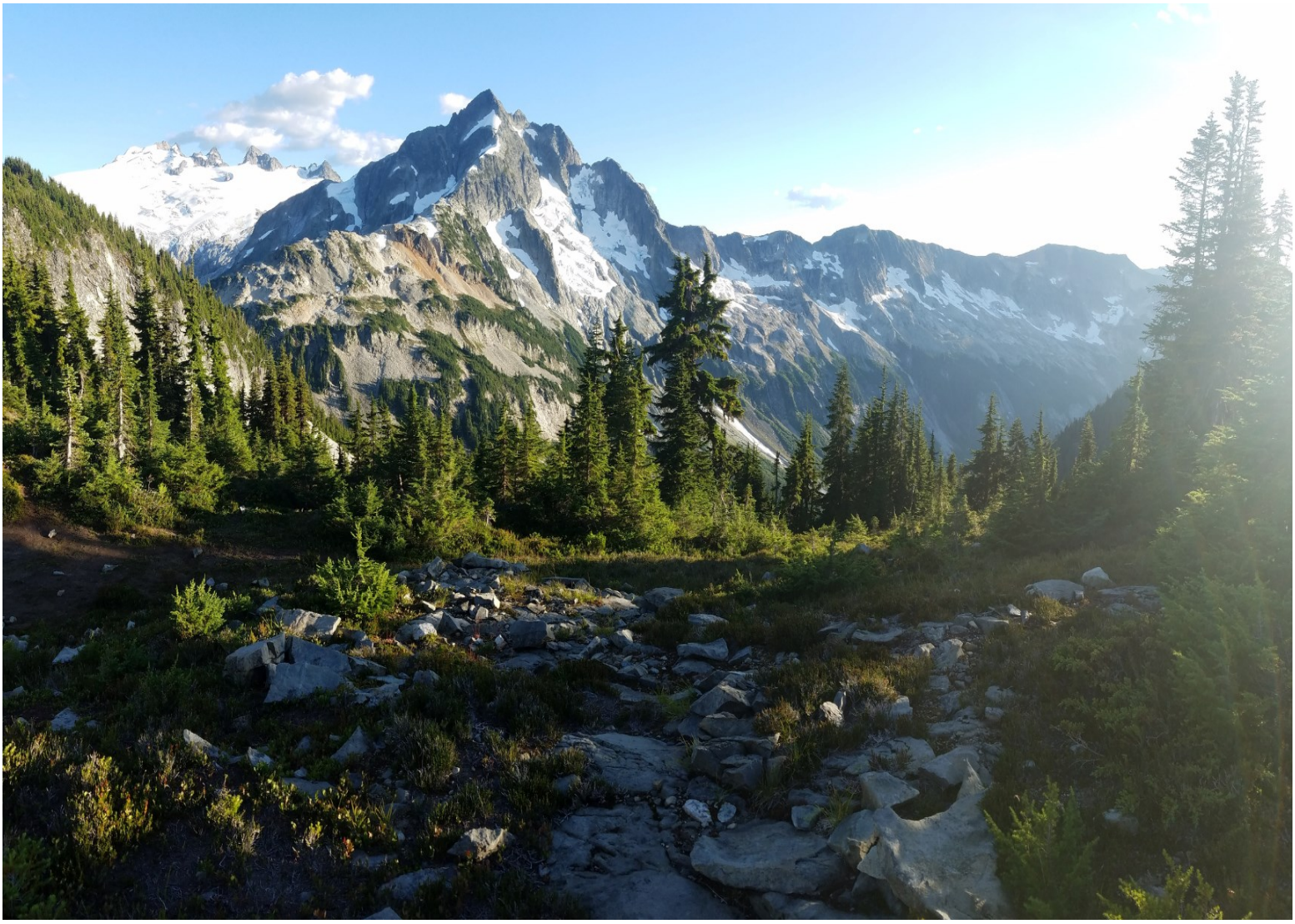

2023

WDCAG PROGRAM

Planning for Resilience and Climate Change

UNIVERSITY OF THE FRASER VALLEY

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UNIVERSITY OF THE FRASER VALLEY

WDCAG

Territorial Acknowledgment

The University of the Fraser Valley is situated on the sacred lands of the Stó:lō, the People of the River. The Stó:lō have an intrinsic relationship with S'ólh Tém:éxw (Our Sacred Land).

The very nature of geography asks us to understand the relationships between living and non-living entities across place and time. Through geography and related studies, we seek to appreciate the ever-changing boundaries of these relationships, and to reflect on these dynamics as we move forward through heat domes, atmospheric rivers, wildfires, earthquakes, and more. These are reminders that the earth is uncontrollably, unrelentingly awake.

As non-Indigenous, it is our responsibility to listen and learn from our hosts, the Stó:lō, who have protected and cared for the intricate web of kinship and life in this region – the lands, waters, animals, plants, rocks, and beyond. Together, we can strive to find and maintain a sense of balance and reciprocity between what we collectively take from and what we give back to the world. In her book "Braiding Sweetgrass", Robin Wall Kimmerer, Indigenous author and scientist from the Citizen Potawatomi Nation, describes this balance as the Honorable Harvest – we must restore our ability to consume with mindfulness, accountability, permission, and respect.

The theme of this WDCAG 2023 conference – Planning for Resilience and Climate Change – aims to represent these aforementioned principles: reciprocity, respect, relationships, restoration, responsibility. It is our hope that by sharing and learning from each other's knowledges and perspectives that we can each consciously and subconsciously embody these principles, thus affecting how, what, and why we learn.

We express our sincere gratitude and respect for the honour of living, learning, and working in Stó:lō Tém:éxw.

UNIVERSITY OF THE FRASER VALLEY

WDCAG

Welcome!

To the 64th Annual Meeting of the Western Division of the Canadian Association of Geographers (WDCAG)

On behalf of the organizing committee, thank you for registering for the 2023 Annual Conference of the Western Division of the Canadian Association of Geographers held at the University of the Fraser Valley, March 10-11 -- our first post-pandemic conference! This year's theme is "Planning for Resilience and Climate Change" and will serve to introduce our new Bachelor of Regional & Community Planning degree, and remind us of the need to plan for extreme events such as heat domes, flooding and more. We are looking forward to learning more from the 53 paper presentations, special sessions and 34 poster presentations. We are pleased to welcome back faculty, scholars, and students in-person to share their research and contributions to geographical knowledge and learning.

We extend our thanks to Dr. Cherie Enns who will be presenting our keynote presentation on Friday evening. Also, thanks goes out to our team of volunteers who will be assisting during the conference.

We hope you have some time to enjoy our campus and the surrounding city of Abbotsford.

Sincerely,

The WDCAG Organizing Committee
Steven Marsh, SLUEC
Claire Hay, TLC
Amy Huesken, SLUEC
Stefania Pizzirani, SLUEC
Afia Raja, SLUEC
Jen Hetherington, SLUEC

UNIVERSITY OF THE FRASER VALLEY

WDCAG

Keynote Speaker: Cherie Enns

Personal Geographies: Evolving Landscapes of Teaching, Research and Learning

We all recognize that our geographies inform our teaching, research and learn-ing, but perhaps without time to reflect on these evolving landscapes and their impact. This interactive presentation integrates reflection as I share selected professional experiences based on Greater Vancouver, Hawaii, Kenya, Tanzania, South Sudan and Fraser Valley geographies. The presentation concludes with examples of emerging geographies and considerations of decolonization, EDI, and the metaverse's reality as impacting programs' future landscapes, specifically the new Bachelor of Regional and Community Planning program at UFV.

UNIVERSITY OF THE FRASER VALLEY

WDCAG

Conference Schedule of Events

Friday March 10, 2023:

TIME:	Description:	Location:
11:00am-1:00pm	Registration desk open	A407d
6:00pm-8:30pm	Registration desk open	Adjacent to B101
7:00pm-8:30pm	Keynote speaker: Cherie Enns 'Personal Geographies: Evolving Landscapes of Teaching, Re-search and Learning'	B101

UNIVERSITY OF THE FRASER VALLEY

WDCAG

Conference Schedule of Events

Saturday March 11, 2023:

TIME:	Description:	Location:
8:00am-2:00pm	Registration desk open	Adjacent to B101
8:30am-10:00am	Concurrent Session A	B101, B132, B140, B161
10:00am-10:30am	Coffee Break & Poster Session	Adjacent to B101 & Alumni Hall B201
10:30am-12(noon)	Concurrent Session B	B101, B132, B140, B161
12(noon)-1:00pm	Lunch	UFV Cafeteria, B105
12(noon)-1:00pm	WDCAG Executive Meeting	B121
12:30pm-1:00pm	Poster Session	Alumni Hall B201
1:00pm-2:30pm	Concurrent Session C	B101, B132, B140, B161
2:30pm-3:00pm	Coffee Break and Poster Session	Adjacent to B101 & Alumni Hall B201
3:00pm-4:30pm	Concurrent Session D	B101, B132, B140, B161
4:45pm-6:00pm	WDCAG AGM	B101
6:00pm-10:00pm	WDCAG Un-Banquet Social	B101, B105

UNIVERSITY OF THE FRASER VALLEY

WDCAG

Poster Presentation Schedule

10:00am-10:30am, 12:30pm-1:00pm, 2:30-3:00pm, B201

Poster #	Name	Abstract Title:	University
1	Dr. Terence Day	The impacts of a cyber-attack on undergraduate teaching and learning	Okanagan College
2	Aayush Sharma	Co-Creating Connected Communities: 15-Minute Neighbourhoods in Surrey, BC	Simon Fraser University
3	Jeffrey Campbell	Surficial geology and permafrost mapping in the Fort Good Hope area, NWT	Thompson Rivers University
4	Julia Franes	A Glacier Survival Assessment of Isosceles Glacier in Garibaldi Park, British Columbia	Thompson Rivers University
5	Brayden Gray-Bowyer	Mount Mariner Glacier Study	Thompson Rivers University
6	Maria Hernandez Rojas	Abnormal behaviour Diavolo Glacier	Thompson Rivers University
7	Valikhan Kussainov	The stability and likelihood of survival of the Cree Peak glacier, Cariboo Mountains, British Columbia	Thompson Rivers University
8	Kathleen Moore	Retreat of an Unnamed Glacier in Stave River Watershed, Garibaldi Provincial Park	Thompson Rivers University
9	Matija Tadic	Accelerated Retreat of Taleomey Glacier	Thompson Rivers University
10	Oscar Vega	Will Moffat peak Glacier survive recent climate?	Thompson Rivers University
11	Greg Fortune	Recession of the Keyhole Glacier, Baffin Island, Nunavut	Thompson Rivers University
12	Heidi Wismath	Assessing and Evaluating Representations of BC in Tourism	Thompson Rivers University
13	Natalie Krizan	Glaciological Sites in the Castle Provincial Parks	University of Lethbridge
14	Roya Mousavi	Historical Analysis of Drought in the South Saskatchewan Watershed Based on Gridded SPI and SPEI	University of Lethbridge
15	Rabecca Thiessen	Cataloguing of rock glaciers in dissimilar regions of the Mackenzie Mountains: Testing for possible semi-automated detection of rock glaciers using topographic data	University of Lethbridge
16	Shiyan Jing	CO_2 levels and indoor air quality in UNBC classrooms	University of Northern British Columbia
17	Faran Ali	Contaminant sediment transport and entrapment in gravel-bed streams	University of Northern British Columbia
18	Kaylee Barnes	Assessing thermal habitat conditions in the Parsnip River Basin, British Columbia	University of Northern British Columbia
19	Alexander Pennock	Investigating the Contributions of Varying Land Uses to Water Quality in Cultus Lake and the Cultus Lake Watershed	University the Fraser Valley
20	Mariah Kashmark	Mapping Ammonia Releases to Major Drainage Basins in Canada	University of Northern British Columbia

Poster Presentation Schedule

10:00am-10:30am, 12:30pm-1:00pm, 2:30-3:00pm, B201

Poster #	Name	Abstract Title:	University
21	Hariharan Sendamangalam Varudaraju	Effects of changing environmental conditions on glyphosate degradation and melatonin production in wild strawberries	University of Northern British Columbia
22	Clay Falk	Synapsis of sulfur oxidating bacteria within Acid Mine Drainage production	University of the Fraser Valley
23	Alison Goeres	Assessing the timing of the extent of the Laurentide Ice Sheet using optical dating, Hudson Bay Lowland, Manitoba	University of the Fraser Valley
24	Aidan Haagensen	Soil health variations in old-growth and re-growth forests in Sx̱ótsaqel/Chilliwack Lake Provincial Park	University of the Fraser Valley
25	Abbey Riddolls	A Comparison of Diel Cycles of Old and Second Growth Watersheds	University of the Fraser Valley
26	Justine Stoeckly	Optical dating of sand dunes to assess the timing of proglacial landscape stabilization, New Jersey Pine Barrens, USA	University of the Fraser Valley
27	Cameron Stanton	Mid-Holocene reconstruction of Riverbend Cave, Horne Lake, Vancouver Island through radiocarbon dating.	University of Victoria
28	Lindsay Worden	A Preliminary Exploration of the Paleontological and Archaeological Potential of Gordon River Caves, Vancouver Island	University of Victoria
29	James Clare	Conservation of the Oregon Forestsnail Within the Fraser Valley Regional District	University of the Fraser Valley
30	Cole Besser, Axel Edgers, Beau Hamilton	Pacific Salmon Management: 35 Years of Change and Progress	Western Washington University
31	Emma Burgess, Leilani Heenan-Letini & Zoe Wiley	Endangered Chinook Salmon: a Comparison of US and Canadian Management Policies	Western Washington University
32	Nicole Charter & Stu Reckase	The Future of Cascadian International Wildfire and Smoke Response	Western Washington University
33	Mark Dalhstrom & Tyler Stewart	States of Sovereignty: An Examination of Indigenous Treaty Rights Honored on the US/CA Border	Western Washington University
34	Tess Reeber & Lily Smith	Cross Border Protection of the Endangered Southern Resident Killer Whale [SRKW] Population	Western Washington University

Paper Presentation Schedule

Session A: 8:30am-10:00am

Room:	Theme:	Presentations:	Abstract Title:	Chair of Session:
B101	Jobs in Geography	Dr. Tom Waldichuk, Dr. Garry Fehr, Blake Collings & Daniel Huesken	What to do with a Geography Degree: Jobs and Other Possibilities	Dr. Tom Waldichuk
B 132	Food & Agriculture	Dr. Rob Newell	Community-based research for supporting integrated food systems planning: Insights from three studies in British Columbia	Dr. Rob Newell
		Alex Glaros	Vertical agriculture in the Lower Mainland, British Columbia: Considerations for food system sustainability and resilience	
		Jofri Issac	A systems thinking approach to examine local food systems planning through a climate-biodiversity-health lens: A Comox Valley case study	
		Mohaddese Ghadiri	An integrated Climate-Biodiversity-Health framework to improve food systems' sustainability	
B140	Health & Accessibility	Keone Gourlay	A Neighbourhood for Everyone: GIS Analysis of Neighbourhood Walkability for People Living With Dementia in Prince George, BC with the DemSCAPE Project	Dr. Mark Groulx
		Mikhaila Carr	Parks, Accessibly Spaces and Storytelling	
		Dr. Mark Groulx	Not for All: Barriers to universal accessibility in outdoor nature spaces across British Columbia, Canada	
B161	Permafrost & Montane Environments	Apryl Nish	Dry vs. moist sites in a montane valley within Waterton Lakes National Park after the Kenow fire	Dr. Olav Lian
		Madeleine Garibaldi	Modelling the impact of surface lapse rate changes on mountain permafrost distribution in four dissimilar valleys in Yukon	
		Nick Noad	Elevational air temperature patterns and implications for permafrost in Northcentral Yukon, Canada	
		Ria Nicholson	Detection and validation of permafrost in the heterogeneous mountain landscape of the Yukon Territories	

Paper Presentation Schedule

Session B: 10:30am-12:00pm

Room:	Theme:	Presentations:	Abstract Title:	Chair of Session:
B101	Perspectives on Health pt.1	Olivia Nieves	Exploring sexually transmitted infection risks among Canadian snowbirds: A study overview	Dr. Valorie Crooks
		Steinunn Jonatansdottir	Being so close: The relational environment of rural nursing	
		Benjamin Lartey	Campaign Organizer and Recipient Perspectives on Ethics of Privacy in Charitable Crowdfunding	
		Jaimy Fischer	From positive change to pandemic pause? Evaluating how investments in safe and connected bicycle facilities impact ridership and gender equity in Victoria, BC	
B132	Community Development & Resilience	Dr. Afia Raja	Tactical Urbanism for Mission Waterfront Development	Dr. Afia Raja
		Cyan LeMoal	Touring Rural Downtowns: Analyzing the Success of Neighboring Kootenay Communities	
		Dr. Talha Qadri	Linking Ambient Noise Analysis with the Sustainable City Planning: Looking Backward to Moving Forward	
		Scott Brown	Planning for Place at the Table, Local Food Systems and Community Resilience: A Comparative Case Study of Terrace and Prince Rupert, BC	
B140	Education in Geography	Crystal Huscroft	Supporting first-year research experiences and external conference presentation within an introductory physical geography course for majors and non-majors	Crystal Huscroft
		Emma Bowick	Lessons from Creative Uncertainty - building a new normal in post-COVID classrooms	
		Daniel Brendle-Moczuk & Dr. Craig Coburn	To be (continued) or not to be? Western Geography, the scholarly journal of the WDCAG	
B161	Water Resources	Wyatt Maddox	Rip-Rap Wave Attack!	Carolyn Atkins
		Jordan Prior	Examining the Environmental Drivers of Sediment Carbon within the Eelgrass Meadows of Clayoquot Sound, BC	
		Melina Sorensen	Predicting the Ecotoxicological Impacts of Microplastics in the Northern Salish Sea: A Novel Approach to Marine Risk Assessment using GIS	
		Megan Howe	Micro Hydropower in British Columbia	

