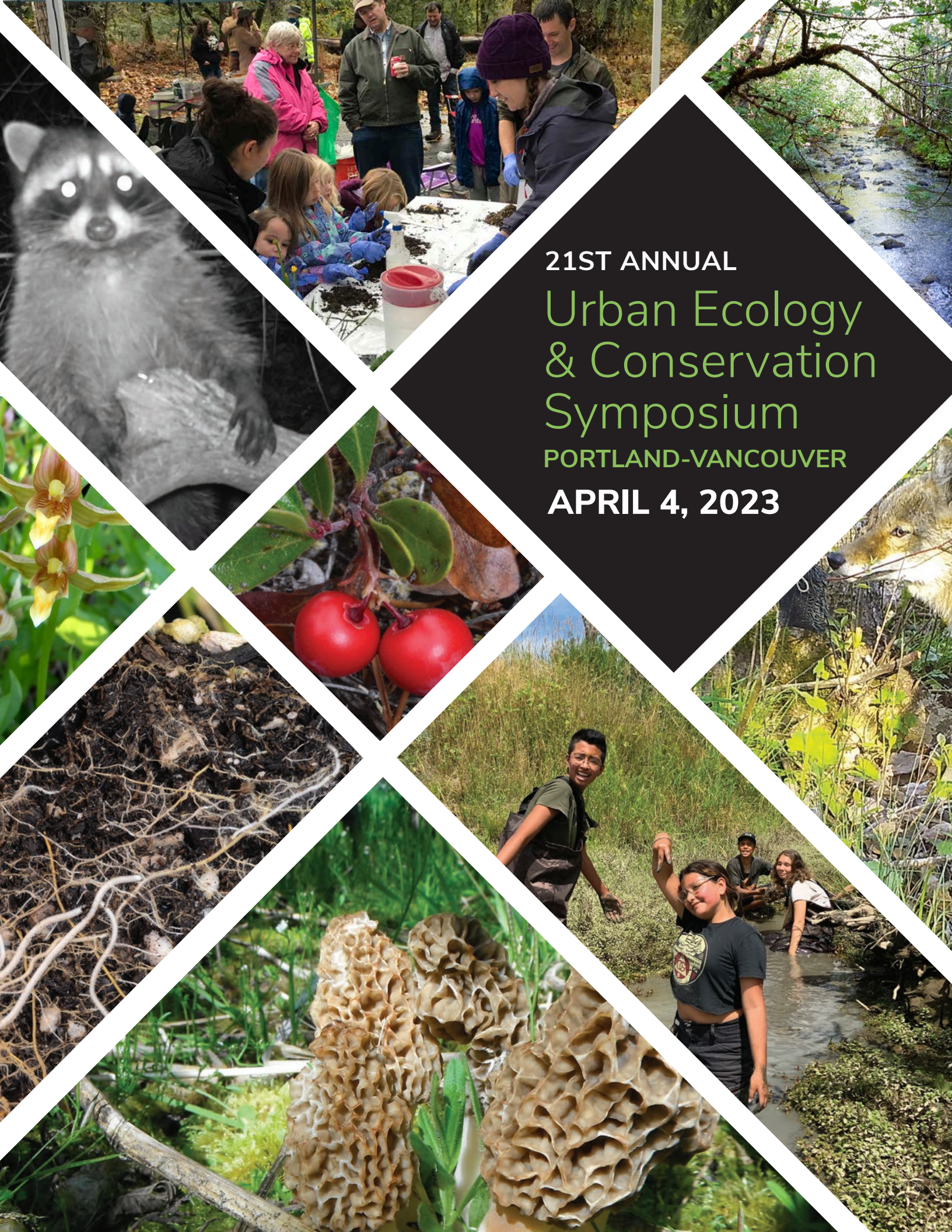


21ST ANNUAL

Urban Ecology & Conservation Symposium

PORTLAND-VANCOUVER

APRIL 4, 2023

COVER PHOTO CREDITS

Graphic Design

We wish to thank Chris Dodge at Portland Audubon for cover page graphic design.

Photographers

Checking out soils with the CRBC – Eric Butler

Tree over stream – Randy Lawrence

Coyote captured by trailcam as part of the Portland UWIN Project– Hunter Storm

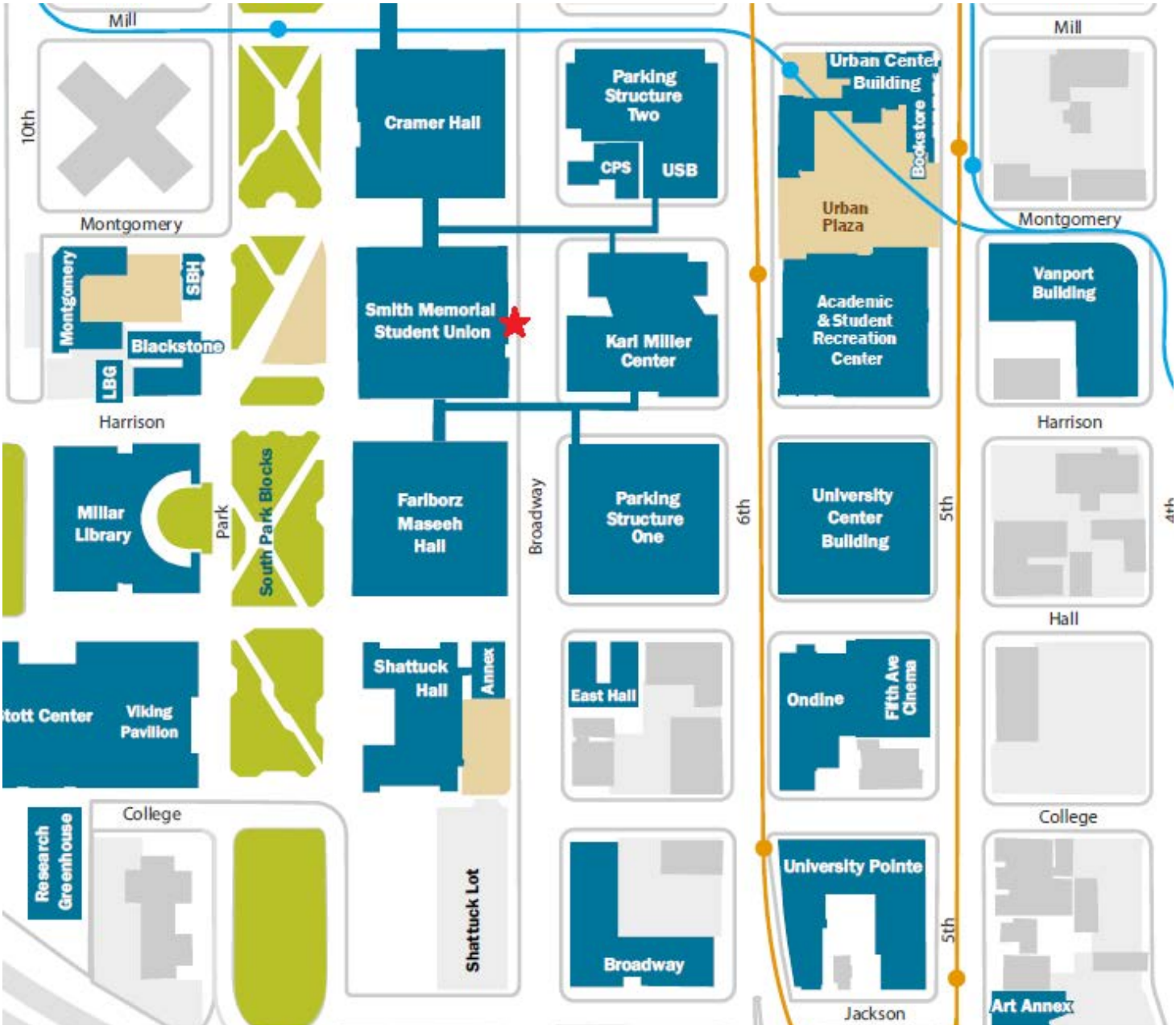
Teen mussel surveys, Oaks Bottom – Laura Guderyahn Morels – Toby Query

Carex unilateralis roots – Gabriel Campbell Orchids – Randy Lawrence

Berries – Gabriel Campbell

Raccoon captured by trailcam as part of the Portland UWIN Project– Hunter Storm

Smith Center's Broadway entrance will open at 8:00 am for Symposium attendees *(see red star)*



21st ANNUAL

URBAN ECOLOGY & CONSERVATION SYMPOSIUM

Held at

Smith Memorial Center Ballroom
Portland State University
Portland, Oregon, USA
April 4, 2023

Organized by the

Urban Ecosystem Research Consortium (UERC)

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IN MEMORIAM

James F. Cathcart

1957 – 2022

Jim Cathcart moved on to a better fishing spot May 20, 2022.

