

Douglasia



VOLUME 41, NO. 2 Summer 2017

Journal of the
WASHINGTON NATIVE PLANT SOCIETY

To promote the appreciation and
conservation of Washington's native plants
and their habitats through study, education,
and advocacy.



About This Issue

by Mary Johnson

I recently came across a term that was new to me: plant blindness. Plant blindness, as defined in 1998 by botanists James Wandersee and Elizabeth Schussler is “the inability to see or notice the plants in one’s own environment, leading to the inability to recognize the importance of plants in the biosphere and in human affairs.” While scientists offer no easy answers as to what causes plant blindness, the end result is the same: humans tend to tune out plants.

How do we improve our vision when it comes to plants? One way the WNPS does this is through its grant program, which helps to promote the appreciation and conservation of Washington’s native plants and their habitat. You can read reports from two grant recipients in this issue. These grants enabled the design and creation of the Nooksack Salmon Enhancement native plant habitat garden in Bellingham and the renovation of the Kruckeberg Botanic Garden serpentine bed in Seattle.

You’ll also want to read Tom Kaye’s article on how *in situ* conservation and reintroduction can work together to support rare plant populations. David Giblin’s article on the Columbia lily (*Lilium columbianum*) offers interesting facts about Washington’s only native lily and reveals where we can see these striking plants in the wild. His article on wildflower hikes takes us to two destinations where wildflowers are expected to be especially abundant this year—a great way to improve your native plant ID skills. Jenifer Parson’s article on freshwater native plants offers an intriguing glimpse into some of the often-overlooked native plants that live in our freshwater lakes. And to gain a historical perspective of rare plant conservation in Washington and the Endangered Species Act, be sure to read Ted Thomas’s article.

These articles and more in this issue deepen our understanding of the important role plants play in our lives and on this planet and encourage us to get outdoors—whether on a hike or in a garden—to explore Washington’s diverse flora. It’s just what the doctor ordered to sharpen our gaze.



On the cover:

Pacific mosquito-fern (*Azolla filiculoides*), showing a striking reddish-tinge in early spring, growing with turion duckweed (*Lemna turionifera*) and algae in a small slough near the mouth of the Skagit River in the Skagit Wildlife Area, Skagit County, Washington.

PHOTO: BEN LEGLER

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* WNPS Fellow is the highest honor given to a member by our society. This title is given to those who have made outstanding contributions to the understanding and/or preservation of Washington’s flora, or to the success of WNPS.

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President's Message: The View from Here

Who is WNPS?

Clay Antieau

Dear Fellow WNPS Members,

In a previous president's message I wrote about the mystery that permeates the membership of an organization such as ours. Even from a leadership position, one encounters only a small sample of members—and actually hears specific suggestions or opinions from a small fraction of those. There's an interesting, perpetual tension between managing an organization to meet the needs and desires of its members and developing a realistic sense of their priorities and opinions.

Along those lines, something notable happened recently. You may have missed it, but what's remarkable is how many members of WNPS did not! In early 2017 the WNPS Editorial Board and Communications Committee surveyed WNPS members. This effort was spurred by a stimulating debate about how WNPS should be spending its volunteer and financial

resources to pursue its mission and communicate its messages. The consensus was that more formalized input from members would be essential to these decisions.

The only other time that WNPS members have been surveyed was in early 2002. At that time, WNPS had just completed the term of its first ever five-year strategic plan (1997 to 2001), and the Board of Directors endeavored to evaluate how the organization fared in deploying that plan. They also wanted additional feedback useful for developing a second strategic plan that would provide direction through the next five years. In 2002, 109 members out of an estimated 1,400 responded (about an 8 percent response).

Notice of the 2017 survey opportunity was delivered electronically to at least 2,100 current and former members and nonmember donors. We even snail-mailed notices to those 120 or so current members (out of about 1,700) who don't have, or haven't revealed, email addresses. The survey was obtained through SurveyMonkey; 562 people responded—a stellar response rate of 26 percent.

You can find the survey questions and associated responses at www.wnps.org/about_wnps/administration/records/strategic_plans/communication_survey.html. I'll avoid revealing the surprises and good information that await you there. Why not take a few minutes to explore the responses yourself? For example, note the responses to the questions in the Tell Us About Yourself and Your Connection to WNPS section (demographics). Or judge how connected our members are by reading the responses in the Email and Social Media section.

For me, these surveys are fascinating for their ability to generate highly varied and insightful comments. Reading through the abundant comments is like attending an actual town hall meeting, with folks freely sharing thoughts and suggestions. As might be expected, the range of opinions and suggestions is broad, heartfelt, and illuminating.

I want to personally thank everyone who took the time to respond to the 2017 survey—and to previous president messages. Your responses have been immediately informative and will continue to inform WNPS planning and strategic efforts. Thanks for generously sharing in the future of WNPS!



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Clay and his dog, Kona, at the channeled scablands of Escure Ranch, Whitman County, Washington. PHOTO: NAOMI CHECHOWITZ

The Aquatic Life and Native Plants

by Jenifer Parsons

In my job as an aquatic plant specialist, I spend a lot of time on Washington's beautiful lakes and rivers. Mostly I'm focused on finding invasive nonnative weeds. But I also like to search for native aquatic plants and have come to regard several with particular fondness. The following are a few of my favorites.

Mosquito-fern or water-fern (*Azolla*) are small, free-floating plants that have overlapping pairs of scale-like leaves and a root that dangles down into the water. The taxonomy is confusing, but Evrard and Van Hove (2004) describe two native species: Pacific mosquito-fern (*A. filiculoides*) and Mexican mosquito-fern (*A. mexicana*). Microscopic examination of leaf and spore characteristics is needed to distinguish between the two, which I admit I have rarely tried since I'm always in a hurry to sample as many lakes as possible. Luckily, the one nonnative invasive species, feathered mosquito-fern (*A. pinnata*), has not been found in the Northwest. This plant has a distinctive branching pattern resulting in a triangular outline, like a tiny Christmas tree. The native species have a more disorganized appearance.

Azolla species are ferns, which in itself is interesting since there are few aquatic ferns. Further, these plants have a symbiotic relationship with a cyanobacteria (*Anabaena azollae*), which lives in small cavities at the leaf bases. Cyanobacteria are able to fix atmospheric nitrogen, which they share with the fern. In exchange, they get shelter and mineral nutrients from the plant. This relationship gives *Azolla* a nutritional edge over other plants. Humans take advantage of this by using it as a green fertilizer in rice paddies and as a nutritional supplement in livestock feed. Recently, due to its proclivity for rapid growth and ease of cultivation, *Azolla* has been investigated for its ability to sequester carbon.



Mosquito-fern (*Azolla*) covering a seasonal wetland in western Washington (King County). PHOTO: S. ABELLA

In large lakes *Azolla* is found only in protected marginal areas, but in small, sheltered ponds it can grow profusely, covering the surface at times. It turns red when environmentally stressed and often is red in early spring in Washington, as shown in the photo of a Seattle-area wetland.

Water-shield (*Brasenia schreberi*) has floating leaves attached to rhizomes in the sediment by long, purplish stems. The stems are slightly elastic so that when the water surface becomes wavy, the leaves can bob up and down without breaking off. The leaves are about 6 inches long and purple underneath. They attach to the stem in the center of the leaf, like a shield or umbrella. In summer, small, dark purple flowers bloom above the water surface.

A thick coating of gelatinous slime covers the stems and the underside of leaves, especially on young growth. This dense muci-



Water-shield (*Brasenia schreberi*) leaves and flower found in Twin Lakes, Ferry County. PHOTO: JENIFER PARSONS

lage is secreted by special single-celled glandular hairs within the plant. The slippery surface makes grabbing and holding onto the plant difficult. Research has found that the mucilage has excellent lubricating properties, with potential uses such as coating pills to ease swallowing (Li et al. 2012).

People in Japan and China eat the spring growth of *B. schreberi*, and researchers have examined potential medicinal uses. Waterfowl also eat the plant, and it provides good shelter and habitat for fish and invertebrates. Its allelopathic properties allow it to suppress growth of other plants, as well as green algae and cyanobacteria (Elakovich and Wooten 1987). As such, *B. schreberi* could help protect lakes from becoming green due to abundant algae growth.

Water-naiads (*Najas*) are completely submersed plants. There are two main species in Washington, *N. flexilis* and *N. guadalupensis* (read on for the third). While most aquatic plants are perennials and depend heavily on vegetative propagation, *Najas* are mostly annuals. They have to make seeds and complete pollination underwater.



Water-naiad (*Najas flexilis*). PHOTO: JENIFER PARSONS

Fewer than 5 percent of aquatic plant species are water pollinated and even fewer do so completely underwater (others have pollen that floats on the surface to floating female flowers). *Najas* accomplishes this with abundant precocious pollen that forms tubes upon release. This effectively elongates the pollen, making it easier to encounter the elongate stigmas. *Najas* have separate male and female flowers, but both are present on the same plant (monoecious). There is nothing that prevents self-pollination, so given the proximity of the flowers to one another, a fair bit of self-fertilization is assumed to take place, though water currents and wave action would facilitate cross-pollination (Les 1988).

Recent taxonomic and genetic work has found cryptic sympatric speciation in *Najas*. This means that genetically distinct, nearly identical-looking species have evolved within the same geographic area. In *Najas*, this occurred sometime in the distant past when a *N. guadalupensis* × *N. flexilis* hybrid formed with both sets of chromosomes from both parents, forming a new tetraploid species that could not backcross with either parent (well, it can, but the progeny are triploid and sterile, and since it is an annual plant they die out quickly). This tetraploid is called *N. canadensis*, and it occurs in Washington too (Les et al. 2015). All three of our species are similar looking, and seeds are necessary for positive identification. Though if you have looked at many of them across a wide range, tentative identification to species is a Gestalt kind of thing.