Paper Presentation Schedule

Session C: 1:00pm-2:30pm

Room:	Theme:	Presentations:	Abstract Title:	Chair of Session:
B101	Perspectives on Health pt.2	Tyler Cole	Qualitatively Evaluating the Rapid Rollout of Telehealth in Long-Term Care During COVID-19 in BC	Dr. Valorie Crooks
		Ashmita Grewal	Abortion Related Crowdfunding Post-Dodds	
		Leah Coppella	Resistance & Resilience at Home: Girls, trans, & non-binary youth using sound for sexual wellbeing boundary -making	
		Alishia Lindsay	Straining to accommodate an aging population: Exploring the characteristics of people entering long-term care	
B132	Tourism	Amy Abdel-Malak	Staying afloat during COVID-19: How BC whale-watching operators weathered the shifting regulations	Jennifer Hetherington
		Dr. Patrick Buckley	Multi-Regional CGE database construction: Hawaii and Tourism	
		Heidi Wismath	Assessing and Evaluating Representations of BC in Tourism	
		Yihang Zhang	Pairing partner needs with visitor feedback: Exploring tourism and virtual tourism, in Tumbler Ridge, BC	
B140	Environment & Conservation	Breanna Gueldner	Comprehensive review of gaps and opportunities in the sustainable fashion sector in the Lower Mainland	Dr. Stefania Pizzirani
		Dr. Tom Waldichuk	A review of Kappa: From mythical creature to festival mascot and a promoter of places and natural landscapes in Japan	
		Madeleine Fisher	Protecting the Unseen: The Resiliency of Cold-Water Corals in the Lofoten Archipelago, Norway	
		Benjamin Haagerty	Sharing the results of a Masters on vegan business in Kitsilano and Mount Pleasant	
B161	Remote Sensing & GIS	Dr. Scott Shupe	Exploring Geomorphology in 3D: the spectacular landscapes of Utah	Dr. Scott Shupe
		Jessica Craig	Applying Historical Air Photos in a Web Map to Assist Local Conservation Efforts in the Somenos Marsh Area	
		Ashling Redmond	Solar energy considerations in urban planning: The conflict between solar potential and densification	

Paper Presentation Schedule

Session D: 3:00pm-4:30pm

Room:	Theme:	Presentations:	Abstract Title:	Chair of Session:
B132	Policy	Dr. Don Alexander	Conservation Authorities, the Ontario Greenbelt, and the Challenges They Face from Doug Ford Government	Dr. Don Alexander
		Will Hanlon	A Journey Without a Map: The impact of Brexit on the Crown Dependencies of Jersey, Guernsey, and the Isle of Man	
		Jessica Froese	Into the Deep: Justice and Gender in Norwegian Fisheries Policy	
B140	Culture & Wellbeing	Shane Doddridge	Spatial and Temporal Dimensions of Tŝilhqot'in Place Name Heritage	Dr. J Hughes
		Md Abdur Rashid	Forced to Bhashan Char: Rohingya Refugees and the Climate and Humanitarian Crisis in Bangla-desh	
		Lawrenz Decano	"Almost a City": Understanding and Planning for Refugee Movement to the City Informed By The Context of Nairobi, Kenya	
		Richard Darko	Mobilizing Through Local Agency to Support Place-based Economic Transition: A Case Study of Tumbler Ridge, BC	
B161	Climate Change Impacts	Dr. Mariano Mapili	Extreme Heat Risk Maps - tools for climate resilience planning in the City of Mission	Dr. Talha Qadri
		Morgan King	Assessing Current Literature on Climate Change Risks and Resiliency of the Okanagan Wine Industry	
		Sierra De Buysscher-Nailor	The impact of climate change on western honeybee: an analysis of health and habitat	
		Mackenzie Ostberg	Melting peaks: Resilience in the alpine tourism industries of the Canadian Rockies and Swiss Alps	

Title:

Staying afloat during COVID-19: How BC whale-watching operators weathered the shifting regulations

Authors:

Amy Abdel-Malak (UNBC), Dr. Zoë A. Meletis (UNBC)

WDCAG Abstract:

The COVID-19 era and related restrictions have impacted British Columbia (BC) whale-watching operators and their perspectives on whale-watching and tourism-government relations. Federal and provincial government responses to the pandemic directly impacted whale-watching, for example, by changing vessel capacity or number of tourists allowed per tour. Adapting to such changes required a certain agility on the part of operators. Many operators accessed key government supports such as loans and wage as well. This presentation is based on a mixed methods project centered on the analysis of qualitative interviews with whale-watching tour operators in 2021. It was also informed by limited participant observation on tours. Here, we present data gleaned from virtual interviews with 10 whale-watching tour operators. These operators represent approximately 1/4 of 39 active existing operators in British Columbia, Canada. We offer participant responses and greater response patterns with respect to: 1) how COVID-19 impacted whale-watching operations in BC, 2) what, if any, pivots or changes operators made in response, 3) which supports they accessed and their evaluations of them, and 4) their perspectives on the future of BC whale-watching. We begin with an introduction to: whale-watching in BC; COVID-19's impacts on tourism as well as government responses to these; key concepts such as the Tourist Area Life Cycle, and ideas about how tourism weathers crises. We then present results highlighting key barriers, opportunities, and adaptations experienced by the tour operators, emphasizing their own words. We end by considering longer term implications for whale-watching in BC.

Key terms: whale; tourism; British Columbia; COVID-19; interviews

Presentation type: Paper

ABSTRACT FOR WDCAG, MARCH 10-11, 2023 – PLANNING FOR RESILIENCE AND CLIMATE CHANGE

Don Alexander

Title: "Conservation Authorities, the Ontario Greenbelt, and the Challenges They Face from Doug Ford Government"

Abstract: This presentation will examine the contribution that the Greenbelt makes to climate mitigation and adaptation in the Greater Golden Horseshoe, and how the Conservation Authorities (CAs) have been an integral part of that. The seeds of the Greenbelt lie in the Conservation Authorities of Ontario, whose history stretches back eighty years.

After their establishment, they spread throughout Southern Ontario and proved innovative in adopting a watershed approach to environmental planning and taking a holistic approach to the relationship between farming, deforestation, soil erosion, flooding, the baseflow of rivers, and the quality of habitat for fish and wildlife. Building on this legacy, the Greenbelt has enjoyed widespread public support, and every government since has vowed to protect it.

The current 'Progressive' Conservative government is seeking to open up the Greenbelt to housing in order to increase supply. To do so, they have imposed their dictatorial will on municipalities, overriding official community plans, and seeking to gut already weakened CAs which have provided protection of natural heritage values and a safeguard against flooding.

This presentation will examine the contribution that the Greenbelt makes to climate mitigation and adaptation in the Greater Golden Horseshoe, and how the CAs have been an integral part of that. The current Doug Ford's government's efforts could help wipe out more than three-quarter of a century of progressive endeavor in the conservation field. Both the Conservation Authorities and the Greenbelt represent major achievements in environmental planning in Canada and are significant forerunners of sustainability theory and practice.

KEYWORDS: Conservation Authorities; Ontario Green Belt; Doug Ford government; environmental planning; sustainability.

Contaminant sediment transport and entrapment in gravel-bed streams

Faran Ali
Department of Geography, Earth, and Environmental Sciences, University of Northern British Columbia, Prince George, BC, V2N 4Z9
Email: faran.ali@unbc.ca

Natural landscapes of British Columbia undergo a considerable amount of disturbance owing to several resource extraction initiatives like mining, forest logging, and oil and gas operations. Mining operation disasters like the 2014 Mount Polley spill have a potential of releasing toxic tailing materials into our rivers and lakes and effecting the integrity of our freshwater aquatic ecosystems. The contaminated sediment released get trapped in spaces between the gravel, reducing oxygen supply, and are gradually released overtime, and therefore have a long-lasting impact on salmon and other fish species in the river system. The main objective of this study is to investigate the changes in gravel entrapment, sediment concentration, particle size distribution and geochemical composition of contaminated fine-grained sediment over time and distance travelled under varying bed conditions in artificial gravel-bed streams representing typical watersheds of northern BC. Samples of fine-grained sediment were collected from representative streams in the Quesnel River watershed that have a strong signal of contamination from natural and anthropogenic disturbance activities. These field samples were processed to separate the <63 µm fraction and released in the large-scale recirculating gravel-bed flumes located at the Quesnel River Research Centre. Cutting-edge flume instrumentation was utilized for observing flow and sediment transport characteristics in real time and for collecting a range of time integrated suspended and gravel-entrapped sediment samples for subsequent laboratory. Preliminary results show a complex relationship between the controlling variables and help in providing a better understanding of the contaminated sediment transport in gravel-bed streams in BC.

Key words: contaminant transport; fine sediment; gravel-bed streams; aquatic ecosystems; anthropogenic impacts

Type of presentation: Poster presentation

Assessing thermal habitat conditions in the Parsnip River Basin, British Columbia

K. Barnes[1], *S. Islam[1], B. O'Connor[2], A. Bevington[3] and J. Caryk[1]

[1]Department of Geography, Earth and Environmental Sciences, Faculty of Environment, University of Northern British Columbia, Prince George, BC, Canada

[2]Chu Cho Environmental, Prince George, BC, Canada

[3]British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Prince George, British Columbia, V2M 2H3, Canada

Abstract: River's thermal regimes are the constantly fluctuating spectrum of water temperatures that are influenced by a multitude of factors on different spatial and temporal scales. Ongoing climate change not only increases the long-term climatic states of these regimes but also modulates the severity and frequency of water temperature extremes through atmospheric-water coupled interactions. Air temperature, a key variable that controls water temperature fluctuations in river thermal regimes, often exceeds dramatically during weather extremes such as heat waves and hence significantly affects the surrounding river water temperatures. This study focuses on quantifying river water temperature extreme events in several different river sites across Parsnip River Basin (PRB), British Columbia. The PRB is home to many different fluvial fish species including the Arctic Grayling (*Thymallus arcticus*) which are identified to have critical threshold temperatures of 14.5°C. We examined the frequency of water temperature events exceeding 14.5°C on hourly and daily time scales using the water temperature data from 95 river sites from 2019 to 2021. The analysis includes comparing daily minimum and maximum temperatures and estimating the lag time between air and water temperature. The results show there are 11 different locations along the Parsnip River where water temperatures exceeded 14.5°C during the Arctic Grayling spawning period. In addition, our analysis shows that river water temperatures are strongly coupled to air temperature during heat wave events with longer lag time in mid-summer and shorter in the Spring. These outcomes leverage our ongoing efforts to monitor thermal habitat conditions in the PRB.

Pacific Salmon Management: 35 Years of Change and Progress

Cole Besser, Western Washington University, Bellingham, WA. 98225-9085 colebess000@gmail.com / besserc@wwu.edu and Axel Edgers, Western Washington University, Bellingham, WA. 98225-9085 Edgersj@wwu.edu and Beau Hamilton, Western Washington University, Bellingham, WA. 98225-9085 hamiltb5@wwu.edu

Since the final ratification of the 1985 Pacific Salmon Treaty, there has been a plethora of changes, improvements and complications to salmon management in Canada and the United States. Perhaps more important, however, are the things that have remained unchanged for close to 40 years. Salmon management will always be tricky, but more knowledge makes for more sustainable decisions that account for climate change. We found that since 1946, there has been improvement around international management of Fraser River sockeye salmon fisheries. such as a comprehensive data collection and analysis program to aid in management action. This has been coupled with catch monitoring, test fishing, analysis of escapement, run size, migration route by stock or stock group, and arrival time as well. Despite improvements in recognizing areas where salmon need to be restored, setting priorities on who gets the rights to the salmon harvest first, and setting goals for escapement, they have not stabilized the salmon populations, causing many communities who rely on them to import salmon. The main contributor to this instability is climate change, which is putting a lot of stress on river and stream ecosystems essential to the salmon's life cycle. We conclude that without stemming from the effects of climate change nationwide, then salmon populations will continue to fall, making all these improvements in salmon management less impactful, as this resource is still at risk of collapsing. This means that policies looking to curb climate change, including policies that do not focus on salmon restoration directly, will be more effective at protecting our salmon resources in the long term. Using a literature search has made it clear that legislation such as the 1985 Pacific Salmon Treaty didn't account for the effects of climate change, which is becoming increasingly present in current Pacific salmon management.

Keywords: Salmon, Fraser River, Climate change, Cross-border, Resource Management

Poster

Emma Bowick,
BA Student, Department of Geography, University of Victoria, emmabowick@uvic.ca

LESSONS FROM CREATIVE UNCERTAINTY – BUILDING A NEW NORMAL IN POST-COVID CLASSROOMS

Signature pedagogies in a discipline have a tendency towards the status quo (Shulman, 2005), with changes evolving slowly and not always motivated by a focus on learner needs. For better or worse, the recent intensive pressures on the academy caused by the pandemic have forced us to confront in much more tangible and transparent ways what truly matters to us as teachers and learners and to reflect more openly on our motivations for pedagogical change. This is no less true in Geography and Political Science, where our established modes of teaching and learning have been both challenged and exposed by the rapid and radical pedagogical shifts imposed upon us. As such, the pandemic offers a unique experimental observational period for inquiry. My research was conducted by interviewing students and instructors in Geography and Political Science departments at the University of Victoria. By asking questions about adaptations at the start of the pandemic, innovations along the way, and the development of necessary resiliency throughout, lessons for the future emerged. As we transition towards a 'post-Covid' world, my initial results suggest that teaching and learning approaches are not simply returning to exactly what they were before and instead a "new normal" is emerging. My goal is to allow us to imagine what comes next, what can be discarded, and what should be incorporated into future post-pandemic classrooms. To sustain learning and teaching in Geography and Political Science, we must develop higher education courses that simultaneously build resilience for instructors and make learning flexibly accessible for students both in times of uncertainty and in times when life "just happens." This project allows us to celebrate our collective creative innovations, to acknowledge what worked and what did not, and to envision future possibilities for meaningful change.

Keywords: teaching and learning, higher education, pandemic, resilience, accessibility.

Paper

Title: *To be (continued) or not to be? Western Geography, the scholarly journal of the WDCAG*

Authors: daniel Brendle-Moczuk, UVic; Craig Coburn, ULethbridge

Abstract:

Western Geography, the academic/scholarly journal of the WDCAG has been published since 1990. Its important predecessors were *Occasional Papers in Geography* which began in 1960 and the *BC Geographical Series* which commenced c.1965.

This presentation will cover the history of the above publications and together as an audience we will wrestle whether to continue *Western Geography*.

To be clear, the presenters are committed to resiliency in changing times and accordingly will argue to maintain *Western Geography*, re-establish a full Editorial Board, and publish the annual WDCAG conference winning presentations and posters as well as other submissions.

The presenters also suggest utilising Masters & PhD students, so they can gain experience, as referees for WDCAG conference winning submissions for inclusion in *Western Geography*.

However, because times have changed perhaps others feel differently and it is time to let *Western Geography* go? Thus join this lively session to discuss the future of *Western Geography*.

Keywords: *Western Geography*; publishing; referees; students

Planning for Place at the Table, Local Food Systems and Community Resilience:

A Comparative Case Study of Terrace and Prince Rupert, BC.

Author: Scott Alasdair Brown,

MA Natural Resources & Environmental Studies (Candidate)

University of Northern British Columbia

Abstract:

Impacts due to climate change and the Covid-19 pandemic have highlighted the vulnerabilities of Canadian communities' food security. Supply chain issues resulting in empty shelves and the rising cost of groceries has increased public interest in strengthening our local and regional food systems. The purpose of this research is to explore the relationship between local food systems and community resilience. This relationship is investigated through a comparative case study of two urban communities in the Northwestern region of British Columbia, the cities of Terrace and Prince Rupert. Initial findings from twenty interviews with key food system actors within these communities as well as a matrix analysis of municipal, regional and First Nation food system policy have revealed major gaps in existing policy and the actual needs of Northern, rural and Indigenous community members. Preliminary results show that local food systems do indeed contribute to community resilience but stronger, holistic policy action is needed to recognize and strengthen food system ties within our communities. Local food system producers contribute more to community resilience than just providing food, policy needs to recognize that food is culture, that food is place. To build more resilient communities, more support is needed for programs that enhance social learning through generational knowledge sharing. There is a fundamental necessity to recognize the importance of hunting and harvesting as a key function in food systems planning, especially when considering Northern, rural and Indigenous communities.

Key words:

Community resilience; Local food systems; Food systems planning; Social learning;

Session type:

Paper

Paper

Multi-Regional CGE database construction: Hawaii and Tourism

Dr. Patrick Buckley, 513 High Street, Western Washington University, Bellingham, WA. 98225-9085 patrick.buckley@wwu.edu

Geographic Economic research is based on theory, modeling, and data and of these the least precise and reported on is data. This paper seeks to address this lacuna as part of an ongoing investigation of a proposed 80% increase of Hawaiian minimum wage and movement away from the tourism sector as a prime economic driver using the Australian Centre of Policy Studies (CoPS) TERM-USA CGE model. Hence the theory and model but not closure are predefined making the major task data development. This paper pulls back the curtain on this task, a generally under reported part of research, of combining CoPS 2005 TERM-USA multiregional data with State of Hawaii DBEDT 2017 Input-Output data and Churma's JobsEQ latest occupational data along with a comparison to IMPLAN and The Trade Partnership's CDxports trade data. Model runs highlight the differences that result from different data assumptions. As data sources and development techniques continue to proliferate issues of data merging will become more critical and the development of techniques to perform and evaluate such efforts more important. This paper is an important step on this journey.

Key Words: Hawaii; Tourism; Multi-regional modeling; database development

Endangered Chinook Salmon: a Comparison of US and Canadian Management Policies

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The North Pacific landscape and surrounding ocean ecosystem is home to many species of anadromous salmonids including Chinook Salmon (*Onchorynchus tshawytscha*), a species whose spawning grounds span the North Pacific Coast of the United States and Canada. International borders and borderlands are fluid for Chinook Salmon populations as they live in fluvial and oceanic landscapes. Many populations of genetically distinct Chinook are registered as threatened or endangered in the U.S. and Canada under their respective legislations, the Endangered Species Act (ESA) and the Species at Risk Act (SARA). In this paper we compare the efficacy of Chinook Salmon management policies and protections, specifically focusing on strategies employed for managing endangered and threatened Chinook populations that migrate through international borderlands in Alaska, British Columbia, and Washington. For methodology, we utilized comparative literature research and analysis of existing data sourced from both the U.S. and Canada to determine the success of integrated management and the potential for improved management strategies. Our research demonstrates that despite the systems in place to support endangered and threatened salmon, such as the ESA, SARA, and the Pacific Salmon Treaty (PST), many Chinook populations are still in decline due to a myriad of factors including poor international management. We conclude that in the face of a changing climate, it is paramount to develop thoughtful and comprehensive management policies that span borders to support Chinook Salmon, a species that is an invaluable part of the North Pacific region's many diverse ecosystems, coastal Indigenous cultures, and economy.