Jim was born in Oakland, California to parents Bill and Jackie Cathcart. His siblings were Anne, Rod, and later, Andrew. Jim's love of the outdoors grew from family trips to Yosemite National Park, fishing with his grandfather and father, and tutoring in fishing techniques by his neighbor Mr. Tracy.

Jim started his post-secondary education at De Anza Community College and Humboldt State University in California. During his Humboldt years, he interned with the Forest Service at the Green Mountain National Forest in Manchester, Vermont. While in New England, he continued his forestry studies, learned ice fishing and met Karen Burnett. Jim and Karen married in 1982.

They moved to California, Washington and finally to University of Idaho, where Jim pursued his Master's degree, all within their first year of marriage. Next was Virginia Tech, where Jim completed a PhD and daughter Erin was born. At last, they moved to Portland, where Jim had landed a job, just in time for their son Peter's birth, followed a few years later by Tim.

Throughout his years in Oregon, Jim was a contributor and active volunteer with the Society of American Foresters, the Boy Scouts, Friends of Trees, the N.W. Steelheaders Sandy Chapter; he greatly enjoyed doing "Salmonberry Surveys." Jim loved his family, fishing, and his work.

Jim's professional resume includes positions in Portland and Salem at the USFS PNW Research Station; Bureau of Indian Affairs; The Campbell Group; 17 years at the Oregon Department of Forestry; and lastly, beginning in 2016, as District Manager at West Multnomah Soil & Water Conservation District.

With Jim at the helm, West Multnomah SWCD excelled at being "the little district that could." He led the way on several successful conservation partnerships and large projects, including a large 75th anniversary celebration. Jim's optimism and determination led to the successful completion of the flagship Sturgeon Lake restoration project, which was decades in the making. Now, the lake again provides his beloved salmon important refugia along a section of river that's one of the hardest legs of their journey through the Willamette/Columbia Basin. Jim was also a major force in developing a model forest conservation easement for landowners in the rural West Hills, where WMSWCD does a lot of work with private landowners, and in bringing back to life the wildlife habitat tax incentive program in the North Willamette Valley.

Jim's legacy carries on in those of us who knew him and worked with him to protect what we love about Oregon and the Pacific Northwest. He provided shining examples of how to overcome obstacles to meet worthy conservation goals. He championed diversity, equity and inclusion, and held himself and his employees accountable in that regard and encouraged them to be leaders among peers. He was a thoughtful mentor, good humored and always ready to lend a hand; and he was a truly inspiring role model in how to face tremendous personal challenges with grace and hopefulness. The glass was always half-full for Jim. So, let's raise a half-full pint to Jim and his life well-lived and to the towering trees and spawning salmon in which his love of the natural world carries on.

IN MEMORIAM

James Luther Davis

1949 - 2022

James Davis grew up in Arizona, and his childhood adventures chasing lizards in the Sonoran Desert encouraged his curiosity and love of nature. While living in California, James taught junior and senior high school science classes and worked in two zoos as the "Zoo Mobile Guy." While attending the University of California, Santa Barbara, James became deeply involved with the local Zero Population Growth chapter, and this involvement led to membership on the National Board of Planned Parenthood for several years. James later earned a Master of Zoology degree from Colorado State University.

James Davis was an entertaining and popular 2007 UERC Symposium keynote.
Photo courtesy Mike Houck

James moved to Portland in 1981 and he soon created a job for himself at Portland Audubon as its first Education Director. He helped lead enormous growth in the organization, establishing many of their education programs. While working at Marylhurst University, James developed an innovative program of science education for Head Start teachers. He was an entertaining speaker at nature conferences and meetings, and he was known for dressing in bird costumes (as the UERC audience saw in 2007!). A published author, James wrote *The Seasonal Guide to the Natural Year: Oregon, Washington and British Columbia*, which was published in 1996. In 2009, a new edition of his book was published under the title *The Northwest Nature Guide*.

As a full-time nature educator and the Smith and Bybee Wetlands Natural Area Naturalist at Metro Regional Government, James co-founded annual events like Bug Fest and Raptor Road Trip, and he contributed to the Salmon Festival, Nature University, and events at Lone Fir Cemetery.

Pursuing his love of music, in 1985, James found a musical community as the rhythm guitarist for The Jitters. Later, he found a new musical direction playing lead guitar for the Surf Weasels, and one of his proudest accomplishments was getting a songwriting royalty check for the surf instrumental *Ponderosa*.

James was an extraordinary environmental educator, birder, naturalist, and friend. He leaves a legacy of commitment to the environment, to teaching, and to encouraging everyone to love, understand, and appreciate nature. Celebrate his memory by spending a day birding at your favorite park or wetland, then head out for music at a local nightclub and have a Manhattan on the rocks, extra sweet.

TABLE OF CONTENTS

Urban Ecosystem Research Consortium (UERC)
Portland, OR - Vancouver, WA Metropolitan Region

What is the UERC?

The UERC is a consortium of people from various universities and colleges, state and federal agencies, local governments, non-profit organizations and independent professionals interested in supporting urban ecosystem research and creating an information-sharing network of people that collect and use ecological data in the Portland/Vancouver area. Participants come from a variety of fields, including:

air quality	*environmental policy*	*hydrology*	*sustainable development*
climate change	*env. social sciences*	*land management*	*transportation*
conservation biology	*fisheries*	*land use planning*	*water quality*
ecology	*geology*	*land/watershed mgt.*	*wildlife biology*
economics	*GIS / modeling*	*plant ecology*	
env. design	*habitat assessment*	*social sciences*	
env. education	*habitat restoration*	*stormwater management*	

Mission Statement - To advance the state of the science of urban ecosystems and improve our understanding of them, with a focus on the Portland/Vancouver metropolitan region, by fostering communication and collaboration among researchers, managers and community members at academic institutions, public agencies, local governments, non-profit organizations, and other interested groups.

Goals and Objectives

- Provide direction and support for urban ecosystem research
- Create an information-sharing network within the research community
- Track and house available information
- Promote greater understanding of urban ecosystems and their importance

Organizers - The principal organizers span academic institutions, government agencies (city, regional and federal), and non-profit organizations. The diverse backgrounds and affiliations of those involved have allowed the UERC to bring together many important sectors of the natural resources community.

Website – The UERC website can be found at **https://uercportland.org/**. There you will find background and contact information, a link to sign up on the listserv, announcements about upcoming events, and full details about annual UERC symposia, including downloadable proceedings.

Listserv - Oregon State University hosts a listserv designed for members to share information and facilitate communication among those interested in urban ecology. Anyone can join by going to http://lists.oregonstate.edu/mailman/listinfo/urban-erc; this is also linked from the UERC web site.

Advocacy Statement - The role of the UERC is not to provide a political or advocacy platform, but rather to foster communication and collaboration by offering a forum for professionals to exchange and discuss information regarding urban ecology and its application to relevant fields.

