the glaciers annual fluctuations. Our results were compared to the Arich et al. (2024) lichenometry study, which enabled us to assign absolute dates to our identified moraine deposits. Results indicate that the Assini Glacier has experienced significant recession over the past century, with glacial retreat rates accelerating in response to contemporary climatic shifts. Our findings underscore the importance of push moraines as valuable tools for understanding alpine glaciers and climate change, and provides a basis for understanding the broader implications of glacial retreat in response to global warming.

Mapping Sustainability with Citizen Science

Munn, Lilias, CS¹ ¹ University of Victoria

"Mapping Sustainability Through Citizen Science" is a participatory action research project, that aims to learn more about informal recyclers (known colloquially as binners and diverters), on unceded lakwaŋan and WSÁNEĆ territories in Victoria, BC. This research shares informal recyclers' contributions to Greater Victoria's municipalities, including promoting a more circular economy through the diversion of recyclable waste from landfills and filling in the gaps of formal waste management in city neighbourhoods. This research bridges the gap between academics and community research participants by collaborating with the diverter-run, non-profit 'The Diverters Foundation'. We employed a citizen science methodology involving local 'diverters' as both research participants and coresearchers, who co-designed each stage of the research and participated in data collection and analysis. The research methods used were surveys and a participatory mapping session with informal recyclers, which allowed researchers and co-researchers to learn more about the composition of the informal recycling community in Victoria, what is most important to diverters and binners about their work, and to collect personal stories and memories. Data analysis was done using an Urban Political Ecology framework, to bring together the environmental, social, and political dimensions of informal recycling. Data from this project will be presented in a written thesis, discussing the contribution of the informal recycling community and sharing the voices and stories of binners and diverters in Victoria. Subsequent materials created from the project will emphasize Calls to Action on how recyclers can get more involved in community-building and advocacy and how the public can support this important and under-recognized community.

Poster Station 8

Paleoenvironmental reconstruction of the Quaternary glacial dynamics of the Mission Flats section, Kamloops, British Columbia, Canada.

Murray, Casey A.¹ ¹ University of Victoria

The Canadian Cordillera has undergone repeated glacial and interglacial cycles during the Quaternary Period over the last 2.6 million years. In south-central B.C., these cycles have deposited sedimentological evidence that enables researchers to reconstruct glacial dynamics through stratigraphic analysis and geochronological dating. However, existing stratigraphic profiles and radiocarbon dates in the interior of B.C. are limited or possess large age uncertainties. To refine the timing of glacial advance and retreat, this study constructed a high- resolution stratigraphic profile of the Mission Flats exposure in a quarry near Kamloops, B.C. Preliminary results suggest that the area underwent repeated episodes of submersion and reworking due to the growth and retreat of a glacial meltwater lake in response to climatic fluctuations. Unconformities indicate several shifts in depositional environments over time, including a notable erosional surface attributed to the most recent Fraser Glaciation. Additionally, stratigraphic and sedimentological evidence may correlate with previous studies in the area, suggesting deposition dating to Marine Isotope Stage 5, approximately 57,000 years ago. These findings (i) will aid in 'bridging' our understanding of ice-sheet behavior and paleoenvironments, including paleoclimates, in south-central B.C. and, (ii) will help future understanding of the distribution and provenance of construction aggregate in the region.

Key words: Quaternary glaciation; paleoenvironments; stratigraphy; aggregate; Kamloops, B.C.

Impacts of Habitat Fragmentation on Westslope Cutthroat Trout

Nickell, Ellen L¹, Jakob Pearn¹, and Treyton Bloomberg-Choymn¹ ¹University of Lethbridge

Westslope Cutthroat Trout (Oncorhynchus clarkii lewisi) are a subspecies of Cutthroat Trout and fall under the Salmonidae family. The subspecies used to have a wide native range both within Canada and the United States, but in recent years their population has been on the decline. Westslope Cutthroat Trout are an indicator species of aquatic health due to their specific habitat requirements of cold, clean water and a form of cover. The decrease in population is a result of many factors including anthropogenic land use practices that results in unsuitable habitat. Poor land use practices such as logging within close proximity to riparian zones severely alters the physical landscape and leads to many unnatural alterations within an ecosystem. The stronghold of the Westslope Cutthroat Trout population is located in southeastern British Columbia in an area where logging is the predominant land use practice around ideal habitat. Patchy habitat adds an increased difficulty for the population to recover due to the lack of connected suitable habitat, leading to geographic isolation for the species. In order to sustain future Westslope Cutthroat Trout populations, it is vital to protect suitable habitat and minimize land disturbance in riparian zones.

