Online Proceedings

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Novel Approaches to Conservation

Session Moderator: Bonnie Becker, Academic Affairs (Tacoma)

026 JHN

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Bushmeat Poaching and Consumption in Northern Tanzania

Ahren Stroming, Senior, Politics and Environmental Studies, Whitman College
Mentor: Philip Brick, Whitman College

Bushmeat poaching – and subsequent consumption – presents the foremost threat to wildlife conservation in East Africa. To assess its social, ecological and economic magnitude, I interviewed a representative sample of the local population in the Lake Manyara area of northern Tanzania. Illegal poaching was evaluated based on 16 structured interviews of poachers from distinct hunting groups. Both availability and consumption of bushmeat were evaluated based on 185 structured interviews of ethnically diverse local households. Some 38 percent of households admitted to consuming bushmeat on a semi-regular basis. Conservative interpretations of numbers of wildlife species poached show rapid depletion due to illegal hunting. Swift implementation of capacity-building programs must occur to provide poachers with alternative income sources and ensure more caution in factors influencing consumption, education programs emphasizing the importance of conservation for groups with high consumption levels, and strategic enforcement patrols in Community Areas frequented by poachers.

Using a SUNA Device to Measure Nitrate in Leachate and Runoff in a Laboratory Environment

William Geir (Will) Jonsson, Senior, Environmental Science - Bothell Campus
Mentor: Rob Turner, Interdisciplinary Arts and Sciences

Measuring the nutrient concentrations of water that drains through soil via buried piezometers tends to be a field intensive, time consuming, and relatively expensive process. This project explored the efficacy of an alternative method which could give more rapid results and enable researchers to track the change in nitrate concentrations as water leached through a soil. 4 inch long soil cores were collected in butyrate plastic liners and brought back to the lab. The cores were mounted and deionized water was poured onto them at a rate just exceeding the infiltration capacity of the soil. Surface runoff samples and leachate from the bottom of the core were filtered through 11 μm pore size filter paper and immediately analyzed for nitrate concentrations using a Satlantic®SUNA ultraviolet nitrate sensor. Leachate and runoff samples were then frozen, and subsequently filtered with a vacuum pump through 1.2 μm retention glass-fiber filters prior to measurement with a Lachat autoanalyzer. Using the SUNA in this way nicely demonstrates, at no cost, how nitrate concentrations decrease over time as water flushes through a soil core in an experiment that is analogous to what happens in a soil profile during an extended rain event. These experiments also indicated strong variability in the nutrients that can be leached from soils depending on the location of collection. However, nitrate concentrations derived from the SUNA tended to be approximately 2x higher than those given by the Lachat autoanalyzer. We suspect this may be due to interference by fine particles with a similar ultraviolet refraction index to nitrate contained in the samples that had only run through the qualitative filter paper.

Characterizing Microplastics of Surface Waters from the Puget Sound, Washington

Lauren Rochelle (Lauren) Johnson, Senior, Environmental Science, UW Tacoma
Mentor: Julie Masura, Environmental Science, Interdisciplinary Arts & Sciences, University of Washington Tacoma

Plastic marine debris is found in coastal and marine waters worldwide. There has been an increase in the study of microplastics, synthetic polymers < 5 mm, throughout the world. Researchers at the Center for Urban Waters, University of Washington Tacoma have collaborated with Sound Experience, a local boat-based environmental education group, trained by our research group on sample collection. This presentation describes the 2012 and 2013 surveys of waters

from Puget Sound, Washington. Undergraduate student researchers from the Center for Urban Waters analyzed the environmental samples using a wet-peroxide oxidation method. This survey measured variable concentrations of microplastics in this region's surface water ranging from 0.05 to 31% microplastics of the dry mass with an average concentration of 7% microplastics of the dry mass. These results and their analysis in relation to environmental factors in the area lead to a greater understanding of the plastic contamination within the Puget Sound region.

A Study of the Impact of Current Speed on Micro-plastic Concentrations

Katherine Ball, Sophomore, Associates in Arts and Sciences, Everett Community College
Mentor: Robin Araniva, Life Sciences, Everett Community College
Mentor: Ardi Kveven, Ocean Research College Academy, Everett Community College

The location of anthropogenic plastics in the marine environment is influenced by current speeds generated by wind and estuarine influences. Local, estuary-based studies by undergraduates at the Ocean Research College Academy (ORCA), an early college program through Everett Community College, conducted surface sampling of the Possession Sound water column for microplastics in the spring and fall of 2013 and winter of 2014. These investigations examine the influence of current speed on the distribution of microplastics in Possession Sound. Two public access docks on opposite sides of Possession Sound (Everett, WA and Langley, WA) were compared to examine spatial trends in current speed as well as proximity to potential land-based sources of pollutants. Samples were collected using a 20 μm plankton and current speed was recorded by flow meter. Water samples were analyzed for plastics using a Wet Peroxide Oxidation to remove organic compounds. It is hypothesized that higher plastic levels will correlate with lower current speeds and increased proximity to urban sources near Everett.

