PROGRAM ON THE ENVIRONMENT
UNIVERSITY of WASHINGTON

Spring 2023

CAPSTONE SYMPOSIUM

Wednesday, May 24, 2023
Online, 4:30 – 7:30 pm

Wednesday, May 31, 2023
In-Person, 5:00 – 8:30 pm

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 non-profits 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.

Share your thoughts on Twitter
Students will be live-tweeting all sessions so if you miss one, follow the updates. If you tweet, we encourage you to share what you learn and use the hashtag, #POEcap.

THE INDIVIDUAL ADVOCATE: COPING WITH CLIMATE GRIEF AND WAYS WE CAN FIGHT BACK. Session: A, Breakout Room #1

Isabelle Arenson*, @iaarenson, Program on the Environment, University of Washington
Site Supervisor: Stephan Classen and Rachel Luther, University of Washington Bothell and Cascadia College
Faculty Advisor: Kristi Straus, University of Washington

The development and implementation of community-based support plans to cope with strong climate related emotions is a crucial aspect of the preservation of individual environmental activism (IEA). The effort to work towards understanding emotional responses and reactions to the changing climate creates the opportunity to reframe a person's emotional response to climate change. More than two thirds of American adults said they had experienced ,eco-anxiety, which can potentially be both debilitating and motivating for the general public to take action towards environmental issues. The in-depth analysis and discussion of action plans for individual advocates is conducted with the aim to gain a more comprehensive understanding of how to improve environmental activism as a concept so it is more inviting and navigable for those struggling with climate-focused mental health issues. During my work assisting the UW Bothell and Cascadia Colleges as a podcast host for the Common Caws for Sustainability Podcast, I was able to gather relevant data from several environmental experts throughout the podcast miniseries. To accomplish this, I interviewed each subject on the same two questions at the end of the interview for continuity, emphasizing themes of community, local politics, and how a person should take care of their mental wellbeing. With this information, I was able to conclude that above all, the ability to stay hopeful is the most valuable. The tenacity of human nature will not surpass the longevity of climate grief, but last alongside it, as grief is not linear and neither is our lived experience.

LIKE, COMMENT, AND SUBSCRIBE: DEVELOPING ENGAGING ONLINE COMMUNICATION STRATEGIES FOR ENVIRONMENTAL NON-PROFITS. Session: A, Breakout Room #3

Sarah E Butruille*, @ButruilleSarah, Program on the Environment, University of Washington
Site Supervisor: Peter Donaldson, Sustainability Ambassadors
Faculty Advisor: Lubna Alzaroo, College of the Environment, University of Washington

Nonprofit organizations are incredibly important in combatting environmental issues, as they connect communities with environmental action and act independently from the government to quickly implement change. However, these organizations have historically struggled with developing marketing/communications strategies in our for-profit world, limiting their impact. With the rise of social media, all nonprofits, including environmental ones, have had to alter the formats with which they communicate to their audiences, adding another hurdle to developing their marketing plans. The purpose of this study was to understand how to utilize social media to create effective communication strategies for environmental nonprofits such as Sustainability Ambassadors (SA). To accomplish this, I completed an internship with SA and personally curated content for them and their grant-holder, Cascade Water Alliance, as well as conducting

an interview with an expert in nonprofit marketing and a literature review on environmental communication. I also analyzed the Instagram pages of various environmental non-profits across the country, their content formats, and their engagement levels. Findings show that to engage a broad online audience most effectively, environmental nonprofits should develop a clear target audience, focus on curating positive messaging, and adapt to trends and format shifts on their social media platforms. Through developing a more effective communications strategy, environmental nonprofits can institute more sustainable change.

THE FUTURE OF OUR WATER: ADDRESSING WATER QUALITY, SUPPLY, AND DEMAND. Session: A, Breakout Room #4

Alex Cabebe*, @Cabaebae, Program on the Environment, University of Washington
Site Supervisor: Ry Yahn and Susan Harper, Seattle Public Utilities
Faculty Advisor: Gunwha Oh, Department of Geography, University of Washington

Water quality issues are a constant issue as rain can pick up pollutants, overwhelm combined sewer systems, and flush out illegally dumped fluids. In addition, water demand continues to increase, as water supply decreases due to climate change as extreme precipitation events and extreme droughts become more frequent and the increasing population in urban areas drive up demand. Therefore, solutions in raising awareness within communities about the changing climate, significance of stormwater runoff and storm drains, and importance of capturing stormwater are important in addressing this problem. Seattle Public Utilities (SPU) plans to reestablish their storm drain marking program to educate and raise public awareness. The purpose of this study was to investigate qualities of an effective volunteer storm drain marking program to aid in reestablishing SPU program and to determine solutions to collect stormwater to decrease urban stormwater runoff and increase water supply. To accomplish this task, I worked with SPU and conducted expert interviews from different jurisdictions around Washington state regarding their volunteer storm drain marking programs and conducted academic literature reviews. Findings showed that utilizing plastic adhesives with messaging saying variations around , “No Dumping,” and, “Drains to Sound”, having a streamlined onboarding process of volunteers, and having a GIS data management strategy in place leads to an effective volunteer storm drain marking program while applying green stormwater infrastructure such as trees, rain gardens, and cisterns within public infrastructures, homes, and businesses can be an effective solution in capturing rainwater to decrease urban runoff and increase water supply.

LET'S TALK ABOUT FEELINGS: ENVIRONMENTAL COMMUNICATION STRATEGIES TO IMPROVE OPTIMISM AND MANAGE ECO-ANXIETY IN THE NEXT GENERATION. Session: A, Breakout Room #5

Nicholas Chappelear*, @nchappy_envir, Program on the Environment, University of Washington
Site Supervisor: Peter Donaldson, Sustainability Ambassadors
Faculty Advisor: Lubna Alzaroo, Program on the Environment, University of Washington

With the continued rise in environment-related problems around the world, doomist media and detached curriculum are causing many young adults to experience feelings of helplessness that

researchers define as eco-anxiety. Although it can be paralyzing, positive and progress-focused narrative can harness this anxiety into productive learning and collaborative action (Pihkala 2020). The aim of this study was to provide environmental communicators strategies to better connect with youth audiences both online and in the classroom. I worked with Sustainability Ambassadors, a nonprofit based in King County, as an Impact Storytelling Intern designing content for grant-funded campaigns and aiding in the curation of a youth-targeted marketing strategy. Engagement data was measured by means of counting likes, comments, and the number of accounts each post reached (known as , "impressions"), and then compared to assess which modes were most popular among our audience. I also conducted interviews with three student ambassadors and a nonprofit marketing consultant; their responses, in conjunction with a multidisciplinary literature review of relevant sources, exposed some opportunities for eco-anxiety management within the intersections of activism, education, and social media. Findings suggest nonprofits can target youth audiences by using entertaining but value-oriented conscious marketing techniques. When coupled with transformative pedagogies that personalize learning and offer collaborative and critical dialogues, environmental communication can recenter the narrative on collective action, provide youth agency over their learning, and assist the next generation in imagining a future that overcomes contemporary feelings of doom.

LEVELING UP THE WORKPLACE: HOW GAMIFICATION FOSTERS IDEAL COMMUNITY ENGAGEMENT PRACTICES. Session: A, Breakout Room #6

Alina Doan*, @doan_alina, Program on the Environment, University of Washington
Site Supervisor: Sally Del Fierro, Port of Seattle
Faculty Advisor: Dr. Yen-Chu Weng, Program on the Environment, University of Washington

Traditionally, workplace training can be boring to attend when the content could be more engaging and interactive with participants. Essential topics of equity and community engagement need to be fun and easily applicable to real-life scenarios. Mastering community engagement as a form of communication with key stakeholders addresses environmental justice issues and has the ability to earn trust and build relationships with marginalized communities. It gives value, meaning, and significance to the individuals being represented. The purpose of this study was to understand the opportunities and challenges of gamification in workplace training centered around equity and community engagement decision-making and how developing an engaging and educational tool can be utilized to communicate environmental topics. I interned with the Port of Seattle and focused my efforts on creating a community engagement board game catered to train employees on best engagement practices during Port-related projects. The game content included clear rules, storytelling, timers, and collaborative and strategic elements that allowed quality engagement between all players. I also conducted a post-interview to evaluate participants on the effectiveness of gamification. As a result, players expressed high engagement, enjoyability, more understanding of equity, better relationships with colleagues, and the proposed application of workplace training. This information unveiled the possibility for gamification to be used to communicate any environmental topics which helped me understand how to empower communities and stakeholders in future outreach efforts in addition to educating those that have difficulty in understanding environmental justice.

REVOLUTIONIZING TRANSIT FOR THE NEXT GENERATION: YOUTH-INSPIRED OUTREACH STRATEGIES FROM TRANSIT EXPERTS. Session: A, Breakout Room #7

Madelyn Eder*, @EderMadelyn, Program on the Environment, University of Washington
Site Supervisor: Eugene Kramer, Seattle Subway Foundation
Faculty Advisor: Kirsten Foot, Communication, University of Washington

The relationship between transportation and climate change is often overlooked despite the fact that the sector contributes significantly to climate-related emissions through the release of particulate matter and CO2. The potential for emission reduction through public transportation is promising, yet the younger generation is frequently neglected. The aim of this study is to learn how to influence youth to make travel decisions in favor of public transit. During my internship with the Seattle Subway foundation, I conducted interviews with six transportation experts from different organizations, including Sound Transit, Transportation Choices Coalition, King County Metro, and the Seattle Department of Transportation, to explore how they engage with young demographics. As a result, six specific recommendations were formulated to tackle how to engage and influence the upcoming generation of youth. Recommendations encompass going beyond traditional methods, fostering a harmonious coexistence of diverse organizational types, community-driven action, equitable knowledge dissemination, avoidance of technical jargon, inclusion of youth in decision-making processes, and providing youth leadership opportunities. Despite this, there remains a disconnect between research and practical application, as only limited inquiry has been undertaken into present-day practices. To close this gap and prioritize the needs of young people, further research must be pursued with a focus on amplifying youth voices and recognizing their valuable contributions. The younger generation holds the key to the future of public transportation and reduced dependence on personal vehicles. There is a responsibility to provide sufficient information and accessibility to public transportation options through targeted outreach strategies.

SUSTAINABILITY AND SOLIDARITY: CONNECTING THE US ENVIRONMENTAL MOVEMENT WITH GLOBAL SOUTH STRUGGLES. Session: A, Breakout Room #8

Alisha Foster*, Program on the Environment, University of Washington
Site Supervisor: Matthew Dumanig, Kabataan Alliance
Faculty Advisor: Zho Ragen, Department of Oceanography, University of Washington

Defend Lumad Struggles, a campaign supporting the Lumad (Indigenous) people of the Philippines against logging and mining on their ancestral land, could benefit from broader support from environmental groups in the US. However, many US environmental groups lack knowledge of the Lumad struggle and/or understanding of how to connect their own work to such a complex geopolitical manifestation of environmental issues. I investigated the existing understandings of “environmental issues” by US environmental groups and individuals, both locally and nationally. To do this, I reviewed research on varying conceptions of environmental issues, then applied the findings to the various environmental groups in the Seattle area based on their actions and discourse. Additionally, I developed visual tools to elevate individual and organizational understanding towards the goal of active solidarity with the DLS campaign and other environmental struggles in the Global South with political-economic roots. For this, I

reviewed research on effective storytelling and motivational psychology, paired it with previous investigation on beliefs of environmental groups as compared to DLS analysis, and created illustrations intended to bridge the gap in an accessible way. The resulting deliverables were a list of local environmental groups with points of unity between their perception of environmental issues and DLS analysis; as well as illustrations conveying information and sparking discussion about the Lumad struggle. This toolkit can potentially aid similar groups in raising understanding and concrete support among individuals and groups who care about environmental issues, but who currently have limited understanding of their root causes.

