

**Association of
Washington
Geographers**



**Spring Meeting
May 19th, 2018**

At Western Washington University

When: Saturday May 19th, 2018 9:30 a.m. – 3:30 p.m.

Where: Arntzen Hall, Western Washington University

This year's meeting theme: Climate Change



Tentative Schedule:

9:30 – Registration and Coffee

10:00 – Morning Paper & Poster Sessions

12:00 – Lunch Break (food trucks will be available)

1:00 – Keynote & Student Awards

2:30 – Field Trip (free, but please register in advance)

Registration:

Faculty and K-12 educators \$10

Students, alumni, and other guests **free**

Awards will be given for best student presentations and posters

For more details and to register:

washingtongeographers.wordpress.com

Free Events for Geography Alumni & Students

- 9:30 – 3:00 Association of Washington Geographers Spring Conference (Free to all Alumni), Arntzen Hall Second Floor – see flier
- 10:00 – 12:00 Huxley College Open house – TBA
- 12:00 – 1:00 Geography Alumni Reception with past and present faculty & staff
- 1:00 – AWG Keynote speaker: Dr. Jon L. Riedel is a National Park Service geologist at North Cascades National Park – Changes to Glaciers in WA over the Past Century
- 2:30 – AWG Field Trip



RSVP: WDCAG2017@wwu.edu or (360) 650-3284



Envr. Studies: Planning , Policy, Educ. & Geography

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May 19, 2018

Dear AWG Participants;

On behalf of the Geographers at Western Washington University, we welcome you to 2018 Annual Meeting of the Association of Washington Geographers.

Our goal for this year's conference has been to offer and attract a stimulating, diverse, and engaging array of papers, posters, and a field trip. We hope that you are able to take part the sessions and the field excursions. The 12 papers, 16 posters, and the keynote and WWU alumni reception presented this weekend further demonstrate the wide breadth and diversity of material that geographers, planners, earth scientists, geologists, foresters, resource managers, planners, anthropologists, computer scientists, biologists, and others contribute to geographic knowledge.

Many of these papers and posters also represent excellence in research by undergraduate and graduate students. We look forward to presenting awards for the best student research paper and poster presentations on Saturday night at the banquet.

Sincerely,

The AWG 2018 Organizing Committee
Patrick Buckley, Professor, Department
Environmental Studies: Geography

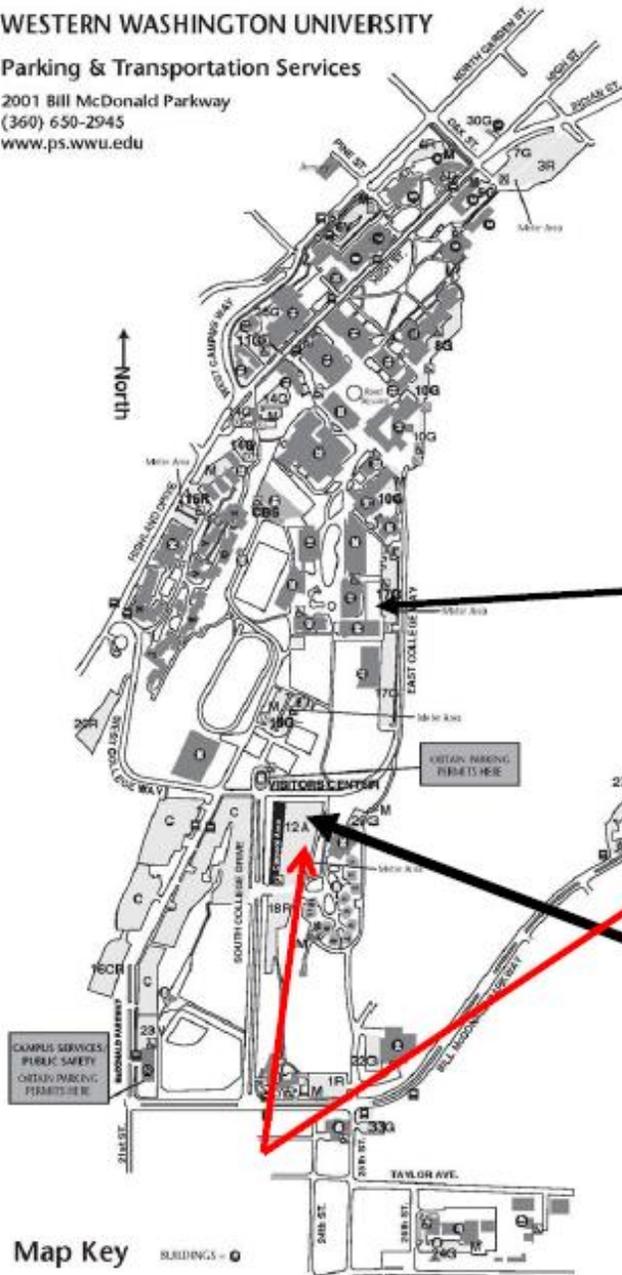
Aquila Flower, Assistant Professor,
Department Environmental Studies:
Geography

