



SPRING 2024

Program on the Environment CAPSTONE SYMPOSIUM

All Abstracts

Compiled Alphabetical Order

Wednesday, May 22nd, Online, 4:30 – 7:30 pm

Tuesday, May 28th, In-Person, 4:30 – 7:30 pm

([UW School of Aquatic Fisheries & Science FSH 102 & Lobby](https://www.washington.edu/maps/#!/fsh))

The Capstone experience is a three-course series (ENVIR 490, 491, 492) centered on a quarter- long project-based internship with a community site partner. Capstone sites range from community-based nonprofits and government agencies to faculty research projects and private sector initiatives. With the mentorship of a faculty advisor and the support of the site supervisor, students gain valuable hands-on experience, explore career possibilities, and build a wide spectrum of professional communication skills.

**STUDENT ABSTRACTS**

**May 22nd (Day One: Online) &**

**May 28th (Day Two: In-Person)**

**in Alphabetical Order**

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| **Go RainWise: Outreach and its Impacts on Community Perception of Green Stormwater Infrastructure.** Session B, Room #1  **Hibo Abdi,** Program on the Environment, University of Washington  **Site Supervisor:** Jenny Heins, Sustainable Ballard  **Faculty Advisor:** Lubna Alzaroo, Program on the Environment, University of Washington  The hydrological cycle has been disastrously altered by urbanization, inducing detrimental environmental, ecological, and social repercussions. This issue is worsened infinitely by climate change, wherein precipitation has and is projected to increase in intensity and quantity. Reliance on traditional gray stormwater infrastructure within urban cities like Seattle renders most of these areas unable to handle changes in precipitation. All while an effective stormwater management system, or green stormwater infrastructure (GSI), is lagging in application. The purpose of this study is to determine how people’s perceptions of green stormwater infrastructure are impacted by interactions with GSI outreach methods. To do so, I sent out a survey tailored to prospective and current customers of the RainWise rebate program, a program that financially incentivizes homeowner's GSI use. The online survey was designed to examine outreach methods used by an environmental nonprofit called Sustainable Ballard to promote the program. Through this survey, I discovered that the outreach methods that increased positive perceptions of GSI most were webinars and mail. Word of mouth also played a significant role in how people decided to share information about both GSI and the program. These conclusions are useful for GSI implementation efforts lead by environmental nonprofits as they can lead to improved outreach and thus improved implementation. As a whole, this research exposes a knowledge gap, one where an increase in GSI outreach research could squash the looming threat improper stormwater management invites. |
| **Why Should We Consider Them a Stakeholder Group? Increasing Youth Engagement with Complex Waste Management Policies.** Session B, Room #2  **Gracia Anderson,** Program on the Environment, University of Washington  **Site Supervisor:** Pam Clough, Environment Washington  **Faculty Advisor:** John Meyer, College of the Environment, University of Washington  Our society encourages us to constantly consume and throw away single-use paper and plastic packaging. This waste has a significant impact on the environment and drives climate change. Washington state loses an estimated $104 million a year to recyclables being landfilled or incinerated, as current recycling systems cannot manage the sheer amount of waste produced. Extended producer responsibility (EPR) recycling programs offer a solution to increase recycling rates and incentivize sustainable packaging. My study aimed to analyze grassroots organizations' unique opportunity to engage youth in complex waste management policies and understand how their engagement can drive stronger waste management programs. During my time working on Environment Washington’s campaign to implement EPR, I evaluated factors that enabled youth to take action. To accomplish this, I attended weekly meetings and events to observe how youth responded to different events and their perceptions of the campaign. I also administered an online assessment to youth involved in the campaign to understand what initially motivated them to get involved. I implemented a social media plan to engage a new demographic and understand what content reached the most viewers. Finally, through meetings and hearings, I observed how other stakeholder groups perceived youth when advocating for EPR. With this information, I determined that hopeful solution-oriented messaging partnered with consistent in-person campaign events is necessary to increase continual engagement in youth. By increasing engagement, grassroots organizations can benefit from the unique communication tactics developed by youth and likely increase support from other stakeholder groups. |
| **Listen Up! Remote Acoustic Bird Monitoring for Assessing Forest Management Actions.** Session A, Room #1  **Jeron Atlas,** Program on the Environment, University of Washington  **Site Supervisor:** Adrian Wolf, The Great Peninsula Conservancy  **Faculty Advisor:** Timothy Billo, Program on the Environment, University of Washington  This project explores the presence of seven owl species across four conservation lands in the Kitsap Peninsula with Cowling Creek Preserve and Grovers Creek Preserve being the predominant focus of the review. This project utilized external audio recording devices (AudioMoths) as the focal data collecting method though additional data processing methods were also exercised through Arbimon to analyze and synthesize findings. Despite the sophisticated attempts to identify these seven species, results were not as abundant as originally anticipated. Through this ten-week process that included over 150 hours of committed work, Barred owl presence was detected at both Cowling Creek Preserve and Grovers Creek Preserve with 79 total “hits”. This study detected a total of 71 hits at Cowling Creek Preserve which was mostly detected between the hours of 18:00-24:00 while Grovers Creek Preserve totaled 8 hits also mostly occurring between the hours of 18:00-24:00. No other target species were detected in any of the 16 study plots across the four conservation properties which suggests possible explanations for their apparent absence might include 1) The lands may not include suitable habitats; 2) the acoustic analysis may have not detected their vocalization; or 3) the recording periods did not capture the appropriate seasons when the animals would be vocalizing (e.g., seasonality). The purpose of this study was to explore the efficiency of remote acoustic monitoring for these nocturnal bird species, discuss possible explanations for their apparent absence, and address habitat requirements and appropriate restoration measures that may be necessary. |
| **Snowpack and Snow Water Equivalent: Monitoring in a Washington Forest Treated By Thinning.** Session A, Room #2  **Dray Banfield,** Program on the Environment, University of Washington  **Site Supervisor:** Rowan Braybrook, Northwest Natural Resource Group  **Faculty Advisor:** Laura Prugh, School of Environmental and Forest Sciences, University of Washington  Forests play a significant role in the water system, storing and distributing water through snowpack accumulation. Changing climate conditions are shifting temperature and precipitation levels, effectively reducing precipitation by snowfall in recent years, resulting in an increased need to find strategies to support adequate snowpack accumulation in forest ecosystems. The aim of this study was to assess the effectiveness of forest thinning in increasing snowpack accumulation and snow water equivalent. To conduct this research, I completed onsite data collection, including snow depth measurements, temperature monitoring, and snow coring, at the Nisqually Community Forest in Ashford, Washington. The resulting data was synthesized to assess trends regarding temperature and thinning treatments’ effects on snowpack and snow water equivalent. Findings show transects with gap cuts or high percentages of thinning allowed for higher levels of snowpack accumulation and snow water equivalent. This suggests that forest thinning can increase snowpack accumulation and snow water equivalent and could be a viable strategy to improve the resilience of the Nisqually Community Forest and other similar Northwestern forests.  **To Seed or Not To Seed: How A Community Garden Can Combat Food Deserts.** Session B, Room #3  **Bella Bartlett,** Program on the Environment, University of Washington  **Site Supervisor:** Levi Casto, Cactus Park Elementary School  **Faculty Advisor:** Eli Wheat, Program on the Environment, University of Washington  Food deserts are a rising epidemic affecting the United States. Due to the reality of living in a food desert, consequences such as food insecurity and increased health problems are experienced by already vulnerable groups, as food deserts disproportionality affect low-income and minority households. One approach to combating food deserts includes the implementation of community gardens. My project with Cactus Park Elementary School, seeks to establish a school garden. I analyzed what the community stands to gain from the school garden, and how the garden can expand on a student’s comprehension of food deserts and the environment. My methodology for this project involved hosting focus groups at two schools located in food deserts. My analysis of participants answers and consideration of the stage each garden is in, revealed a positive response to using the garden as an academic tool both to educate about food deserts and general environmental knowledge. Additionally, there is increased engagement from students in activities involving the school garden promoting learning while providing a connection to green space in an increasingly urbanized area. Lastly, gardens produce food on a small yet accessible scale. Introducing fresh produce into a community that has historically been deprived of it. My findings show that community gardens are an engaging tool to help a community mitigate the effects of a food desert and corroborates outside researchers’ conclusions that school gardens should be utilized in an academic setting. |
| **Using Data To Bring UW Air Travel Emissions Down To Earth.** Session A, Room #3  **Forrest Baum,** Program on the Environment, University of Washington  **Site Supervisor:** Rebecca Neumann, Hydro-Biogeochemistry Research Group, University of Washington  **Faculty Advisor:** Kristi Straus, Program on the Environment, University of Washington  Emissions from air travel are expected to keep rising – making them an important problem to tackle. Universities must find a way to lower their air travel emissions, while still finding a way to perform necessary work that has depended upon air travel. The aim of this work was to understand how UW gathers data to calculate emissions from air travel and use that data to lower emissions. I was connected to UW Sustainability, and with their backing and suggestions, I contacted UW groups to collect flight and emissions data. I also conducted a literature review to research what methods other universities had found effective. A more detailed understanding of our air travel can help lead to both better efficiency in the short term, and knowledge of which big choices may need to be made. Improved data can help understand which next steps will be both most consequential and most effective. A breakdown of which departments are responsible for what number of emissions allows us to make goals and track progress over those smaller groups. This lets us see which groups are leading the way, and we can share which methods are most effective. Better data and understanding can both help UW leadership and other departmental groups make decisions. The success stories can also be published to share proven emission reduction methods with other universities eager to put them to use. |
| **Transportation Transformation: How Seattle Wants the Link Light Rail to be Fixed and Why.** Day 2  **Sydney Belden,** Program on the Environment and School of Music, University of Washington  **Site Supervisor:** Karl Alex Pauls, Seattle Subway Foundation 501 (c)(3)  **Faculty Advisor:** Lubna Alzaroo, Program on the Environment, University of Washington  Seattleites can agree that the Link light rail is a great and useful public asset. However, there is also consensus that it faces numerous glaring issues, to the point where not enough people are riding it for it to be the most sustainable and convenient method of transportation it could be. This study is meant to explore the feelings and opinions of individuals all over the Puget Sound regarding Sound Transit’s Link light rail system. Their responses allowed me to answer the question of what the public’s perceptions and key needs are towards the Link that affect ridership and therefore Seattle’s sustainability goals. To complete this study, I worked with Seattle Subway Foundation, a non-profit organization that acts as an advocate for a better and more expansive light rail system. I was given the opportunity to run their social media accounts and do online outreach which resulted in 434 survey respondents and 20 interviewees to help me discover what the core demands Seattle citizens express for transit. After much analysis, the most common desires were higher coverage of lines and stations, better safety, more reliability, extended hours, and higher train frequency. To fix this, it is a matter of Sound Transit truly listening to what the people need and using that as a basis of future steps to take and goals to make. The improvement of the light rail in these ways would hypothetically increase ridership, thus lowering Seattle’s carbon emissions, lowering transportation costs, and increasing accessibility for all. |
