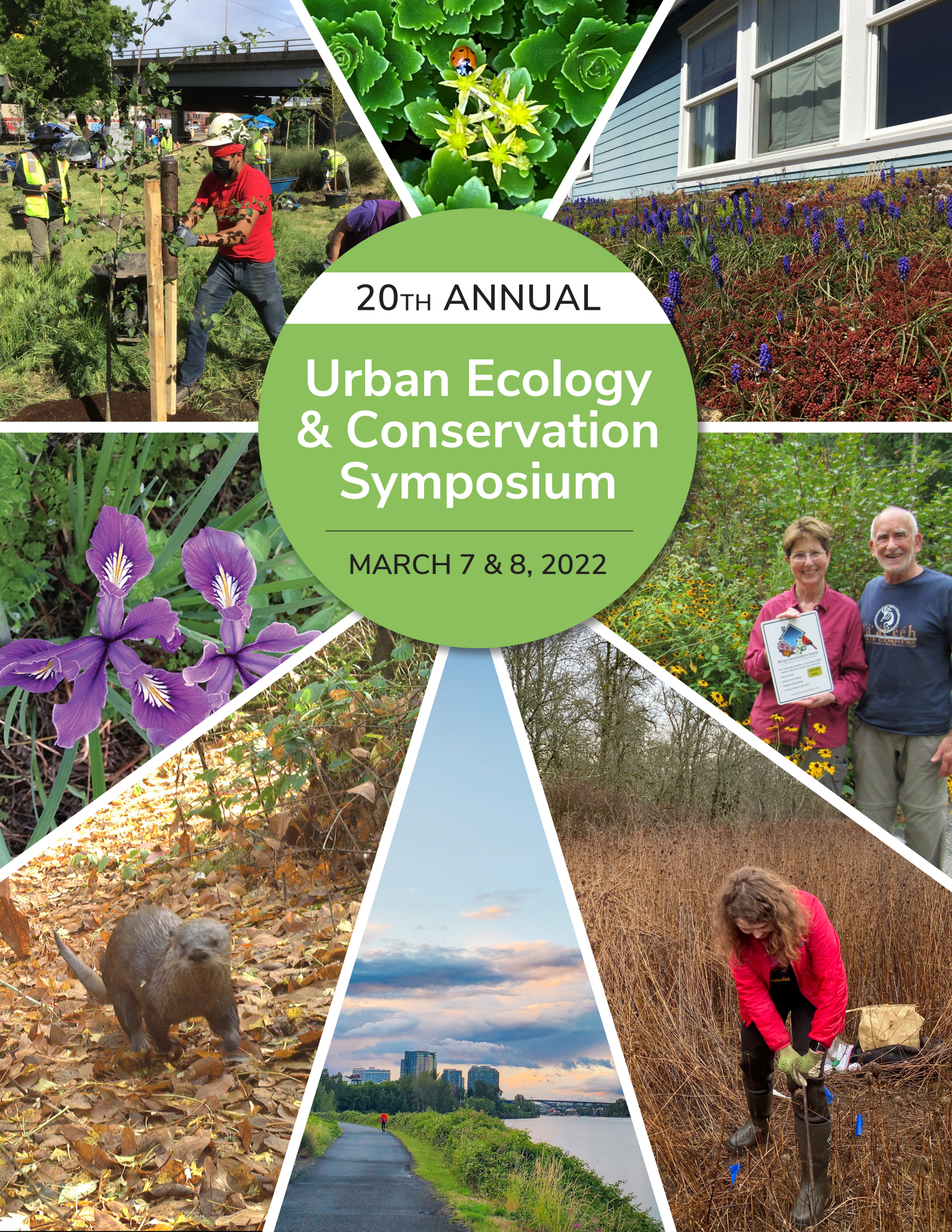

20TH ANNUAL

Urban Ecology & Conservation Symposium

MARCH 7 & 8, 2022

Thanks to the following photographers

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Tree planting with houseless community – Matt Krueger, City of Portland
Ladybug on sedum – Amy Chomowicz, City of Portland
Blooming ecoroof – Tom Liptan, Portland resident
Bring Conservation Home Program – Nina S. Fogel, Saint Louis University
Soil collection in the Tualatin watershed – Guen DiGioia, Oregon State University
Willamette southwest waterfront – Theresa Huang, Urban Greenspaces Institute
River otter (*Lontra canadensis*) caught on trailcam in Hillsboro – Leslie Bliss-Ketchum, Samara Group
Oregon Iris (*Iris tenax*) in Cooper Mountain Nature Park – Lori Hennings, Metro

20TH ANNUAL

URBAN ECOLOGY & CONSERVATION SYMPOSIUM

Held virtually on
March 7 & 8, 2022

Organized by the
Urban Ecology Research Consortium (UERC) in partnership with Social Enterprises

UERC Organizing Committee Affiliations:

CITY OF GRESHAM

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
working for clean rivers

INSTITUTE FOR NATURAL RESOURCES

Metro

PORTLAND AUDUBON
TOGETHER FOR NATURE

Portland State UNIVERSITY

REED COLLEGE

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

URBAN Greenspaces INSTITUTE

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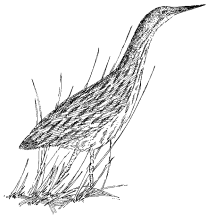

Urban Ecosystem Research Consortium (UERC)
Portland, OR - Vancouver, WA Metropolitan Region

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, state and federal), private firms and non-profit organizations. Individuals from the institutions (listed on the next page) currently serve on the organizing committee. The diverse backgrounds and affiliations of those involved have allowed the UERC to bring together many important sectors of the natural resources community. This year we hired event consultant Social Enterprises again (http://www.socialenterprises.net/) to help organize our first ever virtual conference.

Web Site – http://www.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 the UERC web site and following the link "Join Our Listserv."

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.

2022 URBAN ECOLOGY & CONSERVATION SYMPOSIUM ACKNOWLEDEMENTS

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EVENT SUPPORT

We wish to thank **Hannah Martin**, **Sierra Herron**, and **Krissy Paetzold** at Social Enterprises for their work organizing and executing the event from behind the scenes. We also thank **Chris Dodge**, Portland Audubon, for the cover page graphic design.

