RAE SELLING BERRY SEED BANK & PLANT CONSERVATION PROGRAM

Portland State UNIVERSITY

Spring 2013 Newsletter

From the Director

Dr. Guerrant with Dr. Peter Raven in August

Once again, winter has given way to spring, new leaves and flowers abound, and the never ending work of conserving Oregon's native plants for future generations continues. Conservation is a community effort, and in this issue we give a nod to our place in the larger community and recognize a few of our volunteers and those who generously contributed to a very successful year-end appeal.

In the piece immediately below, I explore the question of which species to save. It is based in part on the presentation I gave at the "2012 International Symposium on Collection and Conservation of Plant Genetic Resources" in Taiwan (see Fall 2012 newsletter). Until recently, our collection focused almost exclusively on rare and endangered plants. But with the specter of global climate change looming ever larger, we have been taking stock of where we are, and thinking about how best to proceed from here. Beginning in 2012, we began to collect common species as well as rare ones, which begs the question of how we choose which species to save.

I have been fortunate to give talks at and participate in two important meetings this year. The first was a Seeds of Success (SOS) meeting that included potential partners of the program, as SOS is forming new partnerships for the first time since it began in 2001. New seed banks for common species are being formed in New York, for the mid-Atlantic region, and in California. We have collected seeds of common species for SOS since 2006, but until last year did not keep any ourselves. The other meeting was the annual meeting of the Center for Plant Conservation, which was hosted by the Lady Bird Johnson Wildflower Center in Austin, Texas. In addition to catching up with what our sister CPC Participating Institutions have been doing, I enjoyed excellent evening talks by two of my academic and conservation heroes.

Dr. Gary Paul Nabhan spoke about an effort along both sides of the Arizona-Mexico border to enhance the ecological health of that area, in a talk entitled "The Three Legged Stool: Native Plant Conservation, Habitat Restoration and Pollinator Recovery." Similar to the decades long efforts by Ducks Unlimited and other groups to establish the chains of wildlife reserves that help migratory wildfowl and other birds survive their annual journeys, Nabhan is working with others to protect and establish an archipelago of suitable habitat islands to support migratory and other insect pollinators in an increasingly unsuitable landscape. The next night, Dr. Peter Raven outlined the challenges we face and some efforts to ensure our descendants the best possible world in the talk, "Plant

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VOLUNTEERING

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Please call Kris at (503) 725-2468 or email kfreitag@pdx.edu if you would like to support our program.

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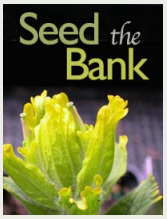

Stay up-to-date with the Seed Bank on our Facebook page!

IN THIS ISSUE

Conservation in a Rapidly Changing World," which was simultaneously bleak and uplifting.

Finally, volunteers, as always, are a vital part of our ability to do this work. In this newsletter we again recognize some of the wonderful and generous people who donate their time to our common effort of conserving Oregon's flora for future generations. Thank you all.

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Which Species to Save?

Ed Guerrant

Weighing the alternatives (Image: Anthony B.)

"Say you have an ark. Which species do you save? ...Will you pick the rarest, the largest, or the smallest? The strongest or the weakest? The most beautiful...or just the tastiest?" So begins the article *Conservation Triage: Which species do you save?*, on a topic of critical interest not just to those of us at seed banks, but to all humanity, and especially our descendants.

Beginning in 1983 with the Berry Botanic Garden Seed Bank for Rare and Endangered Plants of the Pacific Northwest, and now here at the Rae Selling Berry Seed Bank, our focus has been primarily on the rarest. We were not alone in this approach. The Center for Plant Conservation, of which we are a founding member, is a pioneer in the field of ex situ plant conservation, and its focus is squarely on the rarest of the rare. Seed banking can and has made the difference between extinction and survival, at least in the near term. For example, we provided seeds for reintroduction of the endangered *Stephanomeria malheurensis*, known only from a single site in eastern Oregon, after it went extinct in the wild.

Our move to Portland State University provided an excellent opportunity to re-evaluate what we do and how we do it. Concentrating our efforts on the rarest made good sense when we began, given the primary threats of habitat destruction, with the resulting isolation of populations from one another across the landscape, and competition from invasive species. Although those threats are still with us in spades, it has become clear that the potentially devastating effects on biodiversity of global climate change are beginning to be realized. Seed banks are one concrete way we can help ensure the survival of species that otherwise would be lost.