2023 URBAN ECOLOGY & CONSERVATION SYMPOSIUM

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2023 Urban Ecology & Conservation Symposium

AGENDA

PORTLAND STATE UNIVERSITY, SMITH BALLROOM SMSU 355, APRIL 4TH 2023

8:00 **REGISTRATION AND BREAKFAST**

9:00 **WELCOME AND INTRODUCTION**: Dr. Olyssa Starry
Urban Honors, Portland State University

9:10 **OPENING KEYNOTE ADDRESS: Dr. Steward Pickett**
Distinguished Senior Scientist, Cary Institute of Ecosystem Studies
The Baltimore School of Urban Ecology as a Movable Feast

DIVERSITY, EQUITY, INCLUSION *Moderator: Joe Liebezeit, Portland Audubon*

^ indicates student presenter

9:50	Idowu Ajibade	Portland State University	Shifting landscapes of spatial equity and justice: who is vulnerable or resilient to consecutive climate hazards in the Portland region
10:00	Shonene Scott	The Nature Conservancy	Trends in urban tree canopy and dimensions of social equity across the Portland-Vancouver metropolitan area
10:10	Michael J. Yun	Knot	Integrating justice and equity into the regional conservation planning process
10:20	Joe Burg	San Francisco Estuary Institute	Designing green cities for biodiversity and human health
10:30	Q&A		

10:40 **BREAK** *Raffle at 10:55*

WILDLIFE *Moderator: Amy Chomowicz, City of Portland, Environmental Services*

11:00	Eric P. Butler	Clackamas River Basin Council	Sieben-Riverbend confluence: a multifaceted social-ecological restoration effort in an urban floodplain
11:10	Laura Guderyahn	Portland Parks and Recreation	Freshwater mussel monitoring with young people: a bedazzling good time!
11:20	Nicole Bell^	Oregon State University	Assessing three decades of urban garden bee studies
11:30	Hunter Storm	Portland State University	Predicting mesopredator occupancy in the Portland metropolitan area
11:40	Q&A		

11:50 **LUNCH** *Raffle at 1:05*
You are invited to participate in a facilitated discussion during the lunch break. Descriptions of the lunchtime offerings can be found on page 8.

1:10 **AFTERNOON KEYNOTE ADDRESS: Diego Ellis Soto**
PhD candidate, Ecology & Evolutionary Biology, NASA FINESST fellow
Yale University
Uneven distribution of biodiversity is shaped by inequality and racial segregation in the age of digital information

AQUATIC SYSTEMS
^ indicates student presenter
Moderator: Lindsey Wise, Institute for Natural Resources, Portland State University

1:50	Katie A. Holzer	City of Gresham	Why didn't the salmon cross the road? Occurrence and treatment of a newly discovered tire chemical
2:00	Michael Krochta^	Portland State University	Scales of connectivity within stream temperature networks of the Clackamas River Basin, Oregon
2:10	Sean M. Connolly	U.S. Fish and Wildlife Service	Water Connects Us All: How the USFWS uses a fishing and aquatic education trailer to bring Pacific Northwest waterscapes to community outreach events
2:20	Randy Lawrence	Clean Water Services	How warm is your water? Collaborating to identify climate-adapted plant materials for habitat restoration and water quality projects
2:30	Q&A		

2:40 **BREAK** *Raffle at 2:55*

RESTORATION AND HABITAT
Moderator: Brendan White, US Fish & Wildlife Service, Oregon Fish & Wildlife Office

3:00	Toby Query	City of Portland Bureau of Environmental Services	Human-fungi collaboration in natural area stewardship
3:10	Neil Schulman and Amy van Riessen	North Clackamas Watershed Council	Dam removal, habitat restoration, & community engagement on Kellogg Creek
3:20	Jenna T. Simpson	University of Oregon	Defying habitat fragmentation with wildlife crossings
3:30	Andrea Bryant^	US Fish and Wildlife Service & Portland State University	Whitaker Ponds Natural Area remediation project: response of macroinvertebrate communities one year post-remediation
3:40	Q&A		

3:50 **CLOSING REMARKS: Lori Hennings**, Metro

4:00 – 6:00 POSTER SESSION AND SOCIAL with Student Poster Award presented at 5:30

Poster Presentations

Coordinator: Ted Labbe, Urban Greenspaces Institute

*** = primary author**
^ = student

Authors	Title
Ajibade, Idowu (Portland State University)	Beyond redlining: do gentrification, displacement, and neighborhood exclusivity predict access to healthy trees?
Alo, Olamide O.^ (Portland State University)	Soil variables and residential yard management practices significantly influence phosphorus availability in contrasting cities
Brenneis, Valance (Portland Community College)	Mapping the Rock Creek Environmental Studies Center: geospatial approaches for connecting people to place
Bruslind, Svea R.^ (Oregon State University)	Bees eye view: using multispectral photography to simulate bees' view of flowers in natural settings
Butler, Eric P.;* Lau, Kelly; Mates, Susan; Warren, Fran (Washington County Treekeepers)	Washington County Street Tree Inventory: what we've accomplished and what's next
Campbell, Gabriel E. (Portland State University)	Native seed germination trials at the Rae Selling Berry Seed Bank
Felton, Andre;* Pajunas, Briita (Tualatin Soil and Water Conservation District)	Launching the Watershed Navigator
Harwell, Todd (Portland State University)	Integrating community and citizen science with undergraduate urban ecology coursework
Hayes, Jen^ (Oregon State University)	Natives and native cultivars: understanding pollinator preference for native plants and their cultivated counterparts in the Pacific Northwest
Hunter, Ian (Phoenix Habitats)	Using electric power tools in habitat restoration
Janapaty, Vedant V.^ (Silver Creek High School)	A West Coast estuarine case study: a novel, predictive approach to monitor estuarine eutrophication
Larson, Kelli (Arizona State University)	Social dimensions of landscape sustainability: lessons from diverse U.S. Cities
Mead, Mallory^ (Oregon State University)	Applications of iNaturalist to an interaction between petal-cutting bees (family: Megachilidae) and farewell-to-spring (*Clarkia amoena*)
Rutstein, Tess C.^ (Reed College)	The effects of extreme heat events on tree health measurements
Sanneman, Carrie (Multnomah County Drainage District)	Flood Safe Columbia River: opportunities for conservation through flood safety
Santelmann, Mary V.* (Oregon State University), Greydanus, Hattie, Talal, Michelle	Influence of vegetation on air temperature in Portland, OR

Morning Keynote Address

Dr. Steward T.A. Pickett

Distinguished Senior Scientist

Cary Institute of Ecosystem Studies
Millbrook, New York

The Baltimore School of Urban Ecology as a Movable Feast

Urban ecology in North America is of relatively recent vintage, with deeper roots in Europe and Asia. Sometimes people trace urban ecology in the US to the Chicago School in the 1920s at the University of Chicago. In reality, that intellectual tradition was sociological in nature, although many of its principles were analogies borrowed from the biophysical ecology of the period. Two things are worth remembering about that borrowing. First, it was based only on reading the works of bioecologists and not on dialog, even though some professors at the University of Chicago were among the first generation of ecologists in the US. Second, the lack of dialog led the Chicago sociologists to neglect controversies that existed in ecology at the time. Those controversies have been settled in favor of a paradigm of ecology that opposes basic assumptions of the Chicago School and which now serve as the general paradigm upon which contemporary ecology – and by extension – urban ecology are founded. The new paradigm and its various urban applications are labeled the Baltimore School, not because it only "lives" in Baltimore, but because it is an antidote to the misapprehension of the legacies of the Chicago School in ecology in general. Tenets of contemporary urban ecology are reviewed, and their relevance to changing global realities of urban transformation are presented. This summary frames and encourages diverse, ongoing empirical and transdisciplinary work across many forms and trajectories of urban change and application to human wellbeing and environmental justice.

Biography

Steward T. A. Pickett is an ecologist and Distinguished Senior Scientist at Cary Institute of Ecosystem Studies, in Millbrook, New York. He was awarded the PhD from the University of Illinois, Champaign-Urbana in 1977. He specializes in urban and landscape ecology and was founding director of the Baltimore Ecosystem Study Long-Term Ecological Research project. His employs a social-ecological research approach to the structure and dynamics of urban areas and complex regional landscapes. Recent urban ecology research focuses on the equity of green stormwater infrastructure, and the ecology of segregation. He has worked in diverse systems, ranging from primary forests and post-agricultural oldfields in the eastern United States, riparian woodlands in South Africa, and the changing peri-urban zone in Beijing, China. He has produced books on natural disturbance, ecological heterogeneity, humans as components of ecosystems, conservation, bridging ecology and urban design, philosophy of ecology, and linking ecology with ethics. He seeks to increase the diversity and inclusiveness of ecological science, and is active in the Ecological Society of America (ESA) and the American Institute of Biological Sciences to this end. He is a Fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, and the Ecological Society of America. He is a Member of the U.S. National Academy of Sciences. He is a 2022 recipient of the BBVA Foundation Frontiers of Knowledge Award in Ecology and Conservation, and the ESA's Eminent Ecologist for 2021.