| **Act Now? Evaluating Local Perception and Implementation Limitations of Assisted Plant Migration.** Session A, Room #4  **Chelsea Bressler,** Program on the Environment, University of Washington  **Site Supervisor:** Lisa McGinty, Friends of Lincoln Park  **Faculty Advisor:** Eric Higbee, Department of Landscape Architecture, University of Washington  Assisted Migration (AM) is generally defined as the practice of manually moving plant populations to allow for quicker climate change adaptation. In theory, moving plants to more suitable ranges as we continue to experience various climate anomalies may decrease the threat of species extinction while supporting biodiversity and ecological resilience. However, steady implementation is limited by the lack of research and various ecological risks associated with the practice. The aim of this study was to evaluate local perception and awareness of AM tactics, as well as identifying possible ways to safely implement them considering the current boundaries in doing so. I worked with Friends of Lincoln Park to remove invasive blackberry and English Ivy cover and restore native vegetation in West Seattle while collecting survey data pertaining to local perception of AM practices. Additionally, I conducted a literature review to decipher common methodology used for AM policy, as well as what debate surrounds the practice. Based on my literature review and survey data, there is a high urgency for climate change adaptation, yet increasing opposition exists with the lack of research and potential ecological risks associated with more drastic forms of implementation. Thus, it is vital AM research continues to be prioritized as climate change becomes increasingly imminent. Including various types of knowledge and stakeholders in the decision-making process may account for diverse interests and avoid the equally-plausible threat of inaction. |
| **Advancing Healthcare Sustainability: UW Medicine's Energy and Waste Dashboard.** Session A, Room #5  **Mara Bridwell,** Program of the Environment, University of Washington  **Site Supervisor:** Juan Escalante, UW Medicine  **Faculty Advisor:** Lubna Alzaroo, Program of the Environment, University of Washington  In an era where sustainability is imperative, the healthcare sector faces significant challenges due to its extensive environmental footprint. This initiative seeks to address these challenges through the development of a comprehensive "Energy and Waste Dashboard". The dashboard integrates and analyzes environmental data from a major healthcare institution, transforming five years of complex data into actionable insights to enhance decision-making for sustainable practices. By providing a real-time, comprehensive view of energy consumption and waste management, this project positions the institution as a leader in sustainable healthcare operations. The integration of data into a user-friendly interface highlights areas for improvement and guides the institution toward reducing its ecological impact. This project serves as a prime example of how data-driven strategies can promote environmental stewardship within healthcare, demonstrating significant sustainability advancements through targeted data management. Key findings include reductions in waste generation and optimized energy usage patterns, contributing to a more sustainable operational model. Through this project, the potential of data to influence environmental policy is showcased, setting a new standard for sustainability in healthcare facilities. |
| **Surf, Sand, and Sediment: Forage Fish Sediment Surveys as a Case Study for Responding to Insufficient Datum.** Session A, Room #6  **Sierra Briggs,** Program on the Environment, University of Washington  **Site Supervisor:** Terence Lee, Nisqually Reach Nature Center  **Faculty Advisor:** Jason Toft, School of Aquatic and Fishery Sciences, University of Washington  Forage fish are trophically valuable but are under researched in literature surrounding marine ecosystems, thus leading to gaps in knowledge. They serve as prey to many predators, therefore supporting the greater ecosystem of the Pacific Northwest. As mentioned, the lack of literature on forage fish makes it difficult to conserve and manage them. Seeing as they are so important, the management of forage fish should be prioritized in order to protect marine ecosystems. Through collecting and analyzing sediment samples with the Nisqually Reach Nature Center in search of forage fish eggs, I sought to corroborate the claims that forage fish do have habitat preferences by analyzing the sedimentation of Dupont Wharf in Olympia, a historic spawning beach. Thus, I asked the following: How does sediment size influence forage fish spawning behavior? Given that my internship experience was constrained to one site, I sought to answer this question within the geographic limitations of Dupont Wharf. As I conducted my analysis of my results, I found that there was not a clear nor direct correlation between sediment grain size ratio and egg count, therefore re-emphasizing the importance of thorough project planning and data collection. In the absence of observable results, though, existing forage fish literature served to state the results I should have found as well as what the future trajectory of Dupont Wharf might look like in regards to spawning and sedimentation.  **Brilliant Biomethane: Opportunities of Renewable Natural Gas in Propelling a Sustainable Future.** Session A, Room #7  **Joe Bruun-Jensen,** Program on the Environment, University of Washington  **Site Supervisor:** Lars Byberg, AgroFora Bioenergy Systems  **Faculty Advisor:** Aaron Flaster, UW Medicine, University of Washington  Waste generation in the United States has surged in recent years, driven by escalating quantities of food waste, manure, wastewater, and landfill waste. While biogas has emerged as a potential solution to address waste management challenges, the quality of raw biogas often falls short of meeting modern societal needs. My project at AgroFora Bioenergy Systems explored the potential of hydrogen injection technology to upgrade raw biogas into biomethane, presenting opportunities to tackle waste management practices, reduce emissions, and meet the growing demand for clean energy and fuel in the United States. Drawing on insights from industry experts and utilizing data from sources such as the American Biogas Council, my research examined key aspects of the biogas market, including reactor locations, state waste quantities, and market players. The findings suggest that biomethane holds significant promise and value within the current regulatory and economic landscape, with potential for strategies like optimizing the operation of existing biogas plants and leveraging hydrogen injection technology to enhance their performance and impact. My findings underscore the substantial potential for upgrading biogas with hydrogen to create biomethane, offering both financial and environmental benefits. By contributing to environmental conservation, public health, and sustainable energy, the widespread adoption of biomethane could play a crucial role in fostering a greener and more resilient future in the United States. |
| **The Complexity of Inequity: Investigating Accessibility to Environmental Education Resources for Underrepresented Students.** Session B, Room #4  **Abigayle Cariño,** Program on the Environment, University of Washington  **Site Supervisor:** Katie Luxa, Lisa Hiruki-Raring, and Erin Moreland, NOAA Fisheries  **Faculty Advisor:** Lubna Alzaroo, Program on the Environment, University of Washington  Accessibility to environmental education resources for underrepresented students is oftentimes dependent on the location of the school they attend. Outright exposure to outreach, as presented by federal agencies like NOAA, also plays a role in informing the public on environmental science concepts. During my internship at NOAA Fisheries and the Alaska Fisheries Science Center Marine Mammal Laboratory, I inventoried all of the existing marine mammal education materials and content available to the public. Utilizing succinct data collection from an anonymous survey sent to all public school district superintendents in Alaska and Washington, and interviews with education and outreach specialists at NOAA, I aim to identify the limitations of environmental education engagement with the general public. There is a significant variance in the types of environmental education resources available to school districts, and a lack of material available to underserved students in low-income communities. In many cases, regardless of social demographic, little to no curriculum is offered in diverse languages outside of English. To fix the lack of accessibility, environmental agencies and school administrators have the opportunity to prioritize their audiences based on need and socioeconomic status. In our rapidly changing world, accessibility to environmental education for the coming generations is essential. When the public has the resources necessary to become educated on environmental concepts, self-awareness of individual and group impact on the environment increases. In this research study I address the ramifications of inequities in accessibility to environmental education for underrepresented students. |
| **Threatened Green Sturgeon: How Video Analysis Can Be Used To Quantify & Reduce Bycatch.** Session A, Room #8  **Taylor Clementz,** Program on the Environment, School of Public Health, University of Washington  **Site Supervisor:** Susan Wang, NOAA Fisheries, West Coast Region  **Faculty Advisor:** Andre Punt, School of Aquatic and Fishery Sciences, University of Washington  The Southern Distinct Population Segment (DPS) of green sturgeon (Acipenser medirostris) is protected under the Federal Endangered Species Act as a threatened species. This species is being caught as bycatch, however, in the California halibut bottom trawl fishery. Bycatch can be fatal to the green sturgeon and affect this species' ability to recover a stable population size. I interned with NOAA Fisheries, where I conducted an in-depth video analysis of green sturgeon behavior when interacting with bottom trawl nets. The footage was taken from cameras attached to bottom trawl nets off boats, targeting California halibut (Paralichthys californicus) and fishing out of San Francisco and Half Moon Bay, California, USA. I reviewed 18 clips of interactions (ranging from one to ten seconds long) and identified variables, including behavioral descriptions, size estimations, and likely outcome of the interaction. Additionally, I conducted a literature review on potential gear modifications for bycatch reduction. The aim of my research was to identify solutions for reducing green sturgeon bycatch, which included gear modifications. I found that while off-bottom trawl nets and nets with windows allowing green sturgeon to escape may reduce bycatch, there are other important variables to consider. For instance, the depth of the trawl and seasonal variation impacts bycatch, with late spring to early winter accounting for the highest rates. I recommend that future research focuses on determining whether off-bottom gear is an effective way to mitigate green sturgeon bycatch. |
| **Skyrocketing Social Media for Small Businesses: From Ground Zero to Success.** Day 2  **Rexford Curtiss,** Program on the Environment, University of Washington  **Site Supervisor:** Shannon Bly, Whidbey Island Grown Cooperative  **Faculty Advisor:** Theresa Maloney, Global Business Center, University of Washington  Social media is a valuable marketing tool for small businesses that has the potential to amplify their reach, foster community connections, and ultimately drive growth and sales. However, barriers such as limited resources, time constraints, and lack of knowledge often prevent companies from effectively harnessing its power. This study addresses the challenges faced by small businesses in establishing a successful social media presence by identifying key barriers and proposing a practical blueprint for overcoming them. I conducted a literature review to explore the most common barriers to social media integration as well as the strategies used to overcome them. Using this information, I developed and implemented a new social media strategy for Whidbey Island Grown, a local food cooperative. I began by analyzing our follower demographics to create a target audience profile. Backed by data-driven insights, I shifted our content strategy from primarily promotional material to engaging, story-driven content. This included food-related posts like recipe videos, freshly harvested produce, and behind-the-scenes footage from our packing facilities. Finally, to increase our flow of content, I implemented a user-generated content (UGC) schedule. This encourages producers and consumers to contribute content showcasing their stories and products. After the strategy shift, our analytics showed that engagement had increased across all categories including follower growth, likes, comments, shares, and profile clicks. This blueprint serves as a roadmap for other small businesses, especially sustainable ones, that want to encourage people to support and adopt eco-friendly practices. |