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PARKING OFFICE HOURS: 7:30 a.m. - 5:00 p.m.
 For Building #52 Monday - Friday

VISITOR CENTER HOURS: 7:15 a.m. - 8:00 p.m. Monday - Friday
 For Building #20 9:00 a.m. - 5:00 p.m. Monday - Friday
 7:15 a.m. - 5:00 p.m. Monday - Friday
 (Summer and International)

Public Safety open 24 hours.

C/DS no permit required after 5 p.m., Mon-Fri, all hours Sat-Sun.
 Restricted all hours to "P" permit holders only.

High Street Closed:
 Monday-Friday 7:00 a.m. - 9:00 p.m.
 Transit and State Vehicles Only.

Meeting in basement of Arntzen Hall

Exit I-5 at 252 follow signs to WWU

Free Parking in Lot 12A

Map Key

Administrative Services 58	Eden Hall North (Residence) 2	Old Main 11
Administrative Services Building B 51	Eden Hall 6	Parking and Transportation Office 52
Alumni House 1	Environmental Studies 35	Parks Hall 29
Archives, Washington State 45	Environmental Health & Safety 28	Performing Arts Center 16
Arntzen Hall 27	Fishermen College 39	Physical Plant 67
Art Annex 23	Fishermen Complex (Residence) 40	Public Safety (University Police) 52
Baseball Service 42	Five Arts 24	Recycling Center 41
Biology 36	Fraser Hall 12	Redeignery Commons 34
Berman Wood Apartments (Residence) 48	Haggard Hall 15	A Alpha (Residence) F Gamma (Residence)
Bond Hall 29	Health Services 52	B Beta (Residence) G Gamma (Residence)
Bookstore 18	Higgins Hall (Residence) 5	A Delta (Residence) H Sigma (Residence)
Bushman Tower (Residence) 43	Highland Hall (Residence) 13	K Kappa (Residence)
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Chemistry Building 31	Maintenance/Maker Pool 46	Trash Bunker 32
College Hall 19	Malvern Hall (Residence) 5	Viking Commons 7
Commissary 44	Miller Hall 25	Viking Union 8
Communication Facility 37	Nash Hall (Residence) 4	Visitor Information Center 38
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Schedule of Events		
9:30 - 10:00	Registration & Coffee	Arntzen Foyer
10:00- 11:30	Paper Sessions	Group A Arntzen Hall 225
		Group B Arntzen Hall 219
11:30 - 12:30	Illustrated Poster Session	Arntzen Foyer
12:00-1:00	Alumni Reception & Light Lunch	Arntzen Foyer
1:00 Keynote	: Dr. Jon L. Riedel -- Changes to Glaciers in WA over the Past Century	Arntzen Hall 219
2:20- 4:00	Field Trip: Bellingham -- Past & Future	Meet at Arntzen Foyer

Session A: Physical Geography and Spatial Data

AH 225 10:00 – 11:30

Andrew Bach* and Paul Whelan

Retreating Glaciers, Incipient Soils, Emerging Forests: One-Hundred Years of Landscape Change on Mt. Baker, WA

Lauren Drakopoulos

Bycatch and Big Data: does the solution define the problem?