COMPOSTING IN FASTER-FOOD RESTAURANTS: IDENTIFYING BARRIERS AND SOLUTIONS FOR SUSTAINABLE WASTE MANAGEMENT. Session: A, Breakout Room #9
Michaela Fournier*, @michaela490, Program on the Environment, University of Washington
Site Supervisor: Maggie Brown, Cedar Grove
Faculty Advisor: Eli Wheat, Program on the Environment, University of Washington

With the growing consumption of faster-food in King County, the surrounding landfills are filling quickly and releasing large amounts of methane and carbon dioxide into the atmosphere. With a successful composting program implemented, food waste can be diverted from landfills, helping both public and environmental health. The aim of this study is to identify the barriers and solutions of composting in faster-food restaurants to help implement more successful composting programs. The research was conducted through the distribution of a 33-question survey by email, phone, and in-person outreach that was completed by 21 composting and non-composting restaurants throughout King County. To collect more evidence to support the survey results, a literature analysis was completed to draw comparisons to similar data in other cities and counties with comparable populations and regulations to King County. The key findings show that the most prominent barriers are the lack of knowledgeable customers, the need for regular staff training on waste sorting, employee turnover, and the lack of accessible bins, supplies, and updated signage. The most prominent strengths exhibited for both composting and non-composting restaurants include an environmentally friendly image for the store/district/company, cost savings, knowledgeable staff, and reduced environmental impact. This research can facilitate work between composting facilities and local governments to devise methodologies that will assist faster-food restaurants in surmounting barriers to composting. Furthermore, it aims to promote the benefits of composting to commercial entities and decrease the negative environmental effects.

HOW SPECIFIC RECRUITING STRATEGIES CAN INCREASE WORKFORCE DIVERSITY THROUGH HIRING AND PRIORITIZE UNDERREPRESENTED GROUPS.
Session: A, Breakout Room #10
Kalani Gee*, @kalanisworld1, Program on the Environment, University of Washington
Site Supervisor: Dan Tonnes, National Oceanic and Atmospheric Administration
Faculty Advisor: Kris Ebi, Environmental & Occupational Health Sciences, University of Washington

Over the past few decades, the environmental sector has seen little progress toward diversifying the workforce. This lack of diversity stems from structurally unfair recruiting strategies that often skim over underrepresented groups. The purpose of this study is to identify how environmental agencies can restructure their recruiting strategies to promote diversity through hiring and prioritize underrepresented demographics. I worked as an intern with the National Oceanic and Atmospheric Administration (NOAA) to compile a list of recruiting best practices and gather data to determine which colleges should be prioritized when recruiting with a focus on marginalized groups. In order to better understand diverse recruiting, I interviewed four professional recruiters in different industries. The results of these interviews had many overlapping themes such as personalizing messages, customizing the interview experience, and creating an inclusive community through diversity initiatives. In addition to interviewing professionals, I created a college database for the NOAA to utilize when hiring students. This database highlights California colleges and universities that are recognized minority-serving institutions or provide minority support through supplemental programs. This study is significant because the results will help establish structured recruiting plans that prioritize underrepresented groups, increase workplace diversity, and promote a more inclusive work environment. Most environmental organizations are in need of an updated recruiting system that shifts to prioritizing groups that are vastly underrepresented within the industry workforce. In utilizing the specific strategies found through my research, environmental agencies can successfully increase diversity through hiring and address the gap in representation.

REEL STORIES FOR REAL CHANGE: STORYTELLING FOR SOCIAL JUSTICE AT NOAA FISHERIES. Session: A, Breakout Room #11

Makenzie Hallstrom*, @kenziehallstrom, Program on the Environment, University of Washington
Site Supervisor: Lisa Hiruki-Raring, National Oceanic and Atmospheric Administration, Alaska Fisheries Science Center
Faculty Advisor: Dr. Dylan Medina, Department of English, University of Washington

One of the largest barriers to advancing diversity, equity, and inclusion (DEI) goals within the fisheries science community is the underrepresentation of marginalized voices and experiences. To create environments of inclusivity, it is imperative that these institutions critically examine whose stories are privileged and whose are not through official community platforms such as physical exhibits. The purpose of this study was to perform such an examination on the current exhibit for the National Oceanic and Atmospheric Association (NOAA) Ship Miller Freeman at NOAA, Alaska Fisheries Science Center (AFSC), and determine the best practices for using storytelling as a tool for social justice within the agency moving forward. I first conducted a Critical Discourse Analysis (CDA) on the current exhibit to understand the gaps and affordances within current storytelling at the AFSC. I then conducted interviews with professional storytellers who specialize in underrepresented narratives to investigate how storytelling can best serve marginalized groups. As part of my internship, I helped curate materials and develop storylines for a new exhibit for the Miller Freeman that centers social justice. My findings point to a four-stage approach of 1. auditing current storytelling, 2. investigating marginalized stories, 3. developing a holistic storyline, and 4. focusing delivery on education and engagement. I use the Miller Freeman project as a case study for this approach in practice at NOAA Fisheries. This

approach offers a strategy for the agency to advance its DEI goals through storytelling and foster a more inclusive and multicultural environment.

SEEDS FOR SALMON: HOW YOUR GARDEN CAN HELP SALMON HABITAT.
Session: A, Breakout Room #12
Ava Hays*, @AvHays12, Program on the Environment, University of Washington
Site Supervisor: Alicia Keefe, NOAA Fisheries, West Coast Region
Faculty Advisor: Thomas P. Quinn, School of Aquatic and Fishery Sciences, University of Washington

Salmon are a cultural icon in the Pacific Northwest, but their populations are declining due to overfishing, habitat loss, climate change, and urban runoff. This study highlights the potential for individuals to mitigate harm and support salmon populations through gardening practices. The aim of this study involved investigating how native plants contribute to salmon habitat, and how we can encourage the public to choose them. I explored the importance of landscapes, creating resilient garden spaces, ethnobotanical significance, and effective communication strategies while interning with NOAA Fisheries, West Coast Region for their Seeds for Salmon campaign. I identified characteristics of native, nonnative, and invasive plant species, the chemical and physical needs of salmon, and how this overlap. I also conducted six interviews with habitat restoration experts, technicians, and education/outreach coordinators to understand perspectives of those involved with salmon and native plants. I found that by prioritizing transdisciplinary collaboration, landowner values, increasing accessibility of outreach materials, and connecting humans with the environment are vital components of successful communication around native plants and their benefits to gardens and salmon habitat. These practices can initiate individual involvement in salmon-friendly gardening practices, promote knowledgeable perspectives around native, nonnative, and invasive plant use in garden spaces, and cultivate passion for salmon habitat restoration and conservation. Amplifying these practices in marine science communication can promote the connection of terrestrial and marine environments and facilitate better human relationships with the broader environment, creating more resilient spaces in the face of climate change.

MANAGE THE METAVERSE: PRIORITIZING SOCIAL MEDIA FOR ENVIRONMENTAL OUTREACH. Session: A, Breakout Room #13
Jayce Knerr*, @Jayce_knerr, Program on the Environment, University of Washington
Site Supervisor: Marjorie Lodwick, United States Fish and Wildlife Service
Faculty Advisor: Tim Billo, Program on the Environment, University of Washington

We are living in a new digital age where having a strong social media presence is important for expanding project outreach. Environmental organizations need to prioritize online outreach more taking advantage of what social media has to offer. The purpose of this study was to figure out why specifically photography and videography are so successful when sharing content to people in online platforms. I interned with the U.S Fish and Wildlife service in Leavenworth WA, where I worked with the Leavenworth National Fish Hatchery, Mid-Columbia Conservation Office, Trout Unlimited, and NOAA. During my time there I created 8 short documentary videos and

300 photographs for all of the organizations to use for social media. The content I created will be used as examples for the research I did dissecting the traits that make them so valuable for content sharing. With a vast majority of people using social media in their everyday lives, it makes sense to prioritize environmental content sharing to help increase community engagement and overall project outreach. Platforms like YouTube have increased the demand/ use of video, which has been even more successful than just sharing images with text. These results are important because increased community engagement with environmental organizations and projects are vital for future success. Having increased growth is crucial not only for environmental organizations, but any business outline. Implementing consistent postings of professional photo and video related content can help with social media growth and possibly spread your message to a much wider audience.

WASTE NOT, WANT NOT: A DOWN-TO-EARTH ANALYSIS OF COMPOSTING PROGRAMS IN K-12 SCHOOLS. Session: A, Breakout Room #14

Mia Lawson-Henze*, @Mia_LawsonHenze, Program on the Environment, University of Washington
Site Supervisor: Maggie Brown, Cedar Grove
Faculty Advisor: Yen-Chu Weng, Program on the Environment, University of Washington

Globally, food waste contributes to roughly 8% of annual greenhouse gas emissions. Implementing a commercial composting program to address the issue of food waste in grade schools presents a unique opportunity to both divert food from the landfill and introduce environmental education topics to students. The aim of this study was to identify the benefits and barriers to composting in a K-12 setting in order to explore methods of supporting schools with commercial compost implementation. I began my research by conducting a literature review, and then created a survey and distributed it to over 300 K-12 schools in various districts across King County. I asked them to identify top barriers and benefits they faced, as well as supports to help them create a successful program. I found that lack of funding and staff time were some of the biggest barriers, and that an increase in environmental awareness amongst students was one of the biggest benefits. Schools reported that having student engagement opportunities and ensuring available funding were the most helpful supports for a successful program. By 2025, HB 1799 will require organic waste in Washington to be diverted from the landfill, meaning that schools will be compelled to compost. If systems of support are not set up before this blanket measure, composting programs will not achieve their highest possible success. I hope that by beginning to identify barriers to commercial composting, we will be one step closer in providing them the support they need to start diverting their food waste.

BREAKING BARRIERS: SCIENCE COMMUNICATION FOR GOVERNMENT SOCIAL OUTREACH. Session: A, Breakout Room #15

Vanessa Martinez*, @Vanessamarti0, Program on the Environment, University of Washington
Site Supervisor: Hilary Glenn and Meiling Colombano, NOAA Fisheries
Faculty Advisor: Lubna Alzaroo, Program on the Environment, University of Washington

Science-related content has been infiltrating social media platforms for years. However, the larger science community still struggles to create effective and accessible content that highlights endangered and threatened species. Because of the barriers facing science communication efforts, observing and obtaining metrics of engagement on government platforms like Facebook, Twitter, and Instagram is important. This study focused on showcasing to an audience, key issues and events related to endangered and threatened species. To understand the factors of engagement that are necessary for creating effective science communication, this study was conducted in collaboration with NOAA Fisheries West Coast and their platforms in order to curate new scripts for their social media that are specific to the California Central Valley region. Although the endangered winter-run Chinook salmon (Oncorhynchus tshawytscha) and the threatened green sturgeon (Acipenser medirostris) are not seen as flagship species because they are typically not the face of conservation or funding efforts based on the public attitude, posts were found to still return high engagement. Further research showed that scientists communicating with the public needed more resources, like workshops and allotted time to practice outreach specifically designed for social media. Overall, results implicated that there is a desire for less popular species to be emphasized on social media. The results also emphasized the importance of addressing barriers to effective communication strategies such as providing more resources and support for scientists and experts with their public outreach efforts.