Keywords: Integrated management, salmon, endangered species, ESA, SARA

Poster

Surficial geology and permafrost mapping in the Fort Good Hope area, NWT (poster)

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Permafrost, and associated ground ice distribution and abundance, is strongly dependent on surficial geology. In order to understand the potential distribution of thaw sensitive terrain at local to regional scales, surficial geology mapping provides one of the most important tools available. This initial project focuses on mapping surficial geology (1:50,000), permafrost and inferred ground ice conditions for the Hamlet of Fort Good Hope in the Sahtu Region of the NWT using high quality satellite imagery.

A succession of landforms are recognized from mega-scale glacial lineations, recording fast-flowing ice of the Bear Lake Ice Stream, from the ENE to WSW. Proglacial and subglacial fluvial deposits are found east of the Mackenzie River, including a prominent esker complex directly east of the hamlet of Fort Good Hope. Much of the glaciofluvial deposits and the widespread glaciolacustrine deposits from proglacial lakes are overlain by eolian dunes, likely barchan dunes, recording westerly winds off the Mackenzie Mountains.

The Fort Good Hope area is located at the southern boundary of the continuous permafrost zone, where ground ice is mostly found in organic terrain and glaciolacustrine units. In recent decades, permafrost disturbance in the form of the proliferation of thermokarst depressions suggest that ice-rich permafrost is widespread within till deposits across the region. Organic terrain, which occurs as blanket through much of the landscape shows evidence of recent thaw with prominent collapse bog scars and widening of fen channel networks.

Key words: permafrost; surficial geology; cartography; climate change; Mackenzie Valley

Parks, Accessible Spaces and Storytelling

This is a paper presentation.

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Key words:

Accessibility; nature-based tourism; outdoor recreation; information; creative analytic practice

Abstract

The health and wellbeing benefits that nature provides for our communities is well known. Nature can improve cognitive restoration, reduce stress and provide opportunities for connection. At the same time, access to nature-based tourism and outdoor recreation spaces is inequitable, as planning processes often fail to prioritize access and inclusion. Many studies have documented

interactions between persons with a disability (PwD) and physical, attitudinal, and informational barriers within nature spaces. These studies highlight, among other things, a lack of reliable and comprehensive accessibility information and the challenges this gap creates for PwD in essential trip planning processes. This research draws on the knowledge and lived experiences of a small and diverse group of people living with diverse impairments. Field observations utilizing a photovoice methodology and reflective journals were used to document experiences with (in)accessibility in nature spaces in two BC Parks regions. A thematic analysis of this data uncovered four emergent themes related to access and inclusion within these regions. Findings from the project demonstrate how BC provincial parks might be experienced by an individual with a range of impairments and their embodiments of nature through the development of place-based narratives that present objective accessibility standards (e.g., infrastructure measurements) and the experiences of PwD in a consumable way. Throughout this process, ethical challenges arose in attempting to represent lived experience using creative analytic practice and storytelling. This research highlights information gaps and can provide a pathway for researchers in exploring the development of consumable accessibility information in ethical ways.

The Future of Cascadian International Wildfire and Smoke Response

Nicole Charter, Western Washington University, Bellingham WA, 98225-9085, charten@wwu.edu and Stu Reckase, Western Washington University, Bellingham WA, 98225-9085, reckase@wwu.edu

This study explores the future of crossborder smoke pollution, and to a lesser respect wildfires movement, between the United States and Canada specifically in the Cascadia region. As the climate in the pacific northwest continues to become drier and warmer with longer dry seasons, regional fire regimes are expected to change as well. These changes will result in smoke and wildfire patterns that are nation-agnostic; creating the potential for populations on either side of the border to be harmed by the policies of the other. As a result, comprehensive planning strategies and policies must be the primary tools for international governments to mitigate human and environmental damage from cross-border smoke pollution and wildfires. Using historical records and modern GIS data on the frequency and intensity of wildfires, this study shows that wildfires and cross-border smoke will become more common in the near future. As a result, the skeleton structure provided by current international policy and air quality agreements should be used to inform Canadian and American governments' cooperation to protect borderland populations and natural resources.

Keywords: wildfire, policy, smoke, international, borderland, pollution

Poster

Conservation of the Oregon Forestsnail Within the Fraser Valley Regional District

James Clare | February 7, 2023
Department of Geography and the Environment, University of the Fraser Valley

The Oregon Forestsnail, or *Allogona townsendiana*, is one of British Columbia's largest land-snails (TAARA Environmental, 2006). The Canadian population spans primarily across the Fraser Valley, BC, and it is estimated that 3313 square kilometers of their 135,000 square kilometer global range is located within British Columbia. Despite the small proportion of habitat within Canada's border, it is thought that 10-20% of the Oregon Forestsnail's total population may reside in British Columbia (Edworthy et. al, 2012; Environment Canada, 2016; Heron, 2015). The impacts of habitat fragmentation on known populations have been severe, and as a result, the Oregon Forestsnail has been designated as Endangered under the federal *Species At Risk Act* since November of 2002 (COSEWIC, 2002).

The BC Conservation Data Center currently has 94 occurrences mapped across British Columbia. 47 of these occurrences are based on sighting data that is 10 years or older, and only 10 of the 94 sites are based on data within 5 years old (Government of BC, n.d.). The current recovery plan for the Oregon Forestsnail is based on that data, and priorities may be impacted by a more recent assessment of the Oregon Forestsnail's distribution and current threats.

This project was conducted with the purpose of re-confirming and updating the spatial distribution of the endangered Oregon Forestsnail in the Fraser Valley Regional District to aid in directing recovery efforts currently established by the Government of Canada. Using spatial data provided by the BC Conservation Data Center, occurrences within every municipality in the Fraser Valley Regional District except the City of Abbotsford were selected. The City of Abbotsford was not included in this study due to time constraints. Sampling was carried out between early April and late June, during the Oregon Forestsnail's most active months (Westereng & Cordeiro, 2009).

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Qualitatively Evaluating the Rapid Rollout of Telehealth in Long-Term Care During COVID-19 in B.C.

Tyler Cole, Valorie A. Crooks, Janice Sorensen, Sherin Jamal, Akber Mithani

Presentation type: Paper

During the COVID-19 pandemic, physicians across the Canadian province of British Columbia connected virtually to long-term care home residents through video and phone calls, texting, and emailing to reduce transmission risk. While this rapid rollout was needed to safeguard residents' health and living space, physicians and staff who work closely with long-term care facilities noted concerns about how sole reliance on virtual care may negatively impact residents. Our team is qualitatively exploring the effectiveness of such care during the pandemic based on residents', family caregivers', physicians', and staff members' lived experiences. Using a utilization-focused evaluation approach, our research includes person-centered, semi-structured interviews with residents and family members, and focus groups with physicians and staff. In keeping with the focus of this special session, in this presentation we consider some of the ways in which the COVID-19 pandemic opened up opportunities for such research, such as through the creation of unique funding calls, coupled with the challenges we face by capturing the lived vulnerabilities experienced by long-term care residents during the pandemic due to factors such as residents' abilities to recall recent events.

Key words: telehealth; long-term care; COVID-19; equity; effectiveness

Resistance & Resilience at Home: Girls, trans, & non-binary youth using sound for sexual wellbeing boundary-making

Paper

Leah Coppella, Alanna Goldstein, Sarah Flicker

To understand how COVID-19′s stay-at-home orders impacted youths' experiences of home, privacy, and sexual wellbeing, we conducted five virtual focus groups (n = 34) with adolescent girls', trans', and non-binary youths' in the GTA. In this presentation, we will discuss our recently published paper on how sexual wellbeing during the pandemic is practiced in relation to, dependent upon, and negotiated at home. Using intersectionality theory and embodiment theory, we found youth needed spaces where they were not only unseen, but importantly, unheard. We also look at how boundary-making is dependent on identity. Youth primarily negotiated sonic privacy through (a) sound-proofing, (b) sound warnings and (c) "silent reassurance", a term we coined to describe the precursor of silence from other household members in order for youth to feel safe enough to practice sexual wellbeing. This research shows how privacy, gender and sexual identities were negotiated at home in times of extreme uncertainty, highlighting how implications of home as a 'place' during the pandemic, constructs sexual wellbeing. We understand the home as a complex space that can not only determine sexual wellbeing, but where health-promoting boundaries can be negotiated, and resistance and resilience can be found.

Keywords: adolescent; home; intersectionality; sound; boundary-making

Applying Historical Air Photos in a Web Map to Assist Local Conservation Efforts in the Somenos Marsh Area

Author: Jessica Craig, Geography Department, Vancouver Island University

Abstract:

Aerial photography has been collected in British Columbia since at least 1936, providing a wealth of information on the evolution of land cover and past environmental conditions. However, many of these older images are difficult for the general public to access. The latest developments in the functionality of ESRI's ArcGIS Online provide a user-friendly method to create and disseminate web-based maps and other spatial products. This project collated aerial photographs of the Somenos Marsh Area available between 1936 and 2014. Analog photos were digitized and processed into orthorectified imagery. This collection imagery was then made available in a customized web map application for volunteers of the Somenos Marsh Wildlife Society. This web map application provides a useful resource for studying historical land use change; and will facilitate ecological monitoring and remediation projects, and public education efforts. This project demonstrates the ability of ArcGIS Online web applications to make historical aerial photography more accessible to the public and support environmental conservation efforts.

Keywords: aerial photographs; web maps; ArcGIS Online; data access; Somenos Marsh

Paper Presentation

States of Sovereignty: An Examination of Indigenous Treaty Rights Honored on the US/CA Border

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This study explores the impact of the US/CA border on the Coast Salish people, who have lived in the Pacific Northwest since time immemorial. The border imposes both physical and intangible barriers that negatively impact their livelihoods and heritage. By examining historical contexts and utilizing academic research, the study investigates the systematic interactions between the border and the Coast Salish within the imperial context, and its effects on their economy and politics. The study highlights the resiliency of Indigenous communities and their struggle to maintain political sovereignty in both countries, which is exacerbated by external forces in the borderlands. This examination reveals the complex relationship between historical context, treaty rights, and Indigenous sovereignty in the borderlands. The study concludes by calling for greater recognition and respect of Indigenous treaty rights and support for Indigenous sovereignty and self-determination in the region.

Keywords: Coast Salish, borderlands, environmental justice, urban planning, land use law, treaty rights, indigenous land use

Poster

Mobilizing Through Local Agency to Support Place-based Economic Transition: A Case Study of Tumbler Ridge, BC

Richard Darko [a*] and Greg Halseth[b]

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[b] Canada Research Chair, Rural and Small Town Studies University of Northern British Columbia 3333 University Way Prince George, V2N 4Z9, B.C., Canada

Abstract

Scholars have underscored the ineffectiveness of top-down development policies, inherent vulnerabilities within staples-dependent economies, and deindustrialization across historically, small and remote resource towns. Staples-dependent communities struggle with boom and bust cycles that threaten economic viability and community cohesiveness. As a response to trends shaping resource towns, many communities have resorted to locally-driven and bottom-up development approaches to support economic transition. Drawing upon key informant interviews with a case study of Tumbler Ridge, British Columbia, Canada, this research explores the role of local agency in mobilizing local investments to support a place-based economic transition. Our findings highlight how vulnerabilities within the staples-dependent economy present opportunities for unlocking local talents, energies, and capabilities latent within paternalistic institutional structures to enact change via investments in place-based economic planning, social and economic infrastructure, and place revitalization. We also demonstrate how these place-based investments are mobilized through a collective local agency and a network of extra-local actors to foster local aspirations and vision.

Keywords: resource towns; local agency; investments; staples-dependent economy; place-based economic transition.

The impacts of a cyber-attack on undergraduate teaching and learning.

Terence Day, Department of Geography, Earth and Environmental Science, Okanagan College, Kelowna, BC, V1Y 4X8.

KEY WORDS: Teaching; Learning; Undergraduate; Cyber-attack; COVID-19

Poster

A cyber-attack on the Okanagan College computer network was detected at 6.15 am on Monday January 9th, 2023, the first day of the winter semester. The college computer network and website were shut down within 45 minutes, approximately one hour before the first lectures of the new semester were scheduled to begin. The impacts were immediate, and in some cases surprising. Many faculty planned to consult the online schedule to check room locations, but the schedule was inaccessible. The Learning Management System was unavailable, and it was impossible to communicate directly with students. There was no campus wifi, software license managers were offline, and no campus printers were available. However, faculty ensured classes proceeded and there were very few class cancellations. Although COVID-19 and the online pivot increased post-pivot dependency on online systems (Day et al, 2023), I observed it also increased the resiliency of faculty and students by encouraging innovation and adaptation in the face of adversity. Valuable lessons were learned from the cyber-attack and may ultimately benefit both teaching and learning.

Day, T., Chung, C. K. L., Doolittle, W. E., Housel, J., & McDaniel, P. N. (2023). Beyond COVID Chaos: What postsecondary educators learned from the online pivot. *The Professional Geographer*, 1-17. 75:1, 14-30, DOI: 10.1080/00330124.2022.2081225

Sierra De Buysscher-Nailor – Application to present at WDCAG 2023

Title: The impact of climate change on western honeybee: an analysis of health and habitat

Author: Sierra De Buysscher-Nailor (Undergraduate student). Project supervised by Dr. Jeff Lewis

Abstract:

The western honeybee (*Apis mellifera*) is a globally distributed species that is an integral part of many ecosystems. This research aims to identify how climate change will impact the health (reproductive ability, flight eligible hours, and pests and disease) and the habitat (changes in phenology) of *A. mellifera*. The specie's ability to forage is reduced at temperatures above 30°C. This research identified that foraging days have already been reduced since the 1970s and will be further reduced by the 2070s. Another key finding was that spring is occurring earlier in the year during the 2020s than it was in the 1970s and will continue on this trend into the 2070s. Given that daylength hasn't changed, this has led to a mismatch in phenology between the honeybee and flowering plants (their food source). Also, the *Varroa destructor* mite is the lead cause of death for honeybees across North America and has experienced both beneficial and adverse effects of climate change to date. Overall, this study has found that *A. mellifera* are currently experiencing the consequences of human-induced climate change and will experience much greater challenges in the future.

Key terms: climate change; phenology; global warming

Presentation type: paper

"Almost a City": Understanding and Planning for Refugee Movement to the City Informed By The Context of Nairobi, Kenya

Lawrenz Decano
Department of Geography and Environment
University of Lethbridge
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Paper presentation

Abstract

Durable solutions to refugee issues have often been dependent upon humanitarian efforts enforced through refugee camps. However, mainstreamed ideas of refugee camps as pathways for refugee solutions, in hindsight, create blind spots in addressing problems beyond the context of camps. Urban refuge is a strategy pursued by refugees and displaced persons as a solution to their forced migration. To fully understand this phenomenon, we must look at what forces influence the movement of refugees from camps to cities to better plan for urban refuge. Using reports and existing knowledge of refugee experiences in camps and the city of Nairobi, Kenya, this paper provides a conceptual and theoretical understanding of the propensity for refugees to move towards the city. Shifting notions of refugees from passive subjects to active participants is important in reframing refugees as political actors with human agency. This paradigm shift aids in analyzing the dialectic between refugees as active political individuals and the systemic structures in refugee camps and the city. Examination of this dialectic leads to a proposal to complement humanitarianism with development-based strategies to better address urban refuge issues and to support the integration of refugees wholly into urban life and spaces.

Keyword Terms: Nairobi; Bright Hope Thesis; Almost a City; Ambivalence; Formalization

Spatial and Temporal Dimensions of Tŝilhqot'in Place Name Heritage

Shane Doddridge
MA Student, Anthropology – University of Victoria
Cultural Heritage Coordinator, Tŝilhqot'in National Government
Affiliated organisation: Tŝilhqot'in National Government

Paper presentation format

Key words: indigenous toponymy; Tŝilhqot'in; intangible cultural heritage; ethnographic mapping; cultural landscapes

The place names of the Tŝilhqot'in First Nation in British Columbia's southwest interior are considered to be an important form of intangible Tŝilhqot'in cultural heritage, connecting people to places through past, present, and future. Following an ethnographic methodology centring collaborative cartography and on-the-land interviews with Tŝilhqot'in knowledge holders, this paper presentation describes some of the dynamic and culturally distinct ways that Tŝilhqot'in place names manifest through time and space. These nuanced dimensions are informing contemporary toponymic practices across the Tŝilhqot'in cultural landscape, including the adoption of indigenous place names into the Provincial gazetteer, the installation of dual-name public road signs, everyday cartographic applications, and various assertions of indigenous jurisdiction, rights, title, and sovereignty.

WCAG Abstract: Clay Falk

Title:

Synapsis of sulfur oxidating bacteria within Acid Mine Drainage production

List of authors and affiliations:

Lead author: Clay Falk – University of the Fraser Valley (Student)

Co-author: Alan Reid – University of the Fraser Valley (Professor)

Key words:

AM; Pyrite; Mining; Sulphur-oxidating; Ochre

Indication:

Poster

Body:

Acid mine drainage (AMD) is the prominent environmental pollutant associated with the resource extraction industry. AMD primarily affects aquatic environment's due to its liquid form, highly acidic nature and ability to readily dissolve heavy-metals common to mining, such as Hg and Cd. Iron oxides and hydroxides are produced as a product of AMD production. These substances can precipitate out, creating an orange precipitate called ochre. Due to ochre's density, it accumulates on the bottom of stream beds, smothering primary producers and locking up available nutrients. Of the several hundred different types of sulphide-bearing minerals responsible for AMD production, pyrite-rich ore bodies are the most common. The typical process of AMD production involving pyrite is simple; however, to establish dangerous pH concentrations of 2.3 - 3.5, the reaction requires several right factors, including temperature, pH, water and free oxygen content, which are the most influential. Under normal abiotic circumstances, AMD is a very-slow self-limiting reaction. With the presence of clear sulphur-oxidizing chemolithotrophic bacteria, the otherwise slow self-limiting reactions turns into a swift autocatalysis reaction which may not stop for thousands of years. Little is known about these bacteria, which readily create pH environments of less than 2.0 and are extremely hard to culture

due to their polyextremophile nature; however, they commonly exist within mine tailing ponds. This study works to combine current and previous research on sulphur-oxidating bacteria within AMD production to create a synopsis that will provide a centre of knowledge and identify ideas for future research and associated limitation.