Shifts in Energy Allocation in Response to Changes in the Environment in *Mytilus trossulus*

Michelle M. (Michelle) Mc Cartha, Senior, Environmental Science, UW Tacoma
Mary Gates Scholar
Mentor: Kenneth Sebens, Biology, SAFS
Mentor: Emily Carrington, Biology
Mentor: Bonnie Becker, Academic Affairs (Tacoma), UW Tacoma
Mentor: Laura Newcomb, Biology

As intertidal communities face predicted increases in temperature and hydrodynamic disturbances due to climate change, organisms may find it necessary to reallocate energy among normal physiological processes for survival. Specifically, mussels must distribute energy among processes such as attachment, shell growth, metabolism, and reproduction, all of which may be influenced by seasonality and other natural environmental fluctuations (temperature, pCO2, etc.). Examining energy distributions is the first step in predicting responses to environmental change. In the present study, we investigated the energetic cost of byssus production for the intertidal mussel *Mytilus trossulus*. After performing an initial pilot study to establish methods for manipulating byssus production by controlling how often the mussels had to replenish byssal threads (ie. daily, weekly, never), we exposed collected mussels to each treatment in triplicate for a four-week period. We then assessed the energetic cost associated with byssus production in relation to energy allocated to other processes such as growth and development. For all measures (length, width, height, shell mass, etc.), forcing the mussel to produce more byssus resulted in a decrease in growth rate; this was significant for length and shell mass. For this study, activities for making longer shells were first to be forfeited as mussels were manipulated into manufacturing greater amounts of byssus during a season where developing reproductive structures were of highest priority. This research identifies byssus production as a major energetic constraint in mussels, which play an important role both economically through aquaculture as well as in intertidal marine ecosystems. As these globally marketed shellfish are placing more amounts of energy towards byssus production, less energy is available for growth. Coupled with modeling predictions, this information could be useful for aquaculture practices as well as understanding physical changes mussels undergo in response predicted climate change.

Historic Pollen Distribution in Quartermaster Harbor, Washington

Robert Ian Jr (Robert) Taylor, Senior, Environmental Science, UW Tacoma
Mentor: Julie Masura, Environmental Science, Interdisciplinary Arts & Sciences, University of Washington Tacoma
Mentor: Cheryl Greengrove, Interdisciplinary Arts & Sciences

Flora and fauna in the Puget Sound region have changed dramatically over the last hundred years due to logging, industrialization, and development. Pollen analysis is a valuable tool to learn about the historic landscape and can provide insight into historical climates of the region. This study looks at the pollen distribution in the sediments of Quartermaster Harbor, located between Vashon and Muray Islands, Puget Sound, Washington. Variation of historic pollen diversity was compared with documented anthropogenic changes over time. In the summer of 2010, a two-meter core was obtained using an open barrel Kasten gravity corer. Core samples taken every 2 to 4 centimeters were processed to concentrate the pollen. One hundred individual pollen grains were identified

in each sample to determine the concentration and variability of pollen in the harbor over time. Pb210 analysis was used to date the core. Findings from this study will illustrate present and historic land-use changes in the basin.

Legacy Lead Isotopic Signature in Riverine Sediments in Everett, Washington

Christine Heisen, Sophomore, Undecided, Everett Community College
Mentor: Bruce Nelson, Earth And Space Sciences
Mentor: Ardi Kveven, Ocean Research College Academy, Everett Community College
Mentor: Robin Araniva, Life Sciences, Everett Community College

The source and fate of hazardous material released into rivers and estuaries is critically important to protecting environmental health, especially in highly industrialized areas such as the Puget Sound. This study focuses on determining the legacy of heavy metal distribution (Pb-Cu-Zn-As) from a demolished ASARCO smelter site in north Everett, WA near the mouth of the Snohomish River. The Snohomish is a complex riverine system with many potential point and non-point sources of contaminants. This site is the target of remedial actions under the Model Toxics Control Act cleanup regulation developed by the Washington Department of Ecology due to widespread As and Pb contamination in the early 1900's. Previous studies showed a correlation between heavy metal concentrations in benthic sediment of Possession Sound and proximity to industrial sites near the mouth of the Snohomish River. If the source is the ASARCO smelter, we should be able to trace Pb contamination downstream from the site. No data are available from within the river to constrain the specific sources of anthropogenic metals. In our study, we use Pb isotope variability between natural and anthropogenic Pb to establish the extent of dispersion of contaminants derived from ASARCO. The sample suite we collected consists of: three one-meter-long river-bottom sediment cores collected 1) near the mouth of the Snohomish River, 2) near the ASARCO site, and 3) up river to compare natural baseline values with near site and downriver sites; and 4) slag samples to serve as reference isotopic signature of ASARCO Pb. Purification of Pb from the samples is complete, and the isotopic analyses of the Pb are in progress utilizing an inductively coupled plasma mass spectrometer under the advisory of Dr. Bruce Nelson at the University of Washington. This research will identify spatial and temporal relationships among fluvial processes and Pb deposition.