Najas sometimes grow with striking profusion. These supernaiads are a conundrum for lake managers. They appear to be *N. guadalupensis*, which can be perennial because they overwinter even under ice. They rarely seem to make seed, so identification without genetic analysis is back to that Gestalt thing—not

very reassuring when the plant is acting so invasively. This abundant growth occurs in other parts of the country and seems to be on the increase, though genetic analysis indicates these plants aren't a new hybrid or nonnative species. So is it climate change or increasing pollution that is causing the exceptional growth? No one is sure, but that is part of the fun and challenge of aquatic plants. There is so much yet to learn about them.



Algae growing on top of dense water-naiad (*Naja*) growth, McIntosh Lake, south of Olympia, 2009. PHOTO: JENIFER PARSONS

Literature Cited

- Elakovich, S.D., and J.W. Wooten. 1987. An examination of the phytotoxicity of the water shield, *Brasenia schreberi*. *Journal of Chemical Ecology* 13(9): 1935–1940.
- Evrard, C., and C. Van Hove. 2004. Taxonomy of the American *Azolla* species (Azollaceae): A critical review. *Syst. Geogr. Pl.* 74: 301–318.
- Les, D.H., E.L. Peredo, U.M. King, L.K. Benoit, N.P. Tippery, C.J. Ball, and R.K. Shannon. 2015. Through thick and thin: Cryptic sympatric speciation in the submersed genus *Najas* (Hydrocharitaceae). *Molecular Phylogenetics and Evolution*. 82: 15–30.
- Les, D.H. 1988. Breeding systems, population structure, and evolution in hydrophilous angiosperms. *Ann. Missouri Bot. Gard.* 75: 819–835.
- Li, J., Y. Liu, J. Juo, P. Liu, and C. Zhang. 2012. Excellent lubricating behavior of *Brasenia schreberi* mucilage. *Langmuir* 28(20): 7797–7802.

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Working toward the Same Goal: Reintroducing Rare Plants in Support of Wild Population Conservation

by Thomas N. Kaye

Introduction

Biological diversity is facing a global decline. We live in a time that some are calling the Anthropocene (Falkowski et al. 2000, Crutzen and Ramanathan 2000) because of the tremendous alteration of the Earth's atmosphere and surface due to human population growth and its subsequent impacts. These changes to the planet are leading to a catastrophic loss of species diversity so severe that some observers have called the process the sixth great extinction (Kolbert 2014), following the last five major extinction events in the fossil record. Protecting species in the locations and habitats in which they remain is a high priority for conservationists. Creating new populations may also be an important tool for conserving species. With limited financial resources and remnant native plant communities available for species conservation, there is a potential conflict between the two that requires a balanced and well-considered approach.

Conservation of existing wild populations, also called *in situ* conservation, is crucial for several reasons. Wild populations represent a successful ecological fit between a species and its habitat. The individuals in a wild population may be locally adapted to a particular environment and represent, through natural selection, an optimization between the genome of the species and the environmental and biological features of a place. That an otherwise rare species has persisted in a location over time may suggest that it has a reasonable chance of long-term viability at that place, barring any major sudden changes. Wild populations also contain the genetic diversity of species, and in some cases individual populations contain unique genotypes that would be lost if the population were not protected. Such a loss could seriously erode the adaptive potential of the species over the long term.

When rare species are used as the justification for protecting an entire site, such as with some species listed by the US Fish and Wildlife Service as threatened or endangered, their presence can extend protection to additional non-listed species, habitats, and ecosystem functions (the so-called “umbrella effect”). In many ways, *in situ* conservation is the best strategy for long-term species perpetuation and should therefore receive the highest priority for conservation planning, funding, and action. This is typically the case for threatened and endangered species.

Reintroducing rare plants may also be an essential tool that, when combined with protection of wild populations, enhances the potential survival of species beyond what *in situ* conservation alone can accomplish (Falk et al. 1996, Seddon et al. 2007). I argue here that pitting one strategy against the other for scarce conservation dollars and resources is counterproduc-

tive. Instead, the two mechanisms for conserving species can work well together toward the same objective: species persistence. In fact, they may depend on one another for success.

Why reintroduction may be crucial

There are some circumstances in which protection of wild populations alone may not be adequate to meet the conservation objectives for a species (Maschinski and Haskins 2012). One review (Hoekstra et al. 2002) stated that over 70 percent of recovery plans for listed threatened or endangered species called for some form of reintroduction. This is because typically there are inadequate numbers of healthy populations to



Willamette daisy (*Erigeron decumbens*), a federally endangered species endemic to Oregon's Willamette Valley, has declined so much that most of the few remaining populations are small and isolated, and reintroduction may be crucial for its recovery. PHOTO: TOM KAYE

maintain species viability, or those populations that remain are too small to be viable over the long term. Small remnant populations may be vulnerable to extinction due to severe fluctuations in population size and age structure (demographic stochasticity), or they may be genetically depleted and subject to reproductive failure due to genetic drift or inbreeding depression. In these scenarios, one option is to augment (Kaye 2008) populations with additional individuals to increase size and provide both genetic (Willi et al. 2007) and demographic rescue (for example, more seedlings or more reproductive individuals). For example, Willamette daisy (*Erigeron decumbens*) is an endangered species in Oregon's Willamette Valley that suffers from reproductive failure when populations drop below about 20 individuals (Thorpe and Kaye 2011). Population augmentation may be a useful strategy for improving the viability of small populations in this species.

One of the most compelling reasons to conduct reintroductions is to restore a species after local or regional extirpation (that is, a species goes extinct in a portion of its range but persists elsewhere). In the extreme case, there are no wild populations left to protect *in situ*, so reintroduction is the only remaining option, assuming plant materials, like seeds, are still available. Golden paintbrush (*Castilleja levisecta*), a federally threatened species that parasitizes the roots of other plants, has



Golden paintbrush (*Castilleja levisecta*) is a federally threatened hemi-parasitic plant that is undergoing active reintroduction in Washington and Oregon. PHOTO: TOM KAYE

been completely lost from the Oregon portion of its historic range. An active reintroduction program in coordination with conservationists in Washington, where wild populations remain and can provide seeds, is underway to restore the species to its full historical distribution (Dunwiddie and Thomas 2016).

Reintroduction can also improve *in situ* conservation by re-establishing connectivity and population interaction on a landscape scale, especially after widespread habitat fragmentation (Münzbergová et al. 2005, Kaye 2008). Populations of plants that are so far apart (or separated by barriers) that the exchange of genes among individuals (gene flow) is restricted or completely blocked may be at increased risk due to genetic drift, inbreeding depression, and lack of recolonization after population decline or extirpation. When pollinators or dispersal agents cannot move between sites, establishing additional populations as stepping stones between wild sites can restore the ability of populations to interact and can increase their long-term viability. One could even argue that unless practitioners restore connectivity between populations that have become isolated through habitat fragmentation, the de facto management decision is to manage *for* fragmentation and genetic isolation.

Translocation

When a wild population is so vulnerable that its continued presence at a location jeopardizes its survival, movement to a new, safer location may be warranted. Translocation, a specific form of reintroduction, involves moving some or all individuals

from a wild population to a new site or another wild population (see Figure 1 on the next page, left, down-pointing arrow). This has been conducted to mitigate for construction and development projects; some conservationists are highly skeptical of this approach, preferring continued *in situ* conservation instead (for example, Allen 1994). However, there are instances in which a population, even at a wild site, may be in danger of serious losses due to natural processes. For example, in 2003, 38 *E. decumbens* plants and 15 shaggy horkelia (*Horkelia congesta* ssp. *congesta*, a federal species of concern) were successfully translocated from an area in imminent threat of soil loss from headward ditch erosion to a more stable part of the same population (Gisler et al. 2004). Small populations on roadsides may be highly susceptible to catastrophic loss through inappropriate habitat management, such as mowing or herbicide spraying during the growing season, or accidents, such as vehicle crashes, making them candidates for preemptive translocation.

One tangible benefit of reintroductions conducted as experiments is that they can help inform conservation of wild populations. For example, studies aimed at identifying optimal habitat management practices for *E. decumbens* have been hampered (and inconclusive) because the remaining wild populations of this species are so few, isolated, and vulnerable that aggressive experiments are too risky. By establishing reintroduced populations at restoration sites, ecologists have been able to perform replicated experiments with no risks to wild sites and identify habitat management practices (such as prescribed burning and herbicide application to control competing weeds) that can promote recruitment of seedlings and improve management of remnant populations (Giles and Bahm 2015). Reintroduction experiments with Piper's daisy (*Erigeron piperianus*) in the shrub-steppe of south-central Washington have shown that the sexually reproducing populations can be established in appropriate habitat at new sites, and plantings after the last winter freeze have the highest survival (Link and Cruz 2015). Conducting reintroductions as designed experiments (Guerrant and Kaye 2007) can lead to better management practices for wild populations and more successful future reintroductions.

Assisted migration

Climate change in the coming decades may cause suitable habitat for many species to shift across the landscape away from existing populations. Assisted migration is a term coined to describe the human-mediated movement of species to help them track suitable habitat as it moves in response to climate change (McLachlan et al. 2007). This form of species introduction is sometimes controversial but is gaining acceptance as evidence for climate change impacts accumulate (Seddon 2010). In the Pacific Northwest, the need to help some plant species move northward, to higher elevations, to north-facing slopes or more appropriate microsites, may become so acute that this step, which seems drastic by today's standards, will in the future look like common sense.