Dustin Gleaves

Dendrochronology of Seaside Juniper: a recently discovered rare trees species

Yurika M. Harada

Pokémon Go: A Historical and Analytical Consideration of Big Data in GPS Based Applications

Ben Hagedorn

Muscling into Meadows: A Preliminary Dendrochronological Analysis of Recent Conifer Encroachment in Mount Rainier's Subalpine Meadows

Tim Scharks

Psychological reactance to threatening climate messages decreases policy support and donations

* Session Chair

Session B: Human Landscapes

AH 219 10:00 – 11:30

Patrick Buckley*, Paul Stangl, Aidan Simpson, Aisaya Corbray, Alexander Rolfs, Allison Tompkins, Andrew Randall, Cedrick Cornet, Holly Pope, Isaac Calvo, Liam Pollom, Marie Blue, Maya Lewis, Nick Schmeck, and Ryan Beberdick Student

Commuting to University Campus: Affective Reaction and Satisfaction based on Mode of Travel

Caitlin Alcorn

Shifting Everyday Geographies: How Day Work Arrangements Are Reshaping Paid Domestic Service in São Paulo, Brazil

Mike Babb

Spatial-Temporal Trends in IRS County to County Migration Data: 1990 – 2015

Eli Tuberg

Urbanizing geographies & indigenous health outcomes in British Columbia

Edgar Sandoval

UndocuQueer Meaning-Making and Practices of Navigating Space

Anthony Peterson

Opioids: What are our doctors doing to us!

*** Session Chair**

Presentation Abstracts

Session A: Physical Geography and Spatial Data

AH 225 10:00 – 11:30

1) Faculty

Andrew Bach and Paul Whelan, Department of Environmental Studies, Western Washington University, and Washington Department of Fish and Wildlife

Retreating Glaciers, Incipient Soils, Emerging Forests: One-Hundred Years of Landscape Change on Mt. Baker, WA

Glacial forelands are harsh environments where incipient pedogenesis provides the basis for vegetation establishment and succession. The Easton Glacier foreland on Mt. Baker, Washington has till deposited during five time intervals over the last one-hundred years as determined from historic ground and air photos. A soil chronosequence was established on the different age surfaces to assess rates of pedogenesis. As hypothesized, all soil variables, except pH, showed increasing values on progressively older surfaces, with several orders of magnitude increase between the active till and the hundred year surface. Soil texture did not change. Till on ice showed no vegetation cover, low organic matter (0.45%), little to no nitrogen content (max 0.0010%), minimal carbon (max 0.0083%), and a C/N ratio of 5.85. The 100 year old surface has continuous vegetation cover, high organic matter (12.6%), 0.71% nitrogen, 9.2% carbon, and the C/N ratio was at its highest (22.56). Organic matter content started higher than expected in fresh till and gradually increased before vegetation became established, suggesting either aeolian deposition of detritus and/or microbial activity built soil fertility. After about 60 years of exposure, till surfaces became fully covered with vegetation and soil organic matter increased by almost 2800% (0.45% to 12.6%). This rapid rate of soil development, given a short growing season, is hypothesized to be related to several edaphic conditions (topographic setting relative to established vegetation, aspect, and andesitic parent material), rather than a normal condition for the Cascades Range as a whole; demonstrating that on-going climate change is affecting many environmental processes.

Keywords: soil development, climate change impacts, mountain geography

2) Doctoral Student

Lauren Drakopulos, University of Washington

Bycatch and Big Data: does the solution define the problem?

In the early 1990s 'bycatch' made a splash on the global environmental conservation scene. The rapid industrialization and scaling up of commercial fisheries had led to more frequent, unintentional, and sometimes fatal encounters between marine species and fishing gear. Fisheries scientists began framing

the decline in fisheries as a problem of ‘bycatch’ and cited the lack of scientific data on bycatch as the linchpin in resolving the issue. The National Marine Fisheries Service responded by implementing an extensive monitoring program placing scientists, and more recently surveillance cameras, aboard fishing vessels to collect data on bycatch. Speaking to a broader trend in the environmental sciences fisheries scientists and managers contend that more data is the panacea for reducing by-catch and improving the sustainability of fisheries. Yet there is little agreement amongst scientists and managers about how to define ‘bycatch’. In this paper I develop an ethnography of bycatch to demonstrate how ‘bycatch’ was produced as a new environmental object by fisheries science and management. I argue that the slippery ontological status of ‘bycatch’ has produced a kind of epistemic anxiety within fisheries science leading a charge for ‘Big Data’, in effect meaning solution is defining the problem.