Author:

Main author: Clay Falk – University of the Fraser Valley (Student)

- Yes I wish to be considered for a student award. I am a undergraduate within the school of land use and environmental change department

Co-author: Alan Reid – University of the Fraser Valley (Professor)

From positive change to pandemic pause? Evaluating how investments in safe and connected bicycle facilities impact ridership and gender equity in Victoria, BC

Authors: Jaimy Fischer[1], Trisalyn Nelson[2], Meghan Winters

[1] Faculty of Health Sciences, Simon Fraser University, [2] Department of Geography, University of California Santa Barbara

Keywords: active transportation; bicycling, big data; gender equity; COVID-19

Governments are investing in active transportation infrastructure to support healthy, resilient city building and to address the pressing issue of climate change. An example is the City of Victoria, BC, Canada, who invested $11+ million to build a connected network of 'All Ages and Abilities' (AAA) bicycling facilities. Longitudinal studies of such interventions are limited by a lack of data on who is bicycling, and the rarity of disaggregated data limits our understanding of how infrastructure can promote equity for underrepresented groups in bicycling, such as women. Our study aims to address these gaps using conventional and crowdsourced data on bicycle ridership. We are integrating observational counts and crowdsourced data from Strava, a popular mobile fitness app to i) measure change in ridership (overall and for women specifically) pre – post intervention (2016 – 2022) and ii) map spatial patterns of change in bicycling over time. We are modeling ridership change using regression models and assessing spatial patterns of change using a local indicator of spatial autocorrelation. Results show the intervention had a positive overall effect on ridership and gender equity, but effects were obscured by shifting travel patterns through COVID-19. At the conference we will discuss the implications of our findings and how the pandemic may have enduring impacts on bicycling in cities. Situating our discussion within the broader context of planning for climate resilience, we will also discuss how, by prioritizing gender equity, planners might create bicycling policies that advance equity within the social dimension of sustainable mobility policy.

WDCAG Conference 2023 - Abstract
Paper Presentation

Title:
Protecting the Unseen: The Resiliency of Cold-Water Corals in the Lofoten Archipelago, Norway.

Author:
Madeleine Fisher, University of Northern British Columbia

Abstract:

Lophelia pertusa, a cold-water coral that has colonized the depths surrounding the Norwegian Coast for the last 10,000 years, is plighted by anthropogenic issues. *L. pertusa* is a slow-growth stony coral, which serves as an intricate and complex habitat for many species of fish and other fauna. The colonies of *L. pertusa* act as an indispensable foundation of a healthy Arctic marine ecosystem. Modern fishing techniques, primarily seafloor trawlers, pose a serious threat to the survival of these coral reefs, as they destroy everything in their paths. Anecdotal evidence from local fishers suggest that this destruction is greatly affecting their catch numbers. Despite the inferred cycle of habitat destruction leading to a decrease in fish, trawling has continued. Direct exploitation of Norway's seafloors is immediate and leaves a visible trail of destruction in its wake, but the slow, covert impacts of climate change are just as potent. The gradual warming and acidification of the planet's oceans is projected to have negative impacts on the deep-water corals of the North. The devastating effects of seafloor trawling, paired with the indirect anthropogenic effects of climate change, pose significant threats to the long-term survival of *L. pertusa*, and therefore their ecosystem at large. In this presentation, *L. pertusa*, along with the many challenges it faces, will be outlined and discussed based on an analysis of the current literature. The research presented is critical in understanding the importance of protecting seafloor ecosystems, and the communities tied to their well-being.

Key Words: Lofoten; Norway; cold-water corals; *Lophelia pertusa*; climate resiliency.

Recession of the Keyhole Glacier, Baffin Island, Nunavut.

This study aims to describe and predict the approximate rate of glacial recession of the Keyhole Glacier located on Baffin Island, Nunavut, Canada.

Keyhole Glacier is situated in the Central Baffin Island Mountains, within the unceded territory of the Inuit, Nunangat First Nations. By identifying and marking the distance between the Little Ice Age moraines and the position of the glacier toe in recent satellite imagery, this paper concludes that retreat since the Little Ice Age has been, on average, $4.5ma^{-1}$. In comparison, between 1990 and 2020, Keyhole Glacier has been retreating by approximately $7ma^{-1}$.

Using false-colour images from the Sentinel-2 L2A Satellite to observe the accumulation zone of the glacier during the summer of 2022 in combination with the available imagery showing the glacier between 1990 and 2020. This study concludes that since the glacier has been receding at a consistent rate since the end of the Little Ice Age, it is unlikely that this trend will change. Therefore, this study predicts Keyhole Glacier will not survive if the current pattern of climatic conditions persists.

Fortune, Greg

A Glacier Survival Assessment of Isosceles Glacier in Garibaldi Park, British Columbia

Julia F. Franes

Thompson Rivers University

This study examined the Isosceles Glacier in Garibaldi Provincial Park, British Columbia, Canada using satellite images to determine this northeast-facing cirque glacier's likelihood of survival in the current climate. Using a range of remotely sensed datasets, we show that despite slow rates of sustained retreat in recent decades and slightly higher rates of retreat since the last Little Ice Age, Isosceles Glacier is poised to retreat more dramatically due to evidence of significant thinning in the accumulation zone. Geomorphological analysis of the position of inferred terminal moraines using high-resolution Google Earth images of the Isosceles Glacier indicate a retreat of approximately 2,150 m since the Little Ice Age. Comparison of Google Earth Engine Timelapse images of the Isosceles Glacier from 1985 and 2016 indicate an average retreat of 3.6±1.0 ma—^{1}, which is low compared to other glaciers in the region. Despite this low annual retreat rate, the 2021-22 accumulation area ratio (AAR) of the Isosceles glacier was 0.35, which is less than the suggested equilibrium accumulation ratios AAR_0 of 0.54±0.07 for glaciers of its size. Additionally, Sentinel-2 imagery indicates the accumulation zone characteristically has discontinuous snow cover, displays the emergence of rock outcrops, and new rock exposure around the accumulation zone suggesting the Isosceles Glacier's accumulation zone is thinning. A lack of a sizeable and consistent accumulation zone suggests this glacier may accelerate its retreat and not survive current climate.

WDCAG Conference 2023 - Abstract

Paper presentation

Title:

Into the Deep: Justice and Gender in Norwegian Fisheries Policy

Author:

Jessica Froese, University of Northern British Columbia

Abstract:

Norway can be characterized by many things, beyond its fjords and midnight sun, the country is infamous for both its substantial fishing industry and its culture of gender equality. Norwegian women are among those across the globe with ancient traditions and lifestyles that connect them to the sea and its fish. While these positive reputations have been well-earned, Norway is not as progressive as it is often portrayed. Fisheries at every scale have a long history of sex-based discrimination, but more attention is being paid to women's roles as the industry undergoes heavily-critiqued centralization. The goal of this research is to critically examine and compare recent gender equality strategies from the Norwegian fisheries sector with international recommendations. After much deliberation, Norway's 2021 national aquaculture strategy, entitled "A Sea of Opportunities," and the UN's 2018 "Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication" were chosen to represent the national and international fisheries policies for comparative analysis. This research was informed by a review of relevant literature as well as my on-the-ground experience in Tromsø and the Lofoten Islands. Grounded in blue justice theory and the concept of gender mainstreaming, this research seeks to accomplish two things: 1) explore how gendered issues are understood in the context of international fisheries policy recommendations, and 2) evaluate how Norway is or is not implementing international recommendations into national fisheries policy. Analyzing Norway's national strategy alongside international recommendations grounds my place-based study in an important global context.

Key words:

Fisheries; policy; gender mainstreaming; blue justice; Norway

Modelling the impact of surface lapse rate changes on mountain permafrost distribution in four dissimilar valleys in Yukon

Due to the linear distribution of permafrost in low latitude and maritime mountains, it is hypothesized that with climate change the lower elevational limit of permafrost in these environments will move upslope. This phenomenon is referred to as elevation dependent warming (EDW). However, in high latitude continental mountains this may not hold true due to the presence of inversions (increasing air temperature with elevation) and the non-linear elevational distribution of permafrost, which may leave valley bottoms more susceptible to thaw.

To test the validity of EDW in high latitude, continental mountains, surface air temperature maps for four dissimilar valleys in Yukon, Canada (all inversion prone) will be modeled for several different future scenarios using downscaled climate reanalysis data and in-situ inversion measurements. These scenarios will include a combination of both incremental changes to the inversion strength and a baseline increase in the mean annual air temperature. The impact of warming considering changes in the inversion on the future ground thermal regime will then be assessed using the new air temperature distribution and current surface and thermal offsets.

The ultimate aim of this study is to determine if the assumption of EDW applies to high latitude continental mountains or if the presence of winter inversions results in a different distribution of warming. Understanding both the impact of inversions and the subsequent modification by surface characteristics on the ground thermal regimes in these high latitude continental mountains is critical to accurate prediction of permafrost response to climate change and potential related hazards.

Authors

Madeleine Garibaldi University of Lethbridge (lead author PhD Student)

Philip Bonnaventure University of Lethbridge

Keywords

Permafrost; Modelling; Climate Change; Elevation Dependent Warming

Presentation Type

Paper? I am not sure what this means but if possible I would like to do an oral presentation. If that is not available than a poster is fine as well.

An integrated Climate-Biodiversity-Health framework to improve food systems' sustainability

Mohaddese Ghadiri
Ph.D. Candidate, School of Public Administration, University of Victoria

Abstract

Food systems are connected with multiple aspects of sustainability and human well-being, such as pollution, health, climate change, biodiversity loss, water shortage, and soil infertility. In many places across the world, food systems are neither resilient nor sustainable. Using an integrated approach can be helpful to address this issue and improve the sustainability and resilience of food systems. This presentation shares a study using a climate-biodiversity-health (CBH) nexus lens to identify systems relationships among food systems and other sustainability priorities in the Comox Valley region. A community-based approach and semi-structured interview method are used to engage provincial, regional, and local stakeholders in the development of a framework for revealing food planning challenges, strategies, and outcomes with respect to CBH considerations. This framework reveals how various strategies align or conflict with different CBH imperatives, which can inform integrated community sustainability planning efforts. The framework is developed within the Comox Valley context, but it can be adapted to other communities. This presentation details the development of this framework, the interconnections among different components, and how this framework can be developed in other communities.

Keywords: Food systems; Integrated planning; Sustainability

Title: Vertical agriculture in the Lower Mainland, British Columbia: Considerations for food system sustainability and resilience

Presenters: Dr. Robert Newell, Dr. Alesandros Glaros

Vertical agriculture could potentially contribute to local food system sustainability and resilience; however, its contributions depend upon its practical implementation and social acceptance. This presentation shares the results of focus groups and an online survey in the Lower Mainland, British Columbia, where we asked local/regional government, stakeholders, and the public about their perceptions of vertical agriculture. Focus group participants described vertical agriculture's potential for supporting public institutions and for bolstering local food supply, while also noting that zoning barriers, competing land-use priorities, high cost, and lack of community acceptance may hinder widespread implementation. Results from the survey indicate that those most interested in vertical agriculture are wealthier individuals who are interested in environmental issues and frequently participate in environmental and local food initiatives. Key concerns regard its cost and perceived artificiality. Further research should consider diverse ways of implementing vertical agriculture and engage wider community groups in vertical agriculture planning.

Poster presentation

Assessing the timing of the extent of the Laurentide Ice Sheet using optical dating, Hudson Bay Lowland, Manitoba

A. Goeres[1*], M. Schaarschmidt[1], O.B. Lian[1], T.J. Hodder[2,3], M.S. Gauthier[2], M. Ross[3], V. Brewer[1] and N. Ferguson[1]

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The Laurentide ice sheet (LIS) repeatedly waxed and waned over the North American continent during the Quaternary period and profoundly impacted global sea levels, and the local terrestrial environment. The depositional record, which includes glacial and sub-till nonglacial sediments, provides an excellent stratigraphic record to investigate the timing of ice-free periods and glacial dynamics of the LIS. However, pinpointing the timeline of nonglacial periods utilizing radiocarbon dating is difficult as the organic material found often exceeds the dating limit of the method (~50 ka), and the material may be poorly preserved or contaminated. An alternate geochronological method that can discern the time since the last exposure to sunlight is optical dating, which typically has an upper dating limit of about 100 ka. We have applied optical dating of quartz using a single-aliquot regenerative-dose protocol to several key stratigraphic beds in the Hudson Bay Lowland region of northeastern Manitoba. The quartz measured in our study showed luminescence signals with an exponential plus linear dose-response that extends the upper dating limit to over 150 ka. We observed a relatively high spread in equivalent doses from sample aliquots which led us to apply the minimum age model to determine representative equivalent dose values for the age calculations. This poster will use newly acquired data to draw conclusions about the timing of ice-free periods, which provide one line of evidence to constrain the geometry of the LIS in northern Manitoba during the last glacial cycle.

Key words: Quartz; Luminescence; Manitoba; Glaciation; Paleoenvironment

A Neighbourhood for Everyone: GIS Analysis of Neighbourhood Walkability for People Living With Dementia in Prince George, BC with the DemSCAPE Project

Presenter: Keone Gourlay

Abstract:

Being outside and experiencing the neighbourhood provides many benefits for people living with dementia (PLWD). Having a walkable neighbourhood promotes ageing in place while allowing for PLWD to maintain social relationships, connect with nature, and develop a sense of freedom. Neighborhoods with high walkability not only make the neighbourhood more inclusive, but more enjoyable too. While PLWD are affected by general walkability factors such as presence of sidewalks and the availability of destinations such as health services or recreational facilities, dementia-inclusive neighbourhoods must also be distinctive and easy to navigate, as PLWD are more prone to become disoriented or to get lost. The Dementia-Inclusive Streets and Community Access, Participation and Engagement (DemSCAPE) project aims to identify how PLWD interact with their environment and how municipalities can implement change to make cities more walkable for PLWD. A GIS analysis was completed to assess the need for infrastructure allowing aging-in-place for PLWD. This analysis looked at the neighbourhoods of 6 participants in Prince George, BC, and found that neighbourhoods in the city are severely lacking the infrastructure needed to support walkability for PLWD. From the absence of sidewalks to disorienting neighbourhood patterns, the city of Prince George has a long way to go in supporting aging-in-place for PLWD. It is the intent of this project that these findings can be used to influence protocol in municipalities to implement supportive infrastructure for PLWD.

Keywords: Dementia; Walkability; Aging in Place; GIS; Inclusive Neighbourhoods

Type: Paper

Mount Mariner Glacier Study: Poster Presentation

Brayden Gray-Bowyer (Undergraduate student)

Thompson Rivers University

Abstract:

This study compares satellite imagery of a small cirque glacier in 1985 and 2020 to assess the changes that have occurred over the 35-year period. Sentinel-2 multispectral imagery is used to estimate the likelihood that the glacier will survive current climate conditions. The glacier of study (Mount Mariner-South) is located approximately 31 km north of Tofino, Vancouver Island, B.C., within the unceded territory of the Ahousaht First Nation (49.4534 -125.7608). In 1985, the glacier length (highest point in accumulation zone to the toe of ablation zone) was approximated 1215m±10m; however, 35 years later (2020) the glacier was approximately 1003m±10m in length; this suggests a difference of 211m±10m over this period. These measurements yield an average rate of retreat of 6 ma^{1}. Based on the size and pattern of the accumulation area observed during summer 2022, it appears that the glacier is shrinking, which may have consequences for nearby watersheds.

Abortion Related Crowdfunding Post-Dobbs (Paper Presentation)

Ashmita Grewal, Jeremy Snyder
Faculty of Health Sciences, Simon Fraser University.
Ashmita_grewal@sfu.ca

The use of crowdfunding campaigns for abortion related reasons has been of little success in the past, though there is sparse research on this topic post Dobbs. V. Jackson Women's Health Organization. In this presentation we will discuss our recent paper on abortion related crowdfunding activity post the Dobbs decision. A total of 511 campaigns were identified from GoFundMe and GiveSendGo, and 20% were reviewed to categorize into one of five campaign goal type categories. The authors also categorized, included campaigns, into four types of rationales for supporting these campaigns. After reviewing the campaigns, we were left with 398 campaigns. The most common locations for campaigners seeking to facilitate access to abortions were in New York (46, 14.9%), California (n=37, 12.0%), Massachusetts (n=17, 5.5%), Pennsylvania (n=15, 4.9%), and Texas (n=14, 4.5%). Justifications for donations in these campaign narratives fell into four categories, for example the rights category included a campaigner saying "She scheduled an abortion in Ohio, but Ohio had a trigger clause so when the Roe v. Wade decision came down… So, we are fundraising to get her to Illinois for the procedure." Between the leak of the Dobbs decision and US midterm elections in 2022, 398 abortion-related crowdfunding campaigns in the US raised over $3.8 million from over 50,000 donations, though it is not clear how long-lived this increased support will be. Moreover, campaigns are vulnerable to the hosting platform's content moderation policies while also raising concerns about equity in which campaigns receive support.

Not for All: Barriers to universal accessibility in outdoor nature spaces across British Columbia, Canada

Presenter: Dr. Mark Groulx (UNBC School of Planning & Sustainability)

Abstract:

The health and well-being benefits of nature contact are well established, but inequitably distributed. Among other communities, persons with a disability have fewer opportunities to engage in nature contact in a self-determining way due to the presence of interlocking physical, informational, service, policy, and attitudinal barriers. The purpose of the Nature for All project was to utilize accepted accessibility standards to document the state of accessibility in outdoor tourism and recreation spaces across British Columbia. Following community-based research practices, a team of academic researchers and experts working in accessibility practice collected over 6,700 unique measurements documenting potential barriers across 132 outdoor tourism and recreation destinations. Of the 947 infrastructure elements (e.g., pit toilets) and features (e.g., beaches) that were assessed, fewer than five percent met all required accessibility standards. This presentation shares evidence about the categories of infrastructure that are most problematic from an access and inclusion perspective, as well as those that are comparable brightspots. It also reflects on the planning and management practices that must be addressed to advance the state of accessibility in the outdoors. Set within the context of recent provincial and national accessibility legislation, results demonstrate a considerable gap between the policy goal to become barrier free by 2040 and the present state of accessibility in outdoor spaces across the nature continuum.