Afternoon Keynote Address

Diego Soto Ellis
PhD Candidate
NASA FINNEST Fellow

Yale University
New Haven, Connecticut

Uneven distribution of biodiversity is shaped by inequality and racial segregation in the age of digital information

Historic segregation and inequality are critical to understanding modern environmental conditions. Race-based zoning policies, such as redlining in the United States during the 1930s, are associated with racial inequity and adverse multigenerational socioeconomic levels in income and education, and disparate environmental characteristics including tree canopy cover across urban neighborhoods. Recent work quantifying the association between redlining and bird biodiversity information reveals that historically redlined neighborhoods remain the most under-sampled urban areas for bird biodiversity today, potentially impacting conservation priorities and propagating urban environmental inequities across 195 cities in the United States. In fact, the disparity in sampling across redlined neighborhoods grades increased by approximately 40% over the past 20 years. The legal, social, and political consequences of such uneven distribution shaped by inequality and segregation will be discussed alongside ongoing initiatives for a more just sampling of biodiversity blending education, racial justice, science, and music.

Biography

Diego is a Uruguayan PhD candidate in Ecology at Yale University and a NASA FINESST Future Investigator. Working at the intersection of ecology, technology, conservation, and environmental justice, he researches how animals move across the world under increasing human threats and a changing climate. In addition, he is increasingly interested in how our access to biodiversity data is shaped by our socioeconomic status and how past and present social inequalities amplify current disparities in environmental sciences. As a music producer Diego blends sounds from biological concepts and technologies, with music theory, for example by making eight termites jam together or installing microphones on an urban farm to make farm birds sing a song.

Lunchtime Discussions

Grab your lunch and join one of four discussions with experienced peers from the world of urban ecology and environmental education.

Partnering with Fungi in Natural Areas – Room 328

Description: Fungi have been an overlooked, yet essential component of every ecosystem. Mycelial networks are important to ecosystem resilience, and mushrooms can provide food and medicine for humans and non-humans alike. We will have multiple presenters talking about various ways to partner with fungi and a chance to sporulate ideas. Come converge with us!

Conversation lead: Toby Query, City of Portland

Overcoming Barriers to Women in Science – Room 327

Description: People of all genders are welcome to join us to hear stories from three women who have experience overcoming barriers to their careers in science. We will have plenty of time to ask questions and share strategies! Moderator: Lindsey Wise, Portland State University

Panelists: Laura Guderyahn, Portland Parks & Rec; Dr. Nicole Hams, USFWS; Cory Owens, USDA-NRCS

Climate Change Resilience in our Natural Areas – Room 329

Description: Many agencies, organizations, nonprofits, universities and others in our region are undertaking internal climate change resilience (defined as adaptation plus mitigation) efforts via internal audits, plans and activities. How are folks integrating climate change into their natural area planning and restoration activities? What collaborative efforts are underway? Who is conducting climate change-related studies on plant species, habitats and animals? How can we become more effective working together?

Conversation leads: Lori Hennings, Metro; Natalie Rogers, City of Milwaukie

Emerald Ash Borer: A Threat to Oregon's Ash Trees – Room 333

Description: Status update on emerald ash borer, an invasive insect that was recently found in Oregon. Will provide a brief overview on diagnosis, reporting, and Oregon's "slow the spread" response strategy.

Conversation lead: Christine Buhl, Oregon Department of Forestry

ABSTRACTS SUBMITTED

Shifting landscapes of spatial equity and justice: who is vulnerable or resilient to consecutive climate hazards in the Portland region

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Keywords: Climate change, Environmental social sciences

Soil variables and residential yard management practices significantly influence phosphorus availability in contrasting cities

Olamide O. Alo,^ Portland State University, Email: olamide@pdx.edu (poster)

As the extent of urban areas increases over time, activities in urban residential landscapes exert greater influence on biogeochemical cycling. Although these urban settings can provide important ecosystem services, they also contribute to unintended environmental consequences, such as phosphorus (P) pollution of aquatic systems. To better manage pollution and project alternative trajectories for urban ecosystems, there is a need to understand how residential yard management practices affect ecological outcomes in the American Residential Macrosystem (ARM). Across different climate and geographical settings, the ARM is undergoing ecological homogenization with respect to plant biodiversity, hydrology and soil nutrient pools and processes. Previous studies have shown that there is no consistent increase in potential net nitrogen mineralization and nitrification rates in residential yard soils with fertilizer addition. Research also shows that P availability in soil augments the effect of nitrogen addition. However, there has not been a parallel investigation of soil P pools and dynamics in the ARM. This research investigates how soil variables and varying yard management practices, and geographic settings significantly influence patterns and concentrations of available phosphorus. In this study, soil samples were collected at two soil depths from five different yard management typologies in Los Angeles and Baltimore. Available P was extracted using Mehlich 3 extraction method, and P concentrations were analyzed colorimetrically. Results were analyzed using ordinary least squares regression model. Results showed significant differences in soil pH and soil Organic matter across the management typologies for the two cities. Also, the Ordinary Least square model indicated that soil pH, reference, and interstitial management typologies significantly influence the concentration of available P for both Los Angeles and Baltimore cities.

Keywords: Soil science, Land/watershed management, Environmental education

Assessing three decades of urban garden bee studies

Nicole Bell,^ Oregon State University, Email: nicole.bell@oregonstate.edu

Bees are critically important organisms that support biodiversity and crop production via their pollination services. The decline of pollinators has been documented for some native bee taxa, and habitat loss and fragmentation are considered primary drivers of population losses. Although urbanization drives habitat loss and fragmentation, urban gardens can provide a refuge for native bees, and have been the subject of garden bee studies for a few decades. We thus reviewed urban garden bee studies and compiled and analyzed an original metadataset of garden bee functional traits to summarize what has been learned about the potential conservation value of gardens to bees and to identify gaps in our current research efforts. The total number of bee species found across all urban garden studies was between 552 to 647 bee species. Urban garden bee species displayed an array of functional traits, although bees that were non-eusocial, ground-nesting, generalist foragers, and native were most common. The relatively high proportion of parasitic bees suggest that gardens represent high quality habitat for bee communities. Garden bee studies are completely biased towards the Global North. The diversity and non-standard sampling methods employed by garden bee researchers makes it difficult to directly compare results between studies. Our analyses highlight both successes of past urban garden bee studies, and areas of opportunity for future research as we move into a fourth decade of garden bee studies.

Keywords: Conservation biology, Habitat restoration

Mapping the Rock Creek Environmental Studies Center: geospatial approaches for connecting people to place

Valance Brenneis, Portland Community College, Email: valance.brenneis@pcc.edu (poster)

This poster will share several geospatial approaches for connecting community members with Portland Community College's Rock Creek Environmental Studies Center, a 100-acre natural area that serves as an outdoor learning facility, wildlife habitat, and community resource. These approaches include creating GIS maps in various formats that can be used to explore the trail system, make decisions about management activities, and create shared understandings of the space. Mobile applications, such as ESRI Field Maps can be used by students, faculty, and volunteers to collect georeferenced data and monitor changes over time and space. Survey123 can be used to gather information about how people currently use the area and generate ideas for future goals for the site. StoryMaps can be used as a communication tool by faculty and students to share data, tell place-based stories, and make calls for action. By using these approaches, environmental educators and land stewards can work towards goals of documenting natural areas, developing powerful communication tools, and increasing connections with people in the community.

Keywords: GIS / modeling, Land/watershed management, Environmental education

Bees eye view: using multispectral photography to simulate bees' view of flowers in natural settings

Svea R. Bruslind,^ Oregon State University, Email: bruslins@oregonstate.edu (poster)

Flowers use ultraviolet (UV) reflecting signals to influence and attract bees for pollination. Previous research has developed ways to capture these UV signals with UV light applied in lab settings, but methods that can be utilized in the natural world are lacking. Digital photography presents a viable means for obtaining information from natural settings. I developed a method for capturing UV signals in the natural environment using accessible, affordable technology. I used a Sony A6000 full-spectrum converted Mirrorless camera, a Canon 50mm 1:35 FD macro lens, and five specialized filters to capture the UV signals of flowers in vivo. After photographing 7 species of flowering plants native to the Pacific Northwest, along with 15 cultivated versions of the natives, I found 4 species that demonstrated the presence of UV reflectance. This indicates that the approach is viable for use in capturing UV signals in the natural environment. I also found that UV reflectance varied for different anatomical features across plants, with some plants displaying reflective petals and others reflective pollen, for example. This approach would make exploring flowers' UV signals and their effect on bees more accessible and allow for investigating plant-pollinator relationships in nature.