POLLINATORS AND COMMUNITY-BASED SOCIAL MARKETING: PAVING A PATH FOR POLLINATOR PROSPERITY. Session: A, Breakout Room #16

Blake Mason*, @BlakeM_242, Program on the Environment, University of Washington
Site Supervisor: Patricia Newkirk and Wendy Ferry, Pollinator Pathway NW, 21 Acres Center
Faculty Advisor: Jeffrey Begun, Jackson School of International Studies, University of Washington

Pollinators play a vital role in the health and stability of ecosystems around the world, and factors such as climate change, habitat degradation, and pesticide use are threatening them. As a result, certain communities are developing environmental programs that aim to address declining pollinator populations and dwindling habitat at the local level. An example of this can be seen in the work being done by Partners in Pollination: Woodinville, which is a community-organized initiative that aims to rally community support around supporting pollinator health and habitat within the City of Woodinville, WA. While assisting in the development of the project, I evaluated the ways the initiative incorporates the primary methods of community-based social marketing (CBSM) to overcome barriers associated with behavior change while simultaneously defragmenting the urban landscape. To accomplish this, I reviewed a variety of sources pertaining to CBSM, behavior change, and the use of games in order to assess how the Partners in Pollination: Woodinville initiative is utilizing effective behavior-changing techniques. To supplement my understanding, I conducted interviews with social marketing experts and

program developers to gain insight regarding behavior-changing strategies. With this information, I found that the Partners in Pollination program successfully utilizes five of the seven tools of behavior change constituted in the CBSM framework, particularly social diffusion, incentives, and convenience. Additionally, my research and involvement in the project encouraged me to look into how gamification has potential positive implications for changing behavior, supporting pollinators, and participating in citizen science.

FROM AWARENESS TO ACTION: HOW COMMUNITY-BASED SOCIAL MARKETING CAN ENHANCE STORM DRAIN MARKERS AND ENGAGE COMMUNITIES.
Session: A, Breakout Room #17
Ashlyn McGarrah*, @mcgashh, Program on the Environment, University of Washington
Site Supervisor: Ry Yahn and Susan Harper, Seattle Public Utilities
Faculty Advisor: Nancy Lee, Department of Marketing and International Business, University of Washington

Stormwater runoff is the biggest ongoing source of pollution in the Puget Sound. Rainwater falls on our roofs, yards, and streets and collects pollutants such as soaps, pet waste, litter, fertilizers, and gasoline and flows into storm drains that lead directly to local waterbodies and eventually the ocean. Most of these sources of pollution are found in everyday items and it is difficult to regulate these behaviors. Municipalities try to prevent these behaviors through storm drain marking, which is the process of labeling drains with visual indicators that urge the public to not dump. This study aimed to identify which types of marking strategies were the most effective in changing behaviors and how to improve storm drain marking based on the principles of community-based social marketing (CBSM). To accomplish this task, I interviewed stormwater managers from municipalities across Western Washington and employees at Seattle Public Utilities about their storm drain marking program. I also did online research on the framework of CBSM and identified common elements of successful campaigns to form criteria to score different types of markers. Findings show that the most common types of marking are stenciling, plastic adhesive markers, and murals. Stenciling was most effective at changing behaviors, according to the CBSM criteria, and could be improved by being tailored to its community. In conclusion, storm drain markers should be evaluated and improved with CBSM so marking programs can be more effective in preventing pollution and reinforcing desired behaviors to protect Puget Sound and its inhabitants.

UNDERSTANDING FOOD SOVERIGNTY AND IMPROVING WAYS TO ENHANCE INDIGENOUS TRADITIONAL FOOD ACCESS ON STATE MANAGED LANDS.
Session: A, Breakout Room #19
Kayley Pingeon*, @Kayley_Pingeon, Program on the Environment, American Indian Studies, University of Washington
Site Supervisor: Max Showalter and Courtney Higgins, Washington Department of Natural Resources
Faculty Advisor: Charlotte Coté, American Indian Studies, University of Washington

State owned land in the United States is intended to be used by the public for trust beneficiaries like school education, as well as for recreational activities. This has come at the expense of many Indigenous peoples whose traditional harvesting and hunting grounds reside on these lands. State lands are open to tribal members, communities often experience barriers to accessing traditional hunting or harvesting areas. Often capitalistic, colonialist structures have aided in lack of resources needed to provide access. The aim of this study is to identify ways in which state agencies can increase Indigenous traditional food access. During my time with the Washington Department of Natural Resources I evaluated factors leading to inequities of current land use for Washington, 29-federally recognized tribes, how the 29-federally recognized tribes are increasing traditional foods access, and how state agencies can contribute to engaging more productively and honestly when engaging in traditional foods and food sovereignty. To accomplish this scholarly literature review, anecdotal evidence gathered, and interviews to better understand the DNR, and the 29-Federally recognized tribes, relations with traditional foods. With this information, I found it vitally important that agencies managing state lands have educated staff on food sovereignty as well as, actively and systematically engage with tribal communities, in a government-to-government fashion, to further evaluate and better traditional food activities, access, and availability. If active engagement and education across state agencies is made priority Indigenous traditional food access will be improved on state lands.

ENVIRONMENTAL JUSTICE EDUCATION: HOW WE CAN CHANGE OUR PLANET AND SOCIETY ONE CLASSROOM AT A TIME. Session: A, Breakout Room #20

Vanessa Reyes*, @vanessar1709, Program on the Environment, University of Washington
Site Supervisor: Stephan Classen, Cascadia College, Rachel Luther, University of Washington Bothell
Faculty Advisor: Eli Wheat, Program of the Environment, University of Washington

Social justice issues are prominent in our society, as are environmental issues. These topics are often connected and frequently overlooked. There is a lack of availability of education and awareness surrounding these topics, and they are difficult to explain to young children. The purpose of this study was to find the challenges and opportunities within teaching K-12-aged children about environmental justice issues. To accomplish this task, I conducted interviews with environmental and education experts as a podcast co-host for the Common Caws for Sustainability Podcast, surrounding interview subjects and questions of environmental education and justice. I also collected evidence through a literature review and an online survey given to University of Washington students in the Program on the Environment. There are several challenges that appear when educating children about environmental justice issues, including sensitivity and complexity of topics, societal institutions that do not prioritize eco-justice pedagogy, and a general lack of access to environmental education. However, these challenges can be overcome using several different opportunistic approaches or a combination of them, including immersing children in nature, community-based activities such as a neighborhood trash pick-up, and tangible incentives like treats or extra play time. Educating children about the environment and our society is critical for fostering a generation that is accepting of diversity and inclusion and supports environmental stewardship. By doing so, we can aim toward a more promising future for our planet and disproportionately impacted communities.

HISTORY V. MILLER FREEMAN: WAYS ENVIRONMENTAL COMMUNICATION CAN BETTER ENGAGE DIVERSE COMMUNITIES. Session: A, Breakout Room #21

Gian Rosario*, @_GN_Rosario, Program on the Environment, Political Science, University of Washington
Site Supervisor: Lisa Hiruki-Raring, National Oceanic and Atmospheric Administration, Alaska Fisheries Science Center
Faculty Advisor: Lubna Alzaroo, University of Washington

The purpose of the study is to examine how government institutions exacerbate environmental justice issues, mainly by exploring the United States' racial history and how it intersects and perpetuates today's environmental justice issues. Looking at history and its connection to current environmental justice issues, we can learn to prevent similar issues from reoccurring and create a more inclusive environment. The National Oceanic and Atmosphere Administration (NOAA) Miller Freeman/Bell Shimada exhibit project explores the role of Miller Freeman as a publicist who advocated for marine conservation and the exclusion of people of Japanese descent on the West Coast. The internship aims to update a physical exhibit on the NOAA Ship Miller Freeman to include left-out history and reflect the diversity of NOAA's workforce. To accomplish this task, I researched and collated Miller Freeman's marine conservation efforts and anti-Japanese, as well as Bell Shimada's contributions to NOAA. Main evidence collection methods included collaboration with NOAA staff, who provided documents such as family collection photos and documents that corroborated timeline events, research at the UW library collections/digital archives, NOAA Western Regional Center Library, and visiting NOAA sites such as the Montlake lab, which contained historical materials.

TALKING TRASH: EVALUATING EFFECTIVENESS OF PUBLIC OUTREACH IN SOLID WASTE. Session: A, Breakout Room #22

Risa Suho*, @risa_suho, Program on the Environment, University of Washington
Site Supervisor: Sally Hulsman and Rich Gacer, Seattle Public Utilities, Solid Waste Division
Faculty Advisor: Kristi Straus, Program of the Environment, University of Washington

Seattle Public Utilities have been managing the composting and recycling services in the city for years, but there is still a massive amount of waste that could be recycled or composted. If 10% or more of a bin has materials that don’t belong to the bin, such as garbage in a recycling bin the recycling bin will not be recycled, and contents will be dumped in a landfill. When wrong materials are discarded into the wrong bin, this is then considered a contamination. To minimize levels of contamination in Seattle, Seattle Public Utilities developed the Code 17 program. This program is different forms of outreach from letters, oops tags, phone calls and if needed in-person inspections. However, we need to monitor if these efforts were successful in the goal of reducing levels of contamination over time. General results support that outreach efforts do aid in reducing levels of contamination. Through the data analysis and qualitative experience, we have learned there are areas of improvement such as focusing on certain zip codes and identifying if current methods are effective. In order to minimize this issue, we must improve

people's access to information and resources by evaluating the current effectiveness of current public outreach strategies.

THE SURVIVAL OF FOOD RECOVERY PROGRAMS: UNDERSTANDING THE CHALLENGES AND OPPORTUNITIES FOR PARTNER ORGANIZATIONS.
Session: A, Breakout Room #23
Gia-Bao Tang*, @Tang_GiaBao, Program on the Environment, University of Washington
Site Supervisor: Danny Barksdale and Ainsley Meyer, FareStart
Faculty Advisor: Eli Wheat, Program on the Environment, Food Systems Nutrition and Health program, University of Washington

Food recovery is an important aspect of the global food system, as it diverts food from going to waste, and redirects it for human consumption to people who need it most. Typically, recovered food comes from gleaning, which is gathering excess produce or crops after harvest, and donations from growers, commercial produce farmers, distributors, grocery stores, and farmer's markets. These entities partner with food recovery organizations to minimize produce loss and improve food security, especially for vulnerable, socially disadvantaged communities. However, food recovery programs are new, and each can adopt a different model for food rescue. This makes it difficult to compare effectiveness between programs, especially when effectiveness metrics are inconsistently measured, and studied outcomes vary across assessments. The aim of this study is to assess the inefficiencies of FareStart food recovery program from the perspectives of partner organizations. To accomplish this, I assisted FareStart in daily food recovery operations and conducted formal interviews with FareStart food recovery programs focused on the successes, challenges, and impacts the partner organizations experienced. Alongside these interviews I conducted a literature review on existing studies to contextualize my project to a broader scope of food recovery programs. Findings show that FareStart partners struggle with funding as non-profit organizations, with a reliable volunteer base, and with unclear use, impact, and recipients of their donations. Understanding how to best support food recovery partners can ensure the longevity of the program, and the impact it has on alleviating food insecurities and reducing food waste in local communities.

FRUIT PRODUCTION WITHIN SEATTLE: CLIMATE CHANGE & ENVIRONMENTAL JUSTICE. Session: A, Breakout Room #24
Taylor Thao*, @TaylorThao23, Program on the Environment, University of Washington
Site Supervisor: Annie Nguyen, City Fruit
Faculty Advisor: Lubna Alzaroo, Program on the Environment, University of Washington, Eli Wheat, Program on the Environment, University of Washington

Climate change is an ongoing crisis throughout the world, which could potentially impact millions of people and many ecosystem species. Seattle, Washington appears to have a decline in viable fruit production, mainly due to extreme weather. Extreme weather events such as Seattle freeze and heat waves impact the development of fruit trees which ultimately influences both the quality and quantity of fruits. The shortage of fruit could cause further food insecurity thus

intersecting with the environmental justice issue. City Fruit is committed to assisting local orchards in growing feasible fruits as well as preserving fruit trees. The aim of this study is to address climate change and promote environmental justice in the lenses of fruit production. Interning at City Fruit granted me valuable insights on tree management through volunteering events and hands-on workshops. I was also able to explore the organization's database to examine statistics about various fruit tree productions. Along with my independent research reports, I discovered ways to mitigate impacts on fruit trees from extreme weather events and Seattle's urban environmental factors. These findings are important, because climate change is an ongoing crisis that is both urgent and inevitable. The crisis is not only a sophisticated and complex issue, but also a multifaceted issue caused by human attitude and behavior towards nature. The most effective approach to combating this issue is to better understand its impacts and maximize the reduction of those impacts.