Keywords: Access & Inclusion; Nature; Tourism & Recreation; Accessibility Standards

Session Type: Paper

Title: Comprehensive review of gaps and opportunities in the sustainable fashion sector in the Lower Mainland

Authors: Sarah Brownlee, Breanna Gueldner, Dr. Stefania Pizzirani, Dr. Robert Newell

The trillion-dollar clothing sector is one of the greatest environmental challenges of our time, and the scale of this challenge is ever growing. For example, in Canada, textiles (i.e. clothing, carpets, furniture, etc.) accounts for 7% of plastic waste generation – or 235 kt – but has the lowest landfill diversion rate (5%) of all plastic waste sectors (Environment and Climate Change Canada, 2019). This project centers the sustainable fashion movement in the Lower Mainland (including Vancouver Island) where there was previously no clear understanding of how and where sustainable fashion companies were operating. This lack of total supply chain documentation fails to provide a clear picture on how BC can promote more sustainability within its borders. This project performed an environmental scan of companies involved in the sustainable clothing sector, inclusive of the full supply-value chain in the Lower Mainland: (1) material production, (2) fabric and garment creation, and (3) recycling and waste management. Our environmental scan showed a large imbalance along the textile lifecycle. Very few fibre manufacturers and even fewer textile "recyclers" exist within the study area, with a total lack of true large-scale mechanical or chemical textile recycling within the province. However, over 200 Lower Mainland/Vancouver Island-based companies manufacture their clothing within the province. This scan highlights the gaps in the regional supply chain, indicating where growth would need to occur in order to create more of a circular, sustainable clothing sector.

Keywords: sustainable fashion; clothing; environmental scan

Title: Soil health variations in old-growth and re-growth forests in Sx̱ótsaqel/Chilliwack Lake Provincial Park

Presenter: Aiden Haagensen

The reduction of old-growth forests as a result of logging practices and climate change in British Columbia has dramatically impacted forest systems. Whilst 25% of British Columbia's forests are considered old growth using a stand-age/biogeoclimatic model, only 1% is highly productive old growth. Apart from being bastions of ecological diversity, old growth has significant Indigenous cultural importance, making the protection of these ecosystems even more pertinent. Sx̱ótsaqel/Chilliwack Lake Provincial Park situated in the traditional territory of the Ts'elxwéyeqw Tribe is home to old growth forest within an ecological reserve area. Adjacent to the ecological reserve area, there are logging operations, providing an excellent opportunity to view young, mature, and old growth forest systems in one geographically condensed research area. Currently, a research study titled "Forest Systems and Wellbeing," is being conducted by faculty and student researchers from the University of the Fraser Valley, and staff from both the Stó:lō Research and Resource Management Centre and Ts'elxwéyeqw Tribe Management.

The focus of the research study is to better understand what makes old growth forest soil different from young and mature forest soil with the goal of developing forest remediation strategies for harvested sites. This presentation will highlight the soil sampling methodology used, coarse spatial extents of sampling sites within the Sx̱ótsaqel/Chilliwack Lake Provincial Park boundary, soil analysis processes, as well as initial results of the soils' biological activity (eDNA) and other factors influencing their eDNA. Ultimately, this research contributes to a greater understanding of the changes logging operations can have on forest systems in British Columbia which can help improve forestry practices and create more resilient and sustainable old growth forest systems.

Vegan Entrepreneurship:
Sharing the results of a Masters on vegan business in Kitsilano and Mount Pleasant

Author: Benjamin F. Hagerty
Affiliation: University of Northern British Columbia
Authorship: Drs. Mark Groulx and Zoë A. Meletis
Presentation Type: poster/slides

Vegan philosophy is often associated with dietary choices and animal rights. While these two subjects are important, the vegan philosophy is intersectional and applicable to a myriad of other subjects, like business. Vegan businesses (VBs) are gaining popularity in global markets (Expert Market Research, 2022; Research and Markets, 2021), yet the scholarly literature contains little about VBs, the experiences of vegan entrepreneurs, or VEs, and what useful insights they have learned from those experiences. This research project had the author visit twelve VEs at their places of business in the neighbourhoods of Kitsilano and Mt. Pleasant in Vancouver, B.C. or by video call to converse with them about their experiences with the vegan philosophy. The resulting deliverable was an autobiographical academic blog series on my pre-existing website, itsbreeandben.com. The series that featured blogs about vegan philosophy in the context of culture, health, religion, mission statements, ethical tourism, pop culture, a history of veganism in Vancouver, and the rising costs of living. It also featured a profile of the participating VEs and their businesses. The last two blogs of the series then summarize and discuss the insights that the VEs commonly mentioned during the conversations, which included health as an impetus for engaging with the vegan philosophy, inclusivity, discrimination from others, and concerns about rising costs of living and doing business. This blog series concludes by exploring how these insights may inform the business community of those neighbourhoods and how cost of living ought to be addressed to support them.
Word count: 249

Keywords: cost of living; small business; ethical tourism; inclusivity; veganism

A 'Journey Without a Map':
The Impact of Brexit on the Crown Dependencies of Jersey, Guernsey, and the Isle of Man

Will Hanlon
Department of Geography, Earth and Environmental Sciences – UNBC

Abstract:

The Crown Dependencies of Jersey, Guernsey, and the Isle of Man are legally independent of the United Kingdom yet are direct subjects of the British Crown. While never members of the European Union, the Crown Dependencies were party to several EU treaties owing to their relationship with the United Kingdom. The UK's referendum to leave the EU in 2016 jeopardized these agreements. Without a say in the matter, the Crown Dependencies were forced to adjust to this new reality which affected various aspects of their societies. During the Brexit negotiations, the Crown Dependencies' interests were represented by British diplomats, but the United Kingdom was always their primary concern. The Crown Dependencies maneuvered quickly in this unfamiliar situation, each jurisdiction attempting to ensure that their social, political, and economic conditions were not too heavily disrupted by the chaotic process. The negotiations dragged on for years, allowing the Crown Dependencies to prepare for many different outcomes, but eventually a deal was signed. Brexit's impacts continue to be felt in the Crown Dependencies, as the end of Protocol III and the establishment of the EU-UK Trade and Co-operation Agreement and UK-Crown Dependencies Customs Unions have reshaped their relationships with the UK, the EU, and each other. This presentation aims to highlight the short-, medium-, and long-term impacts of Brexit on the Crown Dependencies, including fisheries conflicts, worker shortages, and legislative restructuring, while also discussing their resiliency and potentially shifting constitutional relationships with the United Kingdom in a post-Brexit world.

Key Words: Brexit; Crown Dependencies; Territory; Island Sovereignty

Presentation Form: Paper

MARIA FERNANDA HERNANDEZ ROJAS
CURRENT UNDERGRADUATE STUDENT
THOMPSON RIVERS UNIVERSITY

Title: Abnormal behaviour Diavolo Glacier

ABSTRACT for WGCAD POSTER PRESENTATION

Current climate conditions shape how different glaciers behave and survive ablation through time. Located within the Garibaldi Range of the Coast Mountains, Diavolo Peak Glacier, displays abnormal recession of its toe regarding recent trends in annual accumulation area ratios. Sentinel-2 multispectral imagery indicates that high accumulation area ratios have been present annually since 2017, yet the toe is retreating at an approximate rate of 17 m a^{1}. This, compared to glaciers in the surrounding area is abnormal; the common pattern for these glaciers is accumulation area ratios of less than 0.3 and a retreat in their toes as a consequence. Diavolo Glacier has an area of 3.23 km^3 in total as of 2019. Google Earth Engine Timelapse imagery also indicates that the glacier has reduced its length by 17% over the past 35 years. This glacier is located under the traditional territories of Skwxwú7mesh-ulh Temíx̱w (Squamish), Sḵáẖimc Tmicw (St'at'imc), and Cayuse, Umatilla, and Walla Walla, and its retreat influences the hydrology of Cheakamus River, Cheakamus Lake and Daisy Lake, Squamish River, Squamish Harbour, Howe Sound, the Salish Sea, and Pacific Ocean.

Micro Hydropower in British Columbia

WDCAG 2023 Abstract

Author: Megan Howe

Hydropower is often viewed through the lens of large hydroelectric dams, producing many megawatts of electrical power for large communities across Canada. These large dams and reservoirs can cause many negative environmental impacts, as well as produce a power source that may not be accessible for off-grid rural communities. Micro hydropower captures the potential energy from smaller streams and lakes, often not requiring a disconnect in the watershed. These systems have low impact in installation, and can last decades with proper maintenance. Many rural communities, parks, backcountry lodges and homes currently rely on the use of diesel or propane for power and heating, however this is not sustainable due to the cost of importing, and the greenhouse gas emissions associated with burning them. Micro hydropower systems have a higher initial cost than other off grid generating systems, however they last decades longer, have relatively low maintenance costs, and promotes self sufficiency within smaller rural communities. The ideal locations for building a micro hydropower system are where there is enough measured water flow throughout the year, and with thousands of streams and high relief topography, British Columbia has significant potential for the development of micro hydropower systems that could power rural communities in a more sustainable way.

Key words: Micro hydroelectricity; renewable energy; hydrology; rural energy alternatives

Talk Submission

Supporting First-year Research Experiences and External Conference Presentations Within an Introductory Physical Geography Course for Majors and Non-Majors.

Crystal Huscroft, Associate Teaching Professor, Thompson Rivers University, 805 TRU Way, Kamloops BC., V2C 0C8

First-year research experiences are well known to support student learning and educational attainment. Although they have been gaining popularity in recent decades, there are very few resources for guiding the design of such experiences. This study presents an initial framework for incorporating first-year research experiences within a single semester physical geography course. The framework is divided into four main components 1) Lecture-based learning of a theoretical approach to a concept 2) Laboratory-based learning of an authentic technical skill and its to an individualized unique and unstudied case 3) Development of student scientific reading skills to understand the relevance of results and 4) Development of student scientific writing skills in order to communicate the research. The goal of this presentation is to describe the components of this framework and to share lessons learned in the author's first attempt in applying this framework to first-year student research.

Title: A systems thinking approach to examine local food systems planning through a climate-biodiversity-health lens: A Comox Valley case study

Jofri Issac[1]

[1] School of Environment and Sustainability, Royal Roads University, Victoria, BC V9B 5Y2, Canada

Abstract: Food systems are vulnerable to increasing climate change events and environmental degradation. Simultaneously, unsustainable food production, processing, and consumption practices play a major role in rising greenhouse gas emissions and impacts ecosystems, creating a vicious cycle of cause and effect. Such conditions demand a transition to sustainable food systems, which is best done through integrated planning and policy approaches that tackle interconnected socioeconomic and environmental concerns and goals. This presentation discusses research that applies systems thinking and participatory modeling to map relationships among food systems planning and other sustainability priorities, namely those related to climate, biodiversity, and health. The study engages stakeholders in the Comox Valley, British Columbia, to develop a systems map, and it uses the Girvan-Newman community detection algorithm to analyze and identify closely connected nodes or 'clusters'. The results of this work include a more comprehensive understanding of local food systems challenges and opportunities, as well as a framework that can be used to identify and integrate food systems planning and other local sustainability objectives. Through its community-engaged approach, the research produces a holistic picture of food systems and the non-linear interactions among different system components based on the knowledge and perceptions of a variety of local government actors and stakeholders in the Comox Valley region.

Keywords: systems thinking; local food systems; community detection; integrated planning; participatory modeling

CO_2 levels and indoor air quality in UNBC classrooms

Shiyuan Jing*, Kiley Jackson**, Mario A. Salinas-Toledano**, Yinchun Guo***, Peter Jackson*

*Geography, Earth and Environmental Sciences, University of Northern British Columbia (e: Peter.Jackson@unbc.ca)
**School of Engineering, University of Northern British Columbia
***Natural Resources and Environmental Studies, University of Northern British Columbia

On average, Canadians spend 90% of their time indoors (Health Canada, 2020), and university students spend around 60% of their time at the university. Thus, adequate indoor air quality must be ensured in the facilities. There are various air pollutants that affect Indoor Air Quality, including CO_2 which is produced by human respiration. CO_2 levels in outdoor air is about 420 ppm; when average indoor CO_2 concentrations exceed 1000 ppm, humans begin to have adverse effects, and Health Canada and other jurisdictions have proposed 1000 ppm as a management level (Health Canada, 2020). In addition to the direct impact on organisms, CO_2 concentration may correlate to the concentration of other biological emissions, such as airborne viruses, and is also an indicator of air exchange efficiency and general indoor air quality. Consequently, it is important to monitor CO_2 levels in shared spaces such as classrooms and evaluate building heating and ventilation systems. In this study, a network of 12 monitors (Aranet4 Pro) were used to measure CO_2 levels (using an accurate non-dispersive infrared sensor (NDIR)), temperature and humidity. The monitors have been established in different classrooms and study spaces at the University of Northern British Columbia (UNBC) to identify the patterns of CO_2 in relation to room occupancy, focussing on periods of time where peaks (> 1000 ppm based on 60-minute averages) are present. These results will provide insight for actions to improve indoor air quality, such as an adjusting ventilation system schedules and humidity improvement strategies when necessary.

Being so close: The relational environment of rural nursing

Steinunn Jónatansdóttir[1], Martha MacLeod[2], Neil Hanlon[3], Lela Zimmer[2], David Snadden[4]

[1]Phd candidate, School of Health Sciences, University of Northern British Columbia (UNBC)
[2]Professor, School of Nursing, UNBC
[3]Professor, Department of Geography, Earth and Environmental Studies, UNBC
[4]Professor, Department of Family Practice, University of British Columbia

Creating and managing relationships with patients and colleagues is often taken for granted as an innate part of providing nursing care. Navigating nursing relationships in a rural context, however, poses particular challenges that are largely unexplored in nursing scholarship. The aim of this study is to illuminate and articulate the meaning of closeness in rural nursing practice. More precisely, I examine how closeness among members of smaller communities can influence nursing relationships, and how experiencing this closeness may affect nurses personally and professionally. I employ a hermeneutic phenomenological approach to examine 24 in-depth semi structured interviews with 15 registered nurses living and working in eight different rural communities in Northern British Columbia, Canada. The study reveals the relational environment of rural nursing within and outside of work settings, and explores its different facets, ranging from the social structures that are in place to the individual thoughts and emotional experiences of the nurses. The study highlights how practicing nurses have limited control over the relational environment of their community and workplace. It explicates the responsibility of organizations, policymakers, and healthcare leaders to create safe, caring, and supportive rural work environments that enable nurses to provide better care and may contribute to recruitment and retention efforts.

Keywords: Hermeneutics; nursing; relational environment; social intimacy

Type of presentation: Paper

Mapping Ammonia Releases to Major Drainage Basins in Canada

WDCAG 2023 Abstract

Author: Mariah Kashmark

Studying the distribution of pollutant releases in Canada enables the identification of areas with higher levels of pollution and facilitates the implementation of measures to reduce exposure to harmful substances and mitigate the negative impacts of pollutants on ecosystems. The National Pollutant Release Inventory (NPRI) is a publicly accessible, national database in Canada that provides information on the release of pollutants to air, water, and land, as well as the disposal and recycling of waste. Using the publicly available data combined with geospatial python and ArcGIS software, a correlation between ammonia release locations and higher population densities was identified. As a short case study, an examination was conducted on the impact of ammonia releases on fish health in the Fraser drainage basin, which is known as one of the most polluted basins in Canada. The objective of the study was to determine if there is a noticeable increase in reported diseases with an increase in ammonia releases to water. For the analysis, a fish health dataset from the Pacific Biological Station Fish Pathology Program in Nanaimo was used. The integration of geospatial programming and GIS tools in sustainability research provides a powerful framework for understanding complex environmental systems, and their continued use is critical for advancing our understanding of the interconnections between human activity and the natural world.

Key words: geospatial analysis; GIS; geomatics; mapping

Poster presentation

Author
Morgan King (University of British Columbia Okanagan)

Keywords
Resilience; adaptative strategies; wine industry; climate change; Okanagan Valley

Title

Assessing Current Literature on Climate Change Risks and Resiliency of the Okanagan Wine Industry

Presentation Type
Paper

Abstract

Wine production is a growing industry that is environmentally, economically, and culturally significant to the Okanagan Valley and its terroir. The concept of terroir, or the taste of place, is geographically indicated, meaning the quality of wine is directly related to climatic conditions and the physical landscape. Therefore, the strict designation of terroir has made the wine industry vulnerable to the effects of climate change on a global scale. Due to this vulnerability to climate change, it has become important to understand resiliency of wine production as a concept and a practice. My thesis research aims to understand how resiliency is conceptualized by the wine industry and the decision-making process involved in adaptative strategies in the Okanagan wine industry. A systematic literature review of the risks, vulnerabilities, and adaptative strategies used by the wine industry is utilized to create a conceptual framework for climate change adaptation and resiliency in the Okanagan wine industry. Community relevance is important to the research strategy and the literature is a part of a case study of the Okanagan wine industry grounded in pragmatism, a philosophical approach that is of the belief that research must be applied to be understood, methods are chosen to address a problem, and a fusion of approaches may be needed. The literature review results help build a conceptual framework of risks and vulnerabilities, resiliency, and adaptative tools for the Okanagan wine industry.

Natalie Krizan – University of Lethbridge

WDCAG Abstract

Title:

Glaciological Sites in the Castle Provincial Park

Authors:

Natalie Krizan

Undergraduate Student – Environmental Science

Department of Geography and Environment

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Hester Jiskoot

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Abstract:

This poster presents a summary of a geography guidebook created for an Independent Study, titled "Glaciological Sites in the Castle Provincial Parks". The 34-page guidebook focuses on eight sites in Castle Provincial Park and Castle Wildland Provincial Park that demonstrate the effects of glaciation. It was created to be a resource for park visitors, serving as a self-guided tour book to sites of glaciological interest near campgrounds or along hiking trails. Visitors can come to appreciate their significance as they read about the processes that shaped their features.