| **Tracking the eco-pulse, community environmental awareness and light rail development.** Session B, Room #5  **Kitto Davison-Kunhardt,** Program on the Environment, University of Washington  **Site Supervisor:** Arthur Bachus, Seattle Subway Foundation 501 (c)(3)  **Faculty Advisor:** Yen-Chu Weng, Program on the Environment, University of Washington  Seattle’s South Park neighborhood is the destination for a potential Link Light Rail expansion, but in order to implement this project, there needs to be a basis for community support. This requires an understanding of how residents value their environment and what their awareness of light rail benefits may be. Through my time with Seattle Subway, I conducted a research project centered around this potential light rail expansion; what I wanted to discover was how important the environmental benefits typically associated with light rail are to the residents of South Park and what the overall community awareness level is. Additionally, whether or not these benefits have the potential to be utilized in communication strategies for garnering ballot support for the Link Light Rail expansion. After surveys, interviews, attending community meetings, and engaging in street-level conversations with the diverse residents in the area. I found attention to local environmental issues indicating environmental awareness, that specific local terms on environmental issues connect well with residents when discussing climate change and transit projects, and that South Park has a typical notion of distrusting government agency infrastructure projects. Considering these factors in future communication for ballot initiatives relating to light rail in all Seattle neighborhoods could help enhance community engagement and overall support for a more environmentally friendly means of transportation. |
| **Redefining Impact: Unlocking the Transformative Power of Individual Environmental Action.** Session B, Room #6  **Brandon Espiritu,** Program on the Environment, University of Washington  **Site Supervisor:** Lisa McGinty, Friends of Lincoln Park, Green Seattle Partnership  **Faculty Advisor:** Eli Wheat, Program on the Environment, University of Washington  Environmental crises' demand diverse responses that recognize the inherent importance and impact of individual environmental actions. This study reframes such actions' potential by exploring different perspectives that could shape perceptions and their significance beyond quantitative metrics. It illuminates how grassroots initiatives transcend quantifiable impacts, such as the fostering of ecological literacy, empowering communities, demonstrating positive outcomes, and shaping sustainability mindsets. Through a literature review on individual action methodologies, interviews, and personal experiences in ecological restoration at Lincoln Park, the research elucidates how bottom-up efforts catalyze transformative change. Adopting a systems-based lens which integrates individual, community, political, and ecological viewpoints allows organizations and policymakers to co-create resonant environmental initiatives. This synergistic approach facilitates continuous learning, adaptation, empowerment, and collaborative design of programs addressing multi-dimensional participation barriers, nurturing environmental stewardship and cultivating environmentally-conscious citizens.  **Moving Beyond the Like: Crafting Captions for Meaningful Environmental Engagement.** Day 2  **Jillian Evans,** Program on the Environment, University of Washington  **Site Supervisor:** P. Sean McDonald, Program on the Environment, University of Washington  **Faculty Advisor:** Francesca Valsesia, Michael G. Foster School of Business, University of Washington  The online world has increasingly become a space in which information on any number of topics is shared, argued, and learned about. In the last few years, a term has arisen to describe the inaction of engaging with crucial topics with a simple like or comment: clicktivism. When information is shared online, people engage with the tools they have been given- the ability to like, comment, and reshare. However, many are left wondering what their next steps could be towards making change. I wanted to know what would move people beyond an Instagram post- and onto an article or deeper conversation with their peers. I decided to create an experiment by sending out a randomized survey, in which I tested out four different combinations of caption lengths and tones with the same visual. I wanted to see what impact captions have on a post, and what engagement and further action they might cause. I also worked with the Program on the Environment as their social media intern, where I conducted literature reviews on the value of social media for college advertising and worked towards increasing student engagement with their array of social media accounts. How my findings apply to social media work and digital activism depends on what the desired outcome is. Every part of online posting, including writing effective captions, is an important piece of the puzzle to successful environmental communication online. |
| **Oysters Gone Wild: Exploring Pacific Oyster Naturalization in the Salish Sea.** Day 2  **Kiley Foster,** Program on the Environment, University of Washington  **Site Supervisor:** Jordan Hollarsmith, Rebecca Cates, and Henry Fleener, NOAA Fisheries, Alaska  **Faculty Advisor:** Mark Scheuerell, School of Aquatic and Fishery Sciences, University of Washington  Pacific oysters (Magallana gigas), introduced to Washington state about a century ago, have emerged as one of the most important species in our aquaculture industry. As both a non-native species and an ecosystem engineer, Pacific oysters can significantly influence the dynamics of the Salish Sea ecosystem in a variety of ways. Despite their established presence, the factors leading to their naturalization, self-sustaining wild populations, remain somewhat unknown. Improved comprehension of these factors is essential for refining management policies and maximizing their potential for regenerative aquaculture uses while mitigating drawbacks to marine habitats. This research aims to provide a nuanced understanding of Pacific Oyster naturalization in the Salish sea, from ecological determinants of naturalization to ecosystem impacts. To accomplish this task, I conducted comprehensive interviews of fifteen experts in the oyster industry to create a ranked list of environmental factors influencing naturalization. Alongside a literature review, this list informed the creation of an online map displaying wild Pacific oyster populations overlaid with datalayers of the environmental conditions that contribute to naturalization. Findings show that sea surface temperature, food abundance, and suitable setting substrate were the most important factors for Pacific oyster naturalization. In addition, rising sea temperatures associated with climate change will likely expand the range of the Pacific oyster beyond its current niche. This project aspires to contribute to the broader field of ecological dynamics of non-native species, offering valuable insights for managing Pacific oyster populations while promoting holistic sustainability in the aquaculture industry. |
| **Adaptive Sampling Strategies to Capture Shifting Fishery Stocks in the Eastern Bering Sea.** Session A, Room #9  **Dylan Fournier,** Program on the Environment, University of Washington  **Site Supervisor:** Lewis Barnett, NOAA Fisheries  **Faculty Advisor:** Anna Nisi, University of Washington  Shifting fishery stocks in the Eastern Bering Sea have implications for fisheries management, infrastructure, and native subsistence in Alaska. They also give us the opportunity to rethink historical fishery practices and see if new methods may work better in the future. Sampling is one such practice that will need to adapt to accommodate shifting stocks. Current Eastern Bering Sea sampling involves a fixed grid of points that are sampled during surveys. However, as it becomes more pressing to expand the grid, it may be more efficient to utilize other sampling methods. Stratified random sampling could reduce the number of sample locations needed without affecting statistical products, and using environmental covariables to guide sample allocation could reduce effort in years where fish aren’t found in their new ranges. Knowing how a sampling regime will respond to environmental conditions is an integral part of implementing a new system. Fisheries managers want to be sure that they are mitigating risk when implementing new practices. For my research, I examined stratified random sampling with point allocation guided by sea ice extent using spatial modeling with the sdmtTMB package in R Studio. The adaptive sampling method was tested for its sensitivity to different levels of spatial correlation, strength of the underlying density gradient, and observer bias using simulation testing. I found that the adaptive sampling method was fairly consistent across a number of environmental scenarios which bodes well for its case as a suitable sampling method in the Eastern Bering Sea. |
| **Snow Problem: How Forest Adaptation Strategies Can Mitigate the Effects of Warming Winters.** Session A, Room #10  **Errol Funk,** Program of the Environment, University of Washington  **Site Supervisor:** Rowan Braybrook, Northwest Natural Resource Group  **Faculty Advisor:** Martha Groom, School of Interdisciplinary Arts & Sciences, University of Washington, Bothell  Expanding the utilization of forest thinning and gap cutting techniques in Washington’s woodland ecosystems could offer promising solutions to enhance the snow accumulation process. By limiting snow interception from dense second growth canopies, these methods could bolster forest resiliency, mitigating the effects of climate change. Snow accumulation is a cornerstone resource throughout Washington state, pivotal for ensuring water security, sustaining agricultural production, powering hydroelectric infrastructure, and facilitating recreational activities. This study was part of a collaborative internship with the Northwest Natural Resource Group (NNRG) during winter of 2024. The objective of the research was to assess the efficacy of gap cut and thinned forested areas in promoting snow retention relative to untreated second-growth forests within the Nisqually Community Forest in Ashford, Washington. To understand snow variance among different forestry techniques, data was collected along six separate transects each treated with varying percentages of either thinning or gap cutting as well an untreated control area. A comparative analysis between data collected this season and from prior years revealed positive trends correlating snow accumulation with the implemented forestry adaptation strategies. Notably, gap cutting was the most effective treatment for harboring snow, followed by fifty percent thinning and seventy percent thinning. In contrast, untreated second growth forest exhibited the least amount of snow accumulation and retention throughout the duration of the project. The absence of effective forestry adaptation strategies could leave Washington’s forests and the essential functions that rely on seasonal snowpack vulnerable to the escalating impacts of warming winters in the region. |
