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Cascadia Prairie-Oak Partnership Conference

ABSTRACTS

ECOSTUDIES INSTITUTE

ORAL ABSTRACTS

RESTORING A 40 ACRE OLD GROWTH OAK WOODLAND. **Sara Alaica** | Institute for Applied Ecology. saraalaica@appliedeco.org

Most of the Willamette Valley's historic oak woodlands have been lost to land use changes, fir encroachment, and invasive species. In 2022 the Institute for Applied Ecology began restoration of a 40 acre old growth oak woodland. Trees planted for timber production were encroaching on the Oregon white oak, and invasive species were preventing sapling establishment in the understory. IAE conducted tree thinning, invasive species control, and has now begun revegetating the understory to restore native habitat. We share the results of the restoration so far, how the trees and native seed bank have responded, and best practices for restoring this unique habitat type.

TARGETED HERBIVORY AS A MANAGEMENT TOOL IN WILLAMETTE VALLEY OAK AND PRAIRIE SYSTEMS. **Abby Andrus** | Willamette Valley Oak and Prairie Cooperative; **Elizabeth Swanson** | Oregon State University. elizabeth.swanson@oregonstate.edu

Willamette Valley oak woodlands, savannas, and prairies support some of the highest species diversity and numerous cultural values in the Pacific Northwest yet persist on only a fraction of their original expanse (Vesely & Rosenberg, 2010). As a result of settler colonial land management practices, oak and prairie landscapes have largely been converted to other land uses that do not support former species and cultural diversity. Contributing to the degradation of oak-prairie landscapes are the decline of grazing pressure from native ungulate species (Middleton, 2013) and strategic burning practices by Indigenous peoples (Hamman et al., 2011) which has resulted in non-native shrub encroachment and dominance in these vulnerable systems. In this talk we will discuss results of phase one in a two-part study that examined the comparative impacts of grazing, mowing and burning as non-chemical methods for restoring native vegetation and controlling invasive shrubs on Tribal lands in the Willamette Valley. Through a Before-After, Control-Impact ("BACI") experimental design, changes to plant community structure and composition were assessed. We will also present the proposed research for the next phase of the study where we evaluate grazer forage preference, and the potential for grazing in sequence with mowing to maintain undesirable species. This study will contribute valuable information to aid management decision-making and inform how various tools can complement each other in achieving management goals, particularly on sites where shrub encroachment is a concern and chemical control is undesirable.

WILLAMETTE VALLEY OAK AND PRAIRIE COOPERATIVE. **Abby Andrus** | Pacific Birds Habitat Joint Venture; **Thomas Kaye** | Institute for Applied Ecology. wvoakprairiecoop@gmail.com

The Willamette Valley Oak and Prairie Cooperative is a loosely affiliated network of participants who voluntarily work together to conserve and maintain prairie and oak landscapes in the Willamette Valley ecoregion. Together, we are working to 1) support Indigenous and Tribal leadership in setting priorities and approaches to restoration including capacity for Tribal ecocultural burning and access to culturally important sites/resources, 2) Develop a stronger local conservation workforce and a more robust restoration supply chain, and 3) Increase collaborative approaches to landscape-scale restoration, monitoring, community engagement, and messaging in the Willamette Valley. Since 2024 the Cooperative has secured over $20 million for oak and prairie conservation. This substantial funding will help

partners across the Willamette Valley be more effective together by utilizing limited resources more efficiently, increasing our pace and scale of impact, and sharing strategies and lessons with each other. The Prairie, Oaks, and People Investment Strategy connects the Cooperative and partners in the Willamette Valley to other regions through shared strategies and shared capacity gaps, allowing for a stronger, unified voice to advance our work locally and connect the work throughout the Pacific Northwest.

THE INDIGENOUS GARDENS NETWORK. **Greg Archuleta, Jesse Norton** | Confederated Tribes of Grand Ronde.

The Indigenous Gardens Network (IGN) serves as a hub of collaborative, Indigenous-led land projects that aim to restore traditional gathering areas throughout Southwestern Oregon (SWO) so that First Foods and plants of cultural significance can be cultivated, harvested, and made accessible to Indigenous partners. The IGN mobilizes new and existing resources in innovative ways to create project-based and experiential learning opportunities that address the urgent issues of food security, climate change, and Indigenous food sovereignty. The project represents a regional partnership that brings diverse partners together (Tribes, educators, conservation organizations) to address barriers to First Food access and cultivation. The IGN is re-connecting and re-establishing First Foods, Medicines, and Fibers landscapes in SWO and engaging SWO partners in supporting Tribal access to – and stewardship of – critical cultural resources. The IGN supports Grand Ronde and Siletz in building sustainable food systems that improve well-being, strengthen food security, and increase their control over Native agriculture and food networks. The IGN addresses barriers by: 1. Centering Native peoples with a clear understanding of accountability to them; 2. Providing technical and facilitation support 3. Collaborative & empowerment research designed with Tribal partners; and 4. Cross-organization partnerships that break down barriers between organizations and Tribes to build partnerships that address issues of access, use, and management of First Foods, Medicines, and Fibers resources.

VARIABILITY OF STREAKED HORNED LARK ANNUAL APPARENT SURVIVAL ON JOINT BASE LEWIS-MCCHORD, WA.
Stephanie Augustine, Gary L. Slater | Ecostudies Institute. saugustine@ecoinst.org

Successful conservation of imperiled bird populations requires knowledge of the factors impacting demographic rates. In songbirds, population dynamics are strongly influenced by annual survival, and understanding drivers of variation in this parameter across intrinsic and environmental factors can inform management activities aimed at species recovery. In the south Puget lowlands, breeding populations of the federally threatened and Washington State endangered streaked horned lark (*Eremophila alpestris strigata*) are restricted to a handful of remnant prairie and airfield sites, with ~75% of individuals on Joint Base Lewis-McChord (JBLM). Conservation measures have increased population sizes on JBLM over the past decade, but a potential decline in females in the region suggests further examination into specific demographic rates may be warranted. We used mark-resight data between 2010 and 2024 from 1,536 color-banded birds on four sites at JBLM to model annual apparent survival in a Bayesian hierarchical Cormack-Jolly-Seber modeling framework. At all sites except McChord Airfield, juvenile survival was substantially lower than adult survival, and male survival was greater than female survival. McChord had the highest juvenile survival probabilities and the lowest adult survival. This phenomenon may be due to the unique conditions at the site, where Bird Aircraft Strike Hazard (BASH) management of large avian predators may support juvenile survival, but adult collisions with the large fixed-winged aircraft may reduce adult survival. Further investigation of the factors influencing annual survival will be crucial to disentangle and mitigate the variable threats to the south Puget Sound lark populations and ultimately achieve species recovery.

PLANTS OF THE SOUTH COAST SALISH CAMAS PRAIRIES: COLLEGE STUDENTS CREATE A FIELD GUIDE. **Frederica Bowcutt** | The Evergreen State College; Chantay Anderson | Nisqually Tribe; Lisa Hintz | Silvaseed; Sarah Hamman | Ecostudies Institute. bowcuttf@evergreen.edu

In 2026, a new field guide to the south Coast Salish camas prairie plants will be launched on the tenth anniversary of The Evergreen State College Press publishing Vascular Plants of the South Sound Prairies. Both amateurs and professional botanists alike will find the retitled second edition an easy-to-use reference to identify many of the plant species in these unique ecosystems. The revised field guide will include illustrations and descriptions of roughly 200 plants found in the south Coast Salish glacial outwash prairies and associated oak woodlands. It will also be expanded to include some non-vascular plants (mosses and liverworts) and lichens. This presentation will describe how, over twenty years, more than fifty students from The Evergreen State College collected herbarium specimens, illustrated and described plants, and wrote about the natural and cultural history of these remarkable ecosystems to make this field guide possible. With the support of local professional scientists with expertise in floristics and restoration ecology, students studied the historical ecology of these cultural ecosystems. They also learned how ecological restoration efforts and increasing access to first foods are contributing to renewed interest in camas prairies and the inherent value of traditional Indigenous ecological knowledge. The field guide created by Evergreen students, along with a linked website, contributes to ongoing efforts to tend to Coast Salish prairie plants and the important human relations with them. Our collaborative, community-based research has been generously supported by the Evergreen Foundation and the Washington Native Plant Society.

MEDITERRANEAN OAK BORER: AN EMERGING INVASIVE PEST OF OAK. **Christine Buhl**, Wyatt Williams | Oregon Department of Forestry. christine.j.buhl@odf.oregon.gov

Mediterranean oak borer (*Xyleborus monographus*) is an exotic, invasive woodboring ambrosia beetle recently detected in California then in Oregon. This insect vectors pathogenic fungi that has contributed to mortality of white and red sections of oak such as *Quercus garryana*, *Q. lobata*, and *Q. douglasii*. This talk with review the biology of the insect and associated fungi, diagnosis and management guidance, and provide a status update on monitoring, research, and management efforts in Oregon.

DESIGNING MONITORING TO INFORM RECOVERY EFFORTS OF OREGON SILVERSPOT BUTTERFLY. **Izzy Bur**, Cheryl Schultz | WSU Vancouver; Erica Henry | Washington Department of Fish and Wildlife; Richard Van Buskirk | Pacific University. isabel.bur@wsu.edu

Oregon silverspot butterfly has persisted at low or very low population sizes despite decades of conservation efforts, including reintroduction of captive-reared butterflies at several sites. To date, monitoring efforts have relied on index counts. This approach does not reliably provide information about population size for two primary reasons. First, the method does not include detection probability and the relationship between record counts and actual population abundance on a survey-date is unknown. Second, because the number of captively-reared individuals and the timing of their release is not recorded, it is unknown how many captive individuals are included in estimates of abundance of the wild population in any given year. Thus, the index counts have limited use in projecting population trends. As a result, there is a need for a comprehensive approach that incorporates detection probability and produces reliable estimates of population size to assess population trends. We used mark-release-recapture (MRR) and distance sampling techniques to estimate the population size of Oregon silverspot butterflies at three sites in Oregon for three

years and compared estimates derived from both methods. We then used these estimates to evaluate the current index count methods. Our findings will inform the development of a long-term monitoring scheme that can be consistently applied by multiple agencies across various sites, improving efforts to monitor and conserve Oregon silverspot butterfly populations.

USING BUTTERFLY MONITORING TO INFORM HABITAT RESTORATION ON JOINT BASE LEWIS MCCHORD. **Samantha Bussan, Mollie Steele** | Ecostudies Institute. sbussan@ecoinst.org

Many butterfly species associated with prairie oak ecosystems are in decline due to habitat loss and degradation. It can be difficult to restore and manage habitat for at-risk species due to a lack of knowledge of their habitat needs and populations. Ecostudies Institute monitors at-risk butterflies on Joint Base Lewis-McChord (JBLM) to directly inform habitat restoration and management activities. We strategically enhance butterfly habitat by tailoring prescribed burn planning, native seeding, and nonnative plant treatment and then use subsequent years' butterfly monitoring data to evaluate efficacy of previous management and refine future efforts. We will discuss two case studies, Puget blue butterflies (*Icaricia icarioides blackmorei*) and hoary elfin butterflies (*Callophrys polios*). Both species are dependent on fire-adapted host plants; regular, low-intensity fire is essential to the long-term maintenance of their habitat. However, fire can also be lethal to butterfly individuals present in the burn footprint. We show how the use of burn exclusions in prescribed fires, followed by strategic invasive plant treatment, has benefited Puget blue and hoary elfin populations in two prairies on JBLM. Burn exclusions provide refugia and allow individuals to more quickly recolonize after fire. Since excluding fire from an area also prevents mortality of invasive plants such as scotch broom (*Cytisus scoparius*), follow up treatment is needed. Failure to do so can cause habitat decline within old exclusions and a reduction in habitat quality on the landscape. By applying an adaptive management framework, we can maintain and restore at-risk butterfly habitat in prairie-oak ecosystems.

SLOW AND STEADY GARRY OAK ECOSYSTEM RESTORATION VIA MOWING OR GRAZER EXCLUSION. **David Clements** | Trinity Western University; Vanessa Jones, Virginia Oeggerli | University of British Columbia; Emily Gonzales | Parks Canada; Juniper Malloff | University of Toronto. clements@twu.ca

Invasive perennial grasses degrade vulnerable Garry Oak ecosystems in the Pacific Northwest. Sweet vernal grass (*Anthoxanthum odoratum*) is one of the most abundant invasive grasses, forming monocultures in meadows once dominated by native perennial forbs (NPF). Sweet vernal grass is quite invulnerable to grazing. Previous research showed that a combination of mowing and grazing prevention could potentially shift community composition. We established 5 x 5 m plots in 2009 at Trinity Western University's Crow's Nest Ecological Research Area on Salt Spring Island, BC, Canada and tracked plant abundance over 15 years within four treatments: 1. fenced/mowed, 2. fenced/unmowed, 3. unfenced/mowed and 4. unfenced/unmowed. We hypothesized that long-term mowing in the absence of grazing should reduce non-native perennial grasses (NNPG) in Garry Oak ecosystem communities. Annual monitoring of the vegetation was conducted and in 2016 we sampled for biomass. Trends in percent cover over the first 7 years showed a decline in NNPG with mowing but no concomitant increase in NPF. At the end of 7 years, the dry weight of NNPG in fenced/mowed plots was still relatively high, illustrating the inadequacy of a single August mowing. In subsequent years we mowed in both early July and August. In the ungrazed/mowed sites NNPG did decline, but non-native annual grasses (NNAG) replaced NNPG, rather than native species. In all four treatments, native perennial graminoids (NPG) are increasing, especially, *Carex inops*. However, the lack of NPF regeneration on the site illustrates that a holistic restoration effort would require extensive planting of native vegetation.