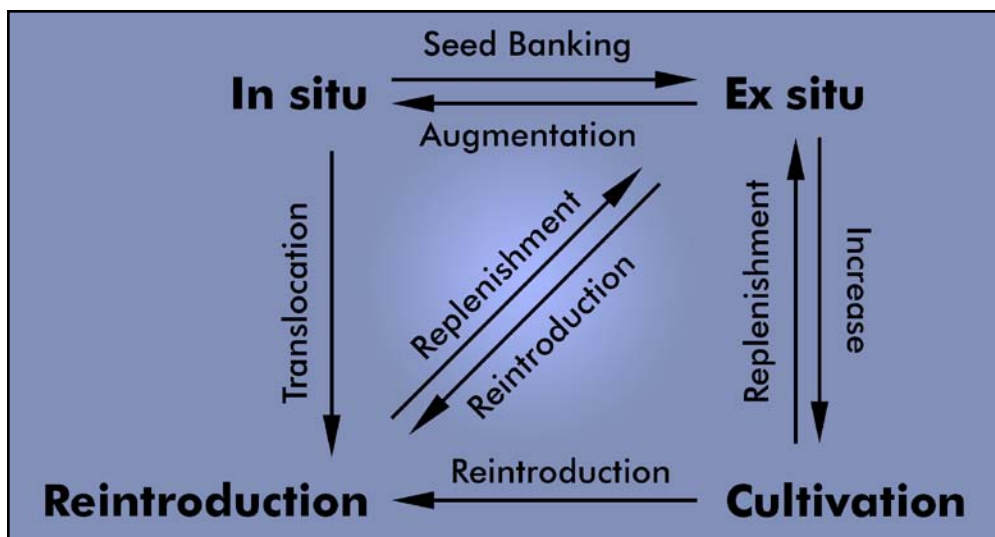


Figure 1. Positive interactions between *in situ* conservation, *ex situ* resources, cultivation, and reintroduced populations.

How *in situ* conservation and reintroduction can work together

Wild populations contain the genetic resources and diversity needed for reintroduction projects. Without *in situ* populations it is difficult or even impossible to conduct reintroductions. And wild populations, in the specific cases outlined above, can benefit from reintroduction efforts. Together, *in situ* and reintroduced populations can provide improved conservation status for many rare plants. One conceptual framework for considering how wild and reintroduced populations can work together is through *ex situ* conservation (seed banks and living collections) and cultivation practices (see Figure 1).

Ex situ conservation programs, in which seeds or living plants are collected from the wild and stored under protected conditions (see Figure 1, top, right-pointing arrow), are typically considered insurance policies—in the event of catastrophic wild losses, genetic material is safeguarded for future conservation efforts. Notable coordinated initiatives for *ex situ* conservation include the Svalbard Global Seed Vault in Norway (mainly for crop plants), the Millennium Seed Bank managed by Kew Gardens in the United Kingdom, and the Seeds of Success program and the Center for Plant Conservation in the United States, a network of seedbanks that focus on maintaining frozen collections of rare plant species.

As diagrammed in Figure 1, plant materials in *ex situ* collections can be used to augment wild populations (top, left-pointing arrow), or go directly to reintroducing populations in the wild (lower diagonal arrow). An intermediate step, moving plants from *ex situ* collections into a cultivation program (right, down-pointing arrow) to increase the available seeds for sowing or grow plants for outplanting at wild sites (bottom, left-pointing arrow), is a common practice in large-scale reintroduction programs. In some cases, no *ex situ* collection is involved, and instead, seeds are collected in the wild and placed directly into a cultivation program (no arrow shown).

When *ex situ* plant materials are used for conservation purposes, they may be seriously depleted. Placing seeds from cultivated plants or reintroduced populations back into *ex situ* collections as a form of replenishment (right, up-pointing arrow) may be needed but requires careful genetic management to avoid domestication selection, loss of diversity, and genetic drift. Volis and Blecher (2010) suggest that growing semi-wild populations of rare plants for seeds and maintaining living plants offers a form of quasi *in situ* conservation. An *inter situ* approach involves nonwild populations maintained in a natural habitat to supply seeds for reintroductions (Husband and Campbell

2004). Further, these arguments suggest that in an integrated conservation program there may be a continuum of rare plant population types from those that are completely wild to those that are in cultivation, with many forms in between. Through careful landscape and genetic planning, wild plant population conservation and reintroduction can work together to support one another in a cohesive process.

What could go wrong?

A reintroduction project carries no guarantee of success. Many factors affect how well plants establish and persist at a given site. If rare plant populations are imperiled due to factors such as invasive species, fire suppression, and development, these issues will need to be addressed at the reintroduction site as well. Sites that appear to be suitable habitat for a rare plant in the eye of a conservationist may fail to support the species for reasons that are not always clear. Soil conditions, moisture availability, and plant community composition may affect plant performance in subtle ways. One way to compensate for the very real likelihood that a reintroduction will fail is to plant many more individuals at many more sites than are needed to meet conservation targets. This approach has been used for *C. levisecta* reintroduction with marked success. Although several reintroduction attempts have failed, a sufficient number to meet conservation targets have succeeded. This strategy relies on the availability of large amounts of seeds or other propagules, which, in some cases, will rely on a strong wild collection and cultivation program.

Plant reintroductions could inappropriately combine different locally adapted forms of a plant species, resulting in outbreeding depression (Montalvo and Ellstrand 2001) or even the mixing of cryptic species—morphologically similar species that are not yet recognized by systematists. For example, a nonlocal genetic type planted adjacent to a wild population could result in cross pollination among well-adapted local plants, poorly adapted non-local genotypes, and offspring from

such crosses that are also poorly adapted to the site. This could ultimately put the wild population at risk. In addition, the seed collection, cultivation, and outplanting processes associated with reintroduction may have unwanted effects on genetic diversity and plant reproduction and survival (fitness) (Basey et al. 2015). But careful planning to minimize these risks has resulted in reintroduced populations that successfully mirror the genetic diversity of wild populations. This is the case with pink sandverbena (*Abronia umbellata* ssp. *breviflora*), a rare species found on beaches and dunes from British Columbia to northern California (McGlaughlin 2002), as well as *C. levisecta* (Basey 2015).

One concern raised about reintroductions of species to currently unoccupied sites is that the rare species could alter the habitat in unpredicted and unwanted ways. “Why disturb one assemblage of plants in an attempt to relocate others?” asked Fahselt (1988). The translocation process could disturb the site significantly as well as add a new and potentially harmful biological interaction, and it may be motivated by a desire to move problematic species out of the way of development projects, thus enabling habitat loss. However, the evidence so far is that moving rare plants to new locations seldom causes significant changes to the biological community. Moving plants to new sites beyond their historic range presents greater threats (Reichard et al. 2012), but even those pale in comparison to the effects of most invasive weeds. Moreover, plants (as opposed to animals) moved over relatively short distances have a very low incidence of becoming invasive (Mueller and Hellman 2008).

Rare plant conservation has a social dimension in that what managers do on the land can be shaped by neighbors and other groups. Neighboring land owners who are concerned about the presence of listed threatened or endangered species near them, or moving onto their properties, may oppose a reintroduction program for fear that it will put their own private property rights at risk (Maschinski et al. 2012a, Kaye et al. 2011). Many do not understand the limited protections provided by the Endangered Species Act for plants (as opposed to animals) on private lands, and these misperceptions can make members of the public uneasy with plant conservation programs. Careful and respectful outreach to the community in which a project is active may be the key to a successful reintroduction program (Parker 2008).

Conclusion

Our wild populations are precious pieces of our natural heritage. With limited resources available for rare plant conservation, too much emphasis on reintroduction could result in inadequate management of wild sites. A conservation program for a rare species that includes a reintroduction component should explicitly balance *in situ* conservation with reintroduction and other actions. Fortunately, guidance and best practices for reintroductions has been developed and made available by the Center for Plant Conservation (Maschinski et al. 2012b) to provide comprehensive support for plant reintroduction

projects. With planning, reintroduction can support the overall conservation of a species, drawing from and supporting wild populations in an integrated program.

Literature Cited

- Allen, W.H. 1994. Reintroduction of endangered plants. *BioScience* 44: 65–68.
- Basey, A. 2015. Genetic changes associated with native plant propagation: Case study in *Castilleja levisecta*. MS Thesis. Northwestern University and the Chicago Botanic Garden, Chicago, IL.
- Basey, A.C., J.B. Fant, and A.T. Kramer. 2015. Producing native plant materials for restoration: 10 rules to collect and maintain genetic diversity. *Native Plants Journal* 16: 37–53.
- Crutzen, P.J., and V. Ramanathan. 2000. The ascent of the atmospheric sciences. *Science* 290: 299–304.
- Dunwiddie, P., and T. Thomas. 2016. Golden paintbrush (*Castilleja levisecta*): The road to recovery of a threatened species. *Douglasia* 40(4): 21–23.
- Fahselt, D. 1988. The dangers of transplantation as a conservation technique. *Natural Areas Journal* 8: 238–243.
- Falk, D.A., C.I. Millar, and M. Olwell. 1996. *Restoring Diversity: Strategies for Reintroduction of Endangered Plants*. Washington, DC: Island Press.
- Falkowski, P.G., R.J. Scholes, E. Boyle, J. Canadell, D. Canfield, J. Elser, N. Gruber, K. Hibbard, P. Hogberg, S. Seitzinger, V. Smetacek, and W. Steffen. 2000. The global carbon cycle: A test of our knowledge of earth as a system. *Science* 290: 219–296.
- Giles, D.E.L., and M. Bahm. 2015. Demography and management of Willamette daisy. *Institute for Applied Ecology*, Corvallis, Oregon.
- Gisler, S., T.N. Kaye, and A. Brandt. 2004. Salvage and transplanting of *Erigeron decumbens* ssp. *decumbens* and *Horkelia congesta* ssp. *congesta* at Speedway. *Institute for Applied Ecology*, Corvallis, Oregon.
- Guerrant, E.O., and T.N. Kaye. 2007. Reintroduction of rare and endangered plants: Common factors, questions and approaches. *Australian Journal of Botany* 55(3): 62–270.
- Hoekstra, J.M., J.A. Clark, W.F. Fagan, and P.D. Boersma. 2002. A comprehensive review of Endangered Species Act Recovery Plans. *Ecological Applications* 12: 630–640.
- Husband, B.C., and L.G. Campbell. 2004. Population responses to novel environments: implications for *ex situ* plant conservation. Pages 231–266 in E.O. Guerrant, K. Havens, and M. Maunder (eds.), *Ex Situ Plant Conservation: Supporting Species Survival in the Wild*. Washington, DC: Island Press.
- Kaye, T.N. 2008. Vital steps toward success of endangered plant reintroductions. *Native Plants Journal* 9: 313–322.
- Kaye, T.N., R. Schwindt, and C. Menke. 2011. Do private land owners support species conservation? Results of a local survey (Oregon). *Ecological Restoration* 29: 10–12.
- Kolbert, E. 2014. *The Sixth Extinction: An Unnatural History*. New York: Henry Holt and Co.