STORMWATER AWARENESS: THE IMPACT OF PUBLIC EDUCATION AND ENGAGEMENT PROGRAMS. Session: A, Breakout Room #25

Christian Vargas*, @ChrisVarEnvr490, Program on the Environment, University of Washington
Site Supervisor: Ry Yahn and Susan Harper, Seattle Public Utilities, Pollution Prevention Community Engagement
Faculty Advisor: Clare Ryan, Environmental and Forest Sciences, University of Washington

Raising public awareness of stormwater pollution is vital to reduce polluting behavior and is required by the Clean Water Act of 1972. Furthermore, rising sea levels and seasonal flooding from heavy rain events are disproportionately affecting regions in King County. The purpose of this study was to determine the effectiveness of public education and engagement programs in raising awareness of stormwater pollution in the public. To determine the effectiveness of education and engagement programs I collected data through a pre- and post- survey from a group of the Duwamish Valley Youth Corp who participated in mural design workshops and stormwater education lectures. Additionally, I conducted research on effective public education, public outreach, effective use of signs and public art, and positive behavior change. Findings show that education and engagement programs are effective in raising awareness of stormwater pollution and have positive behavior change impacts. However, continued programs with the same group may lead to saturation of content and a decrease in effectiveness. As public education and outreach programs are both a time and financial commitment for local municipalities, understanding how much to invest for the most return can determine if a program will be effective and reach the desired goals.

DECOLONIZING STRUCTURAL RACISM IN THE US FOOD SYSTEM: CENTERING BIPOC VOICES. Session: A, Breakout Room #26

Emma Lee Ward*, Program on the Environment, Environmental Studies and Anthropology, University of Washington
Site Supervisor: Ainsley Meyer, FareStart Food Recovery Innovation Employee; and Danny Barksdale, FareStart Food Recovery Program Manage
Faculty Advisor: Dr. Eli Wheat, Ph.D. in Biology, a Professor at the UW

The US agricultural system has a history of discrimination towards Black, Indigenous, and People of Color (BIPOC) farmers, which has directly contributed to white and non-Latino farmers owning more land and generating more farm-related wealth than farmers of color at overwhelmingly high levels. For my research, I aimed to amplify the voices and experiences of BIPOC farmers, with the goal of discussing what challenges they face and exploring ways to address those challenges. During my internship with the food recovery nonprofit FareStart, I conducted interviews with local farmers with whom I developed a professional relationship, as well as carried out independent research. Addressing the types of discrimination farmers face today can lead to a more inclusive and diverse agricultural sector, promote environmental justice, and advance social equity in the US. According to my findings, owning or accessing land, discriminatory lending practices, hindrances to accessing or being excluded from markets, lack of representation, lack of data being available, language/cultural barriers, and environmental injustice are the most substantial factors contributing to BIPOC farmers' discrimination. Moving forward, my findings show that outreach and technical assistance, addressing health disparities, increased funding/reparations, increased representation, more comprehensive data, as well as cooperative ownership models all have the potential to reverse systemic violence and disparities within the agricultural system.

TRANSIT AT YOUR FINGERTIPS: LINKING SOCIAL MEDIA TO ENVIRONMENTAL ACTION. Session: A, Breakout Room #27

Madison Warnock*, @maddwarn, Program on the Environment, University of Washington
Site Supervisor: Joe Reilly, Seattle Subway
Faculty Advisor: Jason Young, Senior Research scientist, University of Washington iSchool

Concern for the climate crisis is rising and so is the need for a rapid reduction in carbon emissions. In 2020, 61% of Seattle’s carbon emissions came from the transportation sector, which has also led to Seattle having a horrible reputation for traffic. So, one way to reduce a large sector of emissions and reduce city traffic, is by adding more light-rail transit to our city, and to do that we need to effectively communicate with the public! The aim of this study was to evaluate the methods used by Seattle Subways online social media engagements with the public and how the public engages with their social media accounts. To examine their social media engagement, I created an audit of their social media posts, and categorized the top posts (by highest number of likes and by year) focusing on tones, themes, and the target audience of each post. My findings show social media content that is on brand with the mission receive more engagement than post that are less focused on the goals and mission of the organization. My findings also show that conducting audits, surveys, and creating metrics for measuring civic action are very much needed to measure environmental action. My findings show how important effective communication is to creating engaging content for the public, which can facilitate learning and education. Additionally, effective communication can support organizations by helping them to better understand their impacts, which in turn can spur positive environmental impacts.

EMPHASIZING IMPACT: EXPLORING EFFECTIVE PROJECT REPORTING STRATEGIES FOR GRANT-FUNDED SUSTAINABILITY INITIATIVES. Session: A, Breakout Room #28
Gulsima Young*, @gy_capstone, Program on the Environment, Information School, University of Washington Site Supervisor: Tatiana Brown, Campus Sustainability Fund, University of Washington Faculty Advisor: Kyle McDermott, Campus Sustainability Fund, University of Washington

Grant-funded efforts are integral to sustainability work, yet it is difficult to measure the impact that these interdisciplinary projects have. Thus, metrics must be collected to evaluate how projects are reaching their goals, receiving necessary support, and making a community-engaged impact. This research is conducted through an internship as the Project Development Specialist at the Campus Sustainability Fund (CSF). The CSF is a student-run and student-funded grant program at the University of Washington whose mission is to promote resilience, equity, and justice-centered sustainability on campus. This research provides recommendations for how the CSF's current quarterly reporting process can be enhanced to better measure project impact. This is investigated through stakeholder interviews with (1) current CSF-funded project teams and (2) sustainability-focused grant organizations at other universities. Based on research findings, it is recommended that instead of developing a new reporting process, the CSF should dedicate time to improving the existing system. This should be pursued by exploring routes for project categorization and metric development beyond implementation-oriented phases. Additionally, the CSF should seek to implement a more structured schedule for project check-in meetings. Lastly, the CSF should assess the potential for integrating creatively-focused reporting methods. These findings will enable the CSF to meaningfully improve its reporting process, which will position the CSF to better understand and communicate project impact, expand funding opportunities, reach new audiences, and sustain funded projects. Ultimately, this research will provide a framework for the CSF and other grant organizations to more effectively support interdisciplinary, justice-centered sustainability initiatives.

EUROPEAN ORIGINS OF SILVICULTURE AND ITS EFFECT ON PACIFIC NORTHWEST FORESTRY. Session: B, Breakout Room #1
Margaux Clarke*, @ClarkeMargaux, Program on the Environment, University of Washington
Site Supervisor: Rowan Braybrook, Northwest Natural Resource Group
Faculty Advisor: David Montgomery, Earth and Space Sciences, University of Washington

Historically forests across the globe have been degraded due to forestry practices that did not prioritize the health of forests. These practices tended to include operations where there was no attempt to regenerate the forests after use or the methods over-simplified forest structure and composition. Mismanagement like this will ensure quicker degradation of resources and services as well as increase the impacts of climate change. The purpose of this study was to understand how forestry has evolved and changed since these more rudimentary practices and particularly how the forestry in the Pacific Northwest has been shaped by its European origins. To accomplish this task, I interned with the Northwest Natural Resource Group (NNRG) on a project that worked to adapt forests to climate change, as well as I conducted extensive literature

review and carried out informal interviews. From my research, there has been a growing trend of shifting forestry objectives towards increasing the health of forests by increasing forest complexity. I was able to see this firsthand in the project I worked on for NNRG which is studying the impact of small patch cuts and thinning in a forest in order to increase snow accumulation (and therefore water supply). These methods, which originate from earlier European silviculture methods, are practiced in such a way that it adds complexity to the forest structure. Continuing this shift towards valuing forest complexity is going to be the key to sustaining and maximizing healthy forests.

SAVING THE SEA LIONS ONE CLICK AT A TIME: USING ARTIFICIAL INTELLIGENCE TO TRACK STELLER SEA LION POPULATIONS. Session: B, Breakout Room #2

Kate Connelly*, @KateConnelly125, Program on the Environment, University of Washington
Site Supervisor: Burlyn Birkemeier and Katie Sweeney, National Oceanic and Atmospheric Administration, Marine Mammal Laboratory
Faculty Advisor: Chris Anderson, School of Aquatic and Fisheries Sciences

Steller sea lion populations in Alaska have been variable over the past few decades and currently, the Western population is on the endangered species list. This means the National Oceanic Atmospheric Administration (NOAA) is responsible for producing a population assessment each year. This is conducted by counting each sea lion from thousands of aerial images, which can take up to 9 months to complete. Therefore, NOAA is working to implement artificial intelligence software to increase the speed of this process. This project aimed to determine if it is beneficial for NOAA to implement an artificial intelligence software into their work system, specifically into the Steller sea lion research group. During my internship with NOAA, I was responsible for checking the accuracy of the detections made by the AI software. I performed quality control assessments on thousands of detections. I then processed the information and determined the software's accuracy, 80%, a number that will continue to increase. Concluding that it would be beneficial when conducting reports for Steller sea lions and other marine mammals and allowing more time to work on conservation efforts or other projects. Artificial intelligence is still very new in the environmental field and there are only a few projects using it to assist in their work. But I do believe that there is a future for AI in this field and NOAA should spend the time and resources on implementation.

RETHINKING ENVIRONMENTAL ASSESSMENTS: UNLOCKING THEIR POTENTIAL WITH ENVIRONMENTAL JUSTICE. Session: B, Breakout Room #3

Isabel Corona-Campiz, @belcoronaa, Program on the Environment, American Ethnic Studies, University of Washington
Site Supervisor: Max Showalter and Stefan Petrovic, Washington State Department of Natural Resources
Faculty Advisor: Rubén Casas, Urban Environmental Justice Initiative Lead, School of Urban Studies, University of Washington - Tacoma

Environmental justice (EJ) is crucial as it considers the various obstacles overburdened communities encounter. EJ is especially vital when constructing evaluations that influence future

actions. So, what role do environmental assessments play in all of this, and more importantly, how can we avoid further marginalizing already burdened communities? This study aims to identify the obstacles and opportunities of constructing an environmental justice assessment. As the environmental justice intern at the Washington State Department of Natural Resources (DNR), I was tasked with creating a pilot environmental justice assessment (EJA). I collected evidence from informal interviews, extensive research analysis, and DNR staff feedback. After consolidating all the evidence, I determined that a three-step approach can address various concerns about the integration of EJ into environmental assessments. This straightforward yet comprehensive three-step approach consists of a pre-assessment, EJ assessment, and post-assessment. The significance of these findings lies in their potential to establish an unbiased environmental evaluation process that does not disproportionately impact already marginalized communities. Finally, this three-step approach offers a clear strategy for conducting environmental justice assessments and contributes to the scarce knowledge available.

