2025 Plant Conservation Symposium - Abstracts

Featured plenary presentations:

Presenter: Olga Kildisheva, PhD
Affiliation(s): Consultant, Viridian Ecosystems
Chair, International Network for Seed-based Restoration (INSR-SER)

Decoding dormancy: Understanding seed traits to help conserve and restore Great Basin forbs

Olga will explore different seed dormancy mechanisms and germination traits of important Great Basin forb species, including many found across eastern Oregon. She will discuss how understanding these essential aspects of seed biology can help us conserve and restore our biodiverse plant communities in an era of rapid change.

Presenter: Ed Alverson, MS
Affiliation: Natural Areas Coordinator, Lane County Parks

Willamette Valley ecosystems: Past, present, and future

In the mid-19th century, Oregon's Willamette Valley supported 1.5 million acres of prairie and savanna, in contrast to the dense conifer forests dominating the adjacent Cascade and Coast Ranges. Most of this historic prairie and savanna habitat has been lost to an onslaught of change: habitat conversion, invasive species, and fire exclusion. As a consequence, this landscape, along with the diversity of plants and animals that depend upon it, has been a focus of intensive conservation efforts over the past 40+ years. What have we accomplished, and what more is needed? Ecological time provides a foundation upon which we may ground our day-to-day work.

Session: Climate Resilience/Pollinators

1. Planting for Climate Resilience: Recommendations for Metro Land Managers

Presenter: Adrienne St. Clair

Affiliation: Metro

Co-authors: Jess Nettle Shamek, Lori Hennings, Adrienne St. Clair, Hannah Schrager, Jina Sagar, Mary Vogel, Kristina Prosser, Chris Hagel, Jonathan Todd, and Jonathan Soll

Abstract: As climate change accelerates, restoration scientists face increasing pressure to enhance resilience in planting projects through strategic plant material selection. To guide Metro land managers, we compiled science-based recommendations for utilizing climate-adapted plant materials in ecological restoration. These guidelines aim to sustain ecosystem function, enhance both species and genetic diversity and account for acceptable risk, and all within a cultural context.

Our approach emphasizes increasing the species and genetic diversity of native plant materials used in restoration projects. Key strategies include increasing native but underrepresented climate-adapted taxa, tailoring planting palettes to site-specific factors such as slope, aspect, and drought exposure, and continuing admixture provenancing within the ecoregion. We also recommend selective climate-adjusted provenancing for commonly used restoration species that have potential to be highly vulnerable to predicted climate shifts. We draw a clear boundary at assisted migration across bioregions due to an increased level of risk.

Summary of Recommendations:

- Increasing native species diversity and incorporating disturbance-resilient species.
- Reintroducing extirpated or underrepresented climate-adapted species within their historical ranges.
- Adjusting planting palettes to match elevation, slope, and exposure to climate stressors like drought or heat.
- Continuing admixture provenancing from within the ecoregion and selectively applying climate-adjusted provenancing for common “work horse” species.
- Preserving the genetic diversity of vulnerable local species through seed banking and targeted seed collection.

Each recommendation is accompanied by supporting literature, feasibility, a level of assumed risk, and implementation partners. The document also outlines practices Metro does not endorse, clarifying the thresholds of acceptable risk and defining a practical framework for climate adaptation in regional restoration.

Session: Climate Resilience/Pollinators

2. Small-scale environmental heterogeneity modifies plant species' responses to climate warming in Willamette Valley prairies