We can't store enough of each species, with genetic and ecologically representative samples across their entire ranges. There really is no alternative; we must choose. And the choices are difficult across the full range of abundance: at what point is something either so rare that it cannot be saved, or so common that it is for all intents and purposes invulnerable? Is it more important to save 'ecologically important' species, or to ensure the most representative coverage of the evolutionary tree of life? Which

OTHER LINKS

Conservation Triage: Which species do you save?

Institute for Applied Ecology: Adventures in Conservation Research

The rare non-sucky infographic on climate change

Remaining Unnoticed for 100 Years, a Kyrgyz Onion Species Strikes With Its Beauty

Rare Discovery of Plant Genus

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Western larch, Larix occidentalis, *important in Northwest (Image: USFS)*

species do we save?

I recall a particularly contentious discussion at the CPC symposium that led to the book *Restoring Diversity: Strategies for Reintroduction of Endangered Plants*. The basic question we were wrestling with was: should we abandon those species that are so far gone they constitute what some call 'the walking dead'? In order to better use our limited resources on species that we have more reason to think we might be able to restore, should we abandon species that are down to their last few individuals? In Hawaii, a large number of plant species are known from 50 or fewer individuals, some down to a single individual. Hawaii's Plant Extinction Prevention Program (PEP) listed 213 PEP species in 2012, meaning they had 50 or fewer individuals. In that discussion, it appeared that those advocating a tough love triage approach opted to let the rarest of the rare go extinct in peace. But someone then said, if we're going to write off some, why not turn them over to local amateurs, giving them free reign to do what they might? At that point, the discussion shifted toward a general consensus not to write off any species, no matter how rare.

Superb cyanea, Cyanea superba, *extirpated and reintroduced (Image: US Army)*

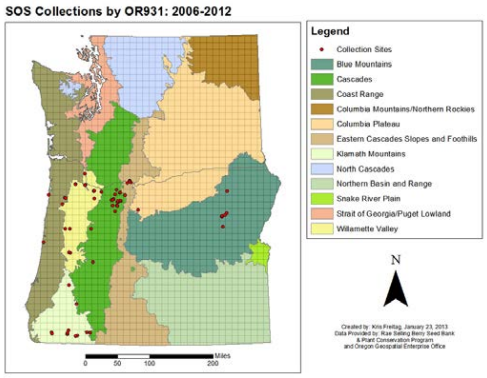
In the early 2000s I was fortunate to have had a chance to see the last surviving individual in the wild of the magnificent *Cyanea superba*, a plant now extinct in the wild. Fortunately, seeds and fruits had been collected, and there are now several reintroduced populations numbering in the several hundreds of individuals.

At the other end of the spectrum are seemingly invulnerable, widespread, competitively dominant species. But these, too, might not be as secure as we'd like to believe. The concept of 'extinction debt' was first offered in the mid-1990s, and seems to have survived a number of challenges. This theory holds that in a permanently fragmented world, where patches of suitable habitat are isolated from one another, it is precisely those widespread competitively dominant species that are most at risk of randomly winking out in individual patches over a 50- to 400-year time frame. This counterintuitive outcome is based in part on the notion that the best competitors are often poor dispersers, so cannot re-colonize patches where a species has become extirpated.

So, where does this leave us? Prioritizing species for collection is, not surprisingly, something we have thought about long and hard. There is, of course, no single right answer--other than, perhaps, "it depends." The choice of which species to collect depends

primarily on our purposes, and the nature and extent of what it is we are trying conserve, or in other words, the sampling universe: which species, where do they occur, and how abundant are they? Available funding and resources always factor in as well.

Given the potential vulnerability of even common, competitively dominant species in a world where suitable habitat is permanently fragmented, AND in which, because of global climate change, we cannot assume that currently suitable habitat will remain so, we need to respond appropriately. As I mentioned in the Fall 2012 newsletter, we are in the early phases of establishing an Oregon Ecoregions Seedbank, which will focus on more common species. Our purposes are to provide 'extinction insurance' and also to provide material for large scale ecological restoration efforts. Our sampling universe is the seed plants of Oregon's ecoregions. We are not alone in this desire. In February I attended a meeting of the Seeds of Success program at the North Carolina Botanical Garden. Just as our work with rare plants of the Northwest with the Center for Plant Conservation is part of a larger, national, effort, we hope to have our regional seed bank for common species be part of a similar effort of independent regional organizations.