- Link, S.O., and R.O. Cruz. 2015. Establishment of Piper's daisy (*Erigeron piperianus*) in the shrub-steppe of south-central Washington. *Native Plants Journal* 16: 107–116.
- Maschinski, J., and K. Haskins. 2012. Introduction. Pages 1–6 in J. Maschinski and K. Haskins (eds.), *Plant Reintroduction in a Changing Climate*. Washington, DC: Island Press.
- Maschinski, J., S.J. Wright, and C. Lewis. 2012a. The critical role of the public: Plant conservation through volunteer and community outreach. Pages 53–70 in J. Maschinski and K. Haskins (eds.), *Plant Reintroduction in a Changing Climate*. Washington, DC: Island Press.
- Maschinski, J., M.A. Albrecht, L. Monkes, and K. Haskins. 2012b. Center for Plant Conservation best reintroduction practice guidelines. Pages 277–306 in J. Maschinski and K. Haskins (eds.), *Plant Reintroduction in a Changing Climate*. Washington, DC: Island Press.
- McGlaughlin, M., K. Karoly, and T.N. Kaye. 2002. Genetic variation and its relationship to population size in reintroduced populations of the pink sand verbena, *Abronia umbellata* subsp. *breviflora*. *Conservation Genetics* 3: 411–420.
- McLachlan, J.S., J.J. Hellmann, and M.W. Schwartz. 2007. A framework for debate of assisted migration in an era of climatic change. *Conservation Biology* 21: 297–302.
- Montalvo, A.M., and N.C. Ellstrand. 2001. Nonlocal transplantation and outbreeding depression in the subshrub *Lotus scoparius* (Fabaceae). *American Journal of Botany* 88: 258–269.
- Mueller, J.M., and J.J. Hellman. 2008. An assessment of invasion risk from assisted migration. *Conservation Biology* 22: 562–567.
- Münzbergová, Z., M. Mildén, J. Ehrlén, and T. Herben. 2005. Population viability and reintroduction strategies: A spatially explicit landscape-level approach. *Ecological Applications* 15: 1377–1386.
- Parker, K.A. 2008. Translocations: Providing outcomes for wildlife, resource managers, scientists, and the human community. *Restoration Ecology* 16: 204–209.
- Reichard, S., H. Liu, and C. Husby. 2012. Is managed relocation of rare plants another pathway for biological invasions? Pages 243–261 in J. Maschinski and K.E. Haskins (eds.), *Plant Reintroduction in a Changing Climate*. Washington, DC: Island Press.
- Seddon, P.J., D.P. Armstrong, and R.F. Maloney. 2007. Developing the science of reintroduction biology. *Conservation Biology* 21: 303–12.
- Seddon, P.J. 2010. From Reintroduction to Assisted Colonization: Moving along the Conservation Translocation Spectrum. *Restoration Ecology* 18: 796–802.
- Thorpe, A.S., and T.N. Kaye. 2011. Conservation and reintroduction of the endangered Willamette daisy. *Native Plants Journal* 12: 289–298.
- Volis, S., and M. Blecher. 2010. Quasi *in situ*: a bridge between *ex situ* and *in situ* conservation of plants. *Biodiversity Conservation* 19: 2441–2454.
- Willi, Y., M. van Kleunen, S. Dietrich, and M. Fischer. 2007. Genetic rescue persists beyond first-generation outbreeding in small populations of a rare plant. *Proceedings of the Royal Society B* 274: 2357–236.

Tom Kaye studied rare plant biology at Oregon State University, focusing on an Olympic Mountains endemic, Astragalus australis var. olympicus, for his master's degree and population viability analysis of several Pacific Northwest species for his PhD. Tom is the executive director at the Institute for Applied Ecology in Corvallis, Oregon.



WNPS Endowment Fund

Each year WNPS offers grants for projects that educate the public about native plants and for research in areas such as the biology of native species, conservation, school-based education for youth, and plant inventories of little-studied areas. WNPS grants are funded from generous donations made to the WNPS Endowment Fund.

The WNPS Endowment Fund, established in 2010, provides a stable and long-term source of funds for native plant research, education, and conservation grants and projects. Interest, dividends, and capital gains from the endowment are used to fund WNPS grant awards and projects. Gifts are retained as capital. As the WNPS Endowment Fund grows, so does the return and size of the awards. Gifts to the endowment are a long-term investment in fulfilling the mission of WNPS.

Since 2010, the endowment has grown to over \$140,000 and is funding projects like the two described in this issue of *Douglasia*. With continued growth, the Plant Research and Inventory, Education, and Conservation Committees would be able to award larger grants annually, and here your gift could impact native plant funding around Washington State.

Donations to the WNPS Endowment Fund may be made two ways:

- Online at www.wnps.org/support/ways.html (where you can also view the Endowment Policy)
- By mail: Please make checks payable to the WNPS Endowment Fund

You may also want to consider the WNPS Endowment Fund in your estate plans. Your bequest will keep your love of native plants alive by supporting worthy projects for years to come.

Please consider the WNPS Endowment Fund in your charitable giving.

Summer Hikes for a Snow-Laden Winter and Late Spring

by David Giblin, Central Puget Sound Chapter

As I write this it is now May, and the Seattle area has yet to have a 2017 day at or above 70°F. To say it is a late spring is to say that we got a little bit of snow in the mountains this past winter. A deep snowpack combined with a late spring means that the bloom time in the high country of Washington will be pushed back to probably

late July through early September. I actually prefer this to years when the subalpine and alpine flowers are burned up by mid-August. Moreover, in years like this one there is a tendency for early- and late-season species to bloom together, creating unusual combinations [for example, avalanche lilies (*Erythronium montanum*) and alpine bistort (*Bistorta bistortoides*)].

I'll suggest two destinations that should be spectacular this year. For both, I recommend trying to go during the week because they are popular destinations (for good reason).

From late July to early August get out to Olympic National Park's Obstruction Point to do either the Lillian Ridge Trail or the Grand Ridge Trail. Both trailheads are accessible from the parking lot at the end of the Obstruction Point Road (a wonderful 7.6-mile drive from a turnoff near Hurricane Ridge).

You'll find three things on these trails: an abundance of wildflowers, a moderate elevation gain, and some of the most dramatic views of the Olympic Mountains anywhere. I was last there for the 2014 WNPS Study Weekend on a hike led by WNPS member Jim Duemmel. So struck by it all, I swore that I would come back every year. Things that you'll see on these trails include scree fields covered in blankets of monkey-flowers (*Erythranthe*, formerly *Mimulus*), lupines (*Lupinus lepidus*), small-flowered penstemon (*Penstemon procerus*), and silky phacelia (*Phacelia sericeus*). There's lots more—just choose a sunny day and take advantage of the extended day length this time of year. Make plant lists if you go. There currently is no list for either hike on the WNPS plant list site. Directions and information about the hikes can be found at: www.wta.org/go-hiking/hikes/grand-ridge and www.wta.org/go-hiking/hikes/lillian-ridge.

From late August to early September the Mount Baker area cannot be beat (as long as it's not raining or snowing). Following the paved road to Artist Point and doing any hike from there is an extraordinary experience. If you can tolerate longish drives on gravel or dirt Forest Service roads, make the trip out to do the Skyline Divide hike. Despite the longish drive from the Mount Baker Highway, this can be a busy trail



View of Mount Baker from Skyline Divide meadow just beyond where the trail reaches the ridge. PHOTO: MARK TURNER

on the weekends—the slopes, meadows, and ridges of wildflowers with spectacular views of Mount Baker, Mount Shuksan, and the Salish Sea explain why. Don't expect solitude. My wife, Julie, and I did this hike as a backpack, and we were amazed at how many people were camped along this ridge on a sunny, warm Saturday evening in August. During the week though, you might have the place nearly to yourself. Following the trail far enough takes

you to the base of Chowder Ridge. You'll find a great plant list (135 species) for this hike on the WNPS website: www.wnps.org/plant_lists/counties/whatcom/whatcom_county.html.

The full trail is 9 miles round trip with an elevation gain of 2,500 feet, but you don't need to do the entire trail to experience the splendor. You make the ridgeline in about 2 miles (elevation gain: 1,500 feet). From there you can decide how far you need to go to satisfy your wildflower and scenery interests. You'll pass plenty of beautiful scenes just making the ridge. A description of the hike can be found at www.wta.org/go-hiking/hikes/skyline-divide. You'll need a Northwest Forest Pass to park at the trailhead.

Look on the bright side of this wet, cold, long winter and spring. There promises to be a summer full of great wildflower displays throughout our high country, which reminds us why we put up with some of the weather that we do!