Presenter: Sarah Erskine

Affiliation: University of Oregon

Co-author: Jeff Diez

Abstract: Now and in the future, successful management and conservation must consider how climate warming impacts plant species and communities. Predicting these effects remains challenging because warming can have unique effects on each species within a community and communities exist across heterogeneous spatial and temporal scales. Even at fine spatial scales, environmental heterogeneity can generate microclimates that could either amplify or buffer warming effects. Quantifying how climate warming effects vary across landscapes is therefore essential for successful restoration planning. We investigated the effects of experimental warming on two annual forbs, *Clarkia purpurea* and *Collinsia grandiflora*, at eight sites across a 2km^2 matrix of prairies in the Willamette Valley. The sites captured environmental variation such as soil type, elevation, slope and aspect. At each site we measured germination rate, flowering phenology, reproductive output, and seed traits. In many cases, species' responses to warming were consistent in direction, but varied in magnitude across the sites. In other cases, warming effects were only detected at some sites and/or warming had divergent effects across sites. For example, at almost all sites flowering time advanced with warming, but the degree of advance ranged from two to seven days earlier among sites. These findings suggest that small-scale environmental heterogeneity mediates plant responses to climate warming in Willamette Valley prairies. While such variation introduces uncertainty in predicting species' future responses, it also indicates that some locations may buffer warming effects. Climate-informed restoration may therefore be most effective when incorporating landscape heterogeneity into planning.

Session: Climate Resilience/Pollinators

3. A framework to enhance plant and pollinator conservation with big biodiversity data

Presenter: Chris Cosma

Affiliation: Conservation Biology Institute

Abstract: Habitat loss drives pollinator declines by disrupting specialized interactions with native plants, jeopardizing ecosystem health and human food security. Since pollinators rely on connected habitat across human-dominated landscapes—including urban and agricultural areas—native plant revegetation by private and public land stewards is essential for their conservation. This presents an opportunity for the integrated conservation of native plants and pollinators. Despite growing public interest in pollinator conservation via native plant restoration, these efforts face two significant barriers: a science gap, where the historic lack of comprehensive biodiversity data has hindered data-driven guidance; and an access gap, where the design of existing tools (e.g., long static plant lists with little supporting information) limits their accessibility to non-expert users. The rise of big biodiversity data (e.g., from community science) offers new potential, but requires analytical frameworks to translate data into actionable insights. We present a novel framework integrating plant-insect interaction networks, species distribution models, and predictive modeling to identify region-specific pollinator support plants using big biodiversity databases. We demonstrate how incorporating these insights into intuitive decision support tools can empower inclusive, data-driven habitat restoration to improve native plant and pollinator conservation outcomes. We also highlight how integrating agricultural data into this framework can guide management decisions that maximize biodiversity and crop pollination services.

Session: Climate Resilience/Pollinators

4. Pollinators, eDNA, and Resilience

Presenter: Maggie Graham

Affiliation: The Understory Initiative

Abstract: Wouldn't it be neat if flowers could talk? Especially if they could tell us about their relationship with pollinating insects?! Join us to learn about efforts to use environmental DNA (eDNA) to identify pollinating insects at restoration, conservation, agricultural, and solar energy sites in Oregon and across the country. This project is a collaboration between The Understory Initiative, Oregon State University, Cornell University, USGS, US DOE, and several additional universities across the country.

Session: Taxonomy & Molecular Phylogenetics

5. Refining our understanding of *Castilleja* in Oregon

Presenter: Ed Cope

Affiliation: Coos Watershed Association

Abstract: *Castilleja* is a notoriously difficult genus, with many species that can be bewilderingly variable. It is also highly diverse in Oregon, which compounds the difficulty of identification. However, ever–improving documentation on digital platforms such as iNaturalist have provided substantial insight into many questions surrounding the genus. In this presentation, we will discuss several new discoveries that this technology has enabled in the past few years. This includes: the discovery of undescribed taxa; the documentation of new populations of conservative species; the discovery of species as–yet undocumented in the state; confirming the ranges of species not well–documented in herbaria; the documentation of previously unknown color forms; and the documentation of previously unknown hybrid forms.