FINANCIAL SPONSORS

2022 Urban Ecology & Conservation Symposium
AGENDA

Monday, March 7, 1:00-4:30 pm

1:00	**WELCOME & INTRODUCTION & 20 YEAR RETROSPECTIVE: Olyssa Starry, PhD** Associate Professor, University Honors College, Portland State University		
1:15	**OPENING KEYNOTE ADDRESS: Alan Yeakley, PhD** Professor and Chair, Department of Geography & Environmental Systems, University of Maryland ***Portland: Explorations on the Green Edge***		
2:00	**BREAK** *Raffle at 2:15*		
EQUITY AND HUMAN DIMENSIONS* *indicates >2 authors; see abstracts.			***Moderator: Aaron Ramirez, PhD*** Assistant Professor of Biology & Environmental Studies, Reed College
2:20	Jane Tesner Kleiner	nature+play designs	Restoration of school campuses - A piece to the urban climate challenge
2:30	Matt Krueger & Barbie Weber	City of Portland Ground Score Assn.	Engaging the houseless community in tree planting and maintenance
2:40	Adela Miller & Jade Jones-Hawk	City of Vancouver Urban Forestry	Pursuing equitable urban tree canopy coverage in Vancouver, WA
2:50	Nina S. Fogel*	Saint Louis University	Mutually beneficial collaborations between residential conservation programs and academic researchers: Lessons from St. Louis
3:00	Q&A		
3:10	**BREAK** *Raffle at 3:25*		
WILDLIFE* *indicates >2 authors; see abstracts.			***Moderator: Joe Liebezeit*** Staff Scientist & Avian Conservation Manager, Portland Audubon
3:30	Joe Skalicky	US Fish & Wildlife Service	Lamprey and Boney Fish Salvage During Restoration at Steigerwald Lake National Wildlife Refuge
3:40	Hunter Storm*	Portland State University	Predicting mesopredator interactions in the Portland metropolitan area
3:50	Tom Liptan	Unaffiliated	Ecoroof Bio-diversity in residential neighborhoods
4:00	Joe Ferguson	Alliance High School	Whitaker Ponds Wild! A High School Interdisciplinary Urban Wildlife Ecology Project
4:10	Q&A		
4:20– 4:30	**WRAP-UP**		

Tuesday, March 8, 9:00 am-1:00 pm plus optional tours

9:00 **DAY 2 WELCOME, ANNOUNCEMENTS AND INTRODUCTION: Amy Chomowicz**
Principal Analyst, Project Management Office, City of Portland Bureau of Environmental Services

9:05 **OPENING KEYNOTE ADDRESS: David G. Lewis, PhD**
Associate Professor of Anthropology and Ethnic Studies, Oregon State University

Native Portland: Changes to the Cultures and Environment of the Wapato Valley during Settlement

9:50 **BREAK** *Raffle at 10:05*

CLIMATE & ECOSYSTEM SERVICES*
*indicates >2 authors; see abstracts.

Moderator: Brendan White
Conservation Partnerships Division Manager, US Fish and Wildlife Service, OR Fish & Wildlife Office

10:10	Garett Pignotti*	Washington State University	Predicting urban air temperatures using land cover type and satellite observations of surface temperatures
10:20	Amy Johnson*	Portland Community College	Quantifying Ecosystem Services Using i-Tree Eco Model Within Urban Forests Provides Educational Opportunities for Students
10:30	Emma Russell & Mary Logalbo	Portland State University / West Multnomah SWCD	Improving climate resiliency and management practices in conservation planning by developing a 'climate lens' at West Multnomah Soil and Water Conservation District
10:40	Guen DiGioia	Oregon State University	Carbon Sequestration Potential After Riparian Restoration—A Baseline Study of Carbon Stocks and Mycorrhizal Communities
10:50	Q&A		

11:00 **POSTER SESSION**

HABITAT*
*indicates >2 authors; see abstracts.

Moderator: Lindsey Wise
Biodiversity Data Manager, Institute for Natural Resources

12:00	Dominic Maze & Julia Bond	City of Portland	Quantifying Impacts to Water Quality from the Introduction of an Invasive Wood-boring Insect
12:10	Lori Hennings*	Metro Parks & Nature	Metro's Bond Refinement: Identifying acquisition priorities in the Urban Target Area
12:20	Rebecca Talbot	Portland State University	Spatial and Seasonal Variations of Microplastic Concentrations in Portland's Freshwater Ecosystems
12:30	Laura Guderyahn & Sarah Miller	Portland Parks & Recreation / Department of Environmental Quality	Whitaker Ponds Natural Area Remediation Project: A brilliant example of successful partnership, communication and realization of goals.
12:40	Q&A		

12:50 **CLOSING REMARKS AND POSTER AWARDS: Lori Hennings**
Senior Natural Resource Scientist, Metro Parks & Nature

Field Tours start at 2:30pm – See Page 7

POSTER PRESENTATIONS

Coordinator: Theresa Huang

Author(s)	Title
Jen Hayes, Gail Langellotto*^ (Oregon State University),	Natives and Nativars: Understanding Pollinator Preference for Native Plants and Their Cultivated Counterparts in the Pacific Northwest
Michelle L. Talal* (Tel Aviv University, Oregon State University), Mary V. Santelmann (Oregon State University),	Visitor access, use, and desired improvements in urban parks
Gwyn Case* (Johnson Creek Watershed Council)	The secret garden: Results and reflections from the Back 5 Project
Evelyn A. Haase*^ (Reed College)	Heavy metal deposition in epiphytes in downtown Portland, OR in areas of tear gas munitions detonation
Katherine Gelsey*^ (Pomona College), Daniel Ramirez (California State University, Channel Islands), Heejun Chang (Portland State University)	Spatial analysis of landscape characteristics, anthropogenic factors, and seasonality effects on water quality in Portland, Oregon
Mariah D. Vertulfo*^, (Portland State University)	Analysis of Harmful Algal Blooms in the Willamette River, Portland, Oregon
Rod Coles*, Margaret Armstrong, Eric P. Butler (Friends of Tualatin Hills Nature Park)	History of Tualatin Hills Nature Park, Part 1
Llewyn B Whipps* (Ash Creek Forest Management)	Field Crews as Data Collectors for Effective Restoration

* *Primary author*
^ *Student presenter*

UERC 2022 - FIELD TOUR DESCRIPTIONS

March 8 from 2:30-3:30pm

Although the Symposium is virtual again this year, we are offering in-person field tours! *Previous registration is required.*

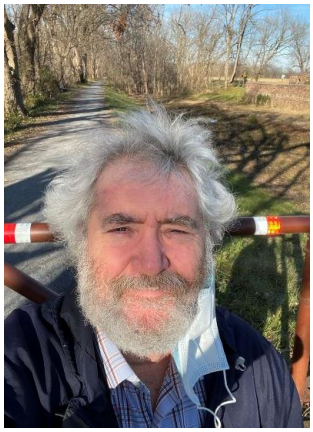
Tour - Who Builds it Best? Engineers vs. Beavers in a Constructed Wetland | Led by Katie Holzer, City of Gresham
Visit a large constructed stormwater treatment wetland in Gresham with resident beaver families. Check out water quality data, habitat, and beaver coexistence devices.

Tour -Beaver and Human interactions in a Suburban Stream | Led by Heejun Chang, Portland State University
Visit a range of nature-based storm infrastructure facilities with beaver dams in suburban residential areas in west Portland. How suburban development, beaver dams, and other storm facilities affect flow and water quality data.

Tour - Shwakuk Wetlands - A Community-Led First Foods Project | Led by Serina Fast Horse of Kimimela Consulting & Toby Query, Julie Matney, and Jennifer Devlin of Portland Bureau of Environmental Services
Visit a 5 acre wetland in the Columbia neighborhood where a former pumpkin patch has been transformed into a community imagined space where Indigenous Traditional and Ecological Knowledge is being uplifted and reimagined for our current context.

