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ABSTRACTS

ORAL PRESENTATION ABSTRACTS

Agarwal, Niklas
BA Student (Geography), UBC

LIVABLE CITIES? COMPETITIVE CITIES: HOW URBANISM IDEALS AND MILLENNIALS HAVE MADE CITIES MORE COMPETITIVE

Cities today are transforming at incredible speeds. Not only are more people living in cities, but cities are becoming more “livable" by focusing on urbanism ideals that value walkability, access to transit, and creativity. What caused this shift? I argue that it is competitiveness. This can be shown through the dual increase in the media coverage of the ideas of “liveable cities” and “competitive city.” In this paper I show how cities are increasingly following globalization patterns and revitalizing to attract young millennial workers. Moreover, this increase in coverage of “competitive cities” mirrors scholar-identified trends where when cities become more livable they see an increase in living costs through gentrification. This article will first outline and explain the trend, conduct a brief media trend analysis, and then proceed to discuss the problems of livability with a focus on gentrification and competitiveness using real world examples.

Key Words: Livable Cities; Competitive Cities; Millennials; Urbanism

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Auerbach, Katriona Siloen
MA Student (Interdisciplinary Studies), UNBC

HUNTING, HEALING AND THE HUMAN-LAND RELATIONSHIP: AN EXPLORATION OF HEALTH THROUGH INDIGENOUS INFORMED HUNTING PRACTICES, LAND RELATIONSHIPS AND WAYS OF KNOWING

Prior to settler contact, many North American Indigenous teachings linked well-being to land-relations and, in doing so, created a foundation for vibrant and healthy communities. Evidence suggests that hunting was a means of connecting individuals to the land in ways that strengthened human-land relationships and, in doing so, significantly improved mental, physical, emotional and spiritual health. However, when settler populations arrived, they brought with them a worldview that desacralized the landscape and fractured Indigenous human-land identity. This disconnection continues to manifest today in land use conflicts, racism, and the impoverished health and well-being of Indigenous communities. This research is based on the premise that strategies to address the social ills, that many Indigenous peoples face today, may be found in the Indigenous teachings that have nurtured the peoples who have practiced them since time immemorial. More specifically, it seeks to address the question: *How can hunting, and the human-land relationship that develops through specific Indigenous hunting practices, facilitate the health, healing, and well-being of North American Indigenous peoples?* The Interdisciplinary nature of this research merges concepts, theories and ideas from First Nations Studies, Health Geography, Health Sciences and Anthropology disciplines. This inquiry will be explored through an Indigenous lens and will draw on Indigenous informed decolonizing methodologies with the intent to acknowledge and validate Indigenous systems of knowledge and strengthen capacities that align with right relationship with Indigenous ways of living. This research further seeks to encourage and support an enriched and ongoing engagement in cultural reconciliation and revitalization.

Blackman, Tyler Andrew
BA Student, University of the Fraser Valley

THE CANADIAN FARM WORKERS UNION: SOCIAL MOVEMENTS AND LABOUR ARRANGEMENTS

In the 1970s, many Canadians were shocked to hear of the disparaging working conditions and discrimination of farm labourers, particularly in the Lower Mainland of British Columbia. The labour force was characterised by predominantly new immigrants who were women, children, and elders. The working conditions of that time motivated key individuals to instigate a movement to seek justice for these marginalized workers. Using archival material and semi-structured interviews this study focuses on the formation, efforts, and flows of the Farm Workers Organising Committee (FWOC) and shortly thereafter the Canadian Farm Workers Union (CFU). This time period and the struggle of seasonal and full-time farm labourers is well documented as the emergence of a trade union that influenced improved working conditions for farm labourers. However, the FWOC and CFU had a less than conventional emergence as a trade union. Here, I argue that the FWOC and the CFU is better positioned as a social movement when examining the evolution of the movements strategies, goals, and outcomes.

Keywords: labour; agriculture; farmworkers; social movement; history

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Bracken, Linda
BA student, Vancouver Island University

AGING IN PLACE: AN INTERDISCIPLINARY APPROACH

The goals of this paper are to bring awareness to the developmental difficulties of our elders while highlighting merits of infrastructure planning used to create a positive space - a place for elders to live happily in their home communities for as long as possible. The main objective is to demonstrate how keeping people in their homes as long as possible is for the benefit of the senior and their community. When developmental needs of the elderly are consider as normal and not deviant, fear is removed and life for the elderly citizen becomes more productive. Both planning and accrued lay knowledge can inspire the creation of adaptive homes and neighbourhoods that benefits the all residents of a mixed community creating a place for everyone over an extended time frame. Flexible home designs can be suitable for other residential consumers such as families with young children or people with disabilities.

Key words: sustainable development; infrastructure; community; psychogeography; planning.

Brady**,** Nurmaiya (Maiya)
MA Student (Geography), Department of Earth and Atmospheric Sciences, University of Alberta

SELF-HELP GROUPS AS AN ALTERNATIVE MODE OF PUBLIC SERVICE DELIVERY IN RURAL INDIA

Self-help groups (SHGs) as a mode of community-based and driven development has been increasingly adopted within international development practice as a platform for broader community engagement. SHGs have been mobilized to promote government programs and local development initiatives because of their perceived ability to empower participants in ways that externally implemented programs cannot. In India, SHGs have been actively utilized to promote rural micro-financing and micro-enterprise initiatives with the intent of improving financial empowerment, livelihood creation, and gender empowerment. The existing literature on SHGs is heavily dominated by case studies focusing on the

financial and economic outcomes of such interventions. This research explores the role of SHGs as an alternative mode of public service delivery, specifically in rural communities that suffer from service delivery deficits and institutional constraints. It asks if SHGs can help bridge existing service delivery gaps and what are the associated benefits and challenges surrounding this approach? To address this, a qualitative analysis was conducted with 171 SHG members, policy makers, and key informants through focus group and individual interviews in two high-density districts in the Indian state of Kerala. Preliminary data analysis support the role of SHGs as an effective delivery mechanism for rural public services and government poverty alleviation schemes within these communities. The results of this study seek to contribute to the knowledge gap that exists on SHGs as a service delivery mechanism while considering outcomes beyond traditional economic variables.

Key words**:** Self-help groups; Service delivery; Rural development; High-Density

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Brendle-Moczuk, Daniel
GeoSpatial Librarian, University of Victoria

BC'S ELECTRICAL ENERGY NEEDS AND SITE C DAM IN THE PAST AND PRESENT: WHY GIVE A DAM(N)?

In December 2014 BC government and BC Hydro bureaucrats announced they were going ahead with the Site C hydro-electric dam and reservoir because the benefits outweigh the risks. Construction began in the summer of 2015.

Despite being billed as clean energy and in the public interest the environmental and social costs will be experienced by those in the Peace River valley and not by distant electricity consumers. Today's society benefits from the dams and reservoirs of the past but do not remember the dammed rivers such as the Finlay, Parsnip, and Peace.

Although humans have dammed and manipulated rivers for millennia, should we be concerned about this third dam and reservoir on the Peace River within BC?

This paper will re-tell the historical geography of the drowned Peace River landscape and assert that other less landscape intensive energy sources should be further investigated to provide BC's electrical energy needs.

Keywords: hydro-electric dams and reservoirs; electrical energy; historical geography

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Buse, Chris, Connolly, Michelle, Fredeen, Art, Halseth, Greg, Harder, Henry, Parkes, Margot, Weincyzk, Al, and Wells, Rachael
Cumulative Impacts Research Consortium, University of Northern British Columbia

ADDRESSING AN 'INTEGRATION IMPERATIVE': MERGING ENVIRONMENTAL, COMMUNITY AND HEALTH PERSPECTIVES TO DEVELOP AN UNDERSTANDING OF THE CUMULATIVE IMPACTS OF RESOURCE DEVELOPMENT FOR NORTHERN BC

Northern British Columbia has a rich history of resource development operations including, but not limited to: forestry and mountain pine-beetle recovery, fisheries, mining, renewable energy projects, and a recent surge in oil and gas exploration. To respond to emerging concerns surrounding the

interaction between multiple industrial projects operating on a common land base, the Cumulative Impacts Research Consortium (CIRC) was created. The CIRC is a new initiative at the University of Northern British Columbia that serves as a platform for original research and community engagement on the cumulative impacts of resource development. This presentation aims to report on a range of research and community engagement activities that the CIRC has focused on over the past year, including key lessons gleaned from northern communities during dialogue and workshop sessions. Specifically, this presentation highlights promising and emerging best practices to address the cumulative impacts of natural resource development by integrating diverse fields of practice (e.g. environmental sciences, community development, health sciences) and multiple perspectives (e.g. industry, First Nations, government, civil society) into a holistic framework for assessing, understanding, and measuring cumulative impacts. This includes criticisms of conventional environmental assessment approaches as practiced in BC and Canada at large, and recommendations to the research and practice community on how to enhance monitoring and planning processes in light of multiple land use stressors on humans, wildlife, and the lands we call home.

Keywords: cumulative impacts; northern British Columbia; rural and remote communities; resource extraction and development; land-use planning; environmental assessment

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Casali, Amy
Department of Geography and Environment, Trinity Western University

FIELD-BASED ENVIRONMENTAL EDUCATION: WHY YOU SHOULD SAY YES WHEN YOU DON'T KNOW WHAT YOU'RE GETTING YOURSELF INTO

According to the Ontario Ministry of Education: "The future of environmental solutions ultimately rests with students … More than ever, it is vitally important that our education system not only prepare students academically but also provide them with the skills, perspectives, and practices they will need to meet the social and environmental challenges of the future." The Department of Geography and Environment at TWU recognizes the importance of engaging students at the local level to understand environmental change as it happens. The Department also seeks to instill in their students an appreciation of the need for ecological restoration. Theory and skills acquired in the classroom are put into practice through a number of field-based research internships for students. Fieldwork for these internships is conducted at the Crow's Nest Ecological Research Area, a 29 ha property on Salt Spring Island, B.C., containing endangered Garry oak meadows and at the 10 ha Blaauw Eco Forest in Langley Township, B.C., which is home to a variety of microhabitats including a remnant bog. Fieldwork conducted by interns at these sites focuses on native species assessment and monitoring, removal of invasive vegetation and ultimately ecological restoration. Both locations provide students the opportunity to design and conduct field experiments, develop and hone critical skills such as working with spatial databases, and practicing compiling and writing field reports. More than that, they give students an appreciation for the importance of practical environmental education in contemporary times.

Keywords: environmental education; ecosystem restoration

Chow, Victoria[1], Nadanasabapathy, Saraswathy[2], Ng, Keng Hon[3], and Hawkins, Blake[4]
[1]University of British Columbia, Linguistics
[2]University of British Columbia, Sociology
[3]University of British Columbia, Psychology
[4]University of British Columbia, School of Library, Archival, and Information Studies

USING A HEURISTIC EVALUATION FOR LGBTQ HEALTH CYBERSPACES

Geographers are beginning to re-engage in scholarly debates regarding the virtual interactions occurring in cyberspaces by LGBTQ youth. This early-stage second generation of scholarship demonstrates that further interventions are required regarding these interactions concurrently with health information seeking for sexual, physical, and other everyday health needs. For this presentation, we are reflecting on key themes that were produced from a heuristic evaluation of virtual health spaces, which are targeted for LGBTQ youth health and wellbeing. To complete this evaluation, we used an evaluation model previously used for online men's health promotion, and adapted it for LGBTQ youth health and wellness. For our sample (n=18), we chose websites that were targeted for the broader LGBTQ youth population. After we used our measure on every website webpage, the data was then further analyzed with content analysis to produce general themes associated with the websites. The current results from these virtual spaces continue to indicate that, further investigations are required regarding what is found in these spaces. Some of the websites were not very inclusive and appeared to target a primarily white and abled-bodied population. Furthermore, some websites were better than others at providing accessible information and preventing information overload. As virtual spaces have become more easily accessible and geographers engage in LGBTQ virtual spaces, it is necessary to understand them from a health-based perspective. LGBTQ youth nowadays typically rely on these spaces. Through evaluating these virtual health spaces, it offers geographers an opportunity to observe the virtual form of interactions amongst LGBTQ youth.

Key Terms: LGBT Health; Cyberspaces; Health Geography; Health Promotion; Heuristic Evaluation

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Dawson, Teresa
Department of Geography, University of Victoria

SETTING OUT ON A LONG JOURNEY TOGETHER: REFLECTIONS ON FIRST STEPS IN DECOLONISING INTRODUCTORY HUMAN GEOGRAPHY

Geography has not had a very illustrious history when it comes to the way that our work (whether consciously or not) has often been used to underpin the colonial project in Canada and in particular to suppress or destroy the culture, rights, and even the very lives of indigenous peoples. A group of colleagues at the University of Victoria has been holding serious discussions for some time as to how to "decolonise" our program. Such efforts have been made even more imperative since the publication of the full *Truth and Reconciliation Commission Report* last year and broadening awareness in the university that urgent action is required. I am part of this group of colleagues who are working collectively, at all levels, both inside and outside the classroom, on our geography program at UVic. For this project to succeed in transforming our curriculum, we will have to take a really deep and critical look, not just at our geography content, but also our ways of knowing, our ways of learning, our pedagogies, and our students' experiences. Further, we cannot expect our indigenous colleagues and students to do all the work. To quote Paulette Regan (2010), we must "begin by decolonising ourselves."

In my own case, I felt we needed to start at the beginning of the program and so I tackled the "introductory course in human geography," which is one of the very first courses any geography student should take in our program. In this session, and acknowledging fully that I am not an indigenous person myself, I will offer a few reflections about my own rudimentary steps in the crucial and long journey we need to undertake together. My contribution to the session is designed to be both an invitation to others to join the conversation, by sharing their ideas and experiences, as well as a call to action.

Key words: teaching and learning; decolonising the curriculum; indigenous ways of knowing.

Deacon, Leith, and Garvin, Theresa
Department of Earth and Atmospheric Sciences, University of Alberta

Cultures, Landscapes & Geographic Space (HGP 100) is the introductory course to Human Geography and Planning offered at the University of Alberta. In the spring of 2014, we were awarded funds to help transform the method of delivery for HGP 100. We focused on four primary objectives: 1) Transform HGP 100 from a lecture-based to a blended learning course, 2) Engage student in critical and discovery-based learning, 3) Ensure a sustainable model for future course delivery and, 4) Evaluate student and faculty satisfaction with the revised delivery method. This course redesign has been a very useful and successful project. In particular, there are two areas that are worth further presentation:

1) Online quizzes: we completely changed the evaluation of the course and one particular change has been very well received. We administer three online quizzes (10% each) based on two units and students are given two attempts over a period of seven days to complete the quiz. Students consistently see an improved mark in their second attempt and when they begin to prepare for the final exam, a significant amount of preparation has already been completed.
2) Addition of seminars: unlike most physical science-based courses, HGP 100 never included seminars. This redesign has included a significant focus on these seminars and the work that students have completed has been innovative and noteworthy.

This presentation will provide a thorough overview of our experiences redesigning a traditional 3 x 1 hour lecture format into a fully blended course with emphasis on the benefits related to introduction of the online quizzes and the additional of small group seminars.