THE ROLE OF APPLIED SCIENCE IN RECOVERING AT-RISK BUTTERFLIES: AGENCY PERSPECTIVES ON RECOVERY OF FENDER'S BLUE AND TAYLOR'S CHECKERSPOT BUTTERFLIES. **Mikki Collins**, Kelsey King | US Fish and Wildlife Service. mikki_collins@fws.gov

The success in downlisting Fender's blue butterfly is a milestone for USFWS and partner organizations across the Willamette Valley. It represents the strong commitment and trust in the process of working across landowners to develop solutions that meet needs of landowners while working towards actions to recover species. USFWS has worked closely with biologists to gain insight into the biology of this at-risk butterfly in a manner that would inform their decision-making. In this talk we provide specific examples of this work. For example, to develop Habitat Conservation Plans for Fender's blue butterfly, it was important to prioritize potential land parcels based on dispersal distances from extant habitat patches. We are working towards similar information for Taylor's checkerspot to ground discussions with landowners about future conservation actions.

REINTRODUCTION STRATEGY DEVELOPMENT AND EVALUATION FOR STREAKED HORNED LARKS. Hannah A. Sipe | University of Washington; Gary L. Slater | Ecostudies Institute; Abby E. Bratt | University of Washington; Scott F. Pearson | Washington Department of Fish and Wildlife; **Sarah J. Converse** | University of Washington. hannah.sipe@mso.umt.edu

Decision-analytic methods applied to reintroduction problems can help overcome common challenges in reintroduction, such as complex management alternatives and uncertainty. We engaged in a decision-analytic process to develop a framework for reintroduction of the Streaked Horned Lark (SHLA; *Eremophila alpestris strigata*), in the South Puget Sound region of Washington State, USA. We generated a variety of management alternatives that captured options throughout the entire reintroduction process, including release site, release cohort size, and release method. To evaluate these alternatives in terms of their ability to meet species conservation goals, we developed a metapopulation model and parameterized it with elicited expert judgements and empirical demographic information to predict site-level abundance and persistence. Predicted reintroduction site persistence and abundance were highest for strategies involving adult breeding pairs released with their dependent young and strategies involving larger numbers of releases. Our framework offers insight about the development and evaluation of reintroduction strategies for metapopulations in highly fragmented landscapes.

ASSESSING POPULATION DIFFERENTIATION IN PLASTIC RESPONSES TO DROUGHT AMONG CO-OCCURRING ANNUALS. **Emily Cook, Jeff Diez** | University of Oregon. jdiez@uoregon.edu

Rapid adaptation and phenotypic plasticity can promote species persistence under changing climates, yet their roles in shaping community resilience remain unclear. While single species studies highlight that both adaptation and plasticity can facilitate survival in novel conditions, the capacity for such responses is likely to vary widely among species and populations. Differences in genetic diversity, local environments, and evolutionary histories complicate predictions about which species or populations will thrive under future climate scenarios. Consequently, our limited understanding of how multiple co-occurring species may respond to environmental change may constrain the development of effective restoration strategies for fostering resilient communities. We investigated population differentiation and plastic responses to drought stress in five co-occurring prairie annuals—*Clarkia purpurea, Collinsia grandiflora, Gilia capitata, Microsteris gracilis*, and *Plectritis congesta*. Populations from three environmentally distinct regions were grown in a greenhouse common garden experiment with manipulated soil moisture to assess

phenological and morphological plasticity and drought tolerance. We found significant population-level differences in trait means for phenology and leaf traits in response to drought. We also found significant plasticity in all measured traits, but saw more differences among species than populations. The effects of plasticity on fitness varied in direction and magnitude, suggesting diverse strategies for coping with drought at the species and population levels. This study represents a critical step towards expanding research from single species to entire communities. Building on this type of work may provide land managers with actionable insights to foster greater resilience and success in restoration efforts under shifting climates.

EAST CASCADES OAK PARTNERSHIP. **Lindsay Cornelius, Kat Shepard** | Columbia Land Trust. oaks@columbialandtrust.org

The East Cascades Oak Partnership is a bi-state collaborative of 19 tribal, state, federal, and local organizations led by Columbia Land Trust working to implement oak conservation and restoration in the East Cascades and the Columbia River Gorge. In Oregon, a $7 million investment from the Oregon Watershed Enhancement Board addresses limiting factors resulting from removal of indigenous lifeways, fire suppression, climate change, development, and intensive grazing practices through restoration, technical assistance, outreach, and land protection. This funding was leveraged with Joint Chiefs, Infrastructure Reduction Act, and National Priority Landscape Funding, bringing significant resources to an historically underserved community at risk of wildfire and transformed by climate change and invasive species. In Washington, The Klickitat Oaks Flyway Conservation Initiative, a response to the national 3 Billion Birds call to action will ensure permanent protection of a critical area of connecting oak habitat for neo-tropical migratory birds and other wildlife in south-central Washington State and North-Central Oregon. Together with partnering agencies, The Conservation Fund, Green Diamond Timber Company, and Yakama Nation, Columbia Land Trust has raised more than $90 million in public funding and $5.5 million in private philanthropy for the protection of 60,000 acres of oak and conifer forest in the flyway. The Prairie, Oaks, and People Investment Strategy provides a powerful case for these investments, linking together a network of state, federal, and Tribal conserved lands to ensure the viability of connected habitat at the continental scale.

REKINDLING THE RELATIONSHIP WITH FIRE IN SAMISH TRADITIONAL TERRITORY. Emma Kortuem, **Andrew Delaney** | Samish Indian Nation. adelaney@samishtribe.nsn.us

Prairies in Samish Traditional Territory were once maintained like gardens through careful weeding, burning and cultivation of traditional foods such as Common Camas and Chocolate Lily. These important food harvesting and knowledge sharing spaces were passed down matrilineally until colonization in the mid-1800's. Now, only 3% of Washington States native prairie habitat remains. This dismal number is the result of fire suppression, the conversion of prairie lands into highways, housing developments, and agricultural spaces, and the loss of traditional land management knowledge through forced assimilation efforts. The Samish Nation, in partnership with agencies such as San Juan County Land Bank and Conservation District, Washington State Department of Natural Resources, and Padilla Bay National Estuarine Research Reserve, has begun the slow process of reclaiming traditional practices that nourish and restore these landscapes such as burning and community tending. Samish DNR technicians have attended certified prescribed burn manager training, participated in both pile and broadcast burning, and helped lead intertribal burning workshops. This effort requires connection to and recording of traditional ecological knowledge, partnership building, community involvement, and adapting land management techniques to modern times. This

process, though still at its early stages, has already had broad impacts on the community. We hope that this work will re-establish the important connection between humans and the prairie landscape, aid in climate resilience, strengthen communities, and protect culturally important and endangered species.

USING EXPERIMENTAL HABITAT MANAGEMENT TO INFORM PRACTICES TO RECOVER OREGON SILVERSPOT BUTTERFLY. **Emma Dombrow**, Cheryl Schultz | WSU Vancouver; Erica Henry | Washington Department of Fish and Wildlife; Richard Van Buskirk | Pacific University. emma.dombrow@wsu.edu

Successfully managing habitat can mean the difference between life and death for many rare and at-risk butterfly species that occupy disturbance-reliant habitats. This includes the Oregon silverspot butterfly, *Speyeria* [= *Argynnis*] *zerene hippolyta*, which is a federally threatened species that requires frequent disturbance to maintain the quality of early successional habitat needed for butterfly larval survival, vegetation resource availability, and adult reproductive behaviors. Despite the need for disturbance, it is largely unknown how habitat management can be used as a tool to support Oregon silverspot butterfly population viability. In response to this knowledge gap, we designed experimental research at two sites on the Oregon coast to investigate the degree to which the introduction and intensity of habitat management practices affected Oregon silverspot butterfly larval survival, their associated vegetation resources, and adult behaviors. We learned that some management practices, especially those which substantially reduced cover of competing vegetation, increased larval survival. In addition, given sufficient density of violet hostplant, it was more important to reduce overall vegetation structure than to increase violet density. These findings will have direct implications for management decisions and overall Oregon silverspot butterfly conservation strategies.

ANNUAL FORB RESPONSES TO CLIMATE WARMING VARY AMONG SPECIES AND ACROSS LOCAL ENVIRONMENTAL GRADIENTS. **Sarah Erskine**, Jeff Diez | University of Oregon. serskine@uoregon.edu

Although it is well established that climate change will generally affect plant phenology (e.g. flowering times) and reproduction, some studies have documented substantial variation in sensitivity to changing climate among co-occurring species and across species' ranges. Understanding this variability is important for predicting how current populations may change and for selecting species for restoration that will be resilient to climate change. We designed two field experiments with annual forbs commonly used in restoration of Pacific Northwest (PNW) prairies and utilized open-top warming chambers to imitate predicted future climate conditions. The first experiment used seven taxonomically and phenologically diverse species to examine interspecific variation in climate responses. The second used two of the seven species across multiple sites within a preserve to explore how different abiotic conditions at a local scale may buffer or exacerbate the effects of warming. We found significant variation in how warming affected phenology and reproduction among species, across sites, and between the two experiments conducted in subsequent years. All species that significantly shifted their phenology advanced, however the magnitude of shifts varied widely, and some species did not shift their phenology at all. Reproductive output was less responsive to warming than phenology, but there was more variation in how species responded, with some being positively affected and other negatively affected to varying degrees. These findings highlight how PNW prairie species' responses to climate can be extremely species- and site-specific, which should help guide future management and restoration efforts.

HCP MITIGATION: A WESTERN WASHINGTON PRAIRIE SUCCESS STORY. **Sanders Freed** | Center for Natural Lands Management; Linda Krippner | Krippner Consulting. sfreed@cnlm.org

Habitat Conservation Plans (HCPs) are planning instruments that provide a means for businesses that believe their development might impact a listed species to work with the US Fish and Wildlife Service (USFWS) to allow the development to continue with certain conditions. Kaufman Enterprises engaged a consultant—Krippner Consulting—to draft an HCP to authorize take of listed species while developing thirteen properties. The HCP covered the endangered Taylor's checkerspot butterfly (*Euphydryas editha taylori*), threatened streaked horned lark (*Eremophila alpestris strigata*), and the threatened Mazama pocket gopher (*Thomomys mazama*). A cornerstone of the HCP was restoration and perpetual protection of the Leitner Prairie Preserve, a 36-acre degraded prairie remnant in south Thurston County. In 2018, CNLM was contracted to perform restoration to meet the HCP's final phase standards. After 7 years of intensive restoration, including two prescribed burns and numerous herbicide treatments and native seedings, Leitner Preserve has met these standards and perpetual management plans are in process. Monitoring has revealed good habitat for Taylor's checkerspot, Mazama pocket gopher occupancy has increased by 60%, and the entire site is short-grass prairie suitable for the lark. Restoration of degraded prairies, especially those infested with Scotch broom and non-native grasses have proven difficult to restore. This project provides a successful example of how the USFWS, private businesses, and conservation land trusts can work together to allow needed development while protecting vulnerable species. This collaboration and restoration success can be expanded for the needed future mitigation to satisfy development needs and endangered species protection.

BUILDING BRIDGES: COMMUNITY-DRIVEN PRAIRIE OAK RESTORATION FOR URBAN CORRIDORS AND RESILIENT LANDSCAPES. **Matt Gravel** | Bloomsday Natives and SymbiOp Garden Shop & Landscaping. info@bloomsdaynatives.com

Urban prairie oak restoration is a keystone strategy for re-establishing ecological connectivity between fragmented wild spaces while fostering vibrant human and non-human communities. In this presentation, we will share process-based insights and lessons learned from ongoing restoration projects in the Pacific Northwest, where regenerative land design principles and community engagement have created transformative outcomes.

Key topics include:

- Connecting Wild Spaces – Showcasing mapped projects that link urban green spaces with surrounding landscapes, demonstrating the role of restoration in creating ecological corridors.
- Regenerative Land Management – Exploring techniques that enhance soil health, water retention, and biodiversity, creating self-sustaining ecosystems in urban settings.
- Cooperative Models for Restoration – Highlighting how co-operative business structures promote accessibility, equity, and long-term stewardship in restoration practices.
- Community-Led Innovation – Presenting unconventional and community-driven approaches that engage diverse stakeholders in the restoration process, emphasizing the social and ecological benefits of collaborative restoration.

