

Douglasia



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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.



President's Message: The View from Here

by Keyna Bugner

Dear WNPS Members,

April is Native Plant Appreciation Month (NPAM) in Washington, and this year's theme is "Planting for Tomorrow." This year we are highlighting our native flora and its relationship to the people, wildlife, and pollinators of Washington. Climate change, once thought of as a future concern, is now a reality for many people; we are experiencing warmer, drier summers, as well as unpredictable rain and snow patterns. These unpredictable weather



conditions make it hard to plan for the future. While we may not know what the future holds, we do know that intact native ecosystems are resilient and can adapt to changes in the environment. Throughout our state, WNPS members work to maintain biodiversity through our mission to promote the appreciation and conservation of Washington's native plants and their habitats through study, education, and advocacy.

The NPAM committee has put together a great webinar series for April. Several of the webinars will highlight ways we all can use native plants in our own gardens. As I have mentioned in past articles, planting native plants in my own yard is near and dear to my heart. Every year I continue to remove more of my grass lawn and replace it with forbs and grasses more adapted to the dry conditions of Eastern Washington. If you are looking for ways to add more native plants to your yard, check out the native plant directory and vendor list for native plants and seeds on the WNPS website.

Below is a list of webinars planned for April. To learn more about the events and register for a webinar go to wnps.org/wnps-annual-events/npam.

The Legacy of Dr. Art Kruckeberg: Dr. Richard Olmstead

Friday, March 31, 7:00pm

JOURNAL OF THE WASHINGTON NATIVE PLANT SOCIETY

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* The WNPS Arthur R. Kruckeberg 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.

** Deceased

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Information for Contributors

Members and others are invited to submit material for publication in *Douglasia*. We now accept scientific manuscript submissions that will be peer-reviewed. Other articles, book reviews, poetry, photography, or illustrations are welcome. All materials submitted should relate to the study of Washington's native plants. Acceptance will be based on space and appropriateness, and materials are subject to copyediting (substantive editing with author's permission). Contributors are reminded that the *Douglasia* audience ranges from the professional botanist to the interested enthusiast. For more information about how to contribute, see: wnps.org/douglasia/contribution.

Email submissions to Douglasia@wnps.org.

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Gardening with Native Plants for the Future:

Marcia Rivers Smith

Thursday, April 6, 7:00pm

Gardening Under Native Trees:

Christina Pfeiffer

Wednesday, April 12, 7:00pm

The Heritage Gardens Program:

Panel Discussion

Tuesday, April 18, 7:00pm

Underground Allies: Tiny Yet Mighty:

David Montgomery & Anne Biklé

Monday, April 24, 7:00pm

Resilient Gardens for Uncertain Futures:

Clay Antieau

Thursday, April 27, 7:00 pm

In addition to these great presentations, each WNPS chapter has organized some great field trips and events throughout the state. If you would rather explore native plants on your own, you can go to the chapter web pages on our website to find spring self-guided destinations. Many chapters also coordinate with local partner organizations for events; you can find those events on our partner calendar: wnps.org/partner-calendar.

As I write this message there is snow falling in Ellensburg and I am anxiously waiting for the first spring flowers to emerge in my yard. As the days get longer and weather warms up, I hope you get a chance to get out and explore the diversity of native plants in your area with friends and family.



Article references are available on the WNPS website here:
wnps.org/douglasia.

On the cover: Serviceberries (*Amelanchier alnifolia*) blooming with golden currant (*Ribes aureum*), great camas (*Camassia leichlinii*), and prickly currant (*Ribes lacustre*) in the photographer's mostly-native garden in Bellingham. PHOTO: MARK TURNER

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Whitebark Pine is Washington's Newest Threatened Plant Under the Endangered Species Act

by Walter Fertig, WNPS Editorial Committee Chair

After two years of deliberation and soliciting public comment, the U.S. Fish and Wildlife Service officially designated whitebark pine (*Pinus albicaulis*) as a Threatened species under the U.S. Endangered Species Act on December 14, 2022. Whitebark pine becomes the 11th plant species from Washington protected under the Act (though two others, golden paintbrush [*Castilleja levisecta*] and Nelson's checkermallow [*Sidalcea nelsoniana*] have been recently proposed for de-listing).

Whitebark pine is still widespread across northwestern North America, ranging from southern British Columbia and Alberta south to California, Nevada, and Wyoming. This species is mostly found at upper treeline, where it is exposed to strong winds and deep snow, resulting in individual trees that are often twisted or stunted. Whitebark pine is considered a keystone species because its large nuts are an important food resource for Clark's nutcrackers, grizzly bears, and other animals.

Over the past 25 years, whitebark pine populations across its range have declined by more than 50% due to depredation by white pine blister rust (*Cronartium ribicola*) and mountain pine beetles (*Dendroctonus ponderosae*). Blister rust, a non-native fungal pathogen, can kill mature trees by clogging the food-transporting phloem tissue below the bark, effectively starving the plant of nutrients. Mountain pine beetles are native but becoming more common as winters become milder. Beetles bore holes in the wood that become entry points for infection by blister rust spores. Climate change is exacerbating these impacts and making timberline habitats more vulnerable to wildfire.