PLASTIC POLLUTION POLICY: HOW CERTAIN PERSPECTIVES CAN PLAY A LARGE ROLE. Session: B, Breakout Room #4

Jessica Day*, @jdayuw, Program on the Environment, University of Washington
Site Supervisor: Ben Enticknap, Pacific Campaign Manager & Senior Scientist, Oceana
Faculty Advisor: Kristi Straus, Program of the Environment, University of Washington

Plastic pollution has increased over the years, leading to more plastic waste runoff into our oceans, harming marine environments. The younger generation has shown a large level of concern for environmental problems, despite having a large concern, many young people do not know specific steps to make an impact on the pollution problem. This study aimed to understand the perspectives that the University of Washington students have on plastic pollution and conclude ways in which we can engage and educate college students on environmental issues. To answer, I focused on advocating for two plastic reduction bills in Washington while interning with Oceana. My main research was accomplished by creating a survey for students about plastic pollution, distributing a petition in favor of the bills, and designing a toolkit to amplify the policies. After concluding my research, I discovered that service learning was an important way to educate and engage students on the environmental issue of plastic pollution. Engagement in policy analysis and providing a toolkit for individuals to engage in can also be added for extra engagement and education. These results are significant because we can reduce overall plastic pollution if more individuals understand the issues and the solutions surrounding it. Service learning can also be used to engage and educate students on any topic in the environmental world. If plastic pollution is reduced by passing policy, we can help heal the ocean's biodiversity, decrease the number of marine animals injured, and save humans from plastic contamination.

WATER CONSERVATION PROGRAMS: HOW MUNICIPALITIES CAN SAVE MONEY, WATER, AND SALMON. Session: B, Breakout Room #5

Sofia Dreessen*, @DreessenSofia, Program on the Environment, University of Washington
Site Supervisor: Kirsten Harma, Chehalis Basin Partnership
Faculty Advisor: Emily Hovis, Environmental and Occupational Health Sciences, University of Washington

Climate change has led to increased variation of stream-flows, which can reduce the availability of water for people and river ecosystems. Ensuring that water is used as efficiently as possible by communities and municipalities can benefit stream ecosystems and provide more consistent and equitable water supply down the line. Municipal-level water conservation programs are a common method to reduce water-use overall and address these issues, but exploring how these programs can be more effective and comprehensive has implications to improve available water quantity. This study focuses on the various methods that cities can implement to reduce water use, how these methods can be more effective, and the level of support that municipal employees have for each of these options. Through case-study analysis, literature review, and informal interviews, a variety of water-conservation measures were collected. Then, the applicability of these metrics was evaluated through survey responses from local municipal employees. On the municipal side, it was found that cities can update and expand their infrastructure, change their water rate structures, and participate in behavior-changing outreach efforts to reduce water-use. On the residential side, landscaping changes and replacement of high-use water appliances can also effectively reduce use. These options can effectively reduce water-use and better prepare residents, stream ecosystems, and municipalities for hydrological alterations due to climate change and they do so without reducing equity in water access or income for municipalities.

REGULATING THE UNKNOWN: A REVIEW OF WHALE AND VESSEL COLLISIONS AND THEIR POLICY IMPLICATIONS. Session: B, Breakout Room #6

Emery Edwards*, @emeryjea, Program on the Environment, Political Science, University of Washington
Site Supervisor: Dan Lawson and Justin Greenman, NOAA Fisheries Office of Protected Resources Division
Faculty Advisor: Trevor Branch, Aquatic and Fishery Sciences, University of Washington

Whale and vessel collisions are a rising concern for whale species as the size and weight of traversing vessels, in tandem with the overall increase in shipping traffic, have led to a rise in deaths by collision. The nature of this topic leaves much information unknown whether because of international under-reporting, the collision not being observed due to ship size, low carcass recovery rates, etc. It is essential to address this issue as these concerns rise and climate change drives migratory populations closer to high-traffic areas to feed. In order to address this broad issue facing the West Coast Region (WCR), I worked with NOAA Fisheries evaluating collision entries from 1980-2022. I assessed all available data points to aid the construction of a preliminary national vessel collision database. Through this process, I was able to uncover information in text fields and reports, such as the portion of vessel struck that had not yet been

evaluated for the WCR. This consequently informed which fields will be included in the national database. In the last two decades, collision rates have been rising, and with that comes a need for policy mitigation strategies. For the completion of my independent research, I evaluated the effectiveness of mandatory and voluntary speed reduction programs through a literature review and assessed ways they may apply to the WCR,Äôs rising concerns. My research has concluded that the WCR must pursue a mandatory speed reduction program to mitigate whale deaths to best serve the whale populations of the region.

ENSURING THE SUCCESS OF RESTORATION PROJECTS: THE IMPORTANCE OF RESTORATION TECHNIQUES & MONITORING. Session: B, Breakout Room #7

Quinn Friang*, @friang_q, Program on the Environment, University of Washington
Site Supervisor: Sebastian Ritacco, Sammamish Parks and Recreation
Faculty Advisor: Tim Billo, Program on the Environment, University of Washington

Ecological restoration is a vital part of combating climate change. Some problems that have arisen with ecological restoration are poor management of completed restoration projects and not determining the correct restoration techniques to use. This is important because if a restoration site is not managed and monitored after a project is complete, the progress will become completely reversed. Similarly, if the correct restoration techniques are not determined based on an area's climate, the restoration project will not be set up for success. The purpose of this study is to determine the best restoration techniques for different parts of Washington state, and to stress the importance of monitoring restoration sites. In order to accomplish this I helped to survey over 50 trees and bushes in an area covered in invasive blackberry bushes. Factoring in the climate of the area the site was in and what trees and bushes thrived the most, myself and another intern developed a restoration plan for the site. In addition to this I researched the climate of both eastern and western Washington, as well as looking into the importance of monitoring restoration sites. The results showed how much climate can impact what restoration techniques work the best in certain areas. My research also stressed the importance of continuous monitoring of restoration sites in order to ensure success. Determining helpful restoration techniques and monitoring completed restoration sites go hand in hand to ensure a successful restoration project.

THE RISE OF MACHINE LEARNING IN MARINE ECOLOGY RESEARCH. Session: B, Breakout Room #8

Nicole Garces*, @ Nicole_Garces2, Program on the Environment, University of Washington
Site Supervisor: Molly McCormley, Marine Mammal Lab, National Oceanic and Atmospheric Administration.
Faculty Advisor: Andre Punt, School of Aquatic and Fishery Science, University of Washington

As more species are listed under the Endangered Species Act (ESA) because of factors such as over-exploitation, damaged habitats, and resource competition leading to a decline in their

population size, the countries in which these species are found must do their part in protecting, monitoring, and recovering them. One new innovative way to monitor such species is through the use of machine learning (ML). This involves using pattern recognition methods based on Artificial Intelligence (AI) techniques to identify animals to allow monitoring of populations and migrations. This project with the National Oceanic and Atmospheric Administration (NOAA) aims to study the reliability of ML for Steller Sea Lions (SSLs) in the Aleutian Islands, which are classified as the western distinct population under ESA. The reliability of AI will be evaluated by comparing human-monitored observations of each sea lion with the ML algorithm's outcomes. To accomplish this, I participated as an observer of SSLs that would act as comparative data to multifunction on how accurate NOAA's current AI model is improving, and to feed in new observed data for the AI to learn. With the final comparative data of my work to the AI model, I found an increased miss rate of SSLs by the AI model, but additionally increased at catching SSLs that I the observer missed. This project will serve as one of several baseline tests to assess whether it is possible to efficiently monitor the impact of humans and global warming on animal health, distribution patterns, and population size.

EVALUATING THE FEASIBILITY OF EXPANDING RECYCLING IN THE SOUTHWEST US AND ITS IMPACTS ON PUBLIC LANDS. Session: B, Breakout Room #9

Casey Gilson*, @caseygilson490, Program on the Environment, University of Washington
Site Supervisor: Anna Wilson and Hannah Johnson, Human Eco Consulting LLC
Faculty Advisor: Sam Kay, Department of Geography, University of Washington

In the United States, waste management services are utilized to manage and dispose of waste created by individuals and communities. Improper waste management can have devastating impacts on the environment and can be detrimental to human health. Many areas across the US experience limited access to waste management services. As an intern at Human Eco Consulting, I organized and analyzed data and information regarding waste management at National Forests in the Southwest US and performed waste audits to understand the current services provided at National Forests. This project provided insight into the broader recycling habits of the Southwest region and indicated the lack of recycling infrastructure in both Arizona and New Mexico. The purpose of this study was to examine the advantages and barriers of expanding recycling initiatives in the Southwest US and also sought to understand how these initiatives can be used by National Forests in the region. I conducted expert interviews to gain insight from professionals with waste management experience in the Southwest and also conducted literature review, utilizing these sources to gain insight into waste management and recycling, both domestically and internationally. Through this research, I concluded that barriers to expanding recycling initiatives in the Southwest US include education, infrastructure, economic, environmental, and policy/regulation. Advantages to expanding recycling initiatives include encouraging environmental preservation and acknowledging issues of how waste is currently managed. Expanded recycling initiatives mean more opportunities for national forests to participate in sustainable waste management and encourage better waste habits from visitors.

A HISTORY OF HEAVY HARVESTING: THE EFFECTS OF LOGGING ON RIPARIAN ZONE FORESTS. Session: B, Breakout Room #10

Karena Iliakis, @IliakisKarena, Program on the Environment, Geography, University of Washington
Site Supervisor: Teodora Minkova and Warren Devine, Washington State Department of Natural Resources
Faculty Advisor: Van Kane, School of Environmental and Forest Sciences, University of Washington

The Olympic Peninsula has a lush environment, and notably, riparian zones, the areas between rivers and dry land, are imperative for many healthy ecosystems. However, the peninsula also has a strong logging industry, which has historically disrupted riparian zones through intensive clear-cuts. It is important to understand how these forest stands have recovered after logging events to ensure a healthy ecosystem and better protect riparian zones that may still be recovering. The purpose of this research is to analyze how forests in riparian zones within the Olympic Experimental State Forest (OESF) have recovered after historical logging events. To accomplish this task, I created a map detailing historical logging in 16 watersheds within the OESF. Then, I gathered data on the health of forests in OESF's riparian zones, such as the count of live and dead trees and biodiversity. This was followed by an analysis of these variables in relation to the most recent year of harvest. Many riparian forests that were harvested from 1940 onward show signs of recovery, such as natural forest successional patterns and high biodiversity of trees. Recently harvested areas had the lowest biodiversity, but they still show signs of expected forest succession. Areas that have been harvested should continue to be monitored for changes in regrowth, but these results show that best management practices meant to protect forests in Washington are working. Identifying areas that have recovered or need aid can also help in focusing restoration efforts where it is needed most.

PEDESTRIANIZIN PIKE PLACE MARKET. Session: B, Breakout Room #11

(Henry) Tsz Him Lau, @HenryTszHimLau, Program on the Environment, University of Washington
Site Supervisor: Gordon Padelford, Seattle Neighborhood Greenways
Faculty Advisor: Tim Billo, Program on the Environment, University of Washington

Pedestrianization is an increasingly popular approach to urban transportation and environmental planning. Meanwhile, Pike Place Market is one of the greatest and oldest farmers markets in the US, it was originally designed for pedestrians but is currently dominated by vehicles. The purpose of this study was to collect opinions about the idea of pedestrianizing Pike Place Market from workers at the market. to accomplish this task, I interviewed business owners and employees at the market, and utilize literature research. The results show interviewees overwhelmingly support the idea. Pedestrianization can provide numerous benefits, including benefits in economic; social; environmental; health; and more equitable society. However, implementing pedestrianization can be challenging. Barriers include opposition from residents

and local merchants, cost recovery, and the lack of political support, etc. Despite these challenges, pedestrianization plays an important role in promoting a more sustainable and liveable city, policymakers will need to consider all the important factors and the needs of citizens in designing solutions for urban areas, not limited to Pike Place Market but to all areas in Seattle.

