

RAE SELLING BERRY SEED BANK & PLANT CONSERVATION PROGRAM



Spring 2017 Newsletter

From the Director



Director Ed Guerrant

Perhaps the biggest news is that our relational database, long in the works, is now operational, and undergoing 'alpha-testing.' That means we will be checking every command and link to ensure they work as they should. See my article below for more about what this exciting and significant step forward will do for us. Although it may seem very esoteric, there is much that volunteers can contribute to this and subsequent steps, with relatively little training. It will serve both an evaluative function, allowing us much better access to the enormous amount of information we have amassed since 1983, and also serve as a planning tool for future collection.

Kris Freitag's project, Citizen's Rare Plant Watch, continues to grow, and for those who might want to participate, please note the upcoming volunteer training on April 15. See below some of the target species on which CRPW will focus this year.

This year will mark the twentieth year of our experimental reintroduction of the endangered western lily (*Lilium occidentale*). We have since added a demographic study of a small, naturally occurring population (the only one on federal land), in which we follow the fate of each plant every year. In fall 2015, we initiated an experimental augmentation to increase its numbers. There is something very satisfying about studying a place over many years, appreciating how it both changes and stays the same. One surprise for me last spring was how much the salal (*Gaultheria shallon*) had grown in just one year, necessitating a third round of vegetation management last fall.



Volunteers estimate population size

In the absence of fire or other naturally occurring

MAKING A DIFFERENCE

CRPW TRAINING APRIL 15

Join us in monitoring rare plant populations in Oregon! **Citizen's Rare Plant Watch** sites are within 2-3 hours drive of Portland, in a variety of habitats. Small groups will be led by an experienced leader, but we will have much to teach each other. We strongly recommend our April 15 training session, from 9:30am-4:30pm at the **Tualatin River National Wildlife Refuge**. Thanks to Wendy Gible of Rare Care for conducting part of the training!

Please call Kris at (503) 725-2468 or email kfreitag@pdx.edu if you would like to attend the training, support our program, provide a valuable service and have some plant-geeky fun.

MAKE A GIFT TODAY

GIVE ►

Have you included or considered including the Rae Selling Berry Seed Bank in your estate plans? If so, or if you would like to learn more, please contact Kathleen Hampton, Major Gifts Officer, at (503) 725-3526 or hamptonk@psuf.org.



Lilium occidentale, western lily

disturbance, it is astonishing how quickly shrubs and trees can change a landscape, which to us often seems to be in a sort of equilibrium. I was shocked to learn from my older son that on property in Northern California that has been in his mother's family for five generations, the meadows have contracted by 70% in the last 70 years! Woody encroachment in the absence of historically "typical" disturbance can lead to dramatic changes in the landscape. These two examples of extreme, but seemingly slow vegetation changes highlight the importance of banking seeds of rare and common taxa in an uncertain world, in order to have material for restoration.

At a more personal level, I was thrilled to hear that former SOS intern, Lindsey Riibe, will be pursuing her PhD at the University of Florida. It looks like she will be studying rare ferns in the Caribbean, contributing to the advancement of scientific knowledge in general, as well as directly informing conservation activities by the US Fish and Wildlife Service, at least on US administered islands.

It seems obvious that the USFWS would want the best information possible in order to manage these and other rare species, but we shouldn't be lulled into complacency. Not everyone appreciates the value of scientific knowledge for guiding public policy actions, like conserving biodiversity, or confronting climate change. Richard Hofstadter's 1963 book, *Anti-intellectualism in American Life*, should remind us that what many now regard as the "war on science" being waged by fossil fuel interests and their favored politicians is not without precedent in American history. Much of the public antipathy to science in general and climate science in particular is probably driven in part by fear resulting from the economic stagnation of middle class incomes over the last 40 years. But as the familiar bumper sticker declares, "If you think education is expensive, try ignorance."

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2017 Treasure Hunts!

The season is beginning for **Citizen's Rare Plant Watch**. Our training is happening on **April 15!** Here are a few of the species we will be looking for throughout spring and summer~

Boechea atrorubens (sicklepod rockcress), found northeast of Mt Hood, is in few recently verified sites in Oregon; we received a request to update its scanty records. This species (under its former name) was the first to be accessioned into the seed bank in 1983, by our dear, late friend Louise Godfrey.



Stay up-to-date with the Seed Bank on our Facebook page!

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CONTACT US

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Laboratory Manager, Kris Freitag



Partial to, even dependent on the spray from waterfalls, *Sullivantia oregana* (Oregon sullivantia) is found almost entirely in the vicinity of the Columbia River Gorge. Needless to say, it is an adventure to get close enough to get a good look at it.