Plant species receive less protection under the Endangered Species Act than animals. Protections extend primarily to federal lands, such as those managed by the National Park Service, U.S. Forest Service, and Bureau of Land Management, and include restrictions on removal of whitebark pine plants and the import or export of whitebark pine wood or other products. These protections do not extend to plants on state, tribal, or private lands. Projects affecting listed species on federal lands or actions by U.S. government agencies on other lands do require consultation with the U.S. Fish and Wildlife Service to reduce potential impacts. The Service has not designated critical habitat for whitebark pine and has issued a 4(d) ruling that can authorize land management actions (such as thinning, seed collection, or research) that might impact individual plants but benefit the conservation of the species as a whole. The listing also does not affect the collection of edible seeds by Native Americans for ceremonial or traditional cultural use.



Climate-friendly Gardening with Native Plants

By Bertie J. Weddell

The rollin' Palouse ain't nothin' but wheat and barley and dry peas and lentils . . . and hippies who like the low rentals.

—*Song by the late Bill Olson, early 1980s*

Native plants of the rollin' Palouse provided the region's first peoples with roots and berries that made up a significant portion of their diet. Later, the deep, fertile soils in this region of southeastern Washington and adjacent Idaho attracted farmers and two land-grant universities. Small towns populated by academics and city folk seeking a rural lifestyle followed.



Arrowleaf balsamroot (*Balsamorhiza sagittata*). PHOTO: JACIE JENSEN

These changes eliminated most of the Palouse prairie. Known also as meadow-steppe, the remaining fragments of this ecosystem contain diverse assemblages of native perennial grasses and forbs, including several regional endemics (Weddell and Skinner 2007). (Meadow-steppe also occurs in Ukraine and Russia.)

Most precipitation in the Palouse falls in winter, spring, and fall, but in normal years the roots of native plants and crops can reach soil water even during the dry summers. However, at its western edge, the climate is too dry for many of the native forbs, and meadow-steppe gives way to steppe dominated by just perennial grasses.

Two summers ago, when the Pacific Northwest experienced a dramatic heat dome, I lost some native species from my yard. Commercial growers throughout Washington also felt the impact of this unwelcome phenomenon. Berries and cherries withered, leaves of potato plants rolled up like tacos, and cereal crops matured too soon.



Woolly sunflower. (*Eriophyllum lanatum*) PHOTO: JACIE JENSEN

As I look forward to the longer days and milder weather of spring this year, I find myself wondering what I can do to prepare for the changing climate that lies ahead. How can I maximize carbon storage and minimize carbon emissions in my yard and plan for how assemblages of native plants might change in a warming climate? In this article I will try to answer these questions and then explore specifics in the Palouse.

Farmers and scientists have been doing work on climate-friendly farming for decades, although climate change was not the original impetus for their work. That came from the Palouse's high erosion rates. In the 1960s, the development of no-till seeders that plant directly into crop stubble reduced the need for plowing (Huggins and Reganold 2008). This change meant that less of the soil's buried organic matter became exposed to air. The importance of this technology for reducing greenhouse gas emissions was not evident for several decades, however.

Adding or subtracting greenhouse gases

Greenhouse gases (GHGs) prevent heat from radiating away from the earth. Carbon dioxide (CO₂) is the most abundant GHG, but there are several others. Methane and nitrous oxide are of special concern. Both are less abundant than carbon dioxide but more effective at trapping heat.

If you ever had an introductory class in biology, you probably learned that green plants take up CO₂ during photosynthesis. In this way, plants remove carbon dioxide from the atmosphere, and some subsequently is used when biomass is formed. When biomass is incorporated in soil, carbon-containing compounds are stored. This process is known as CO₂ storage or carbon sequestration. Soil is thus one of the earth's principal sites of carbon storage (the ocean is another).

In the reverse of this process, organic matter burns or decomposes and releases CO₂ (as well as some other GHGs). In well-aerated soil, microorganisms decompose dead roots, wood, or other organic matter and produce some carbon dioxide. Tillage, or even digging by animals or gardeners, brings soil organic matter to the surface, where it comes into contact with higher concentrations of oxygen. This speeds up decomposition and the release of CO₂ (Montgomery 2007).