This presentation will highlight the importance of prairie oak restoration as a tool for building resilient, multifunctional landscapes that connect people to place and foster long-term ecological stewardship. Attendees will leave with actionable insights for integrating regenerative practices and community engagement into their restoration projects.

GROWING EFFECTIVE TRIBAL CO-STEWARDSHIP RELATIONSHIPS FOR PRAIRIE-OAK ECOSYSTEMS: EXAMPLES AND LESSONS FROM SOUTH COAST SALISH PRAIRIES. **Sarah T. Hamman** | Ecostudies Institute; **Joyce LeCompte** | Willamette Cultural Resources Associates. shamman@ecoinst.org

Restoration and management of Indigenous cultural ecosystems often lack consideration of the values and knowledge of the Indigenous communities that have stewarded these landscapes for millennia. Native American peoples of the Pacific Northwest have a long history of cultivating camas prairies and Garry oak woodlands for a suite of plants used for food, medicine and fiber. Indigenous stewardship, including harvesting of first foods, was severely disrupted in most open prairies of the region over 200 years ago, as Euro-American diseases decimated Indigenous populations, and colonizers forcefully alienated Indigenous people from their homelands and their land stewardship practices. Today, partnerships between Tribes, local jurisdictions, state and federal agencies, universities and non-profits are developing effective tribal co-stewardship relationships for prairie-oak ecosystems that center Indigenous people, priorities and practices. Co-stewardship necessarily involves access to ancestral lands, shared decision-making, on-the-ground stewardship actions, and protection of Indigenous Knowledge throughout the process. In southern Coast Salish prairies, partners have worked together over the past 8 years to strengthen relationships, identify and increase safe access to camas harvesting areas, and bring awareness of Indigenous practices and cultural connections to both Tribal and non-Tribal communities through several programs focused on food sovereignty and camas prairie cultural ecosystem restoration. These careful efforts are aimed at developing a shared understanding of what Indigenous co-stewardship of these rare landscapes could look like through the incorporation of cultural priorities into restoration goals and collaborative planning and implementation with Indigenous communities throughout the restoration process.

HOW TO RESTORE A PRAIRIE AND GET LARK HABITAT TOO. **Scott Harris**, Laura Estrada, Thomas Kaye | Institute for Applied Ecology; Bob Altman | Avifauna Northwest. scottharris@appliedeco.org

The Streaked Horned Lark (hereafter lark), once abundant but now listed as Threatened under the U.S. Endangered Species Act, has an estimated rangewide population of fewer than 2,000 individuals. Larks require patches of sparsely vegetated ground (for nesting) within a large, open landscape of low-statured herbaceous vegetation (for foraging). These requirements pose a challenge for typical prairie restoration, where the primary objective is to encourage expansive growth of native plants. While these restored prairies provide ideal foraging habitat for larks, they lack nesting habitat, especially when historical disturbances such as cultural fire are excluded. In order for prairie restoration to contribute to lark recovery, creative and novel approaches are needed. These approaches include creating or maintaining vernal pools and swales. We conducted a 2-year study assessing the effectiveness of this practice in the southern Willamette Valley. We found that vernal pools and swales can provide nesting habitat for larks but are entirely dependent on seasonal weather patterns (i.e., how long the pools stay wet and limit available habitat). The second phase of this study, initiated in Fall 2024, will assess the efficacy and logistics of using herbicide and flame-weeding to create small nesting habitat patches at a restored prairie.

RECOVERING ENDANGERED BUTTERFLIES AND THEIR RARE HOST PLANTS – A VIEW FROM THE FIELD. **Scott Harris**, Jessica Ruff, Thomas Kaye, Andrew Esterson, Alexis Larsen | Institute for Applied Ecology. scottharris@appliedeco.org

Recovering rare species from the threat of extinction requires a substantial commitment. In Northwest Oregon, we have worked for over a decade with landowners, academia, and land management agencies on the recovery of Fender's blue butterfly (*Icaricia icarioides fenderi*, threatened) and its primary host plant Kincaid's lupine (*Lupinus oreganus*, threatened); and also Taylor's checkerspot butterfly (*Euphydryas editha taylori*, endangered) and one of its host plants golden paintbrush (*Castilleja levisecta*). This work between multiple entities has led to the delisting of golden paintbrush and the downlisting of Fender's blue butterfly. In this presentation, we will discuss the recovery of these species from the perspective of a non-profit partner. We will present case studies of how successful coordination, habitat restoration, monitoring, plant materials development, and research have provided tangible steps towards recovery. These examples will be framed within the themes of some of the critical elements for successful recovery: namely 1) sufficient funding, commitment, and effort, 2) strong coordination between all partners, and 3) capacity and enthusiasm for addressing knowledge gaps.

OAK LOSS IS DRIVEN BY NEW URBAN DEVELOPMENT IN URBAN AREAS AND LOGGING IN RURAL AREAS. **Lori Hennings** | Oregon Metro. lori.hennings@oregonmetro.gov

The Oak Prairie Work Group, established in 2012, mapped Oregon white oak (*Quercus garryana*) distribution from 2014-2018 within the northwest Oregon-southwest Washington Intertwine boundary and identified the largest, most important remaining oak habitat patches called "Oak Cores." In 2024 I assessed the status of the 110 Oak Cores using recent aerial photographs in Google Earth Pro. Twenty-two percent of Oak Cores appeared intact. Nearly half (45%) exhibited some loss of less than 5%. Twenty-five percent showed moderate loss of 5-25%, 6% showed heavy loss of 25-50% and three Oak Cores in newly developing urban areas are currently being developed and would no longer qualify as Oak Cores under our original criteria. Inside the Urban Growth Boundary, new development including roads and buildings caused the highest losses. In rural areas, logging caused the highest losses, with large lot residential development, agricultural encroachment and small patch tree cutting also contributing. Getting ahead of new urban area planning, educating residents about the importance and resilience of our native oak species, and working with the timber industry to retain climate-friendly oak trees when logging could help slow these losses.

ESTIMATING SITE-LEVEL ABUNDANCE OF MAZAMA POCKET GOPHERS. **Erica Henry**, Gail Olson, Christa LeGrande, Ilai Keren | Washington Department of Fish and Wildlife. erica.henry@dfw.wa.gov

Being able to efficiently and reliably estimate population size of listed species is critical for tracking progress towards recovery. Pocket gophers are particularly difficult to count as they maintain solitary tunnel systems and are rarely detected above ground. Mound counts are an unreliable index of gopher abundance because mounding rates and mound detection rates can vary by season and across a landscape. To overcome these challenges, we developed a new method for estimating abundance based on the patterns of mound detections rather than counts. The underlying assumption of our method is that mounds that are close together are likely made by the same gopher, and mounds that are far apart are made by different gophers. To implement our method, we marked the locations of fresh gopher mounds detected along a 1m wide transect and used a two-state Hidden Markov Model to assign each mound a probability of being from the same individual previously detected, or a new individual. In this model, distances between mounds are distributed as a penalized Gamma mixture of mounding rates (gaps between mounds belonging to a single individual) and population density (gaps of "empty" space between individuals). From 2020 to 2024 we applied this method across several sites occupied by Mazama pocket gophers and estimated abundances that range

from 100s of gophers to over 2,000 gophers. Key to the success of this method is careful survey design and transect placement so that site abundance estimates are comparable across years.

IDENTIFYING AND FILLING KNOWLEDGE GAPS TO MOVE TAYLOR'S CHECKERSPOT CONSERVATION FORWARD. **Erica Henry** | Washington Department of Fish and Wildlife. erica.henry@dfw.wa.gov

Taylor's checkerspot is an endangered butterfly with a range that spans the prairie-oak region from BC to Oregon. Checkerspots and other butterflies in the Nymphalid family frequently persist as metapopulations, and are model taxa for decades of foundational research to understand metapopulation dynamics. Thus the backbone of the recovery strategy for TCB includes multiple independent functioning population complexes. However, the Recovery Team did not define "population complex" and instead identified this as a critical research need. In this talk, we will discuss the theory behind, and building blocks necessary to construct models of population complexes for Taylor's checkerspot. We will walk through methods for estimating minimum patch size and lifetime dispersal, highlighting the data that we already have in hand, what can and cannot be borrowed from other species, and how we are moving forward to fill data gaps that remain. Key to the success of these efforts will be aligning actions with the butterfly's ecology such that we give them the best chance to persist into the future.

WATER STRESS IN MATURE *QUERCUS GARRYANA* ACROSS YEARS AND IN RESPONSE TO THE REMOVAL OF FIR TREES. **Ava R. Howard** | Western Oregon University. howarda@wou.edu

Oregon white oak (*Quercus garryana*) savannahs and woodlands were once a dominant component of the Cascadia bioregion, but much of this habitat has been lost, threatening the region's unique oak-associated biodiversity. Restoration and conservation of these habitats occurs against a backdrop of changing water resource dynamics driven by Douglas-fir encroachment and climate change. To understand patterns of water stress in mature oaks, we developed a long-term, research project in the Willamette Valley of Oregon. Fifty mature *Q. garryana* were selected across three habitat conditions: savannah, conifer-encroached forest, and restored oak-woodland. Baseline (pre-dawn) and peak (midday) water stress levels were assessed every year in late summer from 2019 to 2024 and monthly during June to October for ten trees in 2017 and 2023. Substantial interannual variation in water stress followed climactic variation in summer heat and precipitation. Midday xylem water potential in upper branch samples demonstrated highly anisohydric behavior, ranging from less than -1.0 MPa (low stress) to greater than -5.0 MPa (high stress). Oaks growing in the savannah were more water-stressed than oaks growing in the fir-encroached forest, and restoration did not lead to excessive oak water stress when fir trees were logged and removed. These results demonstrate that savannah oaks will be most impacted by climate change driven drought while the net effect of fir encroachment is to reduce water stress in overtopped oaks. Our results also show that restoration of encroached habitats to release oaks from fir competition does not risk excessive water stress to the oaks.

DISTRIBUTION AND HABITAT ASSOCIATIONS OF SLENDER-BILLED WHITE-BREASTED NUTHATCH. **Gavin Hughes**, Stephanie Augustine, Gary L. Slater | Ecostudies Institute. ghughes@ecoinst.org

The loss of prairie and oak-woodland habitat in the Puget Lowland ecoregion has contributed to population reduction of many avian species, including the slender-billed white-breasted nuthatch (*Sitta carolinensis aculeata*, hereafter "nuthatch"). Nuthatches were a once-common resident and an obligate of Garry Oak woodlands in Washington State,

which have been threatened by altered disturbance regimes and development pressures. Nuthatches are now considered restricted to Clark and Cowlitz counties in small numbers (less than 50 individuals; 2015 WDFW SWAP) and extirpated from the Puget Lowland ecoregion, though information defining current population size, extent, and habitat association is limited. To address this, we conducted a rangewide survey for nuthatches and their associated habitat characteristics across southwest Washington. We conducted surveys from March 26 to May 9, 2024, across 218 locations. At each site, we conducted 8-minute point count surveys with one minute of conspecific playback. We detected a total of 36 nuthatches across 32 survey points. While the majority of occupied sites were in Clark and Cowlitz counties, we detected nuthatches at four points in Lewis County, two in Thurston County, and one in Pierce County. At least two fledglings were observed at a site in Thurston County, indicating breeding activity. Among all survey points, those with nuthatch detections contained more large, mature Garry Oak trees with higher, more open canopies. Our findings indicate that nuthatches are more abundant and widely distributed in Washington State than previously believed and will help inform land-management practices that will contribute to their return to the ecoregion.

SEED BASED RESTORATION IN PACIFIC NORTHWEST USA PRAIRIES: TOWARD IMPROVED RESTORATION OUTCOMES. **Thomas Kaye**, Scott Harris | Institute for Applied Ecology. tom@appliedeco.org

Grassland loss in Pacific Northwest prairies has reduced native prairie habitat to less than 1% of its historic extent. These habitat declines have led to the reduction in abundance and extent of several habitat specialists, especially plants, butterflies and birds, some of which have been listed by federal and state agencies as threatened or endangered. Restoration of prairies and species populations in this region relies on establishing native vegetation into altered or degraded sites to recreate functioning prairie conditions. Seed based restoration is the dominant practice in this region for large scale restorations but faces significant barriers to consistent success. This talk will review the most common restoration techniques in the region (including planned cultural burning, chemical control of nonnative vegetation, mowing, livestock grazing, and seeding with diverse native plants), and research conclusions to date. For example, burning prior to seeding is the most effective method for improving seedling emergence after seeding, but nonnative plant emergence is also promoted by fire. Combinations of treatments, such as herbicide and burning, followed by seeding, can substantially improve restoration success. Also, methods that improve seed-soil contact and soil nutrient status can substantially alter restoration outcomes. The challenges that seed based restoration continues to face in this habitat include predictability of outcomes, specifically driven by soil conditions, nonnative seed bank emergence, weather conditions during the year after planting, and how these interact with species selection and seeding rate.