Session: Taxonomy & Molecular Phylogenetics

6. The Perennial North American (PENA) Clade of Apiaceae Subfamily Apiodeae - A Comprehensive New Next-Generation Molecular Phylogeny

Presenter: Mark Darrach, MS

Affiliation: Burke Museum Herbarium, University of Washington

Abstract: The PENA clade of Apiaceae subfamily Apiodeae is comprised of well-known but poorly understood genera including *Lomatium* (>100 species as presently circumscribed), *Cymopterus* (42 species as presently circumscribed). At present a total of 14 recognized genera comprise the group in total. A new broad sampling next-generation produced phylogeny greatly expands these 14 genera to now include over 40 genera, many of which are monotypic. Previous thinking that genera such as *Lomatium* have recently, and are actively speciating at the present time have proven to be erroneous. Applying molecular clock techniques to the phylogeny conclusively shows that the most recent speciation events amongst presently recognized taxa date to about 2 Ma with some lineages dating well into the Miocene with crown ages >8 Ma. The PENA clade is considered to be notoriously difficult taxonomically with some workers pointing to apparent extreme morphologic plasticity in some taxa such as the *Lomatium triternatum* complex. Most of this putative plasticity proves to be significantly overstated. The PENA clade has a relatively narrow “tool-kit” of morphological characters to work with, and they have been recycled through various often distantly-related taxa numerous times throughout the lineage. Reliable synapomorphies are however broadly lacking in the group. The new phlogeny includes a significant number of undescribed species – some are native to Oregon. Many are of apparent conservation concern and are in need of management attention accordingly.

Session: Taxonomy & Molecular Phylogenetics

7. Conservation Genomics of Gentner's Fritillary

Presenters: Em Johnson and Aaron Liston

Affiliation: Department of Botany & Plant Pathology, Oregon State University

Abstract: *Fritillaria gentneri* is a federally and state-listed endangered species distributed in southwestern Oregon with one population in adjacent California. A challenge to the management and conservation of *F. gentneri* are the co-occurring and possibly ancestral species *F. affinis* and *F. recurva* and their nearly indistinguishable vegetative states. We sequenced these species' chloroplast genomes from 12 populations, identified diagnostic markers suitable for high-throughput assays, and used these to genotype hundreds of individuals from four populations. We found high level of chloroplast differentiation among populations and subpopulations of *F. gentneri*. Phylogenetic analysis of the chloroplast genomes suggests 4-5 independent origins of *F. gentneri,* with a much closer relationship to *F. recurva* than *F. affinis.* We are now conducting a genotyping by sequencing (GBS) study of 96 individuals to determine if similar patterns of genetic differentiation are found in the nuclear genome. We have also used flow cytometry to investigate patterns in ploidy level across species and populations. Preliminary results based on 4 populations and ca. 20,000 polymorphic nucleotide sites reveal little genetic variation within populations of *F. gentneri* – consistent with predominantly asexual reproduction – and high levels of genetic differentiation among *F. gentneri* populations. In contrast, there is moderate genetic variation within populations of *F. recurva* and *F. affinis* but little differentiation among populations. While initial analyses find little evidence in support of the long-standing hypothesis of a hybrid origin of *F. gentneri* from *F. recurva* and *F. affinis*, we refrain from ruling out hybridization until more in-depth analyses are completed.

Session: Taxonomy & Molecular Phylogenetics

8. The evolutionary origins of the endangered, white-flowered larkspurs *Delphinium leucophaeum* and *D. pavonaceum* based on comparisons of gene expression and floral pigment chemistry