This work is relevant to the conference theme in that the relationship between anthropogenic impacts in regard to land use practices and maintaining critical habitat is a gap that requires bridging. Moving forward it is important to prioritize sustainable resource management harvesting practices while preserving biodiversity, but we'll cross that bridge when we get there.

Key words: Westslope Cutthroat Trout, habitat fragmentation, land use, anthropogenic

Poster Station 10

The Retreat of an Un-named Glacier on Mount Hugh Neave, B.C. Canada

Ogunyemi, Olanshile¹, Crystal Huscroft¹ ¹Thompson Rivers University

This study analyses the retreat of an un-named cirque glacier on Mount Hugh Neave in Wells Gray Provincial Park, British Columbia since the Little Ice Age. Situated in the Cariboo Mountains, the glacier drains into Clearwater Lake and eventually the Thompson and Fraser River systems. Investigations of the pattern and retreat of the glacier were conducted using Google Earth Engine, Google Earth Web, Sentinel-2 false colour imagery and topographic maps. These resources and imagery facilitated the analysis of changes in the glacier from the Little Ice Age to the 20th-21st century transition (1987-2021). The study reveals marked retreat of the un-named glacier over the assessed period. Between 1987 and 2021 the glacier retreated 569 m, representing a 25.8% reduction in total length. The average rate of retreat over this period was calculated to be 16.7 m/year. The likelihood of survival for the un-named glacier was assessed through the examination of Sentinel-2 false color imagery collected in early September 2024. If weather patterns of 2023/24 persist, we can expect further retreat of the glacier. This analysis revealed that the accumulation zone covered 13% of the total glacier area at its smallest extent, which is drastically insufficient to balance annual ablation, and that the glacier is threatened with extinction. These results show the urgent need for reducing carbon emissions. These actions can help slow down global warming and prevent further rapid glacier retreat.

Micro- and mesoplastics on the beaches of Okanagan Lake and Skaha Lake in Penticton, British Columbia

Oviatt, Jayne¹, Todd, Redding¹ ¹Okanagan College, Department of Geography, Earth & Environmental Science

Statement of relevance: While conducting this research, I noticed many people had heard about microplastics but associated them with the ocean. The plastic pollution problem can seem abstract and irrelevant when you live inland. This project bridges the disconnect between knowing that microplastics exist as a problem and the reality that microplastics are everywhere, including the beaches in your hometown or vacation destination.

Abstract: Plastic pollution of sandy beaches is a global concern that is exceptionally relevant in Penticton, British Columbia, a city located between two freshwater lakes. With this in mind, we set out to estimate the quantities of plastic pollution and spatial distribution of plastic particles on the beaches of Okanagan Lake and Skaha Lake. Potential sources of plastic pollution were explored. Plastic particles were collected from beaches at both lakes by marking 0.5 metres by 0.5 metres quadrants and sieving the sand through a one-millimetre sieve. Plastic pieces were collected and analyzed by size (1-5 mm as micro and >5 mm as meso) and type. Microplastics and mesoplastics were found on the beaches of both lakes. Microplastics were prevalent, but the mesoplastic quantities found were impossible to ignore. Our findings were preliminary and left the door open for further research regarding plastic pollution on the beaches of Okanagan Lake and Skaha Lake.

Keywords: Microplastics, Mesoplastics, Lake, Freshwater, Okanagan Lake, Skaha Lake, Pollution

Regional Variations and Cultural Diversity of Hinduism

Pidlisecky, Chris¹, Alyssa, Olek¹ Elizabeth, Green¹ ¹Thompson Rivers University

Religion is highly contextual, so exploring the regional differences of Hinduism can offer a greater understanding of how geographic barriers and features create diverse sets of cultural and religious traditions. As a religion without a primary hearth, we aim to understand how the different branches of Hinduism have bridged the gap between its many regional and community level variances. In examining the global distributions of Hinduism, we aim to highlight how contextuality has shaped the creation of many diverse sets of practices and beliefs. Further, we aim to look at how, irrespective of regional variations, the broader and shared tradition of Hinduism holds the belief in the divine origin of the Vedas and Upanishadic concepts. Finally, we will delve into the connections to place within Hinduism, and attempt to understand the importance and plurality of sacred spaces, such as the Ganges River and Mount Meru.