The guidebook and poster contain maps, illustrations, and photos of the sites, detailing the geology, glacial history, and erosional and depositional processes. The sites include: Table Mountain (geology), South Drywood Creek Valley (U-shaped valley), Bovin Lake and Haig Lake (cirques and tarns), Southfork and Barnaby Lakes (paternoster lakes), Carbondale Hill (streamlined feature), Castle River Bridge riverbank (deposition), and a possible rock glacier south of Mount Haig. None of these sites were incorporated in existing guidebooks and all

information about them was from literature research and investigation of online geological datasets by the student, discussions with the supervisor, and from knowledge gained in various undergraduate physical geography courses. The majority of photos in the guidebook were taken by the student and all maps were created for this project in ArcGIS software. Inspiration for the project came from working and recreating in the Castle region and learning about its unique geological history, including of the fascinating processes by which glaciers carve mountainous landscapes.

Keywords:

Glaciological History; Geography; Geology; Guidebook; Erosional Features

Presentation Type:

Poster

Abstract: Valikhan Kussainov
Thompson Rivers University
Undergraduate
Poster

The stability and likelihood of survival of the Cree Peak glacier, Cariboo Mountains, British Columbia

In this research, several images of an unnamed Cree Peak glacier were acquired. These satellite images originate from various online websites, including Google Earth, Atlas of Canada - Toporama from the Canadian government website, and Sentinel Hub Playground. This poster displays the change in size of said glacier from 1986 to 2020, its location, as well as its major features. It will also tackle the topic of glacier's stability and survivability. Based on the research, it was established that due to multiple factors such as lack of rock outcrops and presence of solid accumulation zone, the glacier is in relatively favorable condition and won't disappear for another 300 years, despite retreating annually for 7.8 meters.

Campaign Organizer and Recipient Perspectives on the Ethics of Privacy in Charitable Crowdfunding

Benjamin N.B. Lartey[1], Valorie A. Crooks[1], Jeremy Snyder[2]

While charitable crowdfunding can assist recipients in meeting their basic necessities, such as housing and health care costs, this practice continues to draw attention from academic and public audiences due to its ethical implications. Among these ethical implications include the issue of privacy, and concern that campaigners are publicly sharing personal details in the hopes of raising funds. To urge donors to contribute towards their campaigns, recipients of charitable crowdfunding campaigns are encouraged to share private details about their medical needs and histories, money, families, and daily activities. How do campaigners navigate such privacy trade-offs? Do those campaigning on behalf of others consider the privacy of fund recipients? To begin to answer these and other important questions, we are conducting interviews with Canadian crowdfunders who have campaigned to raise funds to support health and/or housing costs. This presentation will provide an overview of the study and emerging insights from recently completed interviews with Canadians who crowdfunded on behalf of someone else. Our research aims to deepen the scholarly and public understanding of the ethical dimensions of charitable crowdfunding as they impact privacy. More specifically, our research will increase our understanding of how the urge to raise money online influences procedures for obtaining consent to disclose personal, financial, medical, and family information.

Keywords: Crowdfunding; Campaign; Ethics; Privacy; Healthcare

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WDCAG Conference 2023 - Abstract

Paper presentation

Title:

Touring Rural Downtowns: Analyzing the Success of Neighboring Kootenay Communities

Author:

Cyan LeMoal, University of Northern British Columbia

Abstract:

Twinkly lights strung from trees, street level shops, familiar community faces, and etched-out green spaces. This is an image of what downtowns have the potential to be with bottom-up approaches. Downtowns have the ability to be the heart of a community where much of the services, politics, and businesses are located. The twentieth century brought many changes that promoted the evolution of downtowns towards car-centric planning and the decentralization of businesses and services. Despite this decline in downtowns, many community members and municipal government officials still understood the importance and purpose that downtowns served for communities. In order to enhance the quality of downtowns, revitalization projects were implemented in many communities across Canada. However, the majority of downtowns are persistently desolate and vacant of businesses and people. As such, my presentation will focus on the importance of successful downtowns and the varying revitalization efforts. Guided by Filion et al.'s (2004) downtown success factors, I will examine two communities in the Kootenay region of British Columbia to determine the quality of their downtowns. The first community of focus is Nelson, a small community that can be added to the list of successful Canadian downtowns. In contrast, I will explore Castlegar, which has had a struggling downtown for numerous years as a result of traffic patterns, disinvestment, and lack of local businesses in the area. The goal of this research is to bridge community development with urban planning to ensure the success of revitalization projects in rural communities throughout British Columbia.

Key words:

Downtowns; urban planning; community development; Castlegar; Nelson

Straining to accommodate an aging population: Exploring the characteristics of people entering long-term care

Alishia Lindsay[1], Neil Hanlon[2], Davina Banner-Lukaris[3], Shannon Freeman[3]

[1]MSc Health Sciences (candidate), University of Northern British Columbia (UNBC)
[2] Professor, Department of Geography, Earth and Environmental Sciences, UNBC
[3] Associate Professor, School of Nursing, UNBC

Canadian long-term care facilities (LTCFs) are straining to adapt to changing societal needs and circumstances, yet research looking at changes in the long-term care population is surprisingly limited. To shed more light on these matters, this study provides a glimpse into those transitioning into long-term care for the first time. We conducted a consecutive, cross-sectional study using 10 years of initial assessment data (2010-2020 inclusive) from the Canadian Institute for Health Information. An exploration of demographic characteristics (e.g., sex, age, body mass index, previous residential location), health status (e.g., presence of chronic conditions), and care needs (e.g., help needed with activities of daily living) was conducted to develop a profile of the population transitioning into Canadian LTCFs. We will conclude with a discussion of the policy implications of this research and areas in need of additional study.

Keywords: Older adults; long-term care; Canada; activities of daily living; chronic conditions

Type of presentation: Paper

WDCAG Annual Meeting Abstract Submission

Title: Rip-Rap Wave Attack!

Authors and affiliations: Wyatt Maddox, University of Victoria, University of Akureyri

Abstract:

Riprap installations are a common strategy on the west coast for mitigating erosion and inundation, but are they effective? Climate change-driven sea level rise and increased storm intensity are motivating governments to investigate and implement extensive coastal protection structures. Royal Roads Bay in Colwood, BC, hosts a high-value foreshore area for recreation, ecological conservation, and infrastructure. Increasingly, overtopping and erosion of fine sediment have led to annual crises with considerable danger to residents. To protect this shoreline from erosive damage, riprap has been installed along portions of the high tide area. A spatial survey-based research study in partnership with the municipal engineering department was undertaken to determine the efficacy of the existing riprap through seasonal variability. Air photos and satellite imagery were compared to determine long-term morphology and substantiate documented accounts. Side scour, wave deflection, and ineffective construction techniques are contributing to increased erosion found in areas backed by riprap when compared to sections with a natural backshore. Prior to recent extreme erosion events, inundation was prevented by the width of the beach, not the riprap. Alternative strategies for mitigating coastal damage are necessary to preserve the important features of the shoreline as climate change impacts escalate.

Keywords: coastal erosion; erosion mitigation; coastal geomorphology; riprap; spatial surveying

Type of presentation: Paper

List of authors: Wyatt Maddox, BSc, MRM

Extreme Heat Risk Maps - tools for climate resilience planning in the City of Mission

Mariano Mapili, Saba Berenjforooshazar, and Carter Johannes*

The heat dome which settled in Western Canada for a week in the summer of 2021 will forever be etched into the memories of the population that experienced the effect of an extreme heat event, and the fact that 619 people in BC perished in the extreme heat event, will surely become a conversation topic about severe weather for years to come. Climate goals are turned into action in local governments, and for a while now, you will find several initiatives on the reduction of global warming and planning for resiliency under a changing climate, as concerns in the local government. The heat dome advanced the timeline for such a concern and underscored that the time to plan for climate resiliency should have been yesterday. After the event, the proactive Union of BC Municipalities immediately sprang into action, offering member municipalities a Community Emergency Preparedness Funding for Extreme Heat Risk Mapping, Assessment, and Planning. The City of Mission collaborated with the School of Land Use and Environmental Change at UFV to obtain the funding, and we are reporting here the lessons we have learned in Phase 1 of the three-phase project – the GIS mapping of risk and vulnerable population following standard mapping techniques, using available weather data, and supplementing spatial data with city records. Finally, we present an interactive and participatory GIS map that the City of Mission can easily update and where civic engagement can be realized to prevent future extreme heat emergencies in the city.

Associate Professor and GIS Students, respectively, in the School of Land Use and Environmental Change, Faculty of Science, University of the Fraser Valley.

Retreat of an Unnamed Glacier in Stave River Watershed, Garibaldi Provincial Park, British Columbia

Kathleen Moore and Crystal Huscroftt

Department of Geography and Environmental Studies

Thompson Rivers University

February 22, 2023

Abstract (Poster Presentation)

The retreat of glaciers in southwestern British Columbia is happening at an alarming rate. An unnamed cirque glacier lies on the northeast slope of Galaxy Peak within the Stave River watershed in southeastern Garibaldi Park, British Columbia. A comparison of Google Earth Engine Timelapse imagery reveals that the glacier has been retreating at an average of 5.5±.5 m a^{-1} between 1988 and 2020. If the glacier were to continue retreating at this same rate, the glacier would take approximately 193 years to disappear completely. The position of terminal moraines using high-resolution satellite imagery indicates that the approximate length of the glacier during the maximum of the Little Ice Age was 2.2 km. If measured from the end of the Little Ice Age until 2020, the glacier would have retreated at an average rate of 5.1±.2 m a^{-1}. Additionally, analysis of sentinel-2 imagery from 2022 indicates the accumulation area ratio (AAR= 0.3) is below the equilibrium accumulation ratio (AAR_0) required for the survival of glaciers between 1 and 4 km^2. Other evidence such as rock islands appearing in the accumulation zone and lakes forming on the east margin indicates a low likelihood of survival for this glacier in our current climate.

Historical Analysis of Drought in the South Saskatchewan Watershed Based on Gridded SPI and SPEI

Roya Mousavi[1], Dan L. Johnson[2], James M. Byrne[3]

Drought is one of the most challenging extreme events that can cause catastrophic and long-lasting impacts on water availability, environment, agriculture, economic variables, and societies. This study investigates the historic changes of drought in Southern Alberta. The study area is home to communities whose main economic activity is agriculture, many of which have suffered from severe drought events in the past. Current trends of more warming and less available water have caused concern regarding vulnerability of the local communities and the economy of the region to future drought. We employed Standardized Precipitation Index (SPI) and Standardized Precipitation Evapotranspiration Index (SPEI) as drought indicators at different timescales to explore significant changes in the past four decades (1980-2018). The indices are computed using Daymet gridded weather data in the South Saskatchewan Watershed. Comparing four past decades showed that drought in years between 2000-2010 was more extensive than the rest of the study period. The percentage of the area impacted by severe or extreme droughts has significantly increased in the last two decades, compared to 1980-2000. Results show decreasing trends of drought in some parts of the watershed, mainly in the headwaters of the Bow River in the Rocky Mountains and increasing trends in larger areas mostly located downstream. This region has experienced drought, on average, in nearly 50% of the months during the analysis period. Comparing the results obtained by these drought indices suggests significant differences between the SPI and SPEI. Also, SPEI outperformed SPI in detecting dry months.

Keywords: Climate change, Extreme events, Drought severity, Agricultural drought

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Title: Community-based research for supporting integrated food systems planning: Insights from three studies in British Columbia

Presenter: Robert Newell
Position: Canada Research Chair in Climate Change, Biodiversity and Sustainability
Affiliation: Royal Roads University (Victoria, BC)

Abstract: Integrated community sustainability planning requires participatory and place-based approaches to ensure that plans and strategies are grounded in local social, environmental, cultural, political, and economic contexts and realities. Accordingly, applied research that aims to support local planning efforts toward food systems sustainability and resilience should employ place-based, participatory approaches. This presentation discusses three community-based participatory studies done in British Columbia (i.e., the Fraser Valley, the Comox Valley, and Revelstoke), designed to support local food systems planning. Each study is similar in how they engage local government and stakeholders using systems and scenario approaches to explore food systems issues and strategies; however, they differ with respect to research frameworks, methods, and focuses, as well as the nature of the local food issues that are explored. The presentation identifies similarities among the different projects, such research outcomes related to concerns around freshwater systems, while also identifying differences, including how sociocultural contexts and challenges vary among the participating communities. The presentation concludes with overall insights on opportunities, challenges, and recommendations for conducting community-based research to support local integrated food systems planning and resilience efforts.

Title: Detection and validation of permafrost in the heterogeneous mountain landscape of the Yukon Territories

Authors:

Ria Nicholson (lead author; M.Sc candidate), University of Lethbridge

Dr. Phillip Bonnaventure; University of Lethbridge

Keywords: permafrost; Yukon Territories; discontinuous permafrost; ground truthing; permafrost validation

Type of presentation: Paper/oral preferred, poster is alright as well

This study focuses on the creation of a field methodology for permafrost detection and validation which is useful in the heterogeneous mountain landscape and discontinuous permafrost zone of the Yukon Territories. Ground truthing methods and other indirect forms of permafrost validation are complicated by a series of climatological, environmental, and geological factors. Elevation-based permafrost modelling which is useful in other periglacial zones becomes unreliable in the Yukon due to frequent surface-based temperature inversion events, and the clast-rich bedrock nature of large portions of the terrain confounds physical ground truthing methods such as frost probing, thermal gradients, and digging. Microsite variables such as aspect, vegetation, and topographic position index (TPI) also have a significant influence on the presence or absence of permafrost despite the subarctic climate. In non-bedrock areas, frost probes, thermal gradients, and digging will be used to verify the presence of or absence of permafrost. A frost probe is inserted into the ground until resistance is felt at the top of the permafrost table below the active layer. Thermal gradients involve using a series of thermistors arrayed in a grid over an area to take temperature over a short period of time. Digging can also be used to confirm the presence of cryotic materials at depth. This study will be performed in conjunction with the use of a network of ground temperature nodes and air temperature stations which have been deployed between 2019-2022.

Exploring sexually transmitted infection risks among Canadian snowbirds: A study overview

Olivia Nieves, Valorie A. Crooks, John Pickering, Jeremy Snyder

Upon retiring, there's much that can change in a person's life, including their residential circumstances. In a practice known as International Retirement Migration (IRM), older Canadians popularly known as 'snowbirds' seasonally relocate to locations with better climate and/or economic conditions during the winter months. Despite the size of Canada's snowbird population, little is known about their sexual health in this cross-border context, with several studies pointing out a link between travelling and sexually transmitted infection (STI). Given the growing popularity of IRM among Canadians as well as the increasing rates of STIs among seniors, we are leading a study that seeks to identify the potential for Canadian-based policy and practice interventions to both prepare IRMs for expected sexual health risks when wintering abroad, and to appropriately screen, treat, and (when needed) counsel them upon their return to Canada. In this presentation we will discuss our plans to conduct semi-structured interviews with health care providers and public health representatives in Yuma, Arizona – a popular destination for older Canadians – about the implications of cross-border sexual health behaviours and outcomes in Canadian IRM populations. Raising the profile of STIs as a relevant health issue for IRMs will help us to identify the challenges and opportunities for STI prevention and sexual health promotion for Canadians in communities like Yuma, where the population is doubled during the winter months with a great participation of Canadian snowbirds.

Key words: International Retirement Migrations, snowbirds, Sexually Transmitted Infections (STI), sexual risks

Type of presentation: Paper

Dry vs. moist sites in a montane valley within Waterton Lakes National Park after the Kenow fire

Apryl Nish, Jesse Aspinall, Dani Nadeau, Kaydunn Henry, and Laura Chasmer

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In 2017, a large wildland fire burned 19,300 hectares (40%) of Waterton Lakes National Park, Alberta (Parks Canada, 2021). Our site provided the parameters to study how persisting ecosystem traits affect the regrowth of forest ecosystems following a fire that resulted from decades of suppression. The objective of the study was to analyze growth in two sites with different moisture characteristics. The research was completed within the Akamina Valley, by measuring vegetation within 60 1m x 1m vegetation plots, 31 in the moist, riparian site, and 29 in the upland, dry site. Through the summer in 2022, approximately bi-weekly measurements over six periods were recorded. We measured average vegetation height by taking height measurements approximately centred from the bottom of a 1.2m x 1.2m frame. Finally, we took the Green Chromatic Coordinate (GCC) of each plot, 6 times by taking RGB camera images around 1.5 meters from the ground, and separating the colour bands using ArcGIS Pro. The prevalence of Pinus in the dry site is a great indicator as to the resilience and regrowth of Pinus in these regions, under dry, warm conditions akin to many post-fire landscapes. The prevalence of Pinus in the dry, upland site bodes was quantified by taking seedling counts at each site, where we saw an average of ~4 seedlings per plot in the dry site, and <1 seedling per plot in the moist site. Our study provided insight into the ideal conditions for select species to thrive in post-fire montane ecosystems.

Key words: Wildfire; Vegetation; Montane; Ecosystems; Regrowth
Format: Poster

Title

Elevational air temperature patterns and implications for permafrost in Northcentral Yukon, Canada

Authors

Nick C. Noad and Philip P. Bonnaventure

Bonnaventure Lab of Permafrost Science (BLPS)

Department of Geography and Environment

University of Lethbridge

5 Keywords

Surface lapse rates; Surface-based temperature inversions; Permafrost; High-latitude mountains; and Dissimilar valleys.

Abstract

Much of Canada's north, including Yukon Territory, is underline by permafrost. With temperatures warming due to climate change there is a need to accurately understand where permafrost is currently, where and when future thaw will occur, and how the landscape above the thawing permafrost will change. Predicting answers to these questions is difficult as there are complex relationships between surface air temperature and ground surface/permafrost temperature. One factor further confounding this relationship is that temperature patterns across northwestern Canadian mountains are driven by elevation. These elevation patterns of temperature across the landscape are not just as simple as cooling air temperature the higher the elevation gets. A phenomenon known as a surface-based temperature inversion (SBI) is a frequent occurrence in these high latitude mountainous landscapes as during the winter season and nighttime when incoming solar radiation is mostly absent. When a SBI is present, air temperature increases with increased elevation. This means that most of the time it is warmer near the top of the mountain rather than in the valley bottom. My research aims to study how the impact of SBIs on surface air temperature patterns influences permafrost distribution across the high latitude mountains of northwestern Canada. The findings of my research suggest that permafrost may be absent, or more readily susceptible to thaw on the mountain slopes than in the valley bottom. This could have serious implications for this region as there may be a quicker response of slope failures due to permafrost thaw than previously expected.