Keywords: Plant ecology, Animal ecology

Whitaker Ponds Natural Area remediation project: response of macroinvertebrate communities one year post-remediation

Andrea Bryant,^ US Fish and Wildlife Service and Portland State University, Email: bryant32@pdx.edu

East and West Whitaker Ponds are located along the Columbia Slough, surrounded by industrialization. Metro Metals, a metal recycling plant directly behind East Whitaker Pond, historically drained untreated water into the pond until 2008 when a stormwater treatment was put in place. After the Department of Environmental Quality (DEQ), discovered contaminants, including heavy metals, pesticides, PCBs, semi-volatile organic compounds, and PAHs in East Whitaker Pond, Metro Metals and DEQ collaborated on remediation of the pond in 2021 by placing a protective six-inch cap on the contaminated sand. After remediation, the pond was refilled naturally by rainwater and groundwater to allow aquatic plants and animals to repopulate the area. We collected three years of pre-remediation (2018-2020) and one year of post-remediation (2022) aquatic invertebrate community samples. Samples were taken once per month from April to October from six locations in Whitaker Ponds, four locations in the East Whitaker Pond and two in West Whitaker Pond. Aquatic invertebrates were identified to family, and richness and abundance were determined. A non-metric multidimensional scaling (NMDS) and linear regression analysis was performed in R to examine community shifts pre- and post-remediation. With only one year of post-remediation data, the NMDS did not show a community shift. However, linear regressions over time did show a modest increase in both richness and abundance. With our initial year of post-remediation data, Whitaker Ponds tentatively appears to be an example of an urban aquatic community's resilience to contamination and positive response to remediation efforts.

Keywords: Water quality, Habitat restoration, Land/watershed management

Designing green cities for biodiversity and human health

Joe Burg, San Francisco Estuary Institute, Email: joeb@sfei.org

Increasing biodiversity and improving human health are two frequently cited benefits that urban nature provides. But how can we plan, design, and build communities to maximize both human health and biodiversity? We present a framework for understanding how these services are provided in urban environments and practical design guidance for accentuating these services in urban planning and design. We aim to facilitate greater collaboration between advocates for biodiversity and human health in the built environment, informed by a synthesis of literature from the public health and ecology fields as well as work on the ground advising partners in the San Francisco Bay Area. Through a review of existing urban ecology literature, the San Francisco Estuary Institute (SFEI) developed an urban biodiversity framework consisting of seven elements essential for maintaining biodiversity in cities: patch size, connections, matrix quality, habitat diversity, native plants, special resources, and management. Using this framework, we reviewed public health literature on urban greening to identify connections between urban biodiversity and human health and develop design guidance for fostering healthier biodiverse communities. This presentation will introduce a design guidance document developed by our interdisciplinary team of scientists, planners, and designers to inform the planning and design of a variety of urban spaces at the site scale. These actionable recommendations seek to leverage synergies and manage tradeoffs between supporting human health and biodiversity, allowing cities to maximize the benefits provided by their projects.

Keywords: Land use planning, Land/watershed management, Sustainable development

Sieben-Riverbend confluence: a multifaceted social-ecological restoration effort in an urban floodplain

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Earlier this year, the Clackamas River Basin Council (CRBC) completed major implementation of the Sieben-Riverbend Confluence restoration effort. While this effort began as a typical fish-habitat enhancement project, it has evolved into something much more impactful. The unique challenges of an urban floodplain, fed by a flashy, highly-impacted stream, have led CRBC to expand the scope of restoration work beyond the construction zone and adopt watershed-scale interventions, with funding and technical assistance from several partners. At the same time, one of the landowners, the Clackamas River Community Co-op mobile home community, has become a deeply engaged partner in the restoration effort. CRBC celebrates the successes and surprises that Sieben-Riverbend Confluence has brought us, and we look forward to long-lasting relationships we are building with this small urban watershed and the communities that call it home.

Keywords: Habitat restoration, Land/watershed management, Environmental social sciences

Washington County Street Tree Inventory: what we've accomplished and what's next

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Treekeepers of Washington County is a group of community members working to protect and advocate for trees in urban Washington County. As part of this mission, we have undertaken an effort to map and measure street trees throughout the County's unincorporated urban neighborhoods. We trained teams of volunteers to collect field measurements and enter data into the i-Tree Eco application, which uses peer-reviewed models to calculate these trees' contributions to human health, wellbeing, and prosperity. We are reporting on the results of our first year of data collection in 2022, and our strategic plan for 2023 with a focus on environmental equity and areas of greatest need.

Keywords: GIS / modeling, Land use planning

Native seed germination trials at the Rae Selling Berry Seed Bank

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A total of 187 preliminary germination trials were conducted on 154 Pacific Northwest native plant taxa at The Rae Selling Berry Seed Bank located on the Portland State University campus in Portland, OR. Trials were conducted throughout 2022 on seeds stored for 0.1 to 34 years in a cold, dry room (5° C and 25% relative humidity). Seeds were sown without pretreatments or prior to sowing seeds were imbibed and cold-stratified for 4 months at 5°C or soaked in 1,000 ppm Gibberellic Acid for 24 hours. Seeds were either germinated under laboratory conditions (25/15 °C day/night; 12-hour photoperiod) or in a climate-controlled greenhouse under light or dark conditions. Germination occurred in 51% of trials and a total of 89 taxa were germinated. The seed pretreatments of cold stratification or gibberellic acid improved germination for several species indicating their seeds may have physiological dormancy and require winter conditions in the wild or pretreatments prior to sowing for germination. For several other species, there was >50% germination for seeds without pretreatments and pretreatments did not improve germination, indicating these species may be non-dormant and germinate immediately or have non-deep physiological dormancy which can be overcome with time in dry storage. Light affects were species specific and light improved, reduced, or did not affect germination. Of the 90 trials conducted on seeds stored long-term (14 to 38 years), 52% of taxa germinated, indicating many Pacific Northwest native species have orthodox seeds that can be stored long-term using standard *ex situ* seed banking techniques.

Keywords: Conservation biology, Plant ecology

Water Connects Us All: how the USFWS uses a fishing and aquatic education trailer to bring Pacific Northwest waterscapes to community outreach events

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When you can't bring students or community members to the water for educational experiences, how can you bring aquatic species and habitats to them? In 2019, a team of U.S. Fish and Wildlife Service information and education specialists came together with $25,000 and a plan: create a mobile, fishing and aquatic education trailer that could be shared across multiple offices, easily transported to on- or off-site events, contain a series of hands-on, scalable, and kinetic activities focused around Pacific Northwest riparian zones, rivers and streams, and native aquatic species. And it had to look visually captivating, whether it was on the road or parked. They had no idea what was coming next. This presentation will quickly recap two plus years of effort undertaken to bring the 'fishing/aquatic education' trailer from concept to creative design to communities--including pandemic-induced stops and starts, and share some valuable lessons learned and project dos and don’ts. We hope our presentation will provide inspiration—and a precautionary tale or two--for those interested in considering a similar project now or in the future. The FWS team will also share how the trailer has been used across Oregon and Washington in 2022--and forward into the future--in both urban and rural settings once pandemic safety precautions were eased and supporting in-person community outreach events was again possible.

Keywords: Environmental education, Fisheries, Wildlife biology

Launching the Watershed Navigator

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The Tualatin River watershed is a complex web of city, county, and non-profit partners. It’s no wonder residents of Washington County don’t always know who to turn to for their natural resource related questions. Beginning in 2019, Tualatin SWCD, Clean Water Services, (with support from Stamberger Outreach Consulting, Community Engagement Liaison Services, and Brave New Day) joined forces to design, build, and launch a user-centered website that connects communities to relevant natural resource related resources. The Watershed Navigator connects individuals and communities to their local service providers. Not only does the Navigator build connections between providers and communities, it also depicts how natural processes shape the watershed and how urbanization has (and continues to) affect these processes. Our presentation will take attendees through the journey of the Watershed Navigator, from conducting focus groups with marginalized communities to launching this resource into the wild.

Keywords: Environmental education, Environmental social sciences, Land/watershed management

Freshwater mussel monitoring with young people: a bedazzling good time!