Duros, Jacob[1], and Petticrew, Ellen[2]
[1]MSc Student (Natural Resources and Environmental Studies), University of Northern British Columbia
[2]UNBC Research Chair of Landscape Ecology and Professor of Geography, UNBC

MAPPING THE MOVEMENTS OF AQUATIC PARTICULATES IN 3D USING A CTD PROFILER IN QUESNEL LAKE, BC

The movement of suspended particulates throughout watersheds is an important hydrological and geomorphological process. Salmon play a key role in this movement and redistribution of suspended particulates that are important in aquatic and terrestrial ecosystems. Research has been conducted on the movement and storage of marine-derived nutrients (MDN) in aquatic systems throughout the Pacific Northwest; however, previous research seems to vary in whether MDN has a beneficial, neutral, or detrimental impact on aquatic ecosystems. A sampling strategy was designed to evaluate the temporal

and spatial distribution of MDN delivered from the Horsefly River into Horsefly Bay on Quesnel Lake, British Columbia, which supports a significant sockeye salmon stock (Horsefly River sockeye returns in 2014 ~450,000 spawners). Preliminary results of this study suggest that MDN are delivered to Horsefly Bay during the late fall and early winter months; however not in high volume. These MDN that are flowing into Horsefly Bay may be entering while waters are in turnover or inversely stratified. This may lead to these nutrients being lost to the depths of Quesnel Lake and not being utilized by primary production. During spring and summer months the Horsefly River plume is suspended higher in the water column. MDN that may be entering Horsefly Bay during this time may be better available to biota living in these warmer shallower waters which could increase primary production. The findings of this study may help determine if MDN impact the growth and survival of juvenile salmon rearing in Quesnel Lake.

Key Words: Nutrients; Behavior; Salmon; Aquatic

Edgington, David W.
Professor, Department of Geography, UBC

MANAGEMENT OF NUCLEAR POWER PLANT ACCIDENTS: A COMPARISON OF THE CHERNOBYL AND FUKUSHIMA DISASTERS

While Chernobyl is not a perfect comparator for the Japanese Fukushima Dai-Ichi Nuclear Power Plant Accident of March 2011, the series of explosions in the Fukushima Dai-Ichi Plant were the largest nuclear plant (NPP) disaster since the Chernobyl disaster of 1986 and the second disaster (after Chernobyl) to be given the Level 7 event classification of the International Nuclear Event Scale. At the outset of the Fukushima crisis in March 2011, many assertions by Greenpeace Japan claimed that the Ukrainian response to the Chernobyl NPP accident involved a more generous approach to evacuating women and children, setting boundaries around the stricken Plant, and the provision of more lavish compensation amounts. This study interrogates archival and textual materials to investigate these claims. It is based on reports that cover the social geography of both Chernobyl and Fukushima. To examine this proposition, the analysis covers: (1) the number of victims from the disasters; (2) how decisions were made to evacuate people in immediate proximity to the stricken power plants, (3) decontamination procedures; (4) compensation for evacuees; and (5) post-disaster recovery efforts, including the restoration of evacuees to their original homes. The results indicate that the Japanese situation in 2011 was probably handled as best as could be expected while the situation in the Ukraine was shaped by the breakup of the Soviet Union in the early 1990s and the economic crisis that beset the country soon after.

Keywords: environmental disasters, Japan, Ukraine, Nuclear power; recovery strategies.

Emon, Carolyn[1], and Hanlon, Neil[2]
[1]MA student (Interdisciplinary Studies), University of Northern British Columbia
[2]Professor of Geography, UNBC

CARING FOR THE INVISIBLE: BARRIERS AND CONSTRAINTS TO PROVIDING SERVICES FOR VICTIMS OF HUMAN TRAFFICKING

Human trafficking is an abhorrent crime that exists throughout the world, affecting communities of all sizes. Men, women and children are treated as slaves and are forced into exploitive situations for both labour and sexual services. Temporary and permanent residents living in exploitive situations for even limited periods of time face long-term emotional and physical trauma. While the body of research on global human trafficking is growing, there are few studies that look at the delivery of, and access to, community-level care and support for victims in smaller urban centres, where human trafficking is less prominent and victims of trafficking are less prevalent. The purpose of this research is to expand on Canadian human trafficking literature and to address gaps by examining in service provision for victims of trafficking in Prince George, British Columbia (BC). Using a case study approach, we conducted key-informant interviews (n=19) with service providers in Prince George and Vancouver, BC. We examine the nature of service coordination and provision in Prince George and how this differs from service provision in a larger gateway centre, such as Vancouver. Our findings indicate that there are wide variations in understandings of human trafficking amongst service providers, and key differences in resource and institutional conditions that create barriers to victim identification and service coordination.

Key terms: human trafficking; support; service provision; trauma; vicarious trauma; slavery; exploitation

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Galbraith, Anna H., and Jordan, David A.
Department of Geography and Environment, Trinity Western University

RECONSTRUCTING PRE-EUROPEAN SETTLEMENT GARRY OAK (*QUERCUS GARRYANA*) DISTRIBUTION IN THE WILLAMETTE VALLEY, OREGON

Oak savanna, a historically prominent landscape in the Willamette Valley, Oregon, has been in decline as a result of invasive species, fragmentation of habitat, and discontinuation of the natural disturbance regime since European settlement around 1850. In order to better inform restoration management in oak savanna, three spatially-explicit annual ring-width chronologies for Garry oak were developed for Mount Pisgah, Eugene; Chip Ross Park, Corvallis; and Jim's Creek, Oakridge County in the Willamette Valley, Oregon. Study sites were chosen based on known presence of legacy oaks, accessibility of site, and availability of plot-level ecological data (e.g. soil depth, slope, aspect) that could be joined to tree location using GIS. Target trees were selected in the field by diameter and open-grown form. The Chip Ross Park site chronology spans a total of 224 years from 1790-2014 and has a series intercorrelation of 0.479, while the Mount Pisgah chronology spans a total of 380 years from 1634-2014 and has a series intercorrelation of 0.503. Statistically significant ($p<0.01$) series intercorrelations and the presence of marker rings indicate common radial growth signals among sites. Growth patterns present in the chronologies indicate an initial increase in growth of Garry oak following European settlement around 1850, followed by increasing suppression until present. Further spatial analysis on these geographically-referenced chronologies will provide insight into the landscape characteristics which contribute to the long-term survival of Garry oak amidst changing environments.

Keywords: *Quercus garryana,* dendrochronology, geographic information systems (GIS), Willamette Valley

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Hanlon, Robert J.
Lecturer (International Relations and Asian Politics)
Thompson Rivers University

SUSTAINABILITY WITH CHINESE CHARACTERISTICS: THE ASIAN INFRASTRUCTURE INVESTMENT BANK, POLITICAL ELITES AND DEVELOPMENT IN SOUTHEAST ASIA

This paper asks what impact the Asian Infrastructure Investment Bank (AIIB) will have on Southeast Asia's development process. While the 57 member organization has communicated that it will promote social and environmental sustainability, it remains questionable how the AIIB will integrate such themes within its lending framework. Moreover, with China having committed an initial $US 100 billion to the organization's inaugural budget and holding the only veto power, Beijing has secured a dominant position within the group. It can therefore be argued that China's national interest may have serious implications for how the organization operates and influences its members especially within the context of sustainable development. While the AIIB has declared that all of its future clients will be required to submit an Environment and Social Standards (ESS) assessment for each proposed project, it is not clear how rigorous the process will be. In particular, protocol on how the AIIB will measure projects that could impact human rights and the environment are vague. What then can be made of the AIIBs commitment to environment and social standards throughout the region? Using Southeast Asia as a broad case study, this paper argues that the AIIB risks undermining human rights and sustainable development in the pursuit of development projects that are in-line with elite interest thereby marginalizing some of the region's most vulnerable populations.

Harvey, Theo, and Jiskoot, Hester
Department of Geography, University of Lethbridge, Lethbridge AB, Canada

DETECTION AND MEASUREMENT OF ARCTIC COASTAL FOG OVER GREENLAND GLACIERS USING MODIS, DEMS AND GLACIER INVENTORIES

As temperatures rise and atmospheric moisture increases over the Arctic Ocean, the frequency and spatial extent of Arctic coastal fog may change. Whereas higher level clouds enhance glacier melt, some coastal glaciers under frequent summer fog have experienced reduced melt. Research on the effects of fog on glacier surface energy balance is scarce. A first step in increasing our understanding of fog over glaciers is to quantify its spatiotemporal extent. We present the horizontal and vertical extent of significant fog events over East Greenland glaciers and the ice sheet. We modified a MODIS fog classification based on Bendix *et al.* (2005), which we validated with MODIS cloud phase products, ground observations and Landsat images. We process MODIS level 1B and level 2 cloud products as follows: 1) examination of visual and SWIR bands and NDSI; 2) initial fog/low stratus discrimination with SWIR thresholding and cloud products; 3) calculation of fog/low stratus geometrical thickness; 4) final discrimination of fog/low stratus using edge pixel detection, trend surface analysis, and DEM filling. The final product is a 500 m fog mask over East Greenland. We present examples of fog extent throughout the melt season. Mean fog thickness is 100-250 m, maximum inland extent 75 km, and maximum fog extent over glaciers and the ice sheet > 10000 km^2 and occurs in July/August. This is the first attempt to

measure and quantify fog over glaciers over large spatial scales. The method and results will lead to better quantification of cloud radiative forcing by fog.

Keywords: Arctic meteorology; Remote sensing; Glaciology; Fog; GIS

Hawkins, Blake
Masters of Library Science Student, University of British Columbia

WHERE WERE THE GAYS[1]? PRODUCING KNOWLEDGE IN A LEGACY OF NORTHERN MASCULINITY

The sociocultural landscape of Northern BC has problematic legacies of Eurocentric hegemonic masculinity due to resource industries that employ(ed) the majority of the region's men. Characteristics of normalized masculinity associated with these men include ruggedness, anti-feminine, and/or homophobia resulting in frequent subjugation of men to gay fear and gender (self)policing. Thus, limiting discourses about gender fluidity which might trouble the heteronormative legacy. This ontology regarding gender becomes normalized, through the sociological influences of family and society, for male youth and potentially promotes the marginalization and/or pillory of queer male youth. In this paper, I argue that this historical sociocultural legacy of unhealthy masculinity found in Northern British Columbia spaces has resulted in ostensible challenges for improving the health of the gay population(s). I claim that there is currently a socio-politicization/subjugation of knowledge production/mobilization connected with qualitative queer research in Northern BC. The theoretical underpinning of this paper incorporates sociological theories of men studies concurrently with critical rural, queer and gender geographies, and the politicization of knowledge production/mobilization. Furthermore, autoethnographic narratives are integrated regarding the emotion labor of recruiting queer male youth for this health-related research project. There is a growing discourse concerning masculinity, queerness, knowledge production/mobilization and health; however, this is juxtaposed by the lacking discussion about the geographical challenges with recruiting rural queer male youth to share lived experiences in hypermasculinized geographies. Without investigating this challenge, there is, I argue, the potential that the health outcomes of queer male youth cannot improve and persist heterogeneous compared to heterosexual men.

Key Terms: Queer Geography; Masculine Space; Gay Young Men; Knowledge Production & Mobilization; Health Geography

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Hay, Claire
Department of Geography and the Environment, University of the Fraser Valley

THE IMPORTANCE OF FACILITATION IN PROBLEM-BASED LEARNING

Problem-based learning (PBL) is an inquiry-based pedagogy built on student-directed learning where students encounter real world problems and then use a variety of skills and techniques to investigate the problem. In this way, students develop an understanding of theoretical concepts through an application to real world problems. In a PBL model, the instructor's role is changed from being the deliverer of knowledge to facilitator, mentor, interventionist, supporter and role model. Deliberate and

[1] Gay is being used in a homogenous tense in regards to anyone identifying as a man, and who is non-heterosexual (i.e., gay, bisexual, transgender, trans*, queer, intersex)

careful facilitation is key to student success and engagement in a PBL learning model. Successful facilitation involves thoughtful design of authentic assessment activities that mirror the real world, integration of project reporting into the course design, providing opportunities for self-reflection and a willingness to be a cheer-leader for both the learning process and the students themselves. From my experience, facilitation is more time-consuming than traditional instructional activities and more important. This paper will identify the facilitation techniques adopted in an upper-level coastal geography course and discuss the relative importance of these techniques in effective course delivery.

Key words: problem-based learning; facilitation; teaching; learning; coastal geography

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Holden, Sarah
BA student, Vancouver Island University

VANCOUVER ISLAND'S 'WEST COAST' ARCHITECTURE

The history of Vancouver Island's built environment begins with early First Nations architecture. The following late colonial and early modern periods contributed rich maritime forms to the landscape. The contemporary landscape is dominated by an influx of non-native peoples and the proliferation of suburban development. To some extent the forms that encapsulate the cultural-historical meaning of "West Coast" have been erased from the landscape; however, the term remains and acts as an umbrella term for an eclectic mix of "West Coast" aesthetic. Official Community Plans (OCPs) on Vancouver Island use this term to preserve established local vernacular and to guide future development.

Keywords: West Coast; Vernacular Architecture; Official Community Plans

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Jahan, Nushrat[1], and Deacon, Leith[2]
[1]MA student, University of Alberta
[2]Assistant Professor, University of Alberta

ANALYTICAL FRAMEWORK FOR REGIONAL ECONOMIC RESILIENCE: A CASE STUDY OF DEVON

Sustainable development planning based on local ideas of regional economies is necessary for regional economic, social and environmental resilience. This issue is more critical for a resource based economy, where economic cycles (boom/ bust) associated with changing price of resources in international markets occur regularly. Balancing between localization and diversification is the key to making regional economies resilient.

This presentation will provide project background and justification of the research and a series of operational definitions (i.e. resilience, resource based community and regional economic resilience). A short description of how regional economic resilience has been conceptualised along with some determinants of regional recovery and resilience will be offered. Presentation of the study area including geographic location and key demographic, economic and social statistics will be provided.

Keywords: Regional economy, resilience, resource based economy, analytical framework

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Jones, Fiona, Lee, Therise, Altura, Kyla, and Peng, Samantha
BA Students, University of British Columbia

RELATIONSHIP FIRST: IDENTIFYING AN INTERDEPENDENT SOCIAL HOUSING APPROACH IN VANCOUVER

The aim of our Vancouver-based research was to explore the intersection of social engagement and housing. Resulting from both a localized survey in the South East False Creek neighborhood and interviews with nonprofits across Vancouver, we propose a Relationship First model. This approach, first termed by one interview participant, amalgamates the Housing First and Treatment First approaches which are well established paradigms in social housing thought. Rather than the focus on the physical space of housing or specific treatment programs, the relationship first model focuses on developing interpersonal interactions to reduce homelessness. Relationships are enabled through their spatial concentration under Housing First but developed with the engagements fostered by Treatment First services. Through social engagements, a stable sense of belonging and affirmation of self-worth are mutually produced, enabling the success of services.

For the creation for stable relationships we identify the need for changing public attitudes to substance abuse, welfare and, notably, mental illness. Mental illness in particular is often invisibilized in discourse but associated with a strong negative stereotype. Public outreach programs and educational campaigns are crucial for the mitigation for destructive stigmas. This focus on employing outreach programs to individualize relational support broadens the mandate of social housing providers from a narrowly defined one of allocating accommodation to an interpersonal attention. In codifying this Relationship First model we hope to formalize it as a reciprocal framework for the reduction of vulnerability in our society.