NATIVE PLANTS AND FOODS INSTITUTE CAMAS EDUCATIONAL RESOURCES. **Elise Krohn**, Tahoma Peak Solutions, Native Plants & Foods Institute; **Mariana Harvey** | Yakama Nation and Tahoma Peak Solutions, Native Plants & Foods Institute. elise@tahomapeak.com

Join Mariana Harvey (Yakama) and Elise Krohn from the Native Plants and Foods Institute as they share educational resources featuring camas and prairie ecosystems. Explore the Native Plants and Foods Curriculum Portal including the Tend, Gather and Grow Teaching Toolkit, Plant Teachings for Growing Social-Emotional Skills, and Swinomish 13 Moons Project. You can also learn about camas on the interactive Cedar Box Experience website. Hear a traditional camas story and learn how camas leads us in practicing reciprocity.

PLANT COMMUNITY RESPONSES TO SOIL NUTRIENT MANIPULATIONS IN REMNANT AND RESTORED PRAIRIES. **Caitlin Lawrence** | Oregon State University; **Thomas Kaye** | Institute for Applied Ecology. lawrenca@oregonstate.edu

Habitat destruction has greatly reduced the extent of prairies in the United States. Many remaining prairie fragments are poor quality, facing threats including invasion by non-native species and biodiversity loss, which can be promoted by soil nutrient enrichment. A possible restoration tool to counter these threats is soil carbon addition, which stimulates microbial activity and immobilizes nutrients. This can potentially improve conditions for native species, which are often outcompeted under high nutrient conditions. We tested the efficacy of carbon addition for controlling non-native species in two Oregon prairies by creating treatments of varying nutrient availability and monitoring plant community responses for two growing seasons. Experimental treatments included carbon (sucrose) addition, ambient soil nutrients (controls), and nutrient addition (NPK fertilizer). Community composition differed significantly among nutrient treatments at both sites in both growing seasons. Vascular plant cover was significantly reduced by carbon addition compared to ambient nutrient availability and increased by nutrient addition. Native grasses were unaffected by nutrient manipulation, whereas non-native grasses were reduced by carbon addition and increased by nutrient addition. Non-native forbs were reduced by carbon addition, and by nutrient addition by the second year of the experiment. Richness of non-native species was more affected by nutrient manipulation than richness of natives and was increased or unaffected by nutrient enrichment and decreased by carbon addition. Our results suggest that nutrient enrichments can promote the success of non-native species and that carbon addition can counter these effects on a species- and site-specific basis.

MOVE SLOW AND BUILD THINGS: INDIGENOUS-STATE COOPERATION ON SUSTAINING LANDSCAPES. **Maurice Major** | Cultural Landscapes LLC.

Over decades of being employed by state agencies created by historically recent colonizers—but recognizing that my real bosses are places and people who have lived in relation with them since Time Immemorial—I have learned a bit about how agencies may cultivate better relationships between governments, cultures, and lands. Boundaries, not just on maps but on calendars and disciplines and funding, are deeply embedded in governance and need to be blurred or erased to make meaningful progress. State-erected barriers to truly cooperative stewardship with Tribes are legion: emphasizing mere compliance, relegating tribes to check-box concurrence or concerns, capture of "cultural resource management" by the archaeology industry, exclusion of non-"credentialed" voices. All this and more hold us back. Real change is a long-term project. This talk will cover efforts already underway, such as harvests on state land and navigating pathways to cultural access, taking acknowledgement from words to action, integrating Indigenous criteria into state planning and operations, and other bureaucratic and on-the-ground maneuvers.

CHANGES IN THE LAND: SOUTH SOUND PRAIRIE MANAGEMENT A DECADE IN. **R. Adam Martin**, Andrew Smith, Janelle Bouman | Ecostudies Institute. amartin@ecoinst.org

Since the federal listing of several prairie-associated species in 2013, considerable resources have been devoted to managing the South Sound Prairies. At Joint Base Lewis-McChord, we employ a landscape-scale monitoring and management approach to enhance and evaluate prairie vegetation conditions for listed species. Our primary management objectives involve reducing the cover of invasive non-native shrubs and grasses, lowering vegetation height, and increasing the cover and diversity of native species. Through these objectives, we aim to create suitable

habitats for ESA-listed species and support the maintenance and expansion of high-quality prairie. We utilize fire, herbicide, mechanical control, and seeding interventions to achieve these vegetation goals. This study evaluates ten years of landscape-scale vegetation monitoring across 3,250 acres of remnant prairie to address two questions: 1) is our management achieving species and composition goals? 2) how well do species goals support composition goals? Throughout the prairie landscape, we have improved ESA-species habitat by increasing the cover and diversity of native species through seed addition, decreasing invasive shrub cover and reducing vegetation height. Management actions, particularly fire, have also altered the composition of the non-native prairie flora, resulting in a decrease in non-native perennial species and a significant increase in non-native annuals. This shift in the non-native composition has mitigated the gains in nativity achieved through management. Developing strategies to manage a more annual-dominated plant community will need to guide the next decade of prairie management to achieve our goal of a richer, more diverse prairie landscape.

WE CAN'T SEE THE FLOWERS FOR THE TREES: WOODLAND AND MEADOW RESTORATION IN THE SAN JUAN ISLANDS USING SMALL TREE REMOVAL AND DEER EXCLUSION METHODS. **Samantha Martin** | Ecostudies Institute. smartin@ecoinst.org

In many locations throughout the San Juan Islands, forests have infiltrated into historic meadows and woodlands due to a lack of fire and changes in land management practices. Adding to this structural change is the loss of top predators to regulate deer populations. Using historical records and recent botanical surveys, we worked with WA State Parks and the National Park Service to restore more open structures in areas where native forb species associated with meadows and woodlands persist in the understory. This talk will discuss the importance of woodland restoration and how this open forest structure could be a crucial habitat type as global temperatures increase. We will also discuss the importance of protecting even relatively small areas from deer herbivory and how this can benefit local pollinators and overall biodiversity.

PRESCRIBED BURN ASSOCIATIONS – THE SPARK THAT'S NEEDED. **Csanyi Matusicky** | Pheasants Forever/NRCS. cmatusicky@pheasantsforever.org

Since 2019, there have been multiple Prescribed Burn Associations (PBAs) formed in Oregon to try and create communities of people that are actively engaged in the remediation of a long history of fire suppression in our region. This general suppression of fire coupled with changing climate, and non-adaptive forestry practices have created a landscape ripe for catastrophic wildfires. This absence of burning has put North America in a "fire debt" and one of the only ways out of our fire debt is through "good fire" being put on the ground. Whether that is in a pre-planned manner using prescribed burns or through wildfires – it will happen. Given that nearly half of Oregon's land is privately held, the existence of PBAs is crucial. By reintroducing controlled burns on the landscape, these PBAs aim to offer their respective communities a cost-effective method for land stewardship, mitigating wildfire hazards, enhancing wildlife habitat, expanding wildlife corridors, and addressing the impacts of climate change. Many people feel that fire is something that is uncontrollable, unfeasible, and unobtainable. This is why the movement to create Prescribed Burn Associations is igniting all across the United States. Just by providing support in the form of knowledge, tools, and people, these associations can help countless communities usher in a new era of conservation. Those who would like to be involved do not have to have any prior fire experience; all you need is an open mind and a drip torch.

NATIVE PLANT ACCESSIBILITY AND COMMUNITY-FOCUSED RESTORATION. **Kristen Miskelly** | Satinflower Nurseries. info@satinflower.ca

Access to native plants is critical for advancing ecological restoration and supporting community well-being. Since 2013, Satinflower Nurseries: Native Plants, Seeds & Consulting has worked to increase the accessibility of native seeds and plants while fostering community-led restoration across Southern Vancouver Island. By cultivating genetically local native species and prioritizing accessibility, education, and collaboration, the nursery demonstrates how ecological restoration and community engagement can go hand in hand. This presentation shares Satinflower Nurseries' approach to producing approximately 200 native plant species, available as seeds and potted plants, using organic methods, with a special focus on supporting the conservation and restoration of Prairie Oak (Garry Oak) ecosystems. Seed production methods, including the development of seed rows and custom seed blends, are discussed alongside educational initiatives that build capacity in native seed use and restoration planning. One example is MeadowMakers, a community education program that empowers participants to transform underutilized urban spaces into pollinator friendly meadows. Through native plant and seed production, public education, and applied community-based projects, Satinflower Nurseries offers a model for how small businesses can contribute to ecological restoration and community well-being. This work underscores the potential of native plants to restore ecosystems, support biodiversity, and support meaningful relationships between people and place.

POLLEN LIMITATION INCREASES IMPORTANCE OF POLLINATORS FOR RARE PRAIRIE PLANTS. **J. Christina Mitchell**, Thomas Kaye, David Cappaert, Scott Harris | Institute for Applied Ecology; Susan Waters | Quamash EcoResearch. christinamitchell@appliedeco.org

Global losses in biodiversity highlight the diverse, and often dependent connections between species. The conservation of endangered plants must also consider management of associated plant and arthropod communities, including pollinators. To better understand the role of pollinator communities for the conservation of rare plants, we conducted targeted studies on Willamette daisy (*Erigeron decumbens*), Kincaid's lupine (*Lupinus oreganus*), and golden paintbrush (*Castilleja levisecta*). These perennial, endemic forbs are listed (Willamette daisy, Kincaid's lupine) or previously listed (golden paintbrush) under the U.S. Endangered Species Act. Previous experiments suggest Willamette daisy is affected by inbreeding depression and that seed set, and therefore reproduction, may benefit from pollination services. To address whether Willamette Valley rare plants face limitations to effective pollination, we determined whether Willamette daisy, Kincaid's lupine, and golden paintbrush are pollen limited, if seed set varies with plant density, and how pollinator communities vary. We conducted pollen supplementation experiments, quantified seed set and flower density, and observed insect visitors to populations of these three species. Initial results suggest pollen supplementation increases seed set and seed set generally increases with increasing flower head density. The suite of insects visiting these rare plant species is diverse, and species have varied pollinator communities depending on flower morphology. Prairie pollinator communities and effective pollinator services have direct implications for threatened and endangered plant species; plant conservation depends on pollinator conservation, and both need scientifically-informed habitat conservation and management efforts.

CONNECTING COMMUNITIES WITH LANDSCAPES: PEOPLE, PLACE, AND ECOLOGICAL RESTORATION. **Max Mitchell**, Paige Erickson-McGee, Dominique James | Habitat Acquisition Trust. max@hat.bc.ca

Community-building plays an essential role in the long-term success and sustainability of ecological restoration projects. Often, these projects rely on the dedication of individual volunteers who contribute substantial time, or upon funding sources that may not be guaranteed in the future. When a key individual takes a step back from their role or funding dries up, projects risk losing momentum, and progress may become undone. To ensure the long-term continuation of ecological restoration efforts, succession planning must be considered. Therefore, it is important to consider community-building in ensuring continuity of restoration work. Fostering communities of engaged volunteer stewards can help these projects endure, promoting greater resiliency in the face of evolving challenges. BY creating opportunities for people to come together, we can build a diverse, inclusive, and intergenerational community of knowledgeable, conscientious, and connected stewards. Since our focus is on prairie-oak ecosystems, it is vital that efforts be guided by Indigenous leadership. These ecosystems are the result of traditional Indigenous land management practices, and many of the threats they face stem from colonial dispossession. Returning active stewardship to the landscape is essential for the protection of biodiversity, yet contemporary life presents numerous challenges to this reconnection. One approach that our team at Habitat Acquisition Trust (HAT) has taken has been to host monthly ecological restoration sessions. These aim to support Indigenous-led initiatives in communities, increase capacity for self-led stewardship, and strengthen community bonds. This presentation will highlight key learnings from HAT's community-based restoration efforts over the years.

SWINOMISH GENERATIONS CAMAS PROJECT: A FOOD SOVEREIGNTY INTIATIVE TO REVITALIZE AND REINTRODUCE AN IMPORTANT TRADITIONAL FOOD. **Todd A. Mitchell** | Swinomish Tribe.

Camas is one of the most important cultural foods in the Coast Salish Territory. The nutritious bulb of this deep blue-purple flower is valued for its sweet flavor and energizing qualities. Many Native families traditionally traveled great distances and camped for several weeks to dig large amounts of bulbs. People actively tended the prairies where camas existed to maintain the plant. The time spent tending also allowed for traditional knowledge transfer between specific groups of people. This knowledge includes harvesting techniques, landscape management, cooking methods, and effective food storage for long winter months. Coast Salish oral traditions involving Camas are a testament to our historical record as Coast Salish peoples. While early non-Native settlers witnessed entire prairies of camas, many camas areas have been developed or converted to other crops. Today there are few camas on and near the Swinomish Reservation but small populations have been found including at the newly acquired Kukutali Preserve, a Tribal State Park on the Reservation. With these small populations, the Tribe has renewed interest in traditional foods and traditional foods management techniques. In order to increase access to local, healthy and traditional foods, this project focuses on how to bring back camas growing and management to the Swinomish Reservation. Through experimentation with different resource management techniques including traditional burning, we are adaptively managing our strategy for increasing camas production and awareness on the Swinomish Reservation.