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Native freshwater mussels are an integral part of Pacific NW freshwater ecosystems, improving water quality, nutrient cycling and habitat for many of our local wildlife species. In the summer of 2018, Portland Parks and Recreation, Bureau of Environmental Services, and the Army Corps of Engineers (among others) completed a restoration project at Oaks Bottom Wildlife Refuge that re-established the natural flooding regime of the refuge and reconnected many acres of backwater habitat for salmon, mussels, turtles and other protected wildlife species. Preparation for the project included removing and re-homing several hundred native freshwater mussels that were living within the construction area. A unique mark-recapture method of "bedazzling" recolonizing live mussels was used to document recovery of the project site and to educate and inspire local youth groups, including the Youth Conservation Corps and PDX SummerWorks Interns. These young people are learning how much fun science can be and that it is right here in their own backyards.

Keywords: Environmental education, Habitat assessment, Wildlife biology

Integrating community and citizen science with undergraduate urban ecology coursework

Todd Harwell, Portland State University, Email: tharwell@pdx.edu (poster)

Community and Citizen Science (CCS) holds great potential for enhancing societal engagement and collaboration in urban ecology research. CCS is scientific research conducted, in whole or in part, by amateur or nonprofessional scientists as well as professional scientists (Ballard et al., 2017). This term encompasses a wide range of approaches including public participation in scientific research, volunteer monitoring, crowd-sourced science, or participatory action research (Ballard et al., 2017; Haklay, 2013; e.g., Ottinger, 2017). Though largely lacking in formal training opportunities, CCS is a very powerful form of public engagement with the potential to address declining trust in science institutions, and the urgent need for engagement and mutual understanding in science related to global challenges such as climate change, mass extinction, invasive species, water scarcity, and transboundary threats to public health. In recent years there have been increased efforts to integrate CCS in undergraduate coursework, which provides students diverse opportunities to engage with authentic scientific research that contribute to increased engagement and improved learning (Vance-Chalcraft et al., 2022). Through sharing examples of integrating CCS activities and data with an undergraduate honors urban ecology course at Portland State University, this poster will highlight student experiences, outcomes, and feedback related to this experiential and engaged learning approach.

Keywords: Environmental education

Natives and native cultivars: understanding pollinator preference for native plants and their cultivated counterparts in the Pacific Northwest

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Native cultivars present a paradox for ecologically-minded gardeners: growing interest in native plants is largely related to their benefits to pollinators, yet many native plants found at nurseries may be significantly altered, compared to wild genotypes. The goals of our research are to identify potential differences in bee preference for wild type natives or cultivars, and to understand what floral traits plant breeding impacts. In this presentation, we focus on native bee visitation to 7 species of Oregon native plants and one to three associated cultivars, documented over three field seasons (2020-2022). Each season we conducted 5-minute pollinator counts before, during, and after peak bloom (25-100% bloom coverage). We hypothesize native bee preference (based on pollinator counts) for native status (natives or cultivars) will vary by plant species group, and altered plant traits (via selections and/or breeding) may be associated with changes in bee visitation. Our preliminary analyses revealed no clear preference for natives or cultivars across all study plant groups, but native status was found to be a significant predictor of the variance in foraging native bee abundance for three plant groups. Here, we will report our results based on three years of pollinator surveys and provide recommendations on selecting plants for pollinator gardens.

Keywords: Conservation biology, Plant ecology, Animal ecology

Why didn’t the salmon cross the road? Occurrence and treatment of a newly discovered tire chemical

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Recently, a specific component of runoff was identified to be particularly harmful to some salmonids: 6PPD-quinone, which comes from vehicle tires. Research groups in Oregon and Washington have been collecting data on this newly discovered chemical in urban streams and in stormwater runoff and treatment facilities. This new information can help us understand the threat and how to mitigate it. 6PPD-quinone has been detected in urban runoff and streams throughout the region. The distribution of the chemical generally follows expected patterns where levels increase with traffic volume. Encouragingly, the chemical appears to be removed substantially by green stormwater infrastructure, such as bioretention soils and pervious pavement. It is likely that 6PPD-quinone will continue to be present in runoff for the foreseeable future as tire manufacturers investigate substitutions for this tire additive that is critical for durability. More research is needed, but current data on stormwater green infrastructure shows that these methods are effective for treating runoff from high-traffic roads to produce runoff that is safe for salmon populations.

Keywords: Conservation biology, Fisheries, Land/watershed management, Transportation, Water quality

Using electric power tools in habitat restoration

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The disciplines of forestry, habitat restoration, and ecological landscaping are often understood as having net environmental benefits, as they are mostly concerned with installing new plants that will create long term habitat and sequester carbon over time. However, the pollution that is emitted on such projects by large vehicles and gas power tools is often overwhelming, compared to the amount that is able to be captured and sequestered by newly installed plants, making many projects into a net source of pollution rather than mitigation. Research in the last 15 years has shown that two-stroke engines in gas power tools can generate between 100 and 300 times more air pollution per gallon than a standard pickup truck. This is often in the form of carbon monoxide and non-methane hydrocarbons that contribute to ground-level ozone, smog and local temperature increases. In California, small gas engine tools are now creating more ozone pollution than all of the passenger cars in the state combined, putting this issue on par with pollution from the passenger auto industry. With our Western Red Cedar and Douglas Fir forests here in Oregon projected to decline, “green” disciplines need to reconsider how they can lower their environmental impacts quickly. One potential available solution is electric power tools, which are now suitable for professional use. We will explore further statistics on gasoline reduction from switching to electric power tools, and higher prevented emissions in relation to the lower carbon sequestration potential of plantings in habitat restoration projects.

Keywords: Air quality, Climate Change, Sustainable development, Habitat restoration

A West Coast estuarine case study: a novel, predictive approach to monitor estuarine eutrophication

Vedant V. Janapaty,^ Silver Creek High School, Email: vjanapaty5@gmail.com (poster)

Estuaries are wetlands where freshwater from streams mixes with salt water from sea. Also known as “kidneys of our planet”- they are extremely productive environments that filter pollutants, absorb floods from sea level rise, and shelter a unique ecosystem. However, eutrophication and loss of native species are ailing our wetlands. There is a lack of uniform data collection and sparse research on correlations between satellite data and in situ measurements. Remote sensing (RS) has shown great promise in environmental monitoring. This project attempts to use satellite data and correlate metrics with *in situ* observations, collected at five U.S. west coast estuaries. The 5 west coast estuaries under study were: San Francisco Estuary, Elkhorn Slough, Tijuana Bay, South Slough, and Padilla Bay. Images for satellite data were processed to calculate 7 bands (SIs) using Python. Average SI values were calculated per month for 23 years. Publicly available data from estuaries was used to obtain 10 parameters (OPs). Average OP values were calculated per month for 23 years. Linear correlations between the 7 SIs and 10 OPs were made and found to be inadequate (correlation = 0 to 44%). Fourier transform analysis on 7 SIs was performed. Dominant frequencies and amplitudes were extracted for 7 SIs and four machine learning(ML) model algorithms were trained, validated, and tested for 10 OPs. The OPs saw improved R2 values in the range of 96.1% to 99%. This novel approach can be used to get periodic analysis of overall wetland health with satellite indices. It proves that remote sensing can be used to develop correlations with critical parameters that measure eutrophication in situ data and can be used by practitioners to easily monitor wetland health.

Keywords: Conservation biology, GIS / modeling, Land/watershed management, Water quality

Scales of connectivity within stream temperature networks of the Clackamas River Basin, Oregon

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Stream temperature is a fundamental indicator of the overall health of aquatic ecosystems. Warming trends due to changes in both local land use and global climate will affect the viability of aquatic species' habitats and efforts to conserve them, highlighting the importance of understanding the relative controls on stream temperature. Contextualizing influential landscape and climate variables within the directional, dendritic structure of stream networks is essential in understanding their relative importance from location to location, and in making watershed-wide predictions of stream temperature. A multiyear stream monitoring effort in the Clackamas River Basin, Oregon was leveraged to derive a geostatistical spatial stream network (SSN) model using a novel pool of stream temperature covariate datasets derived at multiple spatial scales. This presentation will demonstrate how variables such as summer air temperature, recent wildfires, and underlying geology work together at different scales, allowing high resolution predictions of stream temperature throughout river basins using SSNs. Furthermore, we will highlight the implications of scaled influential factors to resource managers' future efforts to conserve and restore healthy streams.