Key Word Terms: Social housing; Housing First; Treatment First; Homelessness

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Josephson, Ken
Cartographer, Department of Geography, University of Victoria

DEEP MAPPING FOR DEEP LEARNING

Many of our current pedagogies are problematic at best, disrespectful of, or incompatible with, community or Indigenous ways of knowing and being. Community mapping (CM) as practiced by the UVic *CM Collaboratory* is an attempt to invert power structures behind the teaching and learning of standard Western Cartographic maps and mapping. As part of the *Collaboratory*, partnerships developed with First Nations, government and non-government organizations and citizen groups are providing co-learning opportunities for students hungry to create, support and celebrate positive change in the places and spaces they call home. Through community engaged, service-based course projects, students empower the voices of those whose stories and connections to land and community often go unheard. In the process, they facilitate and document everything from feasts and events, to working in community gardens and restoration projects. Community Mapping as a pedagogical tool certainly isn't without its challenges. It requires a certain level of maturity and sensitivity from students, is more work for faculty (often not acknowledged by their institutions) and demands time investment by

community partners. Yet the deep learning that results is so transformative that the value of the approach is hard to deny. Students struggle with questions such as “How do we re-present our many stories and place names respectfully, without devaluing one to another?” They learn that there is a difference between the ‘facts’ associated with a place as mapped using western techniques, and the deeper 'truths' embedded in a place’s stories and names as captured in a community mapping project.

Key words: community mapping; place names; indigenous knowledge

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Kennedy, Peter[1, 2], Zhang, Jinkai[3], Coburn, Craig[1, 2], and Staenz, Karl[1, 2]
[1]Department of Geography, University of Lethbridge, Lethbridge, Alberta, T1K 6T5, Canada
[2]Alberta Terrestrial Imaging Centre, Lethbridge, Alberta, T1K 6T5, Canada
[3]Alberta Agriculture and Forestry, Great West Life Building, Edmonton, Alberta, T5K 2M4, Canada

CALIBRATING AUTOMATIC UPDATES OF VARIABLE-ACCURACY LARGE-AREA LAND-COVER MAPS

The expertise embedded in existing high-accuracy land-cover maps can be used to produce updated land-cover maps automatically. However, the low and spatially-variable classification accuracies of large-area maps confound existing automated approaches. The objective of this study was to analyse the problems with automating updates of maps with low and spatially-variable accuracies. Experiments used the 25-m Earth Observation for the Sustainable Development of forests (EOSD) land-cover map, the 30-m Global Forest Cover treeCover2000 (GFC) map, and six 10-m SPOT 5 HRG images of the Vermilion River watershed, Alberta, Canada to train multivariate decision trees. Under this framework, the EOSD-trained classifications were very successful. Forest producer’s accuracies improved absolutely by 15% on average, and forest user’s accuracies improved by 25% compared to the original EOSD. However, the GFC-trained classifications were inconsistent, with forest producer’s accuracies that increased absolutely by 32% on average, and forest user’s accuracies that decreased 12%. This inconsistency was attributed to the inability of the decision trees to adapt automatically to the spatial variation in the relationship between forest labels and actual forest objects. It was concluded that for automatic map-guided classification to be successful in areas where training-map accuracies are highly variable, local training-map statistics (e.g., producer’s accuracies, class areas, or per-pixel class probabilities) are needed to calibrate the relationship between forest labels and forest.

Key words: Land cover; Classification; Automation; Calibration; Class probabilities

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Kieta, Kristen[1], and Owens, Phil[2]
[1]MSc. Candidate (Natural Resources and Environmental Studies), UNBC
[2]UNBC Research Chair of Landscape Ecology and Professor of Environmental Science, UNBC

EFFECTS OF FREEZE-THAW CYCLES ON PHOSPHORUS RELEASE FROM GRASS BUFFER STRIPS AFTER MULTIPLE CUTTINGS

Vegetated buffer strips are a common best management practice used in agricultural landscapes because of their proven effectiveness to reduce loading of sediments and nutrients, including phosphorus, to adjacent surface waters. In northern climates, these landscapes are prone to numerous freeze-thaw cycles (FTCs) throughout winter and spring which causes plant cells to lyse. During the freshet, lysed cells release phosphorus and the buffer vegetation becomes a source of phosphorus to

surface waters. Experiments were conducted to understand if the number of FTCs and soil phosphorus concentrations impact the concentrations and type of phosphorus released. Timothy grass (*Phleum pretense)* was grown in containers in soil treated with either 80 kg/ha of mono-ammonium phosphate fertilizer (12:61:0) or in soil un-fertilized under controlled conditions. Two cuttings occurred at 65 days and again 36 days later. Shoots were harvested and subjected to 0, 3, or 6 FTCs consisting of 8 hrs. duration at +4°C and 16 hrs. of -20°C. After completion of FTCs, shoot samples shaken in deionized water which was analysed for water extractable phosphorus (WEP), and total dissolved phosphorus (TDP). Results from the first harvest showed there was no significant difference between plants grown in soils amended with phosphorus fertilizer and those in natural soil, but that there was a significant difference in WEP concentrations with increased FTCs. Additional analysis after the second clipping and comparisons to ongoing field studies at a research station in Manitoba will help inform landowners on how to manage buffers to reduce phosphorus loading to surface waters.

Key Words**:** Vegetated buffers; phosphorus; water quality

Leverett, Conner, and Nelson, Trisalyn
University of Victoria

SUPPORTING ACTIVE TRANSPORTATION PLANNING WITH BETTER DATA

Due to health, climate change, traffic congestion, and many other reasons, cities are looking to increase bicycle ridership volumes. In order for cities to make educated planning decisions about cycling and cycling infrastructure, there needs to be a baseline knowledge of ridership volume. However, many bicycle counts are an afterthought or by product of vehicle counts and thus there is a limited availability of data. The goal of this presentation is to overview the opportunities to optimize existing and new data sources. Different data storage techniques will be examined to determine the best methods for preserving existing data. An analysis of the advantages and disadvantages of different bicycle count methods will be presented and volunteer geographic information, specifically from www.bikemaps.org, will be explored as a method to enhance existing counts. Overall, a recommendation will be made for cities to best count, preserve, and present bicycle counts in order for confident and positive active planning decisions.

Key Words: Bicycle; Volunteer Geographic Information; Data Storage; Data Optimization

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Logie, Gordon[1], and Coburn, Craig[2]
[1]M.Sc. Student (Geography), University of Lethbridge
[2]Associate Professor, Geography, University of Lethbridge

THE IMPACT OF SPATIAL RESOLUTION ON MODELLING THE LEAF AREA INDEX IN RIPARIAN FORESTS USING OPTICAL REMOTE SENSING

The appropriate scale for measuring phenomena is a fundamental question in geography. In remote sensing, scale is often considered in terms of the spatial resolution. Selecting a sensor with an appropriate spatial resolution is a key consideration in any remote sensing application.

Riparian areas adjacent to rivers are among the most diverse and important ecosystems in the world. Man-made alterations to river discharge patterns have caused a decline in riparian forests, and there is a

need for ongoing quantitative monitoring of riparian health to assess efforts to improve river management practices. The Leaf Area Index (LAI) is a key biophysical parameter which related to many aspects of vegetation health and function, and therefore should be among the data acquired in any riparian monitoring effort.

In this research the issue of scale was addressed in the context of measuring LAI in riparian forests in southern Alberta. LAI was estimated using an empirical model based on the Normalized Difference Vegetation Index (NDVI) derived from high resolution airborne imagery. The airborne imagery was spatially resampled to simulate a variety of different spatial resolutions from 1 metre to 500 metres, and the empirical model was used to estimate LAI at each resolution. Differences in predicted LAI were compared between the native resolution data and each simulated resolution. Predicted LAI was found to change along with resolution, with differences in excess of 50% manifesting at low resolutions. Potential causes for the observed changes are discussed.

Key word terms: remote sensing; scale; spatial resolution; leaf area index; riparian ecosystems

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MacDonald, Julia
MSc Student (Community Health), University of Northern British Columbia

STAGING RELATIONSHIPS: USING DEVISED THEATRE TO EXPLORE FIRST NATIONS YOUTHS`EXPERIENCES WITH THEIR HEALTHCARE PROVIDERS

In Canada, vast inequities exist between Aboriginal and non-Aboriginal youth, especially in northern, rural communities. Such inequities include increased rates of teenage pregnancy, HIV/AIDS, malnutrition and unemployment. Research has shown that positive relationships with physicians greatly impacts on health, yet, to date, research on relationships between healthcare providers and Aboriginal peoples has not widely consulted or involved the younger population. As such, the goal of this research was to explore relationships between Indigenous youth (ages 19-25) and their healthcare providers, particularly physicians, by identifying cultural and social factors that encourage or hinder meaningful access to health care. This project employed a community-based participatory research approach ensuring local knowledge and insight. Data gathering methods included a devised theatre workshop and a focus group. Preliminary findings include four key themes that exemplify First Nations youths' experiences of relationships with healthcare providers in a Northern British Columbia Nisga'a First Nations community. The themes include Disconnect, Incompleteness, Empathy and Empowerment.

Mahoney, Craig[1], Hopkinson, Chris[1], Hall, Ron[2], and Filiatrault, Michelle[2]
[1]Department of Geography, University of Lethbridge
[2]Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, AB

A FRAMEWORK TO MAP FOREST ATTRIBUTES ACROSS A REMOTE REGION OF NORTHWESTERN CANADA

The Canadian Northwest Territories (NWT) is undergoing rapid land cover changes due to climate change, permafrost thaw, and increased land development. Furthermore, the transition from federal to territorial land stewardship has prompted the government of the NWT to update their forest inventory due to previous versions inadequacies and to accommodate future monitoring investigations. Establishing a baseline map of contemporary conditions is crucial in the future assessment of land cover

evolution. However, data sparsity in such regions often inhibits investigations. This study develops a methodological framework that utilises minimal field plot, airborne laser scanning (ALS), and spaceborne geoscience laser altimeter system (GLAS) data to predict forest attributes over a 200,000 km^2 NWT pilot region of interest (ROI). The framework scales forest attribute models from field data to intersecting ALS data, and within ROI GLAS data. Increasingly quality controlled GLAS data are employed in random forest (RF) and k-nearest neighbour (kNN) spatial imputation (SI) algorithms to yield regional estimates of stand height and crown closure on a 30 m grid. Resulting outputs are compared with independent ALS data to evaluate data filtering effects and SI model selection. kNN and RF models produce best estimates of stand height (R^2=0.40, RMSE=4.01 m) and crown closure (R^2=0.13, RMSE=20.84 %), respectively. These variables form the primary descriptive structure attributes that are typical of forest inventory mapping programs, and provides insight as to how they can be derived in remote regions where field information and physical access is often limited.

Keywords: LiDAR; GLAS; vegetation; forest attributes; mapping

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McCaffrey, D. R. and Hopkinson, C.
University of Lethbridge

A MULTI-DECADAL AERIAL PHOTO AND LIDAR RECORD TO OBSERVE SHIFTS IN ALPINE TREELINE ECOTONE

Vegetation boundaries, such as alpine treeline ecotone, are often key indicators of change in ecologic and hydrologic systems. A multi-decadal record of oblique photographs, aerial photographs, and LiDAR data is outlined as a potential asset in investigating ecologic and hydrologic change in the headwater regions of the Bow and Castle rivers. Ground validated measurements of tree height, diameter breast height, and leaf area index are used to test novel methods of characterizing alpine treeline ecotone with LiDAR derived measurements of gap fraction, using several return ratio methods. We present the hypothesis that forest mortality observed in some high slope regions over the past century may be due to drying, possibly as the result temporal shifts in runoff causing late season stress, or an overall decrease in moisture availability. The projected utility of this research in modelling carbon storage and hydrologic response in the region will be reviewed. These historical analyses present a unique opportunity to understand the impact that continued atmospheric warming could have in source water areas, such as the eastern slopes of the Rocky Mountains.

Keywords: Treeline, LiDAR, Alpine Ecology, Hydrologic Modelling, Change Detection

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Mehta, Michael D.
Professor, Geography and Environmental Studies, Thompson Rivers University

WOOD SMOKE EMISSIONS AND PUBLIC HEALTH: RURAL COMMUNITIES, RISK, DENIAL, AND SOLUTIONS

The risks associated with exposure to wood smoke are incontrovertible, and a growing body of scientific evidence demonstrates that domestic wood burning appliances generate public health concerns that are particularly pronounced in rural communities in British Columbia and elsewhere.

Acute and chronic exposure to particulate matter - and the 200+ chemicals associated with combustion from wood burning - is linked definitively to a range of cardio-pulmonary outcomes including stroke and heart attack. Asthma is exacerbated and other major respiratory disorders including chronic obstructive pulmonary disease (COPD) increase significantly with exposure. Additionally, a range of adverse health outcomes including significant increases in cancer rates, as well as developmental issues in fetuses and young children have been noted.

Wood smoke is 12 times more toxic than cigarette smoke, and estimates from the U.S. Environmental Protection Agency show that a single fireplace operating for an hour, and burning 10 pounds of wood, generates 4,300 times more carcinogenic polyaromatic hydrocarbons than smoking 30 cigarettes. Additionally, many wood appliances will emit in 9 hours the equivalent amount of particulate emissions as driving a vehicle 18,000 km. In spite of this evidence, community and individual denial of the problem predominates.

This study demonstrates how citizen science groups can enhance understanding of these issues by deploying a community mapping protocol for identifying through the use of a nephelometer and GPS those neighborhoods where the problem is noteworthy. A case study from Gabriola Island is presented, and solutions to this public health issue are discussed.

Key terms: wood smoke; risk; public health; rural

Mohn, Camille
BA Student (Geography), University of British Columbia

PROTECTING THE GLASS SPONGE REEFS OF HOWE SOUND

A National Marine Conservation area and possibly other measures will be necessary to adequately protect the glass sponge reefs, Jurassic period formations, recently discovered in Howe Sound. The glass sponges have silica or glass skeletons, causing them to be very brittle and delicate and leaving them particularly vulnerable to bottom trawling. The Canadian government has proposed a National Marine Conservation Area to protect the sponges, but thus far only fishing closures are in place. The sponges remove bacteria form water by filter feeding, and release ammonium as a by-product, which helps with primary production of phytoplankton. They are a foundation species, creating habitat for other organisms and influencing community structure. They may also be a potential carbon sink and thus a buffer against climate change. Glass sponges are known to stop filter feeding as a response to sediment overload. Howe Sound is currently recovering from the negative environmental impacts of Britannia mine and local pulp mills, and new industrial projects have been proposed. I will be investigating what measures need to be taken in order to adequately protect the Glass Sponge Reefs of Howe Sound. I will consider Howe Sound's proposed gravel mine, garbage incinerator, LNG facility and shipping routes, and what cumulative effects these proposed industrial projects might have on the health of the ecosystem and Glass Sponge Reefs.