Seed Bank collections for SOS

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Seeds In-situ and Ex-situ

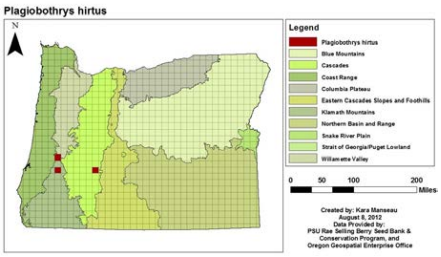
The picture is becoming clearer! More and more we can represent imperiled plants in their geographical context, as well as enabling you to see what we see when we extract seeds for storage.

(Image: USFWS)

Rough popcornflower, *Plagiobothrys hirtus*, is a charming plant of marshy areas. It blooms in late spring, finishing seed-set by high summer, as pools dry up.

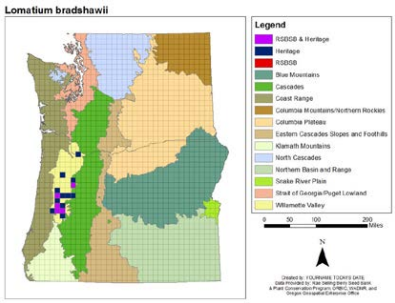
Designated "Endangered" federally and in Oregon, *P. hirtus* is restricted to Douglas County. Invasive plants, agriculture and development threaten its narrow range. Only about a dozen populations are known to exist. The map shows one site further to

the east, which is nonexistent, the result of a one digit error. This illustrates another important goal of the mapping project--to discover errors in the data.



P. hirtus seeds are typically ornately textured "nutlets," an appropriate name. The tough coats serve them well in their variable habitat, as well as in storage.

A member of the parsley family, Bradshaw's lomatium, *Lomatium bradshawii*, is a feathery-leaved perennial. It has a taproot, allowing it to ride out the valley summers and survive the once-common summer fires, which provided so many benefits to prairie plant communities.



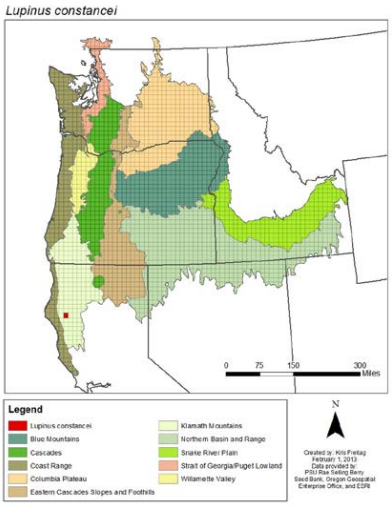
L. bradshawii grows in similar seasonally wet areas, most populations within 10 miles of Eugene, Oregon. Its preferred grassland habitats are facing the usual threats.

L. bradshawii does not produce seed as copiously as many of its relatives, but they are held up high and are persistent and easy to harvest.

(Image: Sydney Carothers)

Lupinus constancei, Lassics lupine, is named for the tiny Lassics Range that is its only home. It is one of the species that thrives on serpentine soils. Silky hairs produce the 'silver' effect and provide protection from the strong sunshine of its rocky habitat.

L. constancei has dwindled to fewer than 400 reproductive individuals in its narrow range in the Northern California coastal mountains.



L. constancei has the typical tough-coated, 'painted' seed of many legumes, like the cultivated pinto bean. Small mammals enjoy the seeds, contributing to extinction pressure on the species.

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Berry volunteers connect

Volunteer Elizabeth Stanek

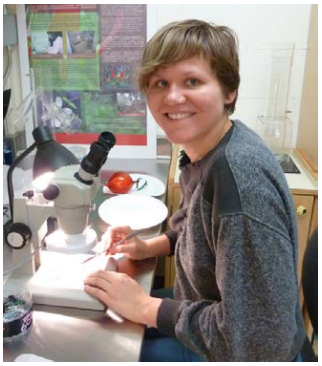
Elizabeth Stanek volunteered with the seed bank at The Berry Botanic Garden for many years. She drives in from Mosier in the Gorge when she can (and when weather permits!) She has a home with her husband outside Mosier, where she has been able to focus on her longstanding interest in native plants. Under Ed Guerrant's encouragement she began to keep records on the phenology of the flowering plants in the varied habitats of their 40 acres. This is the sixth season for this activity and she finds that each year her knowledge of the plant/weather relationships increases. She hikes

and learns with the Native Plant Society of Oregon. She has also been working with Rare Care in Washington for the past few years to monitor endangered plants on the Washington State side of the river, and intends to participate as well in the fledgling Rare Care program in Oregon. In addition she monitors water quality on the Columbia for Columbia Riverkeeper. "In these ways I attempt to help provide data and participate in conversations about the state of our natural world. Although the effects of climate change will inevitably impact our world, education and understanding, as well as political action can exert some influence on the pace and course of events."