David Giblin is collections manager at the University of Washington Herbarium, Burke Museum, where he researches the Pacific Northwest flora. He is a regular contributor to *Douglasia*.



Columbia Lily (*Lilium columbianum*): Washington State's Only Native True Lily



Multi-flowered inflorescence of the Columbia lily (*Lilium columbianum*). PHOTO: MARK TURNER

by David E. Giblin, *Central Puget Sound Chapter*

According to *Flora of North America* (2003), 22 *Lilium* species, and an additional nine subspecies, occur in the United States and Canada. Of these, only one species occurs in Washington State: the Columbia lily (*Lilium columbianum*) in the Liliaceae family. The scientific name was formally published in 1871 by Maximilian Leichtlin, a German horticulturist who specialized in the cultivation of bulbous plants, including lilies.

That Leichtlin would be the author of record for this western North American lily, which ranges from southern British Columbia to northern California and east to northern Idaho and western Montana, is an interesting story. Bulbs of the species were collected along the Columbia River around 1870 and sent to Leichtlin under the unofficial name *L. columbianum*. Leichtlin grew the plants in his garden, and in 1871 he wrote about his experiences in *Journal de la Société Centrale d'Horticulture de France*, a French journal. By the rules of botanical nomenclature, in doing so he validly published

the scientific name *Lilium columbianum*. Interestingly, one of the earliest herbarium specimens of this species dates to 1834, a collection made by David Douglas along the Columbia River near Vancouver, Washington. He incorrectly identified his collection as *L. superbum*, a species native to eastern North America.

Though it is Washington State's only native true lily, *L. columbianum* is a magnificent plant. In the wild it can grow to nearly 2 meters (6 feet), though 1 meter is more common. Like all true lilies, *L. columbianum* is a bulbous perennial, with the bulbs reaching about 8 × 10 cm (about 3 inches high × 4 inches wide) in size and often somewhat rhizome-forming. The stems are singular from the base, with one to nine well-spaced whorls of up to 20 leaves per node.

The inflorescence is a terminal raceme, which on mature plants can have up to 45 flowers, though somewhere around 15 is more typical. The individual flowers nod from the raceme axis and bear six strongly reflexed, yellowish- to bright-orange, red-spotted sepals and petals. Six pollen-laden anthers and a thickish style are suspended from the center of the flower. Butterflies are the primary pollinators, particularly the swallowtails. The plants produce fairly large, brown seeds in olive-brown, upright capsules that open (dehisce) longitudinally along three suture lines. Each capsule contains between 100 and 300 seeds.

In Washington this species can be found in

a wide range of habitats. I have collected it in May growing out of thick stands of salal (*Gaultheria shallon*) on the edge of Douglas-fir (*Pseudotsuga menziesii*) forests on small islands in the San Juan Islands, as well as on moist, open subalpine slopes in the North Cascades in August. The common theme among sites is mostly full sunlight conditions, with soils ranging from relatively dry to nearly wet.



Reflexed sepals and petals of the Columbia lily (*Lilium columbianum*), with stamens and pistil emerging from the center of the flower. PHOTO: MARK TURNER

Geographically, in Washington *L. columbianum* occurs on the Olympic Peninsula, along the Pacific Coast counties, throughout the Cascades, and east across the northern counties to the Idaho border. Not surprisingly, the desert-like central region of Washington is devoid of this species. Historically this harsh environment may have served as a barrier to *L. columbianum* dispersing into the cooler, moister areas of the Blue Mountains in the state's southeastern corner.



Columbia lily (*Lilium columbianum*) growing in a subalpine meadow along Copper Pass Trail in Okanogan-Wenatchee National Forest, Washington. PHOTO: MARK TURNER

Given its relatively wide distribution in the Pacific Northwest, *L. columbianum* is not a species of conservation concern. However, I do find it interesting that the bulbs sent to Leichtlin were collected along the Columbia River. Checking the Consortium of Pacific Northwest Herbarium online database shows very few collections of this species have ever been made along the river's banks (<http://www.pnwherbaria.org/data/search.php>). In "A monograph of the genus *Lilium*," by Henry John Elwes (1880), the author describes habitats where the plant grows as follows: "I learn from Herr B. Roetz that it is found on dry sandy plains, and on the mountains up to 500–1,000 feet elevation, where the climate in winter is very severe, and where rattle-snakes were so abundant in autumn

that it was a work of much danger to dig up the bulbs." Brave! So while this species may not be of conservation concern, where we find it today seldom matches the "dry sandy plains" habitat of the late 1800s.

In terms of seeing these plants in the wild, the Chinook Pass area of Mount Rainier National Park (Highway 410) is an easy place to find it, as are the moist meadows near the Swauk Creek Campground and nearby Swauk Pass (Highway 97). Other locations, additional photos, and more information about *L. columbianum* in the wild can be found at the Plants of Washington Image Gallery (biology.burke.washington.edu/herbarium/imagecollection.php) and Wildflowers of the Pacific Northwest (www.pnwflowers.com/).

Regarding garden cultivation, *L. columbianum* is not a species you'll typically encounter at a local nursery here in Washington. The Asian lily species and even the eastern North American *Lilium superbum* (Turk's cap lily) are commonly offered due to a combination of easier propagation from bulb divisions and more spectacular plants [*L. superbum* can reach up to nearly 3 meters (10 feet)]. You can order bulbs online from Keeping It Green Nursery (www.keepingitgreennursery.com) or Sevenoaks Native Nursery (www.sevenoaksnativenursery.com).

Growing from seed is also an option. However like so many bulbous, monocot perennials, seed to flower for *L. columbianum* is likely to take three to five years (Kruckeberg 1996). Of course, the resulting plants are definitely worth the wait. A quick online search shows that you can buy seeds from Inside Passage in Port Townsend (www.insidepassageseeds.com/native_wildflowers.html). Additional cultivation information can be found on the Washington Native Plant Society website (www.wnps.org/landscaping/herbarium/index.html). Why I don't grow this in my own garden is a mystery to me and something that I plan to address in the near future.

References

- Elwes, J.H. 1880. *A monograph of the genus Lilium*, illustrated by W.H. Fitch. London: Taylor and Francis.
- Kruckeberg, A.R. 1996. *Gardening with Plants of the Pacific Northwest*, 2nd Edition. Seattle and London: University of Washington Press.
- Leichtlin, M. 1871. *Journal de la Société Centrale d'Horticulture de France*, ser. 2, 5: 98.
- Skinner, M.W. 2003. *Lilium*. Pages 172–197 in Flora of North America Editorial Committee (eds.), *Flora of North America*, Vol. 26. New York and Oxford.

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A Historical Perspective of Rare Plant Conservation and the Endangered Species Act in Washington State

by Theodore B. Thomas

Plants and plant communities found in Washington State and more broadly in the Pacific Northwest form some of the most distinctive ecosystems on Earth. Many of these plants are threatened by several factors. Whether growing in ancient forests, wetlands, glacial outwash prairies, shrub-steppe, or high-elevation plant communities, the most prominent threats affecting the plant kingdom are loss of habitat from development, land use changes, invasive species, disease, and impacts associated with climate change.

Plants are essential to life on Earth. Though the extinction of species has occurred since life began, human activities are hastening the loss of biodiversity. As the world's population increases, humans place a high value on natural resource extraction as well as the land that is required to produce these resources and shelter the growing number of people. The Center for Plant Conservation estimates that one in eight species of native plants in the United States is of conservation concern (www.missouribotanicalgarden.org/media/fact-pages/center-for-plant-conservation.aspx).

The federal legislation that brought us the Endangered Species Act (ESA) in 1973 quickly became the most powerful conservation law enacted to provide protection to species and their habitat. Congress made two distinctions in terms of protections provided to plants: (1) under Section 2 plants (or invertebrates) could not be protected at the population level, which is a status we do apply to vertebrate animals, and (2) under Section 9 of the ESA there is no prohibition against the taking of a protected plant from private property [US Endangered Species Act (ESA 1973, as amended)]. The ESA was predated by the Endangered Species Preservation Act of 1966 (Public Law # 89-669) and by the Endangered Species Conservation Act of 1969 (Public Law # 91-135). The ESA of 1973 strengthened these earlier laws by authorizing the Secretary of the Interior to declare a list of species or subspecies that may be threatened or endangered with extinction.

In Washington State, the human population is increasing, and by 2025 it is expected that eight million people will inhabit our state. Just like our increasing population, the new revision of Hitchcock and Cronquist's *Flora of the Pacific Northwest* will cover many more taxa, approximately 3,099 species and subspecies, which are up from less than 2,000 terminal taxa described in the 1973 edition. Like the increase in population we will witness in Washington State, we also see an increase in the number of plant taxa known or newly discovered in our state; many of these taxa are nonnative species that have recently invaded Washington. Historically, plant exploration in

Washington has been rigorous, from the discoveries of David Douglas in the 1820s to the prodigious collections by Wilhelm Suksdorf in the late 1800s and early 1900s to the collective works of Hitchcock, Cronquist, Ownbey, and Thompson in the middle of the twentieth century. More recently, a flood of new collections, especially those stimulated by the University of Washington Herbarium at the Burke Museum, and the discovery and description of new species have expanded our list of native, naturalized, and invasive nonnative species found in Washington and surrounding states.



A field of yellow, blooming Bradshaw's lomatium (*Lomatium bradshawii*) in southwestern Washington. PHOTO: JOE ARNETT

The Washington Natural Heritage Program has identified more than 300 vascular plant species with conservation status in our state (Camp and Gamon 2011). Considering the broad diversity of plants and the spectrum of environmental conditions and threats found in Washington State, it took many years to begin assessments to develop a list of endangered or threatened plants in Washington that required protection under the ESA.