Sticky purple geranium (*Geranium viscosissimum*). PHOTO: JACIE JENSEN

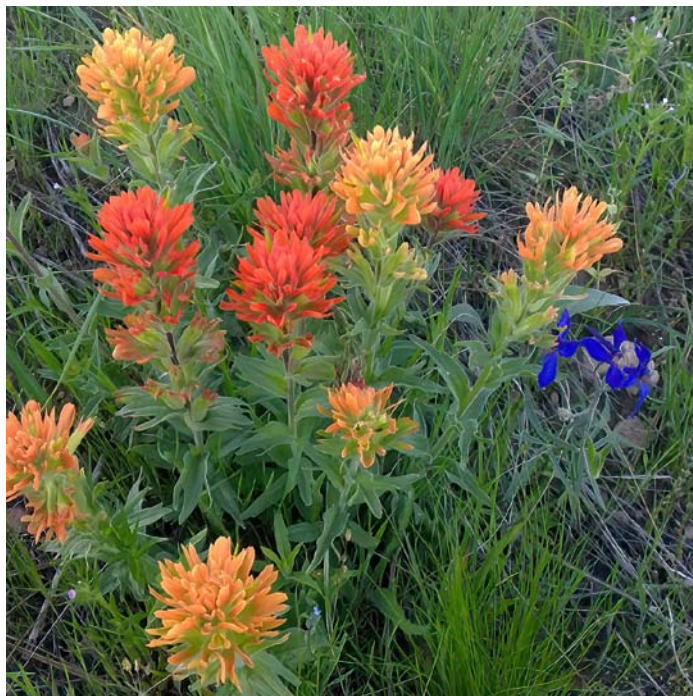
Organic matter can also decompose in the absence of oxygen. That anaerobic decomposition occurs where organic matter is saturated in soil or compost that is wet. The resulting process is much slower than decomposition that occurs in the presence of air. However, decomposition in the absence of oxygen produces methane in addition to CO₂. This is what makes wet compost and some wetlands smell like rotten eggs.

When organic matter remains buried while it is decomposing, most of the GHGs that are produced remain trapped. But when wetlands are drained or wet compost is exposed to air, methane escapes. This is a big concern because the heat-trapping effect of a given amount of methane is many times greater than the impact of a similar amount of CO₂. So, to minimize the release of heat-trapping gases from our gardens, we need to turn our compost often to aerate it and keep it from producing methane. On the basis of this brief discussion, we can come up with a few basic principles of climate-friendly gardening.

Dos and don'ts of climate-friendly gardening

The implications of this short summary for climate-friendly gardening are twofold:

- To minimize carbon emissions: Minimize soil disturbance and exposure to air; minimize anaerobic decomposition in compost.



Harsh paintbrush (*Castilleja hispida*). PHOTO: JACIE JENSEN

- To maximize carbon storage: Maximize plant biomass.

These principles are pretty straightforward. But they don't provide guidance on what species to plant. For that, we need to consider how particular species are likely to respond to a warmer climate.

Planning for potential shifts in climate: What species should we plant?

As we prepare for additional climate change, it makes sense to ask which organisms are likely to thrive, or at least to survive, in a warmer world. Here again, insights from agricultural ecology can help us understand how our native plant distributions may shift.

Across central Washington there is a climate gradient, with average annual precipitation increasing from west to east. Currently, farmers at the eastern edge of the Palouse typically produce dryland crops of grains and legumes each year. A little further to the west (beginning near the city of Colfax), the climate becomes slightly warmer, and precipitation is lower. In that drier zone, there is not enough moisture to produce crops every year. Instead, growers usually raise grain once every two or three years. After that, they leave their fields fallow for a year or two. During that time, soil water accumulates.

For our purposes, the significant prediction here is that cropping systems in the Palouse are likely to shift with a warming climate. The edge of the zone where crops are produced once every two or three years may move eastward. In other words, growers near the border with Idaho who now raise crops every year may start producing crops only one out of every two or three years as the climate becomes drier. They may adopt a rotation more like that of their current neighbors to the west.

Similarly, a warming climate in the Palouse may favor native plants that are already adapted to relatively dry conditions. The principal perennial bunchgrasses—bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), and Sandberg bluegrass (*Poa secunda*)—already have wide distributions that include the drier zone west of the Palouse. So do some, but not all, of the forbs.



Velvet lupine (*Lupinus leucophyllus*). PHOTO: DAVID SKINNER

I suggest that growing those three bunchgrasses along with native forbs that occur within meadow-steppe in relatively dry habitats might increase the chances that native plant gardens in the Palouse will persist in a warmer climate. This seems like a promising strategy to me. I admit, however, that one might argue that we should plant rare native species which have limited distributions because they have the greatest need of protection. This is a matter of debate. There are advantages and disadvantages to each of those strategies. (And any time rare plants are grown it is essential to be sure not to disturb or deplete rare populations in the process!)

Perennials are especially important for the task of preparing for a warmer future. Their extensive root systems stabilize soil and store carbon below ground. Table 1 lists common native grasses and forbs of dry or dry/mesic habitats in Palouse meadow-steppe. Many of these, such as arrowleaf balsamroot (*Balsamorhiza sagittata*), woolly sunflower (*Eriophyllum lanatum*), sticky purple geranium (*Geranium viscosissimum*), harsh paintbrush (*Castilleja hispida*), and velvet lupine (*Lupinus leucophyllus*) are good choices anyway because of their showy blossoms.

On the other hand, in dry environments, annuals tend to do better than perennials. So it makes sense to hedge our bets by including some native annual forbs such as slender phlox (*Microsteris gracilis*).