Key words: Glass sponge reefs; Howe Sound; Industrial Projects; Environmental Impacts

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Morgan, Jeffrey
Simon Fraser University

PORTRAYALS OF OFFSHORE MEDICAL SCHOOLS IN THE CANADIAN PRINT MEDIA: A HEALTH EQUITY LENS

Technologies of globalization have radically transformed the provision of health services, well illustrated by the movement of patients, practitioners, and trainees across international borders to access medical care, education, and professional opportunities. Canadians studying medicine abroad are increasingly familiar representations of global healthcare mobility. In particular, offshore medical schools are for-profit, private enterprises located in the Caribbean and South America that exclusively provide undergraduate medical education to primarily U.S. and Canadian students who wish to return home and practise medicine. This growth industry has become increasingly popular among Canadian students, especially those unable to gain entry into domestic medical schools. In fall 2015, I conducted a content analysis of coverage surrounding offshore medical schools in the Canadian print media. This analysis revealed several dominant discourses that framed offshore medical schools as alleviating health worker shortages and providing much-needed opportunity for qualified Canadian students, although left the practice largely un-problematized. In response, I draw from literature across global healthcare mobilities and the growing literature on Canadians studying medicine abroad to raise critical and health equity considerations ignored in the media.

Key words: health geography; health services; medicine; qualitative; health equity

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Huneault, Genevieve[1], and Mullins, Phil[2]
[1]MA Student (Natural Resources and Environmental Studies), UNBC.
[2]Associate Professor, Outdoor Recreation and Tourism Management, UNBC.

DEVELOPING A RELATIONAL MODEL OF RECREATION SPECIALIZATION AMONG FLY ANGLERS IN PRINCE GEORGE, BC.

Scholars and practitioners in outdoor education are developing new ways to critically analyze and approach human-environment relations within their field that move away from assumptions that society is separated from Nature, and instead strive to understand humanity as belonging within diverse environments. We explore how places, environmental processes, and other inhabitants become meaningful for participants through their involvement in outdoor recreation activities. This has significant implications for understanding peoples' identification with particular environments, and reactions to resource development projects in contested landscapes. The research presented here explores how skill development informs participant perceptions and connectedness to place through fly angling in the Prince George region. Bryan (1977) described recreation specialization as a “continuum of behaviour from the general to the particular, reflected by the equipment and skills used in the sport and activity setting preferences” (p. 175). Increased recreation specialization has consistently been correlated with increased environmental understanding, use of low-impact practices, and support for conservation, as well as pro-environmental values, attitudes and behaviours; it has also been shown to predict of place attachment. The initial work on this research project, which we present here, builds on this well-established literature by further integrating and synthesizing research on place, embodied knowledge, and outdoor skill. These diverse literature were incorporated into a draft heuristic model, which we present, that illustrates specialization in terms of personal, ecological, environmental, and

social relations of the participant. Using one specific activity, the model is being refined with fly anglers in and around Prince George, BC.

Key words: Recreation specialization; embodied knowledge; skill development; fly angling; place.

Mutual, Alycia[1], Wilson, Gary[2], and Romanets, Maryna[3]
[1]MA Candidate (Interdisciplinary Studies), UNBC
[2]Professor, Political Studies, UNBC
[3]Professor, English, UNBC

BEAUFORT SEA RESOURCE DEVELOPMENT THROUGH THE LENS OF THE MEDIA

The media's role in shaping Arctic perceptions receives little attention among northern scholars, yet this is where most citizens obtain information about the Arctic. Given the region's geographical remoteness, the media take on substantial power to influence citizens' perceptions. This research critically examines how print media present resource development in the Beaufort Sea region. The project consists of a qualitative discourse analysis comparing local newspapers with national newspapers (i.e. north-south) as well as Canadian and American newspapers. To learn more about northern media, an additional component of this research includes interviews with six journalists who work in the north (Fairbanks and Yellowknife). The study shows how national newspapers tend to portray industry and the federal government as the main decision-makers when it comes to resource development, whereas local newspapers tend to assert the power of local Indigenous groups and municipal/state/territorial governments.

Keywords: cultural studies; resource development; northern studies; media studies

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Naqvi, Kim
Geography & Environmental Studies, Thompson Rivers University

FINDING GEOGRAPHY: DEFINING AND PRESENTING GEOGRAPHY ON DEPARTMENT WEBSITES IN CANADA

Students rarely enter university with a good understanding of geography, especially in provinces where the topic is less emphasised in high school programmes. Most Canadian Geography Department websites include a definition of the discipline, and a key image or images to introduce students to the topic. However, definitions vary in length, complexity, and physical accessibility. Students in a second year core course on geographic thought examined definitions and symbols used by Canadian universities to define the discipline as preliminary research for preparing a 25-100 word definition of their own. The following comparison emerged from student observations and class discussions while evaluating extracts from the websites, and further review of the websites *in situ*.

Key words: geographic thought; pedagogy

Parks, Wendy, Kathrens, Lindsay, Sociedade, Megan, and Simmonds, Jaimy
BA students (Geography), University of Victoria

CREATIVE MICRO-GEOGRAPHIES IN THE ACADEMY: CO-LEARNING THROUGH GRASSROOTS PEDAGOGY

Our presentation will draw on our experience working with instructors and courses designed to promote student-led experiential and community learning. We will discuss our experiences conducting and utilizing community mapping, and place-making strategies in the context of community initiatives—highlighting the roles and responsibilities of the Academy and the students involved. In particular, we will focus our presentation on the processes and ethics associated with undertaking community immersive projects rooted in decentralized learning and teaching pedagogies, which necessarily center on a praxis of decolonization. We will underscore the importance and value of such community centered experiential learning within the field of Geography. Additionally, we will endeavour to illuminate potential pathways to increase the capacity of, and to continue building, meaningful knowledge exchange and application.

Key words: student-led experiential learning; applied collaborative learning, decolonising praxis, Indigenous students, community as classroom.

Peetoom, Kai
MA Student (Interdisciplinary Studies), UNBC

THE ALASKA HIGHWAY GAS PIPELINE EASEMENT: A KLUANE FIRST NATION CASE STUDY

The Alaska Highway Gas Pipeline (AHGP) is a major industrial development project that has been proposed within the Yukon since 1977, yet remains unconstructed. The AHGP Easement represents the most tangible aspect of the AHGP in the Yukon and remains a long-standing land tenure right impeding southern Yukon First Nations under comprehensive land claims agreements. This applied research project aims to support Kluane First Nation (KFN) in identifying and addressing potential consequences associated with the AHGP Easement that are currently relevant to KFN as a self-governing Yukon First Nation. Community-based, decolonizing qualitative research methodologies have been employed to interpret how impacts of the AHGP Easement are perceived and experienced by KFN. Semi-structured interviews gathered information from KFN staff and community members as well as Yukon and federal government officials and industry representatives regarding the possible impacts that could be attributed to the AHGP Easement. Primary source documents have been utilized to analyze the historical and present circumstances of this case study. Environmental findings and outcomes emerging from the research project include issues of jurisdictional complexity, linked environmental and socio-economic changes over time, and problems with the existing environmental assessment framework. The research project has integrated all relevant environmental science and natural resource management literature focused on First Nations and Indigenous peoples' responses to industrial development projects in northern Canada. Recommendations for how the AHGP Easement may be best managed in the future will be determined and prepared as a report for KFN following an analysis of the research data.

Keywords: First Nations; Kluane First Nation; Alaska Highway Gas pipeline; industrial development; environmental assessment

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Pelto, Ben M[1], and Menounos, Brian[2]
[1]PhD Student (Natural Resources and Environmental Studies), UNBC
[2]Canada Research Chair in Glacial Change and Professor of Geography, UNBC

AN EVALUATION OF DIFFERENT MASS BALANCE METHODOLOGIES FOR GLACIERS IN THE COLUMBIA BASIN, CANADA

Glaciers across western Canada are currently retreating in response climate change, with as much as 70% of ice area projected to be lost by 2100. These changes will diminish and warm surface flows during late summer, but more research is required to predict how glacier retreat will affect water resource management and aquatic ecology in watersheds such as the Columbia Basin. Our study seeks to improve modeling efforts of glacier change in the Columbia Basin through field and remote-sensing research on four alpine glaciers. We assess seasonal mass balance both through traditional approaches and through the use of airborne LiDAR surveys. Results from 2014-2015 show a strong agreement between both datasets, lending confidence to our ability to use the geodetic data to produce accurate estimates of seasonal mass balance. Mass balance was highly negative at all four sites, averaging close is -1.5 m of water equivalent. Strong mass loss accords with near record losses observed across western North America. For the two glaciers with mass balance derived from both methods, estimates of mass balance differed by only 0.10 and 0.23 m water equivalent (10 and 15 %), and estimates of winter balance by 0.15 and 0.08 m water equivalent (4 and 7 %).

Pike, Stephanie
Geography Department, Vancouver Island University

SUSTAINABLE ENERGY IN NORTHERN COMMUNITIES

In a world where per capita consumption and population are on the rise and natural resources are decreasing, the value of clean energy is becoming undeniable. Although clean energy has the potential to support much of human life on Earth, there are many environmental and economic limitations. Location can be one of the largest environmental challenges of all sustainable energy sources. Capability of northern communities to access and utilize wind turbines, solar panels and geoexchange systems as sustainable energy sources was evaluated. The evaluation was based on available energy (e.g. sunlight, wind), costs (capital and maintenance), and carbon/ecological footprints. This evaluation acted as a basis for the development of two case studies (Whitehorse, Yukon and Inuvik, N.W.T.) The final product was a determination on if and how sustainable energy can support northern communities and to what extent.

Keywords**:** Sustainable energy; northern communities; environmental limitations; economic limitations

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Rasmus, Kristy[1], Petticrew, Ellen[2], and Rex, John[3]
[1]MSc Student (Natural Resources and Environmental Studies), UNBC
[2]UNBC Research Chair of Landscape Ecology and Professor of Geography, UNBC
[3]Adjunct Professor, Geography, UNBC

THE HYDROLOGIC REGIME AND THE SEASONAL RETENTION OF MARINE DERIVED NUTRIENTS IN THE HORSEFLY RIVER

In the fall of 2014 ~450,000 sockeye salmon returned to the Horsefly River in the Central Interior of BC to spawn. During and following the spawn the river received a pulse of marine derived nutrients (MDN) from the metabolic wastes of the live salmon and the decay of the carcasses. The value of these nutrients to the functioning of the riverine ecosystem depends on if, where, and for what time period these nutrients are retained in the river system. Re-suspended bed sediment and riparian hyporheic water samples were collected during the fall of 2014 and the spring/summer of 2015. Bed sediment was analyzed for the marine derived stable isotopes of nitrogen and carbon. Water samples were analyzed for nitrogen and phosphorus concentration. River water level was monitored at three sites evenly spaced along the channel and hyporheic water level was recorded using nine installed piezometers. During the spawn a strong marine signal was picked up in the isotope data. By the following spring this signal appears to have returned to pre-spawn levels. An increase in hyporheic nutrient concentrations was also observed during the spawn. Time series analysis shows a high correlation between piezometer water levels and the river level. These preliminary results suggest that: 1) MDNs are being temporarily stored in the bed sediment and that the duration of storage is in part related to river discharge and concomitant sediment scour, and 2) surface water carrying nutrients from the salmon does enter and flow through the hyporheic zone.

Keywords: hyporheic; salmon; nutrients; hydrology

Reiffarth, Dominic[1], Petticrew, Ellen[2], Owens, Philip[3], and Lobb, David[4]
[1]PhD Student (Natural Resource and Environmental Studies), UNBC
[2]UNBC Research Chair of Landscape Ecology and Professor of Geography, UNBC
[3]UNBC Research Chair of Landscape Ecology and Professor of Environmental Science, UNBC
[4]University of Manitoba

SOIL AND SEDIMENT TRACING USING COMPOUND-SPECIFIC STABLE ISOTOPES IN MANITOBA, CANADA

Determining sediment provenance in riverine systems is important for addressing soil erosion and the transport of sediment-bound pollutants. Commonly used tracing techniques, such as fallout radionuclides (FRNs) and geochemistry, are able to identify areas of source sediment within a catchment, but are limited when identifying sources based on land use. Biomarkers found in soil and sediment, which reflect the vegetation associated with a particular land use, have been investigated as potential tracers.

Fatty acids (FAs) are present in all aerial portions of higher plants, and have been shown to be recalcitrant biomarkers. The FAs are transferred from the plant and bound to the soil, and are then transported during flow events. Structurally, all FAs of plant origin are identical. Two structurally identical FAs may be distinguished from one another by examining the ^{13}C:^{12}C ratios of the molecule. Biochemical pathways within the plant and environmental conditions affect the ratios. Differences in the

compound-specific stable isotope (CSSI) ratios between two FAs that are structurally identical may exist. In order to effectively trace the soil, a panel of FAs present in both sediment sources is selected which then leads to an isotopic fingerprint that is ideally significantly different between each source. An understanding of the spatial and temporal variability of the biomarkers is important when examining the applicability of CSSIs as a sediment tracer. Temporal and spatial sampling has been performed in the South Tobacco Creek Watershed in Manitoba, Canada, with the goal of addressing these variability concerns.

Keywords: compound-specific stable isotope analysis; tracing; erosion; water quality; land use

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Robinson, Haley Elizabeth
BA Student (Geography), Vancouver Island University

SENSE OF PLACE WITHIN THE MOUNT ARROWSMITH BIOSPHERE REGION: AN EVALUATION OF OUTDOOR INTERPRETIVE SIGNAGE

For this study, current literature was reviewed to understand the connection between interpretive signage and sense of place, and to determine what constitutes strong interpretive signage. Knowlton Cockett's idea that interpretive signage in parks and public spaces "extends sustainability and sense of place education into the public realm of lifelong learners" is a central theme of this project (2008). The Mount Arrowsmith Biosphere Region (MABR) provided a boundary to work within for this project; it was chosen due to the vast array of public sites within it that allow people and nature to connect. Twelve public sites across the MABR were selected and then evaluated. The evaluation was based on the availability of interpretive signage, what information was presented, how much information was presented, the use of visuals (illustrations / photos / maps), the presence of wayfinding aids, how up-to-date the information was, and the condition of the signage. Exemplary uses of outdoor interpretive signage were identified, a list of recommendations to improve to existing signage was developed, and opportunities for future interpretive signage were determined.

Key words: Sense of place; interpretive signage; biosphere reserve; Mount Arrowsmith Biosphere Region

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Nadanasabapathy, Saraswathy[1], Chow, Victoria[2], Ng, Keng Hon[3], and Hawkins, Blake[4]
[1]BA Student (Sociology), University of British Columbia
[2]BSc Student (Linguistics), University of British Columbia
[3]BSc Student (Psychology), University of British Columbia
[4]MLS Student, (Information Studies), University of British Columbia

VIRTUALLY QUEER: A NEED FOR FURTHER INVESTIGATION OF CYBERSPACES

Virtually Queer: A Need for Further Investigation of Cyberspaces (PART 1)
There is currently an inadequate distribution of queer-centered resources for youth in some of the health service delivery areas in British Columbia. The service options are limited compared to downtown or in the city-limits of the Greater Vancouver Regional District. In Northern British Columbia, for example, the sum of services targeted at queer youth is nearly non-existent despite selected communities with Queer-Straight Alliances in schools or libraries. Youth who have lack access to physical

services and have internet access can partake in online interactions to build social networks in cyberspaces. The purpose of this presentation is to discuss some of these health-related cyberspaces, and to demonstrate why there is a need for further discussion about these spaces. Currently, there is a limited amount of scholarship in geography, and most of the literature outside of the discipline is targeted at men who have sex with men (MSM) populations using online communities for promiscuous sexual interactions and sharing unhealthy information with other users. We believe that there is a need for further expansion to this scholarship. For instance, there is nearly a non-existent discussion regarding lesbian interactions online, which is problematic since the BC Adolescent Health Survey demonstrated that lesbian youth are the most virtually active internet/computer users. Through this discussion, we want to evoke a discussion regarding LGBTQ cyberspace and to increase the scholarly discourse on these interactions. The internet is now an indispensable part of the everyday lifestyle of queer youth, in the North and elsewhere, for discussions of health and non-health topics.