| **Living In A City Doesn't Have To Mean Living Disconnected From Nature.** Session B, Room #7  **Graham Gaimari,** Program on the Environment, University of Washington  **Site Supervisor:** Grace Stiller, Weed Warriors Nature Stewards Program  **Faculty Advisor:** Erin Gilbert, Program on the Environment, University of Washington  Interacting with nature is important for the health and well-being of individuals and communities as it promotes physical exercise, facilitates clean and healthy environments, and helps us fulfill basic evolutionary human needs. However, living in an urban environment with development and technology surrounding every aspect of life can make forming deep and intimate personal connections with nature difficult. The purpose of this project was to understand how and why urban residents can and should develop connections with nature by partaking in environmental stewardship activities not only for the health of local ecology but also to promote individual health and well-being. To accomplish this, I extensively reviewed the literature on the various individual benefits to health and well-being that interacting with nature has and the different ways this can be achieved. Additionally, I also conducted an internship with Weed Warriors- Nature Stewards Program; performing environmental restoration work, assisting in carrying out various environmental outreach programs, and developing native plant learning content for the organizations community garden web-page. Using the insight from my research and experiences, I used a critical lens to evaluate the effectiveness of the different environmental stewardship activities that I performed at promoting the individual benefits of interacting with nature. I found that activities which are hands-on, interactive, as well as those that inspire and equip people to become actionable agents in their societies to be the best for effectively engaging people with environmental stewardship while simultaneously maximizing the personal benefits they are able to gleam from the experience. As the population of cities continues to grow, environmental problems perpetuate, and the conveniences of technological innovation and development expand, it is important to understand not only how, but why urban residents in all communities can and should develop bonds with their natural surroundings. |
| **Growing a Better Tomorrow: Exploring the Role of Community Gardens in Promoting Sustainability and Community Well-Being.** Session B, Room #8  **Jayce Gilles,** Program on the Environment, University of Washington  **Site Supervisor:** Grace Stiller, Weed Warriors, Nature Stewards Program  **Faculty Advisor:** Perry Acworth, College of the Environment, University of Washington  Urban Gardening is a promising solution to the current environmental degradation caused by the agricultural industry. As more of our reality must adapt to the threat of climate change, adopting more sustainable ways of life are crucial, which is how urban gardening enters the picture. A very important aspect of urban gardening is the volunteers and community members that engage in their community gardens and adopt this lifestyle. Growing our own food is not an easy task, and in modern day life, it may not always be the most convenient or accessible. Community gardening is not only a means for sustainability, but community interaction and resilience. The main challenge with promoting community gardening is that there is not extensive research or initiatives that push urban gardening to a wider audience than our immediate vicinity. During my time with Weed Warriors, I got to interact with other volunteers as well as gain personal experience working in a community garden. To learn more about what motivates people to volunteer at their community garden at the location I frequented, I sent out a survey with in-depth questions regarding their experiences they’ve had with community gardening. The survey results show that there are hurdles such as time commitment, however the benefits that a participant experienced while participating at their gardens resulted in an overall response of how positive their experience is when being able to community garden. While this was a smaller data sample, it’s one of the reasons why there needs to be more research into this initiative because community gardens allows us to grow our food sustainability and create a stronger relationship with nature and our community.  **Diving into Marine Science: Using Telemetry to Teach Ecological Responsibility.** Session B, Room #9  **Grace Glisson,** Program on the Environment, University of Washington  **Site Supervisor:** Michelle Lander, NOAA National Marine Mammal Laboratory  **Faculty Advisor:** Jennifer Tennessen, Department of Biology, University of Washington  Animal telemetry, the science of gathering information on the movement and behavior of marine organisms using animal-borne sensors or electronic tags, is a powerful tool for studying elusive species such as blue and fin whales. Inspired by the need to utilize animal telemetry in education and deepen understanding of marine conservation, this project aims to integrate real-world scientific data into high school curricula by utilizing animal telemetry, motivated by the need to deepen understanding of marine conservation and inspire environmental stewardship. The U.S. Animal Telemetry Network (ATN) provides unity, stability, and continuity for collecting and managing marine telemetry data, vital for protecting endangered species and informing ecosystem-based management. Telemetry data obtained remotely, in real-time or archival mode from satellites enables researchers to document movements and survival of aquatic animals in relation to environmental variables, aiding in mitigating anthropogenic threats. During my NOAA internship with the ATN, I developed an educational lesson plan using telemetry data to explore the behavior and ecology of blue and fin whales. Despite their protected status under the Endangered Species Act, blue and fin whales face ongoing threats. Understanding their movements and behavior through telemetry data is crucial for effective conservation. This study analyzed telemetry data from 22 blue and fin whales, aiming to equip students with data analysis skills and foster environmental stewardship. By translating complex scientific research into accessible educational content, this approach prepares future generations to address global environmental challenges and nurture a sense of responsibility towards marine ecosystems. |
| **Sustainable Business Communication: Strategies for Effectively Conveying Sustainability Efforts to Consumers.** Session A, Room #11  **Valerie Gwyneth,** Program on the Environment, University of Washington  **Site Supervisor:** Erica Carlson, Perennial Zero Waste  **Faculty Advisor:** Nives Dolsak, School of Marine and Environmental Affairs, University of Washington  In today's global landscape, there is a growing emphasis on sustainable practices, prompting businesses to articulate and measure their environmental and social impact. Effective communication of sustainability efforts is crucial for businesses to bridge the gap between intention and execution, fostering consumer understanding and commitment to sustainable practices. This paper explores the communication strategies employed by sustainable businesses to effectively convey their sustainability initiatives to consumers. I executed a combination of research methods, including surveys, interviews, and market research. This allowed me to gather insights from sustainability professionals and businesses with sustainable business models. The findings highlight the importance of sustainable practices for consumer relationships, the challenges faced in communicating sustainability efforts, common methods of communication, and the impact of sustainability initiatives on cost reduction, brand reputation, and competitiveness. Challenges identified include limitations in formal communication channels, difficulty quantifying sustainability outcomes, and maintaining consistency in messaging. However, various approaches have emerged to overcome these challenges, including the development of easily understandable metrics, the utilization of visual aids and training programs, and leveraging social media platforms. The implications of effective sustainability communication extend beyond enhancing consumer perceptions to fostering sustainability education, increasing opportunities for businesses, and informing messaging strategies. Overall, this paper contributes to the understanding of sustainability communication and provides insights for businesses aiming to navigate the complexities of communicating sustainability efforts in a rapidly evolving consumer landscape. |
| **Who's Been Touching Your Food?: An Analysis of Local Food Systems and their Impact on the Community, Economy, and Environment.** Day 2  **Lizzie Hackett,** Program of the Environment, School of Art, University of Washington  **Site Supervisor:** Sara Hughes and Lindsay Gilliam, Carnation Farmers Market  **Faculty Advisor:** Carly Sheehan, School of Art  In the United States, consumers have separated themselves from the food they eat. Current agricultural systems are now homogenized and food is mass-produced to maximize profit. Large-scale agriculture destroys soil, pollutes the environment, and can harm local communities, so the aim of this paper is to analyze the positive effects of localized food systems and the barriers that are involved in facilitating local food systems. In my internship, I worked with the Carnation Farmers Market to create a cookbook to boost community engagement and funding for the market. Based on a variety of literature and data collection from my internship, I concluded that consuming “local” foods will improve food systems as a whole, which includes the relationship between the consumer and producer, the viability of smaller farms, and the impact on the environment. Through face-to-face interactions with producers, consumers have a deeper knowledge of where their food comes from which improves their relationship and knowledge about their food. Educational programs about food systems also help facilitate a more local network of food consumption, and when local food systems are supported, for example, through farmers markets, local, small-scale farmers can get business directly while interacting with the consumer. |
| **Analyzing Western Hemlock Decline in Seward Park.** Session A, Room #12  **Eric Holmquist,** Program on the Environment, University of Washington  **Site Supervisor:** Paul Shannon, Friends of Seward Park  **Faculty Advisor:** Tim Billo, Program on the Environment, University of Washington  Urban forests offer a multitude of benefits, human-centered and otherwise. Seattle’s largest urban forest, Seward Park, has witnessed a significant decline in Western hemlocks over the past few years. This is part of a sobering, nationwide trend in tree deaths. We analyzed the spatial range of decline and determine whether the cause of the tree mortality was old age or another factor. Over a span of ten weeks, we surveyed over 700 trees in the forest, giving each of them a health rating, along with other descriptive statistics. Two survey sites were established at the beginning of the study, and we surveyed every tree we could find within those sites. Near the end of the survey, we used a density function to redefine the sites. The healthier region was significantly wider than we first predicted. Health ratings were taken, along with other descriptive statistics including DBH, slope, aspect and geographic coordinates. A large difference in health between the two areas was observed. This difference in health was not determined by age, as there was no correlation between diameter and health. This implies that a different factor is at play. Further research, including DNA sequencing, may inform us if there is a pathogen infecting the trees. Other possibilities, such as differing geology or climatic conditions, have been discarded. Western hemlocks are often overlooked in scholarly literature despite their abundance in Washington State, so further research will support management efforts elsewhere. |
| **Exploring Personal Food Sovereignty: The Relationship Between Perception and Action in the Food Justice Movement.** Day 2  **Maddie Keating,** Program on the Environment, University of Washington  **Site Supervisor:** Shannon Bly, Whidbey Island Grown Cooperative  **Faculty Advisor:** Eli Wheat, Program on the Environment, University of Washington  Personal food sovereignty, meaning one’s ability to produce or gather their own food, is an important element of everyday life. Providing cultural resilience, sustainable nourishment, and better connection to oneself, and the planet, the relationship we have with our ability to grow, produce, or gather local food is essential. However, local food is often not accessible due to a variety of barriers including cost, limited space, lack of knowledge, and more. This makes personal food sovereignty hard to achieve, especially for underserved and marginalized communities, or those living in urban areas. The purpose of this research was to explore the relationship between emotional and physical proximity to local food organizations and level of personal food sovereignty, in order to better understand barriers and opportunities. To accomplish this, I interned with Whidbey Island Grown Cooperative, an organization that works to connect local producers with consumers through a website ordering system, to conduct interviews and surveying with local farmers, customers, and residents regarding feelings around local food access. I had personal conversations at individual’s farms and local businesses, and conducted surveying at local farmer’s markets and agriculture workshops. My findings show that individuals have a strong desire to increase their personal food sovereignty, but that many face barriers such as cost, lack of knowledge, limited space, and limited time. Further education and access to local food organizations is vital to alleviate this issue. |