Keywords: Fisheries, Big Data, Environmental Management

3) Masters Student

Dustin Gleaves, Western Washington University

Dendrochronology of Seaside Juniper: a recently discovered rare trees species

Seaside Juniper (*Juniperus maritima*) is a recently discovered species of Juniper tree endemic to the Pacific Northwest. Prior to discovery in 2007, Seaside Juniper was treated as Rocky Mountain Juniper (*J. scopulorum*) due to cryptic speciation. Although climate is a well known primary determinant of forest health, the effects of fluctuating climatic conditions on the growth and regeneration of Seaside Juniper have never been studied. Dendrochronology uses the measurement of annual tree ring widths as a proxy for periodic climate conditions. If successful, this study will produce a model of climate conditions over the lifespan of the sampled trees, potentially prior to instrumental measurements. No dendrochronological study of Seaside Juniper is available in published literature and no existing chronology is available from the International Tree Ring Databank, the primary public database of tree ring chronologies. Due to this lack of study, it is unknown if individual Seaside Junipers crossdate, defined as expressing consistent patterns of annual growth between individuals, which would indicate non-random climatic response, a crucial requirement of dendrochronological study. Prior studies have succeeded in correlating precipitation and temperature with the closely related Utah Juniper (*J. osteosperma*) and Rocky Mountain Juniper growth, which indicates a potential for climate sensitivity in Seaside Juniper. If Seaside Juniper expresses climate sensitivity, this represents a yet unutilized resource of dendrochronological records that could be used to elucidate long-term climate trends in the Salish Sea region.

Keywords: dendrochronology, trees, climate change

4) Undergraduate Geography Student

Yurika M. Harada, University of Washington

Pokémon Go: A Historical and Analytical Consideration of Big Data in GPS Based Applications

Digital media and mobile applications used for leisure have become increasingly interwoven into people’s daily lives. Although playful mobile applications and their effects on society have been studied from a psychological, business, or computer science perspective, they have not been heavily engaged in the field of geography. Using Pokémon Go as a case study, this paper aims to explore the ties between the corporate history and digital data of Niantic and the effect it imposes on the “real world”. It aims to conduct a spatial analysis of pokéstops in King County, Washington. In order to do this, I will conduct a discourse analysis of online documents from Niantic, newspapers, social media, and fan websites recounting the company’s history with previous applications and press interviews. In addition, a spatial analysis of Pokémon Go (pokéstops) overlaid on American Community Survey 2012-2016 data was

created. The purpose of this analysis is to see potential spatial inequalities that the application have created. The findings show Niantic's lack of ethical consideration by how it deals with users data and privacy and as a result shows how the users have responded to issues in the past. The results of the research also illustrate the skewing of data towards urban tech centers and how more rural areas have less pokéstops to the point that the application may even be considered pointless to have.

Keywords: Mobile applications, geographic gaming, big data

5) Masters Student

Ben Hagedorn, Western Washington University Grad Student

Advisor: Aquila Flower

Muscling into Meadows: A Preliminary Dendrochronological Analysis of Recent Conifer Encroachment in Mount Rainier's Subalpine Meadows

A dramatic reconfiguration of the subalpine ecotone is underway in many mountainous regions. One of the changes occurring in subalpine ecosystems is the shrinking and fragmentation of subalpine meadows. In July 2016, we investigated the encroachment of conifers into a subalpine meadow on the south side of Mount Rainier as part of the North American Dendroecological Fieldweek, a unique experiential learning program dedicated to training participants in the theories and techniques of dendrochronology. We collected increment cores and cross-section disks from conifers in a subalpine meadow to determine their dates of establishment. We compared these establishment dates with climatic and environmental variables to assess potential drivers of encroachment. Our results show that the establishment of conifer seedlings occurred in distinct pulses over the twentieth century coinciding with periods of low summer snowfall. We found that seedling establishment rates were much higher on locally convex micro-topographic settings and in areas with a dense cover of woody shrubs. While our results should be considered a preliminary analysis, they reveal a compelling story of the spatiotemporal patterns of conifer encroachment and suggest potential causal mechanisms that warrant further investigation.