Keywords: GIS / modeling, Land/watershed management, Water quality

Social dimensions of landscape sustainability: lessons from diverse U.S. Cities

Kelli L. Larson, Arizona State University, Email: kelli.larson@asu.edu (poster)

The sustainability of urban landscapes requires (re)designing residential yards away from traditional monocultural, high-input lawns toward climate-adapted, wildlife-friendly alternatives with lower negative, environment impacts. Achieving landscape sustainability in urban neighborhoods involves not only designing and managing yards in ways that increase ecosystem services and decrease disservices; it also warrants enhancing and sustaining residents' appreciation and maintenance of local landscapes into the future. To advance knowledge about and the transition toward landscape sustainability, a multi-city project in the US has examined how assorted drivers and constraints have enabled and inhibited changes in residential yards and neighborhoods. Based on interdisciplinary social-ecological research across Los Angeles, Phoenix, Miami, Baltimore, Boston, and Minneapolis–St. Paul, this research highlights opportunities and challenges for urban landscape sustainability through recent and potential changes in US residential land systems. Overall, evidence suggests that residential yards are shifting away from high-input, monocultural lawns toward diverse alternatives that use less water and provide wildlife habitat, among other environmental benefits. Critical lessons learned from this research will be featured in this poster presentation, including: 1) the paramount importance of aesthetic appreciation and low maintenance yards for residents' yard choices and management; 2) the tenuous relationships between environmental values/attitudes and landscaping decisions; and 3) the complex drivers and constraints involved with recent changes in residential land systems toward sustainability across varied US regions. This research underscores important recommendations for influencing residents' decisions for urban landscape sustainability.

Keywords: Land/watershed management, Environmental social sciences, Conservation biology

How warm is your water? Collaborating to identify climate-adapted plant materials for habitat restoration and water quality projects

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Over the last two decades, natural resource conservation partners in the Tualatin basin have utilized locally-sourced native plant materials to accomplish a variety of water quality and habitat enhancement objectives throughout the basin. To date, the selection of plant materials has been based on local historical reference sites for a variety of different plant communities (i.e., wetlands, riparian forest, and upland forest), which ensures that the materials selected are appropriate for the Tualatin basin. Unfortunately, climate change disrupts this management paradigm. Restoration projects need to be resilient to environmental changes over long time scales. Climate change scenarios indicate that our restoration sites will experience warmer and drier conditions in the future where locally-sourced plant materials may not meet restoration objectives. To address these challenges, Clean Water Services, the Tualatin Soil and Water Conservation District and the Institute for Applied Ecology have partnered to develop and implement a climate-adapted native plant materials strategy. The strategy seeks to enhance genetic and species diversity in restoration projects by sourcing a portion of our plant material from areas expected to be future climate analogues for the Tualatin basin, either using multiple seed sources within a species (assisted gene flow) or new species all together (assisted migration). I will discuss activities to date that include: the identification of and plant community surveys at climate analogue sites, species selection, seed collection and design for a long-term common garden experiment to identify promising plant materials for future restoration projects.

Keywords: Plant ecology, Climate Change, Habitat restoration

Applications of iNaturalist to an interaction between petal-cutting bees (family: Megachilidae) and farewell-to-spring (*Clarkia amoena*)

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Farewell-to-spring (*Clarkia amoena*) is an attractive annual forb native to the Pacific Northwest. Recent research has found it to be a top plant for native pollinators, which contributes to its popularity in gardens and restoration sites across the region. Though the most commonly available native seed is *C. amoena* lindleyi, Oregon and Washington are home to five subspecies of *C. amoena*. The species has taken off in ornamental markets as well, leading to the widespread planting of *C. amoena* cultivars, which are largely derived from the extirpated subspecies whitneyi. Research has yet to explore whether pollinators are partial to specific *C. amoena* subspecies or cultivars. Here, we will use the community science database, iNaturalist, to examine *C. amoena* and its variants and their relationship with petal-harvesting bees (Anthophila: Megachilidae). This study will examine this non-trophic relationship in addition to commenting on the potential of iNaturalist as a data source to study a morphologically complex plant that exists in environments ranging from remote natural areas to urban gardens. We hypothesize that iNaturalist will not yield a significant dataset of identified subspecies to perform comparative analyses of bee petal-harvests. However, we speculate that a sufficient dataset with which to compare cultivars and native type *C. amoena* will be produced, and that petal-harvesting bees will prefer native type *C. amoena* over cultivar types due to coevolutionary relationships between native plants and bees.

Keywords: Plant ecology, Habitat restoration, Conservation biology

Human-fungi collaboration in natural area stewardship

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Fungi have enormous potential to be incorporated in the stewardship of natural areas. Mycorrhizal networks demonstrate the importance of fungi to the resilience of ecosystems as facilitators of communication, nutrient allocation, and carbon sequestration. Wood decomposing fungi can degrade human-created persistent toxins, build soil, and create edible and medicinal mushrooms. What if land stewards prioritized the caretaking of fungi for the benefit of all species? The City of Portland's Revegetation Program has been experimenting with different fungal species to inoculate weeds, downed wood, thinned trees, and wood chips. We have also created a morel bed to grow this mycorrhizal and saprophytic fungi that has the potential to improve tree resilience and soil structure. We will show you the techniques that we have used and where we have been successful and where more work is needed. We are learning new ways to work with fungi that can improve soil and plant health, filter water, reduce fire risk, and produce mushrooms that can feed wildlife and people. Other potential collaboration with fungi includes mycorrhizal spore production, rare fungi propagation, mushroom species lists, myco-filters for stormwater, and creating a spore library. Working with fungi can be incorporated into land stewardship but there needs to be more experimentation, knowledge sharing, and infrastructure.

Keywords: Habitat restoration

The effects of extreme heat events on tree health measurements

Tess C. Rutstein,^ Reed College, Email: rutsteit@reed.edu (poster)

As the climate continues to warm, the pacific northwest is experiencing more frequent extreme heat events, or more than 3 consecutive days with average temperatures above 35℃. Many assessments of tree health are performed during the summer and, due to the large sample size of these assessments, tree health data from the beginning of the summer and the end are often grouped together without consideration of the part of the season in which they were collected. It is hypothesized that, in the wake of extreme heat events, trees will experience damage that will lead to significantly different health assessments than those taken before the extreme health events. To assess the impact of extreme heat events on tree health, we took water potential, CO_2 absorbance, and light adapted fluorescence measurements at three points over the summer that all occurred within one week of an extreme heat event. These measurements were taken on selected trees of four different species: *Acer macrophyllum, Acer platanoides, Calocedres decurrens and Thuja plicata*. We found that, between June and August, average predawn water potential decreased significantly for all four species while average delta water potential remained constant. Similarly, average light-adapted fluorescence was relatively stable over time for all four species. Average CO_2 absorbance decreased for both *Acer* species, but not to a point of definitive statistical significance and requires further study. These results indicate that certain measures of tree health remain stable in the wake of extreme heat events while others need to be reassessed for accuracy.

Keywords: Climate change, Plant ecology

Flood Safe Columbia River: opportunities for conservation through flood safety

Carrie Sanneman, Multnomah County Drainage District, Email: csanneman@mcdd.org (poster)

For more than a century, the Portland Metro Levee System has been hiding in plain sight. Now, the whole system is getting a makeover and may just pop up into the public eye. This talk will showcase the effort to develop the new Urban Flood Safety and Water Quality District and the opportunities it creates to advance environmental, climate, and justice goals. The Columbia Corridor drainage districts have managed flood safety in the Columbia Slough and Columbia River Floodplain since 1917. The system includes 27 miles of levees, 45 miles of conveyance ways, and 12 pump stations. In 2019, the Oregon legislature created the Urban Flood Safety and Water Quality District (aka New District), which will take over managing the levees and moving water across the levees out to the Columbia River. The New District is designed to take a holistic approach to flood safety, integrating green infrastructure, landscape resilience, climate change, equity, social justice, and cultural history. Right now, the New District board of directors is setting up funding for operations and capital improvements. This presentation will provide a) an overview of the New District and many partners working to modernize flood safety along the Columbia; b) a summary of strategies staff expect to see in the New District's work; c) opportunities to advance water quality, fish and wildlife habitat, environmental justice, and climate resiliency through new district investments; and d) opportunities to get involved.