Slender phlox (*Microsteris gracilis*). PHOTO: WALTER SIEGUND, WIKIMEDIA COMMONS

For further consideration

I offer these suggestions as untested hypotheses. WNPS members can contribute to answering these questions by keeping records of weather and species-specific plant survival in their yards, as well as interactions with pollinators and pests. (Perhaps this could even generate research projects and funding proposals.) Climate change presents a colossal, untested experiment. Let's do what we can to be ready.

Bertie Weddell is a retired member of the Washington State University faculty and the founder of Draba, a consulting firm specializing in habitat evaluation. You can reach him at weddell-bertie@gmail.com.



Snapshots of YEER

A new WNPS program that engages middle school science students in restoring native plant communities

by Janneke Petersen, Program Developer & Coordinator for Western Washington

What is YEER?

Youth Ecology Education through Restoration (YEER) is a new program through the Washington Native Plant Society (WNPS) that matches middle school science teachers with local WNPS chapter members to restore an area of their schoolyard or nearby land in their community. Teachers agree to teach a 4-week Ecosystem Unit that centers around a challenge: to increase the biodiversity of their restoration site. Taking on the role of restoration ecologists through hands-on lessons, students learn how native plant communities form the foundation of complex food webs. They apply this knowledge to come up with a plan for increasing the biodiversity of their site. YEER is run by Western Washington Coordinator Janneke Petersen and Eastern Washington Coordinator Gretchen Graber.

Snapshots of the YEER Pilot Schools

Rose Hill Middle School, Redmond

"The students are absolutely LOVING IT. They are so excited not just to come outside and do the work, but they're also recognizing that they're contributing. There's been a lot of discussion about why this is important and the lessons have helped with that. And it's local! The fact that they can make a contribution right here at Rose Hill. I mean, it's just so meaningful for them." —Kim Haber, science teacher



Rose Hill's restoration site at their school. PHOTO: JANNEKE PETERSON

Rose Hill has two restoration sites in its schoolyard: In the 2021-2022 school year the 6th grade class restored a forested area with a Himalayan blackberry (*Rubus bifrons*) understory surrounded by parking lot. This past summer, the school's maintenance staff mowed and treated the 15-foot-high blackberry patch at this year's restoration site, right by the school entrance. With the guidance of Tina Miller, lead YEER Steward, and four local WNPS members, students grubbed out the root balls at the site on their first restoration day last fall. Shrieks of victory could be heard throughout the schoolyard when particularly large root balls were unearthed. Later in the fall, they planted 360 native plants (20 different species!), including western red cedar (*Thuja plicata*), snowberry (*Symphoricarpos albus*), Douglas-fir (*Pseudotsuga menziesii*), nootka rose (*Rosa nutkana*), etc. They will be back outside during the spring to mulch around each of their plants and weed out any returning blackberries. For next year's site, the YEER Steward team

During YEER's two-year pilot we have:

- planted 4,536 native plants
- removed 56 cubic yards of weeds
- restored 2 acres
- engaged 1,414 students as restoration ecologists
- engaged 24 WNPS members as volunteer YEER Stewards

has their sights on a Himalayan blackberry thicket lining the border of the schoolyard.

Wahluke Junior High, Mattawa

"It definitely made an impact on their awareness [of their environment]. Like, at the end, they could talk about plants they didn't even know the names of at the beginning. To me, the reason to continue this program is that you don't care about what you don't know about." — Cynthia Smith-Kuebel, teacher



Wahluke student with a native plant. PHOTO: GRETCHEN GRABER

Wahluke Junior high is in an agricultural community along the Columbia River in Eastern Washington. The school is surrounded by agricultural fields and much of the schoolyard is unused agricultural land that is barren of plant life, except for tumbleweeds. The students are primarily the children of migrant agricultural workers and many are English language learners. The 8th grade science teacher has a background in botany and jumped at the opportunity to partner with the YEER program. Last year, her 8th graders planted 1,000 plants in an old agricultural field that is now part of their schoolyard. This year, her 8th graders planted 1,040 shrub-steppe plants in a gravel site in their schoolyard that is outside portable office buildings. The school was happy to have a low water-use landscaping solution for the gravel. Last fall, led by the YEER Coordinator for Eastern Washington, Gretchen Graber, with the help of local chapter members, students planted 19 different species into the gravel, including sagebrush (*Artemisia tridentata*), globe mallow (*Sphaeralcea munroana*), Oregon sunshine (*Eriophyllum lanatum*), needle and thread grass (*Hesperostipa comata*), and snow buckwheat (*Eriogonum niveum*). In a few years, the result will hopefully be dramatic: from gravel to a diverse shrub-steppe habitat.

Paterson Junior High, Paterson

"I can't wait to plant. Do we get to go to our restoration plots today?" —Asked frequently by Paterson students to their teacher as they entered the classroom during the YEER program.