Tour - Harborton Habitat Restoration Site | Led by Colin McLaren, PGE
In 2020 PGE restored several acres of Willamette River floodplain habitat at their Harborton site by removing dredge spoils placed on site in the early and mid-20th Century and introducing native plants and habitat structures. Harborton supports a regionally significant northern red-legged frog breeding site, which informed and influenced restoration design. Site monitoring in 2021 documented over 120 plant species, 43 bird species, deer, elk, coyote, and wild juvenile Chinook and coho salmon.

Tour - Linnton Mill Restoration Site | Led by Kari Dupler, RestorCap
The site is located along the Willamette River in the Linnton neighborhood. The restoration included removal of hundreds of pilings, old buildings, and fill materials to create off-channel habitat for juvenile salmonids. The site also includes habitat structures for other species including mink, bald eagle, osprey, and other wildlife in the area. The work was completed in 2019 and RestorCap is currently monitoring and managing the site.



Afternoon Keynote Address

Dr. Alan Yeakley

Professor and Chair
Department of Geography &
Environmental Systems,
University of Maryland, Baltimore County

Portland: Explorations on the Green Edge

So, how did the UERC start? And by whom? And most importantly, why? As for where, I guess we already all know that! In my talk, I'll take you back to an experimental summer urban ecology class I taught at PSU over 20 years ago, and conversations my students had with environmental leaders in Portland that led to all this. Additionally, I'll share a brief review of urban ecology findings by my research lab at Portland State in the following areas: the urban stream syndrome, riparian plant and animal ecology, wetland invasive plant management, and stream corridor management at the scale of cities in Oregon and Washington. While I'm of course happy with our scientific accomplishments that have contributed to a better understanding of urban ecology and management in the Portland-Vancouver metropolitan area, I'm most proud of the students I've advised. Seeing them flourish in their grad research and then their careers is a great joy for me. Collectively, we in my lab represent just one example of many such stories of urban ecosystem science and management efforts by all of us who participate in the Urban Ecosystem Research Consortium of Portland-Vancouver (yes, still a mouthful 😊).

Biography

Alan Yeakley is Professor and Chair of the Department of Geography & Environmental Systems at the University of Maryland Baltimore County (UMBC). From 1994-2016, Dr. Yeakley was a founding faculty member of the Department of Environmental Science & Management at Portland State University in Oregon. Prior to PSU, Alan earned a Ph.D. in environmental science from the University of Virginia, where he was a presidential fellow, and then was an NSF post-doc with the Odum School of Ecology, University of Georgia. He has been a principal investigator on numerous NSF, USFS and EPA research grants in ecosystem ecology, hydrology, and management with a particular focus on Portland-area urban ecosystem science. Alan has published over 50 journal articles and book chapters in ecosystem science, and he was the lead editor of the 2014 book *Wild Salmonids in the Urbanizing Pacific Northwest*. Dr. Yeakley has also served as major advisor for 30 graduate students, most of whom conducted their theses and dissertations on urbanizing Pacific Northwest ecosystem science and management. Dr. Yeakley is an original founding member of UERC.

Morning Keynote Address

Dr. David G. Lewis

Associate Professor of Anthropology
and Ethnic Studies
Oregon State University
Corvallis, OR

Curating Settler Colonialism in The Wapato Valley of Oregon

In the 19th century settlers brought changes to the land and native peoples of Oregon. The tribes had a tough time adjusting to these changes as their food and resources were taken away and destroyed. Tribal peoples experienced rough conditions on the reservations and their former homelands were radically altered by the settlers. Now we are working to document the changes as tribes work to recover silenced histories and suppressed cultures 180 years after settlement. This presentation will address examples of changes brought to Oregon through the history of the tribes and their significant places.

Biography

David G. Lewis is a member of the Confederated Tribes of Grand Ronde, of Oregon. He has a PhD from the University of Oregon (2009) and is assistant professor of Anthropology and Ethnic Studies at Oregon State University. David served as Cultural Manager of the Grand Ronde Tribe, and Tribal museum designer, and Exhibits Curation manager. David has conducted research on Oregon tribal history for some 25 years and has numerous publications in journals, and chapters in books. He is currently engaged in two publication projects, *Tribal Stories of Western Oregon*, and lead editor of *Kalapuyans of Western Oregon*, a collaborative project with eighteen contributors. Additionally, David has researched and written over 470 essays for his blog, the Quartux Journal, ndnhistoryresearch.com. David conducts numerous presentations annually with community groups, at conferences, and at universities educating about tribes in the region, consults with local governments, and organizations on diversity, place naming, and land acknowledgements, and curates museum exhibits at local historical societies and museums. David lives in Salem, OR with his wife Donna, and sons Saghaley and Inatye.

ABSTRACTS SUBMITTED

Spreading information, not invasive species: Oregon Invasive Species Council's online information hub to inform, share, and collaborate

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Alexander Staunch, Mosaic Ecology LLC, Email: alex@mosaicecology.com
Jalene Littlejohn, Samara Group, Email: j.littlejohn@samarapdx.com

Invasive species pose a serious statewide threat to Oregon. In 2017, the Oregon Invasive Species Council (OISC) published the Statewide Strategic Plan for Invasive Species. Development of a web-based hub that facilitates learning and collaboration on the prevention, early detection and management of invasive species is a priority in the Statewide Strategic Plan. The hub transformed the former Oregon's Worst Invaders List into a searchable and sortable web-based database. The hub has different metrics which can be queried, such as species status in Oregon, introduction or dispersal pathways of concern, suitable habitat, timely alerts, or combinations of multiple metrics. Through the alert component, the new hub is designed to provide up-to-date information regarding emergent invasive species issues. The hub also provides links to other resources, providing users access to additional critical information. The OISC hub provides an opportunity for invasive species specialists to connect and share information, which will allow better preparation and rapid response to invasive species threats. The OISC believes this new hub will be of immense value in providing current information needed to mitigate or eliminate risk posed by invasive species in Oregon. We, the OISC, want your help and input. Learn how to join the OISC's upcoming workshop about the Oregon's Invasive Species Hub, how to use it and how it can benefit you, the invasive species specialists, and others. Participants will be among the first collaborators to provide feedback on the development and rollout the Hub.

Keywords: Conservation biology, Habitat assessment, Environmental policy

The secret garden: results and reflections from the Back 5 Project

Gwyn Case, Johnson Creek Watershed Council, Email: gwyn@jcwc.org

The Leach Botanical Garden is a hidden botanical gem tucked away in SE Portland, but beyond the manicured paths lie five acres of leafy chaos. Once a pig farm, the eastern five acres of the Leach Botanical Garden (affectionately called the "back 5") devolved into a tangle of Himalayan blackberry, English ivy, and other invasive plant species. Since 2019, the Back 5 Project has worked to transform this land from an ecological desert to an outdoor classroom and healthy forest. Formed as a partnership between the Leach Botanical Garden and many other organizations, including Wisdom of the Elders, the Blueprint Foundation, David Douglas High School, the African Youth Community Organization, and the Johnson Creek Watershed Council, the project emphasizes the inclusion of underserved communities and creating opportunities for mentorship. More than just a restoration project, The Back 5 educates participants in scientific methods, ecological concepts, and environmental restoration. We describe some of the early progress and successes of the project, like partially restoring several acres of vegetation and spending hundreds of hours monitoring plants, amphibians, and macroinvertebrates. We also discuss some of the challenges the project has faced along the way and plans for the future.