Key Words: Dendrochronology, Subalpine Ecotone

6) Geography Instructor

Tim Scharks, Geography, Green River College

Psychological reactance to threatening climate messages decreases policy support and donations

The efficacy of threatening messages (a.k.a. "fear appeals") about climate change is debated but rarely tested. Persuasive communication may generate psychological reactance, a motivational state of opposition characterized by counterarguments and anger. In a large (n=845) randomized experiment of US adults, we find a climate change fear appeal generates reactance and suppresses support for mitigation policy conditional on political orientation. First, while all respondents experience reactance when exposed to a climate change fear appeal, right-leaning respondents experience significantly greater levels of reactance. Second, among right-leaning respondents reactance plays a critical role in policy support. While exposure to a fear appeal increased policy support among right-leaning respondents low in reactance, policy support boomerangs among high-reactance right-leaning respondents exposed to a fear appeal. This suggests fear appeals can polarize support for mitigation policy. Reactance has no significant effects on policy support among left-leaning respondents. Finally, reactance to a climate change fear appeal suppresses donations to climate change-related organizations. Overall, findings suggest using fear appeals to motivate support for climate change mitigation should be undertaken with caution. Our research highlights reactance as an important mechanism through which fear appeals can backfire, and suggests climate change communications should be tested for reactance.

Keywords: climate policy; communication

Session B: Human Landscapes

AH 219 10:00 – 11:30

1) Faculty and Undergraduate Students

Patrick Buckley, Paul Stangl, Aidan Simpson, Aisaya Corbray, Alexander Rolfs, Allison Tompkins, Andrew Randall, Cedrick Cornet, Holly Pope, Isaac Calvo, Liam Pollom, Marie Blue, Maya Lewis, Nick Schmeck, and Ryan Beberdick, Environmental Studies Department, Western Washington University, Bellingham, WA 98225. E-mail: patrick.buckley@wwu.edu

Student Commuting to University Campus: Affective Reaction and Satisfaction based on Mode of Travel

The purpose of this study is to test two general hypotheses of commuting to campus by multiple modes. The first based on Mehta's higher order needs attainment looks at choice of alternative modes of commuting. Specifically it compares the current results based on a questionnaire executed on a university campus with similar variables found in a previous study conducted in an inner city urban neighborhood that lead to a pattern of alternative modal choice for commuting purposes. Second, we investigate affective (attitudinal) impacts of different modal choices for commuting and compare this to the results reported in an earlier study for commuting to a university campus in England. Those results indicated less stress and greater measures of positive affective variable such as pleasantness and interest for users of alternative forms of transportation in their daily commutes. We propose that by better understanding both of these areas, we will be able to determine what effects personal choice of transportation mode for commuting and influence future campus and urban design to stimulate more alternate and less automobile travel while at the same time meeting Mehta's higher order needs and lowering negative affective aspects of commuting while increasing positive ones.

Keywords: Commuting behavior, alternate modes of transportation, affective reactions

2) PhD Candidate in Geography

Caitlin Alcorn (faculty mentor: Kim England), University of Washington

Shifting Everyday Geographies: How Day Work Arrangements Are Reshaping Paid Domestic Service in São Paulo, Brazil

Major changes are currently taking place in one of the largest sectors of female employment in Brazil: paid domestic service. Over six million, predominantly working class women of color perform the often invisibilized labor of cooking, cleaning, and caring for children and elders in the homes of mostly white middle- and upper-class families. Historically, domestic workers lived in the homes of their employers, leading to a complex employment relationship that clouded exploitation in the sentiments of family and friendship, and placed extreme restrictions on workers' mobility both within and outside the house. In the last decade, day work arrangements have become increasingly common, as employers replace their one full-time worker with multiple part-time day workers. The rise of day work arrangements represents a dramatic spatio-temporal reorganization of the domestic service sector, a sector of fundamental significance in Brazilian society, both reflecting and reproducing race, gender, and class-based

inequalities and notions of servility. This paper aims to uncover the significance of these shifting arrangements for workers and employers, as well as the ways in which longstanding social hierarchies in Brazilian society are being dismantled, remade, and reinforced in response to changes within the domestic service sector.

Keywords: paid domestic work; Brazil

3) PhD Candidate

Mike Babb, Department of Geography, University of Washington. E-mail: babbm@uw.edu

Spatial-Temporal Trends in IRS County to County Migration Data: 1990 – 2015

The IRS' Statistics of Income branch produces yearly county to county migration data. These data originate from the US population's yearly tax filing. Starting in 1990 and continuing through 2015 there are data on the number of people migrating between counties. This talk explores the spatial and temporal trends in internal migration. Specifically, it showcases the distances people travel when migrating and the growth and decline in various population centers.