Lovely as all the *Erythroniums*, *Erythronium elegans* (elegant fawn-lily) is strictly limited to the Coast Range of Oregon and is found primarily in six sites, although it lives in a variety of habitats.



Chloropyron maritimum ssp. *palustre*, called saltmarsh bird's-beak, is limited to saltmarshes along the west coast, and thus is highly vulnerable to development and disruption by invasive species. We will be again trying to find it in historical sites this year.



We will again be seeking *Eucephalus gormanii* (Gorman's aster); this time at

kfreitag@pdx.edu
(503) 725-2468

Location:
SRTC Room B1-81
1719 SW 10th Ave
Portland, Oregon 97201

Mailing address:
Rae Selling Berry Seed Bank &
Plant Conservation Program
PO Box 751-ESM
Portland, OR 97207-0751

Fax:
(503) 725-9040



the request of the BLM. This ridgetop denizen takes some effort to discover and cannot often be a priority for government botanists. That's where our wonderful volunteers come in!

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A Database More Interesting Than You Might Imagine

Ed Guerrant



State listed species, Botrychium pumicola, pumice moonwort

The Seed Bank has reached a major milestone on a journey that began years ago at the Berry Botanic Garden. Our custom relational database, which has been in development for five years, is now up and undergoing testing (volunteers welcome!).

We have amassed a tremendous amount of information about our seed collections and associated activities since the Berry Botanic Garden Seed Bank for Rare and Endangered Plants of the Pacific Northwest was established in 1983. Many years ago we had an "off the shelf" database for botanical gardens in general, but it didn't serve our seed bank needs, so we moved the information to a series of Excel spreadsheets. Although we can find and assemble any information we need, to do so with spreadsheets is time consuming and

not particularly flexible. When we moved to PSU in 2011, we began in earnest to develop a database that would serve our needs. As of 2016, we had well over ten million wild collected seeds, in almost 24,000 separate accessions, from over 2,400 separate collections. And those numbers do not include many collections of garden grown seed from wild collected stock. In addition to the basics: what species, where, when and how many were collected, there is also a tremendous amount of supporting information, including weights and germination test results.

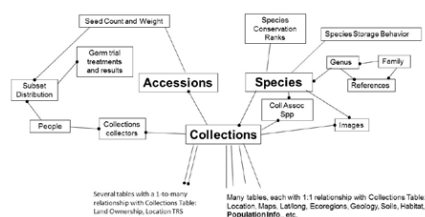
When we began this effort, I was clear about what I wanted the database to do--I wanted to be able to ask a wide variety of questions and to efficiently select the appropriate subsets of information to address those questions. I also wanted to use it as a tool to plan future collections. Working with an excellent

programmer from Chicago, well versed in botanical issues, we have developed a powerful tool for querying and evaluating our current collections, as well as for strategic planning. This dual role is a step beyond any other seed bank database of which I am aware.



Collecting *Lomatium* seeds

Perhaps my first big insight in working with the programmer led to moving the "center of gravity" of how information is organized from accessions to collections (see figure). This may seem subtle, but it turned out to be an essential step forward. But first, what are accessions and collections, and how do they relate to each other? In the early years of the seed bank, accessions and collections were effectively the same thing: we gathered seeds from many plants of a species at a particular site on a particular day, and combined them into a single bulk collection, which received a unique accession number. In the early 1990s, we began keeping the seeds from each maternal plant separate, ending up with many small samples of a species at a particular site on a particular day; thus a single collection comprised many accessions.



Structure of Seed Bank database

Let me briefly explain how a relational database differs from a spreadsheet, which may contain the same information. Once we determined what we wanted the database to do for us, we needed to break down the information we had into a series of "tables," each of which contains a single type of information. For example, a list of species is an example of a table. Each row in this table represents a particular species (or subspecies). Each row has a unique

identifier (we use numbers) to which other tables--such as a list of accessions or of collections--can link. The relationships of the various tables to one another are assigned; our database uses the relationships 'one-to-one,' and 'one-to-many.' For example, the species table and collections table bear a one-to-many relationship, such that one species may be found in many different collections, but each collection will be of only one species. In this way we need only enter the basic species data once. With its unique identifier we then can attach all that information to many different collections. An example of a one-to-one relationship between tables is between the "Collections" and the "Population Information" tables: each collection is from a single population, which has associated information about the population that refers only to a single collection.