Volunteer Liz Dally

Volunteer **Liz Dally** was a member of The Berry Botanic Garden for years. When the seed bank moved to PSU, she found the downtown location was convenient to visit once a week to help out in the lab. As a co-owner and technician at Hawthorne Auto Clinic, she has found herself involved in the green transportation movement. Recently her shop has been recruited to be the Portland warranty station for the Th!nk City, a fully equipped, two passenger electric car with a range of up to 100 miles, and they have eagerly delved into electric car repair technology. She frequently takes the opportunity to discuss transportation options with customers, including how to select the most efficient car for their needs, and whether using public transportation, car sharing, or biking might be appropriate for some of their trips. Even though electric cars require less maintenance and repair than gasoline powered autos, she is really excited about their benefits. "I just hope I'm in the business long enough to see a self-driving car roll into the shop!"

Lindsey Riibe joined us near the end of last year. Growing up in Seattle in the 80s and 90s, much of her experience out of doors was already blighted by habitat and species loss. It was not until the return of the bald eagle to the Seattle area that she realized the critical impact humans have on the environment--both positive and negative. Her love of plants and botany grew into an interest and investment in conservation. Realizing that we can have a positive effect on species survival is ultimately what inspires her to volunteer at the Rae Selling Berry Seed Bank. She also volunteers at Metro's Native Plant Center, helping to restore vital habitat through the propagation of native plants. "By volunteering at both the Native Plant Center and the Seed Bank, I get to be part of both ex-situ and in-situ conservation efforts which, like the return of the Bald Eagle, strive to be a positive impact on the environment."



Volunteer Lindsey Riibe

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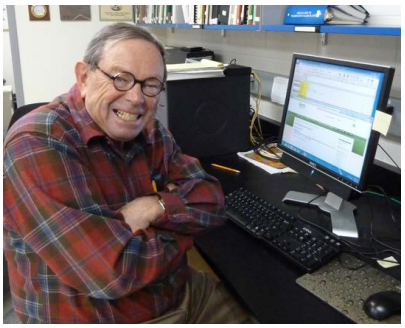
Making a Difference - Private Support

Thank you to our supporters for over $7,000 in response to our end-of-year annual appeal!

Thank you as well to Gilbert and Laurie Meigs, the founders of a conservation education endowment, for a generous year-end gift to the fund.



Volunteer and donor Gilbert Meigs

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 Paul Mortimer, Assistant Dean for External Relations in the College of Liberal Arts & Sciences, at 503-725-9894 or pmortimer@pdx.edu.

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Upcoming Events

Community Involvement PEG Meeting

(Image: USGS)

Deb Meihoff, facilitator
Thursday, April 18, 6:00 - 8:00 p.m.
City Hall, 1221 SW 4th Ave, Portland
in the Pettygrove Conference Room
The general public is invited to attend.

Monthly meeting of the Community Involvement Policy Expert Group for the Comprehensive Plan Update.

More details>>

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Thin Ice: The Inside Story of Climate Science

Global screening of a new documentary for Earth Day, followed by a moderated discussion
Monday, April 22, 5:00 - 7:30 p.m.
Portland State University, Shattuck Hall Annex (Corner of SW Broadway and SW Hall)
Free and open to the public

Please join us on Earth Day for a free screening of the new documentary film *Thin Ice: The Inside Story of Climate Science*. The screening at PSU will take place simultaneously with other screenings around the country and across the globe, prompting discussions about climate change, climate science, and potential strategies and solutions for a quickly changing world. Screening will be followed by a moderated discussion with some of PSU's own climate science experts: Randy Bluffstone, professor of economics and sustainable land use expert; Robert Scheller, assistant professor environmental science and management and director of the Dynamic Ecosystems and Landscapes Lab; and Andrew

Fountain, professor of geography and geology and glacier expert.