| **Evaluating Social Infrastructure’s Impacts on Community Networks to Build Resilience.** Session A, Room #13  **Jason Kung,** Program on the Environment, University of Washington  **Site Supervisor:** Zackary Thill, Climate Impacts Group  **Faculty Advisor:** Kristi Straus, Program on the Environment, University of Washington  Urban landscapes are constantly changing and, with the pressure of climate change, cities are not able to respond to disasters fast enough. One proposed solution is social infrastructure, which can be defined as a space where people in a community can gather and connect with one another. The purpose of this study was to find out how social infrastructure brings communities closer together, eventually leading to networks of people that are able to rely on one another in various situations. During my time with the Climate Impacts Group, I researched and analyzed articles relating to the benefits and implications of social infrastructure. I created a database in Zotero with over 40 of these articles for future reference and compiled my findings from the articles in a written report. Independent study was also conducted in Seattle to find examples of local social infrastructure in libraries and the conscious efforts by the city to build resilience to the recent heat waves. From these methods, it was clear that social infrastructure is necessary for cities as it supports diversity and inclusion, strengthens community and builds resilient and sustainable cities. Communities that are able to rely on each other more are able to mobilize resources faster, thus building resilience in case of climate-related disasters. Furthermore, in the long term social infrastructure builds civil societies, supports the health and well-being of local residents, and builds climate resilience through community.  **Compostable Products: Breaking down Barriers and Building up Solutions.** Session B, Room #10  **Kayla Lay,** Program on the Environment, Department of Chemistry, University of Washington  **Site Supervisor:** Janet Thoman and Kari Rolnik, Compost Manufacturing Alliance  **Faculty Advisor:** Sally L. Brown, School of Environmental and Forest Sciences, University of Washington  Compostable products are a rapidly growing field with promise to reduce single-use plastic waste and contribute to a sustainable circular economy. Many companies are investing in creating products and packaging to meet this goal. However, while progress has been made towards expanding and implementing compostable products, there is a lack of attention to compostable product infrastructure. The federal guidelines that regulate compostable product degradation do not align with the processes and technology used by industrial composters. Through my research, I aim to examine the results of this mismatch and provide recommendations for how regulations can be amended to best align with industry standards. This was done through a literature review and a quantitative analysis of the feedstock conditions of 116 composter field tests provided by the Compost Manufacturing Alliance, an independent compostable product certifier. Through this, it was possible to identify key areas for policy improvement and intervention and to suggest numerical ranges for those policies to target. This research finds that while compostable products are a promising alternative to single-use plastics, Washington State lacks the infrastructure for proper implementation. Before compostable products are pushed as a sustainable packaging option, there needs to be labeling that ensures products can be clearly identified as compostable for both consumers and composters by color and key descriptors, in addition to recommendations for composters that split composter conditions by residence time, pH, and Moisture content and consider different composter technology. This will ensure that compostable products are properly tested and developed, identified and sorted by consumers, and degraded by industrial composters. |
| **Forage Fish Distribution Across Tidal Elevations: Implications for Habitat Management.** Session A, Room #14  **Tabitha Lederer,** Program on the Environment, University of Washington  **Site Supervisor:** Terence Lee, Nisqually Reach Nature Center  **Faculty Advisor:** Jason Toft, School of Aquatic and Fishery Sciences, University of Washington  Forage fish play an essential role in the trophic flow of marine ecosystems, as a food source for culturally and ecologically important species, such as salmon and marine mammals. Their role makes forage fish species, like surf smelt and Pacific sand lance, indicator species for the ecosystem health of Puget Sound. However, as sea level rise and shoreline development increase, the shoreline habitats that forage fish need for spawning are being reduced. My research aimed to determine how tidal elevation influences forage fish spawning distribution at DuPont Wharf, Washington. I worked with the Nisqually Reach Nature Center to collect sediment samples and analyze them to find forage fish eggs and map their distribution patterns along the shoreline. The findings indicate that surf smelt distribution is concentrated at higher tidal elevations, with a peak at 12 feet above mean lower low water; the results on sand lance distribution were inconclusive. More research is required to support these conclusions and find more influences on spawning distribution. Distribution data can be used to inform habitat management and influence decision-making about shoreline development and conservation in Puget Sound. |
| **Measuring the Sustainable Impact of a Construction Tool Reuse System.** Session A, Room #15  **Lena Lewis,** Program on the Environment, University of Washington  **Site Supervisor:** Anna Wilson, Seattle REconomy  **Faculty Advisor:** Kat Huybers, Atmospheric Sciences, College of the Environment, University of Washington  With the global stress on landfill capacity and atmospheric CO2 emissions caused by human consumption, there is a need to reimagine our habits. Construction materials, specifically household tools and materials are a part of the over-consumption. Many homes purchase a new item, like a power drill, only to use it sparingly. Communities can deter waste from landfill and carbon emissions from production by following the circular economy model and reusing shared items, like by using a tool library. The purpose of this study is to develop a set of methods to measure the sustainable impact of a tool library, and to evaluate the effectiveness of the Shoreline Tool Library through the application of these methods. In order to develop these methods, I worked with Seattle REconomy at the Shoreline Tool Library. I conducted an initial literary search for research concerning embodied carbon on construction materials; primarily steel, plastic, iron, wood, and electronic components. To find the weight deterred from landfill I weighed tools in the library. I then multiplied these weights by the materials’ associated emission factors to find the embodied carbon of each target tool. This project revealed that in Winter 2024 the Shoreline Tool Library prevented 528.62 kgCO2e from production, and 137.86 kg from landfill. These methods of finding weight and embodied carbon can be used to prove the sustainable impact of a re-use system, and encourage support for local tool libraries. |
| **How Invasive Blackberry Affects Soil Conditons and the Implications for Ecological Restoration.** Session A, Room #16  **Colin MacDonald,** Program on the Environment, University of Washington  **Site Supervisor:** Sebastian Ritacco, City of Sammamish  **Faculty Advisor:** Eli Wheat, Program on the Environment, University of Washington  Himalayan blackberry is an invasive species in the Pacific northwest that takes over and outcompetes native plants. It’s very difficult to remove, and has spread all across western Washington. To determine the extent of its impact, I designed a study to see how Himalayan blackberry affects the surrounding soil. To accomplish this, I tested soil from five different plots, each featuring differing amounts of native plants and blackberry. I tested for soil water holding capacity (WHC), which is a measure of how much water the soil can hold and make available for plants. My study found that while Himalayan blackberry on its own didn’t affect soil WHC, a higher WHC was associated with a higher total plant presence, likely caused by a higher levels of organic material. This tells us that when working to restore a site ecologically, care should be taken to ensure that sites are well-populated with native plants, as they can change the soil to encourage more growth. Furthermore, more research is needed on Himalayan blackberry specifically and the dangers it poses to our environment. |
| **Visualizing a Path Towards Sustainability: A Model Of Data Management for the Future.** Session A, Room #17  **James Moy,** Program on the Environment, University of Washington  **Site Supervisor:** Juan Escalante, UW Medicine - Harborview Medical Center  **Faculty Advisor:** Jeremy Jess, Public Health Phd., Sustainability, University of Washington  As modern data management technologies allow for ever-increasing amounts of information collection, a major challenge for organizations is the increasing complexity in striving to implement sustainability goals and initiatives that make effective use of this data. Many organizations become overwhelmed by the sheer amount of data they are collecting and cannot properly synthesize it into usable insights that can be deployed. This research project explores the critical need for modeling and managing vast amounts of sustainability data to effectively meet organizational goals and achieve sustainable outcomes. Through my internship with UW Medicine at Harborview Medical Center, I explored this topic through a study examining the integration of modern data-driven decision-making with sustainability practices to achieve 5- and 10-year sustainability benchmarks. Using a case study approach, the project involved building a sustainability dashboard tool to manage and visualize key metrics. The data environment analysis revealed insights into successful models for optimizing resource utilization, specifically focusing on reducing physical and chemical waste to decrease carbon footprints in healthcare delivery. These findings align with broader state and local sustainability goals while supporting the long term strategic vision for organizational sustainability. By leveraging data analytics and visualization techniques, the research demonstrates how organizations can refine their data management process to deploy strategies that achieve environmental, social, and financial sustainability. This approach empowers businesses and institutions, both within and beyond the healthcare sector, to make informed decisions that drive positive environmental outcomes, contributing to a more sustainable future. |
| **Healing from the INside OUT: a research study on the impacts of outdoor environmental learning on overall student well-being.** Session B, Room #11  **Faith Murray,** Program on the Environment, University of Washington  **Site Supervisor:** Kaelie Spencer and Brittany Ahmann, Sound Salmon Solutions  **Faculty Advisor:** Jodi Newman, College of Education, University of Washington  Humans hold deep connections to outdoor spaces and recall important life skills or memories from those experiences. We are entering a digital age where less and less people are having the opportunity to have outdoor experiences. The aim of this study is to address the benefits that outdoor environmental education has on overall wellbeing, specifically within youth. I interned with a non-profit organization called Sound Salmon Solutions and asked the teachers involved in their ‘salmon in schools’ program to identify any positive or negative difference they have noticed and if they felt their engagement with the program was worthwhile. Also, I visited the school every week and participated in teaching about the salmon life cycle, where I was able to gain first-hand observations/experience with elementary school students. Outdoor environmental education has the potential to give a lot of benefits to youth in many ways, such as their social, emotional, physical, and mental health. By fostering connection through the outdoors, youth have increased chances to experience happiness and explore more passions that can lead them to future careers. Educated and healthy youth lead to a better future and it is up to the leaders of the world to make these opportunities accessible to all children.  **Modernizing Environmental Education: Integrating Telemetry Data into Academic Practices.** Session B, Room #12  **Emily Muterspaugh,** Program on the Environment, University of Washington  **Site Supervisor:** Michelle Lander, NOAA National Marine Mammal Laboratory  **Faculty Advisor:** Erin Gilbert, Program on the Environment, University of Washington  Telemetry data is an increasingly useful resource for analyzing the impacts of climate change on the environment and animal populations. However, in order for telemetry data to become more accessible to both environmental stewards and the general public, it must be properly integrated into environmental education practices. During my time with NOAA’s Animal Telemetry Network (ATN) as an Education & Outreach intern, I seeked to establish: (1) The main benefits of integrating telemetry data into K-12 academia, and (2) How to most effectively incorporate this data into environmental education practices and curricula. I accomplished this during my internship by developing a virtual, independent lesson plan that was designed for 9th-12th grade students. Additionally, I interviewed 7 telemetry data experts employed with my host organization. With this information, combined with scholarly research, I found that the main challenge of integrating telemetry data into academic instruction would be engaging younger audiences with the material. However, the benefits of this implementation far outweigh the drawbacks, as it has the potential to enhance place-based learning methods, which are proven to foster environmental stewardship in students. Furthermore, the visualization capabilities of telemetry can be combined with other forms of data to create a more holistic perspective on climate change and anthropogenic harm. In summary, this is a significant issue to address because telemetry data can only be utilized to its greatest extent if we make an active effort toward teaching the future generations of students about proactively applying this data toward developing climate change mitigation solutions. |