Keywords: Internal migration, population change, migration data

4) Undergraduate Geography Student

Eli Tuberg, Geography Department WWU

Urbanizing geographies & indigenous health outcomes in British Columbia

The process of urbanization in British Columbia is shaped by planning policy that favors economic development over the rights of First Nations communities. With a steady appropriation of reserve lands, indigenous people have visibly migrated to urban areas in greater numbers since 1965. The implications this urbanization has for indigenous health is what I aim to examine with this thesis — Health here referring to more than high blood pressure or body mass index, but the overall well-being of indigenous people. I divided the literature review and body of my essay into three main sections based on different (but interconnected) bodies of scholarly work. First is a short history of the province, and specifically the accumulation of wealth and expansion of population in Vancouver, leading to gentrification and a higher propensity for economic development outward, into indigenous spaces. Then, in the middle section, I focus on the resulting squeeze on reserves which I argue contributed to driving a younger generation of First Nations into urban settler society in search of new opportunities. Finally, I look at the decline in traditional foods and the statistics around infant mortality, cardiovascular disease, and other afflictions that affect indigenous people at a much higher level than other groups. The ways in which urbanization affects different communities are as varied and multifaceted as the process itself, which is shaped by the specific economic frameworks present in its conception.

5) PhD Candidate

Edgar Sandoval, Geography Department, University of Washington, Seattle, WA 98195. E-mail: edgars21@uw.edu

UndocuQueer Meaning-Making and Practices of Navigating Space

This paper centers the experiences of undocumented queer Latinx migrants to explore the ways that they engage in disidentification to transform the space around them. Geographers have researched the simultaneity of sexuality and racialization; however, studies explicitly examining UndocuQueer as

identity, experience, and analytic within the discipline remain nonexistent. This paper explores how undocumented queer Latinx migrants active in social movements, or UndocuQueers, have engaged disidentificatory practices to produce spaces for themselves, others, and communities. UndocuQueers deploy disidentification to navigate spatial configurations of geopolitical, cultural, and economic exploitation, marginalization, and exclusion. This paper brings literature on queers of color critique into conversation with geography to reframe UndocuQueer as a collection of disidentificatory practices that shape reality and produce new, or different, worlds. I draw on UndocuQueers' narratives of what identifying as UndocuQueer means to show how they perceive their relations to the world around them and how they seek to make their own life chances in the present and the future. I conclude that the vulnerability UndocuQueers experience does not prevent them from being agents in the production of social, political, and spatial practices. Rather, they are constantly engaged in a project of world-making that is nuanced, open, and relational.

Keywords: disidentification, undocumented queer migrants, practices

6) Community College Student

Anthony Peterson

Opioids: What are our doctors doing to us!

A close examination of the geography of the 'opioid epidemic' from 2006-2016.

College Posters

Alexander Beauchene, Claire Janetzki, Elias Gurel: Geography Department, Western Washington University, Bellingham, WA 98225. E-mail: beaucha4@wwu.edu

Remediation of Heavy Metal Pollution in Easter China

The rapid development of industry in China has led to an increased level of heavy metals into the soil, resulting in polluted farmland soils. Heavy metals mainly come from mining and smelting, sewage irrigation, and other production and industrial activities. 19.40% of the farmland soil samples in Eastern China taken from 612 different sites were found to be polluted by heavy metals. The heavy metals found in the Chinese soils include lead, chromium, arsenic, cadmium, and mercury. These heavy metals are classified as strong carcinogens by the International Agency for Research on Cancer. High levels of heavy metal exposure can cause permanent intellectual and developmental disabilities, behavioral problems, hearing loss, attention problems, and disruption in the development of visual and motor functions. The Chinese government has attempted many remediation efforts, with ex-situ and phytoremediation being the most pervasive. The most successful ex-situ remediation technique was thermal desorption. This is where the soil is heated to a temperature where the contaminants either evaporate or combust. Another remediation technique used is phytoremediation which involves planting certain types of plants in the soil plants to physically take the pollutants and heavy metals out of the soil.

Keywords: Heavy metals, Ex-situ, Phytoremediation, East China

Natalie Bankuti, Undergraduate, WWU

Biogeography of *Prunus serrulata*

The Japanese Cherry Blossom tree (*Prunus serrulata*) is a species not native to North America, yet one we see annually neatly lining the streets of many American cities in parks and other public places. This poster will present on the many biogeographical aspects of *Prunus serrulata* including the original biogeographical extent, the current extent we see today due to anthropogenic factors, as well as the realized niche of the species, general physiological traits, adaptation strategies, evolutionary history, and cultural relevance. This poster will be a broad overview of these characteristics of *Prunus serrulata* and not go into extreme detail about any one aspect of the species. Though many of the characteristics presented will be applicable to the entire genus of *Prunus* organisms, I will be focusing solely on that of *Prunus serrulata*.