WORKING TOGETHER TO REMATRIATE CAMAS MEADOWS IN THE SALISH SEA. **Sulatiye' (Maiya) Modeste** | Stqueeye' Learning Society; **Tara G. Martin** | University of British Columbia. tara.martin@ubc.ca

Oak meadow ecosystems have long been misunderstood by non-Indigenous People. Lack of understanding surrounding their origins and incomplete mapping of their historical distribution have contributed to a colonial narrative of what these places were and are. Working together in the Canadian Salish Sea, *Stqeeye' Learning Society* --

an Indigenous led non-profit organization based on Salt Spring Island, in the traditional territory of the *Quw'utsun* and *W̱SÁNEĆ Peoples*, and the *Conservation Decisions Team*, University of British Columbia, are re-storying these culturally and ecologically rich ecosystems centering Indigenous knowledge, values and stewardship practices. Our work reveals the inaccuracy of current mapping to inform the distribution of these places as well as the well-intentioned but often misguided nature of colonial attempts to restore these places. Legacies of the colonial project, including residential school intergenerational trauma, the persistence of racist government policies and land dispossession continue to impact Indigenous communities and alienate them from these ancient food and medicinal gardens. In this talk, we share our journey working together to support the revitalization and rematriation of these ancient Indigenous food systems.

MICROSITE EFFECTS ON ABUNDANCE, GROWTH, AND PHENOLOGY OF GOLDEN PAINTBRUSH (*CASTILLEJA LEVISECTA*) DURING THE TAYLOR'S CHECKERSPOT BUTTERFLY (*EUPHYDRYAS EDITHA TAYLORI*) LARVAL FEEDING STAGES. **Courtney Murphy** | The Evergreen State College. courtneymurphy95@gmail.com

Golden paintbrush (*Castilleja levisecta*) is a prairie forb native to the Willamette Valley-Puget Trough-Georgia Basin Ecoregion that historically served as an oviposition plant and food source for the Taylor's checkerspot butterfly (*Euphydryas editha taylori*). Currently, *E. e. taylori* relies on non-native common plantain (*Plantago lanceolata*) as an oviposition plant and larval food source in Washington, but recent declines in *P. lanceolata* linked to climate change suggest *E. e. taylori*'s sole reliance on this plant may harm the species long term. This thesis investigates how microsite variations affect growth, abundance, and phenology of *C. levisecta*, a historic food source for *E. e. taylori* larvae, in order to better understand what factors affect its growth during the larval feeding stages. I identified four microsites based on topography and temperature across three prairie restoration sites and took biweekly measurements of percent cover and height as the plants grew, then percent senesced as they died back. Data loggers tracked temperature at each plot, and a species richness assessment was done at each site to further characterize microsite differences. Species richness differed between microsites, with a trend of cold and wet microsites having higher species richness than others. The effect of microsite on percent cover was not consistent between sites, and was greatest in the wet microsite at PRI, the hot microsite at CR, and had no significant effect at GHP. Microsite did not affect height except at PRI, and the cause may have been species composition in the plots. Microsite did have a significant effect on senescence across all sites, with hot microsites senescing faster and more completely than others during this study.

INVERTEBRATE HERBIVORY IN *Q. GARRYANA* CANOPIES: THE ESSENTIAL TROPHIC LINK TO AN OAK ECOSYSTEM. **Sienna Painter**, Ava Howard, Gareth Hopkins | Western Oregon University. spainter19@mail.wou.edu

Quercus garryana, Oregon White Oak, has a native range stretching through the Cascadia bioregion, hosting hundreds of endemic vertebrate and invertebrate species. Changes in land use have resulted in *Q. garryana* habitat loss of over 95%, reducing resources for insect herbivores whose biomass provides essential food for vertebrates of conservation concern. We aim to understand the long-term patterns of foliar insect herbivory to mature *Q. garryana* canopies in order to understand how oak canopies support invertebrate primary consumers in oak ecosystems. Our research is conducted within four habitat types: dense conifer-oak forest, open oak-savannah, and two habitats undergoing restoration from mixed conifer-oak to restored oak woodland. We sampled mid-canopy foliage from 2-15 trees per habitat each year from 2019 to 2023. The average percentage of material consumed by invertebrates per leaf ranged

from 3.13% to 44.17% and showed interannual variation that cycled in a five-year pattern. Insect herbivory by chewing represented the largest portion of consumed foliage, followed by other damage such as necrosis, skeletonizing, and then mining. We found significant variation in all types of foliar insect herbivory between years, the temporal effect of which was amplified in some habitats more than others. The largest portion of foliage consumption was caused by chewing insects such as the Western Oak Looper and other caterpillar species. Recognizing patterns of foliar insect herbivory on *Q. garryana* will improve our ability to restore oak ecosystems and conserve the native biodiversity *Q. garryana* amplifies.

OREGON NATIVE SEED STRATEGY: A COLLABORATIVE APPROACH. **Kathryn Prive**, Dani Marshall | Oregon Native Seed Collective. kathryn@understoryinitiative.org

The Oregon Native Seed Collective (ONSC) has developed a comprehensive Oregon Native Seed Strategy to address the critical need for ecologically appropriate native plant materials in restoration efforts statewide. This presentation outlines the collaborative process we used to create the strategy and highlights early implementation efforts funded through Oregon House Bill 3409 (Natural and Working Lands Fund). Key elements of the strategy include: assessing regional seed needs, expanding collection and production efforts, facilitating research, developing decision-support tools, implementing conservation seed banking, and securing sustainable funding. We will discuss how the strategy aims to increase native seed availability and use, conserve biodiversity, and restore resilient ecosystems. Innovative aspects include incorporating traditional ecological knowledge, emphasizing the conservation of sensitive species, and developing economic support for the native seed industry. Early implementation efforts include expanding regional native seed farmer networks, creating new networks, and engaging tribal communities in species selection and farmer support. We will present insights from our process, strategy components, and initial implementation activities that may benefit other regions developing similar approaches. The presentation will foster discussion on challenges and opportunities in implementing such strategies across diverse landscapes and jurisdictions.

RADICLE ECOLOGY: THINKING LIKE AN ECOSYSTEM FOR BOTTOM-UP CHANGE. **Kathryn Prive** | The Understory Initiative. kathryn@understoryinitiative.org

As environmental challenges intensify, traditional top-down approaches to ecological restoration may fall short, especially in oak-prairie systems. Advocating for a shift toward community-driven strategies, this presentation highlights the importance of prioritizing local knowledge, fostering partnerships, and empowering grassroots initiatives to drive meaningful change. Central to these efforts is The Understory Initiative's philosophy that community connection fuels restoration, with native seeds as its currency. By embracing this mindset, we can build more resilient ecosystems and strengthen community ties to the environment. Drawing from TUI's work in southern Oregon, this presentation illustrates how bottom-up thinking transforms seed-based restoration into a collaborative, community-led effort. The first case study highlights the combined successes of the Rogue Native Plant Partnership and TUI's pollinator habitat initiatives, showcasing how collaboration between seed farmers, landowners, and ecologists has addressed native seed shortages and enhanced biodiversity. The second case study focuses on the Klamath Siskiyou Oak Network's (KSON) Upper Rogue Oak Initiative, where partnerships with tribal communities, federal agencies, and local seed producers are supporting landscape-scale restoration of culturally and ecologically significant oak-prairie habitats. These examples demonstrate that ecological restoration begins from the ground up, with those who know the land best.

HYBRID WOES AND BUTTERFLY DREAMS: MANAGING *CASTILLEJA* HYBRIDIZATION RISKS WHILE EXPANDING TAYLOR'S CHECKERSPOT HOST PLANTINGS. **Isaac Sandlin** | Oregon Department of Agriculture Native Plant Conservation Program; Thomas Kaye | Institute for Applied Ecology. isaac.sandlin@oda.oregon.gov

Taylor's checkerspot butterfly (*Euphydryas editha taylori*) persists in only two declining populations in Oregon. Expanding its larval host and nectar sources is critical for survival and requires innovative strategies in response to increasing climate pressures. Oregon's limited host plant availability and predicted climate extremes necessitate reconsidering strategies like co-planting the recently de-listed *Castilleja levisecta* with *C. hispida*, despite concerns about hybrid introgression. This study conducted reciprocal pollination experiments between diploid *C. levisecta* and diploid, tetraploid, and hexaploid *C. hispida* to assess hybridization risks. Results show that ploidy differences significantly influence reproductive isolation. While diploid *C. hispida* crosses with *C. levisecta* produced highly fertile hybrids, posing a genetic swamping risk, increasing ploidy in *C. hispida* curtailed gene flow, reduced fertility, and strengthened reproductive barriers, limiting potential introgression. Findings suggest it may be worth experimentally outplanting *C. levisecta* with higher ploidy *C. hispida* to evaluate benefits to Taylor's checkerspot host plant diversity. A diverse food supply may enhance ecological resilience and safeguard against climate uncertainties, justifying increased investment and research as this species declines in Oregon.

USING APPLIED CONSERVATION SCIENCE TO RECOVER FENDER'S BLUE BUTTERFLY: CASE STUDY LEADING TO THE FIRST DOWNLISTING OF AN ENDANGERED BUTTERFLY. **Cheryl Schultz** | WSU Vancouver. schultzc@wsu.edu

Fender's blue is the first butterfly species listed under the Endangered Species Act to be sufficiently recovered to warrant downlisting from Endangered to Threatened. This action is a major milestone and culmination of three decades of commitment to science as a backbone to conservation actions and partnerships across the Willamette Valley prairies. In this talk, I highlight key steps taken to understand the ecology of the butterfly in the context of potential conservation actions. These include 1) dispersal behavior and demography of the butterfly to predict current and potential connectivity and metapopulation persistence, 2) experimental restoration efforts to design actions which support resource requirements for the butterfly, and 3) experimental habitat management to quantify the demographic responses of butterflies to management actions which landowners deemed appropriate to manage habitat. These activities were conducted based on engaged discussion with agency biologists and landowners. This step facilitated use of results by these organizations to implement on-the-ground conservation efforts in a manner that fostered collaboration and positive engagement with neighbors and partners across the landscape.

CLIMATE, COMMUNITY, AND LANDSCAPE DRIVEN SHIFTS IN OREGON WHITE OAK DEMOGRAPHY: IMPLICATIONS FOR RESTORATION IN URBAN LANDSCAPES. **Jess Nettle Shamek** | Portland Metro, Portland State University; Andrés Holz, Daniel Ballhorn | Portland State University. jess.shamek@oregonmetro.gov

Oak regeneration is a recognized challenge across North America. The cessation of Indigenous management, urbanization, habitat fragmentation, new species introduction, and the increase in ungulate browsing have all contributed to the decline in oak ecosystems. Oregon white oak has undergone significant decline in its occurrence and demographic diversity since colonization. Outside of cultural burns, little is known about what drives Oregon white oak demography. Here, we present the results of a study investigating landscape-, community-, and climate-level drivers of three age classes of juveniles of Oregon white oak. Using variable-width belt transects and quadrats, we

surveyed twelve urban and peri-urban oak woodlands in the Portland metro region to gather seedling and sapling counts, as well as species composition and cover (%), long-term climate normal, and landscape metrics. We used general linear models and logistic regression to model the influence of predictors on age and class. Results showed that landscape, climate, and plant community variables are important drivers of Oregon white oak demography. For saplings, climate and landscape metrics were important predictors. Seedling count was influenced by urbanization as well as total winter precipitation and mean autumn temperature. At the quadrat level, seedlings showed significant negative relationships with invasive species cover, native shrub cover, and native grass cover and a positive relationship with species' richness and total native plant cover. These results suggest that community structure and habitat quality are important for seedlings, while climate and landscape structure are key factors influencing sapling retention. These findings provide valuable insights for land managers navigating habitat restoration decisions.

ASSESSING THE CONSERVATION STATUS OF OREGON VESPER SPARROW IN SOUTH PUGET LOWLANDS, WA. **Gary L. Slater,** Stephanie Augustine | WSU Vancouver. gslater@ecoinst.org

Understanding population abundance and distribution is important to assess the conservation status of imperiled species and is a critical first step in developing conservation strategies aimed at recovery. The Oregon vesper sparrow (OVSP; *Pooecetes graminus affinis)* is an imperiled subspecies being considered for listing under the Endangered Species Act. OVSP are migratory with regional breeding populations in the Umpqua Valley, Klamath Mountains, and Willamette Valley in Oregon, and the south Puget lowlands in Washington State. OVSP were historically considered abundant and common on glacial outwash prairies and oak savannas in the south Puget lowlands. Previous assessments suggested the region supported 250-300 individuals. To assess current population size and distribution, we surveyed for OVSP at 14 sites where habitat appeared suitable, including historically occupied sites. The most intensive monitoring was performed on Joint Base Lewis McChord (JBLM), where we surveyed over 100 line transects annually from 2015 to 2024. Using distance sampling, we produced the first quantitative estimates of population size on JBLM and showed that the population appears to be declining. OVSP were not found on previously occupied sites even though many of the sites have received management treatments to improve prairie habitat quality. We estimate that the south Puget lowland population currently numbers <150 individuals and may be restricted to two prairie complexes. Demographic monitoring and upcoming region-wide analyses will be critical to improve our understanding of habitat needs and factors influencing vital rates, which in turn are necessary to develop short- and long-term conservation strategies to boost populations.