One recurring challenge to maintaining records is that species names change, including genus and family names. We structured the database such that when a name changes, we simply add the new accepted name, connecting it to the old name. After that, if we search for either name, it finds all instances in the database and lets us know which the

accepted name is. Much of the surge in name changing is due to the great strides in recent decades in our understanding of evolutionary relationships, often informed by genetics. For example, the fairly common western Labrador tea, *Ledum glandulosum*, was found to be evolutionarily embedded in the middle of the *Rhododendron* family tree, thus some prefer to name it *Rhododendron columbianum*. Another big change has to do with the widespread north temperate genus *Aster*, of which we used to have many species. Now, from an evolutionary point of view, it has been broken up into many genera. None of Oregon's are recognized as being "true" asters, and what we always thought of as asters are now distributed among *Eucephalus*, *Seriocarpus* and *Symphyotrichum*. The plants haven't changed, but the names now better reflect our understanding of their evolutionary relationships.



Rhododendron columbianum.
(Image: W. Carl Taylor, hosted by the
USDA-NRCS PLANTS Database/USDA
NRCS, 1992. Western wetland flora:
Field office guide to plant species.)



Eucephalus vialis seeds

In order to be able to use the database as a planning tool, we are entering the conservation status or rank of all rare and endangered in the Pacific Northwest. In this way, we will be able to ask questions like, "How many State Listed Threatened species are there in Oregon or Washington, and of those, how many collections do we have, how large are they, and how old?"

Finally, the seed bank database was constructed using a language that will facilitate its use with GIS, or computer

mapping. In combination with population level data maintained by the State Heritage programs, we will be able to comprehensively compare what we have with what is out there, and so strategically plan future collections. Overall, the database represents a quantum leap in our ability to understand and use the enormous amount of information we have about our collections. I will end as I began: there is a lot of work left to do, and volunteers interested in assisting us are welcome.

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Berry Volunteers Connect

Volunteer **Krista Brenholt** just jumped right in to help process seeds, recently, explaining: "I decided to start volunteering at the seed bank because I feel passionately about conservation efforts and sustainability. I've seen



Volunteer Krista Brenholt

the problems that climate change is going to cause in the future, and is causing right now, and I wanted to make a difference. The seed bank is an important way to protect our future in the face of dramatic climate shifts, and I'm honored to be able to do my part. I am a biology major with a minor in space and planetary sciences. In the future I intend to work on the preservation of our natural environment."

A researcher and instructor at PSU, **Meenakshi Rao** has plenty on her plate, but is very generously making her GIS expertise available to us. Her interests dwell firmly in data analysis and visualization, which lends itself well to our database and mapping needs. We greatly appreciate her ability to wrangle numbers so skillfully.



Volunteer Meenakshi Rao

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Making a Difference - Private Support

A special thanks to all who donated in response to our 2016 Annual Appeal:

Rachel Witmer, Jerry & Stephany Anderson, Katherine & Roger Lintault, Audrey Moser, Cheryl McCaffrey, Carol Putnam, Corinne Gentner, David & Kay Pollack, Janet Dorow, Lisa Blackburn, Courtney & Anthony Vengarick, Yvonne Hajda, Virginia Morthland, Joan Horstkotte, Barbara Manildi, David Mull, Dean Runyan & Liz Evans, Patricia Schleuning, Jim Sjulín & Gay Greger, Janet & Stephen Webster, Elizabeth J. Lilley, Paul Slichter, Lorali Reynolds, Raj Sarda, Martin Skinner, Elisabeth Dally, Patricia Stenaros, Burton Lazar, Gilbert & Laurie Meigs, Candy Puterbaugh, Andrew Rice & Katherine Jeffcott, Marna Tallman, Elisabeth Farwell, Keith Karoly, Wendy Lee, Byron E. Lippert, Jean & Ralph Quinsey, Diane & James Waggoner, Kenneth Jay Walters, Sylvia Giustina, John Bondurant, Janice Dodd, Margot Thompson, Susan & John Schilke.

Private gifts and grants make all the difference in the life of our program. You can go directly to our [giving page](#), or for more information on ways to make a gift, please contact Kathleen Hampton, Major Gifts Officer, at (503) 725-3526 or hamptonk@psuf.org.

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Upcoming Events

Citizen's Rare Plant Watch Volunteer Training

Saturday, April 15, 2017
9:30 a.m. - 4:30 p.m.



Erigeron howellii, *Howell's fleabane* (Image: Ron Klump)

Tualatin River National Wildlife Refuge,
19255 SW Pacific Hwy, Sherwood, OR 97140
Free! Please RSVP, 503-725-2468

Join us in monitoring rare plant populations in Oregon! Citizen's Rare Plant Watch sites are within 2-3 hours drive of Portland, in a variety of habitats. Small groups will be led by an experienced leader, but we will have much to teach each other. We strongly recommend this training session. If you wish to take on independent assignments, training is

required.