Danielle Chevalier, Western Washington University.

Small Organic Local Borders

Regional linkages, policy networks and business interactions in place between US and Canada through various sectors, both within government and private businesses, can create shared goals irrespective of federal governments' barriers or supports (VanNijnatten, D., 2009). Increased communications through

these linkages can shape a common ideology (Brunet-Jailly, 2008.p104-124). In Whatcom county's Nooksack Valley, Washington, and Lower Mainland BC's Fraser Valley regional district there is a similar championing of small organic and local farms on both sides of the border. However, this common ideology is not a product of interconnected links for local and organic. In fact, they are very separate, and border/government policies and national identities heavily impacts access to, sales, and communication between the two. Small farms according to USDA is grossing under \$150,000. There is variance in what constitutes local, specialty crops, and family farm so the focus will be on those who advertise as such. The objective of this study is to explore how the border actually impacts small farms ability to market their produce locally. This study looks broadly at what trade exists in specialty small organic vegetable crops. Bunched parsley is used as a case study crop. The fundamental question: **Is there an opportunity for small farms in the Nooksack Valley to sell specialty crops across the border?** It will take a comparative look at "organic local" distributors, federal retail sales reports, importing requirements, "local organic" grocers/food coops, and trade/business support organizations.

Kiana Freeman and Chris Novak. Environmental Studies Dept., Western Washington University, Bellingham, 98225, freemak9@wwu.edu

Mental Health Impacts from the 2011 Japan Tsunami, Earthquake, and Nuclear Crisis.

March 11th, 2011 at 2:46 pm, a **9.0** magnitude earthquake hit off the pacific coast of Japan, causing a triple disaster of earthquake, tsunami, and nuclear power plant crisis. The disaster caused **22,000 deaths** and **2,500 missing people**, and caused **\$309 billion of damage** to many cities across Japan. Even though the damage was economically devastating, mental health is not commonly addressed in relation to this disaster. **Post-Traumatic Stress Disorder and other mental health illnesses** are still prevalent in many people that were impacted by the 2011 crisis today. A few studies and research have been conducted to analyze the mental health in the aftermath of the disaster. Based upon the response in Japan and mental health issues that arose from the disaster, the Japanese Government has developed a large mental health program and has supported the community of those who suffer from PTSD and other mental illnesses. Even with this initial response, the mental health care system still has a long way to go due to cultural, economic, and social strains. Disasters are prone to occur, especially with Japan being located on three plate tectonics, Japan needs to prepare for future disasters.

Key words: Mental Health, human-environment, Japan, Crisis

Conner P. Harrington, Environmental Studies Dept., Western Washington University, Bellingham, WA 98225. E-mail: harrinc6@wwu.edu

GIS Analysis Focusing on The Real Estate Market

This last January I had the opportunity to be an intern for Windermere Real Estate. I learned a whole new program being QGIS, this translated to processing maps within a difference aspect, being business minded and environmental. The maps created were used to illustrate to the agents of Windermere and community; safe areas to live, public interest and investment. This overall experience taught me how to work under pressure and with a different set of individuals. I am very thankful for this opportunity and expect to use these skills in the future.

Keywords: GIS, QGIS, Investment, Zoning, Planning

Mary Hemminger, Dennis Weibe, and Aaron Zilz with Rebekah Paci-Green's as Professor. The students were in the Natural Hazards Planning class in Fall 2017 at Western Washington University.

Hazard Mitigation for Hurricane Winds

In this poster we discuss the possible mitigation strategies for high wind events with consideration that heavy rains and flooding may occur with high wind events. We chose six main approaches to planning for high wind events that include many mitigation techniques and strategies, the approaches include: prevention, structural engineering projects, property protection, public information, natural resource protection and evacuation knowledge. We briefly summarize and critique six mitigation strategies including: planning, dams and levees, implementing building codes, hazard maps and education, natural barriers and evacuation. To provide examples of these successful uses of these mitigation strategies we discuss three case studies: Hurricane Andrew in Florida, Hurricane Floyd in North Carolina and Hurricane Charley in Florida.