Paper (Oral) Presentation

Nick Noad hopes to present this work, PhD student for the award considerations.

Title: Melting peaks: Resilience in the alpine tourism industries of the Canadian Rockies and Swiss Alps

Author: Mackenzie Ostberg, University of Northern British Columbia

Paper Presentation

Abstract:

Mountain environments are imperative for spiritual, physical, and mental health for many beings, and have been since time immemorial. However, mountain ecosystems are fragile and increasingly more susceptible to climate change impacts. The Swiss Alps and Canadian Rockies are two mountain ranges that are dependent on the tourism industry for economic success in their respective countries, however, each are faced with current and projected changes. The dependency of alpine tourism on the surrounding environment and the mountains' 'environmental performance' is imperative for push-pull factors to attract tourists. Due to the dependence on climate factors, such as snow, alpine winter tourism's integrity is being increasingly jeopardized. In addition, adaptive strategies are expensive and insurance on infrastructure in increasingly hazardous spaces is unaffordable. This research will investigate two things: 1) the mitigative, adaptive, and resiliency strategies between the Swiss Alps and Canadian Rockies, and 2) the projected impacts to the tourism industry based on aspects of snow reliability, environmental performance, and visitor satisfaction, natural hazards, and safety. A comparative analysis between the two regions can establish which region faces greater risk, larger barriers to adaptation, and the overall benefits of policy change implementation.

Key Terms:

Climate change; resiliency; Swiss Alps; Canadian Rockies; Alpine tourism

Investigating the Contributions of Varying Land Uses to Water Quality in Cultus Lake and the Cultus Lake Watershed

Author: Alexander Pennock

Abstract:
The Cultus Lake Watershed (CLW) provides a wide range of social, economic, and environmental services within its region and beyond. The immediate area surrounding Cultus Lake is used by recreators, permanent residents, seasonal visitors, and many local businesses while other areas within the watershed support protected ecological areas, dense residential developments, and agricultural land. In order to preserve these values, it is vital that we understand the effect that different land uses have on the health of the CLW. In recent decades, cultural eutrophication has driven a transition within the Cultus Lake from its historical oligotrophic status towards a mesotrophic state. This significant change to the lake's chemistry represents a major threat to endemic wildlife including species which are presently at risk. This study compares water quality measurements downstream of residential, recreational, and agricultural land use zones to measurements taken from Sweltzer Creek (the lake's outlet). By evaluating the changes to water quality downstream of these zones we can better understand the effect of each type of land use on water quality throughout the CLW and the lake itself. Results indicated high water quality within Watt Creek, though this site appeared to experience the highest degree of fluctuation between samples. Temperature, pH, and dissolved oxygen differed significantly between the water feeding into Cultus Lake and that which drains from it. These results suggest that the inlet creeks buffer the acidity of Cultus Lake and that inputs from residential developments may be adversely affecting water quality downstream.

Key words: Land use; Water Quality; Urban Development; Eutrophication;

Presentation Type: Poster

Title: Examining the Environmental Drivers of Sediment Carbon within the Eelgrass Meadows of Clayoquot Sound, BC

Authors: Jordan Prior (MSc student) and Eva Kwoll (PhD)

Abstract:

The global outlook on climate action has shifted from reducing the release of atmospheric CO_2 to including its removal via natural carbon storage mechanisms. The capability of eelgrass meadows to store carbon has become a key research objective within the Pacific Northwest. This study attempts to identify the environmental drivers of sediment organic carbon variability with a differentiation between allochthonous and autochthonous carbon. Seven eelgrass meadows within Clayoquot Sound, BC were selected based on eelgrass characteristics, morphological qualities (tidal velocity, grainsize, turbidity, etc.) and distance to river mouths. Carbon stock varied among sites with five sites ranging between 21.115 ± 1.386 gC/m^2 and 28.853 ± 1.597 gC/m^2. Cannery Cove (56.619 ± 2.822 gC/m^2) and Ducking (15.003 ± 1.829 gC/m^2) were outside this range. Through the use of Kruskal-Wallis tests and Wilcox-pairwise tests, the environmental drivers were shown to be statistically different between separate sites, with Ducking and Cannery Cove having the highest and lowest velocities of the sites within Clayoquot Sound, respectively. Analysis of Isotopic signatures, conducted via a Bayesian Mixing Model, show a strong allochthonous signal primarily from marine sources with terrestrial sources seen nearer to river mouths. This study highlights the importance of carbon capture from allochthonous sources by eelgrass meadows in regions where in-situ production of carbon is small. A knowledge of the hydrodynamic setting therefore is essential for accurate estimates of carbon capture.

Key words: Coastal Geomorphology; Blue Carbon; Eelgrass Meadows; Carbon Sequestration; sediment transport

Type: Paper

Linking Ambient Noise Analysis with the Sustainable City Planning: Looking Backward to Moving Forward

Author: S.M. Talha Qadri

Affiliation: School of Land Use and Environmental Change, University of the Fraser Valley, Abbotsford, BC-Canada

Abstract:

Magnitude, focal depth, distance from the epicentre and the direction of the fault rupture are always considered vital factors contributing to the disaster during an earthquake. However, site response is one of the most crucial variables in limiting the potential damage to the urban centres near and away from the epicentre. Urban sprawl and skyrocketing real estate market have pushed people out of the city centres and triggered mushroom growth of infrastructures, sometimes in and around the zone of shaking amplification. The nature of the earth's materials and local geological structures strongly influences ground motion. Sediments deposited over the bedrock respond differently during an earthquake. The seismic waves move swiftly through the competent bedrock, whereas these waves get trapped and amplified while passing through the thick columns of alluvium. The surface waves slow even further if the soft sediments have higher water content. This phenomenon triggers site amplification and can contribute to disaster. Ambient noise recordings can be conducted in any urban settlement to evaluate the fundamental frequency of the loose sediments and the thickness of alluvium deposited on the bedrock. Ambient noise analysis is a passive and non-destructive technique globally used to establish the site response analysis. The abstract focuses on how the ambient noise technique can help mark the zones with thick columns of unconsolidated sediments and how we can share our findings with people close to the vulnerable sites. Our analysis will be crucial for the land use planners and contribute towards sustainable cities near some earthquake-prone regions.

Keywords: Site response; Ambient Noise Analysis; Fundamental frequency; Alluvium thickness; Sustainable cities

Abstract WDCAG 2023

Tactical Urbanism for Mission Waterfront Development

Dr. Afia Zubair Raja

- Key words: Tactical Urbanism; participatory planning; waterfront development
- Type of presentation: paper

The City of Mission is working towards the revitalization of the Mission waterfront to bring numerous benefits to the region. The focus is on the creation of new businesses, leisure activities, housing and community spaces throughout the waterfront's 296 acres of land. Thus, this research aims to deploy participatory design and integrated planning to (1) reflect upon the challenges faced by organizations in the regeneration of areas and explore ways to involve local perspectives in design through tactical urbanism (2) to squeeze the gap between planner's perspective and citizen's priorities (3) help the City of Mission develop an environmentally sound, socially inclusive, economically viable, aesthetically beautiful and functional waterfront. Workshops were held targeting visible minorities in the area, which resulted in useful feedback. The investigation will end in the provision of practical course of action to the regulatory authority that will boost long-term integrated participatory planning in the Fraser Valley.

WDCAG 2023
Abbotsford, BC – University of the Fraser Valley
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Forced to Bhashan Char: Rohingya Refugees and the Climate and Humanitarian Crises in Bangladesh

Md Abdur Rashid, PhD Natural Resources and Environmental Studies (Geography) student, University of Northern British Columbia, 3333 University Way, Prince George, British Columbia, VN2 4Z9, Email: rashidm@unbc.ca

Catherine Nolin**,** Professor, Department of Geography, Earth & Environmental Sciences, University of Northern British Columbia, 3333 University Way, Prince George, British Columbia, VN2 4Z9, Email: catherine.nolin@unbc.ca

Abstract

The Rohingya people, stateless for more than six generations, are one of the world's most maltreated and persecuted refugee groups. In 2017, state-supported violence in the Rakhine State of Myanmar created a cross-border humanitarian and environmental crisis as one million Rohingya people suffered violent evictions, massacres, imprisonment, and forced migration into the Cox's Bazaar region of neighboring Bangladesh. Bangladesh is identified as one of the most vulnerable countries to the global climate crisis and yet recent developments blocking their repatriation suggests that the Rohingya refugees may have to live in Bangladesh indefinitely as stateless individuals. The main focus of this critical ecofeminist-inspired research is to amplify the lived experiences of Rohingya refugees who are encountering humanitarian and climate crises. The Government of Bangladesh (GOB) forcibly relocated more than 30,000 refugees from camps in the Cox's Bazaar region to the isolated, flood-prone island of Bhashan Char in the Bay of Bengal in 2021 and 2022. The shifting attitude of the GOB towards the Rohingya people and their volatile political status have accentuated their vulnerability in the contemporary context. The initial phase of this research will be a situational analysis to unveil the ground-level realities of lack of consultation and viable options that the Rohingya refugees are suffering in the relocation "disasterscape" (Cupples 2022). In-depth qualitative interviews via the recording of testimonios (Nolin and Russell 2021) of the Rohingya refugees in their own language will be step one.

Solar energy considerations in urban planning: The conflict between solar potential and densification

Author: Ashling Marie Redmond

Solar potential is uneven across the urban landscape because the solar potential of each building is affected by the surrounding texture of the urban form. The integration of solar energy considerations into urban planning and design is crucial to ensuring a transition to more sustainable cities. However, a key challenge for urban planners and city administrations is the tension between solar potential and densification. It is estimated that without appropriate early-stage planning and building design, increased densification, especially in urban cores, could decrease the solar potential by as much as 75%, primarily due to the complex overshadowing effects. This issue is especially pertinent given that increasing densification is generally accepted and widely implemented as part of urban sustainability agendas. The high-density form in many urban cores, therefore, may have already significantly lowered the solar potential in these areas. This paper highlights this conflict and emphasizes the importance of incorporating this issue into solar energy considerations in urban planning, design, and policy. This research evaluated the city of Calgary, AB's solar potential. Using a 1m DSM created from high quality lidar data, ArcGIS Pro area solar radiation tool, and other GIS tools, I compared the downtown core with surrounding neighborhoods to determine if there was a decrease in solar potential in the higher density downtown core. My findings suggest that the downtown core had significantly lower solar potential than the surrounding neighborhoods. This conclusion highlights the tensions between densification and calls for greater attention to this issue among urbanists.

Key words: Solar potential; densification; urban planning; GIS

Presentation type: Paper

Cross Border Protection of the Endangered Southern Resident Killer Whale [SRKW] Population

Tess Reeber, Lily Smith, 513 High Street, Western Washington University, Bellingham, WA, 98225-9085, reebert@wwu.edu and smithl68@wwu.edu

Southern Resident killer whales (SRKW) have been a part of the coastal and inland waters of the United States and Canada, including the Salish Sea, for time immemorial. Within the past 50 years, Southern Residents have experienced rapid population decline largely due to the "Capture Era" during the 1970s, decreased Chinook salmon abundance, and increased pollution and vessel noise. In 2003 and 2005, the SRKW population was listed as endangered under Canada's Species as Risk Act and the United States Endangered Species Act, respectively. As of early 2023, the population continues to decline; there are 75 orcas within the three SRKW pods and they continue to face the ongoing risks of prey availability, pollution, and vessel traffic. Priority action through policy and programs is necessary to mitigate these risk factors and support SRKW recovery. Because SRKW home waters are shared between Canada and the US, recovery efforts are collaborative. This project is a comparative literature search that analyzes various U.S. and Canadian environmental policies/organizations regarding Southern Residents, the Salish Sea, and salmon (Chinook) restoration. Looking at governmental reports from Canada and the United States dating back to 2008, recovery plans for Southern Residents follow a similar pattern: list their the species' history and potential threats, but also rehabilitation goals. Our research suggests that the two countries put much effort into formulating written recovery plans for Southern Resident killer whales, but the population remains at high risk for extinction.

Key Words: Salish Sea, Cross Border region, Southern Resident Killer Whale, Endangered Species

A Comparison of Diel Cycles of Old and Second Growth Watersheds

Abbey Riddolls, 300151127, February 21st 2022

Water quality parameters in streams are reflective of complex physical, chemical, and biological factors. These parameters are not stagnant, and can change daily, weekly, seasonally, and on geologic timescales . Weekly sampling strategies are commonly used to infer seasonal fluxes in streams. These strategies are effective for determining coarse patterns in water quality parameters, but fail to account for the dynamic daily changes that occur in streams, particularly those caused by biological activity. Analyzing diel cycles, where water is sampled hourly, is an effective way to understand these fine scale processes. This literature review will describe the known diel cycle processes for a comprehensive array of water quality parameters processes such as photosynthesis, redox reactions, and discharge fluctuations. Some cycles are well documented, such as dissolved oxygen and temperature. Others, such as those for trace elements, are poorly understood and represent gaps in the research

The Upper Chilliwack Watershed, which drains mountains in North Cascades National Park in the US, was selected as the first site for the 12 hour sampling strategy. It represents a relatively pristine forest undisturbed by commercial logging practices. Species diversity is high compared to nearby watersheds in the greater Chilliwack Watershed, and the watershed also holds significant traditional ecological value to the Ts’elxwéyeqw people. 12 hours of hourly water quality data was collected from the Upper Chilliwack watershed and nearby Paleface Creek, a recently logged watershed. Data was analyzed for diel changes in field parameters, major ions, trace elements, and nutrients within and between the streams. Data from this project contributes to the larger Forest Systems Health and Wellbeing Project, in collaboration with the Stolo Research and Resource Management Centre (SRRMC), Ts’elxwéyeqw Tribe Management Ltd., and Woods Hole Oceanographic Institution.

EFFECTS OF CHANGING ENVIRONMENTAL CONDITIONS ON GLYPHOSATE DEGRADATION AND MELATONIN PRODUCTION IN WILD STRAWBERRIES

Hariharan Sendamangalam Varudaraju

Glyphosate is a post-emergent, non-selective, broad-spectrum herbicide globally used in forestry and agriculture to control weeds. Earlier, it was thought that glyphosate is environment-friendly and does not cause any harm to nontarget organisms present in the ecosystem due to its mechanism. The mechanism of action of glyphosate is to target the shikimic acid pathway that is present only in plants. However, due to its overuse, it has leached into groundwater and soil systems, posing serious threats to the environment. The application of herbicide affects the targeted plants and reaches the non-target plants mainly due to spray drift, wind direction, and rainfall. The sublethal concentration doesn't kill the plants. However, it leads to the malformation of plant parts. Plants produce hormones to combat stress conditions. Melatonin is a stress response molecule that increases concentration whenever plants are exposed to heat, cold, and chemical stresses. Although melatonin increases during stress conditions application of glyphosate pose a major threat to melatonin production as the application of glyphosate disrupts the production of 5-enol-pyruvyl-shikimate-3-phosphate synthase (EPSPS), which catalyzes the sixth step in the shikimic acid pathway. By blocking the enzyme, glyphosate prevents the biosynthesis of aromatic amino acids that act as melatonin's major precursors. My research aimed to study how glyphosate affects melatonin production in wild strawberries under different temperatures and light periods combinations. Wild strawberry plants were exposed to different environmental conditions in three growth chambers. Plant morphological changes were recorded to study the plant-glyphosate relationship, and leaf samples were collected for the melatonin-glyphosate relationship weekly. Results suggested that the efficiency and degradation of glyphosate were influenced by both temperature and photoperiod. However, the production of melatonin was only influenced by temperature.

Co-Creating Connected Communities: 15-Minute Neighbourhoods in Surrey, BC

Aayush Sharma, Meghan Winters

Faculty of Health Sciences, Simon Fraser University

Key Terms: 15-minute neighbourhoods, healthy cities, community-engaged research, equity

Type of Presentation: Poster

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Auto-centric urban design harms our health and the climate. To address this, cities are adopting the "15-minute neighbourhood" planning concept, where all necessary amenities such as homes, work, shopping, healthcare, schools, and entertainment are within a 15-minute walk, bike ride, or transit from one's home. Adopting such policies is meant to support sustainability, transport, and liveability goals. However, while the 15-minute neighbourhood approach may resonate in European cities or the densest downtown cores of the world's major cities, it is uncertain how feasible it is in the Canadian suburban context. Our study explores accessibility to amenities and how this intersects with equity in Surrey, BC, using a 15-minute neighbourhood framework. Home to 580,000 residents, Surrey is amongst BC's fastest-growing and most culturally diverse communities but experiences some of the greatest social inequities, such as increasing housing unaffordability and lack of sustainable mobility. Under these pressures, city staff are exploring how to plan for an equitable future. In partnership with the City of Surrey, we are mapping 15-minute neighbourhoods and using community-engaged research (CER) methods to develop a community-informed definition of a 15-minute neighbourhood. This presentation will showcase 15-minute neighbourhoods in Surrey and discuss the value of CER methods in city planning. Our work advances research and practice by using GIScience approaches alongside CER to advance social equity in urban planning and draws attention to equity considerations within broader and increasingly popular concepts of sustainable urban planning in Canadian cities.

Exploring Geomorphology in 3D: the spectacular landscapes of Utah

Scott Shupe, School of Land Use and Environmental Change, UFV
key words: drones; landscapes; 3D; geomorphology; geology
presentation type: paper

Advances in remote sensing technology have greatly increased our ability to identify and monitor the Earth's changing environment, particularly on medium to broad scales. While these advances have also benefited local scale (i.e. "large" cartographic scale) analyses, as demonstrated by publicly available Google Earth imagery, a gap still exists at even larger cartographic scales where many immediate impacts of human and natural processes occur, but may not be recorded on remote sensors. Emerging research around the globe is beginning to show the benefits of using drones for identifying features and observing landscape change at scales that are too localized for most airborne and satellite sensors, yet still inaccessible, difficult, or time consuming to observe in the field. Advancements in computer vision have also increased our ability to more easily re-create, view and analyze geomorphic features from different angles in 3D, providing invaluable information to help understand landforms and landform change for both teaching and research purposes. In the current research numerous drone missions were flown over 26 study locations across Utah for landscape analysis. Aerial images were processed to create orthomosaics and digital elevation and 3D models which are being used to map, model and study a variety of geomorphic and environmental features including sand dunes, cliffs, columnar basalt, a limestone cave, an ancient shoreline, hoodoos, an arch, massive upturned strata, pedestals and other features and environments. This presentation will include a visual walk through some of these features with an emphasis on geology and geomorphic expression.