PRAIRIE-OAK COMMUNITY RESTORATION ON AN ACTIVE MILITARY BASE. **Gina Smith** | JBLM Fish & Wildlife. gina.smith@cotostate.edu

Joint Base Lewis-McChord (JBLM) is the largest military base on the west coast of the United States and is a critical landholder for species dependent on prairie-oak habitats in the Puget-Trough ecoregion. JBLM has a unique land use history that has been shaped by fire for thousands of years. Indigenous burning predating Euro-American settlement, followed by over a hundred years of artillery-caused wildfires, and an innovative prescribed fire program have helped preserve high-quality glacial outwash prairies on the installation. In many cases, JBLM hosts the largest remaining populations of several threatened and endangered prairie-oak obligate species and the largest suitable habitat for these species remaining in the region. Currently, this unique landscape is co-managed by federal, state, tribal, and non-profit agencies to sustain rare species, facilitate military training, timber harvesting, tribal access, and recreation. In

recent years, the land management teams on JBLM have made several notable accomplishments in the restoration of prairie-oak habitats such as an overall reduction in Scotch broom (*Cytisus scoparius*) cover, increasing federally endangered streaked horned lark (*Eremophila alpestris strigata*) populations, and increasing the abundance of native flora. However, there are still many ongoing challenges our land managers continue to face with the continued influx of exotic species, climatic instability, turbulent funding, increasing wildfire risk, urbanization, and habitat fragmentation. This presentation will focus on the management tools we use to maintain functional ecosystems while meeting needs for military training and the progress, challenges, and lessons learned from working on an ever-changing multi-use landscape.

OREGON VESPER SPARROW MIGRATION STRATEGIES AND OVERWINTERING LOCATIONS. Sarah M. Rockwell, **Jaime L. Stephens** | Klamath Bird Observatory; Bob Altman | Avifauna Northwest. smr@klamathbird.org

Oregon Vesper Sparrow, the unique subspecies of Vesper Sparrow found west of the Cascade Mountains in Oregon and Washington, is under review for ESA listing because of its small population size and declining trend. Klamath Bird Observatory is contributing to a range-wide study assessing productivity, survivorship, dispersal, recruitment, and habitat needs to identify where within the annual life cycle conservation actions are needed. Knowledge of overwintering locations and migratory stopover sites, and potential threats originating there, are key information gaps. Our objectives were to: 1) describe locations used during fall migration, winter, and spring migration, and 2) compare migration phenology and non-breeding locations used by two different breeding populations. In 2020-2022 we fit archival GPS tags on 26 adults in the Rogue Basin and 14 in the Willamette Valley, Oregon. Data retrieved from eight returning birds revealed a variety of migration strategies, with substantial overlap between the two breeding regions. Individuals departed nesting areas between September 19 and October 7; most used routes through California's Central Valley or the western Sierra Nevada foothills. Duration of fall migration ranged from 4 to 64-69 days, as some individuals employed lengthy (up to two-month) fall stopovers. Stationary wintering areas ranged from central to southern California. The earliest spring departure date was March 31 – April 5, and the latest was April 10; spring migration duration was 6 to 10-15 days. This work is an important first step towards delineating the subspecies-specific winter range, and being able to integrate spatiotemporal information into targeted conservation strategies.

KLAMATH SISKIYOU OAK NETWORK'S UPPER ROGUE OAK INITIATIVE. **Jaime L. Stephens** | Klamath Bird Observatory. jlh@klamathbird.org

Klamath Siskiyou Oak Network (KSON) is a regional collaboration between local agencies, tribes, and non-profit organizations working to conserve oak ecosystems on private and public lands in southern Oregon and northern California. Guided by the KSON Strategic Conservation Action Plan, the Upper Rogue Oak Initiative is leveraging $13M to restore 3,650 acres to reduce the two highest ranked threats to oak-prairie ecosystems - fire exclusion and conifer encroachment - through restoration actions, and strengthen partnerships to support future work. Through active working groups focused on monitoring and technical assistance, engagement, and compliance, in tandem with an Inter-Tribal Advisory Committee, we are implementing top-notch restoration and building capacities toward increased pace and scale. This Initiative's targeted ecological outcomes are to support stable populations of oak-prairie-dependent wildlife species sustained by habitat structure and native plant species composition and to maintain oak-prairie ecosystems resilient to habitat loss and degradation from climate, extreme fire, insects, and disease. The Prairie, Oaks, and People investment strategy provides a touchpoint to consider how our work is contributing to

regional goals, and to think broadly about how we can elevate oak and prairie conservation with key audiences to maintain the current level of momentum over the next five years.

CULTIVATING COLLECTIVE STEWARDSHIP OF OREGON WHITE OAK THROUGH ART, MEDIA, AND COMMUNITY ENGAGEMENT. **Charlotte Trowbridge**, Alex Hale, Adriana Lovell, Elise Wahl | Tualatin Soil and Water Conservation District. charlotte.trowbridge@tualatinswcd.org

With most remaining Oregon white oak habitat located on privately-owned lands, the conservation of this important habitat depends on community members understanding and valuing its ecological and cultural significance. The simple act of learning to recognize the leaves, bark, and acorns of an Oregon white oak is fundamental in forming a connection with the tree. Learning about its history on the landscape, and the many important cultures, plants, and animals associated with it, can lay the foundation for developing a sense of stewardship. In this presentation, we will showcase Tualatin Soil and Water Conservation District's efforts to raise awareness about Oregon white oak ecosystems in Washington County, Oregon, through art, exploration, and community engagement activities. By utilizing creative mediums, we aim to engage the public in a deeper connection with this habitat, highlighting its ecological, cultural, and aesthetic value. Visual art and storytelling help elevate oaks as charismatic components of the local landscape. Community events, such as tree planting initiatives, classroom lessons, and self-guided nature walks, provide opportunities for hands-on engagement and encourage residents to take action. Central to these efforts is the belief that community involvement is key to the conservation of Oregon white oak. By cultivating emotional and intellectual connections with Oregon white oak, we aim to inspire a collective commitment to its preservation. These creative and participatory initiatives are designed to not only raise awareness but also foster a sense of stewardship, ensuring the Oregon white oak habitats persist and thrive on the landscape.

OAK RELEASE AND PRAIRIE RESTORATION ON THE SCATTER CREEK WILDLIFE AREA. **Richard Tveten**, Bill Kronland, Isaac Nequette | Washington Department of Fish and Wildlife. Richard.Tveten@dfw.wa.gov

Since 2018 WDFW has completed 240 acres of oak release and prairie restoration via commercial removal of invading Douglas fir and non-commercial removal of Oregon ash. Douglas fir removal projects have extracted more than 100 tons of woody biomass per acre. Even the most severally suppressed oaks are responding vigorously to release from competition. Following the removal of invading woody vegetation, a wide variety of long-suppressed prairie species immediately rebounded too, and federally threatened Mazama pocket gophers quickly moved into treated areas. Natural recruitment of oak seedlings has been more than sufficient in areas where all oaks had been shaded out. Initial gains, however, must be protected with aggressive, prolonged weed control including mowing, burning, spraying and pulling.

PRESCRIBED FIRE INCREASES PLANT-POLLINATOR NETWORK RESILIENCE TO LOSSES OF RARE NATIVE FORBS. **Susan M. Waters**, Emily R. Brown | Quamash EcoResearch; Rachel M. Mitchell, Ethan M. Taber | University of Arizona. susan@quamasheco.com

Prairie restoration efforts focus on changing the composition of plant communities, often with the implicit hope that restored communities with higher native diversity will be more resilient to future stressors. However, the impact of restoration activities on pollinator diversity and the resilience of plant-pollinator interaction networks is incompletely

understood. We examined the effects of prescribed fire and native forb replanting (plugging and seeding) on plant-pollinator communities in a restoration chronosequence in western Washington prairies. We then simulated three scenarios in which plant species were either extirpated or deliberately controlled, and documented the resulting cascades of projected secondary extinctions. Specifically, we explored the effects of 1) removal of an abundant exotic forb, 2) removal of an abundant forb designated a noxious weed, and 3) extirpation of the rarest native forb. Pyrodiversity (diversity of fire history) and replanting effort increased the diversity of floral resources, increased the frequency and diversity of pollinator visits, altered networks of plant-pollinator interactions, and buffered networks against secondary extinctions. Rare forbs contributed disproportionately to network robustness in less restored prairies, while removal of typical exotic and noxious plants had relatively small impacts on network robustness, particularly in prairies with a long history of restoration activities. Restoration actions aimed mainly at improving the diversity and abundance of pollinator-provisioning plants may also produce plant-pollinator networks with increased resilience to plant species losses.

HOW MUCH DO RARE PLANTS SUPPORT POLLINATOR DIVERSITY? **Susan M. Waters**, David Cappaert | Quamash EcoResearch; Scott Harris, Thomas Kaye, J. Christina Mitchell | Institute for Applied Ecology. susan@quamasheco.com

The Washington Department of Natural Resources estimates that almost 10% of plant species in Washington are rare or at-risk, including several species of Cascadia prairies. Historically, rare plants have been overlooked as important pollinator resources, because many pollinators are generalists that can visit many types of flowers. However, as threats to pollinators increase and plant diversity shrinks, scenarios may emerge in which rare plants do play important roles in sustaining pollinators. We leveraged conservation-focused pollinator diversity surveys on five rare plants to ask: 1) How diverse are the insects visiting rare plants? 2) Under what circumstances might rare plants be especially important in supporting insects? We identified flower-visiting insect taxa for five U.S. federally threatened or endangered plants in Washington and Oregon, U.S.A., including Cascadia prairie specialists golden paintbrush (*Castilleja levisecta*) and Willamette daisy (*Erigeron decumbens*), as well as Wenatchee Mountains checkermallow (*Sidalcea oregana var. calva*), Umtanum desert buckwheat (*Eriogonum codium*), and White Bluffs bladderpod (*Physaria douglasii ssp. tuplashensis*). We found that some rare plants support a very high richness of visitors, such as the daisy (112 visiting insect taxa) and the bladderpod (107 visiting insect taxa). In addition, we found rare plants especially important to supporting pollinators via two mechanisms: either by supporting rare and specialist bees (checkermallow, paintbrush) or by providing phenologically unique resources (buckwheat). It is clear that rare plants can provide important floral resources for a wide variety of pollinating insects, including rare specialists, and that conservation of pollinator communities should incorporate conservation of rare plants.

POSTER ABSTRACTS

THE EFFICACY OF BROADCAST SEEDING OF SOUTH SOUND PRAIRIE SPECIES. **Janelle Bouman**, Andrew Smith, R. Adam Martin | Ecostudies Institute. jbouman@ecoinst.org

Over the past decade, millions of seeds have been sown across the South Sound prairies. At Joint Base Lewis-McChord, we have kept detailed records of the quantity and spatial extent of 59 prairie species sown over the last ten years. Using a landscape-scale monitoring dataset, we assessed the effectiveness of broadcast seeding in enhancing the cover of native annual forbs, perennial forbs, and perennial grasses. Our findings indicate that broadcast seeding generally increased the frequency and cover of sown species. However, the overall increase in cover resulted from the successful establishment of only a small number of fast-growing species. Additionally, perennial tap-rooted forbs and bulbs may take five years or more to become detectable or establish sufficient cover to be captured by point-intercept methods. Broadcast seeding effectively establishes native winter annuals and Roemer's fescue (*Festuca roemeri*), while other methods, like targeted hand-seeding, are likely more suitable for many prairie species with specific microsite needs. We recommend that broadcast seeding efforts concentrate on sowing competitive and faster-growing species, such as Roemer's fescue, native winter annuals like blue-eyed Mary (*Collinsia spp.*) and seablush (*Plectritis congesta*), as well as perennials like yarrow (*Achillea millefolium*), Oregon sunshine (*Eriophyllum lanatum*), and field chickweed (*Cerastium arvense*). Our results suggest that nearly 1,000 seeds per meter may be necessary to increase native prairie cover sufficiently and that evaluating the success of seeding efforts may require 5 to 10 years.

GPS TAGS REVEAL NON-BREEDING SEASON MOVEMENT PATTERNS OF SOUTH PUGET SOUND STREAKED HORNED LARKS. **Erika Brownson, Alexis Culbertson**, Stephanie Augustine, Gary L. Slater | Ecostudies Institute. ebrownson@ecoinst.org

After a decade of monitoring the federally threatened and Washington state endangered streaked horned lark (*Eremophila alpestris strigata*; lark) on Joint Base Lewis-McChord (JBLM), we have begun to understand several factors limiting lark populations during the breeding season, but little is known about spatially explicit threats and movements outside of the breeding season. Historic resights of color-banded birds suggest most larks that breed in the South Puget Sound region winter in the Willamette Valley, OR, but small sample sizes and lack of high spatial resolution precludes further insight into their migratory and wintering ecology. In 2023, we deployed 19 Lotek PinPoint 10 archival GPS tags on larks on JBLM. In 2024, we recovered six tags of the seven birds that were resighted (37% return rate). All larks converged in the Artillery Impact Area (AIA) on JBLM in both the pre- and post-breeding season. Five spent the winter on agricultural lands primarily in the north-central Willamette Valley, OR, while the sixth individual crossed the Cascade Range to winter near Gateway, OR, an area not previously identified as a potential wintering ground for this subspecies. In the spring, most birds appear to have flown directly from wintering sites back to JBLM, but two birds used stopover sites in southwest Washington. In 2024, we deployed an additional 26 tags on JBLM; data from retrieved tags will provide novel insight into the factors occurring off-base that could be impacting demographic rates and decisions to colonize new sites.