Presenter: Keith Karoly

Co-authors: Lindsey Babcock and Kenta Tsukamoto

Affiliation: Biology Dept., Reed College

Abstract: *Delphinium leucophaeum* Greene (White rock larkspur) and *D. pavonaceum* Ewan (Peacock larkspur) are state-listed, endangered species native to the Willamette Valley, Oregon. Both larkspurs are distinguished from their purple-flowered relatives by their possession of sepal and lower-petal tissues that are white. We have previously determined that the white color of sepals of *D. leucophaeum* is dominant to the purple-colored sepals of its sister species, *D. nuttallii* A. Gray. The sepal tissues of *D. leucophaeum* and *D. nuttallii* differ in which flavonoid pigments they contain, and the underlying genetic cause of this pigment difference appears to be evolutionary divergence of a transcription factor that regulates gene expression for the flavonoid metabolic pathway. We have recently profiled the flavonoid pigments and gene expression for sepal tissue from *D. pavonaceum* to determine if the white-flowered trait for the two endangered species has a common evolutionary origin. We also profiled the flavonoid pigments for a white-flowered larkspur population in the Bull Run watershed that has been previously described as a possible *D. pavonaceum* population. Our pigment analysis showed that *D. leucophaeum* and *D. pavonaceum* share fundamentally similar flavonoid pigment profiles, while the Bull Run larkspur population showed evidence of being an albino form of a purple-flowered larkspur (most likely *D. trolliifolium* Gray). Our gene expression results from white sepal tissue showed that *D. leucophaeum* and *D. pavonaceum* share similar patterns of down-regulated flavonoid pathway genes when compared to their purple-flowered relatives. Together, these results point to the likelihood that white-flowers for the two endangered species shares a common evolutionary origin and that introgressive hybridization likely contributed to the origin of these two endangered larkspurs of the Willamette Valley.

Session: Species Conservation

9. Survey of golden paintbrush in Oregon in 2025 indicates widespread population declines

Presenters: Thomas Kaye and Scott Harris

Affiliation: Institute for Applied Ecology

Abstract: Golden paintbrush (*Castilleja levisecta*), a perennial hemiparasitic herb, once occupied prairies and grasslands throughout the Puget Trough and Willamette Valley. Due to substantial habitat loss, it was extirpated from Oregon (last collected in 1938) and was listed as Threatened in 1995 by the US Fish and Wildlife Service. Subsequently, following substantial gains in population numbers through a rangewide reintroduction program between approximately 2010 and 2019, it was removed (delisted) from the Threatened species list in 2023. Post-delisting monitoring began in 2023 and was repeated in 2025 by the Oregon Department of Agriculture and Institute for Applied Ecology. Findings from surveys in 2025 indicate that 87% of Oregon populations have declined in size since 2023 (n=32), and 100% of populations >1000 flowering plants declined. Major threats observed include lack of management and expansion of annual plants into paintbrush habitats. The species is self-incompatible and requires insects for pollination. We observed California bumblebee (*Bombus californicus*) as the predominant pollinator. Fruit set (the proportion of flowers that made fruits) declined significantly across six populations from 2015 to 2025, potentially indicating reduced pollinator service. Continued habitat management and introductions, additional research into optimal management strategies, better understanding of interactions with pollinators and pollinator population health, and control of annual plants are important areas for continued work to bolster the species' declining populations.

Session: Species Conservation

10. Sand Dune Phacelia - Growing Up in Sand

Presenter: Kathryn Prive

Affiliation**:** The Understory Initiative

Abstract: Learn about collaborative efforts to restore sand dune phacelia, a threatened plant which is found in the dunes and prairies of Oregon's South Coast. This project is a collaboration between The Understory Initiative, The Institute for Applied Ecology, and the US Forest Service. Kathryn Prive from The Understory Initiative will talk about the ecology of this special plant, current restoration efforts, and the unexpected challenges (and successes) of growing plants in sand.

Session: Species Conservation

11. *Botrychium pumicola*: ecology and conservation of a rare fern of the Oregon Cascades

Presenter: Laura Estrada

Affiliation: Institute for Applied Ecology

Abstract: Pumice moonwort (*Botrychium pumicola*) is a rare fern currently listed as Threatened by the State of Oregon and considered a Sensitive Species by federal land management agencies. This eusporangiate fern is a fascinating endemic to the Cascade Range in Oregon and Northern California that occupies two geographically distinct habitat types: alpine pumice fields above tree line and montane "frost pockets" in lodgepole pine forests between approximately 4,000 and 5,000 feet elevation. Long-term monitoring shows that alpine populations are relatively stable while montane populations are in decline and in some cases experiencing extirpation. In 2021, the Institute for Applied Ecology and the U.S. Forest Service initiated a multi-year project to better understand the autoecology of pumice moonwort and develop guidelines for its conservation and restoration. In this presentation, we will discuss preliminary findings of that study, including the development and groundtruthing of a species distribution model (to delineate coarse scale distribution) and a habitat covariate model (to identify fine-scale habitat predictors).