Keywords: Habitat restoration, Environmental education, Plant ecology

Rats and bird feeders: myths, truths and IPM strategies for Norway rats

Keith Chaloux, Pest & Pollinator LLC, Email: keith@pestandpollinator.com

Norway rats (*Rattus norvegicus*) are a common commensal invasive pest known to utilize bird and wildlife feeders as preferred food sources. Failure to implement Integrated Pest Management (IPM) for Norway rats can lead to undue rodenticide pollution, non-target exposure and severe economic damages. This presentation integrates information from more than 5+ years of professional observations in integrated pest management and analysis of data on services performed per target pest to yield novel insights for reducing economic damages of Norway rats and ecological impacts of routine management applications. This information suggests that bird & wildlife feeding practices contribute to pest management problems with Norway rats and that alternatives like habitat restoration can encourage native birds, wildlife & pollinator species without attracting invasive rat pests.

Keywords: Habitat restoration, Animal ecology

History of Tualatin Hills Nature Park, part 1

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Margaret Armstrong, Friends of Tualatin Hills Nature Park, Email: margarmstrong45@gmail.com
Eric P. Butler, Friends of Tualatin Hills Nature Park, Email: ebutle2@pdx.edu

Tualatin Hills Nature Park (THNP) is a 222-acre greenspace in the heart of Beaverton. With five miles of trails, a nature center, and a unique mosaic of habitats, THNP attracts over 200,000 visitors every year. The Friends of Tualatin Hills Nature Park recently began a project to document the history of THNP by interviewing many of the community members who advocated for its preservation. We present Part 1, a video telling the story from the effort to protect St. Mary's Woods in the early 1970s until the park's original 180 acres were acquired by the Tualatin Hills Park and Recreation District in 1982, and talk briefly about how the video was made and our future plans.

Keywords: Environmental policy, Environmental social sciences, Land use planning

Carbon sequestration potential after riparian restoration: a baseline study of carbon stocks and mycorrhizal communities

Guen DiGioia, Oregon State University, Email: gpatty4@gmail.com

Increased atmospheric carbon emissions of carbon monoxide, carbon dioxide, and methane acerbate climate change through carbon cycle disruption. Riparian areas offer substantial ecosystem services such as water filtration, slowing and cooling, and, as is being discovered, a significant carbon sink. Total percent carbon and carbon stocks in restored riparian areas are not well understood but restoring riparian portions of agricultural lands may serve as a multifaceted approach to limit climate impacts through stream temperature reduction and sequestering carbon.This study analyzed 14 years of current restoration project data in the Tualatin watershed. Nutrient and carbon concentrations and specific fungal guild presence was compared in two unrestored sites to understand the role of restoration in achieving carbon goals.We found that when compared to unrestored riparian areas, carbon sequestration levels nearly doubled while other nutrients (N, P, and K) plateaued at year 14. Mycorrhizal fungi species proportions were explored as a possible correlation to increases in carbon. Twenty-nine arbuscular and 56 ectomycorrhizal fungi species were identified from soil samples across sites. Overall, we found no correlation between mycorrhizal species proportions, time since restoration, or carbon percentage with univariate, quasibinomial analysis. However, non-parametric multidimensional scaling (NMS) fungal community plots provided multivariate insight that unique fungal community composition may correlate with carbon percentage in riparian areas along the Tualatin.Thus, restoration of riparian areas from previous agricultural lands appears to greatly influence carbon percentages and carbon stocks, and fungal community composition may correlate to increased carbon accumulation in restored areas.

Keywords: Climate Change, Soil science, Land/watershed management

Whitaker Ponds Wild! A high school interdisciplinary urban wildlife ecology project

Joe Ferguson, Alliance High School, Email: jferguson@pps.net

The departments of Science, Natural Resources, and Language Arts of Alliance High School at Meek Campus (a Portland Public Schools alternative high school), in collaboration with the Columbia Slough Watershed Council (CSWC) and Burning Hearts Media, developed the Whitaker Ponds Wild! interdisciplinary wildlife ecology project during the 2020-2021 school year. When high school learning continued in distance-learning due to the COVID-19 pandemic in the fall of 2020, teachers and students from Alliance High School and community partners from the CSWC and Burning Hearts Media set up wildlife monitoring video cameras at Whitaker Ponds Natural Area in northeast Portland. Video cards were collected weekly throughout the school year and students analyzed videos and collected data on wildlife behavior and ecology in this unique Portland natural area. Students learned about the unique urban wildlife of this park (beavers, river otters, coyotes, raccoons, squirrels, rabbits, birds, etc.) and other wildlife of the Pacific Northwest. They created videos, presentations, and other creative projects and games with the data collected in the cameras. The project was truly interdisciplinary as students read the young adult novel, A Wolf Called Wander, studied various aspects of Oregon and Pacific Northwest ecology, and wrote papers and stories about the wildlife studied in the class. This novel project engages students in the learning of the urban ecology of their own city and helps students develop empathy for the wildlife living in their own neighborhoods. https://www.columbiaslough.org/blog/whitaker-ponds-wild-alliance-high-school-guest-post

Keywords: Environmental education, Wildlife biology

Mutually beneficial collaborations between residential conservation programs and academic researchers: lessons from St. Louis

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Sacha K. Heath, Living Earth Collaborative, Email: sachakheath@gmail.com

There has been growing interest in conducting biodiversity research in residential areas; however, finding suitable study sites is a challenge. Saint Louis University in Missouri has overcome this hurdle by establishing a collaboration with St. Louis Audubon's Bring Conservation Home (BCH), the sister program to Portland's Backyard Habitat Certification Program. We aim to highlight the elements of our partnership, the benefits to both organizations and community participants, and some challenges. BCH's multi-tiered certification program offers a study system ideal for ecological research: a single factorial comparison of habitat differences at the local scale across a gradient of urbanization. We are investigating patterns of bee, bird and mosquito diversity across 45 BCH yards. The collaboration also offers opportunities for community engagement. We have created a citizen science project and many BCH enrollees are eager to participate and learn more about the wildlife in their yard. Additionally, we partnered with psychologists to determine whether enrollment in BCH has promoted changes in human behavior. However, challenges remain. Due to the nature of the research, additional legal and regulatory documentation was needed. Adding sub-studies also led to confusion among participants and required additional communication. In total, however, the benefits outweighed the challenges. BCH benefited from having their certification criteria empirically tested. Community members both gained and provided knowledge and felt pride in having legitimately contributed to science and conservation. We advocate for an expanded conceptualization of what collaborations with home conservation programs can be to one mutually beneficial for all stakeholders.