ASSESSING MANAGEMENT TREATMENTS FOR CONTROLLING INVASIVE ITALIAN ARUM. Laura Estrada, **Denise Giles, Scott Harris** | Institute for Applied Ecology. lauraestrada@appliedeco.org

Italian arum (*Arum italicum*) is a highly invasive weed in the Pacific Northwest, posing significant management challenges. This study evaluated five control treatments for this troublesome species: (1) manual excavation, (2) glyphosate-only herbicide, (3) imazapyr-only herbicide, (4) combined glyphosate and imazapyr application, and (5) mow and tarp (occultation). The effect of treatments was evaluated by comparing against an untreated control. Effectiveness was assessed based on above-ground dieback, along with a cost and time analysis. After two years, the most effective treatments, considering both time investment and efficacy, were ranked as follows: mowing and tarping, herbicide applications, and manual excavation. In 2025, the study will conclude with tuber biomass sampling to evaluate below-ground control, supplementing the current effectiveness measures.

MANAGING REED CANARY GRASS WITH MINIMAL ENVIRONMENTAL IMPACT. **John Goetz III**, Ben Protzman, Brian Shepard | Clean Water Services; Sudeera Wickramarathna, Bogdan Strimbu, Jon Souder | Oregon State University. goetzj@cleanwaterservices.org

Reed canary grass (*Phalaris arundinacea*) is a ubiquitous plant species that degrades wetlands by forming monocultures throughout the Pacific Northwest. Applications of glyphosate-based pesticides are effective and commonly applied at a rate of 2% with an appropriate surfactant for the management of reed canary grass. However, the use of glyphosate has become controversial in recent years over concerns of the potential harm to humans, native vegetation and freshwater ecosystems. Additionally, the costs and time required to effectively manage reed canary grass continue to increase placing additional pressure on project budgets. This study assesses the effectiveness of various applications of glyphosate-based pesticide formulations in managing reed canary grass populations using high resolution multispectral imagery acquired with unmanned aerial systems. A set of six glyphosate-based formulations ranging from 0.5% to 2% with and without a water buffering agent, or kicker, were tested in a complete randomized design with five replications at Jackson Bottom in Hillsboro, OR. The images were captured biweekly during the growing season from April 2019 to October 2020, leading to 29 orthoimages. Repeated measures analysis suggests no significant difference between the highest (2%) and lowest (0.5%) glyphosate concentrations tested in managing reed canary grass, indicating that each concentration is equally effective. Moreover, we found that the kicker provided no significant contribution in managing reed canary grass. Therefore, to reduce the potential harm to humans, native vegetation and freshwater ecosystems while controlling treatment costs, we suggest using minimal concentrations of glyphosate with appropriate adjuvants when managing reed canary grass.

CONSERVATION GRAZING AS A MANAGEMENT TOOL FOR PRAIRIE OAK COMMUNITIES: PROGRESS, CHALLENGES, AND FUTURE DIRECTIONS. **Melissa Habenicht**, Sarah Hamman | Ecostudies Institute; Stephen Bramwell | WSU Extension; Jake Yancey | Tracking Y Ranch; Sanders Freed | Center for Natural Lands Management. mhabenicht@ecoinst.org

Grazed working lands across western Washington have the potential to meet multiple ecological and livestock production objectives, including the provision of habitat for a variety of prairie species (plants, pollinators, birds, gophers) and improved forage quality and productivity. Across much of this landscape, lack of management and intensive grazing focused on increased forage yield have resulted in working lands dominated by non-native pasture grasses and undesirable forbs. Working with ranchers, private landowners, and conservation partners, we aim to support working lands and conservation outcomes by integrating prescribed conservation grazing and restoration actions. Prescribed grazing practices tailor the timing and intensity of grazing to meet desired outcomes using

planned grazing systems and deferment periods (removal of grazing during sensitive time periods for plants & wildlife). If applied at the right time and with the appropriate number and species of livestock, grazing can help control weeds, manage vegetation structure, and open bare ground for seeding. Even under ideal conditions, additional management actions may be necessary, and their implementation is complicated when treatment windows overlap with grazing periods. Seeding also requires special considerations, such as selecting for or against certain species traits (e.g., toxicity, resilience to trampling/herbivory) and managing grazing in seeded areas. We will present ways we are adapting restoration methods to work in concert with grazing on heavily degraded lands and identify some of the challenges and opportunities associated with this management tool.

WESTERN BUMBLE BEES AND OTHER POLLINATORS IN THE OLYMPIC NATIONAL FOREST. **Karen Holtrop** | US Forest Service; Erin Adams | US Fish and Wildlife Service; Logan Fields | Heartwood Nursery. karen.holtrop@usda.gov

Western bumble bee (*Bombus occidentalis*) is a once-common bumble bee experiencing population declines range-wide. We conducted systematic bumble bee surveys on the Olympic National Forest (ONF) in 2022-23 to compare to a 2017-2018 ONF bee survey effort. Ten species were identified throughout 22 sites, with *Bombus flavifrons* and *B. mixtus* the most frequently encountered (found at the most sites), and most abundant (number of individuals at each site). The rare *B. occidentalis* was found at eight of 22 sites, doubling the number of recent *B. occidentalis* location records on the ONF. However, *B. occidentalis* abundance was relatively low. *B. occidentalis* was found on eight different host plant species. All *B. occidentalis* observations were in the Dungeness and Big Quilcene watersheds in the northeast ONF, ranging in elevation from 2500 to 5900 feet. A diversity of other pollinators was noted, including 26 butterfly species. The non-native honeybee (Apis mellifera) was observed at several sites, including in remote areas suggesting nearby presence of feral colonies. Including the B. occidentalis records, 12 total bumble bee species were identified between the two survey efforts.

COMMUNITY SCIENTISTS NEEDED TO PILOT A GARRY OAK MONITORING INITIATIVE. **Joseph Hulbert**, Zarina Gallardo, Isiah Montejano, Faith Dewitz | Washington State University. hulbe@wsu.edu

Garry oak are vital to prairie oak woodlands in the Northwest, but the global movement of goods has introduced new challenges for its conservation. Introduced species such as the Mediterranean Oak Borer (*Xyleborus monographus*) threaten to the health of these trees and ecosystems. These ambrosia beetles tunnel into Garry oaks and can spread fungi that infect and damage the tree. There is a need for more monitoring of these beetles and their diversity, therefore, the WSU Forest Health Lab is interested in piloting a community science project. Community scientists can contribute by monitoring trees, collecting data, and testing approaches to collect beetles with DIY beetle traps using plastic jugs and hand sanitizer. Collected beetles can then be submitted to the WSU Research and Extension Center in Puyallup, WA for further identification and DNA analyses. The feasibility and engagement of the pilot project will shape future monitoring efforts and help conserve prairie oak woodlands.

A SURVEY OF ECTOMYCORRHIZAL FUNGI ASSOCIATED WITH OREGON WHITE OAK TREES IN TWO HABITATS. **Simon Kimberly**, Ava Howard, Amity Deters, Taryn Ho, Laura Ferry, Melissa Kelley | Western Oregon University. kelleym@wou.edu

Quercus garryana (Oregon white oak) savannahs and woodlands, once a major component of the Pacific northwest landscape, have substantially declined in the last century. These ecosystems provide vital habitat to many unique species. While work has begun to better understand how these ecosystems function and the role of *Q. garryana* within them, very little is known about below-ground microbial communities despite the importance of these microbes. Oaks are obligately mycorrhizal and are known to be symbiotic with ectomycorrhizal (ECM) fungi on their roots. This partnership between fungi and plant roots benefits oaks by providing water and nutrients. We are studying the diversity and composition of the ECM associated with oak roots in two contrasting habitats. We collected roots from 14 mature oaks selected across savannah and conifer-encroached forest in a 22-ha ecosystem in Oregon's Willamette valley. Using a metabarcoding approach we identified a total of 63 oak-associated ECM fungi. Of these ECM, 33% were found in both habitats, 36% were found only in the forest, and 30% were found only in the savannah. We have determined that while the two habitats have similar levels of fungal diversity, the savannah and forest oaks have distinct mycorrhizal communities from each other. Understanding the composition of mycorrhizal fungi associating with *Q. garryana* in these different habitats will increase understanding of this endangered ecosystem and how to best restore a thriving oak community.

BEST MANAGEMENT PRACTICES FOR MITIGATING IMPACTS TO STREAKED HORNED LARKS ON OCCUPIED AIRFIELDS. **Christa LeGrande, Michelle Tirhi** | Washington Department of Fish and Wildlife. michelle.tirhi@dfw.wa.gov

The streaked horned lark best management practices (BMPs) were developed to guide airport and federal lands site management that enables the ongoing use and maintenance of site while minimizing impacts to streaked horned larks. These BMPs are applicable for use in occupied lark habitat, have a benefit to the maintenance of lark populations, and directly relate to lark survival and productivity. To inform BMP effectiveness and adaptation, a project planning BMP selection checklist and a post-project compliance form are provided for site manager use. Monitoring the use of these BMPs is a critical component to improving the activity use in occupied lark habitat. Washington Department of Fish and Wildlife published these recommended BMPs in January 2025.

TAKING THE LONG ROAD: WESTERN BLUEBIRD RECOVERY IN THE GEORGIA BASIN. **Kathleen F. Lewis** | San Juan Preservation Trust; Jacquie Taylor | British Columbia Conservation Foundation; Gary L. Slater | Ecostudies Institute. kathleen@sjpt.org

Since 2007, numerous conservation partners within the Puget Trough-Georgia Basin have been working to restore a regional population of Western bluebirds (WEBL; Sialia mexicana) to their former range in the San Juan Islands, Washington State and Vancouver Island, British Columbia, through reintroduction. This secondary cavity-nester and short-distance migrant was considered common in oak-prairie habitats during the early 1900s, but populations began disappearing in the mid-1900s due to habitat loss and fragmentation and competition for nesting cavities. By the 1960s WEBL were extirpated from the San Juan Islands, and by the 1990s, from Vancouver Island. Project partners initiated 5-year active translocations (2007-2012; 2012-2018) on San Juan Island and Vancouver Island, respectively, from a large source population at Joint Base Lewis-McChord military installation in south Puget Sound. Populations were established at both locations but subsequently declined and emergency translocations were implemented. Likely causes of declines included environmental factors, high nest predation rates, low female survival, and effects of small populations. Subsequent augmentation and active management (e.g., nest box protection, supplemental feeding) to reduce threats appear to have stabilized populations. However, as both populations remain subject to small-

population problems, sites may benefit from occasional (every 3-5 years) translocations until more populations are established. While valuable knowledge has been gained from nearly two decades of reintroductions and demographic monitoring, partners will continue to face the challenges of running long-term recovery projects focused on a migratory passerine, reliance on a mostly volunteer workforce, limited funding opportunities, and transport of avian species across international borders.

LAKEWOOD'S GARRY OAKS: VICTIMS OF FAILED LOCAL POLICY AND PLANNING. **Christina Manetti**, James Dunlop | Garry Oak Coalition. action@oak.eco

This presentation summarizes what has been learned during four years of engagement with the City of Lakewood in the area of Garry oak policy. The City of Lakewood has one of the most extensive urban Garry oak canopies in the region. However, the City's inadequate policies have meant that Lakewood has lost more than five hundred oaks in recent years – a number that continues to increase. Despite public pressure and resultant amendments to the municipal code, Garry oaks of all ages continue to be removed on both public and private property. The author has participated in appeals before three different hearing examiners in Lakewood and Pierce County and will outline legal obstacles that have stood in the way of effective protection. The presentation will provide an overview of the main problems facing Garry oak conservation in the City of Lakewood and suggest what kinds of policy changes are necessary to better protect this keystone species.