Paterson students at their restoration site. PHOTO: GRETCHEN GRABER

Further south along the Columbia River, Paterson lies on the Washington-Oregon border and is also a predominantly Latinx agricultural community. The science teacher at Paterson was eager to partner with the YEER program and has been learning about native plants for the first time herself, through the YEER curriculum. Her 6th graders last year restored disturbed shrub-steppe habitat next to the schoolyard, and this year's restoration site is adjacent. This year, with the guidance of Gretchen and local chapter members, her class of 48 students managed to plant an impressive 272 shrub-steppe plants (13 species), including sagebrush, bitterbrush (*Purshia tridentata*), blanket flower (*Gaillardia aristata*), purple sage (*Salvia dorrii*), and showy daisy (*Erigeron speciosus*).

Ray Reynolds Junior High, Pasco

"This is just so peaceful." —student (said during restoration field day at Rattlesnake Mountain)



Ray Reynolds students planting a fire-burned area on Rattlesnake Mountain. PHOTO: GRETCHEN GRABER

Ray Reynolds joined during the 2022-2023 school year, the second year of the pilot program. The 7th grade science teacher was eager to involve his students in a real-world restoration project, connected to a high-quality curriculum. The restoration site for his class of 7th graders is a fire-burned area of Rattlesnake Mountain, managed by the Washington Department of Fish and Wildlife. During the fall, students were led by Gretchen and local chapter members on an all-day field trip to the site to plant 480 shrub-steppe natives (19 species!) including sagebrush, snow buckwheat, pearly everlasting (*Anaphalis margaritacea*), yarrow (*Achillea millefolium*) and pale evening primrose (*Oenothera pallida*). Tapteal Greenway, a local conservation organization, generously covered the cost of the YEER program for Ray Reynolds.

Quilcene Middle School, Quilcene

"Wait, you can get paid to do this work? Seriously?! I'm gonna be a restoration ecologist when I grow up!" —Student (said during planting)



Quilcene students at their restoration site at Snow Creek Preserve. PHOTO: JANNEKE PETERSON

The 7th grade class in Quilcene has adopted an old pasture in Snow Creek Preserve, owned by Jefferson Land Trust. YEER is helping the land trust achieve its land management goals for Snow Creek Preserve by restoring the pasture. The pasture is dominated by non-native pasture grass that is, in the words of Carrie Clendaniel, JLT Preserve Manager, "not doing anything for local wildlife." During the early fall, students visited the preserve to observe their restoration site, learn how to identify native plants in the upland forest reference ecosystem, and do a plant biodiversity survey of a plot in their restoration site and one in the reference ecosystem. They came back in early January to plant and sheet mulch 50 native plants (10 species), including snowberry, oceanspray (*Holodiscus discolor*), grand fir (*Abies grandis*), red alder (*Alnus rubra*), and nootka rose. A sense of pride is developing with Quilcene science students; they will steward this pasture (which is many acres) back to health, passing the baton from one 7th grade class to the next.



Griffin 7th grader plants Idaho fescue with help of parent chaperone, at Twin Rivers Ranch Preserve in Shelton. PHOTO: HEIDI ENGLE

Griffin Junior High, Olympia

"I am passionate about being outside with kids in nature, doing the work that I believe is super important for bringing back biodiversity to some of our old farms and homesteads that are now land trusts." —Heidi Engle, YEER Steward (South Sound Chapter member)

Griffin Junior High's 7th graders are restoring a 3,600 sq. ft. area of old pasture land bordering Cranberry Creek at Twin Rivers Ranch Preserve in Shelton, owned by Capitol Land Trust. The site is dominated by non-native pasture grass and was used for grazing cows for many decades. Cranberry Creek, just a few feet from the restoration site, is a salmon-bearing creek and this land is therefore a high priority for CLT to restore to a healthier riparian habitat. South Sound Chapter members Heidi Engle and Samantha Elie stepped up to the role of lead YEER Stewards. The dedicated team, including three additional South Sound Chapter members, led groups of students when they visited the preserve early in the fall to make observations of their restoration site, learn how to identify native plants, and do a plant biodiversity survey of a plot within the restoration site and the bordering reference ecosystem. On a blessedly sunny and warm day in early December, students returned to carry out their restoration project, planting and sheet mulching 400 plants including salt-tolerant species, native grasses, and riparian species.

Taking YEER Forward

With the end of the pilot approaching, there are big questions that WNPS is working on answering through a series of YEER Visioning workshops this spring, facilitated by WNPS member Nan Maysen. How do we take YEER forward? How will it be funded in the future? Do we scale up and offer it to more schools, or simply keep working with the six schools that participated in the pilot? How might YEER and the Steward Training Program work together?

We have received significant interest from around the state from teachers and stewards, wondering if they can have a YEER program in their community. One of those inquiries came from Federal Way School District; they reached out and asked if they could partner with us to have YEER in all nine middle schools in their district. We are starting with just one Federal Way middle school next year and will go from there. The Steward Training in Tacoma will provide the trained Stewards needed to lead the restoration project in the schoolyard (a lawn transformation).