Keywords: Habitat assessment, Conservation biology, Environmental education

Spatial analysis of landscape characteristics, anthropogenic factors, and seasonality effects on water quality in Portland, Oregon

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Urban areas often struggle with deteriorated water quality as a result of complex interactions between landscape factors such as land cover, use, and management as well as climatic variables such as weather, precipitation, and atmospheric conditions. Green stormwater infrastructure (GSI) has been introduced as a strategy to reintroduce pre-development hydrological conditions in cities, but questions remain as to how GSI interacts with other landscape factors to affect water quality. We conducted a statistical analysis of six relevant water quality indicators in 131 water quality stations in four watersheds around Portland, Oregon using data from 2015 to 2021. *E. coli* and lead in the wet season are negatively correlated with distance to nearest GSI. Spatial lag and spatial error models best explain variations in water quality; when accounting for spatial autocorrelation, up to 43% of variation in water quality can be explained by selected landscape and anthropogenic variables. Future studies should include multi-level analysis at the census block group scale to include sociodemographic variables that demonstrate whether benefits from GSI are equally distributed. Our findings provide valuable insights to city planners and researchers seeking to improve water quality in metropolitan areas by implementing GSI.

Whitaker Ponds Natural Area Remediation Project: a brilliant example of successful partnership, communication and realization of goals

Laura Guderyahn, Portland Parks and Recreation, Email: Laura.guderyahn@portlandoregon.gov
Sarah Miller, Oregon Department of Environmental Quality, Email: sarah.miller@deq.state.or.us

Development along the Columbia Slough has resulted in an accumulation of a variety of contaminants in slough sediments and in fish tissue. Major contaminants in slough sediments include heavy metals, pesticides, PCBs, semi-volatile organic compounds, and PAHs. At Whitaker Ponds, historical untreated stormwater discharges to East Whitaker Pond led to the need for remediation of East Whitaker Pond sediments for metals, PCB and PAHs. After seven years of partnership between Metro Metals Inc., the Department of Environmental Quality, Metro, Portland Parks and Recreation and other watershed stakeholders, the pond was drained, areas of highest sediment contamination removed, a six-inch sand cap was placed on approximately 2/3 of the pond; sediment areas with moderate PCB concentrations included an additional activated carbon amendment mixed into the sand cap in Summer 2021. The project had many ecological and community goals, including the removal of as much contamination as possible and "capping" the remaining sediment to prevent remaining contamination from moving into the water column all while minimizing negative impacts of construction on existing ecological values of the pond. Further, a focus on intentional relationship building and communication to all stakeholders and jurisdictional partners ensured the development and implementation of a project with the full support of the community. This project stands as an example of successful community and jurisdictional coordination that should be used as a template for future remediation projects that are already planned for the Columbia Slough watershed.

Keywords: Animal ecology, Habitat restoration, Water quality

Heavy metal deposition in epiphytes in downtown Portland, OR in areas of tear gas munitions detonation

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Protests over the summer of 2020 in support of the Black Lives Matter movement saw a dramatic increase in the use of Riot Control Agents (RCAs), namely tear gas, in response to protestors. Tear gas munitions contain heavy metals, notably zinc (Zn) as a smoke screen agent. Historically, lichens and mosses have been used to assess environmental quality, particularly heavy metal deposition. Lichens and mosses are known bioaccumulators and therefore bioindicators. Air pollution negatively impacts the frequency and density of lichens in urban areas. However, mosses are less sensitive to variation in air quality than lichens. To assess the heavy metal deposition due to the use of RCAs, *Parmelia* lichens and *Polytrichales* mosses were collected from street trees at a height minimum of 1.5m using a Teflon coated razor blade. The samples were rinsed, dehydrated, and powderized in preparation for nitric acid-based microwave digestion. Samples were analyzed for Zn concentrations using Flame Atomic Absorption Spectroscopy (FAAS). A map of Zn concentrations in the region of study was compiled using GIS to show any correlation between RCA munition detonation and elevated Zn concentrations.

Keywords: Air quality, Environmental social sciences, GIS / modeling

Natives and nativars: 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 seven genera of Oregon native plants and one to three associated cultivars, documented over two field seasons (2020 and 2021). This study is ongoing, and takes place at Oak Creek Center for Urban Horticulture in Corvallis, Oregon. 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 genus group, and altered plant traits (via selections and/or breeding) may be associated with changes in bee visitation. Our preliminary analyses reveal 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. A post-hoc Tukey test revealed the native annual (*Clarkia amoena*) received significantly more visitation than its cultivars in both 2020 and 2021, the native (*Eschscholzia californica*) received greater visitation than one cultivar in 2021, and *Achillea millefolium* was preferred over one cultivar in 2020 and two in 2021.

Keywords: Plant ecology, Conservation biology, Animal ecology

Metro's Bond Refinement: identifying acquisition priorities in the Urban Target Area

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In November 2019 the region's voters approved a $475 million bond measure to protect clean water, restore fish and wildlife habitat and provide opportunities for people to connect with nature close to home. It was the third such voter-approved measure over the past 25 years. Each bond measure presented the public with a set of carefully selected "target areas" (TAs) within which properties may be purchased from willing sellers using bond funds. Once a bond passes, Metro undergoes a bond "refinement process" to identify a high priority subset of lands based on a suite of criteria. All three bonds share goals for healthy streams and habitat and included substantial governmental and community outreach, but the 2019 bond differs in three important ways: (a) it prioritizes racial equity and Indigenous needs, (b) for the first time it includes an Urban TA, and (c) it emphasizes opportunities to increase climate change resilience. Throughout Metro's engagement efforts we heard that the region's residents wanted Metro to integrate equity in new and deeper ways. Metro hired Knot consulting to develop several modeled data layers tied closely to voter approved, bond-specific criteria related to environmental justice. Those layers, used individually and in combination, helped us make and better understand the effects of prioritization decisions. While this effort was specific to the land acquisition refinement process for the 2019 bond, staff from Metro's strategic funding team and data resource center continue to discuss ways to use this model as a starting point for regional environmental justice analyses that could be applied and shared more broadly.

Keywords: Climate Change, Conservation biology, Environmental social sciences

Community engagement can accelerate research about urban forest health issues

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Urban forests are essentially open-ended experiments, but many cities have limited capacity to document observations and changes. Citizen or community science projects can enhance this capacity for understanding changes in urban environments. The Forest Health Watch program (https://foresthealth.org) was co-designed to engage communities in forest health research and the pilot project focused on the dieback of western redcedar. Many community scientists have contributed to foster shared understanding and accelerate research about the dieback of redcedar and a handful of other urban forest health issues in the region. This presentation will summarize the approach and preliminary outcomes of the projects and engagement activities within the Forest Health Watch program.