Using methods of representation such as maps and population distribution graphs, we aim to make this information accessible and understandable so as to broaden attendees' knowledge of Hinduism. This topic is relevant to the conference's theme of "bridging" because our examination dives into how the shared nature of cornerstone beliefs, and the incorporation of new beliefs, can bridge the gap between variances in local traditions.

Effluent Routes from Gold, Coal, and Uranium Mines in Canada

Press, Nick¹ ¹Okanagan College Okanagan College (Environmental Studies Program)

This poster explores the potential for freshwater contamination resulting from some of Canada's largest operations in the mining sector. Using ArcGIS's "trace downstream" tool, potential effluent routes are charted and compared with polygons denoting critical habitat for aquatic species listed as threatened or endangered according to Canada's Species At Risk Act (SARA). The three types of mines explored in this project are Gold, Uranium, and Coal. They were chosen based on their relative ubiquity in the Canadian mining sector and the fact that reliable research documenting the spread of effluent discharge from these types of mines is easily accessible. The intent of this project is not to condemn or curtail Canadian mining activities, but only to provide a resource for conservationists to plan ground-truthing missions and assess whether or not environmental damage is, in fact, taking place.

This poster was created as part of a course on GIS and remote sensing at Okanagan College; as such, it was not designed with the intent of aligning with the WDCAG 2025 theme of "bridging". Nevertheless, the project could be seen as "bridging" the methodological differences between Geographers/Cartographers and professionals in the physical sciences, as data collected from the field could further enhance the GIS model, and GIS data could better inform Biologists in the field. It was also a term project for one of the more technical components of the program, so in a personal way, it represents a "bridge" of experience that granted me knowledge and skills applicable to my desired future career.

Keywords: Mining Effluent, Freshwater, SARA, Pollution, Conservation

Analyzing The Survival Potential of Styx Glacier, British Columbia

Raymer, Evangelina D.¹ ¹Thompson Rivers University

This study investigates the retreat and survival potential of the Styx Glacier, located in the Coastal Mountains of British Columbia, using historical and satellite imagery. The research employs measurements taken using Google Earth imagery, Google Earth Engine Timelapse imagery, and Sentinel-2 false colour satellite imagery to determine the rate at which the Styx Glacier is retreating and assess the relative size of the accumulation zone. The Styx Glacier is estimated to have extended 5.73 km during the Little Ice Age, as indicated by lateral and terminal moraines, and trimline measurements. Comparing satellite imagery between 1985 and 2022 reveals retreat of about 0.83 km, yielding an average rate of about 22 m/yr in recent decades. The accumulation area of the glacier is currently approximately 11.63 km2 and exceeds a cited 33% threshold needed for glacier suggests future retreat. These findings demonstrate the effects of increased regional temperatures and highlight the importance of continued monitoring of glacial retreat.

The Effectiveness of Fungi Decomposition on Oil Spills in Marine and Land Ecosystems

Robinson, Kara M.¹ ¹University of Lethbridge

Oil spills can cause significant long-term damage to all ecosystems by leaving environmental contamination and waste resulting from hydrocarbons found in oils, particularly petroleum. Hydrocarbons are carcinogenic and toxic to many ecosystems resulting in a disruption that alters the biodiversity of the ecosystem affected. When these ecosystems are contaminated, it can take years to restore the environment, if it can be restored at all, resulting in irreversible ecological damage. Microorganisms, like fungi, can decompose a significant amount of petroleum hydrocarbons, during spillage these microorganisms proliferate quickly consuming the hydrocarbons which are essential for their growth and product of producing carbon dioxide and water. Fungi have degradative abilities to break down hydrocarbons through their complex mycobiota systems in both marine bodies of water and sediment environments. In a contamination site fungi have shown the ability to use crude oil as their only source of carbon. The effectiveness of using fungi compared to previous methods of remediation can be inquired, as fungi can transport nutrients and pollutants significant distances while being environmentally conscious. It was found that some fungi were able to decompose and remove crude oil significantly from contamination sites. On and offshore oil response strategies with continuous monitoring were able to mitigate harmful impacts to both humans and the ecosystem of the affect area. The number of aerobic and anaerobic bacteria, as well as the mycelium of the fungi increased in length when placed in oily soil.