There is still much to figure out, but one thing is for sure: participating YEER teachers, students, and stewards have voiced their high enthusiasm for the program. At YEER's heart there is a joyful feeling during the restoration days, as multiple generations come together to restore Washington's native plant communities.



Restoration on Your Own

by Mark Turner

This young Sitka spruce (*Picea sitchensis*) was planted on the photographer's property near Bellingham in 2016 after clearing a huge thicket of Himalayan blackberries (*Rubus bifrons*), creating what we call the "blackberry desert." This photo is from spring 2000 and the tree is now nearly 10 feet tall and thriving. The land was cleared of its old-growth conifers decades ago and now has bigleaf maples (*Acer macrophyllum*) and red alders (*Alnus rubra*) that are nearing the end of their life and forming woodpecker-friendly snags. Planting conifers jump-starts the next stage of succession.



Bracken Fern, a Poisonous Food Plant

by T. Abe Lloyd, Koma Kulshan Chapter

Having a cosmopolitan distribution and both edible rhizomes and frond shoots, bracken (*Pteridium aquilinum*) was once a food of global importance. In North America, however, its reputation is tainted. To be clear, bracken is poisonous, but like many foods, proper processing and moderate consumption are important. When properly prepared, bracken rhizomes and frond shoots—called fiddleheads or crosiers—have a long history of use. Here in the Pacific Northwest, the rhizomes are more commonly consumed than the crosiers. I will introduce the species, discuss the toxicity, and describe the traditional use of bracken rhizomes in our region.

Description

Brackens can easily be distinguished from other ferns by their habit of arising singly (as opposed to in clumps) from long underground rhizomes. Their relatively lengthy and finely pubescent “fiddleheads” and fronds have big branches and a triangular outline with the largest branches arising lowermost. Each frond usually has fewer than 15 primary branches on

fronds that are thrice-pinnate, which means they have three orders of feather-like branching. Easily our largest fern, bracken fronds can grow to seven feet tall in deep soils, and rhizomes can extend horizontally underground for more than seven feet, producing a dozen fronds. Bracken rhizomes that my students harvested from eight small sample plots at my house yielded an average of 2.3 ounces per square foot (fresh weight).

The genus *Pteridium* comes from the Greek word *pteridion* for a small fern. The species epithet *aquilinum* also comes from Latin and means “eagle.” When Carl Linnaeus bestowed this name on the plant, he explained that an eagle could be seen in the cross section of the rhizomes. However, today many people attribute the name to the wing shape of the fronds. The common name bracken is derived from an Old Norse word meaning “fern.”