Key Terms: LGBT Health; Health Geography; Virtual Health; Health Inequality; Social Networks

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Smith, Dan[1,2],Coulthard, Bethany[2], Mood, Bryan[2], and Starheim, Colette[2]
[1]Professor, Geography, University of Victoria
[2]University of Victoria Tree-Ring Laboratory, Department of Geography, University of Victoria

RECONSTRUCTING LONG-TERM SNOW HISTORIES FROM TREE-RINGS IN THE BRITISH COLUMBIA COAST MOUNTAINS

Ongoing and accelerating hydroclimatic changes in the Coast Mountains are having lasting ecological, economic, and social consequences. These changes are noteworthy in the Pacific Ranges, where the annual snowpack is the primary driver of dry season water supply availability. While little is known about the spatial or temporal characteristics of snow accumulation within this area, recent snowpack declines have led to reduced streamflow in many watersheds. The prospect that substantial societal challenges lie ahead was underscored in 2015 by snowpacks in southwestern British Columbia that totalled from 0-50% of normal, and contributed to summer-long water shortages in the Greater Vancouver area. Despite recognition of the range of possible consequences of continued snowpack declines, short-term instrumental records make it difficult to determine whether low snow events like those in 2015 occurred in the past, or whether they are unprecedented and related to warming climates. Our research focuses on applying dendroclimatological and dendrohydrological methodologies to construct pre-instrumental snow histories from snow sensitive tree-ring width records. Long-term proxy records highlight the complexity of snow distribution in southwestern British Columbia and the common patterns of variability associated with persistent synoptic climate regimes. In some settings, our reconstructions indicate that the reduced snowpacks in 2015 were unprecedented since at least the mid-17th century. The research findings provide important insights into the representativeness of historical snowpack datasets, and allow for fundamental understanding of longer term trends, variability, and teleconnection relationships.

Keywords: dendroclimatology, dendrohydrology, snowpack histories, climate change, Coast Mountains

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Spinney, Jamie
Faculty, Saint Mary's University, Halifax, NS

SCHOOL TRAVEL MODE DECISIONS: PERSONAL, SCHOOL, AND NEIGHBOURHOOD IMPACTS

This research investigates the impacts of personal, school, and neighbourhood characteristics on school travel mode decisions for elementary students in Halifax, Nova Scotia. Travel diary data were collected from students aged 5 to 11 years, and joined with socio-demographic, school, and neighbourhood characteristics. Multinomial logistic regression was used to examine the relationships between these characteristics and their mode choice decisions (car, bus, or walk). Results indicate that socio-demographic, school, and neighbourhood characteristics all impact mode choice decisions, but the distance between home and school remains the most significant. Findings suggest schools should be sited within the communities they serve in order to promote active transportation.

Key words: journey to school; school siting; neighbourhood design; mode choice; active transport

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Sussbauer, Richelle[1], and Owens, Phil[2]
[1]MSc Student (Natural Resource and Environmental Studies), UNBC
[2]UNBC Research Chair of Landscape Ecology and Professor of Environmental Science, UNBC

SEDIMENT-ASSOCIATED CONTAMINANT DYNAMICS IN THE QUESNEL RIVER FROM THE MOUNT POLLEY MINE DISASTER

Early morning on August 4, 2014 Mount Polley mine, owned by Imperial Metals, experienced a breach to their tailings impoundment facility. Imperial Metals estimates that a total of 25 million cubic meters of tailings water and solids was washed down into Hazeltine Creek, scouring out native soil material and vegetation including large trees. The combination of tailings and native material emptied into Quesnel Lake. Hazeltine Creek went from a 2-4 m wide creek to a 35-185 m creek with areas of extreme erosion. This study examined the temporal and spatial movement of sediment-associated contaminants, including metals and phosphorus, in the Quesnel River, which is below the lake. The main methods employed included the collection of suspended river sediment using both active and passive samplers (i.e. a continuous-flow centrifuge and Phillips time-integrated samplers), and discrete bed sediment samples by a re-suspension technique. This study will provide important information on the metal concentrations associated with sediment from the Mt Polley mine breach in the Quesnel River as well as storage within the river channel. Results indicated elevated levels of some metals, with a significant difference between metal concentrations at the upstream site, closer to the breach, compared to downstream sites. Furthermore, there was a correlation between particle size and percent inorganic material with metal concentrations.

Key words: Sediment; contaminants; tailings; Mt Polley

Thelin, Larissa[1], and Lewis, Jeff[2]
[1]BSc Student (Geography), Vancouver Island University
[2]Faculty, Vancouver Island University

THE POTENTIAL EFFECTS OF CLIMATE CHANGE ON THE HABITAT RANGE OF THE VANCOUVER ISLAND MARMOT

The endemic Vancouver Island marmot is one of British Columbia's most vulnerable species. Although recovery efforts have increased the population size of this species in recent years, in 2015 there were only an estimated 250-300 marmots living in the wild – about half the numbers needed for a healthy, viable population. Research shows that the rise in surface temperatures induced by climate change will cause many animal species to follow their shifting ranges either upwards in elevation or towards the poles. Since this marmot is found in only a few fragmented locations on Vancouver Island, it is thought that a shift in range could be detrimental to their wellbeing given the geographical constraints of the island. This research project first calculates and maps the current potential habitat range of the Vancouver Island marmot, allowing us to understand which parts of the island the marmots could currently inhabit if population numbers were higher. Next, this project calculates and maps the potential shift in habitat range by 2100 due to the projected change in climate of Vancouver Island.

Key terms: marmot; climate; habitat; climate change; Vancouver Island

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Turner, Brandon, and Hill, David
Thompson Rivers University

THE MAKER'S ENVIRONMENT: PARTICIPATORY SENSING WITH HOBBYIST ELECTRONICS

There is an increasing need for high spatial resolution data to facilitate adaptive management of natural resources, particularly in urban environments. The growing accessibility to inexpensive hobbyist level technology in recent years offers a unique means with which to address this need. This project explores whether or not this technology can be leveraged to create reliable instrumentation usable by researchers and citizens alike. A case study will be presented in which Arduino microcontrollers and a variety of sensors are assembled and configured to monitor stemflow from juvenile pine trees. This case study will demonstrate that homebrewed devices based on hobbyist platforms can be simple and remain inexpensive enough for citizen-scientists while still offering data of sufficient quality for researchers and practitioners. Further, the project will exhibit the flexibility of these platforms through their scalability and accessibility to fulfill gaps currently not covered by traditional sensors.

Keywords: Technology; Environmental Sensors; Participatory Sensing; Hydrology

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Turner, Rhys, and Shaw, Pam
Vancouver Island University

RECREATING BIOREGIONALISM: BUILDING COMMUNITY INTEREST THROUGH THE HUMAN-NATURE CONNECTION

This research examines the re-introduction of a decades old yet tested approach in Geography, specifically the concept of bioregionalism, to re-invigorate levels of citizen involvement in community growth and change. A bioregional approach enables a clear understanding of the inter-relationships, connections, and context of issues in urban environments, and the consequences of action or inaction. Tied to this is an emphasis on understanding the connections between natural systems and human agency, between the natural world and the human mind. A return to a bioregional approach to conceptualizing urban spaces has the potential to increase the human-nature bond and promote greater involvement in community issues.

This research provides examples to engage local residents in establishing bottom-up structures of interdependent governance within the communities they inhabit. By providing structure to endemic areas of various scales, communities can redevelop their physical and behavioral characteristics and collectively undertake particular goals in order to overcome the severe penalties facing our local communities and regions.

Key Words: Reliance; Reciprocity; Community Engagement; Bioregionalism; Comprehensive

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Waldichuk, Tom[1], Tabayashi, Akira[2], Yagasaki, Noritaka[3], Kikuchi, Toshio[4], Nihei, Takaaki[5], and Kaneko, Jun[6]
[1]Thompson Rivers University
[2]University of Tsukuba
[3]Nihon University
[4]Tokyo Metropolitan University
[5]Hokkaido University
[6]Ehime University

AGRI-TOURISM IN JAPAN AND BRITISH COLUMBIA

Whereas intensive agri-tourism case studies have occurred throughout British Columbia (BC), few studies have taken a regional approach to classifying commodified rural space. We have previously examined agri-tourism in Japan and now focus on southern British Columbia. After briefly highlighting past research in Japan, this presentation examines the varieties of commodified rural spaces in southern BC and the roles they play in sustaining rural economies and societies. This study focuses on the Lower Mainland, southern Vancouver Island, the Okanagan, and the Thompson-Cariboo region. This research is based on a review of tourism and agriculture government documents, interviews with government officials and site visits to agri-tourism operations in September 2014 and June 2015.

The Lower Mainland is characterized by diversified rural commodities such as hobby farms, Circle Farm Tours, and pick-your-own operations. In the Cowichan Bay area there is a slow food movement that concentrates on consuming local food. In these two regions residents from Vancouver, Victoria and other nearby cities visit on weekends. Wine tourism is important in the Okanagan, whereas ranch

tourism and branded dairy products characterize commodification in the Thompson-Cariboo region. Since both regions are far from large population centres, most visitors stay longer.

There are regional differences in the types of commodification, modified by physical conditions, accessibility to metropolitan centres, and local agricultural activities. In short, the commodification of rural spaces in southern BC, which is more advanced and diversified than that of Japan, plays an important role in sustaining rural economies and societies.

Key words: rural space; commodification; agri-tourism; wine tourism; slow food

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Waldichuk, Tom[1], Horning, Darwin[2], and Hawkins, Blake[3]
[1]Department of Geography & Environmental Studies, Thompson Rivers University
[2]Lecturer, School of Environmental Planning, University of Northern British Columbia
[3]MLIS Student, UBC

WHAT TO DO WITH A GEOGRAPHY DEGREE: JOBS AND OTHER POSSIBILITIES (PANEL)

Similar to the successful panel that was held at the 2014 WDCAG at the U. of Victoria, 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? Or should I do something really different like teaching English overseas for a year?

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. Panelists will reflect on whether undergraduate and graduate studies are helping to prepare students for the 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.

Walker, Kirk[1], and Nolin, Catherine[2]
[1]MA Student (Interdisciplinary Studies), UNBC
[2]Associate Professor, Geography, UNBC

NARRATIVES IN THE ANDES: CHALLENGING TRAUMATIC MEMORY WITH PHOTOVOICE

The village of Huamanquiquia, Peru was one of many communities to experience multiple violent events during the Peruvian internal armed conflict. This period, from 1980 to 2000, is popularly known in Quechua as “terrorismo tiempupi.” Both the guerrilla group Sendero Luminoso and state military directly targeted and victimized Indigenous peoples. The violence left these already marginalized communities with a legacy of trauma and social fracture.

Through my Master’s-level research, I sought to distill the collective memory of the community as related to this period of violence, in terms of place and spatiality. In collaboration with the Peruvian Forensic Anthropology Team (EPAF), I utilized a visual participatory method, popularly known as

Photovoice, framed with feminist methodology. Ten participants were given digital cameras, with basic camera instruction, and asked to take several days to illustrate memories from the conflict. They returned with hundreds of digital images which served as the foundation for interview conversations.

The findings of this research are multiple. As expected, the visuals reflected places of traumatic memory and places of memorialization, as well as places of anticipated fear. Participants depicted themselves as survivors, not victims. Escape routes, hiding locations, chakras (cultivated fields) and new construction projects depicted the resilience of these strong Andean people. Participants who had never used a camera before developed novel storytelling techniques: re-enactment, re-creation, sequences, and the selfie. These narratives in the Andes demonstrate that visual storytelling is an empowering, cathartic performance for survivors of traumatic events.

Keywords: collective memory, Peru, post-conflict, Photovoice, trauma

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Ward, Valerie
MSc Student (Health Sciences), UNBC

CULTURAL WEBS: THE ROLE OF PLACE IN THE DEVELOPMENT OF CULTURALLY AND AGE RELEVANT ONLINE MENTAL HEALTH RESOURCES.

Traditional sources of health information are no longer satisfying the needs of younger generations, including Aboriginal youth, who are increasingly turning to the Internet with their health-related questions. Research has shown that culturally tailored health information resources are those best received by Aboriginal people. This project looked at whether existing online mental health resources, especially those catering to a BC audience, are age and culturally appropriate for Aboriginal youth (ages 19-25) living in Northern BC. Using a social determinants of health framework, this research employed decolonizing and (participatory) action-based research methodologies to explore mental health disparities experienced by young Aboriginals. Digital storytelling was explored as potential tools for documenting young Aboriginal voices in sharing what they envision to be ideal online mental health resources. This study resulted in five key findings. The most important finding was that existing online mental health resources, especially those made with the purpose of serving populations across the province, do not adequately address needs of Aboriginal youth living in Northern BC. Instead, in some cases, they perpetuate a discourse about mental health that is irrelevant to Aboriginal youth. Digital storytelling, as an arts-based method, however, was an effective and engaging research tool to work with youth populations. This research contributes to a better understanding about producing more accessible and appropriate online mental health resources for Aboriginal youth in Northern BC that may help to promote better health and wellbeing within this population.

Key Terms**:** Mental health, Aboriginal, Northern BC, Online, Wellness

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POSTER PRESENTATION ABSTRACTS

Aitcheson, Marina, Bouchard, Frédérique D , Fall, Alicia, and Henderson, Morgan
University of Victoria

WHY COMMUNITY MAP? BECAUSE WHEN COMMUNITIES MAP TOGETHER, THEY GROW TOGETHER

In this presentation we will share and illuminate how community mapping, and more broadly, participatory research can contribute to social resiliency and food sovereignty. We will draw on four of our own experiences through a course instructed by Dr. Jen Bagelman in the winter of 2015. This experiential learning opportunity was rooted in building and sustaining community-campus partnerships. In collaboration with four local organizations, we each worked to develop a community map to promote food justice within our region. Victoria is a diverse setting where local food initiatives are budding, and can be nurtured, enhanced and investigated through creative, participatory mapping.

One map considers accessibility to healthy and culturally appropriate foods for newcomers. This becomes increasing important as Victoria explores possibilities of becoming a sanctuary city in the wake of the current migrant crisis. Another map creates a visual of public consultation for the re-imagining, re-purposing and re-developing of a former racetrack as it is transferred into agricultural land. This map has been included in a report to help local decision makers decipher community values and priorities for this site. Another map stems from an entrepreneur's desire to show viable downtown rooftop garden area. This map will be presented to City Council to forge alternative foodscapes within City borders. Another map explores traditional Indigenous food systems and the history of colonization. It is a tool for continued data input, and public education.