Balancing Conservation and Culture: The Future of Sustainable Tourism in Belize

Schmidt, Kira¹ ¹Thompson Rivers University

Tourism is one of Belize's fastest-growing industries, due to its rich culture and natural landscapes. However, as the tourism industry grows, there are increasing concerns about balancing environmental conservation with cultural preservation. Belize is a small, English-speaking country on the northeastern coast of Central America. The approximate size of Belize is 22,966 square kilometers, but despite its size it has a very rich cultural heritage and biodiversity. Belize is known for its varied landscapes, which include tropical rainforests, ancient Maya ruins, and over 400 offshore islands, known as cayes. The Belize Barrier Reef System is the second largest reef system in the world as well as being a UNESCO World Heritage Site which includes and protects the cayes as well. This research examines the intersection between sustainable tourism practices with the preservation of Belize's cultural and natural heritage. By evaluating the impact of ecotourism on both local communities and ecosystems, this study seeks to understand how Belize can promote sustainable tourism while protecting their cultural identity and environment.

The Tantalisingly Tragic Trajectory of Mount Tantalus's Northwestern Glacier

Schneider, Lauren N.¹ ¹Thompson Rivers University

Monitoring the rate at which a glacier retreats benefits environmental research, as it significantly impacts the hydrology, geomorphology, and ecology of downstream environments and provides valuable insight regarding climate change. The cirque glacier on the northwest-facing slope of Mount Tantalus is in the direct line of sight of Mount Jimmy Jimmy and viewed by many hikers throughout the Squamish area. However, no one has studied the recent pattern of retreat of this glacier. This study examines various rates of recession of the glacier and analyses the health of its 2024 accumulation zone. Using Sentinel-2 multispectral satellite imagery, we find that this glacier has retreated approximately 100 meters between the years of 2009-2024, yielding an average rate of retreat of 7m/ yr. We also demonstrate that this glacier will continue to experience a decrease in mass, as the accumulation zone accounted for less than 30% of the glacier's surface area. The anticipated retreat of this glacier will impact the Shíshálh Nation, as the runoff leads to the Clowhom River located downstream of the Salmon Inlet and glacier retreat impacts the timing, volume, and temperature of stream flow and will be detrimental for the surrounding salmon populations and reliant communities.

Refining Late Pleistocene Tephrostratigraphy in South-Central British Columbia with Evidence of Mount St. Helens Set C Correlations.

Senilov, Nikolay A.¹, Matthew Bolton², Crystal A. Huscroft³, Gillian M. Krezoski¹, Sophie L. Norris¹ ¹University of Victoria, ²University of Alberta, Edmonton, Alberta, ³Thompson Rivers University

South-central British Columbia (BC) hosts a rich archive of Late Pleistocene glacial and interglacial deposits, where multiple volcanic ash layers (tephra) serve as important chronological markers. Although the source volcanoes for most of these tephra remain unknown, previous studies have identified Mount St. Helens as a potential contributor. This work compiles and synthesizes existing geochemical, stratigraphic, and chronological data on Late Pleistocene tephra in south-central BC to refine current tephra descriptions and evaluate possible correlations with Mount St. Helens Set C. Qualitative comparisons of major oxide glass geochemistry show that several BC tephra (Okanagan Centre, Cherryville, Riggins Road, and Mission Flats) share compositional similarities with Mount St. Helens Set C. Additionally, mineralogical and chronological comparisons further support these correlations. Recent studies have also confirmed the presence of Mount St. Helens Set C tephra in the region, extending its known dispersal range into BC (Lesemann et al., 2013). By bridging local tephrostratigraphic records with the broader volcanic history of Mount St. Helens, this work helps support a more robust chronological framework for future studies of Late Pleistocene sediments in the region, thereby enhancing our understanding of glacial and interglacial dynamics and wider environmental change.

The Historical Growth of the Rural Urban Fringe of Costa Mesa, CA, and Delta, BC.

