

Undergraduate Research Symposium May 17, 2013 Mary Gates Hall

Online Proceedings

SESSION 1B

NUTRIENT CYCLES: CHANGING PERCEPTIONS OF WATER, AGRICULTURE, AND WASTE

Session Moderator: Michael Kucher, School of Interdisciplinary Arts and Sciences

171 MGH

1:15 PM to 2:45 PM

* Note: Titles in order of presentation.

Why do We Trash It? Identifying the Behavioral Challenges behind Improper Disposal of Recyclable and Compostable Waste

*Joel Nicolai (Joel) Kohlstedt, Senior, Environmental Studies
Mentor: Frederica Helmiere, Program on the Environment*

In conjunction with Sustainable Seattle, my project seeks to identify barriers to recycling and composting in Seattle in order to ultimately increase the amount of recycling and composting that takes place. My research questions attempt to address this in two parts. First, if Seattle residents participate in recycling and composting, what is preventing them from recycling and composting more? Second, what changes can be made by the government or policy makers in order to encourage more recycling and composting? To identify barriers, I have read past reports studying difficulties in implementing recycling, and also behavioral studies identifying which methods can lead to behavioral change. From this, I discerned that the ideal methodology would consist of conducting interviews of consumers and testing multiple waste infrastructure systems at Seattle Tower using different plans on each floor to determine obstructions to commercial recycling in Seattle. Next, to identify possible behavioral modifications for more renewable action, I will conduct consumer interviews as well as the Seattle Tower project, both of which are still in progress. Initial research suggests that common recycling problems for consumers are a lack of standardized labeling on packaging and products. The results of this study and recommendations about labeling will be posted on the Sustainable Seattle website, and the Seattle Tower will be given infrastructure recommendations for improved efficiency based on the results of what was most effective. Ideally the implications of this project will lead to increased recycling and com-

posting rates in Seattle. This can lower the costs of waste disposal for the public, businesses, as well as the city. Recycling and composting is much more cost effective and environmentally responsible than hauling trash each day to a landfill, and therefore should be utilized as much as possible.

POSTER SESSION 2

Commons West, Easel 37

12:45 PM to 2:15 PM

Ecosystem Protection, Outdoor Recreation, and the Trade-offs Associated with Public Park Management: A Case Study

Mariah Eryn Vane, Senior, Environmental Studies

Mentor: P. Sean McDonald, Program on the Environment

Public parklands provide a space for recreation and ecosystem protection. However, managing parks for these traits can be a challenge as the two activities are often in conflict. The aim of this study is to explore the trade-offs between ecosystem protection and recreation in public parks through a case study of Fay Bainbridge Park (FBP) on Bainbridge Island, Washington. Bainbridge Island Metro Park & Recreation District (BIMPRD) with guidance from Washington Sea Grant (WSG) proposed the addition of three boardwalks at FBP with the intention of providing beach access and reducing trampling. For this study, I worked with WSG and BIMPRD to survey park visitors. The survey focused on participants' use of FBP, their current understanding of the local ecosystem, and their feelings toward the addition of beach boardwalks, specifically impacts of boardwalks on beach ecology, aesthetics, and accessibility. In order to place this study in the context of public park management, I conducted a literature review of related case studies. The survey results revealed patterns concerning park use, prior ecological knowledge, and feelings toward the addition of boardwalks at FBP. This study will help inform BIMPRD and WSG on infrastructure decisions and the development of educational signage. More broadly, this work contributes to the larger body of information concerning appropriate public parkland management that maximizes value to visitors without compromising the health of park ecosystems.

POSTER SESSION 4

Balcony, Easel 122

4:15 PM to 5:45 PM

Is Climate Change a Big Risk for Businesses? A Look into What Business Managers Think

Soshi Kumamoto, Senior, Environmental Studies

Mentor: David Tetta, PoE

Do you worry more about getting cancer or having heat stroke? If you chose cancer, you are among the majority because cancer has a relatively higher risk perception. Risk perception describes how people emotionally and psychologically perceive hazards. It is different from risk assessment, which often analyzes risks quantitatively. Therefore, some risks may have minimal hazards but elevated risk perceptions, and vice versa. Understanding how businesses perceive climate risks is crucial to effectively approach climate change. My research aimed to determine whether businesses perceive climate change as a substantial risk to alter business behaviors. As such, I first interned at the U.S. Environmental Protection Agency to evaluate the risk perception associated with polychlorinated biphenyls (PCBs) and whether higher risk perception encourages action. I discovered that PCB contaminations in NY schools were associated with a high risk perception, which consequently pressured authorities to take proactive and remediation measures. Alongside my internship, I conducted a literature review and verified that higher risk perception triggers higher chances of action. However, there are limited evidences that willingness to act may plunge when people find benefits associated with risks, entrust others to manage risks, or lack resources. In applying these findings, I conducted additional literature review to evaluate the willingness to invest by businesses for climate change, through looking at their risk perceptions. My results indicate that businesses have moderate risk perception of climate change, but low willingness to act. Most managers believe that regulators will tell them what to do, implying that they entrust the government to manage climate change. I conclude that businesses will not pay to prepare for climate change at this point in time. This implies that government must mandate businesses to change. Future studies must assess willingness of businesses to take actions as climate risks become greater.

POSTER SESSION 4

Balcony, Easel 103

4:15 PM to 5:45 PM

The Carpenter Creek Estuary Restoration Project: Subsequent Sedimentation and Potential for Salmonid Resurgence

Samuel Michael (Sam) Deliso, Senior, Environmental Studies

Mentor: Kristi Straus, Program on the Environment

We assessed the impacts of the Carpenter Creek Estuary Restoration Project, headed by Stillwaters Environmental Center of Kingston, WA, in regard to the goals of habitat restoration and preservation. Due to diversions and development, the altered hydrology and sedimentation regime of the stream and intertidal estuarine habitats led to unfavorable conditions for local wildlife, in particular, native salmonids such as Cutthroat trout (*Oncorhynchus clarkii*), Coho (*kisutch*), Chum (*keta*), and endangered Chinook salmon (*tshawytscha*). With the completion of the first phase of the restoration in 2011, the replacement of a ten foot culvert under S. Kingston Road with a ninety foot bridge, we began gauging the efficacy of the restoration by analyzing water quality, sediment samples, rates of sedimentation, and the extent and composition of intertidal vegetation islands in relation to the presence and abundance of salmonids using diachronous data from pre- and post-bridge construction. We collected and analyzed sediment samples taken in 2011 and 2012 from thirty three transects/quadrats along the estuary banks using Wentworth's Classification of Coarser Sediments Based on Size of Particles and a gravelometer. These data reveal a decrease in total fine sediment volumes and an increase in larger grain sized pebbles and sand more conducive to salmonid spawning. We evaluated shifts in sedimentation rates and the size and species composition of vegetation islands in the estuary using vegetation surveys and geographic information systems (GIS). We gauged fish presence and abundance utilizing on-site observation, the online Habitat Work Schedule, and reports by local individuals and organizations, with indications of increased habitat health and availability based on geospatial analyses and fish presence. The results of this study are not yet conclusive, but implicate significant progress in the creation of habitat more suitable for returning salmonids, warranting additional research and funding for the completion of the restoration project.