The first plant species to be listed under the ESA that was known to occur in Washington State was Nelson's checker-mallow (*Sidalcea nelsoniana*), which was listed as threatened in 1993. The species is known to be present in two southwest Washington counties with a much broader distribution within western Oregon. Although Bradshaw's lomatium (*Lomatium bradshawii*) was listed as endangered in 1988, earlier than *S. nelsoniana*, the listing was based on its distribution in Oregon. The plant was unknown from Washington State until it was discovered in two wet prairies in Clark County in 1994. One of the two populations turned out to be a "gold mine" discovery, because the population contains somewhere from 1,000,000 to greater than 20,000,000 plants depending on the date

and source of the monitoring data. Surprisingly the larger of these two populations is found within the rough and wetland margins of a local golf course. Who would have thought that threatened plants and a golf course would be a compatible mix for plant conservation?

Howellia is our only monotypic genus, defined as having only a single species in the entire genus, on Washington's rare plant list. Water howellia (*Howellia aquatilis*) was originally listed in the mountain-prairie region in 1994 but has since been found to be much more broadly distributed, including in wetlands of western and eastern Washington on both public and private lands. The known distribution of *H. aquatilis* has expanded into five states, and population numbers have been stabilized or are improving within some of its distribution such that the species may be ripe for delisting within a few years.

At about this same time (1994) the US Fish and Wildlife Service (USFWS) was beginning to focus considerable attention on prairies, and in 1997 after a 13-month listing moratorium, the final rule to list golden paintbrush (*Castilleja levisecta*) as a threatened species was published. This species had been extirpated from Oregon as early as 1938 and was reduced to 11 populations known only from Washington and British Columbia. As of 2016 this species has now been reintroduced into Oregon and is now found in approximately 50 populations in western Oregon and Washington.

Through the recognition of prairies as a declining and threatened ecosystem, we have made tremendous progress using *C. levisecta* as a focal species that has contributed to the purchase of several prairie conservation properties and a region-wide interest in this declining landscape. Our work on the recovery of *C. levisecta* likely led to additional steps to conserve prairies and all its parts when USFWS listed three additional prairie species in 2013 and 2014, including the endangered Taylors' checkerspot butterfly, the threatened streaked horned lark, and the subterranean-dwelling, threatened Mazama pocket gopher.

In late 1999 Wenatchee Mountains checker-mallow (*Sidalcea oregana* var. *calva*) was listed as an endangered species. This became Washington's first plant species to have critical habitat designated to protect where it was found. Just a few months later, in 2000, three species were again listed in Oregon, with one of them, Kincaid's lupine (*Lupinus oreganus*, previously known as *L. sulphureus* var. *kincaidii*), known from the Boistfort Prairie and Toledo in Lewis County, listed as threatened. *Lupinus oreganus* was listed because it was the native larval host plant for the endangered Fender's blue butterfly, which along with the Willamette daisy (*Erigeron decumbens* var. *decumbens*) was listed for Oregon, but both of these species are found exclusively in Oregon.

In 2002 USFWS listed showy stickseed (*Hackelia venusta*) as an endangered species due to its tenuous (threatened) nature

Table 1. List of plant species in Washington State that have received federal status as threatened or endangered through rule making. (For a comprehensive explanation of the Global Status/State Rank system visit http://file.dnr.wa.gov/publications/amp_nh_vascular_ets.pdf and scroll to the bottom of the document.)

Species Name <i>Scientific Name</i> (Common Name)	2013 Global/State Rank	Washington State Status	US Fish and Wildlife Service Status
<i>Arenaria paludicola</i> (swamp sandwort)	G1/SX	X	E
<i>Castilleja levisecta</i> (golden paintbrush)	G1/S1	E	T
<i>Eriogonum codium</i> (Umtanum desert buckwheat)	G1/S1	E	T
<i>Hackelia venusta</i> (showy stickseed)	G1/S1	E	E
<i>Howellia aquatilis</i> (water howellia)	G3/S2S3	T	T
<i>Lomatium bradshawii</i> (Bradshaw's lomatium)	G2/S1	E	E
<i>Lupinus oreganus</i> (<i>L. sulphureus kincaidii</i>) (Kincaid's lupine)	G5T2/S1	E	T
<i>Physaria douglasii</i> ssp. <i>tuplashensis</i> (White-Bluffs bladderpod)	G2?/S2	T	T
<i>Sidalcea nelsoniana</i> (Nelson's checker-mallow)	G2/S1	E	T
<i>Sidalcea oregana</i> var. <i>calva</i> (Wenatchee Mountains checker-mallow)	G5T1/S1	E	E
<i>Silene spaldingii</i> (Spalding's silene)	G2/S2	T	T
<i>Spiranthes diluvialis</i> (Ute ladies'-tresses)	G2/S1	E	T

Global ranks range from G1 (critically imperiled) to G5 (demonstrably secure). State ranks range from S1 (critically imperiled) to S5 (demonstrably secure).

E = Endangered
T = Threatened

X = Possibly extinct or extirpated
? = Rank up for further consideration

and the single population where it was found. Due to a long history of collection of *H. venusta*, it was determined that designation of critical habitat was not prudent and therefore none was designated for this plant. After substantial research efforts we have improved our knowledge of the reproductive system of this plant, but it remains a difficult task to expand the geographic distribution of this species and the single site where it is found remains as the only viable, albeit small, population.

Nearly two decades after being discovered as “a plant species new to science,” USFWS listed as threatened two plant species known from the Hanford Reach of the Columbia River. The Umtanum desert buckwheat (*Eriogonum codium*) was known to inhabit lithosols, and the White-Bluffs bladderpod (*Physaria douglasii* ssp. *tuplashensis*) was known to grow exclusively on caliche (calcium carbonate) soils, which has inspired the common name for this species: White Bluffs.

In 2011 USFWS entered into an agreement known as the Multi-District Litigation settlement with WildEarth Guardians and the Center for Biological Diversity to complete endangered species status reviews for 252 species. Included among these is one Pacific Northwest plant species that had been determined to “be warranted, but precluded,” meaning that the species was thought to meet the definition of a listed species but for which we had no funding to complete the review. This species, the northern wormwood (*Artemisia campestris* var. *wormkioldii*), was classified as a candidate species in 1999. In 2016 FWS made an assessment for *A. campestris* var. *wormkioldii* and determined that the threats to the species were not of the magnitude or imminence than was previously considered, and the species was removed from the candidate species list.

The USFWS is responsible for assessing the status of species at risk. When and if it is determined a species requires the ESA to protect, conserve and recover the species, it becomes our responsibility to use our collective conservation wisdom, experience, and abilities to work together to improve the status of imperiled plants.

Theodore Thomas received his master's degree from Oregon State University, where he focused on forestry, botany, and entomology. He is a senior ecologist with the Division of Listing and Recovery, US Fish and Wildlife Service, Lacey, Washington. He has worked on plant conservation and supported recovery of imperiled plants and butterflies for more than two decades, with a focus on the prairies of western Washington and Oregon.

References

- Camp, P., and J. Gamon. 2001. *Field Guide to the Rare Plants of Washington*. Seattle: University of Washington Press.
- Endangered Species Act of 1973, as amended, Pub. L. No. 93-205, 87 Stat. 884 (Dec. 28, 1973). www.fws.gov/endangered/esa-library/pdf/ESAall.pdf.



Botany Washington 2017: Learning in Leavenworth

by Anna Thurston, South Sound Chapter

This year's Botany Washington, held at the Tierra Learning Center just north of Leavenworth, continued the longstanding academic collaboration between the University of Washington Herbarium at the Burke Museum and the Washington Native Plant Society. The weather was better than anticipated, the trip leaders and presenters as devoted and skilled as ever, and over 60 participants enjoyed the weekend.

The learning started on Friday evening, with Dr. David Tank (associate professor of biological sciences at the University of Idaho), sharing a visually stunning overview of paintbrush (*Castilleja*) phylogenetics. Over the next two days, the floristic and taxonomic diversity of the East Cascades was the focus of attendees, whose ranks included students, professionals, and long-time members of the WNPS from as far away as Oregon and British Columbia. Participants could enjoy a botanical excursion along the road to Sugarloaf Peak or amble up Chiwaukum Creek. Tweedy's lewisia (*Lewisiopsis tweedyi*) was found on both trips, and mountain lady-slipper (*Cypripedium montanum*) was located on the event grounds. For attendees alternately interested in honing their taxonomic and plant identification skills, a grass workshop was held on Saturday and a session on Polemoniaceae (phlox family) on Sunday.

Saturday evening's presentation focused on the status and management needs of western Washington prairie plants. Dr. Susan Waters, conservation biologist working with the Center of Natural Lands Management, illustrated how exotic invasives create pollinator distraction. Because they more readily adapt to climate change than many natives, invasive species effectively hoard the benefits of foraging pollinators, whose choice of nectar or food sources is determined by which species is first available. Dr. Waters' statistical analyses illustrate how native seed production can be critically and quickly impaired. This is complicated research, but it was well-communicated to the audience.

For those who missed the opportunity, there's always next year. Kudos to the trip leaders and to Denise Mahnke, business manager of the Washington Native Plant Society, who organized the event location and meals. For future Botany Washington events, watch your WNPS newsletter. Seats at this annual educational retreat go quickly for good reason.

Anna Thurston recently graduated with a master's degree from Evergreen State College in Olympia. She is a 2017 Evergreen Sustainability Fellow of Evergreen State College. Her attendance at Botany WA was sponsored by the South Sound Chapter.