Keywords: Climate Change, Plant ecology, Environmental education

Quantifying ecosystem services using i-Tree Eco Model within urban forests provides educational opportunities for students

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Stratified random sampling methods were used to quantify ecosystem services provided by trees in the diverse urban forest in the Rock Creek Environmental Studies Center (RCESC) on the Portland Community College (PCC) Rock Creek campus. The RCESC is a 110-acre natural area on the western edge of the Portland Metro Area Urban Growth Boundary located in the Willamette Valley ecoregion. The RCESC is made up of a mosaic of habitat types including wetlands, oak woodlands, and upland coniferous forests. The RCESC is managed not only to provide wildlife habitat and floodplain function but also acts as a living laboratory facilitating experiential learning opportunities, both for students and the broader community. As part of the Environmental Studies research program at PCC, in collaboration with the award-winning PCC sustainability office, students engaged in quantifying the ecosystem services provided by the forested areas within the RCESC. i-Tree Eco modeling software was used to analyze student data. The results presented a valuable opportunity to further engage students through a range of research questions about urban forest structure, function and value. Students considered how to apply this research towards promoting sound management decisions, human health, and environmental quality. This presentation will focus on the iTree results, the limits of their application, as well as lessons learned for how to further engage students in this type of research.

Keywords: Environmental education, Habitat assessment, Land/watershed management

Restoration of school campuses: a piece to the urban climate challenge

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As Pacific Northwest communities look for solutions to address Climate Change Action plans, one piece of the puzzle lies throughout our urban areas – school campuses. School districts tend to be one of the largest land owners across urban and suburban communities. Campus layouts and land management practices have trended to minimalize natural settings, beyond turf lawn, parking lot shade trees and street trees. City codes have provided some direction to reduce pavement heat islands and green stormwater management, but the majority of school campuses are pavement or turf. Initiatives are underway to change how school campuses look and function, both for educational and play uses, but also to support broader goals. Local school districts' bond programs have updated building designs to be more efficient and reduce environmental impact. Similar thinking has been applied to the campuses, many of which range up to 20 acres per site. Greening of Schoolyard best design and management practices have added a variety of natural features to campuses, including shade trees, native plants, several garden types (including pollinators) and more. These designs not only significantly increase the amount of green corridors, they also become living laboratories for students to see their daily lesson plans come to life. They can observe, learn, understand, and perhaps become the next generation of stewards. I will showcase recent results from bond programs in Vancouver and Evergreen Public Schools over the last five years and the impact they are making to address sustainability goals.

Keywords: Habitat restoration, Sustainable development, Environmental education

Engaging the houseless community in tree planting and maintenance

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The Bureau of Environmental Services (BES) manages Portland's wastewater and stormwater infrastructure and plants trees to protect public health and the environment. BES maintains two traffic circles that function as stormwater facilities at the east end of the Morrison Bridge. This area in the Central Eastside Industrial District (CEID) has limited tree canopy and greenspace. In recent years the soil and vegetation in the facilities have been negatively impacted by campers.The Central Eastside Industrial Council (CEIC) has partnered with Trash for Peace, a non-profit organization that employees houseless individuals to organize routine garbage removal and cleanup services. This partnership sought to expand to include the traffic circles. After two years of community engagement, CEIC and BES co-produced an action plan. During that time, BES developed a relationship with the houseless community and learned of community interest in increased tree canopy. BES organized a tree planting for the sites. In spring of 2021, 70 trees were planted by members of the houseless community, with assistance from city staff and partner Friends of Trees. A team of trained stewards from the houseless community has maintained the trees and worked with the city to restore the stormwater facilities. The stewards are paid an hourly wage. Maintenance of the site will continue for two years through an agreement between BES, CEIC, and Trash for Peace. This project demonstrates the importance of relationship building, community engagement, and the involvement of marginalized communities in environmental stewardship. We hope to expand this model to other BES-managed sites around the city.

Keywords: Climate Change, Environmental education, Land/watershed management

Ecoroof biodiversity in residential neighborhoods

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Portland's first ecoroof was built to measure rain management performance. However, unbeknownst to the researcher that little 180sf garage ecoroof would reveal a treasure of biodiversity as well. Installed in 1996 at a NE Portland residence and then in 2019 removed and then reinstalled on a new residence front porch in SE Portland. The soil, plants and biodiversity came with it. The researcher continues to monitor the ecoroof for signs of life and has captured evidence of many species who inhabit or visit the ecoroof. This presentation will provide photos of compelling observations. An ecoroof is like the old little grocery store down the street, with birds, bugs, plants, seeds and microorganisms in seasonal abundance. The ecoroof also provides self-storage for some species to stash winter food. Some species forage for seeds, some eat plants and seeds, some gather nesting materials, some come to find other species to eat, and of course the pollinators - doing what they do best!

Keywords: Wildlife biology, Sustainable development, Environmental education

Quantifying impacts to water quality from the introduction of an invasive wood-boring insect

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The emerald ash borer (EAB; *Agrilus planipennis*), is a destructive and costly exotic forest insect in United States. A dietary specialist, EAB feeds and congregates almost exclusively on ash species (genus *Fraxinus* [Family: *Oleaceae*]). While EAB has not yet been detected in the Pacific Northwest, there is a consensus among scientists and practitioners that its introduction is all but inevitable, posing a serious concern for the endemic Oregon ash (*Fraxinus latifolia*). Oregon ash is highly susceptible to EAB and will therefore be imperiled and potentially driven to functional extinction when EAB establishes in the Pacific Northwest. While the loss of Oregon ash due to EAB would have an impact on riparian canopy and habitat of local waterways, the extent of this impact is uncertain without an estimate of the existing Oregon ash abundance and distribution. This study assessed the abundance and location of Oregon ash along two local waterways (mainstem Columbia River Slough and Johnson Creek) and evaluated the potential impacts of canopy loss due to EAB and the implication for riparian shade and resulting water quality. Results indicate the EAB-mediated loss of Oregon ash would impose significant short- and long-term impacts to water quality though increased thermal loading.

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

Pursuing equitable urban tree canopy coverage in Vancouver, Washington

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The City of Vancouver has received a recent assessment of urban tree canopy, completed in October 2021 with data from 2019 and 2020. Through regularly and thoroughly assessing tree canopy, the City of Vancouver's Urban Forestry program can identify spaces for improvement, with equitable tree canopy coverage throughout the city as a primary goal. The benefits of a robust tree canopy range from regulatory infrastructure, like storm water management and heat mitigation, to proven psychological benefits associated with access to greenery. The data provided by the most recent tree canopy report informs where the program targets efforts and resources. Historically, Urban Forestry has focused outreach efforts on the neighborhood level. With this new project and data, the program can assess tree canopy on many scales, including the smallest geographic scales possible--census tracts and blocks. Used by the U.S. Census Bureau to track populations, these units are invaluable indicators of environmental justice, as they are directly linked with demographic and socioeconomic data. The program is utilizing resources like the Washington Environmental Health Disparities map and Tree Equity Score information in tandem with this new tree canopy assessment to concentrate new canopy growth on traditionally overburdened communities with disproportionately low canopy coverage. The recent Tree Canopy Assessment findings show current tree cover in the city of Vancouver rests at 19%, up from 16% in 2011 (this increase in canopy includes newly annexed areas), and 32% of the city remains possible planting area. Urban Forestry maintains a goal of reaching 28% urban tree cover by 2030. With 74% of possible planting area in Vancouver located on private property, Urban Forestry is concerned with removing barriers to planting, maintenance, and preservation to make tree stewardship feasible and accessible to all residents. The ambitious goal of 28% tree cover by 2030 must be a joint effort between the city, partnered organizations, and residents.