| **Evaluating outreach opportunities within RainWise to increase participation in homeowner green infrastructure and support clean water goals.** Session B, Room #13  **Quynhnhu Nguyen,** Program of the Environment, University of Washington  **Site Supervisor:** Jenny Heins, RainWise Outreach Program  **Faculty Advisor:** Mark Scheuerell, School of Aquatic and Fishery Sciences  During my time at the Rainwise Outreach program, my project aimed to address the pressing issue of stormwater pollution in Seattle, caused by escalating urbanization and its adverse effects on clean water systems. My interest in wildlife conservation plans to incorporate Rainchangers in my project. My primary aim during this project is to explore various messaging effects of Rainchangers in order to increase community interest in the Rainwise program. While our Rainchanger serve as great mascots for the City of Seattle, they’re also here to educate us about the detrimental effects of Stormwater pollution on Puget sounds most beloved critters and their habitat. During the internship, the responsibilities included survey creation, environmental education, collaboration with partners, program marketing, and customer support, focusing on a specific micro-neighborhood outreach. My specific micro-neighborhood focus will be on Westwood Village, located between West Seattle and Burien. This community is essentially a diverse low-income community that meets our criteria to qualify for the rebate program. Engaging with local communities through tabling events presents a valuable opportunity to connect and promote our program to diverse members of Seattle. This project holds significant importance in addressing critical environmental issues by managing stormwater and reducing pollution, thereby enhancing water quality in Seattle. Recognizing the pivotal role of environmental education in garnering public involvement and support, we emphasize the necessity of well-informed communities in driving environmental initiatives. Through the production of reports, graphics, and visual materials, we aim to communicate findings effectively, fostering improved water quality and fostering more sustainable practices throughout Seattle. |
| **Farming in the Desert: Equitable and Sustainable Agriculture in Arid Climates.** Session B, Room #14  **Miranda O'Herron,** Program of the Environment, University of Washington  **Site Supervisor:** Levi Casto, Cactus Park Elementary School  **Faculty Advisor:** Perry Acworth, UW Botanical Gardens, University of Washigton  Desert climates present a myriad of challenges within agriculture. Due to high water scarcity and infertile soils, the harsh desert environment adds barriers within the food production process, making fresh and local produce difficult to access. Research shows that dry climatic conditions can increase food insecurity in desert regions, disproportionately affecting low-income communities. Alongside these challenges, climate change is projected to exacerbate unfavorable agricultural conditions in the desert. Despite these obstacles, arid climates can offer vast agricultural opportunities through the application of sustainable agriculture techniques, commonly known as permaculture. Permaculture is the utilization of natural processes to cultivate crops while simultaneously supporting the diversity and stability of local ecosystems. During my work with Cactus Park Elementary School, my team implemented an educational garden that will employ permaculture techniques on a small-scale with the goal of distributing fresh produce to underserved communities. To accomplish this, I conducted research on how to execute permaculture on a small scale, identifying the potential benefits and challenges of applying permaculture in the desert climate. Through interviews with farmers in Las Vegas and an in-depth peer review, I found that incorporating local farmer and traditional Indigenous knowledge in conjunction with permaculture techniques on small-scale farms can produce more reliable crop yields. Integrating permaculture practices into arid agriculture can not only enhance food security but also contribute to the restoration of desert ecosystems. |
| **Playing for Keeps: Multimodal Learning in Outdoor Environmental Education.** Day 2  **Ruby O'Malley,** Program on the Environment, University of Washington  **Site Supervisor:** Kaelie Spencer, Sound Salmon Solutions  **Faculty Advisor:** Lubna Alzaroo, Program on the Environment, University of Washington  Environmental education is an important evolving field that holds the potential to shape future generations of environmentalists. When it comes to important Pacific Northwest issues like the protection of salmon, outdoor environmental education in particular has the power to connect students to nature in meaningful ways. Because it’s an emerging field, organizations have limited resources and funding to provide outdoor education to public schools. During my time as an education intern with Sound Salmon Solutions, I set out to study how environmental educators can best connect students with nature, even within the short amount of time these organizations are able to teach students. I also explored experimental methods of education, including childrens’ eco-theater. I collected and compiled data from in-classroom observations, pre- and post- lesson surveys from students, and opinion-based surveys from the teachers of those students. I also conducted a wide range of literature and article research to supplement the data I collected. Using thematic analysis and data visualization, I found that students gained a significant understanding of watershed stewardship through the lessons taught by SSS, and the multimodal lessons were especially effective at engaging and exciting the students. Additionally, teachers believe that eco-theater would be beneficial as another form of multimodal learning for students to learn about important environmental issues such as salmon. These findings suggest that environmental education organizations should invest in creating multimodal outdoor curriculum in order to maximize the connections students are able to make with the environment. |
| **Wellbeing Over Waste: Engaging Youth on Addressing Plastic Pollution.** Day 2  **Isaac Olson,** Program on the Environment, Oceanography, University of Washington  **Site Supervisor:** Pam Clough, Environment Washington  **Faculty Advisor:** Kristi Straus, Program on the Environment, University of Washington  Plastic pollution driven by corporations producing single-use plastics is an increasing threat to environments, wildlife, and communities in Washington state. Extended producer responsibility (EPR), a system that holds plastic producers financially responsible for post-consumer handling of plastics, can increase recycling rate and equity in Washington, but needs broader public support to pass. This project intended to determine the most effective outreach strategies in communicating about EPR to youth and how to drive student engagement on addressing plastic waste. To do this, I worked with the lobbying group Environment Washington on in-person and virtual outreach initiatives, including organizing a lobby day, presenting to student organizations, and conducting online outreach on a Students That Oppose Plastic Pollution sign-on letter delivered to legislators. I also analyzed survey data and anecdotal evidence on the most effective messaging and the most appealing ways of further engagement. Evidence shows that messaging centering direct impacts, climate change, and thorough context were particularly motivating, and that in-person outreach was much more effective in driving action, especially when leveraging pre-existing relationships. Additionally, students were twice as likely to engage in low-effort actions, such as sharing the letter with friends, compared to high-effort, more fulfilling actions such as attending a lobby day. These findings inform outreach strategies allowing EPR and other environmental legislation to pass in Washington by engaging the youth, a critical demographic in driving environmental action. Addressing plastic pollution is critical in protecting Washington’s environment, wildlife, communities, and hope for an equitable, sustainable future. |
| **Eat Dirt, It’s Good For You: An Analysis of Early Childhood Environmental.** Session B, Room #15  **Zola Ontiveros,** Program on the Environment, University of Washington  **Site Supervisor:** Nicolette Riggins, Chrysalis Forest School  **Faculty Advisor:** Astra Bryant, Department of Physiology & Biophysics  Modern cultural trends are encouraging society to feel detached from the natural world. Popular technology, in addition to social expectations, are minimizing time spent outside for the average person. This is especially prevalent in urban centers and marginalized communities. Access to nature is becoming more of a luxury experience for many. This perceived detachment encourages harmful systems, such as resource exploitation and climate change, which are unsustainable when considering the projected needs of future populations. The purpose of my research is to address these issues by analyzing the positive effects of facilitated time in nature. During my time with the Chrysalis Forest school I was able to build upon this research to better understand its implications for future generations by directly working with youth participants. The methodologies used with this style of teaching center around active participation with the content being taught. Students engage multiple of their five senses, which in turn creates neural pathways that are associated with long-term memory. This not only supports knowledge retention but also allows participants to feel much more connected with the content being taught. These implications are substantial for both individual participants and society, because they support the spread of ecological knowledge. Additionally, time spent in nature is important for developing an appreciation for the natural world. Participants are more likely to internalize the taught content, and in turn make behavioral changes to protect the environment. By supporting environmental education, widespread isolation and inlying behaviors can reduced, and sustainable behaviors can be nurtured.  **Strategic Alignment in Information Systems and Corporate Sustainability: A Knowledge Management Perspective.** Session A, Room #18  **Lia Pecunies,** Program on the Environment, University of Washington  **Site Supervisor:** Gabriella Henkels, Harborview Medical Center  **Faculty Advisor:** Fred Pursell, School of Business, University of Washington  The pressing nature of environmental decline requires organizations to adopt a systematic integration of sustainability within their practices. This paper explores the intersection of Information Systems (IS), Corporate Sustainability Strategy (CSS), and Knowledge Management (KM) through the lens of strategic alignment. By synthesizing emerging research, the study addresses the gap in literature regarding the implementation of an integrated IS/CS strategy. Drawing from the Knowledge-Based View (KBV) and Actor-Network Theory (ANT), the research develops a conceptual process-based model that incorporates the Strategic Alignment Model with principles of Knowledge Management. The framework calls for the alignment for characteristics of CSS objectives with IS requirements, nested within a KM process that coordinates knowledge assets for strategic deployment. Feedback loops enable iterative adaptation to internal and external business environments, facilitating the continual refinement of organizational strategy and processes. The paper contributes to both theory and practice by elucidating the dynamic interplay between IS, KM, and CSS, offering insights for managerial decision-making and future research directions. |