Simcoe, Audrey H.¹, Chon Him, Ng¹ ¹Thompson Rivers University

This poster compares the rural urban fringe and the sprawl of two small cities, one from the United States, and the other from Canada. Both cities have a population of about 100,000 people. The poster contains information on how the sprawl developed, especially after the mindset shift post WWII, and the issues this creates regarding the loss of farmland, as well as the concern towards the sustainability of the rapid development. It also discusses the influence of larger cities nearby, as both cities we chose are within a Metropolitan Influence Zone. In Costa Mesa, the main reasons for the loss of farmland are rapid population growth and inefficient land use, while in Delta, the development of Highway 17 and land going to the Tsawwassen First Nation are the reasons for the depletion of ALR (Agricultural Land Reserve) land. Both cities developed around the West Coast, and have increased their sprawl Eastward. We used the historical data on Google Earth to see the expansion of these cities and how the purpose of the land around the cities has changed, mostly from farmland to residential areas. The use of scholarly sources discussing the rural urban fringe, the peri-urban area, and city planning documents helped to elaborate the core concepts we wanted to put in our poster. The poster bridges the comparative farmland conversion by Canadian cities versus American cities. We found that both cities have lost valuable farmland due to the growth of the sprawl, with poor, vague planning that leaves gaps regarding the development of land and the migration of the rich to outside of our locations' respective megacities being two of the main reasons this growth occurred.

Keywords: sprawl, sustainability, farmland loss, metropolitan influence zone, peri-urban.

Poster Station 20

Studying the Retreat of the Zodiac Mountain Glacier

Slosarkova, Klaudie¹ ¹Thompson Rivers University

The unnamed glacier on Zodiac Mountain in Wells Gray Provincial Park, BC is a small cirque glacier facing northeast. Using recent and historical satellite imagery of the glacier we compared last year's accumulation area ratio (AAR) to published stead-state ratios for small glaciers. It was found that the rate of retreat for the Zodiac Mountain glacier between the years 1980 to 2020 was only 1.05 ± 0.85 m a-1. However, in 2024 the glacier's was 0, with the snowpack completely disappearing by September and we anticipate that the glacier is in essentially a rapid death spiral.

Community-Based Slope Monitoring: A Case Study at Swift Creek Landslide, Valemount, British Columbia

Sofizada, Samiullah¹, Shea, Joseph¹ ¹University of Northern British Columbia

Landslides are significant threats to infrastructure and people in mountainous areas, and thus, proper and easily accessible monitoring is essential. This study focuses on the Swift Creek landslide in Valemount, British Columbia, which poses a threat to the town's drinking water supply and vital transportation corridors. The research aims are to design a low-cost slope monitoring system that uses Arduino, and that can be used to engage the community in the research program. Once installed, the sensors will provide real-time data on slope movements as part of a broader geohazard assessment project.

Prototypes of the slope monitoring device have been constructed and tested in the lab, and a sensor has been deployed near the University of Northern British Columbia to test its performance over winter. The device, which costs a total of (Offline \$150/Real-Time \$735), uses an Arduino ESP32 microcontroller and MPU6050 accelerometer and gyroscope to measure and record positional changes, and is powered by lithium-ion batteries. The device has two ways of data retrieval: manual data transfer using microSD and real-time web-based access, which suit different monitoring purposes. This flexible design allows both real-time and offline access to geotechnical data.

This research will also involve collaboration with Valemount High School students and community members, who will use the monitoring packages in a series of educational and participatory training sessions. We aim to improve practical knowledge and tools for local stakeholders working to improve geohazard resilience and promote affordable monitoring technologies. The Swift Creek case study shows the feasibility of combining low-cost technology with participatory approaches to solve geohazard challenges. It also encourages community engagement in scientific processes to deliver long-term sustainable results.