[More details>>](#)

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Soil School

Saturday, April 8, 2017
8:00 a.m. - 4:00 p.m.
PCC Rock Creek Event Center
17705 NW Springville Road, Portland
\$30

Got Dirt? Then join us at Soil School! It will be a day packed full of information for small farmers, landscapers, gardeners, grounds managers and anyone else who wants to improve the health of their soil.

Why is soil important? The health of your soil determines the health of everything that grows in it--the food you eat, the products you sell, and the natural world that is sustained by it.



Humus is essential! (Image: Edafologia2.0)

[For more details and to register>>](#)

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Sandy River Delta Eco-Blitz

Saturday, April 22, 2017
9:30 a.m. - 3:00 p.m.
Sandy River Delta, Crown Pt Hwy, Troutdale
Free and open to the public

This eco-blitz is part of a region wide, on-going effort to find and collect data on the Portland-



Garden spider and milkweed

Vancouver metro area's wildlife, sponsored by the **Intertwine Alliance**. The **Sandy River Basin Watershed Council** hosts this event. It is free, open to all ages, and no experience is necessary. Community members will be paired with identification specialists who will lead them on an outing to observe species of interest.

[For more details and to register \(by April 15\)>>](#)

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Native Plant Appreciation Week



Balsamroot and others in the Gorge

April 22 through April 29
Portland Metro area and beyond

Eight days of dedicated Oregon native plant education and awareness! Oregonians enjoy an amazing diversity of native plants; they help connect us to this land, deeply rooted in Oregon soils since before humans set foot here.

Hosted by the **Portland Chapter of the Native Plant Society of Oregon (NPSO)**, NPAW has been celebrated across Oregon for over a decade. NPSO, an all-volunteer, non-profit organization, protects and conserves threatened and endangered plant species, carries out rare plant

surveys and monitoring programs, develops guidelines and policy regarding native plant gardening, ethics, grazing, mining, and forest management, and works on plant salvage and reintroduction.

Highlights of NPAW week include:

- April 22: Native Plant Keying Workshop (class and field trip)
- April 23: Giant Trees of Lost Creek Hike
- April 24: **Rae Selling Berry Seed Bank Open House**
- April 27: Native Plants and Pollinators of Mt. Hood
- April 28: Oregon's Flora: A Musical Exploration
- April 29: Conboy Lake National Wildlife Refuge

[More details>>](#)

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Native Plant Sales Around Portland



Douglas aster,
Symphyotrichum subspicatum

- April 7 & 8: **Backyard Habitat Program**, 9am-4:30pm, Echo Valley Nursery, 18883 S. Ferguson Road Oregon City, OR 97045
- April 8: **Leach Botanical Garden**, 9:30am-2pm, Floyd Light Middle School, 10800 SE Washington St
- April 14 & 15: **Skyline Grange**, 9am-5pm, 14416 NW Skyline Blvd, Portland, OR 97231. **Pre-order by April 8**
- April 29: **Jackson Bottom Wetlands Preserve**, 9am-3pm, 2600 SW Hillsboro Highway

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The Wide World of Seed Banking

Saving seeds for future use is as old as human civilization and as timely as today's headlines. Our focus has been on rare and endangered species, but the world of seed banking is far more expansive. It probably began with storing seed for next year's crop, and agricultural plants are likely still the most common focus of seed banks around the world. But recent decades have seen an explosion of seed banking of a much wider array of plants for many different purposes. In this section, we seek to provide a glimpse of the wide and wonderful world of seed banks.

In Our Country: Portland State University Seed Library

Not seed banks, per se, seed libraries are increasing in popularity. The Student Sustainability Center operates this library, where students, faculty and staff can check out free seeds to plant and grow.



PSU Seed Library

The inventory includes 350 different varieties of beans, peas, melons, pumpkins, lettuces, tomatoes, beets, flowers, herbs, medicinals, teas, and so much more.

[Continue reading at the PSU Seed Library site>>](#)

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In the World: Threatened Flora Seed Centre

Part of the Australian Seed Bank Partnership, the Threatened Flora Seed Centre is Western Australia's principal seed banking facility for rare, threatened and poorly known native plant species.



West Australian native, Lechenaultia sp.

The seed centre aims to store sufficient genetic resources from each threatened species to ensure its successful reintroduction and establishment in the wild if extinction occurs. Its activities underpin many of the department's plant recovery programs.

[Continue reading at the Threatened Flora Seed Centre site>>](#)

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Stay informed on upcoming events and news by regularly visiting the [Rae Selling Berry Seed Bank web site](#).

This e-newsletter is a publication of the Rae Selling Berry Seed Bank & Plant Conservation Program at Portland State University