Bracken rhizome cross-section. PHOTO: ABE LLOYD

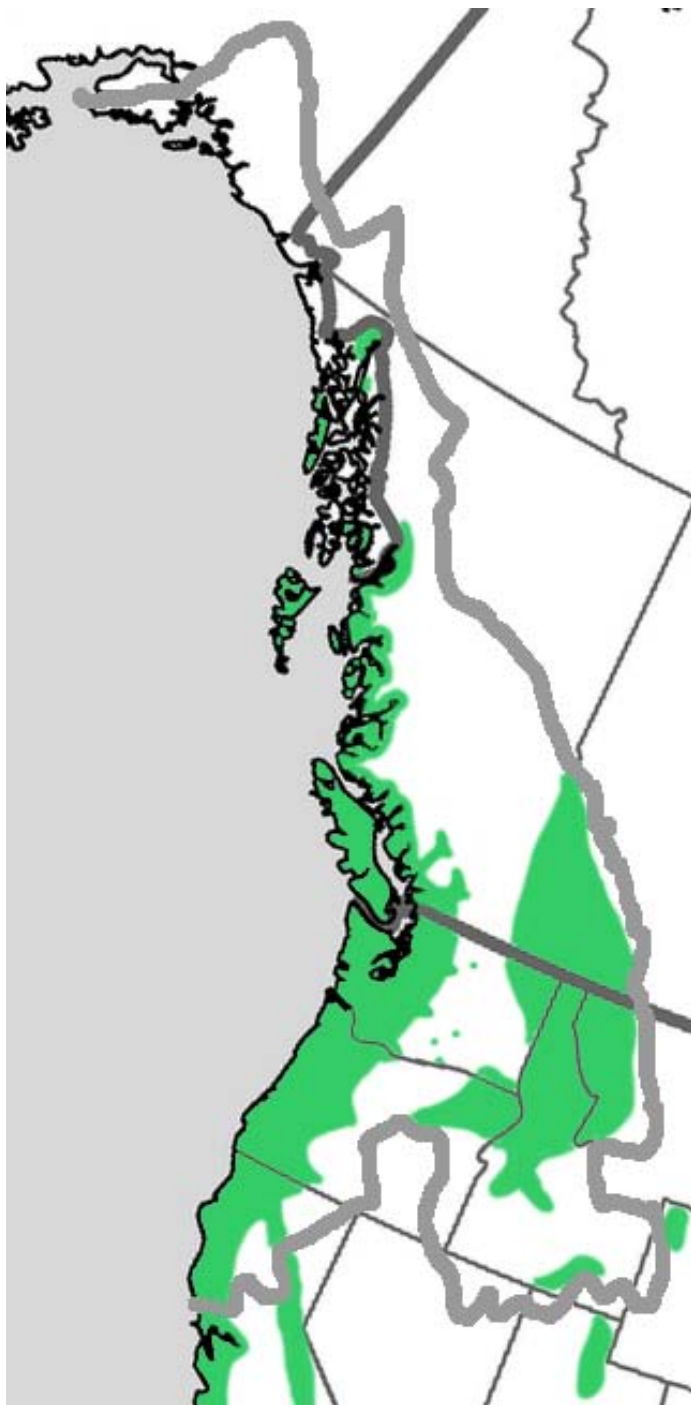
Range and Habitat

In our region, brackens are found from Haines in southeast Alaska southward along the coast to San Diego, CA. They grow abundantly in the Georgia Basin, Puget Trough, and Willamette Valley, but can also be found on both sides of the Cascades up to 6000', and on both sides of the Oregon and California Coast Ranges (iNaturalist, Consortium of PNW Herbaria, Calflora).

Inland populations are more sporadic and limited in British Columbia to the headwaters of the Skeena and Kitimat rivers, the Lillooet area, and the western slope of the Rockies from Prince George southward. East of the Cascade crest, brackens are limited to valley bottoms near water or forested areas in northeast and southeast Washington, northern Idaho, western Montana, and northeast Oregon. They are also found on the west slope of the Sierras in California (iNaturalist, Consortium of PNW Herbaria, Calflora). Look for brackens in moderate to



Mature bracken frond. PHOTO: ABE LLOYD



Distribution of bracken in the PNW. PHOTO: ABE LLOYD

large canopy openings associated with western hemlock along the northwest coast, with Garry oak, Douglas-fir, and redwood in lowland forests, and with ponderosa pine in parts of the inland and southern range. They thrive in deep loamy soils but can tolerate lithosols if there is enough moisture, as well as peatlands in places where there isn't too much. Brackens are moderately shade tolerant; they thrive with intermediate disturbance such as fire that limits tree cover, yet doesn't damage their deep roots.

Brackens are the world's most successful fern and one of the world's most successful organisms. Microscopic spores have enabled them spread to all continents but Australia and Antarctica.

Harvest and Preparation

Most people have heard of a "fiddlehead" fern—the tender tip of any fern frond that is curled up tightly and resembles the head of a violin. In North America, the fiddlehead fern of culinary fame is the ostrich fern (*Matteuccia struthiopteris*), which grows abundantly in eastern North America and only makes its way into our area in a few places in British Columbia (such as Chilliwack, Prince George, and Revelstoke).



Bracken crosier. PHOTO: ABE LLOYD

Bracken fronds are not so neatly coiled. The edible portion is actually the tender straight base of the frond below the fiddlehead, so I think the French term *crosier* for these vegetables is more appropriate (named for their resemblance to the staff of a bishop or shepherd). Bracken crosiers are widely eaten in rural parts of Korea, Japan, and China, but they must be detoxified before they are consumed. In southeast Asia they are traditionally prepared by boiling for a few minutes, and then soaking in solution of salt water, baking soda, or wood-ash overnight. Once detoxified, they are sautéed and served. Their flavor resembles a mix of asparagus and almonds. However, the World Health Organization considers them "possibly carcinogenic." A study in Japan found that despite traditional preparation (detoxification) the risk of esophageal cancer increased 2.1 times in men and 3.7 times in women with daily bracken crosier consumption (Kamon and Hirayama, 1975).

Brackens contain cyanide-producing glycoside, thiaminase, and many carcinogenic illudanes including ptaquiloside (Turner and Szczawinski 1991; O'Conner et al. 2019). Lars Rasmussen (2021) found ptaquiloside in all parts of the fern. He also tested the detoxifying effect of boiling and soaking bracken crosiers and found that ptaquiloside levels could be reduced by 17% when boiled for two minutes in water, and could be reduced by 65% when boiled for two minutes in alkaline water

(with CaCl_2 and baking soda). A similar, much older study by Hirono et al. (1972) compared the intestinal tumor rates in rats fed crosiers prepared as they would be for human consumption. They found that crosiers boiled in plain water produced intestinal tumors in 78.5% of the rats and crosiers boiled in water with wood ash, sodium carbonate, or salt produced tumors in just 25% of the rats. They concluded, like Rasmussen, that carcinogens still persisted after the cooking preparation. Both Rasmussen and Hirono observed regional variation in crosier toxicity. Rasmussen even noted populations with no ptaquiloside. Kawai et al. (1981) and Rasmussen also noted that drying the crosiers reduced toxicity significantly, and it is worth noting that crosiers are traditionally sun-dried or pickled for storage in Japan for consumption throughout the year (Hodge 1973).