Keywords: Community-based; Slope monitoring; Swift Creek; Landslide; Arduino

Wildfire Metrics and Antecedent Seasonal Temperature and Precipitation in the Kamloops Fire Zone

Stirrett, Samantha¹, Darryl, Carlyle-Moses¹ ¹Thompson Rivers University

This study explores the relationship between key wildfire severity metrics (number of fires and total area burned) for a given year and the antecedent seasonal temperature and precipitation characteristics in the Kamloops Fire Zone (KFZ). Monthly temperatures obtained for Kamloops and Clearwater were averaged and precipitation summed across four meteorological seasons: winter (Dec, Jan, Feb), spring (Mar, Apr, May), summer (Jun, Jul, Aug), and autumn (Sep, Oct, Nov). Data were available for most years from 1990 to 2022, inclusive. The single best predictor of the number of wildfires (Fn, lightning + human caused) in the KFZ within a given year was the average summer temperature in Clearwater (Ts, Celsius) for that year (r^2 = 0.326), while the best two-variable model included both Ts and the Clearwater precipitation sum from the preceding winter (Pw, mm): Fn = 8.05 Ts – 0.18 Pw -116.8, n = 24, r^2 = 0.546. This model suggests that approximately 55% of the variability in Fn in the KFZ can be explained by these two seasonal variables and that years with summers having elevated temperatures coupled with preceding dry winters tend to have a greater number of wildfires. For total area burned in a year in the KFZ, the single best predictor was the Clearwater total summer precipitation (Ps), explaining 23.4% of the variability, with greater area burned within the KFZ tending to occur with decreasing Ps.

Key words: Wildfire; Climate Change; Kamloops Fire Zone; Clearwater; Kamloops

Swimming Underground: Karst Hydrology and Salmonids

Sweitzer, Keeley E.¹ ¹University of Victoria

On the west coast of North America, Pacific salmon populations have significantly declined, with Coho salmon (Oncorhynchus kisutch) and Chinook salmon (Oncorhynchus tshawytscha) facing the most significant declines. Pacific salmonid species (Oncorhynchus spp.) provide environmental, socio-economic, and cultural significance in British Columbia, yet their habitats continue to be altered by environmental disturbances. Despite Vancouver Island having the highest density of caves in Canada, research on karst hydrology remains limited, often relying on studies from similar ecosystems like the Tongass National Forest in Alaska.

This study examines the complex interactions between karst topography and Pacific salmon within the Gordon River Watershed near Port Renfrew on Vancouver Island, focusing on the relationship between the karst-underlain Wolf Creek catchment and the Gordon River. Karst buffering, the hydrological interaction of carbonate bedrock, alters downstream water chemistry, impacting habitat suitability for salmonid species. This study begins to address knowledge gaps in the Gordon River Watershed and similar karst regions on Vancouver Island that leaves these ecosystems vulnerable to further ecological disturbances and cascading effects, particularly from logging. Karst hydrology acts as a bridge between terrestrial and aquatic ecosystems, influencing water quality and fish habitat through surface and subsurface hydrological processes. Addressing these knowledge gaps is crucial to informing conservation and management decisions that account for the unique environmental and hydrological functions of karst landscapes.

Tree Equity Mapping in Kamloops, British Columbia: Canopy Density and Income Correlation Tadić, Matija¹

¹ Thompson Rivers University

This project utilizes ArcGIS Pro to analyze LiDAR data and identify spatial variations in canopy density across census tracts. Tree density and average income are compared, showing a weak positive correlation (r = 0.23). The study focuses on areas within 30 m of residential housing, where people spend the most time. Results show the highest tree density in Barnhartvale Centre and Upper Sahali, while Aberdeen, the "Indian Reserve" (administrative Statistics Canada (2016) census tract name), Batchelor Heights, and Brocklehurst East have the lowest tree density. Urban tree canopy is essential for providing healthier and more sustainable communities, enhancing air quality, reducing climate change effects, and improving mental health. The ultimate goal of this project is to promote environmental equity in Kamloops by mapping tree density variations and their relationship to income. This map can help planning of future tree-planting efforts aid future urban landscape planning and policy decisions to prioritize communities with low canopy coverage. The project underscores the importance of urban canopy as a tool for reducing the impacts of climate change on communities in Kamloops, BC.