| **Sustainability Within Hospitals: How Hospitals Like Harborview Medical Center Can Become More Sustainable By Using Sustainability Frameworks To Track, Benchmark & Find Solutions.** Session A, Room #19  **Timothy Reagan,** Program on the Environment, University of Washington  **Site Supervisor:** Gabriella Henkels, Harborview Medical Center  **Faculty Advisor:** Nancy Simcox, Department of Environmental & Occupational Health Sciences, University of Washington  Sustainability and reducing greenhouse gas emissions are becoming more important globally and everyone needs to do their part to create and maintain a sustainable society. The healthcare industry accounts for nine to ten percent of the total US greenhouse gas emissions and are no exception to this. The aim of this study was to find the different ways hospitals are implementing sustainability change, and why some methods worked while others didn’t. Practice Greenhealth (PGH) is an organization helping hospitals to implement sustainability changes by providing sustainability resources to them. To do this, I interned at Harborview Medical Center filling out the 2024 PGH Application for the hospital. I contacted and interviewed contractors, employees, and other stakeholders to gain information to fill out this application. I also conducted a literature review to see how hospitals are approaching sustainability. Hospitals don’t have a universal tool to track and measure key sustainability measurements. They are focused on providing quality healthcare but may have little or no expertise in sustainability practices. Using a sustainability framework like PGH, helps hospitals find the correct solutions and changes necessary for the issues at hand. Just by starting to track and measure sustainability data, hospitals can find ways to lower their environmental impact. If hospitals don’t make changes, they will continue having a negative impact on the environment and won’t contribute their fair share to reach a sustainable future. |
| **Interdisciplinary Environmnetal Education: A Solution for Educational Inequities and Climate Inaction.** Session B, Room #16  **John Romano-Olsen,** Program on the Environment, Art: Interdisciplinary Visual Arts, University of Washington  **Site Supervisor:** Emilene Castillo, Partner In Employment  **Faculty Advisor:** Jonathan Rodriguez, Art, University of Washington  The current educational system in the United States does not properly support immigrant and refugee students as a result of systemic educational barriers. Consequently, disparities in educational attainment, social mobility, and employment disproportionately impact immigrant populations compared to those who are native-born. The purpose of this study is to illustrate how utilizing interdisciplinary environmental teaching methods can properly support immigrant needs while also promoting environmentalism to combat anthropogenic climate change. For my internship I created informed lesson plans and activities for a program focused on restoration work, environmental education, and job training skills serving immigrant youth in King County. I collected results through a comprehensive literature review, qualitative observations, and quantitative data collection. I found that using education outside the classroom, group project-based learning, reflective exercises, and hands-on learning were most effective at increasing youth engagement and metacognitive skills. Additionally, spending time and learning outdoors increases environmental caring, spurring pro-environmental behaviors. Therefore, by utilizing more effective teaching methods, educators can promote educational equity for immigrant and refugee students while simultaneously creating individuals who support climate action. |
| **Fostering Youth Engagement in Sustainability; Discovering Motivating Factors and Pathways to Action.** Day 2  **Stephanie Schmidt-Pathmann,** Program on the Environment, University of Washington  **Site Supervisor:** Peter Donaldson, Sustainability Ambassadors  **Faculty Advisor:** Kristi Straus, Program on the Environment, University of Washington  In the face of modern environmental challenges, sustainability stands out as a crucial concept, offering a pathway to address pressing issues like climate change. I interned with Sustainability Ambassadors (SA). SA is a nonprofit organization that strives to get students on board and provide them with support and resources to accomplish sustainability in their schools and daily lives. Due to the potential of younger, highly-motivated individuals to combat major environmental problems, like climate change, bringing the issue to student engagement is crucial to building a sustainable future. This study investigates the motivating factors driving these high and middle school students to join SA and improve their engagement in sustainability projects within their educational environments and homes. To accomplish this task, I conducted surveys and Zoom interviews with the student ambassadors I worked with throughout my internship with SA. I investigated the intrinsic and extrinsic motivations that fueled their involvement in initiatives like Sustainability Ambassadors and took action through small-impact projects, leading to a more significant change. The research uncovers that the students' passion for environmental activism resides in hands-on learning opportunities and a sense of community and belonging. Leveraging these insights, I propose tailored strategies to empower youth and foster sustainable practices, including the promotion of environmental stewardship, the promotion of youth engagement, and the advancement of community resilience. By understanding and harnessing students' passion, Sustainability Ambassadors can use these drives to draw in more students to join their organization and cultivate a community of these changemakers in the future where sustainability is embraced as a shared commitment by all generations. |
| **Breaking the Sound Barrier: Promoting Marine Environmental Outreach Across Formal and Informal Settings.** Session B, Room #17  **Brit Skolnik,** Program on the Environment, University of Washington  **Site Supervisor:** Lisa Hiruki-Raring, Katie Luxa, and Erin Moreland, NOAA Fisheries  **Faculty Advisor:** Kristi Straus, Program on the Environment, University of Washington  Environmental education is crucial for promoting environmental literacy, critical thinking, and environmentally positive behaviors across general audiences. It is important to understand both land and marine ecosystems. However, schools tend to prioritize terrestrial environmental science while neglecting marine science, even though the importance of marine education has long been recognized due to the fact that protecting marine ecosystems is key to reversing issues such as climate change and protecting fish populations that provide jobs and sustenance to many. Informal education, which occurs outside the classroom in settings such as science centers or aquariums, can improve students’ ocean literacy and promote behaviors that benefit marine life. This study aims to understand the barriers faced and successes achieved by informal educators in teaching marine science to general audiences. During my internship with the National Oceanic and Atmospheric Administration (NOAA) as an Education and Outreach intern, I surveyed NOAA staff about their outreach experiences and interviewed staff with heavy outreach and education responsibilities. Through these methods, I discovered that education and outreach endeavors often lack time and resources, hands-on activities are the most effective at getting students engaged, simplicity and easy language is key for maintaining attention, and the importance of making marine education equitable. Promoting accessible non-formal marine education has the potential to increase overall awareness, foster trust in marine science, and help nurture the next generation of marine and environmental scientists to address climate change and other environmental challenges. |
| **What are We Wasting: A Deep Dive Analysis into Public Waste Receptacles and Waste Characterization.** Session A, Room #20  **Jacob Smith,** Program of the Environment, University of Washington  **Site Supervisor:** Meara Heubach, Public Works Department, City of Renton  **Faculty Advisor:** Clare Ryan, Environmental and Forest Sciences, College of the Environment, University of Washington  Waste management is constantly changing, and better means of proper waste characterization are being developed. Still, the mischaracterization of materials occurs frequently. Reducing the number of emissions produced by landfills is detrimental due to a lack of amenities and infrastructure, education, and different behaviors from individuals in different socioeconomic standings. Partnering with the City of Renton Public Works Department, A study was created,  implemented, and published to understand the amount of recoverable and non-recoverable material within public waste cans in commercial, residential, and parks sectors. Around half of the waste found within this study when examining trash in public waste cans could have been composted or recycled. There was a large amount of individually bagged trash within each public waste can, making it difficult for individuals to separate and adequately characterize their waste. This study sought to understand the barriers to proper characterization. I believe an increase in composting and recycling cans will increase the accessibility of recycling and composting. As well as reducing the sizes of openings for public trash cans so individuals can characterize their waste correctly and proper education around sustainability, composting, and recycling can help to increase the amount of recoverable waste used in composting and recycling as well as reduce the amount of waste that ends up in landfills. Recycling and composting will only become more critical as time goes on, as landfills create more and more greenhouse gas emissions, and more trash is added to landfills.  **The Power of Purchasing and Partnerships: Government Money Makes Sustainability Go 'Round.** Session A, Room #21  **Maya Smith,** Program on the Environment, University of Washington  **Site Supervisor:** Erica Carlson, Perennial Zero Waste  **Faculty Advisor:** Christian Primack Metcalfe, Foster School of Business, University of Washington  Government procurement is a trillion dollar industry with a high carbon footprint, yet it holds the potential to combat climate change in a unique way that policy alone cannot. U.S. governments are setting aggressive sustainability goals and focusing on policy implementation, but have struggled to improve internal operating sustainability. This study aims to identify the opportunities and challenges associated with leveraging procurement to facilitate sustainability. To accomplish this task, I interned with Perennial Zero Waste and collected data on topics of sustainability, procurement, and zero waste through surveys and interviews of government officials. Additionally, I conducted a literature review of current opportunities and barriers around sustainable public procurement (SPP), as well as its potential to achieve zero waste goals and engage with vendors. Findings indicate that SPP is an avenue to create public-private partnerships (PPPs) for the benefit of sustainable government operations and improved waste management, advancement of social initiatives, and growth of green industries, yet it remains underutilized in the U.S. due to various barriers. Through internal policy creation, stakeholder engagement, innovation, and use of available resources, barriers can be overcome to realize the numerous benefits SPP has to offer. These findings are significant to my host organization because there are opportunities for their various environmental services to be utilized in the government sector through a PPP that benefits both parties substantially. Understanding the potential of SPP to enhance sustainability efforts will allow for governments to improve operations by engaging with vendors like Perennial Zero Waste. |