Photos from Botany Washington 2017



Tweedy's lewisia (*Lewisiopsis tweedyi*). PHOTO: RAY IZUMI



Scarlet gilia (*Ipomopsis aggregata*). PHOTO: RAY IZUMI



Mountain lady-slipper (*Cypripedium montanum*). PHOTO: RAY IZUMI



Botany Washington 2017 group photo. PHOTO: RAY IZUMI

New Native Plant Habitat Garden: A Partnership between NSEA, Fourth Corner Nurseries, and WNPS



A view of the NSEA native plant garden from above, showing the model creek and various zones with installed plant communities.

PHOTO: ADRIAN SHULOCK

by Wendy Scherrer

In June 2015 WNPS awarded a \$1,000 Education Grant to support the creation of a new Nooksack Salmon Enhancement (NSEA) native plant habitat garden. The garden was built for K–16 students, volunteers, families, scientists, landowners, politicians, and other community members to learn more about native plants and the vital connection between native plant communities, salmon, and restoration methods of our local wildlife habitats.

The NSEA native plant habitat garden is located at the new 6-acre permanent home for NSEA, the nonprofit organization that is Washington Department of Fish and Wildlife's Regional Fisheries Enhancement Group No. 1 in Whatcom County. NSEA officially took over ownership of Fourth Corner Nurseries' retail site in July 2015. With an office, tool storage facility, native plant nursery, potting shed, and log storage area for habitat restoration projects, the new site supports NSEA's full-time administrative, project management, and education staff, interns, AmeriCorps volunteers, and WA Conservation Corps habitat restoration crews.

WNPS Koma Kulshan members worked with NSEA folks to create a list of over 65 native plants to feature in the garden, grouping the plants into seven native plant communities: riparian, wet meadow, rocky bald (open dry), wet marsh, hemlock

forest (wet), Douglas-fir forest (dry), and cedar swamp communities (see plant list on next page). WNPS members verified current scientific and common names, and signs were created for each plant.

A recirculating stream, snags, and a nurse log were added as focal points to demonstrate methods of restoration and landscaping for salmon and other wildlife. NSEA crews and volunteers worked hundreds of hours to create the garden's impressive hardscape, which includes rocks and large woody debris, handmade benches and bridges, and an entrance sculpture. Fourth Corner Nurseries donated most of the native plants and advised on plant siting. A local Boy Scout made this his Eagle Scout culminating project and, along with several middle and high school boys, helped construct and mulch the trails and plants. Interns from Western Washington University and AmeriCorps members also worked hard to construct and maintain the garden.

On April 16, 2016, 65 plants and plant identification signs were installed. Construction was completed in June 2016. NSEA plans to continue maintaining the garden throughout the coming years to ensure plant survival and overall garden success. More plants will be added as NSEA grows with the site.

You can visit the garden Monday through Friday, or by appointment, at 3057 E. Bakerview Road in Bellingham. It is already a destination site for school field trips, college classes,

WA Conservation Corps crew training, and volunteer work parties and in the future will provide an outdoor classroom for teachers, interns, and students from local colleges and schools.

The garden is a win-win partnership project. It is an asset for NSEA's education programs and also aligns with WNPS goals and objectives: promoting appreciation of native plants, providing support for teaching botanical subjects in schools (K–12), and increasing public awareness of native plants through promotion of the effective use of native plants in the landscape for our larger community.

The creation of the NSEA native plant habitat garden included the following partners:

- WNPS - Education grant
- WNPS Koma Kulshan - Chapter grant and volunteers
- NSEA - Staff and volunteers, funding
- Fourth Corner Nurseries, Mud Pond Koi, and Benskin Co. Landscape, Garden & Design - Consultation
- Private donors - Funding

For more information about this project, go to NSEA's website: www.n-sea.org.



WNPS Member Donations at Work. This education project was supported in part by a grant from the Washington Native Plant Society.



NSEA Native Plant Habitat Garden Plant List (Arranged by Plant Community)

Riparian		Wet Marsh	
Pacific willow	<i>Salix lasiandra</i> var. <i>lasiandra</i>	Wapato	<i>Sagittaria latifolia</i>
Sitka willow	<i>Salix sitchensis</i>	Cattail	<i>Typha latifolia</i>
Spiraea (hardhack)	<i>Spiraea douglasii</i>	Small fruited bulrush	<i>Scirpus microcarpus</i>
Red-osier dogwood	<i>Cornus sericea</i>	Skunk cabbage	<i>Lysichiton americanus</i>
Pacific ninebark	<i>Physocarpus capitatus</i>	Hooker's willow	<i>Salix hookeriana</i>
Twinberry	<i>Lonicera involucrata</i>		
Sitka spruce	<i>Picea sitchensis</i>	Hemlock Forest	
Vine maple	<i>Acer circinatum</i>	Grand fir	<i>Abies grandis</i>
Highbush cranberry	<i>Viburnum edule</i>	Sword fern	<i>Polystichum munitum</i>
Nootka rose	<i>Rosa nutkana</i>	Salal	<i>Gaultheria shallon</i>
Snowberry	<i>Symphoricarpos albus</i>	Devil's club	<i>Oplopanax horridus</i>
Western redcedar	<i>Thuja plicata</i>	Deer fern	<i>Blechnum spicant</i>
		Thimbleberry	<i>Rubus parviflorus</i>
Wet Meadow		Dull Oregon-grape	<i>Berberis nervosa</i>
Cow parsnip	<i>Heracleum maximum</i>	Red huckleberry	<i>Vaccinium parvifolium</i>
Blue-eyed grass	<i>Sisyrinchium idahoense</i>	Trillium	<i>Trillium ovatum</i>
Slough sedge	<i>Carex obnupta</i>	Bleeding heart	<i>Dicentra formosa</i>
Small fruited bulrush	<i>Scirpus microcarpus</i>	Red alder	<i>Alnus rubra</i>
Yellow monkeyflower	<i>Erythranthe guttata</i>	Western white birch	<i>Betula papyrifera</i>
		Beaked hazelnut	<i>Corylus cornuta</i>
Rocky Bald (dry)		Black hawthorn	<i>Crataegus douglasii</i>
Garry oak	<i>Quercus garryana</i>	Indian plum	<i>Oemleria cerasiformis</i>
Nodding onion	<i>Allium cernuum</i>	Maidenhair fern	<i>Adiantum aleuticum</i>
Columbia lily	<i>Lilium columbianum</i>	Red elderberry	<i>Sambucus racemosa</i>
Large camas	<i>Camassia leichtlinii</i> ssp. <i>suksdorfii</i>	Salmonberry	<i>Rubus spectabilis</i>
Lomatium	<i>Lomatium nudicaule</i>		
Red columbine	<i>Aquilegia formosa</i>	Douglas-Fir Forest (dry)	
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>	Douglas-fir	<i>Pseudotsuga menziesii</i>
Coast strawberry	<i>Fragaria chiloensis</i>	Tall Oregon grape	<i>Berberis aquifolium</i>
Shore pine	<i>Pinus contorta</i> var. <i>contorta</i>	Red-flowering currant	<i>Ribes sanguineum</i>
Tall Oregon-grape	<i>Berberis aquifolium</i>	Douglas maple	<i>Acer glabrum</i> var. <i>douglasii</i>
		Mock orange	<i>Philadelphus lewisii</i>
Cedar Swamp		Serviceberry	<i>Amelanchier alnifolia</i>
Western redcedar	<i>Thuja plicata</i>	Blue elderberry	<i>Sambucus nigra</i> ssp. <i>caerulea</i>
Red-osier dogwood	<i>Cornus sericea</i>	Pacific dogwood	<i>Cornus nuttallii</i>
Sitka spruce	<i>Picea sitchensis</i>	Snowberry	<i>Symphoricarpos albus</i>
Skunk cabbage	<i>Lysichiton americanus</i>	Grand fir	<i>Abies grandis</i>
Pacific crabapple	<i>Malus fusca</i>	Oceanspray	<i>Holodiscus discolor</i>
Black cottonwood	<i>Populus trichocarpa</i>		
Salmonberry	<i>Rubus spectabilis</i>		

Kruckeberg Botanic Garden Serpentine Bed

by Vicki Demetre, Cynthia Welte, and Brianne Zorn

Serpentine soils, those with high levels of toxic heavy metals, can be found in small patches worldwide. Dr. Arthur Kruckeberg studied serpentine soils, plants that are endemic to serpentine soils, and their adaptations to growing in extreme environments. He even created an area in his garden, the Kruckeberg Botanic Garden (KBG), with serpentine soils left over from his research at the University of Washington. Serpentine soils create inhospitable growing conditions for many plants, and it is unusual to find serpentine collections in public gardens. The collection at the KBG is one of the only places in Seattle to see plants that are adapted to grow in serpentine soils.

Over the past 10 years, the serpentine bed at the KBG has struggled because of increased shade and an accumulation of organic matter in the soil. In 2014 the Kruckeberg Botanic Garden Foundation (KBGF) staff

removed a volunteer chestnut (*Castanea sativa*) shading the bed. In 2015 a WNPS grant allowed us to acquire the materials necessary to renovate the bed, including soil amendments (sand, gravel, serpentine soil, and stones), a tool to expand and re-edge the bed, acquisition and propagation of new plant material, a pH meter to test the soil, and interpretive signage. This bed is an excellent educational opportunity at KBG. Signage in the bed explains why serpentine soils are unusual and how plants all over the world have adapted to thrive on them.

In late summer 2015, KBGF staff traveled to the north fork of the Teanaway, east of the Cascades, near the Eldorado Creek Research Natural Area, an area that Dr. Kruckeberg helped preserve in 1997. We collected plant cuttings, serpentine soil, and rocks (all collected within the standards of the US Forest Service and approved by permit). During the Teanaway trip, we collected cuttings from juniper (*Juniperus communis* var. *montana*), pinemat manzanita (*Arctostaphylos nevadensis*), and western Labrador tea (*Rhododendron columbianum*). We are growing these plants to ultimately plant in the serpentine bed.