Key Words: Natural Hazards, Risk Management, Planning.

Matt Lubar (and Aquila Flower as faculty mentor!)

Examining the Effects of Pacific Ocean Climatic Oscillations on Snow Water Equivalent in the Washington Cascade Range

The El Nino Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO) play significant roles in dictating weather patterns on a seasonal, annual, and decadal scale in the Pacific Northwest. As such, ENSO and PDO have significant influence on snowpack development in the Cascade Range of Washington. While the standalone effects of ENSO and PDO on Pacific Northwest weather patterns are relatively well established, the combined effects and interplay of the two are less well understood. To better understand the effects of ENSO and PDO on snowpack development in the Washington Cascades, analysis of variance testing and regression analysis were used to analyze the significance and spatial variation of SWE across multiple stations in the Washington Cascades over multiple decades. The analysis reveals interesting spatial and temporal patterns in SWE values in response to ENSO and PDO phases over the past six decades. Statistically significant differences between SWE values for multiple phase combinations were discovered upon completion of analysis. Results also indicated that while snowpack development is strongly influenced by ENSO and PDO phase, there are more variables at play in determining spatiotemporal variations in snowpack development and SWE. As winter snowpack development is crucial for drought mitigation and water resource management practices, a better understanding of snowpack development dynamics in response to large scale climatic oscillations and local climatic conditions may provide for more accurate predictions of snowpack size and extent in the future.

Key Words: Snowpack, Climate, Water Resources

Robert Miller, Johnathon Yu, Isabella Neumann, Environmental Studies Department, Western Washington University, Bellingham, WA 98225 Mille528@wwu.edu yuj6@wwu.edu neumani@wwu.edu

Waiting until Marriage: Decline in Japanese Population

The country of Japan has been in recent years experiencing a demographic crisis that no other industrialized nation has seen. The demographics of Japan has seen a significant drop in population density with a shrinking of younger Japanese people. Certain influences of the 21st century have been affecting the male and female population in a negative way for the future of the country. With a

population that has a bigger demographic towards the older generations, the country of Japan will be facing an exponential decline in population. With the change in economics, gender roles, and cultural norms; the dating culture in Japan is shrinking along with its birth rates.

Keywords: Otaku, Demographics, Japan, Population, Culture

Noah Peever and Alexis Bryson Western Washington University, peevern@wwu.edu
brysona3@wwu.edu

Environmental Effects of Ocean Plastic in East Asia

Plastic marine debris, or ocean plastic, is an environmental issue which the scientific community has been aware of for years, but is only recently arriving in the consciousness of the lay community. Most ocean plastic comes from sloppy or incorrect waste management. East Asian waters especially have a high concentration of plastic debris. This causes all kinds of health and environmental issues, which remain largely unaddressed. As ocean plastics become more and more prevalent, these problems will only continue to worsen as well. With the expanding volume of research being done, more and more information is becoming available. Whether it becomes available fast enough to avert disaster is more uncertain. A major battle to fight is the lack of education on these topics. Most people don't even know what microplastic is, or why it's a problem. But it continues to affect the health of the people and planet every day.

Keywords: Ocean Plastic, Marine Debris, Environmental, Ocean, Biomagnification, BPAs, PBDEs

Bellevue Community College Posters

Adam Armijo

Title: “Gentrification in Seattle’s Central District Neighborhood”

This poster presentation will examine the extent that gentrification has occurred in Seattle’s Central District, from a geographical perspective.

Elisabet Gordon:

Title: “The Hanford Superfund site”.

Wes Kapioski:

Title: “Voting Patterns of Hispanics in Texas vs Voting Patterns of Hispanics in Florida.”

Description: Is there a difference in the voting patterns of Hispanics in Texas (primarily Mexican Americans) and the Voting patterns of Hispanics in Florida (mostly Cuban Americans)? I used the most recent US election for my maps.

Hafsa Khan:

Title: “Travel Speed of the Crest of Floods in Snoqualmie Valley”.

Basically, my map depicts the time it takes to reach the crest of the flood starting in North Bend and ending in Duvall, and shows the difference in crest times in relation to one another.

Anthony Peterson:

Title: “Opioids: What are our doctors doing to us!”

A close examination of the geography of the ‘opioid epidemic’ from 2006-2016.