Participatory mapping expanding beyond the classroom can be a method to foster meaningful change in a community.

Keywords**:** community mapping; Victoria; community engagement; food; sustainability

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Baker, Richard, Bossert, Lindsay, Bymoen, Nathan, Christy, Brandon, Cziglan, Christine, Dinsdale, Brie, Ford, Nicole, Grove, Benjamin Hauser, Paige, Helgason, Ty, Irvine, Claire Irwin, Makenzi, Jepsen, Lindsey, Johansson, Geena, Johnson, Trista, McLean, Erin, Nteogwuija, Inwon, O'Reilly, Steven, Ormondy, Jenna, Pain, Sean, Ringland, Devin, Simak, Michael, Spolia, Narain, Svenson, Jenna, Tasker, Joseph, Welychko, Nicholaus, Windhorst, Rachel, Zerrath, Roger, and Naqvi, Kim (Faculty Supervisor)
Undergraduate Students, Thompson Rivers University

DEFINING GEOGRAPHY: A STUDENT PERSPECTIVE

Extending an exercise from 2015, students in a required second year course on Geographic Thought examine definitions and symbols used by Canadian universities to define geography. Each student then developed a definition of 25-100 word definition after in-class discussions of repeating website themes and images, the definitions of previous students, and their own draft definitions, and eight weeks of lectures on development of theoretical schools in geography. After 60 years of intensive theoretical development since the quantitative revolution, students now enter a discipline where, while certain questions persist, theoretical complexity and diversity is much more normalised, and certain social and economic problems have come to the fore. Students evaluate their definitions against the institutional definitions and each other to identify similarities and differences, and their possible sources.

Key words: geographic thought; pedagogy

Bélec, Dr. John, and Parr, Christian
University of the Fraser Valley

SUBURBAN SHIFT: THE ROLE OF THE NATIONAL HOUSING ACT IN CANADIAN POST-WAR SUBURBANIZATION

The research presented in this poster examines the role played by Canada's federal housing legislation, the National Housing Act (NHA) with post-war suburbanization. The promotion of home ownership has been a cornerstone of federal housing policy since its inception, and promulgated through its lead agency, Canada Mortgage and Housing Corporation (CMHC). A widely shared, and enduring view in the literature, is that state-backed mortgage lending played a key role in patterns of post-war suburbanization in the North American city. Furthermore, it is often argued that this occurred to the detriment of the urban core. Belec's (2015) work on Vancouver in 1951, was the first to assess this "suburbanization thesis" with access to primary data from CMHC. The same data source is used in this poster to compare Vancouver's experience with that of Hamilton ON.

Key words: Housing; Suburbanization; Policy

Binnema, Kathryn and Letain, Kara
Undergraduate Students, The King's University, Edmonton, Alberta

fOILed: LESSONS FROM THE NORTHERN GATEWAY PIPELINE

In the midst of the oil price plummet, massive oil sector layoffs in Alberta and other proposed pipelines for reaching tidewater, the once raging controversy over the Enbridge Northern Gateway Pipeline is all but forgotten. Does the current lull in the Enbridge proposal offer important lessons for future pipeline proponents and opponents in Canada? During the height of the controversy, Enbridge was accused of ignoring public opinion and Aboriginal concerns, as well as participating in a biased environmental assessment process. Failure to recognize a very significant difference in public opinions between Alberta and British Columbia regarding pipeline construction was perhaps a major blunder. Through media reports, Enbridge and government documents and opponent submissions, this case study will examine these public factors, as well as the view that the environmental assessment process did not stand up to public scrutiny. This case will try to answer the ultimate question for Canada: what will it take to build a pipeline in this country?

Keywords: Enbridge; Northern Gateway Pipeline; Pipelines; EIA; British Columbia; Alberta

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Bourdages, Madelaine [1], Groeneweg, Alexandra[1], Marsh, Steven[1], Peucker-Ehrenbrink, Bernhard[2], Gillies, Sharon[1], Hinz, Christopher[1], Patterson, Shaylene[1], Raison, Sydney[1], Clemence, Ellen[1], Faber, Audrey[1], McCabe, Marlena[1], and Strangway, Alanna[1]
[1]Universitiy of the Fraser Valley
[2]Woods Hole Oceanographic Institution

PRELIMINARY ANALYSIS OF STONEY CREEK, ABBOTSFORD, BRITISH COLUMBIA: CURRENT WATER QUALITY AND POTENTIAL THREATS TO THE WATERSHED

The growing population in the eastern region of Abbotsford BC has led to an expansion of residential development, thus reducing the natural areas surrounding watercourses. One watercourse that has experienced an increase in surrounding development, and is expected to experience further development, is Stoney Creek. The headwaters of Stoney Creek are located on Sumas Mountain, and then flow downward onto Matsqui Prairie over a span of 6.5 km. Along its length, Stoney Creek flows primarily through single family residential areas and public parks. Much of the creek, which is largely covered by forested canopy, is easily accessible by constructed trails or from roadways. One main issue resulting from the increased residential development is the rise in impervious surfaces, such as rooftops and paved roadways, which contribute to greater surface runoff that enters the watercourse, transporting particulates and pollutants that are present on these surfaces. This poster – based on our study which included visual observations, research into developmental plans, and water quality – aims to identify possible issues and concerns relating to anthropogenic changes along Stoney Creek. The geochemical data collected provides preliminary analysis of the current state of Stoney Creek, and has the potential to eventually show the seasonal variations in the creek's water chemistry. Since this creek is important for the local ecosystem, and provides crucial habitat for spawning salmon, continuous monitoring of the watercourse is needed to ensure its preservation amongst rapidly expanding development.

Key Words: Stoney Creek; Threats; Water Quality; Water Chemistry; Development

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Bowery, Aurora[1], and Jiskoot, Hester[2]
[1]BSc Student (Geography), University of Lethbridge
[2]Faculty, Department of Geography, University of Lethbridge

MAPPING THE CONCRETIONS OF RED ROCK COULEE, ALBERTA

Red Rock Coulee Natural Area in Southern Alberta, Canada, is a fascinating area that has a localized accumulation of hundreds of concretions that are claimed to be amongst the largest in the world. Concretions are resistant rock masses embedded in a host rock of a softer and more erodible composition. The Red Rock Coulee concretions are made of siderite (iron carbonate) and were formed in shallow marine water during the Upper Cretaceous. They are likely part of the Bearpaw Formation and have been exhumated from the bentonitic clay of the host rock since the end of the last ice age. These concretions appear to have formed in clusters throughout the area with the largest cluster at the southern edge of the concretion field.

The concretions of Red Rock Coulee have never been mapped, nor is there any published scientific literature available on the site. Mapping and measurement of concretions is vital to disseminating information about this area, and for comparison to other concretions around the world. We have

started to systematically map the concretions through field measurements of size (incl. diameter, height, tilt), location (differential GPS) and overall geological context with maps, satellite images and airphotos, using GIS and RS. The concretions are mainly ellipsoidal or oval with a size range between approximately 1 - 4 metres in diameter. While many are still intact with minor weathering, some have split into two halves while others have completely broken apart into small pieces.

Key words: Red Rock Coulee; Rock Concretions; Geology; Fieldwork; Mapping

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Bracken, Edward
BA Student (Geography), Vancouver Island University

INTERDISCIPLINARY ACTION PROJECT ON SUSTAINABILITY

This interdisciplinary poster will motivate pedagogical interest in the benefits of creating sustainable projects within the Nanaimo university campus involving at least two or more disciplines. The ongoing action project investigates "What measurable indicators demonstrate that the promotion of environmental clubs, sustainability projects and carbon reducing projects on the VIU Nanaimo campus benefit students? My approach is to investigate and plan actions that will create sustainability and reduce student academic related stress through both problem focused and emotion focused coping strategies while working with domestic and indigenous vegetation. The action project involves a comparative analysis investigating two ongoing campus wide sustainability projects, the Community Peace gardens, and a Native Plant Initiative project. Limitation were place on this action project because the Native Plant Initiative project was a new idea in a planning stage and it was difficult to find people who had plant expertise or time to help with the action project. The Native Plant Initiative and Community Peace Garden on the Nanaimo campus must be long term projects and must involve more people. The unexpected result has been a reduction in personal stress levels due to critical thinking and behavioral change inspired by observation and reflection.

Key Words: interdisciplinary projects; indigenous vegetation; behavioral change; sustainability; stress reduction.

Clemence, Ellen[1, 2], Peucker-Ehrenbrink, Bernhard[2], Marsh, Steven[1], Gillies, Sharon[1], Faber, Audrey[1, 2], Brown, Kristina[2], McCabe, Marlena[1], and Toner, Alexandra[1]
[1]University of the Fraser Valley
[2]Woods Hole Oceanographic Institution.

MAJOR AND TRACE IONS, NUTRIENTS, AND CDOM CONCENTRATIONS AT TWO CONTRASTING SITES ON CLAYBURN CREEK IN BC, CANADA

The Fraser River in British Columbia, Canada, is the largest salmon spawning system in Canada and is fed by thousands of tributaries including Clayburn Creek in Abbotsford, BC. This watershed is comprised of approximately 83.5% natural landcover, 9% agricultural, 7% built-up and 0.5% industrial land, and is under pressure from urban development. In order to investigate the effects of different landcover on water chemistry data was collected three times a week over four months in late 2015. Sampling took place at two sites, one located near the top of the watershed in land classified as suburban/rural/limited use and the other located at the base that is considered conservation/park/forest. Sampling involved in

situ measurements of coloured dissolved organic matter (CDOM) using a Turner Designs Cyclops-7 Fluorometer as well as an YSI ProODO probe and a YSI Professional Plus probe to determine dissolved oxygen, temperature, conductivity and pH. Turbidity was measured using a LaMotte 2020we nephelometer and water samples were filtered and analyzed for nutrients (silicate, phosphate, nitrate/nitrite, and ammonium). A discharge of 0.03 m^3/s (winter baseflow) to 0.13 m^3/s (summer baseflow) deliver contaminates from the watershed into the Fraser River. Between the upper and lower sites, preliminary findings indicate that CDOM concentrations increase by 32% and the pH values increase by approximately 8.5%. Major ions and trace element analyses are currently being conducted to determine how other water chemistry parameters respond to the change in land-use along the flow path of water in Clayburn Creek.

Keywords: Canada – British Columbia; water chemistry; CDOM; Nutrients; Major Ions

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Crooks, Valorie[1], Schuurman, Nadine[1], Castleden, Heather[2], Giesbrecht, Melissa[1], Skinner, Mark[3], and Williams, Allison[4]
[1]Simon Fraser University
[2]Queen's University
[3]Trent University
[4]McMaster University

SITING PALLIATIVE CARE IN RURAL CANADIAN COMMUNITIES: A MIXED-METHOD MODEL THAT INCORPORATES DIVERSE COMMUNITY READINESS INDICATORS

Many countries in the Global North are challenged in meeting the health care needs of aging populations. Canada is no different. Canada has an aging population, and its rural communities in particular are greying at an unprecedented rate. Added to this, the country also faces significant challenges in equitably distributing limited health care resources across its vast territory, often leaving rural communities under serviced. In this poster we present a service siting model developed to identify rural Canadian communities that are highly suitable for enhancing their palliative care services. Following a successful mixed-methods pilot study based in the Canadian province of British Columbia, a preliminary siting model that prioritized isolation, population, vulnerability, and community readiness was created. Forty qualitative interviews were then conducted in four purposely selected rural communities across four different provinces in order to confirm the model and/or identify changes. Thematic analysis of the interview findings point to changes that need to be undertaken in the community readiness arm of the model in order to be more sensitive to the diversity inherent within and between Canada's rural communities. We discuss the revised community readiness arm by drawing on specific examples from the interview findings and present the revised siting model that is now ready for uptake by end-users.

Keywords: Canada; rural; health care; palliative care; health geography

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Doddridge, Shane, Charleyboy, Geraldine, Solomon, Maryann, Doxtator, Luke, Gash, Sarah, Thurow, Mary, Stump, Sherry, and Tŝilhqot'in National Government

TŜILHQOT'IN NATIONAL GOVERNMENT TRADITIONAL USE STUDY

Knowledge keepers from the Tŝilhqot'in First Nation were interviewed by the Tŝilhqot'in National Government (TNG) to obtain spatial data and oral histories associated with land use and occupation history of the Tŝilhqot'in Nation. Interviews were audio-recorded and spatial features were mapped on-the-fly using an ArcMap 10 base map projected onto a whiteboard for participants to draw upon. Participants were questioned based on an interview framework designed to maintain both legal admissibility in ongoing Strength of Claim and Aboriginal Title negotiations, and in upholding to cultural sensitivities. Apart from legal applications, these data are valued by TNG as a basis for addressing traditional use concerns in natural resource referrals for forestry, mining, agriculture, and other disturbances proposed on Tŝilhqot'in lands. Audio recordings from this and are to be digitized, transcribed and translated to English both to be used as ancillary to the spatial data, and as an effort by TNG to document and preserve Tŝilhqot'in cultural heritage, especially language.

Keywords*:* Strength of Claim; Aboriginal Title; Geographic Information Systems; Traditional Land Use

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Faber, Audrey [1,2], Peucker-Ehrenbrink, Bernhard [2], Marsh, Steven[1], Brown, Kristina[2], Gillies, Sharon[1], Clemence, Ellen[1,2], Toner, Alexandra[1], and McCabe, Marlena[1]
[1]University of the Fraser Valley
[2]Woods Hole Oceanographic Institution

INVESTIGATION INTO POSSIBLE EFFECTS OF AGRICULTURE ON THE GEOCHEMISTRY OF WILLBAND CREEK IN ABBOTSFORD, BC, CANADA

The Fraser River is considered to be one of the greatest salmon producing rivers in the world. Before it reaches its outlet into the Strait of Georgia, the Fraser passes through the southwestern region of British Columbia. This region is faced with increasing urbanization and intensive agricultural practices owing to the Lower Fraser Valley's fertile soils. Time series sampling of water chemistry of the Fraser River at Fort Langley and at five Fraser Valley tributary creeks has been ongoing since 2010. Parameters studied for these waterways include nutrients (silicate, phosphate, nitrate, nitrite and ammonium) major ion concentrations (calcium, magnesium, sodium, potassium, chloride, and sulfate), dissolved oxygen, temperature, conductivity, pH, and turbidity. The focus of this study is on two of the tributary creeks originating in the Abbotsford area known for being fish bearing. Clayburn Creek, whose headwaters are located on Sumas Mountain within resource conservation lands, is part of the Willband Creek watershed whose headwaters drain urban residential areas prior to flowing through intensive agricultural lands to its outlet into the Fraser River. We compared geochemical parameters between these two watercourses to determine what effects, if any, the agricultural lands have on water quality since December 2013 and over a high resolution sampling period conducted in the fall of 2015. Preliminary results over the high resolution sampling period indicate 39% higher levels of percent dissolved oxygen in Clayburn Creek than Willband Creek, with turbidity 87% higher and temperature 16% higher in Willband Creek than Clayburn Creek.