In late 2016 the bed was expanded to include the rockery directly to the west, which had previously contained an assortment of rock garden plants not seen in serpentine areas. These plants were removed and relocated, and a soil and rock strip was created at the top of both beds to bridge them. Given that Dr. Kruckeberg passed away in May 2016, this expansion seemed



Serpentine garden bed after renovations. PHOTO: VICKI DEMETRE

fitting and it was decided to make this area a memorial to him. Coincidentally, at this same time in a University of Washington Biology Department storage area, Professor Richard Olmstead found a cache of serpentine soil collected years ago—quite possibly the long-forgotten collection of Dr. Kruckeberg's. We added this soil to the bed's surface for its further animation. Final touches included planting both purchased plants and young plants from cuttings made from southwest Oregon serpentine habitats collected on a previous staff trip as well as signage for individual plants in the bed. A dedication sign with a summary explanation of the significance of serpentine soil was created and placed to educate garden visitors.



WNPS Member Donations at Work. This conservation project was supported in part by a grant from the Washington Native Plant Society.



WNPS Board of Directors Election Candidates

All WNPS members are encouraged to vote for the state board slate of board nominees. Vote using the electronic ballot at www.surveymonkey.com/r/HRKH5G8 or use the ballot below.

Keyna Bugner, Director-at-Large

Kenya has been a WNPS member of the Central Washington chapter since 2008 and a chapter board member since 2015, serving as the chapter secretary/treasurer. As a member of the local chapter, she enjoys leading local field trips around the Ellensburg area.

Kenya's degree in wildlife biology from Colorado State University has led her to explore fields related to botany and habitat management, including conducting plant and mammal surveys in Missouri and fish spawning and murrelet surveys in the Pacific Northwest.

In 2008 Kenya moved to Ellensburg and took an assistant ecologist position with the WA Department of Natural Resources, where she assists with rare plant monitoring, invasive species control, and restoration projects on 26 natural areas—an ideal job for her. In fall 2014 she returned to school to work on a master's degree in plant ecology at Central Washington University and hopes to graduate in winter 2017. Her research project involves testing the effects of various treatments on nonnative grasses to improve a population of the rare obscure buttercup (*Ranunculus triternatus*) in the Columbia River Gorge area.

As a WNPS board member Kenya hopes to bring her interest in conservation to the projects the society is involved in. One of the favorite parts of her job is working with local volunteers and school groups on monitoring and restoration projects and she loves sharing her knowledge of the local plants and wildlife to get others interested in environmental conservation.



Sarah Verlinde, Director-at-Large

Sarah Verlinde began her studies of native plants and wetlands in 2014 when her wetland ecology professor challenged her to create a pressed plant collection for a class project. The following year she gained access to the small herbarium collection at the University of Washington Bothell (UWB) and has been expanding the collection for two years, building up a



small volunteer and student team. Sarah now works full-time as a program coordinator on new projects at the UWB Office of Research. Most of her work focuses on new projects and opportunities in wetland science and cybersecurity, including working part-time as the UWB Herbarium collections manager.

Sarah earned a degree in biology, which included several plant studies. She participated in wetland mitigation and restoration projects with Snohomish County, including plant inventory and monitoring. She worked as an intern at the Tulalip Tribes to reintroduce wapato (*Sagittaria latifolia*), a native food source, to tribal land. For this project she won a Scholarship Award from the Society for Wetland Scientists and presented at the PNW Conference in Olympia.

Sarah is passionate about three things: *excellence* in what she does, *life-long learning*, and to always *be generous* with what you have. Sarah is passionate about education and outreach but usually outside of a classroom setting. Teaching others valuable skills that help them improve their lifestyle or build confidence is most rewarding.

Sarah lives in Snohomish and hails allegiance to the Salal chapter but often attends many Central Puget Sound activities. She served a partial term (2016–2017) as a state board member and is looking forward to serving a full term until 2020.

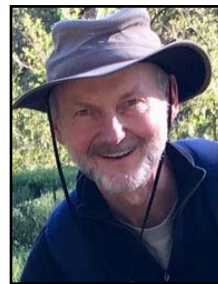
Van Bobbit, Director-at-Large

Van Bobbitt joined the WNPS in the early 1980s and later served on the board of directors. His academic training includes a BA in botany and MS in agriculture.

He taught horticulture, including courses in native plant identification and ecological restoration, at South Seattle College for 16 years, retiring in 2015. His career also included work in the landscape and nursery industry, seven years at the University of Washington's Center for Urban Horticulture, and nine years at WSU Extension.

In retirement, Van has consulted for Seattle Goodwill's Youth Green Corps training program, taught native plant identification workshops for various groups, and volunteered at Seattle Audubon's native plant garden.

Van's passions include plants, teaching, Bernese Mountain dogs, and traveling with his wife, Sharon. Last September, they saw the spring wildflower display in the Western Cape Province.



WNPS Board of Directors Election Ballot

Please vote for three WNPS State Board of Directors candidates or write in a candidate. Mail this ballot to: WNPS Board Ballot, 6310 NE 74th Street, Suite 215E, Seattle, WA 98115 **OR** vote online at www.surveymonkey.com/r/HRKH5G8. Ballots must be postmarked no later than October 15, 2017.

_____ Keyna Bugner

_____ Sarah Verlinde

_____ Van Bobbit

_____ Write-in _____

_____ Write-in _____

Musing on the March for Science

by Becky Chaney, WNPS Conservation Committee Chair

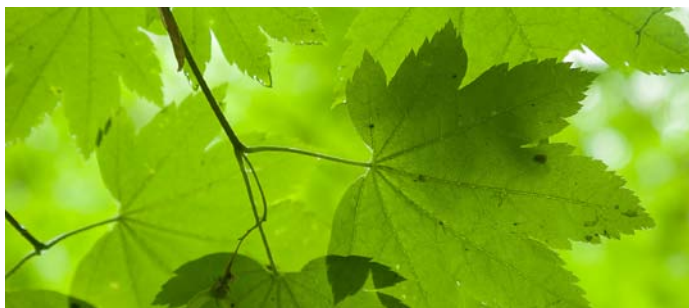
Why march for science? Marching is one way that people can come out of their various niches and learn about other peoples' concerns. Dialogue frequently happens, signs get read, information is distributed, and despair can turn to resolve. Many marchers actively seek additional ways to express their concerns. Marching does not preclude, and often encourages, people meeting with their representatives, with party leaders and officials (who are influential in who happens to be on our ballots), or even conversing with their friends and neighbors about personal political opinions.

Politics is the science and art of people getting along with people. Civic engagement is not an activity to be disparaged but rather a responsibility of citizenship. Declining to participate politically is a political act.

Science is objective and nonpartisan but scientists are not. Collectively, scientists are a special interest group and can be ignored as easily as anybody else—and often are. Most of the media is not out to misrepresent the news—reporters are trained professionals (like scientists). Most politicians are acutely aware of the mood of their constituents (their career depends on it) and most are genuinely committed to doing what they believe is right (like scientists, yet the “professional politician” is derided). Like other professionals, scientists need to be known by the people in order to be trusted.

Obviously not everyone needs to march to be heard. WNPS encourages scientists, whether professional or citizen, to interact. Hikes, study weekends, workshops, programs, and plant sales are social activities that have the potential to further the reach of science, through the knowledge and appreciation of native plants, to new communities. WNPS activities are opportunities to share what we know and love about plants. Just as importantly, they are opportunities for us to learn more about people. WNPS conservation advocacy must include actively broadening our outreach to individuals and communities, particularly those we currently don't know, to be effective. Doing so may be the most important conservation activity there is.

Becky can be reached via e-mail at becky@chaney.org. She is always happy to hear your conservation interests and concerns. Please include “WNPS Conservation” in the subject line.



Support Our Work

The Washington Native Plant Society depends on your support to deliver the programs, field trips, plant sales, research, education, events, and resources that help conserve our state's flora. We can't do this work without you!

Become a Member

Join our community of plant lovers and be the first to learn about the programs in your area. Contact the office or go online at www.wnps.org/join. Registered members receive *Douglasia* in the mail.

Donate Online

You may donate any amount online through our secure website at www.wnps.org/store/donation.html. Out-of-state members can donate at www.networkforgood.org/WashingtonNativePlant.

Donate through Your Workplace

Workplace giving is an easy way to support the Washington Native Plant Society. WNPS is now a member of the Earth Share network.

- **If you are a Federal employee:** You may donate through the Combined Federal Campaign (CFC). The WNPS-CFC number is 69374.
- **If you are a Washington State employee:** You may donate through the Combined Fund Drive (CFD). The WNPS-CFD number is 0315051.
- **Workplace matching gifts:** Your employer may offer to match your charitable donations—and help your gift do more. To find out if your workplace has a matching gift program, contact your workplace's charitable giving contact or check the Matching Gifts database at www.matchinggifts.com/unh/.

Make a Planned Gift

Making a gift through your estate is a powerful way to express your values, care for the earth, and ensure a lasting impact. “*One generation plants the trees, another gets the shade.*” —Chinese Proverb

Here are examples of how to make a planned gift:

- Name the Washington Native Plant Society in your will.
- Make the Washington Native Plant Society a beneficiary to your IRA or life insurance policy.
- Name the Washington Native Plant Society as the beneficiary of a charitable remainder trust.

There are many other ways you can make a charitable gift through estate planning—consult your lawyer or financial planner. For more information, call the WNPS office 206-527-3210.

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** Ad hoc committees are formed to address society business, and are not defined by WNPS bylaws, as are standing committees.

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Golden Paintbrush (*Castilleja levisecta*) along a coastal bluff.
PHOTO: MARK TURNER