Keywords: Land/watershed management, Habitat restoration, Water quality

Influence of vegetation on air temperature in Portland, OR

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Natural areas and street trees in urban environments can help cool air temperatures and enhance neighborhood livability. However, the role of constructed LID features in cooling, and how that role may vary in different contexts, has not been well-quantified. In the summer of 2017, we placed 100 iButton temperature sensors in a stratified-random design, in neighborhoods throughout the city of Portland, with 20 sensors in each of five NDVI strata at a resolution of 100 m x 100 m. We also recorded the proportion of pavement, tree canopy cover, and vegetated ground cover within 10 m of the sensor. Multivariate ordination and comparison of hourly air temperatures identified an effect of both (1) neighborhood NDVI and (2) the relative proportion of vegetation and impervious surface within 10 m of the sensor. In 2018, we further investigated the relative magnitude of the cooling effect of vegetation and presence of bioswales within 10 m of the sensor as compared to the neighborhood greenness at the scale of the 100 m x 100 m NDVI class. Neighborhood greenness (50 m scale) had the greatest effect on cooling of air temperatures, with July mean temperatures of up to 2 degrees C cooler in areas of high NDVI relative to those of low NDVI. Vegetation cover at the 10 m scale played a smaller, but still significant role in cooling air temperatures around the sensor.

Keywords: Sustainable development, Climate change

Dam removal, habitat restoration, & community engagement on Kellogg Creek

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Kellogg Dam, located in the center of downtown Milwaukie, OR, was constructed in the 1850's and predates statehood. The Kellogg Creek Restoration and Community Enhancement Project is a unique urban restoration and fish passage project with amazing opportunities for scientific research. The project will: Provide fish passage to 15 miles of habitat by removing the barrier at Kellogg Dam and restoring the creek through Kellogg Lake; Restore 14 acres of high-quality riparian habitat, functional wetlands, and reconnect the floodplain; Provide 14 acres of new natural area for nature-based recreation and outdoor education; Increase flood storage capacity to reduce flooding in lower Kellogg Creek; Modernize the existing Oregon State Highway 99E bridge with an alternative that increases seismic resiliency and establishes a safe bike/pedestrian undercrossing; Provide interactive learning, scientific research, and real-world laboratory opportunities in the field of urban stream restoration; Engage the community through cross-cultural communication tools and events. Neil Schulman (Executive Director) and Amy van Riessen (Watershed Restoration Manager) with the North Clackamas Watersheds Council will discuss the project history, funding status, and construction timeline since receiving a $15 million grant this year from NOAA Fisheries. They will share current scientific studies being conducted at the project site and discuss opportunities for future research partnerships to study the site before and after the dam has been removed and the impoundment has been restored.

Keywords: Conservation biology, Environmental social sciences, Fisheries, Habitat restoration, Sustainable development

Trends in urban tree canopy and dimensions of social equity across the Portland-Vancouver metropolitan area

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Trees are recognized as essential for maintaining a livable urban environment and the benefits they provide to people are increasingly important in the face of a changing climate. Yet, studies in Portland and elsewhere find that trees and the benefits they provide are inequitably distributed to communities differing by race/ethnicity and income. Furthermore, loss of trees to development pressure or environmental stressors presents additional challenges. To provide a regional perspective, we assessed the relationships between tree cover and communities across 27 cities and four counties in the broader Portland-Vancouver metropolitan area. By integrating new maps for tree canopy cover and canopy change from 2014 to 2020, with land use data, and Census variables describing community race/ethnicity and income, we examined relationships in current tree cover and recent changes in cover across communities as well as across different political jurisdictions and land uses. Across the region, canopy cover was 25.2% in 2020, yet varied by city (20.0-63.9%), and was lower in unincorporated areas (13.0-28.1%). A substantial disparity in tree cover was observed across communities. Canopy cover in predominantly BIPOC communities was on average 28.7% compared to 33.8% in other communities. And, canopy cover in predominantly low-income communities was 24.2% compared to 34.1%. Additionally, many of these areas saw a net canopy loss potentially compounding the disparity. This work provides a regionally consistent baseline, identifies potential priority areas for action, encourages community conversations, and informs planning efforts to achieve an equitable distribution of trees and the benefits they provide to people.

Keywords: Land use planning, GIS / modeling

Defying habitat fragmentation with wildlife crossings

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During urban expansion, existing wildlife habitat is vulnerable to increased fragmentation. As habitat permeability decreases, animals are forced to migrate between smaller unconnected areas leading to an influx of wildlife-vehicle collisions (WVCs). To mitigate these impacts, wildlife corridors must also be included across urban growth boundaries to ensure that protected natural areas do not become population sinks for wildlife. The southern I-205 corridor contains the most pronounced collision hotspots in the Portland-Metro area. Extensive natural and rural reserves are divided by this highway, increasing conflicts between humans and wildlife. Because animals have grown accustomed to the freeway, fewer species attempt to cross across the freeway itself, but instead opt to cross over pre-existing busy bridges and under-crossings made for vehicles because it's their only option. This design research explores and represents alternate ways for wildlife to navigate the I-205/Stafford Triangle landscape through the addition of enhanced culverts, under-crossings, and land bridges. The I-205 expansion project presents an opportunity to restore wildlife crossings across landscape-scale corridors. Beginning with an analysis of regional permeability and concluding with design explorations of priority improvements, this research envisions a future for I-205 that is a model of habitat permeability.

Keywords: Animal ecology, Transportation, Habitat restoration

Predicting mesopredator occupancy in the Portland metropolitan area

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Mesopredators—medium-sized predators such as coyote (Canis latrans), common raccoon (Procyon lotor), and Virginia opossum (Didelphis virginiana)—are well established in cities and live closely with humans. However, we still know relatively little about these animals' habitat selection and behavior as they navigate urban space. How do spatial attributes like the proximity to water or housing density affect where mesopredators choose to live? As part of an ongoing study, we are exploring the spatial occupancy of three mesopredator species as a function of land cover characteristics and sociodemographic factors in the Portland metropolitan area. In collaboration with the nationwide Urban Wildlife Information Network (UWIN), we established 25 monitoring sites along a trans-Portland transect extending 50 kilometers from Hillsboro to Gresham. Using motion-triggered camera traps active from spring 2019 to spring 2021 we collected occupancy results for three non-domestic mesopredator species: coyote (268 detections), common raccoon (218 detections), and Virginia opossum (406 detections). We used 40 landscape and sociodemographic attributes to characterize the habitat around each camera trap, allowing us to measure the influence of features such as human population density, road density, and household income on the presence of mesopredators. This presentation will provide an update on the Portland UWIN project and this specific study, emphasizing the application of this research in urban wildlife management and building habitat connectivity.

Keywords: Wildlife biology, GIS / modeling, Animal ecology

Integrating justice and equity into the regional conservation planning process

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Ecological conservation and restoration efforts in urban landscapes necessarily interact with environmental justice issues, and conservation practitioners are challenged to incorporate these important dynamics into their process. This presentation focuses on a case study of a recent effort, led by the Regional Habitat Connectivity Working Group of the Portland/Vancouver area, to meaningfully integrate the principles of Justice, Equity, Diversity and Inclusion into their Strategic Action Plan (SAP). The Working Group and consultant team completed a full audit of the draft SAP and facilitated multiple internal engagement sessions which resulted in; recommended changes to the plan, a draft community engagement framework and a geospatial dataset, based on community vulnerability factors, to help focus relationship building and engagement efforts. The highest-level message of this work is that the movement to respond to the biodiversity and climate crises is inextricably connected with movements to expand civil rights, reduce income inequality, and achieve social justice. White supremacy and the unsustainable exploitation of natural resources are two sides of the same coin, and it is becoming increasingly clear that there is no addressing one of these problems without addressing the other. 215 years of settler colonialism and systemic racism have been inscribed upon the region's landscape itself, directing the distribution of environmental amenities and burdens across our communities, and delineating barriers and corridors affecting the movement of plants and animals. At the same time, the momentum that is building in these movements separately gains orders of magnitude more efficacy and meaning when pursued together.

Keywords: GIS / modeling, Habitat restoration, Land use planning

AUTHOR INDEX

KEYWORD INDEX