Session: Species Conservation

12. Citizen's Rare Plant Watch Year-End Recap

Speaker: Nora Dunkirk

Affiliation: Oregon Biodiversity Information Center (ORBIC) and Rae Selling Berry Seed Bank

Abstract: Citizen's Rare Plant Watch (CRPW) is a community science program which takes volunteers out to visit populations of rare and threatened Oregon native plant species. Volunteers assess their health and viability, update the Oregon Biodiversity Information Center (ORBIC) state database for rare species, and help contribute to data driven management decisions throughout the state. Housed at Portland State University, this program is open to the public and attracts plant lovers from diverse backgrounds. Each spring, CRPW trains volunteers on methods of data collection, and this year we implemented new technology using Survey123 to streamline population assessments. We focus on species which are data deficient and in need of updated information, and we partner with land managers across Oregon to help fill the gaps in their capacity to survey rare plants. This year we had more than 30 volunteers participate in data collection on populations of nine species of rare plants in Oregon during ten outings between May and September. Our work informs strategies for protecting Oregon's state-listed and regionally rare plant species.

Session: Plant Materials

13. Seed Collection Considerations for Conservation

Speaker: Jake Picardat

Affiliation: Institute for Applied Ecology

Abstract: Effective conservation seed collection requires careful balance between ecological ethics, logistical challenges, and long-term restoration goals. This presentation outlines key considerations and lessons learned from efforts to collect seed from threatened, endangered, and regionally rare species.

Locating populations often begins with historical herbarium data, but shifting landscapes and limited recent data make rediscovery challenging. Once populations are located, phenology monitoring becomes critical. However, predicting flowering and seed maturation is increasingly difficult due to climate variability, the lack of fine-scale data, and difficulty of accessing sites.

Ethical collection practices further influence collection outcomes. Following the 10% collection guideline protects wild populations, but necessitates repeated visits over multiple years to meet targets for seed banking or seed amplification beds. This incremental approach demands sustained coordination among field teams, land managers, and restoration practitioners.

These challenges underscore the importance of coordinated planning and robust data collection that improve collection efficiency while protecting ecological integrity. Strengthening these elements enables conservation programs to increase both the quantity and genetic diversity of seed available for restoration and long-term species conservation.

Session: Plant Materials

14. Confederated Tribes of the Umatilla Indian Reservation (CTUIR) First Food's Seed Banking Program: Vision, Goals, and Current Work

Speaker: Maya Kahn-Abrams

Affiliation: Oregon State University Eastern Oregon Agricultural Research Center (EOARC)- Union

Abstract: First Foods have sustained tribal people since time immemorial. Ongoing relationships with First Foods are essential to the culture of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), as First Foods serve fundamental roles in the health, well-being and cultural identity of the Tribes. To conserve and safeguard these important relationships, the CTUIR Department of Natural Resources adopted a mission to protect, restore, and enhance First Foods throughout their ceded lands. To support this mission, CTUIR is working with Oregon State University, and in collaboration with other agency partners, to develop a seed banking program to ensure the preservation and availability of genetically diverse seeds of culturally significant First Foods species. Culturally significant First Foods encompass an array of species with a variety of growth habits and fruit/flower organizations, growing in populations that occur in a range of distribution patterns at several different spatial scales. The CTUIR First Food's Seed Banking Program focuses on collecting, cleaning and storing wild harvested seeds from across the Blue Mountains bioregion both for long-term banking, and for use in the cultivation of genetically diverse plant materials to support active restoration efforts. Through the preservation of the genetic diversity within First Food's populations, the program aims to support tribal food sovereignty while aiding in climate resiliency to ensure the availability of First Foods for use by future generations.