ETHICAL ECOLOGY: ENVIRONMENTAL RESTORATION, JUSTICE, AND TRIBAL SOVEREIGNTY. Session: B, Breakout Room #12

Arlo Liddell*, @almoshansom, Program on the Environment, American Indian Studies, University of Washington
Site Supervisor: Lisa McGinty, Green Seattle Partnership
Faculty Advisor: Tami Hohn, American Indian Studies, University Of Washington

Industrialization has burdened the global environment causing astronomical amounts of degradation, and we are running out of time to protect the longevity of the biosphere. Ecological restoration is an incredibly important tool to mitigate the effects of environmental defilement, as it fights against and heals the abuse bestowed upon the planet and its people. We, as humans, have the utmost responsibility to uphold the health and wellness of our biosphere and its stewards. However, it is not as simple as digging up weeds and planting more trees. To develop a conception of best practices for ecological restoration, I: worked to restore approximately 2000 ft. of urban forest land within Lincoln Park, talked to local tribal leaders of the Duwamish tribe and visited their ecological restoration site, scoured academic databases for case studies and ethics-based environmental restoration projects, and have been advocating, with consent, for the acknowledgment of inherent rights of unadulterated Duwamish use of Lincoln Park for cultural practices. With the inclusion of community participation and education using urbanized restoration projects, large-scale restoration becomes much more achievable. The incorporation of indigenous stewards is paramount to rebuilding a kincentric relationship with nature and restorative ecology, striving against the indoctrination of an authoritative relationship over nature. As we begin to hold each other accountable for the preservation and continued protection of our natural ecosystems large-scale projects will become more attainable, thus having a greater positive impact on the health of the global environment.

INEQUITY IN WALKABILITY AND ACCESSIBILITY: PROMOTING THE PEDESTRIANIZATION OF CITIES
Session: B, Breakout Room #13

Katherine Lykins*, @KatLykins, Program on the Environment, University of Washington
Site Supervisor: Gordon Padelford, Seattle Neighborhood Greenways
Faculty Advisor: Danya Al-Saleh, International Studies, University of Washington

People are the most critical piece of a city’s success. However, many city plans and designs have failed residents while in the development phase, directing attention to the automobile industry and, in consequence, causing neighborhoods to be inaccessible to pedestrians and making walkability near impossible. While each individual of all backgrounds faces the implications of

our society built for cars, minority demographics often bare the brunt of the burden. Ethnic minorities and low-income residents are disproportionately affected by inadequate access to transportation and are subject to urban sprawl developments requiring a car. This study aimed to understand the importance of walkability and accessibility throughout Seattle by identifying bus routes, existing public transportation options, and neighborhood layout concerning demographic. To achieve this task, I utilized the Seattle Department of Transportation bus route map and looked at the locations and increments of time between each bus. I also used public Seattle databases and GIS mapping systems to indicate ethnic minorities and low-income areas. Once those had been found, I overlaid the map with one that displayed neighborhoods that had been historically redlined. The findings show that Seattle continues to be hyper-segregated, and locations of lower income are the least walkable and accessible by public transit. While the city of Seattle and nonprofit organizations are working diligently to combat the discrepancies in accessibility, radical change must be made in order for equality to be reached. Cities in the United States should increasingly be modeled after those in Europe which often ensure walkability and should decreasingly be designed with cars at the center of mind - as people are always the center of a city.

EXPLORING WAYS TO ACHIEVE ECOLOGICAL RESTORATION GOALS WHILE PROMOTING EQUITY AND JUSTICE. Session: B, Breakout Room #14

Sandy Reyes Tena*, @SandiaRTC, Program on the Environment, Spanish & Portuguese Studies, University of Washington
Site Supervisor: Sebastian Ritacco, City of Sammamish Parks and Recreation
Faculty Advisor: Joyce K. LeCompte, Program on the Environment, University of Washington

Rapid urbanization is causing the health of ecosystems to deteriorate, and with the human population expected to grow in the coming years, solutions to this environmental deterioration are required. Doing restoration work is often seen as a benevolent act used to restore ecosystems that have been and continue to be degraded, especially due to anthropogenic factors such as deforestation and land-use change. While this work is necessary, it is essential to remain critical of its pitfalls and the ways in which restoration work can be improved upon. This project aims to find ways to improve restoration work and integrate more equitable practices, such as including more people of color. Through online surveys given to park stewards, a restoration plan and proposal, and hands-on restoration work with the City of Sammamish Parks and Recreation, the project will add to the body of knowledge surrounding restoration and make it more inclusive. With that information, I found that volunteers believe the best way to improve equity in the restoration field would be to reach out to ethnic-owned businesses and advertise events in multiple languages. Doing this will also aid in the process of including environmental justice in restoration work, allowing the City of Sammamish Parks and Recreation to gain more support for its restoration work and encourage community participation in its efforts.

USING UNDERWATER VIDEO ANALYSIS TO UNDERSTAND FISH RESPONSES TO BOTTOM TRAWL GEAR AND REDUCE BYCATCH OF THREATENED GREEN STURGEON. Session: B, Breakout Room #15

Caity Rigg*, @caityrigg, Program on the Environment, 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

There is a threatened population of green sturgeon in California's rivers and coastal waters that is found in the California halibut bottom trawl fishery as bycatch. Studies show that the post-release mortality rate of these fish is 18% due to stress and injury during handling, so the aim of this study is to create mitigation techniques to avoid bycatch. I conducted an internship with NOAA Fisheries, in partnership with California Department of Fish and Wildlife, to analyze footage from cameras that are placed in the nets of bottom trawls. I recorded each species and its response to the net to better understand their interactions with it and develop solutions with engineering modifications to the net. My research looked at two possible bycatch mitigation techniques. I compared the use of light-touch bottom trawls over traditional bottom trawls with data from my video analysis. I also conducted a literature review to explore the impact that using illumination on the nets may have on fish responses. Though the use of light-touch bottom trawls does not seem to impact the target catch, there is not yet enough data to draw significance in the effects on green sturgeon. Studies from a literature review support that the illumination technique may be utilized, as sturgeon seem to have a repulsive response to red wavelengths in the visible light spectrum strobing at a low frequency. Moving forward, I suggest a crossover design study that tests the techniques to maintain the sustainability of the California halibut bottom trawl fishery.

COLLABORATING WITH TRIBES AND INTEGRATING INDIGENOUS ECOLOGICAL KNOWLEDGE INTO PLANNING AND MANAGEMENT OF KELP AND EELGRASS CONSERVATION Session: B, Breakout Room #16

Sundus Sabbah*, @sundus_sabbah, Program on the Environment, University of Washington
Site Supervisor: Max Showalter and Csenka Favorini-Csorba, Washington State Department of Natural Resources
Faculty Advisor: Eli Wheat, Program on the Environment, University of Washington

The Washington State Department of Natural Resources is currently developing the Statewide Kelp Forest and Eelgrass Meadow Health and Conservation Plan which will be submitted in September 2023. This plan will establish 10,000 acres of kelp forest and eelgrass meadow conservation sites throughout Puget Sound and on the Washington State coastline. Kelp and eelgrass are essential to the health of marine ecosystems and are culturally significant to Tribes in Washington. The decline of these species negatively impacts populations of fish and shellfish that are central to Tribal subsistence fishing and harvesting practices, and Tribes should have equal opportunity to participate and co-manage the conservation of these species. The purpose of my internship was to identify strategies for engaging and collaborating with Tribes on kelp and eelgrass conservation, and how Indigenous ecological knowledge may be integrated into the planning and management of conservation activities. In order to identify effective strategies, I conducted research on literature discussing the use of Indigenous ecological knowledge and its application to conservation projects. I also conducted a case study on two marine conservation

areas that have successfully collaborated with local Indigenous people in conservation planning and management. In my presentation I will discuss key strategies that I have identified that have been proven effective in the planning and management of marine conservation areas, and how they may be integrated into the Statewide Kelp Forest and Eelgrass Meadow Health and Conservation Plan in Washington State.

HOW ALTERING TRAWL DURATIONS CAN SAVE NONTARGET SPECIES Session: B, Breakout Room #17

Katelyn Saechao*, @katelynsaechao, Program on the Environment, Geography: Data Science, University of Washington
Site Supervisor: Susan Wang, National Oceanic and Atmospheric Administration Fisheries
Faculty Advisor: Yen-Chu Weng, Program on the Environment, University of Washington

The growing population and subsequent rise in food demand have resulted in a heavier reliance on fisheries and trawling. Trawling in fisheries has grown because it is efficient at catching fish by simply dragging a large net across the sea floor. However, trawl nets are nonselective, meaning unintended species can also be caught. This increases the risk of overharvesting and death for unintended species while reducing the chances for target species to be caught due to bycatch quotas. The purpose of this study was to determine ideal trawl durations that decrease nontarget species catch. To address this, I interned with the National Oceanic and Atmospheric Administration (NOAA) Fisheries and analyzed video footage from trawl net cameras to identify how species interact with the net. My observations were recorded in a datasheet where I noted information about the species, number of species encountered, and behaviors exhibited. The findings suggest that as trawl durations increase, nontarget species encounters increase substantially, whereas target species encounters experience a slight increase in comparison. Additionally, the findings suggest that short 30-minute durations could reduce nontarget species bycatch, but less target species might be caught as well. By shortening trawl durations, fewer nontarget and target species are caught, which supports the protection of nontarget species. But this may prevent target species catch from meeting food demand. Therefore, the use of shorter trawl durations in combination with other mitigation strategies must be considered and assessed to achieve the goals of minimizing nontarget species and maximizing target species catch.

TEMPERATURE CHANGES DURING THE PREGNANCY OF THE STELLER SEA LIONS ON THE WEIGHT OF THE PUPS Session: B, Breakout Room #18

Yun seo*, @yseo_uw, Program on the Environment, University of Washington
Site Supervisor: Molly McCormley, National Oceanic and Atmospheric Administration
Faculty Advisor: Randie Bundy, College of the Environment, University of Washington

Steller sea lions are an endangered species under the protection of the Endangered Species Act. Climate change is one of the potential reasons for its unsuccessful population recovery, and such change may pose a threat to the health of the population, as this may cause a decrease in food availability, contaminants, and a variety of other factors. The purpose of this study is to identify a potential reason for why the population hasn’t been recovering, looking for correlation between

rising sea temperature with the weight of the pups, as pup weight can be an indicator of population health. I worked with NOAA to analyze information on the sea lion pup weight in tandem with surrounding sea surface temperature, which was used to determine correlation through statistical methods. With this information I came to the conclusion that while recent abnormalities in sea surface temperature may have had an impact on the Steller sea lion pups, it was more through indirect impacts rather than a direct impact, and further research into what other factors impacted by the sea surface temperature may have contributed to changes on the weight of the pups is necessary. This research has the importance of looking at the impacts of anthropogenic carbon emissions on the decline of health of the Steller sea lions at an early point of their life. Advancements of this research may also be used to understand the impacts of climate change on other sea mammals, which will be important to understand future global patterns.

EVALUATING CLIMATE CHANGE: INCREASING SURVIVAL RATES OF CHINOOK SALMON THROUGH FUNCTIONAL ENVIRONMENTAL RELATIONSHIPS Session: B, Breakout Room #19

Emily Sheppard*, @emilysheppard23, Program on the Environment, University of Washington
Site Supervisor: Dr. Amiee Fullerton and Dr. Morgan Bond, National Oceanic Atmospheric Administration NW Fisheries
Faculty Advisor: Mark Scheuerell, School of Aquatic and Fishery Sciences, University of Washington

Climate change is threatening Chinook salmon populations in the PNW through rising river and stream temperatures. Currently 40% of salmon populations have gone extinct from their natural areas. This is damaging river ecosystems with a lack of nutrients leading to a loss of ecological diversity. The aim of this study was to find ways to increase salmon survival rates by evaluating salmon functional-environmental relationships of different life stages of Chinook Salmon. This in turn can be used to aid research for the development of life cycle models (LMC) used to evaluate how salmon populations are affected by climate change. In the past there has been a lot of research done on the relationships between life stages of salmon, however, there are gaps in this research that lack quantitative data of the viability of any individual life stage in response to future climate change. Closing these gaps will maximize recovery efforts and prevent further environmental impacts on aquatic ecosystems. During my internship with the National Oceanic Atmospheric Administration (NOAA) NW Fisheries I worked with a team of researchers to conduct qualitative interviews of fishery scientists to determine the most influential salmon-functional environmental relationships. I then took this information and worked on finding climate solutions to increase survival among Chinook salmon at the most influential life stage in relation to environmental drivers that were affecting survival. The implications of this study will further increase survival and reduce future effects of climate change in river ecosystems in preparation for a warming climate.