Keywords: Environmental social sciences, Land/watershed management, Land use planning, Environmental policy

Predicting urban air temperatures using land cover type and satellite observations of surface temperatures

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Extreme urban heat is known to adversely impact humans and the environment, where certain land use/land cover (LULC) types may amplify temperatures. However, sparsely available air temperature (Ta) data limits study of these impacts. Attempts to map air temperature from satellite land surface temperature (LST) data are often highly empirical and lack sufficient data for robust evaluation. In particular, we do not know: 1) how well do predictions perform across diverse land cover characteristics? And 2) what insights can we gain from predictions based on expected biophysical air surface temperature relationships? In this study, we derived an LST-Ta relationship from a surface energy balance to fit LULC-specific LST-Ta predictive relationships (biophysically-based), benchmarked against a simple linear regression fit. We used satellite LST data and spatially-extensive (> 1 million samples) air temperature maps from sampling campaigns during heat wave days in five U.S. cities, including Portland. Results showed LULC had a large impact on LST and Ta values, e.g., more developed areas had higher temperatures than forested (10 ℃ LST and 1 ℃ Ta differences). Both the linear and biophysical models performed well in predicting air temperatures (RMSE 0.50 and 0.49 ℃, respectively); however, biophysical fitted model coefficients corresponded better to LULC characteristics (i.e. vegetation or imperviousness). Using this approach, this suggests some ability to resolve differences in underlying mechanisms of heat transfer among LULCs. Quantifying such relationships in urban landscapes is critical in adapting and managing cities that often face inequitable exposure to heat from historical disinvestment and segregation.

Keywords: GIS / modeling, Land/watershed management

The future of Portland's forests: conifer regeneration and barriers to recruitment in urban and rural forests

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Some reports suggest that Portland's urban forests have low conifer regeneration rates. If so, this could be due either to a shortage of viable seeds or to a shortage of viable habitat. Nurse logs, in particular, have been identified as a substrate that increases conifer germination and survival rates. My study aims to determine 1) if there is less conifer regeneration in urban forests compared to rural forests, and, if so, 2) do urban forests produce less conifer seeds than rural forests, and 3) do urban forests have less nurse log surface area than rural forests. I sampled five of Portland's second-growth urban forests and five nearby rural second-growth forests. In each site, I quantified the size structure of the conifer community, collected and counted the conifer seed rain, and quantified the surface area amount and decay state of downed wood. Preliminary analyses suggest that the urban forest sites have fewer young conifers and lower seed rain than the rural sites. Nurse log availability, while differing among sites, is less clearly predicted by a site's urban vs. rural location. These results could have important implications for the management of Portland's urban forests and the long term outlook on these parks' conifer populations.

Keywords: Plant ecology

Improving climate resiliency and management practices in conservation planning by developing a 'climate lens' at West Multnomah Soil and Water Conservation District

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Since 1900, the Pacific Northwest of the United States has warmed almost 2°F. Alongside increasing temperatures, the region has experienced wildfires, droughts, decreasing snowpack, and rising sea levels, the results of human-induced climate change driven by increases in greenhouse gas emissions and land use changes. West Multnomah Soil and Water Conservation District ("WMSWCD") works to improve climate resiliency and action in its service area by accumulating climate change data on regional impacts, determining best management practices, collaborating with local partners, and gathering climate mitigation tools. With the inevitability of a changing climate, it is critically important to incorporate a 'climate lens' into local conservation practices. WMSWCD has partnered with Portland State University's Institute for Sustainable Solutions and Louis Stokes Alliance for Minority Participation Program to develop a climate lens with resources that guide the promotion of resilient communities in the face of climate change. Focuses include forest health, wildfire risk, native plant populations, water resources, and invasive threats. Management practices include promoting soil health, sequestering carbon, and incorporating Indigenous knowledge. Useful tools include those for selecting seedlots and measuring carbon sinks. In addition to previously mentioned impacts of climate change, the region will likely experience drier summers and increases in heat wave frequency and intensity. Soil moisture and water availability for agricultural crops are expected to decrease with an increased threat from pests, diseases, and weeds. Management practices such as resilient farming, cover cropping, wildfire risk reduction, and adaptive planting can be used to mitigate climate change through conservation efforts.

Keywords: Climate Change, Land/watershed management, Environmental education

Lamprey and bony fish salvage during restoration at Steigerwald Lake National Wildlife Refuge

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Restoration of degraded aquatic habitat on urban refuges may be vital to ensure ecological function. An integral part of any restoration plan should be lamprey and bony fish salvage (i.e., capture of fish in an area that may dewater to prevent their stranding). In 2021, approximately 1,000 acres of historic Columbia River floodplain habitat in Steigerwald National Wildlife Refuge was restored and connected to the adjoining Columbia River. The refuge is owned and managed by the U.S. Fish and Wildlife Service and is designated as an urban refuge, to benefit the public, while still providing a high degree of ecological function. Gibbons Creek, a perennial stream that runs through approximately 2.3 km of the refuge, was mostly confined to an elevated canal. During restoration, the canal was removed and the creek was restored to a more nature flow pathway. Prior to hydrologic reconnection, fish salvage was required and conducted. The worksite was isolated with block nets to prevent any fish from reentering the site. Salvage protocols specific to lampreys and bony fish were both employed to maximize salvage efficiency. In total, over 37,000 lampreys and 9,000 bony fishes were salvaged, respectively. The success of fish salvage efforts was largely due to many people from various agencies and volunteers who assisted.

Keywords: Habitat restoration, Fisheries

Predicting mesopredator interactions 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 common in urban spaces and live closely with humans. Recent studies in many parts of the world have found that mesopredator populations are expanding. The mesopredator release hypothesis has been used to explain this phenomenon, relating mesopredator expansion with declining apex predator populations. One top predator, the mountain lion (*Puma concolor*), has been steadily in decline in the western US as a result of urbanization and habitat fragmentation. Concurrently, the species richness and range size of many mesopredators has increased. To monitor mesopredators and other wildlife species in coordination 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. Motion-triggered camera traps were installed at each site. Site selection and data collection were both established in accordance with the UWIN camera trap protocol. During preliminary data collection from spring 2019 to spring 2021 we acquired occupancy results for three non-domestic mesopredator species: coyote (268 detections), common raccoon (218 detections), and Virginia opossum (406 detections). In this study, we will model the spatial occupancy of each of these three species in spring, summer, and fall 2021 as a function of landcover characteristics, sociodemographic factors, and other mesopredator occupancies. This analysis will allow us to determine which factors are most predictive of spatial occupancy for each species across the metropolitan region, supporting urban wildlife management and habitat connectivity goals.