Session: Plant Materials

15. From banking to propagation: Expanding the roles of a seed bank in a changing climate

Speakers: Gabriel Campbell and Roxy Olsson

Affiliation: Rae Selling Berry Seed Bank

Abstract: The Rae Selling Berry Seed Bank at Portland State University is dedicated to preserving Oregon native plant genetic diversity, with an emphasis on rare species. It houses one of the nation's oldest rare native seed collections which includes 28,000 accessions representing 800 taxa and millions of seeds. It also supports a Citizen's Rare Plant Watch program that utilizes volunteers to survey rare plants. Recently, it has started a Native Plant Propagation Program which provides the community with supporting knowledge for conservation success of rare (and common) species. Since its inception in 2022, the Native Plant Propagation Program has conducted approximately 1,100 propagation trials on 700 species. Trials have tested various seed pretreatments (such as cold stratification) or cutting treatments (such as auxin application) and have recorded the time required to produce plants in 4-inch containers. Seed bank staff have propagated 494 species using seeds, cuttings, or divisions and successfully produced 451 species in 4-inch containers; this is approximately 15% of Oregon's native vascular plant flora. Plants propagated during trials were distributed to the public, including 3,150 4-inch plants provided to 16 community groups. Here we discuss highlights from these trials and provide recommendations on how to use the data.

Session: Plant Materials

16. Growing a Regional Native Plant Partnership: Building Collaboration from the Ground Up

Speaker: Morgan Fay

Affiliations: The Understory Initiative (TUI) / Umpqua Native Plant Partnership (UNPP)

Abstract: Across Oregon, native seed and plant materials are the foundation for restoration success—but access, coordination, and production capacity often lag behind conservation needs. The Umpqua Native Plant Partnership (UNPP), coordinated by The Understory Initiative (TUI), has spent the last several years bringing together growers, land managers, and restoration partners to close that gap.

This presentation will share how UNPP has evolved into a collaborative model that connects people, programs, and production. What began as a small network has grown into a coordinated system where seed producers, practitioners, and agencies share information, align priorities, and plan for both immediate and long-term restoration needs.

Through open communication, shared tracking tools, and clear partner roles, the program supports flexible, low-risk production while maintaining quality and accountability. Lessons learned include how to navigate partnership challenges, balance supply and demand, and build trust across diverse goals and capacities.

Participants will leave with insights into how collaboration can strengthen Oregon's native plant materials pipeline—from field to nursery to restoration site—and how this model could inform broader, statewide conservation efforts.

Session: Plant Materials

17. Connecting Native Plant Producers with Customers: Plant Finder and Vendor Match Tools with Integration of Climate Smart Restoration Tool

Speaker: Justin Brice

Affiliation: Conservation Biology Institute

Abstract: Would you like to know which native plants are best suited to your region—and easily connect with suppliers that carry them? Co-developed with USDA Conservation Reserve Program (CRP) staff, partners, and early-adopter vendors, the CRP Toolkit is a set of open-access online tools designed to make that process simple.

Using the Plant Finder tool, you can quickly identify which native species are suitable for your location. You can then cross-reference that list with vendor-provided species lists in the Vendor Match tool to find suppliers who carry those plants. Through the Plant Finder's interactive map, simply select your location and answer a few short questions to generate a list of regionally appropriate species. This list can be imported directly into Vendor Match to locate vendors offering those species.

Alternatively, you can use Vendor Match on its own to search for a specific species, regardless of location, and see which vendors currently supply it.

For climate-focused restoration projects, the Climate Smart Restoration Tool (linked within Plant Finder) utilizes future climate projections to help identify existing plant populations growing under conditions similar to those expected in your target restoration area. These populations are ideal sources for plant material likely to be more resilient under future climate scenarios.

The CRP Toolkit was originally developed in collaboration with USDA partners in our pilot states—Washington, North Dakota, South Dakota, Nebraska, Kansas, and Colorado—but there is growing interest in expanding its reach to a broader ecological restoration community.