THE OPPORTUNITIES AND OBSTACLES OF LIFE CYCLE MODELS: PERSPECTIVES FROM SALMON ECOLOGISTS. Session: B, Breakout Room #20

Amy Velasco*, @amyvelascoUW, Program on the Environment, University of Washington
Site Supervisor: Dr. Aimee Fullerton, National Oceanic and Atmospheric Administration
Faculty Advisor: Mark Scheuerell, Aquatic and Fishery Sciences, University of Washington

The Life Cycle Model (LCM) is a tool used by NOAA and other groups to predict populations in the face of changing environmental conditions, and these population estimates are often used to inform conservation, restoration, and policy decisions. These models inherently come with some degree of unreliability, and awareness of the challenges that come with modeling can help all users make better judgments and more informed decision making. The aim of this study was to understand where LCMs begin to fail us based on direct opinions of the very scientists that create and use these models. In this internship, I conducted expert interviews with scientists from NOAA, WDFW, USDA, and others to understand the current state of knowledge surrounding salmon ecology, and how LCMs have helped and hindered that progression of knowledge. I then worked to construct and populate a database through which current research and LCMs are synthesized and summarized. Through the interviews, I identified two major categories of concern: lack of data to inform models (likely attributed to underfunding as well as logistical issues of studying live organisms), as well as potential inability to capture the complexity of dynamic living systems. Being educated and understanding the opportunities and obstacles of LCMs can help us use this technology more efficiently. Moving forward, scientists largely agree that LCMs are undoubtedly extremely valuable, just potentially one part of a broader system of tools that can work together to promote more informed decision making.

HOW BLUE CARBON CAN INCREASE THE CONSERVATION AND RESTORATION OF EELGRASS. Session: B, Breakout Room #21

Tia Vontver, @TiaVontver, Program on the Environment, University of Washington
Site Supervisor: Max Showalter and Csenka Csorba-Favorini, Washington State Department of Natural Resources
Faculty Advisor: Sunny Jardine, School of Marine and Environmental Affairs, University of Washington

As the global environment deteriorates, we have begun to realize the value of ecosystem services. Kelp and Eelgrass are important nearshore ecosystems whose ability to sequester and store carbon, or blue carbon potential, can incentivize their protection to maximize the ecosystem services they provide. The aim of this study was to understand what actions and policy mechanisms could be implemented to maximize the protection of kelp and eelgrass based on their blue carbon potential. During my internship, I worked with the Washington State Department of Natural Resources to compile current information on kelp and eelgrass blue carbon in the Pacific Northwest. For my research, I synthesized scholarly publications, conducted conversations with experts, and developed blue carbon case studies on the Skagit and Snohomish Estuaries. I found that kelp's blue carbon potential is highest under aquaculture with active human intervention. Yet, eelgrass ecosystems have blue carbon potential that can be increased by conservation and restoration alone. Therefore, policy solutions include the monetary valuation of the blue carbon potential of eelgrass ecosystems to be used in cost-benefit analyses or as carbon offset credits in the carbon market to develop revenue. With increased

conservation and restoration of eelgrass ecosystems, not only will climate change be mitigated, but many ecosystem co-benefits will be provided, such as climate adaptation, vital habitats for culturally and commercially important species, erosion prevention, and more. If revenue is generated through the carbon market, the Department of Natural Resources can reinvest in Washington State communities or further conservation and restoration.

WHO DO YOU TRUST?: OPPORTUNITIES FOR INCREASING RESILIENCY IN NATURAL RESOURCE MANAGEMENT. Session: B, Breakout Room #22

Elise Wilson-Leedy*, @LeedyElise, Program on the Environment, Marine Biology, University of Washington
Site Supervisor: Allison Bosworth and Evan Sawyer, National Oceanic and Atmospheric Administration
Faculty Advisor: Chris Anderson, School of Aquatic and Fishery Sciences, University of Washington

As climate change increases the frequency and intensity of climatic conditions worldwide, natural resource management (NRM) frameworks must be prepared to adapt and mitigate the impacts on human and natural systems. However, there is not a “one size fits all” solution; resilient NRM institutions must be tailored to the unique biophysical, social, cultural, and economic contexts of specific regions. The purpose of this study was to explore the social context that influences stakeholder engagement with water resource management and species recovery in the Butte Creek and Sutter Bypass regions in the California Central Valley. To achieve this, I conducted a public comment analysis of the 2014 NOAA Draft Recovery Plan for Central Valley Salmonids, stakeholder interviews, and a literature review. Additionally, my internship with National Oceanic and Atmospheric Administration (NOAA) supplemented my perception of the social context between stakeholder groups, as I had the opportunity to experience and engage in natural conversations with NOAA staff and stakeholders. NRM theory states that institutions can increase resiliency through increasing trust diversity. In the Butte Creek and Sutter Bypass regions, increased resiliency can be achieved through the development of rational and affinitive trust types. A key component to increasing trust diversity in a management framework is through identifying, acknowledging, and incorporating diverse stakeholder perspectives into management. Therefore, my research demonstrates that focusing on the unique contexts of NRM frameworks is essential to identifying opportunities for increasing resiliency within local management contexts and also in the face of climate change.

ENVIRONMENTAL JUSTICE FOR AIRPORT COMMUNITIES: REGIONAL TRANSPORTATION PLANNING IN A POST-JET AGE.
Session: B, Breakout Room #23

Aubrey Wisdom*, @aubreywisdom01, Program on the Environment, Urban Design & Planning, University of Washington
Site Supervisor: Noemie Maxwell and Anne Miller, South Seattle Climate Action Network
Faculty Advisor: David Blum, College of Built Environments, University of Washington

According to recent projections, demand for additional airport capacity support continues to grow as both passenger and cargo aviation increases globally. Although the industry comprises a large part of our modern-day transportation and logistics systems, there is insufficient awareness regarding the health and environmental impacts that airports have on nearby communities. Minority and low-income populations are disproportionately affected by air pollution produced by airports and cargo facilities. Despite research showing that trees help mitigate the negative health impacts of these facilities, expansion plans published by the Port of Seattle implicate over 100 acres of forested land around SeaTac Airport for development. The purpose of this study was to evaluate the land use around SeaTac Airport to determine the best pathway forward for protecting this forested land, as well as understanding the larger-scale transportation planning approaches that could ameliorate the environmental injustices experienced by airport communities. To accomplish this task, I evaluated the Port's published development plans and conducted a GIS analysis of land use and tree canopy distribution around SeaTac Airport. I also completed a literature review of airport-community conflicts in the United States and interviewed elected officials and contacts at regional planning organizations. My analysis suggests the path forward must involve collaboration between public and private entities to identify successful opportunities for infill, land swaps, and rezoning of forested land currently designated as aviation commercial. Alternatives such as high-speed rail must be pursued as the environmental health impacts of aviation necessitate change within the field of transportation planning.

UNDERSTANDING THE PAST TO SAVE OUR FUTURE: A CASE STUDY OF STELLER SEA LION MANAGEMENT Session: B, Breakout Room #24

Aria Yang*, @_ariayang, Program on the Environment, University of Washington
Site Supervisor: Burlyn Birkemeier and Katie Sweeney, National Oceanic and Atmospheric Administration, Alaska Fisheries Science Center
Faculty Advisor: Chris Anderson, School of Aquatic and Fisheries Sciences, University of Washington

The alarming rate of biodiversity loss poses a threat to not only our planet's natural systems, but human health and well-being as well. Despite current conservation management efforts, some studies estimate wildlife populations have declined an average of 69% in the last 5 decades. Understanding how conservation management can be improved is crucial. The purpose of this study was to analyze conservation policy and management through the case of the western Steller sea lion, a population that has been listed as endangered under the Endangered Species Act since 1990. To do so, I worked with the National Oceanic and Atmospheric Administration (NOAA) to provide quality control and quality assessment of aerial imagery, gathering data on Steller sea lion population dynamics. Additionally, I conducted a semi-systematic review of relevant literature and analyzed data on population count and key management events. From my research, I was able to identify three areas impeding the effectiveness of Steller sea lion management: insufficient collaboration between agencies, including a lack of consensus surrounding research priorities, inconsistencies in research findings/scientific uncertainty, and a

heavy political influence. Addressing these gaps will be crucial for the long-term recovery and sustainability of this marine mammal population. Ultimately, this case study reveals the larger discrepancies between conservation efforts and population decline, allowing agencies to focus on solutions that not only benefit the western Steller sea lion, but endangered species populations as a whole.

USING REMOTE ACOUSTIC MONITORING TO ASSESS AVIAN COMMUNITY RESPONSE TO FOREST MANAGEMENT PRACTICES ON GREAT PENINSULA CONSERVANCY PRESERVES. Session: B, Breakout Room #25

Qianchao (Eric) Zhao*, @QianchaoEric_Z, Program on the Environment, University of Washington
Site Supervisor: Adrian Wolf, Great Peninsula Conservancy
Faculty Advisor: Xiaoman Duan, Massachusetts Institute of Technology

As the populations of landbird species in North America have declined dramatically, it is appropriate to implement conservation practices to improve the avian biodiversity and health of the Great Peninsula Conservancy's (GPC) forestlands. GPC is a land trust that owns and manages conservational lands in Washington State. The goal of GPC is to maintain or improve the ecological integrity of forestlands by increasing structural (horizontal and vertical) and species diversity. The aim of this study is to collect bird acoustic recordings and responses via remote acoustic monitoring (AudioMoth), along with use of Arbimon to analyze large amounts of acoustic data. The study of the distribution of birds on GPC's sites serves as an indicator of the effectiveness of the conservation practices implemented by GPC. To accomplish this, I used the avian data analysis tool, Arbimon, to create templates for target species and validate each bird calls and songs. Then I generated results and conclusion based on Arbimon's pattern matching function: the percentages of the target species' calls or songs were always higher after conservation practices were implemented. Therefore, I conclude that the conservation practices implemented by GPC are effective in protecting and improving the avian biodiversity and health of forestlands in Washington state. This conclusion can guide in understanding of efficiency and usefulness of remote acoustic monitoring, which can lead to future environmental restoration actions on forestlands and raise our awareness of wildlife responses to ecological conservation practices.

GEOCACHING FAUX GRANITE: HOW A ROCK IN THE WOODS IS BETTER AT TEACHING THAN YOU ARE. Session: In-Person

Sylas Kasten*, @sylaskasten, Program on the Environment, University of Washington
Site Supervisor: Lisa McGinty, Friends of Lincoln Park
Faculty Advisor: Laurel Peele, M.S., University of Washington

The ironic thing about teaching environmental education is that the majority of our curriculum is taught indoors. For many students, learning about local conservation or restoration feels out of reach when the curriculum isn't directly relevant to them and their communities. The aim of this study explores if Geocaching can be used as an environmental teaching tool, and if so, what are the benefits and barriers that should be considered when applying it to how we teach. During my

internship with Friends of Lincoln Park (FLiP), I prepared 2000 sq ft of urban forest parkland to lead several on-site community restoration events. I specifically held a Geocaching-inspired restoration event that explored using “A rock in the woods” as educational motivator to increase engagement and awareness from the student volunteers. Along with academic research, I published a survey exploring Geocaching participation and physical accessibility for local Seattle residents. Results showed that Geocaching is an extremely versatile platform for education, utilizing cross-curricular integration between community, nature, and school. Geocaching connects the curriculum from indoors to outdoors by improving a student’s sense of place, local resource awareness and environmental stewardship. Geocaching showcases promising potential as an environmental education tool as long as the environmental, physical, and social barriers are considered in its application. A rock in the woods may challenge our worldview of teaching and learning, but in any case, it doesn’t hurt to get up and find out why for ourselves.