More details>>

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Portland Urban Meadowscaping Pilot

Mary Logalbo, West Multnomah Soil & Water Conservation District, Urban Conservationist
Friday, June 7 - 12:15 - 1:00 p.m.
Metro, Room 370 A/B, 600 NE Grand Ave, Portland, OR
Free and open to the public

(Image: KVDP)

Portland Urban Meadowscaping Pilot (PUMP) is a collaborative effort to develop lawn replacement recommendations to increase storm water infiltration and wildlife habitat in Portland's urban landscape. As homeowners become more aware of the environmental impacts of their landscape choices, naturescaping programs are receiving more requests for lawn replacement options. Although common, lawns provide little benefit to storm water infiltration, water quality, or wildlife habitat and require polluting inputs such as fertilizers and mowing. The goal of PUMP is to provide public education, technical support and assistance with the planning, planting and monitoring of meadowscapes on residential landscapes and in public parks to increase wildlife habitat and stormwater infiltration in the urban realm.

PUMP consists of an advisory committee with representatives from West Multnomah Soil & Water Conservation District, City Nature Division of Portland Parks & Recreation, Columbia Land Trust/Backyard Habitat Certification Program (BYHCP) and Xerces Society. Partners bring a diverse background including storm water management, horticulture, native landscaping and entomology. The Portland Urban Meadowscaping Pilot includes data from 6 BYHCP participants and 2 Portland parks. Each participant has agreed to annual monitoring of their site for the next 5 years. Continuing analysis of the monitoring data will be used to determine best management practices for installing and maintaining urban meadows. In addition to answering practical questions PUMP aims to cause a paradigm shift in what people think of as a beautiful “lawn”. A Regional Stakeholders Report on Pollinator Conservation in the Portland Metro Area recently highlighted the need for PUMP.

More details>>

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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, often in their own words.

In Our Region: San Diego Zoo Seed Bank

San Diego County is a recognized biodiversity hotspot with an incredibly diverse native flora. This diversity is under constant threat from habitat loss and fragmentation, particularly from intensive coastal development. Without concerted conservation efforts, many native plant species will decline or disappear within our lifetime, with subsequent impact on plant communities and the native animals that depend on them. Seed banks can provide vital insurance against species extinction or local extirpation by conserving plant germplasm for research and restoration. Stored seed resources can buffer native populations against natural catastrophes such as wildfires and protect against the erosion of genetic diversity by land development and habitat fragmentation.

Continue reading at the San Diego Zoo site>>

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In Our Country: Lady Bird Johnson Wildflower Center

Pressures on the environment are so great in many areas that it is not always possible to conserve plants in their natural habitats. While we cannot always guarantee the safety of a plant in even the best-protected nature reserve, plant seeds can be kept safely for hundreds of years in a seed bank. Should a plant become extinct in the wild, with its seeds stored in a seed bank, it will not be lost forever. Seed banks are also very efficient and cost-effective means of conserving plants, because the seed occupies very little space and requires only periodic attention.

The seed collection program is built primarily on the cooperation of private landowners and the hard work of more than 100 trained volunteers. Volunteers in the field who can watch and monitor the plants make it possible for the project to collect in more places at once. Many landowners get excited about the project and become seed collectors themselves. Another key part of the project is outreach and education, which emphasizes the importance of a diverse native plant population. Native plants play critical roles in the ecosystem, providing wildlife habitat, contributing to water quality, flood management and soil stability.

Continue reading at the Lady Bird Johnson Wildflower Center Seed Bank site>>

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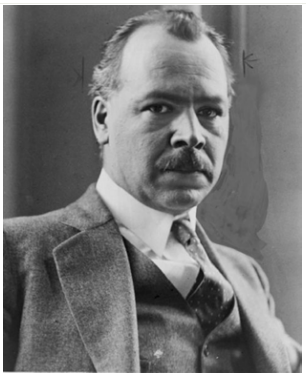
In the World: N. I. Vavilov Research Institute of Plant Industry

The N.I. Vavilov Research Institute of Plant Industry in St. Petersburg, Russia, is the world's first modern seed bank and one of the world's largest collections of plant genetic material. The Institute originated as the Bureau of Applied Botany in



1894. Nikolai I. Vavilov, a Russian biologist, botanist and geneticist, was appointed director. The Institute's seed collections were largely built by Vavilov who explored five continents in the 1920s and 1930s for wild and cultivated forms of agricultural crops. By the 1930s, the Institute was a central national institution involved in collection and evaluation of plant genetic material. The Institute became the world's largest crop research institute under Vavilov's leadership.

Continue reading at the N. I. Vavilov Research Institute 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

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