Key words: geochemistry; nutrient analysis; agriculture; Clayburn Creek; Willband Creek

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Francil, Jena
Western Washington University

INVESTIGATION OF RESOURCE MANAGEMENT AND SUSTAINABILITY IN CASCADIA

This poster depicts the ways in which resource sharing and management has occurred at the smaller scale in Cascadia; specifically, the Fraser Valley and its resources are examined. The local entities that make up the border-region on the British Columbia and Washington sides are inclined to cooperate and compromise with one another in order to maximize ecological and economic benefits. The poster compares examples of both successes and failures where communities become antagonistic. The final aspect of the poster explores how and why resource sharing and cross-border integration is important to fostering sustainability in Cascadia. This looks beyond Cascadia and points out some of the larger scale resources that are found and shared across the border, and how the U.S. and Canada might work together to achieve a more sustainable future.

Keywords: cross-border resource management; sustainability; Cascadia

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Hodder, Kyle, and Suchan, Jared
Prairie Environmental Process Laboratory, Department of Geography & Environmental Studies, University of Regina

HYDROCLIMATIC PROXY RELATIONSHIPS AMONG A NETWORK OF CORES FROM AN ALPINE, GLACIER-FED LAKE

The temporal and spatial variability of recent sedimentation rates are examined for glacier-fed Mud Lake, in the Monashee Mountains of British Columbia. The use of varved sediments as hydroclimatic proxies is well-explored among one-to-few cores, but less commonly among core a network of core samples. Here, varve thickness was assessed using a network of sediment cores (n=63) extracted on a dense, grid-type, sampling scheme. A radioisotope profile, sediment traps and repeated coring among multiple years were used to calibrate varve-years with calendar-years (1919 – 2013 AD). A unique opportunity to explore lacustrine sedimentation was provided by the five-dimensional dataset (easting, northing, depth, varve/sub-laminae thickness, time).

Two clear phenomena emerge: an overall down-lake trend in thickness among varves, punctuated by atypical years in which abnormally thick varves appeared in only specific portions of the basin. Sedimentation patterns, and rates, can differ markedly between sites (and years): there is no ‘single optimum’ core site. We conclude that (1) varve thickness is a key proxy in a hydroclimatic context, but an adjunct consideration should include (2) spatial variation in varve thickness within the basin; varve thickness at any single site is an inconsistent indicator of basin-wide thickness in many years. Our findings do not prohibit use of varved sediments as a hydroclimatic proxy, but do highlight that a core network can yield potentially greater insight into a range of hydroclimatic processes in comparison with one, or few, core samples.

Howey, Lorne[1,] and Jiskoot, Hester[2]
[1]BSc Student (Geography), University of Lethbridge
[2]Faculty, Department of Geography, University of Lethbridge

CREATING THE GLACIER IMAGE ALPHABET: DEVELOPMENT OF A NEW CLIMATE CHANGE LEARNING TOOL USING GOOGLE EARTH

The theme of the *WDCAG-2016* conference is *The West in the 21st Century – Legacies and Trajectories*. The question on every glaciologists and some scientists' minds is, "what is the trajectory of melting of the many glaciers that are within the western hemisphere." Within Canada, the regions of most extensive glaciation are the Canadian Arctic and Western Cordilleran. The decisions about how to manage for this unprecedented melting of a very important environmental resource (water) needs to be studied in greater detail. One way to help with this issue is by continuing to develop ways to educate high school youth and first year geography students in an interesting visual fashion to show the importance of glaciers as environmental resource. This poster presents the process of developing and improving such a teaching tool.

The Glacier Image Alphabet was created last year for the purpose of educating high school and first year geography students about glacier geography. A draft poster was presented at the *WDCAG-2015* conference and feedback from students and professors was noted. Using this feedback, and feedback from presentations to University of Lethbridge geography students, including surveys with respect to the alphabet's letters and colours, an improved version of the poster was constructed. The glaciological terms that were attached to the letters using scholarly publications were also evaluated relative to the school science curriculums of Alberta and British Columbia. A world map of glacier letter locations was added, and incorporation of this new geography teaching tool into Google tours is ongoing.

Keywords: Glaciers; Google Earth; High School Education; Climate Change; Remote Sensing.

Irvine, Claire, BA Student (Geography), Thompson Rivers University: Poster Presenter

Project Team Members: Dr. Michael Mehta, Terryl Atkins, Doug Buis, Ali Burnett, Brandon Dallamore, Nancy Flood, Lee Giddens, Janis Goad, Kim Goodall, Amber Gudmundson, Dr. Charles Hays, Yumiko Hamano, Claire Irvine, Cheryl Kabloona, Eric Little, Ian MacKenzie, Dr. Courtney Mason, Ian McParland, Dr. Kim Naqvi, Tavis Knox, Calum Palmer, Sean Pain, Rob Purdy, Carley Rookes, Jesse Sheppard-Perkins, Sandra Trawin
Thompson Rivers University

THE SOLAR COMPASS: A MULTI-FUNCTIONAL APPROACH TO SUSTAINABLE SOLAR ENERGY BY IMPLEMENTING SOLAR ROADWAYS

Making solar energy a custom can have many social and economic benefits for the future. It decreases carbon emissions, lowers the cost of power usage, and is a useful way to create educational opportunities in environmental studies. Solar roadways are a multi-functional and resourceful way of implementing solar technology that benefits the many aspects of life on earth; economical, environmental, health, educational and use of place.

A team at Thompson Rivers University has been working on a Solar Roadway Project, with the intentions of lowering the cost of energy use on campus, reducing the carbon footprint, and using existing infrastructure in an efficient way. Countries such as the Netherlands have begun to implement solar roadways, and The Solar Compass Project at TRU would be the first in Canada. This poster explores The Solar Compass Project as it has been proposed, and the potential benefits of harnessing solar energy through solar roadways to replace current conventional energy sourcing.

Key Terms: Sustainability; Solar Roadways; Photovoltaic; Renewable; Innovation

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Kanda, Shyna[1], Puri, Karan, Gillies, Sharon, and Marsh, Steve
[1]BSc Student, University of the Fraser Valley

ANALYSIS OF DECOMPOSITION RATES OF THIMBLEBERRY AND JAPANESE KNOTWEED IN THE FRASER VALLEY

Japanese knotweed (*Fallopia japonica*) is an invasive plant species which has shown its adverse effects in the Fraser Valley. In this study, the rate of decomposition of the Japanese knotweed leaf litter was compared to that of the Thimbleberry (*Rubus parviflorus*). As a secondary focus of the study, water quality of the Clayburn Creek in Fraser Valley, BC was assessed in terms of various parameters including habitat variables, chemical analysis, and macroinvertebrate population. During this six-week study, external factors such as temperature, pH, nutrient availability, and the presence of consumers were recorded. Alongside the biodiversity of macroinvertebrates, statistical analysis of the percent mass remaining of the leaf litter, and several other factors support the hypothesis that the rate of decomposition rate of Thimbleberry was greater than that of Knotweed in the Fraser Valley. The nutrient levels of phosphorous and nitrate were also included in the hypothesis, but due to the inconclusive data, results could not be analyzed. This study was replicated over two years; therefore, the data was accumulated when analyzed.

Key word terms: Knotweed; Thimbleberry; invasive; decomposition

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Montgomery, Joshua[1], Hopkinson, Chris[1], Chasmer, Laura[1], and Brisco, Brian[2]
[1]Department of Geography, University of Lethbridge
[2]Natural Resources Canada, Canada Centre for Mapping and Earth Observation, Ottawa, ON

FUSING LIDAR, SAR AND OPTICAL DATA TO MONITOR WET AREA EXTENT OF PRAIRIE POTHOLE WETLANDS IN SOUTHERN ALBERTA

Sensitive Prairie Pothole wetlands are under increasing pressure from urban and industrial development as well as agricultural drainage modification. In addition, recent warming trends may have an increasingly adverse effect on wetland wet area and riparian extent. Synthetic Aperture Radar (SAR) with HH polarization is best able to separate land from water due to the contrast in backscatter responses between land and water in HH polarisation. A methodological framework has been developed focused on data fusion of high resolution SAR, optical and Light Detecting and Ranging (Lidar) data to model changing wet area extents of open water. This framework was then applied to the Shepard Slough wetland complex, a prairie marshland over a 300km^2 region east of Calgary, Alberta. The framework provides a method of data fusion with user extracted threshold (dB) values and automated

k-nearest neighbour (kNN) classification to describe changing wetland attributes over large areas at high resolution. Areas of known surface water are sampled with a SAR polarimetry tool to determine the range of thresholds (dB) that represent surface water at a given time of the year, establishing a three year temporal analysis. Resulting outputs were compared to temporally coincident optical and field validation data, with a Lidar DEM providing validation for topographic uncertainty. Preliminary Kappa Coefficient and overall accuracy values are consistently above 85%. The workflow and supporting attributes presented, provide insight as to how SAR data fusion can effectively derive, map and monitor changes in open area surface water extent in near real-time on both, annual and seasonal scales.

Keywords: SAR, Lidar, data fusion, wetlands

Moyer, Joanne M., PhD
The King`s University

FAITH-BASED ENVIRONMENTAL WORK IN CANADA: A PROFILE

Over the last half decade, as environmental concerns have increased, people both within and beyond faith communities have recognized the close relationship between the dimensions of faith – such as beliefs, values, ethics, and worldviews – and the environmental crisis. Resulting theological work and practical action is drawing increasing attention. This study explores faith-based organizations in Canada engaged in environmental work, investigating their activities, the worldviews that motivate them, and patterns and themes that characterize the faith-based approach to this work. A comprehensive list of organizations was compiled through internet searches, literature review, and key contacts, and a group of 16 active organizations was selected for study. Organization staff and volunteers were interviewed, programs were observed, and some program participants contributed to focus groups and interviews. Study findings indicate a wide variety of program areas, including education, theological reflection and spiritual direction, policy advocacy and activism, congregational resourcing, agriculture and food, conservation work, and nature experience. Various broad themes illustrate the character, approach, and dynamics within this community of organizations. The religious/ethical component of environmental issues was confirmed, the ways in which faith approaches clash with wider societal norms was described, and the organization and expertise existing within faith communities was highlighted. The existence of diversity was one of the most prominent themes, along with a commitment to collaboration, an emphasis on community and solidarity, and a deep sense of calling and commitment among participants. Finally, there was recognition of the spiritual resilience and hope that faith can provide.

Keywords: sustainability; religion; civil society; environmental education; environmental activism

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Nodge, R, Hodder, KR, and Macdonald,
Prairie Environmental Process Laboratory, University of Regina

EXPLORING THE USE OF A UAV TO ASSESS GEOMORPHIC CHANGE AT THE LILLOOET RIVER DELTA

The Lillooet River delta is a dynamic environment, and presents an ideal opportunity to test the use of an unmanned aerial vehicle (UAV) for detection of geomorphic change. This study sought to explore the UAV-technique as a means to quantify: (a) migration of the Lillooet River mouth during a 12-day period

in July 2015; and (b) the associated sediment volume eroded and deposited. A GPS survey was also conducted to ground-truth key landscape features, such as the river banks and lake shoreline. Multiple images were combined to produce daily composites showing the magnitude and rate of geomorphic change(s) to be assessed. Measuring areas of stability is a fundamental component of land use management and geomorphology. The Lillooet river delta is currently experiencing rapid change and documenting this with UAV technology will provide insight into the application of this equipment on a fluvial lacustrine landscape.

Key words: UAV, geomorphology, delta, Lillooet River

O'Keefe, Meghan
Western Washington University, Bellingham, WA, USA

CROSS-BORDER HARBOR SEAL (*PHOCA VITULINA*) MANAGEMENT AND REHABILITATION PRACTICES

This study examines the differences in Harbor seal (*Phoca vitulina*) management and stranded animal and orphan pup rehabilitation in British Columbia and Washington State and the reasons for these differences. The study performed extensive research into differences of wildlife management between B.C. and Washington, especially in regards to harbor seals. Differing management techniques affect species populations on either side of the border, but political boundaries have little influence on wildlife migration, feeding and mating patterns. However, borders can certainly influence species conservation and protection. This study discusses differing harbor seal management techniques in cross border coastal waters and identifies the most successful practices that aid in international conservation efforts.

Keywords: Harbor seal; rehabilitation; cross-border wildlife management

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Okhrimenko, Maxim, and Hopkinson, Chris
ARTeMiS Lab, Department of Geography, University of Lethbridge

MAPPING ACTIVE NDVI FROM MULTI-SPECTRAL LIDAR IMAGE CHANNELS

LiDAR (Light Detection and Ranging) is gaining popularity as a unique high-resolution remote sensing technology due to its 3D sampling of land cover and terrain, and its ability to penetrate into and characterise vegetation structure from tree top to ground. LiDAR is primarily used to construct detailed digital elevation models (DEMs) but the intensity channel (an index of signal reflectance) is increasingly used in a similar fashion to black and white aerial photographs or single channels in multispectral imagery. In passive imagery, NDVI (Normalized Difference Vegetation Index) was developed as a quantitative vegetation monitoring tool for observing vegetation phenology and long-term patterns of loss or growth. Cutting edge multi-channel LiDAR technology, allows for active depth-specific spectral sampling of vegetation profiles. However, in order to benefit from this additional information it is necessary to normalise intensities from each channel or sensor. Currently, most sensor-supplied intensity values are an index of the peak signal amplitude, and not the time-integrated backscattered light response. In order to obtain surface reflectance properties from LiDAR intensity, one can use the radar equation. In the case of a vegetated land cover, however, this is an ill-posed task, for which multi-channel information may provide a solution. Our presentation will showcase prototypical 3D multi-spectral canopy data collected in Ontario (Vivian forest) using a Titan multi-channel LiDAR (Teledyne

Optech, Toronto). Our method for converting normalised multi-channel intensity data to an active NDVI will be presented, and further applications to wetland and forest classification discussed.

Keywords: multi-spectral LiDAR; intensity normalization; NDVI; Teledyne Optech Titan; land cover classification

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Paluck, Alissia, Chasmer, Laura, Hopkinson, Chris, and Mahoney, Craig
Department of Geography, University of Lethbridge

IDENTIFYING VEGETATION AND TOPOGRAPHIC CHARACTERISTICS ASSOCIATED WITH PERMAFROST CONDITIONS IN THE NORTHWEST TERRITORIES

The sporadic and discontinuous permafrost regions of Canada are undergoing rapid permafrost thaw and land cover change due to warming trends and land development. Forest mortality has occurred as a result of excessive permafrost thaw and increased run-off. Quantifying the extent of permafrost thaw over broad regions can exacerbate atmospheric feedbacks through greenhouse gas exchanges and present challenges to infrastructure development. Thaw assessment is challenging due to restricted access dictated by remote locations.

This study is part of a larger project that aims to quantify relationships between permafrost thaw and topographical and vegetation characteristics within the Scotty Creek watershed, NWT. The objectives of this study are to: 1) identify vegetation structural characteristics and topographic variability by airborne laser scanning (ALS) data; 2) relate topographic and vegetation structure to thermal energy emission. Results demonstrate elevated permafrost plateaus can sustain approximately 3.8m taller vegetation than bogs or fens; similarly lowest values of gap fraction were observed for plateaus. Bogs were the warmest land type in the region, on average 2.1°C warmer than plateaus. Cooler spots were found near some bog edges indicating possible water release from permafrost thaw. Characterizing land cover types is vital as increased permafrost thaw may lead to bog expansion leading to runaway warming. However, surface warming may only be evident after excess water from thaw has dissipated.