Paper Presentation

Title:

Predicting the Ecotoxicological Impacts of Microplastics in the Northern Salish Sea: A Novel Approach to Marine Risk Assessment using GIS

Author:

Melina Sorensen, MSc. (Royal Roads University, Gwaii Engineering)

Abstract:

Microplastics are ubiquitous in the world's oceans and have negatively impacted marine biota and ecosystem health. The Salish Sea, an inland sea ranging from Vancouver to Puget Sound, is an ecologically significant ecosystem. This study determined the areas in the Northern Salish Sea in which microplastics are likely to accumulate and subsequently where they are likely to cause ecological harm. Modelling and weighted raster analysis was performed using Geographic Information Systems (GIS). Areas of highest risk were identified, four key ecological areas of concern in relation to the results were investigated, and the potential impacts of microplastics on two key sensitive species (southern resident killer whales and Chinook salmon) were discussed. By identifying vulnerable areas and where microplastics are likely to accumulate, the results could be helpful for conservation managers, fisheries management, and natural resource managers.

Keywords: GIS, Marine Risk Assessment, Microplastics, Salish Sea

Title:

Mid-Holocene reconstruction of Riverbend Cave, Horne Lake, Vancouver Island through radiocarbon dating.

Authors:

Cameron C Stanton[1], Gillian Krezoski[1], and Sophie L Norris[1]
[1]Department of Geography, University of Victoria, Victoria, BC V8P 5C2

Abstract:

Modelling phreatic and vadose passage formation and utilizing radioisotopic dating of cave speleothems are standard methods for reconstructing environmental change in karst landscapes. Horne Lake Caves (BC Parks), Vancouver Island, are hypothesized to have formed during the Sangamon Interglacial (~MIS 5), based on hydrogeological surveys and extensive calcite deposition. However, Th-U dating of speleothems from Euclataws Cave was inconclusive and studies of nearby caves report calcite deposition to < 67 ka cal. yrs. BP, coinciding with the Olympia Interstadial (MIS 3). Here we present five minimum limiting radiocarbon ages that constrain depositional timing in Riverbend Cave (Horne Lake Cave group). Sediment infill from two false floors near the cave entrance reveal a multiphase chamber amendment, that developed after 7970 ± 40 and 2524 ± 19 ^{14}C yr. BP (~8.8 and 2.6 ka cal. yrs. BP), respectively. Wood fragments near the cave terminus constrain the formation of the cave's deepest section to 5157 ± 40 ^{14}C yr. BP (~5.9 ka cal. yrs. BP). Two ages 1166 ± 18 and 347 ± 17 ^{14}C yr. BP (< 1.1 ka cal. yrs. BP) provide contemporary evidence of flow regime variability in the main, active phreatic tube. This new study supports a model of much younger cave formation following the Fraser Glaciation (< 11.5 cal. yrs. BP) or shortly before, likely during the Olympia interstadial (> 26 ka cal. yrs. BP). The study also demonstrates that refugia existed and fluvial processes were active immediately following the last deglaciation and throughout the Holocene.

Keywords:

Vancouver Island; Horne Lake Caves; BC Parks; sediment; radiocarbon dating; glaciation

Presentation Type:

Poster

Optical dating of sand dunes to assess the timing of proglacial landscape stabilization, New Jersey Pine Barrens, USA

Justine Stoeckly[1], Maria Schaarschmidt[1], Stephen Wolfe[2], Olav B. Lian[1.]

[1]School of Land Use and Environmental Change, University of the Fraser Valley, Abbotsford, BC, Canada
[2]Geological Survey of Canada, 601 Booth Street, Ottawa, ON, Canada

Abstract:

Aeolian dune fields are widespread in the northern Atlantic coastal plains, USA. They were likely formed by katabatic winds off the Laurentide Ice Sheet (LIS) that assisted with the proglacial transportation of aeolian sediment along the central eastern American coast. The New Jersey Pine Barrens, a region about 100 km beyond the southern extent of the LIS, contains several aeolian dune forms, including parabolic and transverse dunes, and lunettes, that are currently stabilized and preserved by vegetation. Understanding when the sand dunes stabilized helps to understand how the proglacial landscape in this region responded to the retreating ice sheet. Optical dating, a method used to estimate the time elapsed since sand grains were last exposed to sunlight, provides a geochronological method for dating sand dune stabilization. We applied optical dating to quartz sand extracted from several Pine Barren dunes using a standard single-aliquot regenerative dose (SAR) protocol. We found that most sample aliquots contain a bright, quick-decaying (thermally stable) luminescence signal that have a single exponential dose response, which is suitable for dating. Our ages indicate that these sediments were deposited after the last glacial maximum (before about 24 ka), during marine isotope stage (MIS) 2, when the LIS was retreating northward. In this poster we will present the details of the dating protocol used and some of the resulting ages.

Keywords: aeolian, dune stabilization, paleoenvironment, optical dating, Last Glacial Maximum.

Accelerated Retreat of Taleomey Glacier

Matija Tadic

Analysis of satellite imagery reveals the impacts of climate change on Taleomey Glacier in the central Coast Mountains, British Columbia, Canada. Located approximately 50 km south-east of the community Bella Coola, British Columbia, Canada, Taleomey Glacier is an important source of late summer stream flow for the Taleomey River and other nearby bodies of water. The glacier has been experiencing significant retreat, with the rate of retreat increasing over time. Between 1984 and 2020, the glacier retreated a total of approximately 1300 m, averaging 36 ± 0.5 m/a^{-1}. The majority of the ablation happened between 2000 and 2020 where the ablation rate doubled in comparison to the period between 1984 and 2000. The fact that Taleomey Glacier has been rapidly receding in the past decade highlights the need for action to mitigate the impacts of climate change and protect our environment for future generations.

Cataloguing of rock glaciers in dissimilar regions of the Mackenzie Mountains: Testing for possible semi-automated detection of rock glaciers using topographic data

Rock glaciers have been the subject of extensive research in recent years, due to their potential to serve as indicators of past and present climate conditions and their potential impacts on water resources. Compilation and analysis of collected data on the location, size, and characteristics of rock glaciers within the Mackenzie Mountains was used to build a rock glacier catalogue that will serve as a valuable resource for future research and monitoring efforts. The research also aims to map the spatial distribution of rock glaciers using optical imagery and to develop a semi-automated detection model using Generalized Additive Models (GAMs) in R. The model will incorporate attribute data, such as solar radiation, aspect, topographic position index, slope, elevation, and lithology as controls for rock glacier development. Topographic data was collected in multiple regions of the Mackenzie Mountains and extracted using a 30m digital elevation model (DEM). The results of this study have the potential to improve our understanding of rock glacier distribution and dynamics in the Mackenzie Mountains and could also be applied to similar mountainous regions.

Key words: rock glacier; topographic; Mackenzie Mountains; semi-automated.

Rabecca Thiessen, master's student, University of Lethbridge; Dr. Philip P. Bonnaventure Associate Professor of Physical Geography; University of Lethbridge; Caitlin Lapalme, Physical Geographer, Environment and Climate Change Canada.

Poster Presentation

Oscar Vega Noyola
Abstract for Poster for Conference
Undergraduate Student from Thompson Rivers University
22/Feb/2023

Abstract For WDCAG

Will Moffat peak Glacier survive recent climate ?

With an Elevation of 2268 Meters above sea level, Moffat Peak Glacier proves a retreat between the years of 1980 and 2020 of 60%. Thanks to the provided program tools such as google earth, sentinel 2 playground and *Mapbox*, they allowed to do research on the consequences of a retreat in a difference of 40 years.
Due to the subtraction of mass in glaciers and area, Moffat Glacier stopped feeding the nearby river that connects Lillooet lake and Harrison Lake.
Since the Glacier is located in the first mountain range of the southeast of BC, I firmly believe that with time, the increment of carbon emissions and greenhouse gases will negatively impact the first row of the Coast mountain range of the Fraser Valley. The location of Moffat peak glacier is only partially beneficial since it is allocated in the first row of the Coastal mountain range of BC.
Another factor is that Moffat Glacier is small; its area is measured at 1.11 square kilometres—and its Perimeter is 5,392.87 m.
Therefore the Glacier does not have that much support from Glacier, ice areas and snow, and it is possible to melt within the next 100 years.

Student from
Thompson Rivers University

A review of *Kappa*: From mythical creature to festival mascot and a promoter of places and natural landscapes in Japan

Tom Waldichuk, Department of Environment, Culture and Society, Thompson Rivers University, Kamloops, BC V2C 0C8

Japanese folklore has produced mythical creatures, commonly referred to as *youkai*. One example is *Kappa*, who is a child-size, human-like creature with webbed feet that lives in and around rivers and lakes. *Kappa* has lived all over Japan under regionally different names. The image of *Kappa* has changed over the years. Once a feared water creature, *Kappa* is now generally accepted as harmless, and is portrayed as a mascot -- promoting nature and communities. Through a review of the literature and community websites, this presentation first briefly reviews the metamorphosis of *Kappa.* Then it demonstrates the role of *Kappa* as a mascot in promoting communities and the natural environment. The findings are that *Kappa* has a complex history with its ancient images as a water creature associated with turtles, monkeys, and humans. Historically, rural settlements organized festivals to worship *Kappa* as a deity to prevent residents from being harmed by *Kappa* in streams and ponds and to ensure a good water supply for farming. *Kappa* is now claimed as a mascot in more than one community and is used to foster or rebuild local pride and increase tourism. The image of *Kappa* also promotes a safer and cleaner environment, *e.g.*, through its placement on outdoor signage to stop the dumping of garbage. The principal conclusion is that *Kappa* has morphed from an ancient *youkai* to a national mascot -- with more than one place claiming its ownership -- and it has become a promoter of communities and natural landscapes.

Keywords:

Japan; Kappa; nature; place; revitalization

WDCAG 2023 Geographies of Asia panel

Paper

WDCAG 2023 UFV Abbotsford, Saturday, 11 March 2023

What to do with a Geography Degree: Jobs and Other Possibilities

Organizers:
Tom Waldichuk, Thompson Rivers University, twaldichuk@tru.ca & Garry Fehr, University of the Fraser Valley, Garry.Fehr.@ufv.ca

Similar to the successful panels that were held at the 2014 WDCAG at the U. of Victoria, at the 2016 conference at UNBC, and at the 2017 conference at UFV, this panel will examine life after graduation for undergraduate students. How do I get that real job? What are the steps to get there? How do I go about conducting an information interview? What about volunteering? Should I continue going to school? If so, what courses should I take? Is it too late for me to enter a co-op program? Should I take an online course? Should I go to grad school?

Share your experiences and ideas in this informal panel. Although this session is primarily geared to undergraduates, graduate students are welcome to attend and share their experiences during the transition from undergraduate to graduate studies. Do you think graduate school is helping to prepare you for the work world outside of academia? Faculty and professionals with a geography background are also encouraged to attend and share their employment experiences after graduation and their insights into where the jobs are now and the skills that are needed to take on those positions.

Panelists:

Blake Collins, MCIP, Director - Development Planning, City of Abbotsford:

As generalists, geographers play a vital role in many areas of Local Government. Myself and many of colleagues have educational roots in geographic disciplines from behavioral and social geography, to environmental policy, physical geomorphology and GIS analytics. With emerging trends, I believe geography students will continue to fill key interdisciplinary problem solving positions. In this session, I will offer my educational and career path choices that have led to my current position and role with the City of Abbotsford and share some of the lessons I've learned along the way.

Garry Fehr, Ph.D., UFV Professor and Director of the Agriculture Centre of Excellence

In my current position, I spend considerable time with business owners, researchers, government managers and technicians, producers, entrepreneurs and activists that all operate in the agriculture sector. Perhaps unsurprisingly a significant proportion of them have Geography education in their background.

Daniel Huesken, BSc, UFV Alumni and Owner of GBF Technical Forestry

I grew up in the Chilliwack-Fraser Valley area and graduated in 2012 from UFV with a BSc. in Physical Geography and a certificate in GIS. Throughout my undergraduate degree, I worked as a Research Assistant in the UFV Luminescence Dating Lab. I received an NSERC grant in 2012 and continued as a Research Assistant at UFV after graduation. I also worked as a foreman for a tree planting crew throughout BC's interior. In 2014, I started working as a GIS Technician for West Fraser in Williams Lake, B.C. In 2017, I started my own GIS consulting company and began to shift my focus from forestry mapping to field work in silviculture. In 2020, I purchased a new company, GBF Technical Forestry. I am now in the business of growing forests.

Assessing and Evaluating Representations of BC in Tourism

Heidi K.R. Wismath
Thompson Rivers University

This presentation proposal is for a paper
(to be considered for the undergraduate student award)
and to be shared as a poster during the conference by the author.

Works Cited

Crang, M. (2014). Representation-Reality. In P. C. Cloke, *Introducing Human Geographies, 3rd edition* (pp. 130-143). London: Routledge.

Desination BC Corp. (2022). *Don't Miss - Travel Ideas*. Retrieved from Hello BC: https://www.hellobc.com/travel-ideas/road-trips/?theme=dont-miss

McGillivray, B. (2020). *Geography of British Columbia: People and Landscapes in Transition (4th Edition)*. Vancouver: UBC Press.

Abstract

This paper seeks to explore some of the representations of human-land relationships in select places that are presently known as British Columbia (BC) within the context of Tourism promotion.

While the information presented to visitors will always be a carefully edited representation of place-based knowledge—what goes said and unsaid, along with what is deemed significant by varying levels of locality (think: community

member, hospitality worker, tour guide, visitor [variable familiarity: provincial and national proximity], travel-writer/tourism promoter; all additionally contextualized by personal connectivity to patterns of globalization and historic displacement due to colonization)—is all of interest when we view the landscape as a process that is simultaneously impacted by our relationship (actions) with it and influences our perceptions about its meaning.

Today, all places—perhaps especially those sold as 'destinations'—have been interwoven with layers of human meaning and active relating force, by way of alteration or 'preservation'. Our relationships to physical places—those we have come to inhabit, become visitors within, or pass by—are emerging reflections of interacting cultural values and interpersonal practices. To be aware (and hopefully critical) of the ways in which we participate in the processes that shape our shared places is an exploration of a multiplicity of perspectives about power, privilege, and (re)presentation.

Key Word Terms

Tourism; British Columbia; Representation; Critical Analysis; Culture

WDCAG March 2023
Poster Presentation Proposal - Lindsay Worden
February 3, 2023

Title: A Preliminary Exploration of the Paleontological and Archaeological Potential of Gordon River Caves, Vancouver Island

Author: Lindsay Worden (Undergraduate Student, University of Victoria - Department of Geography).

Abstract: This study aimed to assess the paleontological and archaeological potential of the Gordon River Caves, southern Vancouver Island, in the territory of the Pacheedaht First Nation. The collaborative study between the Hakai Institute and University of Victoria Geography Department examined six caves, with an eventual focus on two caves: Easter and Hourglass Caves, oriented as natural wildlife traps. While no archaeological evidence was discovered, a variety of animal bones were collected and identified, with radiocarbon dating reporting one elk (*Cervus canadensis*) bone to be 373 ±22 yr BP. Findings provide new local insight on pre-colonial ecological distribution of elk (*Cervus canadensis*), and the presence of deer (*Odocoileus hemionus*) and Sooty grouse (*Dendragapus fuliginosus*) in the region. The Gordon River Caves consist of over 30 known caves that have potential for further discoveries but are currently at risk due to logging. In general, caves can be used as a proxy for ecological reconstructions and should be more strongly advocated for in forestry management.

Keywords: paleontology; karst; caves; radiocarbon dating; Vancouver Island

Presentation type: poster

Lead author is an undergraduate student for which, please consider for a student award.

WDCAG 2023: Planning for Resilience and Climate Change

Submission of Abstracts

Presentation or poster title (100 characters or less):

Pairing partner needs with visitor feedback: Exploring tourism and virtual tourism, in Tumbler Ridge, BC

Complete list of authors and affiliations (lead author listed first):

If the lead author is a student, please indicate in a covering email whether you wish the presentation to be considered for a student award and, if so, the appropriate student category (i.e., Undergraduate, Masters or PhD). In cases where a student is presenting work completed in an earlier degree, the appropriate adjudication category is the one in which you are presently enrolled.

Name:	Affiliation:	Email:
Yihang Zhang (Masters student, wish to be considered for a student award)	University of Northern British Columbia	yihangz@unbc.ca
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Abstract of 250 words or less:

Tumbler Ridge, in northern B.C., was established for coal mining in the 1980s. Since then, area decision-makers have sought to diversify the economy. A UNESCO Geopark is the main tourist attraction and a key part of that diversification. It is full of mountains, meadows, glaciers, canyons, waterfalls, caves, and karst formations-a geographer's delight. The Tumbler Ridge Museum showcases fossils, local geology, and paleontological finds. The area has abundant tourism assets but also faces challenges in attracting and retaining visitors. Its remote location at a distance from tourism markets presents a geographical challenge in terms of drawing visitors. Its rugged attractions and trails represent accessibility challenges for visitors and local residents. Collaborating with our research partners, the Tumbler Ridge Museum Foundation and the Tumbler Ridge UNESCO Global Geopark, we investigated visitor experiences and perceptions

via a face-to-face self-administered survey (n= 384; July-August 2022). We asked about motivations, preferences, activities on site, as well as visitor perceptions of virtual experiences. Virtual tourism experiences (VTEs) can be used to promote destinations, enhance visitation enjoyment, and/or augment accessibility. We recognize that Tumbler Ridge sits in a common and difficult with regard to climate change and resilience. Tourism represents an effort to move towards a lower carbon economy. At the same time, “rubber tire” travel is key to its survival and growth as a tourism destination. Can virtual options diversify and extend local offerings? We address this by presenting survey results (n=384) and initial thoughts on virtual inclusions.

Up to five key word terms separated by semi-colons:

Park; Tourism; Virtual Experience; Small town; Northern BC

Type of presentation:

Paper