| **Evaluating the Impact of Invasive European Green Crabs on Native Fish Abundance and Size in Willapa Bay.** Session A, Room #22  **Miriam Stearns,** Program on the Environment, University of Washington  **Site Supervisor:** P. Sean Mcdonald, Program on the Environment, and Lisa Watkins, Washington Sea Grant Crab Team  **Faculty Advisor:** Tim Essington, School of Aquatic and Fishery Sciences, University of Washington  The introduction of European green crabs (Carcinus maenas) into Washington's coastal ecosystems poses significant ecological challenges. These invasive crabs impact native biodiversity by competing for resources and altering habitats, which in turn affects many native species. This study explores the impact of European green crab presence on the size and abundance of native fish in Willapa Bay. During my time with the Washington Sea Grant Crab Team, I analyzed image data from their volunteer-based monitoring program, and measured the sizes of Staghorn Sculpin, Prickly Sculpin, and Three-Spined Sticklebacks. Using linear mixed models and graphical analysis, I examined how variations in green crab population density correlate with changes in the size and abundance of fish species at various sites within the bay. Preliminary findings suggest that green crab presence correlates with increased sizes in sculpin species, decreased sizes of Three-Spined Sticklebacks, and no significant findings regarding changes in abundance. However, the observed fluctuations (or lack thereof) are likely influenced by the geographical features of Willapa Bay, the life stages of the fish that inhabit these sites, and other ecological variables. This study highlights the complex interactions between invasive green crabs and native fish populations, advocating for extended research across a broader geographic area. A comprehensive understanding of the ecological impacts requires an examination of the environmental conditions at each site. Such analyses are crucial for developing effective strategies to mitigate the influence of green crabs on local fish species, thereby supporting the conservation of these vital ecosystems. |
| **Centering Environmental Justice: Fostering Equitable and Sustainable Communities in the Classroom.** Session B, Room #18  **Ayla Stone,** Program on the Environment, University of Washington  **Site Supervisor:** Terrell Engmann, Basilica Bio  **Faculty Advisor:** Jason Groves, German Studies, University of Washington  By prioritizing the just political representation of all people, environmental justice (EJ) addresses disproportionate environmental and health hazards directed to marginalized, low-income, and colored communities, therefore creating more equitable, sustainable, and resilient societies. The reach of the EJ movement to our young generations, however, is limited by the lack of an EJ-based curriculum within pre-college classroom settings. The objective of this study was to understand the role of EJ in high school classrooms, as well as the experienced drawbacks for educators regarding EJ curriculum implementation. To meet the objective, I utilized feedback derived from interviews that were conducted alongside Basilica Bio with current public high school educators. Additionally, I developed a literature review to further analyze EJ curriculum implementation strategies, highlighting ways to support teachers interested in EJ education. The misalignment in priorities and values of educational decision-makers at a district, state, and national level is noted as a primary disturbance for EJ-based curriculum development and implementation. The inaccessibility to understanding community-driving forces, like environmental justice, is an injustice to our students, as they are our future community leaders and environmental stewards. |
| **Carbon, Communication, and Climate: How We Can Reach Net Zero with Less Than 1000 Acres.** Day 2  **Midori Sylwester,** Program on the Environment, Department of Economics, University of Washington  **Site Supervisor:** Rowan Braybrook, Northwest Natural Resource Group  **Faculty Advisor:** Erin Gilbert, Program on the Environment, University of Washington  Small landowners comprise a notable percentage of the private forestland in the Pacific Northwest - and they are excluded from participating in the carbon market. Their potential to produce carbon credits can make a significant impact on reaching net zero emissions. The aim of my research was to understand how communication plays a role in small landowner participation in carbon programs, and consequently, how marketing strategies can be improved to incentivize their enrollment. My work with Northwest Natural Resource Group was intended to identify current carbon programs available to Pacific Northwest landowners owning less than 1000 acres. Through a literature review, fifteen interviews of landowners, program representatives, and project developers, alongside comprehensive online searches, I discovered what programs are presently active, the reasoning behind their requirements, and how Pacific Northwest landowners perceive these opportunities. Carbon programs available to small landowners are not only limited, but often lack the level of transparency and simplicity needed to incentivize landowners to participate. Incorporating the needs of landowners into program development can encourage their engagement. Streamlining informative resources with digestible language or expanding the regions in which these programs serve to include Pacific Northwest landowners is a step toward improved practice. Landowner involvement can further mature the market, contributing to a positive feedback loop and creating a more attractive environment for landowners to enroll in. Involving this community increases the number of carbon credits being sold in the market while simultaneously aiding in achieving the net zero goals established by the international community. |
| **How Hospitals Can Focus On Health In Regards To The Environment.** Session B, Room #19  **Keara Taylor,** Program on the Environment, University of Washington  **Site Supervisor:** Gabriella Henkels, Harborview Medical Center  **Faculty Advisor:** Tania Busch Isaksen, Department of Environmental & Occupational Health Sciences, University of Washington  Hospitals are an essential service and the healthcare industry creates a lot of strain on the environment. Because of this, many hospitals are looking to improve on sustainability but are struggling with implementing sustainability at their facilities. The aim of this study was to find overall barriers to and solutions for sustainability for all hospitals. I interned at Harborview Medical Center and worked on filling out their Practice Greenhealth application. Data was collected through communicating with hospital stakeholders via email and interviewing stakeholders over zoom or in person. In addition to this work for my internship, I also conducted independent research by reviewing scholarly articles related to hospital sustainability and conducted secondary interviews that followed the Practice Greenhealth interviews. To address my research questions, I combined answers from the secondary interviews that went more into depth on sustainability at Harborview and information from the scholarly articles to identify both issues with and solutions to implementing sustainability in hospitals. The main findings of this research were that staffing, waste, and money were the main barriers to sustainability. Employing more staff to implement and track progress of sustainability initiatives, adjusting the supply chain, pharmacy, OR, and cafeteria product usage and disposal, and conducting research to find financially feasible environmentally friendly products for each department would support hospitals' efforts to improve sustainability. This work would support Harborview with their Practice Greenhealth work and would provide financial benefits and improve the efficiency of providing patient care services for all hospitals. |
| **Protecting Seattle's Urban Canopy: Policy Revisions & Education.** Session B, Room #20  **Lauren Williams,** Program on the Environment, Political Science, University of Washington  **Site Supervisor:** Mary Manous, Cascaida Climate Action  **Faculty Advisor:** Kathleen Wolf, School of Environmental and Forest Sciences, University of Washington  Urban forests are an integral part of community health and well-being, especially during climate change. They provide an array of benefits to climate change mitigation, adaptation, and community resilience. But, as populations increase, and more individuals move to urban settings, the urban canopy becomes increasingly threatened. This poses challenges for decreased community and ecological prosperity as changes in weather and climate patterns become more volatile. Protecting trees in urban settings has and will continue to be a challenge without effective policy implementation. The purpose of this study is to understand the most effective methods for protecting Seattle’s urban canopy through the implementation and revision of policy. In order to do this, I read the Seattle Municipal Tree Code (SMC) 25.11 and spoke with four individuals who have history working with the code. I also found comparable cities to Seattle with a more thriving urban canopy, and began reviewing their cities’ tree codes finding differences in language and implementation. Through my research, I found there to be gaps in the objectives of SMC 25.11 and the results seen within the urban canopy. To better implement the goals of the code, more consideration needs to be placed on code language, enforcement, and education surrounding the invaluable assets trees provide. It’s important to understand the methods for most effectively protecting the urban canopy to combat climate change while addressing environmental justice.  **Exploring the Gifts of Community Gardening: Environmentally, Economically, and Socially.** Session B, Room #21  **Jasmine Yu,** Program on the Environment, University of Washington  **Site Supervisor:** Grace Stiller, Weed Warriors, Nature Stewards Program  **Faculty Advisor:** Yen-Chu Weng, Program on the Environment, University of Washington  People experiencing food insecurity will constantly grow if no attention is brought to the subject, especially with today's inflation rates, along with the low minimum wages families are receiving. This brings us to look into community gardens, as it not only gives us an opportunity to help relieve the problem of food insecurity that socio-economically disadvantaged families experience, but it brings more attention to community gardens in general. If actually looking into community gardens, we can see that it brings much more that we expect in the field of: environmental, economical, and social. Bringing me to understand the importance of community gardens, I had the opportunity to work in the New Start Community Garden in Burien. Besides helping out with improving the conditions of the garden, I was able to take a deep dive in understanding the problems the garden ran into, but as well as the amazing outcomes it brought to the communities around through multiple interviews, both from the staff and volunteers there. The New Shark Community Garden was able to bring neighbors together, donate hundreds of pounds of food to the food bank, as well as provide educational lessons for free. Further, community gardens are able to increase biodiversity habitats, as well as prepare everyone for situations, such as during the pandemic of Covid-19. With the spread of awareness of what community gardens could bring to us, it allows the opportunities for more being implemented by spreading the message to local governments together. |
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| **Life and Death: How Does Western Hemlock Mortality in a City Park Affect Pileated Woodpecker Livelihoods?.** Session A, Room #24  **Muwei Zhang,** Program on the Environment, University of Washington  **Site Supervisor:** Paul Shannon, Friends of Seward Park  **Faculty Advisor:** Timothy Billo, Program on the Environment, University of Washington  Urban parks are important environments to support native ecosystems. Western hemlocks in Seward Park’s old-growth forest are experiencing a health crisis that causes them to die at a concerning rate. This forest supports a resident pileated woodpecker population, which has irreplaceable functions for the local ecosystem. Both living and dead trees are vital resources for animals living in the forest, especially woodpeckers. Therefore, the altering hemlock survival and health leave unknown impacts on the population of woodpeckers. My study aims to look at the health condition of western hemlocks in the park and how it is associated with the pattern of pileated woodpecker activities. Working with Friends of Seward Park, I identified western hemlocks in the forest and took a set of feature data from each tree. I recorded any pileated woodpecker activity I encountered in the forest and set up camera traps for spot monitoring. According to my data, pileated woodpeckers most intensively exploit large, relatively intact snags for food and nesting in the park. Their activity level is significantly higher in the hemlock graveyard, defined by the most concentrated deceased hemlocks, than in other parts of the park. Western hemlock mortality is not likely caused by woodpecker activities because they almost only occur on already dead trees. My results show the importance of managing woody debris in urban parks. Further research on the population dynamics of pileated woodpeckers should be conducted to monitor the long-term trends, responding to unknown future development of hemlock mortality. |

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