Keywords: Animal ecology, Habitat assessment, Wildlife biology, GIS / modeling

Visitor access, use, and desired improvements in urban parks

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Urban parks can provide many physical and mental health benefits, but these may not be shared equitably among visitors. The purpose of this study was to explore park visitor demographics and activities, as well as in-depth narratives regarding experiences, perceptions of accessibility, and desired improvements in a range of urban park types of Portland, Oregon. We used a mixed-methods approach to interview and observe visitors in urban parks. The most common activities were physical recreation, adult interactions, and adult-child interactions, which all support well-being. Ninety-four percent of observed children were engaged in physical recreation and three-fourths were interacting with children. Our non-metric multidimensional scaling ordinations with joint plots indicated some trends in visitor demographics and activities across park types, but we found no significant differences in total number of observed visitors, females and males, racial-ethnic groups, or adults and children across park types. Our complementary in-depth, semi-structured interviews revealed motivations for visitation, access concerns, and desired improvements. Visitation was primarily motivated by physical recreation opportunities, accessibility, and children, whereas the main access concerns were park proximity, trails/paths, and maintenance. Feelings of safety were particularly important for female visitors, while a sense of community helped to create a welcoming atmosphere for visitors with underrepresented racial-ethnic backgrounds. Participants across demographics groups discussed desired improvements, which focused on enhancing amenities and social atmosphere. Only 19% indicated that no changes were necessary. We provide strategies for planners, governmental agencies, and community groups to continue enhancing urban park experiences and accessibility for diverse visitors.

Keywords: Environmental social sciences, Land/watershed management, Land use planning

Spatial and seasonal variations of microplastic concentrations in Portland's freshwater ecosystems

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Microplastics are a pollutant of growing concern and are ubiquitous in a variety of environmental compartments. The majority of microplastics research to date has been conducted in marine waters, and less is known regarding the sources and delivery pathways of microplastics in urban rivers. Two watersheds in the Portland metropolitan area were selected to assess microplastic concentrations and potential links with a variety of spatiotemporal factors. Samples were collected from four sites in the Clackamas River watershed and from six sites in the Johnson Creek watershed, with one sampling event in the dry season and two in the wet season. Samples were analyzed for total microplastic count and type, and spatial analyses were conducted at both the subwatershed and nearstream scale. Microplastic concentrations in August were significantly higher than in February. August concentrations also negatively correlated with flow rate, suggesting that lower flow rates present in the dry season may have facilitated the accumulation of microplastics. Only one correlation was noted regarding antecedent precipitation amount and microplastics. Additionally, negative correlations were found between wet season microplastic concentrations and agricultural lands at the nearstream level. While additional research is needed, results indicate that the presence and abundance of microplastics in Portland's waterways may be most strongly influenced by nearstream variables. Fragments were the most commonly observed morphology, with a dominance of the polymer polyethylene. The findings of this research can be used to inform management decisions regarding microplastic waste and identify hotspots of microplastic pollution that may benefit from remediation.

Keywords: Water quality

Analysis of harmful algal blooms in the Willamette River, Portland, Oregon

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The lower Willamette River has seen a recent resurgence in public use and recreation. Urban runoff to the river has improved due to stormwater management and wastewater treatment, leading to higher water quality and decreasing public concern over bacterial contaminants (i.e., *E. coli*). However, the Willamette River basin is large and remains susceptible to nutrient loading, other pollutants, and climate change effects. In recent years, climate change has increased water temperatures and promoted algal productivity in the lower Willamette near Portland, leading to harmful algal blooms (HABs). The blooms occur most often during the summer months, but can also be seen earlier in the year, and are most frequently caused by cyanobacteria. This pilot study focused on quantifying microcystin, the cyanotoxin that is most abundant in the lower Willamette. Sample collectors were deployed at three sites along the Willamette River: (1) Fire Station 21, (2) Audrey McCall Beach, and (3) Sellwood Riverfront Park for one week in August 2021. Related water quality parameters were also sampled, including temperature, pH, conductivity, dissolved oxygen (DO) – prior to each sampling session. After a toxin extraction process and analysis using ELISA kits, microcystin concentrations were determined. The Sellwood location was predicted to contain the highest microcystin concentration due to its proximity to Ross Lagoon, where the water is calmer and shallower, making it prone to algal blooms. Further research on other cyanotoxins and on the climate's impact on the Willamette watershed is to be conducted in 2022.

Keywords: Climate Change, Hydrology, Water quality

Centering farmers' perspectives in assessing the resilience of food farming in rapidly urbanizing regions

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Alarmed by farmland conversion, growing food insecurity, and increasingly threatened resources, multi-stakeholder groups endeavor to improve access to fresh food and protect farmland's multiple community benefits. To inform the allocation of scarce resources needed to sustain local food production, this transdisciplinary action research investigated farm-level resilience within a fragmented county context. What will be needed to retain and enhance local food production capacity for the long term? Iterative analytical approaches utilized multiple data sources framed by agroecological resilience principles. Immersion in the local food movement, as a researcher, consumer, educator, and farmer advocate, offered ample participant observation opportunities across the Portland-Vancouver Metropolitan Region. Primary data also included semi-structured interviews and farming system assessments on 23 farms and two farmer-only roundtables. Analysis of public data compiled from multiple sources documented the high rate of farm turnover, a steady loss of agricultural capacity across all operational scales, and data insufficiencies. While direct-to-consumer (DTC) markets and supportive institutions strive to improve farm viability in urban regions, even DTC farms are only marginally resilient, at best. My dissertation research found an urgent need to redesign local policies, public institutions, and support networks in accordance with stated farmer needs. A pandemic-response assessment informs the next phase of collaborative action research by centering grassroots-led solutions forwarded by Black, Indigenous, People of Color (BIPOC) communities. How does equitable food-oriented development, aligned with BIPOC food sovereignty goals, serve to advance agroecological resilience and food system justice in metropolitan regions?

Keywords: Land/watershed management, Economics, Environmental policy

Field crews as data collectors for effective restoration

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At a time when conditions are rapidly changing and effective restoration is imperative, Ash Creek Forest Management is developing a method to record site and treatment data for restoration projects. Collected daily in the field by restoration crews, the data will offer a systematic way of tracking changing conditions and will capture on-the-ground knowledge to evaluate restoration strategies. Data will be collected in two categories, reflecting the majority of the work we do: invasive species management (typically spraying herbicide, cutting, mowing, handpulling) and native plant installation. In easy-to-use Microsoft forms we will collect observations about site ecology, treatment methods and intensity, weather/ground conditions, and worker perceptions of the day's treatment/s. Using Power Automate, observations will automatically populate an Excel spreadsheet; we also will produce a readout for each submission to archive with project plans. The spreadsheet will be searchable and sortable based on site or question. Through this process we will accomplish multiple goals: collect baseline data on weed management and planting practices; create a record-keeping system to support further research into treatment strategies; and document anomalies or issues for followup. We also will foster workers' awareness of plant communities and conditions, and demonstrate the value of the observations our crews already make while doing on-the-ground restoration work every day. Crews will be field-testing the data collection forms starting January 2022. We look forward to updating this project with initial data and lessons learned over the next year.

Keywords: Habitat restoration, Land/watershed management, Habitat assessment

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