Investigation of Arctic outflows in Bute inlet - Case study February 2019

Ehsan Taghizadeh¹, Jennifer M. Jackson², Charles G. Hannah², Peter L. Jackson¹ ¹ Natural Resources and Environmental Studies and Faculty of Environment, University of Northern British Columbia, Prince George, BC, Canada, ² Institute of Ocean Sciences, Fisheries and Oceans Canada, Sidney, BC, Canada

Gaps intersect mountain ranges worldwide and can also be found between islands or between islands and the mainland. When a cold Arctic continental air mass encounters a mountain barrier, it has several potential paths: it can ascend over the barrier, navigate through valleys or gaps as an outflow wind, or be obstructed and rerouted horizontally around the barrier. In British Columbia, such a gap exists through the Coast Mountains between the continental plateau and Bute Inlet. Arctic outflow winds through this gap, flowing over Bute Inlet, can cause cooling and reoxygenation down to 100 meters, forming a persistent water mass. Climate change-driven changes in gap winds will affect temperature and oxygen dynamics in some BC fjords.

This study examined the synoptic weather patterns using the fifth generation of reanalysis data provided by the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 dataset and available surface station observations. The focus was on four Arctic outflow cases detected in Bute Inlet during February 2019, showing decreases in 2-meter temperature and dewpoint and increases in 10-meter wind speed in the considered station data.

We find the ERA5 analysis maps showed the presence of strong pressure gradients during the gap wind events, resulting from a high-pressure system stretching over western Canada and a low-pressure cyclone over southwestern Canada. Interpolated ERA5 data at the surface indicated that ERA5 could capture temperature changes 2 meters above ground associated with gap wind events. Keywords: Arctic outflows, Gap winds, Bute Inlet, ERA5 reanalysis

Bridging water allocation resources between countries

Vadnais, Dante J.¹, Dominic, Kwasny¹ ¹ University of Lethbridge

The Saint Mary and Milk River Siphon, a crucial infrastructure for water management, facilitates the diversion of water from the Saint Mary River to the Milk River, primarily supporting agricultural irrigation in Alberta. The failure that occurred on June 17th, 2024 caused significant flooding and erosion in the Saint Mary River and drastically reduced water flow to the Milk River, impacting local agriculture, industry, and water supply. Hydrological data collected from the St. Mary Reservoir and Milk River indicated alterations in water levels, with decreased flow observed post-repair. Ecologically, the siphon failure exacerbated water guality issues, disrupted fish migration, and posed long-term risks to biodiversity. The risks involved with prolonged disruption on both sides of the Siphon such as environmental damage to floodplains, vegetation, species in both ecosystems. This incident underscores the importance of timely maintenance and the potential consequences of infrastructure failure on regional water systems. The allocation of water resources is important to both countries in numerous ways such as agriculture, municipal water supply, and ecological health. The ongoing repair work, expected to conclude by fall 2025, highlights the need for sustainable water management practices to mitigate future risks. The failure of the St. Mary and Milk River Siphon provides an important context for examining the complexities of water resource allocation, especially in regions where multiple sectors depend on shared water supplies. It highlights the need for a holistic, forward-thinking approach to managing water resources to ensure their availability, sustainability, and equitable distribution.

38 Years in the life of the Mount Mortella glacier

Vintula, Tadiwanashe¹ ¹ Thompson Rivers University

Mount Mortella Glacier is located approximately 67 km from Kitimat, British Columbia. It feeds water directly into Nanika Lake, the Bulkley River, and the Skeena River. This study investigates the impact of climate change on the glacier. Google Earth Timelapse imagery and Sentinel-2 false colour satellite imagery was used to measure retreat rates and analyse the health of the glacier's accumulation zone. The glacier has retreated 310 m from 1986 to 2022, at a rate of 8.6m per year. The Mount Mortella glacier had an accumulation area ratio (AAR) of 0.4 during late summer of 2024, which suggests that the glacier will not survive. This value is greater than the recognized AAR required for glaciers of this size to survive established by other studies that examine the equilibrium line altitude shifts and how they correlate to glacial health. This observation, combined with the recent rate of retreat, indicates that Mount Mortella's glacier is on a path toward extinction.