DRIVING CHANGE: EFFECTIVE RHETORICAL STRATEGIES FOR SEATTLE'S CLIMATE SOLUTIONS. Session: In-Person

Jordan Williams*, @jollwi15, Program on the Environment, University of Washington
Site Supervisor: Eugene Kramer, Seattle Subway Foundation
Faculty Advisor: Kat Huybers, Atmospheric Sciences, University of Washington

Proper communication of environmental information to future voters is crucial to tackle the climate crisis, especially in places like Seattle where transportation is responsible for disproportionate carbon emissions and pollutant particulates due to excessive single occupancy vehicle use. To reduce emissions, having a variety of public transportation options is essential, yet many voters are unaware of this solution. To address this issue, as a high school outreach intern with the Seattle Subway Foundation, I aimed to determine the most effective rhetorical approach to explaining possible climate solutions. Using Aristotle's three primary rhetorical techniques, Ethos, Logos, and Pathos, I presented the key benefits of sustainable transportation to different groups of high school students and surveyed their responses. The results revealed that Pathos appeals, focusing on emotional appeals, had the most significant impact on students' likelihood to vote for pro-transit measures in the future. This finding is particularly relevant considering the current trend of short and concise communication practices. Knowing what to focus on in discussions of environmental solutions can be crucial in persuading the public to support sustainable actions. In the United States, and Seattle specifically, the transportation sector is a significant contributor to carbon emissions and pollution. By raising awareness of sustainable transportation options and using effective communication strategies, we can reduce these emissions and improve public health. Effectively communicating climate solutions to future voters is necessary to maintain climate stability and build a more sustainable future.

DEFENDING NORTH SEATAC PARK: THE KEY ROLE OF EFFECTIVE ENVIRONMENTAL HEALTH COMMUNICATION. Session: In-Person

Charlie Sikes*, @Charlie_Sikes_, Program on the Environment, University of Washington

Site Supervisor: Noemie Maxwell, South Seattle Climate Action Network
Faculty Advisor: Kristie Ebi, Global Health, Environmental and Occupational Health Sciences, University of Washington

Environmental health communication plays an essential role in protecting human health and safety by increasing awareness and understanding of environmental health risks. It is a vital tool for protecting diverse communities and empowering them to make informed decisions about their health and well-being. The purpose of this study was to explore the best practices for communicating environmental health risks. In my internship, I assisted the Defenders of North SeaTac Park with their public outreach campaign. My work primarily consisted of leading community meetings, speaking at public comments, and managing their social media accounts. Through my research, I concluded that a multimedia approach is best when tailored to the specific needs of the community. In particular, I found that clear and accessible language is essential when communicating environmental health risks. One significant challenge in communicating environmental health risks, is the diversity of the community. As a result, it is crucial to develop targeted messaging that considers the cultural and linguistic needs of each individual community. This is especially important when communicating with diverse communities in situations where awareness one of the only defenses for public health and the future of greenspaces. Effective environmental health communication can help establish solutions to complex environmental health issues, which can equip communities with the tools to protect themselves and their local parks. Ultimately, effective environmental health communication is critical in promoting healthy and sustainable communities.

TALKING TRASH: INTERSECTIONS BETWEEN TECHNOLOGY, WASTE MANAGEMENT & THE TRANSITION TO A ZERO WASTE ECONOMY. Session: In-Person
Lillian Williamson*, @lill_williamson, Program on the Environment, Environmental Studies & College of Arts & Sciences, Political Science, University of Washington
Site Supervisor: Hannah Johnson and Anna Wilson, Perennial Zero Consulting
Faculty Advisor: Kristi Straus, Program on the Environment, University of Washington

Western societies produce more waste now than at any time throughout human history, and waste management is an important way to limit the environmental impacts of waste. Over the past several decades, new waste management technologies including automated sorting, management softwares, and more efficient recycling procedures have been developed. The aim of this study was to understand the opportunities and challenges associated with these new waste management technologies, as well as the scale of impact they can have on waste management. For my Capstone project, I interned with Perennial Zero Consulting, a Seattle-based waste management consulting firm. To collect evidence for my research, I conducted interviews with waste management experts, performed a literature review of waste management technologies, and analyzed several waste management technologies as a part of a catalog project for Perennial Zero Consulting. Although my research showed that waste management technologies can go a long way toward making landfills and recycling more efficient, it also showed that technology alone cannot solve our waste issue. Therefore, it is necessary that Western countries shift to a

low-waste circular economy. This involves shifting production away from goods that are meant to be quickly thrown away, to goods that are intended to be re-used for years. The sheer amount of waste produced globally is not sustainable and has extreme detrimental impacts to both the environment and human health. By transitioning to a low-waste circular economy, we can be able to massively reduce the amount of waste produced, and therefore, reduce its environmental impacts.

NOT EVERYONE IS AN ENVIRONMENTALIST: NEGOTIATION STRATEGIES FOR PASSING PLASTICS POLICY. In-person Session

Annabella Hillyer, @envirbella, Program on the Environment, University of Washington
Site Supervisor: Ben Enticknap and Sara Holzknecht, Oceana
Faculty Advisor: John Meyer, College of the Environment

Global plastic production has grown exponentially since 1950 and is expected to double within the next 20 years, with single-use plastics accounting for 50% of the total. Plastics are ubiquitous in the ocean, threatening marine life and subsequently humans. Policy solutions are a suitable option to mitigate these risks. However, the public and relevant stakeholders must support the suggested policies in order for legislators to vote yes on plastics reduction initiatives that interest environmental organizations. The purpose of this project is to explore the best practices for garnering public support and engaging stakeholders in plastics legislation efforts in Washington State. As a policy intern for Oceana, I supported two plastics reduction bills in the Washington State legislative process, HB 1085 and the Washington Recycling and Packaging (WRAP) Act. I testified in support of both bills, wrote letters to publications, created a petition, and designed a toolkit. I also conducted expert interviews, analyzed committee testimonies, and researched literature. I discovered that to effectively engage stakeholders and the public in environmental decision making, it is important to tailor arguments to reach diverse audiences. Economic, social, and political aspects of plastics policy initiatives must be addressed in addition to environmental factors. Methods that organizations can utilize to assist in this effort include cross-organizational collaboration, toolkit differentiation, demographic research, and identification of stakeholder allies. Ultimately, it is essential for environmental organizations to display alternative arguments for reducing plastic production and consumption beyond environmental concerns to achieve broad-based support for plastics reduction policies.

URBAN FORESTRY: ENABLING CONDITIONS FOR EQUITABLE MUNICIPAL TREE CANOPY. Session: In-Person

Will Feury*, @willfeury, Program on the Environment, University of Washington
Site Supervisor: Joshua Rubenstein, The Nature Conservancy
Faculty Advisor: Anne Reiderer, Environmental and Occupational Health Sciences, University of Washington

Municipal urban forestry programs are an essential sector of city governments as they are responsible for a city’s maintenance and planting of public trees, as well as enforcing tree ordinances. Especially in urban areas, dense tree canopy holds important tools to address public

health concerns of urban heat islands, respiratory disease, and mental health. The purpose of this study is to pinpoint the prominent barriers and enabling conditions to successful preservation and expansion of urban tree canopy. I conducted case studies on three canopy-diverse municipalities: Ithaca, NY, Renton, WA, and Spokane, WA. I had interviews with these urban foresters to understand the barriers to their work and the enabling conditions to what allows them to pursue equitable maintenance, preservation, and expansion of their city's tree canopy. Topics covered in these interviews included forestry authority, educational initiatives, tree ordinance enforcement and focus, acknowledgement of redlining, and tree canopy distribution. These findings led me to the culmination of a policy report with five main recommendations for policymakers to address. Areas policy must address for equitable, sustainable urban forestry reforms includes expansion of staff, establishing neighborhood council systems, directing city council members and departments to aid in tree ordinance reforms, ensure forestry programs can enforce their own ordinances, and allocate resources for equitable tree planting and maintenance in historically redlined Black, Indigenous, and People of Color (BIPOC) communities. This report serves to guide the advocacy efforts of The Nature Conservancy and forestry experts to work with policymakers and address the shortcomings at hand.

MOVING PLANTS MOVING MINDSETS: HOW ASSISTED PLANT MIGRATION CAN HELP COMBAT THE CLIMATE CRISIS Session: In-Person

Shay Steeves*, @shaylovesearth, Program on the Environment, Political Science, University of Washington
Site Supervisor: Rowan Braybrook, Northwest Natural Resource Group
Faculty Advisor: Laura Prugh, College of the Environment, University of Washington

Assisted plant migration (APM) is a new-age tool in climate adaptation research, utilized to mitigate the environmental impacts of ecosystem degradation ensuing from the climate crisis. Assisted migration involves the human movement of plant species from their local range to a new environment likely to suffer or that is currently suffering from climate-related effects, to increase population resistance, biodiversity, and combat the effects of climate change. My research on APM involved a case study of the Stossel Creek APM scientific site in Carnation, Washington. This study aids the expansion of knowledge surrounding climate adaptation techniques that are pivotal to the health and longevity of Washington's precious forest lands. Through an in-depth holistic literature analysis of APM, interviews with the Stossel Creek staff, and analysis of the Stossel Creek Year 1-3 data set, I looked to analyze the effectiveness of the APM process and the positive environmental implications it can have on Washington's forests, as well as its barriers to implementation. My independent research of APM was supplemented through my internship with the Northwest Natural Resource Group, where I conducted forest patch cut and snow monitoring and measurement research as a parallel climate adaptation strategy which aided me in an encompassing perspective of the topic. The concluding evidence from my research showcased that APM is well on its way to being an effective fighter in the battle towards climate resiliency, despite further research being of necessity.

COMMUNITY ENGAGEMENT AND PERCEPTIONS IN SEAWEED AQUACULTURE DEVELOPMENT: LESSONS FROM VASHON ISLAND, WA. Session: In-Person

Nicole Saho Okimoto Wentworth, @okimotosaho, Program on the Environment, University of Washington
Site Supervisor: Dr. Meg Chadsey and Dr. Nicole Naar, Washington Sea Grant
Faculty Advisor: Dr. Clare Ryan, the University of Washington, College of the Environment, School of Environmental and Forest Sciences

There are currently two proposed kelp aquaculture projects on Vashon Island that will influence how future seaweed aquaculture will be conducted in Washington. Despite these farms' potential ecological and social benefits, many people strongly oppose them. This study explores the various factors that contribute to people supporting or opposing these proposed farms to help the residents, farmers, and planners to understand how public perceptions are formed. I interned at the Washington Sea Grant, where I interviewed 10 key informants and conducted a thematic analysis on the interview transcripts and the 72 public comments. Dissatisfaction with the permitting process and communication emerged as a recurring theme among both supporters and opponents of the farms, with other themes including ecological, aesthetic, location, and nature of production. Perceptions about the permitting process ultimately inform public perceptions of the seaweed farms themselves, especially in situations involving high scientific uncertainty and strong feelings about a sense of place. Solutions include informing residents throughout and before the permitting process, designating a communicator to act as a liaison between organizations and residents, and addressing concerns and questions in a public setting. The review process for these proposals can shape how the kelp and other aquaculture industries will look in WA. Identifying and addressing these issues can lead to a stronger relationship with the community and more social acceptance, as natural resource conflicts are often a symptom of a more significant issue (Nie 2003). These findings can improve the permitting process, increase collaboration opportunities, and may improve outcomes.