Future investigation will utilize thermal and high resolution multispectral imagery in conjunction with ALS data to predict permafrost rates of thaw over a larger area using random forest (RF) algorithms.

Keywords: permafrost thaw; LiDAR; thermal; vegetation structure

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Parsons, N. Reed, and Hopkinson, Christopher
Department of Geography, University of Lethbridge

IN-SITU LIGHT EMITTING DIODE DETECTION AND RANGING MAP SNOW PROFILE

The West Castle catchment study site, a mountainous sub-basin of the Oldman River Basin, is a vital hydrological resource as well as an equally ecologically and geomorphologically diverse region in south west Alberta. Three meteorological stations have been installed at three elevations: valley (1415 m ASL); tree line (1850 m ASL); and alpine ridge (2130 m ASL) within the boundaries of the West Castle Mountain Ski Resort. Current accepted methods of in-situ snow depth monitoring, such as ultrasonic

range detection sensors, are only capable of measuring an average accumulation over a small footprint leaving snow surface profile mapping to be conducted manually. Leveraging the Meteorological tower infrastructure, a conventional SR50A sonic ranging depth senor is co-located with a Light Emitting Diode Detection and Ranging (LEDDAR) solution provided by Canadian tech-startup, LeddarTech. In this study we map snow accumulation and snow surface topography using LEDDAR , and compare the accuracy, precision, and susceptibility to extreme alpine conditions to that of the SR50A.

Keywords**:** Snow profile; non-invasive monitoring; new technology

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Krishnan, Dr. Parthiphan, and Little, Malcolm
Kwantlen Polytechnic University

CLIMATE CHANGE, SEA LEVEL RISE AND LIVELIHOOD ADAPTATION STRATEGIES IN ORISSA, INDIA

The exponential rise of greenhouse gas emissions have sparked intensified global warming conditions. An adverse effect from global warming is increasing sea-level rise and the inundation of low-lying coastal regions. Many coastal regions in the world, especially in developing states, contain large urban and rural populations and infrastructure. Accompanying this sea-level rise is the erosion of coasts, increased damage from coastal flooding and storm surge events, and intrusion of salt water into coastal watersheds and aquifers. Many of these phenomena include positive feedback mechanisms that reinforce the adverse conditions.

This study focusses on the district of Kendrapara in the state of Odisha in eastern India, and how damage from impacts due to sea-level rise can be mitigated in the acutely poor and vulnerable region. Ecological services provided by the coast are vital to the low-income, vulnerable populace in Kendrapara. Rural inhabitants in the region rely heavily on resources garnered from diminishing coastal mangroves, in addition to farming the land and managing local aquaculture.

The study's two-pronged approach measures the amount of sea-level rise and investigates what livelihood adaptation strategies are feasible in the region, within existing government and socioeconomic frameworks. A longitudinal study of multispectral satellite imagery will be undertaken to accurately measure the rate of sea-level rise in the study area, and to determine how the shoreline has adjusted in a geophysical sense. Community surveys will be conducted within different communities along the Odisha coastline in order to gain insight into local knowledge, existing livelihood adaptation strategies, and local vulnerability concerns. Changes in coastal land use will be scrutinized to provide further evidence of adaptations enacted by the local populace.

Altogether, the study will aid in developing a conceptual, bioregion-based framework that will link sea-level rise, coastal ecosystem services, and livelihood adaptation strategies within the area of analysis. These linkages could guide disaster prevention/relief policies and strengthen community resilience against adverse effects from global warming.

Marsh, Steven J[1] , Gillies, Sharon Louise[1], Peucker-Ehrenbrink, Bernhard[2] , Janmaat, Alida[1], Faber, Audrey[1], Clemence, Ellen[1], Yakemchuk, Ashleigh[1], McCabe, Marlena[1], Toner, Alexandra[1], Dhaliwal, Harleen[1], Gaultier, Michael[1], Kanda, Shyna$_1$, Leffers, Ryan[1], Mahil, Gaganjeet[1], Paulson, Dianne[1], Puri, Karanjit[1], Sekhton, Jasmine[1], Sidhu, Baljot[1], Sidhu, Davinder[1], Turner, Shae[1], and Strangway, Alanna[1]
[1]University of the Fraser Valley, Abbotsford, BC, Canada,
[2]WHOI, Marine Chemistry, Woods Hole, MA, United States

ANALYSIS OF LEAF LITTER DECOMPOSITION RATES FOR JAPANESE KNOTWEED AND THIMBLEBERRY SAMPLES COLLECTED AT CLAYBURN CREEK, ABBOTSFORD, BC, CANADA

The decomposition of leaves is a vital process for aquatic ecosystems. Analysis was done on the rate of the leaf litter bag decomposition of Japanese Knotweed and Thimbleberry samples in two sites which differ in the degree to which they are influenced by humans. There was a statistically significant increase (Rsq=0.9408) in the rate of leaf litter decomposition as the ratio of Thimbleberry to Japanese knotweed increased. Further analysis was done on invertebrates collected from the leaf litter samples. Knotweed samples have previously shown a higher diversity in invertebrate composition relative to thimbleberry samples (2014). The invertebrate composition is then looked at in conjunction with the leaf litter data and other hydrology related factors

Key terms: Decomposition; knotweed; thimbleberry; leaf; insects

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Raines, Paul
Western Washington University, Bellingham, WA, USA

NORTH AMERICAN UNION: MOVING BEYOND NAFTA

A North American Union between Canada and the United States creates a regional power unlike any seen before. This economic and political partnership would be able to tackle issues of environmental policies, and remove the border as a barrier to the movement of goods, services, capital and labour in ways the North American Free Trade Agreement (NAFTA) never could. However the effects that supranational institutions will have on national and local identity, cross border regions like the Fraser Lowlands or the Salish Sea, and monetary sovereignty are just speculation. The problem arose when looking for supranational institutions here in North America. There is NAFTA and other small institutions that try to make trade easier across the border, but they fall short in an ever globalizing world.

By looking across the Atlantic at the European Union, its institutions, and their structures we see how similar institutions would function here for the North American Union and how they affect identity, cross border regions, and monetary sovereignty.

Utilizing data from the European Union on their structures and of scholarly articles which dissect the idea of a unified North America; this poster shows how North American Union would work on the large scale, its advantages and disadvantages, what it does to the borderlands, and how society would change.

Keywords: North American Union; supranational institutions; free movement; sovereignty; and identity

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Strangway, Alanna, Mapili, Mariano, and Riedlinger, Michelle
University of the Fraser Valley

MONITORING THE SPREAD OF INVASIVE PLANT SPECIES IN ABBOTSFORD, BRITISH COLUMBIA.

The incursion and spread of invasive plant species is a growing concern and is becoming one of the most serious problems facing today's indigenous ecosystems. Although not every invasive plant species poses a current threat, some invaders are receiving increasing amounts of attention for their economic and social impacts around the world. The Giant Hogweed (*Heracleum mantegazzianum*) for example, can cause burns and in more severe cases, blindness to those who come in direct contact. The University of the Fraser Valley (UFV) in collaboration with the Fraser Valley Regional District (FVRD) and the City of Abbotsford (CA), carried out a Geographic Information Systems (GIS) project on the distribution and spread of five invasive plant species in the City of Abbotsford. The spatial, temporal and statistical analyses were carried out employing the ArcGIS software and using GIS layers containing jurisdictional data for roads, railways, streams, riparian areas, land use and soil types, as well as spatial and temporal data on five invasive plant species. The focus of this poster is to display the distribution and spread of these invasive plant species through GIS maps that show predictability in the spread of these invasive plant species. Results from this GIS project can be used to effectively and efficiently manage future incursion and spread of invasive plant species in the city.

Keywords: Invasive Plant Species; Geographic Information Systems (GIS); Fraser Valley

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Tompkins, Kathleen, and Garvin, Theresa
Department of Earth and Atmospheric Sciences, University of Alberta

AGING IN THE EDMONTON JOURNAL OVER TWO TIME PERIODS

The purpose of this qualitative media analysis was to compare how aging populations and issues were portrayed in the Edmonton Journal between the two time periods, 1989-1990 and 2014-2015. The database, "Canadian Newsstand Complete," was used to access relevant articles. In total, eighty-four articles were included in this study. Six central themes emerged from a thematic analysis of the articles: declining health, vulnerability, positive images, popular media, end of life, and aging population. The prevalence of these themes was compared between the two time periods in order to examine possible shifts and consistencies in media representations of aging and related issues. Overall, there was greater coverage of aging-related issues in the 1989-1990 time period. While the prevalence of several of the identified themes and issues remained relatively similar across the two time periods there were some differences noted. These included changes in emphasis on the societal impacts of an aging population and changes in the role of aging within popular culture. Differences in tone or how issues and themes were presented or discussed are also noted.

Keywords: media analysis; aging; human geography

Turner, Shae, and Hay, Claire
Department of Geography and the Environment, University of the Fraser Valley

POTENTIAL IMPACTS OF SEA-LEVEL RISE ON THE COASTAL GEOMORPHOLOGY OF CRESCENT BEACH, BRITISH COLUMBIA

Crescent Beach is located near the southwest corner of the City of Surrey, British Columbia. Positioned on the east side of Boundary Bay, the elevation of the beach and its adjacent community range from 0 to 3 m above mean sea level. The coastal geomorphology is affected by winter storms dominated by SW waves, king tides and northward longshore sediment transport. Predicted sea level rise caused by climate change pose significant risks to the low-lying community. It is estimated that this community will see a sea level rise of 1 m by 2100 and current mitigation methods are insufficient to protect against the projected increase. This poster presents the preliminary findings of a case study on Crescent Beach, conducted as part of a class project. Distance and elevation data were collected along north and west beaches in the community of Crescent Beach in January 2016 and used to construct topographic beach profiles, which can be used to predict changes in shoreline position and beach width relative to projected rising sea levels. In addition, grain size data was also collected, showing a trend of decreasing grain size northward along West Beach, transitioning into smaller grain sizes along North Beach. The impacts of sea level rise on beach composition will also be discussed.

Keywords: Sea-level rise; coastal geomorphology; Crescent Beach; beach profiles

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Wagenaar, Justin, and Adams, Sean
The King`s University

COUGAR CREEK... OH DAM!

The torrential floods of 2013 caused excessive damage to municipalities in the Bow River watershed, including residential areas along Cougar Creek in the town of Canmore, which is 106 km west of Calgary, Alberta. Canmore has proposed to construct a $40 million dollar dry dam in Cougar Creek. The dam has been designed to serve as a flood and debris retention structure, so as to prevent any unnecessary damage that could be caused by future flooding. This poster seeks to examine how the proposed environmental impact assessment for the project will address the various concerns surrounding the environmental, economic and social impacts it may have. We will do so by analyzing the Proposed Terms of Reference for the project, and how it seeks to identify potential adverse environmental and effects. As well, we will take into consideration the inputs of both the government and the public on this project, along with the concerns of other affected parties, to further understand the project's economic and social impacts. Because of the controversial nature that surrounds the construction of the Cougar Creek Dam, it is important to analyze all aspects of this project, to come to a better understanding of how it will affect Cougar Creek, Canmore, and its citizens.

Keywords**:** Cougar Creek Dam; EIA; 2013 Flood; Canmore

Walker, Courtney
Western Washington University, Bellingham, WA, USA

THE TALE OF TWO CITIES: A COMPARISON OF URBAN DEVELOPMENT BETWEEN SEATTLE AND VANCOUVER

As populations increase, it becomes increasingly important to manage that growth in sustainable ways that restrict urban sprawl and its negative impacts. Land use policies and planning tools are key factors that allow cities to develop more sustainably while protecting rural and agricultural land. While Vancouver, B.C. and Seattle, Washington have a similar geographic layout and human population, Vancouver has been more successful at restraining urban sprawl, restricting automobile dependency, and protecting agricultural land. Seattle should look north of the border to improve their urban environment and prevent any more loss of agricultural land.

Key words: Urban Environment; Urban Sprawl; Land Use

Zanussi, Alexandra[1], Adema, Waurner[1], and Wood, John[2]
[1]Undergraduate Student, The King's University, Edmonton AB
[2]Faculty, The King's University, Edmonton, AB

HARE TODAY…GONE TOMORROW: A METHOD FOR MAPPING WHITE-TAILED JACKRABBIT DISTRIBUTION IN EDMONTON, AB

The white-tailed Jackrabbit (*Lepus townsendii*), while native to the open grasslands throughout the interior of North America, has become a common sight in urban settings. Assessed every other year since 1992, data on the approximate locations of white-tailed Jackrabbits in the City of Edmonton has been collected and analysed by various students of The King's University, spearheaded by Dr. John Wood. The data collected has been useful for estimating population densities and studying the synurbization of the species as the city grows larger. This data includes sightings in established urban neighbourhoods, parks, industrial, residential and rural areas in addition to two new residential areas undertaken this year. However, the location data is approximate and not fully geo-referenced. Nevertheless, hardcopy maps showing the routes taken by those collecting the data, accompanied by tabular data sheets, provide a basis on which to digitally map spatial and population distributions over several years. This poster seeks to highlight the challenges associated with synthesising this valuable data set, proposes a method utilizing ArcGIS to map the distribution of white-tailed jackrabbits in the City of Edmonton, and provides a digital basis for adding future data and ongoing spatial analysis.

Keywords: White-Tailed Jackrabbits; GIS; Biogeography; Edmonton; Synurbization

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Zwiebel, Aaron[1], Petticrew, Ellen[2], and Owens, Phil[3]
[1]MSc Student (Natural Resource and Environmental Studies), UNBC
[2]UNBC Research Chair of Landscape Ecology and Professor of Geography, UNBC
[3]UNBC Research Chair of Landscape Ecology and Professor of Environmental Science, UNBC

BIOFILM AS AN INDICATOR OF TRACE METALS CONTAMINATION FROM THE MT. POLLEY MINE TAILINGS SPILL

The Mt. Polley Mine disaster of August 2014 released over 25 M m^3 of tailings and interstitial water into the Quesnel catchment of central interior British Columbia. The majority of the mine waste entered Quesnel Lake, a pristine and superlative fjord lake with abundant stocks of culturally and economically important salmon. Forming a ~3 m thick layer at the bottom of the lake, tailings were enriched with a variety of trace metals, including copper, selenium, and arsenic, leaving a strong potential for food web transfer and long-term environmental damage. To explore the consequences of this disaster and the fate of trace metals in the environment, I propose to use biofilm, also called periphyton, as an environmental indicator. Biofilm matrices are dense with biotic ligands where trace metals can adsorb, and biofilm-associated algae forms the foundation of benthic food webs. Starting in March 2016, biofilm and invertebrates will be sampled from 16 sites variously impacted by the Mt. Polley spill and undergo trace metals analysis by inductively coupled plasma mass spectrometry. I hypothesize that results from these analyses will indicate a gradient of metal contamination in the catchment, as well as reflect the role of biofilm as a vector where inorganic pollutants enter the food web. As mine development continues throughout Western Canada, this research will substantiate the risks posed by mining operations, and explore the role that biomonitoring can play in assessing trace metal impacts.

Keywords: biofilm; mining; trace metals; industrial impacts; biomonitoring