Eocene Volcanism and Paleoenvironments of the Buse Lake Protected Area, Kamloops, British Columbia, Canada

Vogt, Micah¹, Trevor Moffat¹ ¹Thompson Rivers University

The detailed geology of Buse Lake Park, a British Columbia protected area southeast of Kamloops, was mapped as a way of contributing to the understanding of the geologic heritage and mineral resources of British Columbia. The area was previously mined by LaFarge Canada for a high silica-alumina rhyolite that was used for local cement manufacturing. Although a plan for modification of the landscape following creation of the mine quarry was never realized, the magnific rock exposures created by excavation provide excellent cross sections through the Eocene (~ 55 Ma) volcanogenic deposits that are part of the Kamloops Group. Techniques included field mapping at the (1:2500 scale), petrographic analysis of hand samples and thin sections, and 3-D modelling were used to define contacts between geologic units and structures. We show that the area comprises eight units including several layers of siltstone, and chert that are overlain by a silica-rich rhyolite layer that is further overlain by a thick sequence of mafic volcanics. The siltstone layers contain abundant coal lenses indicating nearby or insitu plant material and a high sedimentation rate. We interpret the overlying chert (30 cm thick) to have formed as a chemical sediment from hot silica-rich fluids that preceded the eruption of the silica-rich rhyolite tuff that was mined by LaFarge. A period of rest allowed the deposition of a thin layer of fossiliferous shale overlying the tuff, followed by the deposition of at least two layers of mafic lava that is common of the Kamloops Group. This particular series of events deposited the raw materials Si and Al, near to the limestones of the LaFarge plant, that were used in the local concrete industry. The area remains in the public domain as a protected area and is enjoyed for birding and rock hounding.

Community Connectedness in the Face of Climate Challenges

Walsh, Ryan¹ ¹University of Lethbridge

The Northwest Territories (NWT) face unique transportation and infrastructure challenges due to the region's remoteness and natural geographic constraints. Moreover, climatic changes have exacerbated the difficulties of connecting communities within the North, particularly through the increasing impacts of wildfires and permafrost degradation. By integrating remote sensing (RS) and geographic information systems (GIS) in conjunction with local community knowledge, decision-makers can gain valuable insights to support resilient and purposeful infrastructure planning in the North. This study explores how RS technologies (both satellite and airborne) can be combined with GIS-based spatial analysis techniques to assess risk to established and planned infrastructure, as well as how people and communities may be affected. Both seasonal roads (including ice roads) and all-season roads in the North are particularly vulnerable, requiring data-driven approaches for short- and long-term planning. For example, RS technologies like SAR and LiDAR can detect permafrost subsidence and ground deformation, identifying areas where road stability may be compromised. Thermal and multispectral imagery track wildfire severity, smoke dispersion, and post-fire recovery, highlighting at-risk communities and transportation networks. GIS integrates these approaches to model infrastructure vulnerabilities, assess accessibility challenges, and inform proactive strategies. By leveraging these technologies alongside local and Indigenous knowledge, planners can develop more adaptive and informed infrastructure solutions to address evolving environmental challenges in the North.

The Impact of Glacial Retreat on Groundwater Storage: Implications for Hydrological Systems in a Changing Climate

Watson, Makenna¹ ¹University of Lethbirdge

Glacial retreat has long been known to have multifaceted impacts on groundwater storage and hydrological dynamics of formerly glaciated regions due to their contributions to the hydrological cycle through runoff and subsurface flow. Glacial runoff is especially important in the recharge of existing groundwater aquifers as well as the creation of new groundwater sources such as proglacial aquifers through the natural occurring glacier retreat, however, climate change has significantly altered the rate in which glacier retreat is occurring, leading to a shift in these hydrological dynamics. With faster rates of glacial retreat occurring, groundwater aquifers have suffered loss of meltwater inputs to sufficiently recharge, leading to implications regarding water availability and groundwater health in certain regions that rely on glacial runoff to meet their water demands. This poses the question of how an increased rate of glacial retreat can impact a local regions long-term groundwater supply, and what measures need to be taken to ensure that glacial freshwater remains a secure sustainable natural resource throughout the globe.

Bridging

Global change is a topic that affects both humans and nature alike. As our climate changes with every moment, we are faced with environmental and anthropogenic change that influence each other but are often looked at through different lenses. Through understanding how climate change is impacting the rate of glacial retreat, we can begin to understand these impacts on subsurface hydrology and groundwater storage, ultimately allowing for a bridge to be formed between the glaciological and hydrological impacts presented by climate change, and the change in anthropogenic water resource use in response to this same issue.

Keywords: Glaciers, hydrology, groundwater, subsurface flow, climate change, water resources.

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"Footings of Red Bridge post-fire and cleanup, 23 February 2025."