ONE INDEX TO RULE THEM ALL: IMPROVING THE FLORISTIC QUALITY INDEX TO ASSESS CHANGES IN PRAIRIE VEGETATION ACROSS MULTIPLE SITES. **R. Adam Martin** | Ecostudies Institute. amartin@ecoinst.org

How should we evaluate the success of management interventions in plant communities? Vegetation datasets offer countless ways to describe data, making data interpretation and communication challenging. In South Sound prairies, these issues are further complicated by strong differences in plant composition across sites. The Floristic Quality Index (FQI) offers a solution for effectively describing vegetation data. The FQI combines species conservatism values (C-values) ranging from 0 to 10, typically averaged across species in a specific site or plot, weighted by species richness or cover. Conservatism reflects a species' fidelity to assemblages minimally impacted by modern stressors. Washington's Natural Heritage Program has assigned C-values to Westside plants, using the framework widely employed in Midwest prairie management but remaining underutilized in Pacific Northwest grasslands. However, averaging C-values can be problematic because such measures are sensitive to species richness at plot, site, and regional scales. This sensitivity can obscure meaningful patterns and limit the FQI's utility and interpretability. A more effective approach is to use the maximum C-value present, weighted by species cover. This adjustment captures the index's intention more accurately, theoretically and quantitatively, by focusing on the strongest indicators of intact habitats and is more appropriate for plot-based data. This updated measure strongly correlates with native species cover and richness, regardless of composition. Adopting this updated method improves the clarity and usefulness of vegetation data for interpreting intervention outcomes, supports better decision-making in prairie management, and increases our ability to assess management interventions across varied sites.

PRAIRIES ARE CULTURAL LANDSCAPES: PRESERVING PRAIRIE HISTORY AND ARCHAEOLOGY IN THE SOUTHERN PUGET LOWLAND. **Bethany Mathews, Katy Leonard-Doll** | Antiquity Consulting. antiquityconsulting@gmail.com

Archaeological sites associated with prairies in western Washington provide invaluable information on the history of indigenous landscape stewardship and resource use practices. Archaeological evidence and oral histories indicate prairies in the Puget Lowland have been managed for thousands of years. In the course of Cultural Resource Management (CRM) in the Southern Puget Lowland, archaeological sites in these settings are often recorded as lithic isolates or small lithic scatters, and unfortunately these site types are often not ascribed historical significance. Less than 3% of precolonial prairie remains in western Washington due to settler incursion, and prairie archaeological and cultural sites remain susceptible to impacts from development and agriculture. What methods are we using to identify archaeological sites and cultural landscapes on Puget Lowland prairies, and how can we better preserve this important history? In this poster we recommend that prairie archaeological sites are components of cultural landscapes, and we suggest that status quo CRM methods are not adequate for recognizing these important sites.

DONATION LAND CLAIM LANDSCAPES: AMERICAN SETTLEMENT OF SOUTHERN PUGET LOWLAND PRAIRIES. **Bethany Mathews, Libby Musolino, Riley Mallory** | Antiquity Consulting. antiquityconsulting@gmail.com

Historians and ecologists have observed that Euro-American settlers claimed prairie lands in the Puget Lowland at a high rate, leading to the rapid conversion of prairie habitat to agricultural fields. As we work toward restoring prairies, examining the history of Euro-America impacts to prairies can help us understand the pre-colonial extent and management history of these places. In western Washington only 1.87% of land was initially claimed through the Donation Land Claim process, but counties with large anthropogenically managed prairies were settled at a higher rate (up to 14.8%) than other parts of western Washington. Does the pattern of Donation Land Claim settlement indicate a clear preference for prairie landscapes by Euro-Americans settling the area prior to 1855? How does the Donation Land Claim settlement pattern relate to Indigenous use and management of the Puget Lowland prairies? This poster explores the pattern of Donation Land Claims in western Washington to investigate whether Euro-American settlers primarily claimed prairie lands early in the Euro-American colonization of Washington.

CONSERVATION GRAZING: PUBLIC-PRIVATE PARTNERSHIPS FOR GRASSLAND RESTORATION TO PROMOTE POLLINATOR DIVERSITY. **Erin Mau** | Ecostudies Institute, Quamash EcoResearch. emau@ecoinst.org

Habitat fragmentation in a landscape actively altering with climate change provides unique challenges in managing land for conservation. Utilizing private and working lands to enhance habitat connectivity in this matrix will be vital in conserving habitat into perpetuity. We report here on a project that aims to promote habitat conservation through collaboration between private landowners, ranchers, and restoration practitioners, to support enhancement of plant and pollinator diversity. Restoration efforts included rotational cattle grazing with site-specific prescriptions to manage invasive grasses, manual removal of non-native woody shrubs, and seeding of native vegetation. Twice per season, we surveyed pollinator visitation in 25 x 25 m² plots, the number of which varied between sites. Insects were captured on actively flowering plants and dispatched for identification. Initial Shannon-Wiener diversity across sites ranged from 2.35-3.03. Pollinator richness ranged from 15-35 unique taxa in year one before restoration. Flower visitation was dominated by bees, with flies being the next most common visitor. Sites with a baseline vegetation community closer in structure to native prairie habitat tended to start out with a higher pollinator species richness. Initial results also suggest that collaborative restoration prescriptions, including conservation grazing, result in an increased number of pollinator species. Continuing application of native grass and forb seeds has the potential to increase native vegetation cover, thereby attracting a more diverse suite of pollinators. We are excited to see the expansion of improved habitat through a diverse community of partnerships.

EMERALD ASH BORER: WHAT EVERY OREGONIAN SHOULD KNOW. **J. Christina Mitchell** | Institute for Applied Ecology; Kat Bethea | Oregon Department of Forest and Urban and Community Forests. christinamitchell@appliedeco.org

In June 2022, the invasive Emerald Ash Borer (EAB; *Agrilus planipennis*) was detected in Oregon ash (*Fraxinus latifolia*) trees in Forest Grove outside of Portland, Oregon. EAB is a wood boring beetle (Insect Family: *Buprestidae*) native to northeast Asia that specializes on ash trees (*Fraxinus* spp.). Outside of its native range, populations of EAB are less influenced by natural predators and have expanded to decimate populations of North American ash species including *Fraxinus americana*, *Fraxinus nigra*, and *Fraxinus pennsylvanica*. Ecosystem biodiversity and functions have been altered by the loss of native ash species. Oregon ash is the only native ash species in Oregon and fills a niche in Willamette Valley ecology. Oregon ash is a deciduous, early successional tree often growing in riparian areas or wetlands. It can provide shade and shelter and food resources for native species in open prairies and along waterways. After the discovery of EAB in Washington County, agencies conducted widespread surveying and detection efforts to determine whether the Forest Grove occurrence was the only or first-known EAB infestation. In 2024, trapping and inspection efforts across the state found additional occurrences of EAB in Clackamas, Marion, and Yamhill Counties. The loss of Oregon ash as a result of EAB invasion poses great risk to natural ecosystems in Oregon, but action can be taken now to mitigate future loss of habitat and biodiversity.

CULTIVATING A WASHINGTON SEED STRATEGY. **Cindy Nguyen** | Ecostudies Institute. cnguyen@ecoinst.org

Washington is a state of diverse ecosystems, ranging from coastal rainforest in the west to arid sagebrush steppe in the east, with the mountainous Cascade Range in between. This diversity leads to challenges in sourcing seed for restoration. Often, land stewards are unable to source an adequate supply of native seeds adapted to their region or can't access the diversity of species desired to meet their restoration goals. Increasing the supply of locally adapted, genetically appropriate native plant materials is essential to address restoration needs across ecosystems in Washington State, especially in the face of climate change. A Washington Seed Strategy will address the lack of biologically diverse and ecologically adapted native seeds by providing a common set of goals and actions to increase coordination and information sharing among the diverse collaborators in Washington State. The Washington Seed Strategy will tier off the National Seed Strategy and will be constructed in concert with other developing seed strategies in the region to increase efficiency and collaboration across ecoregions. This poster will detail the initial steps to better understand barriers and the need for a Washington Seed Strategy through interviews, surveys, and discussions started during the August 2024 Washington Seed Strategy Kick-off Meeting.

RESTORING NATIVE PRAIRIE PLANTS TO GRAZED PASTURES IN THE WILLAMETTE VALLEY, OREGON. **Paul B. Reed** | Institute for Applied Ecology; Lauren M. Hallett | University of Oregon. paulreed@appliedeco.org

Agriculture has replaced most prairie habitat in western Oregon, but working lands can potentially be managed to support prairie conservation. In a pilot experiment at My Brothers' Farm (MBF) in Creswell, Oregon, we tested whether native prairie restoration can succeed alongside bison grazing. Specifically, we used rotational grazing to establish native prairie forbs in a field formerly used for annual ryegrass seed production. In fall 2021, MBF began converting this field into perennial pasture by seeding a perennial forage mix. Simultaneously, we seeded 48 experimental plots with 10 native prairie forbs and implemented rotational grazing in half the plots starting in February 2022. Between 2022 and 2024, native cover and richness were greater in grazed than ungrazed plots, though only two native species

tended to persist through 2024. Seeding natives alongside the perennial forage mix (versus into annual ryegrass alone) did not affect native species establishment. Building on these results, we are scaling up restoration across a six-acre paddock. This paddock had been dominated by annual ryegrass and false dandelion, providing minimal forage value. The soil also suffered compaction and low pH. To improve conditions, we seeded a cover crop mix in October 2023 and disked and limed in September 2024. We then seeded 24 native grasses and forbs in October 2024. Our goal is to enhance native biodiversity and pollinator habitat while improving soil health and pasture quality along the way. Through collaboration and sound management, we aim to develop a win-win strategy that benefits both conservation and agriculture.

SHARED RESOURCES: A COLLABORATIVE APPROACH BETWEEN STATE, TRIBAL, AND NGO PARTNERS. **Shawn Ryan, Jared Shorten** | Ecostudies Institute. sryan@ecoinst.org

In Washington's South Puget Sound, partners from multiple entities work collaboratively to conserve the prairie and oak habitat and rare species that call it home. With monitoring and restoration capacity as a limiting factor across the board, a shared crew is providing support across the landscape. The Shared Resources program, run by Ecostudies Institute, acts as a flexible monitoring and restoration crew which consists of staff from Ecostudies Institute, Center for Natural Lands Management, and the Confederated Tribes of the Chehalis Reservation. Our program conducts standardized vegetation monitoring and numerous restoration projects. Focusing on enhancing Taylor's checkerspot butterfly, Oregon vesper sparrow, western bluebird, and other species' habitat, the crew currently supports fourteen tribal, state, county, and privately-owned sites with support from state and federal funding. This approach offers a model for how entities can utilize a collaborative, landscape scale approach to efficiently increase crew and equipment capacity in order to help meet ecological restoration goals across several organizations.

LANDSCAPE-SCALE MONITORING FOR THE ADAPTIVE MANAGEMENT OF PRAIRIES. **Andrew Smith**, Janelle Bouman, R. Adam Martin | Ecostudies Institute. asmith@ecoinst.org

At Joint Base Lewis-McChord (JBLM), Ecostudies Institute (ESI) collaborates with JBLM Fish and Wildlife to develop site-specific management objectives focused on maintaining and enhancing the overall quality of prairie habitat for federally listed prairie species. Our primary management goals include reducing the cover of invasive shrubs and grasses, managing vegetation height, and increasing the cover and frequency of native prairie species that support ESA species habitat. To assess the effectiveness of these management objectives, we conduct landscape-scale monitoring every three to five years using a grid of stratified random 625 m² plots established within each Training Area. One key application of this data is creating predicted vegetation maps that inform spatially explicit prioritized management recommendations and field maps for on-the-ground practitioners. By utilizing Empirical Bayesian Kriging, we produce indicator threshold maps that display the probability of an area of prairie meeting or exceeding predefined management thresholds for invasive plant cover, vegetation height, or native plant cover. The results from these maps improve our ability to plan and monitor management activities. This poster illustrates various applications of this map-making workflow, including invasive annual grass cover, Scot's broom (*Cytisus scoparius*) cover, and native grass cover.

EFFECTS OF PRESCRIBED FIRE ON OREGON WHITE OAKS (*QUERCUS GARRYANA* DOUGLAS EX HOOK.) IN WESTERN WASHINGTON. **Mikala Waldrup** | The Evergreen State College. mikala.waldrup@evergreen.edu

Oregon white oak (*Quercus garryana* Douglas ex Hook.) is Washington's only native oak species and supports many rare and endangered species. Anthropogenic fire along with naturally occurring lightning-ignited fire have been present in Washington's oak ecosystems since time immemorial, but since European settlement began in the mid-1800's, between 95-99% of native prairies and oak habitat have been lost or degraded, due in part to fire exclusion. One tool currently being used to restore and maintain oak ecosystem health is prescribed fire. This thesis examines prescribed fire-induced injury to, and mortality effects on, mature Oregon white oaks, as well as its impacts on oak seedling and sapling abundances. The study uses data collected two years after the reintroduction of prescribed fire to mature oak habitat at Joint Base Lewis-McChord by Nemens et al. (2019), and adds data collected in the same sites in 2024. Oak seedlings and saplings were also counted in transects with and without burn treatments. Eight years after the reintroduction of prescribed fire to mature oak habitat, only 2 out of 201 study trees were killed. There was also not a significant difference between the total number of seedlings and saplings in burned versus unburned transects (using burn status as a fixed effect and transect as a random effect, $p = 0.297$). Findings suggest that mature Oregon white oaks are highly resistant to prescribed fire mortality even after long absences of fire and that prescribed fire presence and absence had no significant effect on seedling and sapling abundances.

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