Despite reduced toxicity from drying, treating, and cooking, I am still reluctant to make bracken crosiers a part of my diet. It is difficult for me to assess, from the scientific literature I reviewed, how sparing consumption of bracken crosiers (e.g., five times a year) might compare to my cancer risk from light consumption of alcohol and red meat, or moderate consumption of sugar.

For those desperate for a taste, look for bracken crosiers as early as February near the coast in California or as late as May in coastal British Columbia. Inland and montane populations will emerge in May or June. They are usually perfect in late April in Western Washington. The fern shoots are best for harvest when they are around ten inches tall and have a recurved top. All the foliage should still be curled tightly. If the foliage is open, they are not safe to eat.

The story of bracken toxicity is not all hair-raising. Rasmussen also assessed ptaquiloside in fresh and dried bracken rhizomes and was unable to detect the carcinogen in commercial products that were made from processed rhizome powder.

Hirono et al. (1972) compared the carcinogenic activity of different bracken parts by feeding them to rats. They found that rhizomes were most toxic, followed by the curly crosier tops, while the crosier stems were least toxic. However, they also noted that bracken rhizome starch contained no carcinogens and concluded that processing must have leached toxins from the rhizome flour. This finding is significant because in our region, the rhizomes are the plant part most commonly eaten.

Ethnobotany

Although bracken hasn't received the same revitalization efforts as camas (*Camassia* spp.), it was one of the most significant root foods of this region and was eaten by virtually all the Indigenous Peoples in southeast Alaska (Moss 2005, McDonald 2005), coastal British Columbia (Turner 1995), western Washington (Gunther 1973; Norton 1979a), and western Oregon (Phillips 2016). In northern California, bracken was the only root food recorded for the Tolowa by Merriam (1967) and was considered a "staple" root food by unspecified Indigenous Peoples in the Sierras (Chesnut 1902). East of the crest, the

long rhizomes were eaten by unspecified Indigenous Peoples in Western Montana (Blankinship 1905), and a few groups in the interior of British Columbia including the Lower Stl'atl'imx (Turner 1997, Hill-Tout 1905), Lower Nlaka'pamux (Turner et al. 1990), Carrier, and Sekani (Turner 1997), and Sylix (Perry 1952 in Moerman 1998). It was "likely the most abundant vegetable food" among the Twana (Elmendorf 1960) and the name of the Nooksack Tribe translates roughly to "always bracken rhizomes" which reflects an important harvest location and village site (Richardson and Galloway 2011).

The long black rhizomes were historically harvested when the plants were dormant, or just breaking dormancy. The Lummi harvested them "when the weather turned cold" and the Skokomish and Stó:lō dug them in the fall (Gunther 1973, Galloway 1982). The Haida (Turner 2010), Ditidaht (Turner et al. 1983), and the Hesquiaht (Turner and Efrat 1982) dug them after the fronds died in the fall. The Ditidaht clarified that the rhizomes were too skinny to harvest when the fronds were still green. The Saanich dug them in the late fall or winter (Turner and Hebda 2012) and believe that eating them in the summer may cause problems. Edward Curtis (1913) noted that Salishan Peoples harvested the roots in the winter. The Tillamook harvested a "wild fern root," which was probably bracken, in December (Jacobs 2003). The rhizomes were dug in the fall, winter, and spring by the Nlaka'pamux (Turner et al. 1990), and a Makah elder thought that the rhizomes may have been harvested in the spring just as the new shoots were starting to grow (Gill 1983). Evidently, they were eaten in the summer by the Nuxálk (Turner 1973). The Upper Skagit ate only those rhizomes that ooze juice (Gunther 1973).

Once harvested, the rhizomes were then either boiled, steamed, roasted, or dried before further processing. In 1863-64 Robert Brown (1868) remarked that the rhizomes were



Bracken rhizomes. PHOTO: ABE LLOYD

boiled and eaten by Indigenous Peoples all over Vancouver Island who “look[ed] upon them as a great luxury.” The Ditidaht (Turner et al. 1983) washed the rhizomes and tied them in fist-sized bundles with a signature knot that identified the owner of each bundle. Bundles were steam cooked in an earthen oven for 24 hours. The Hesquiaht (Turner and Efrat 1982) and Haida (Turner 2010) boiled or steamed the roots overnight before mashing them with a stone to remove the bark and inner fibers from the starchy core. The Haida ate the rhizomes with Eulachon grease (Turner 2010).

The Twana made piles of rhizomes “four to five feet high” and left them to dry for a few days before they were “peeled and cooked on hot rocks in a covered steaming pit until soft, and then pounded... with a wooden club into a moist, fibrous mass.... ‘Flour’ was separated from the pounded center fibers, molded by hand into cakes, and either eaten fresh or allowed to dry. They were prepared for use by soaking. Sometimes dried fish eggs were mixed with the fern-root flour in making these cakes” (Elmendorf 1960).

The Interior Salish also roasted bracken rhizomes in a pit oven, pulverized them into flour that was moistened with water and formed into cakes or balls, which were then dried and stored (Ray 1932). The Carrier steamed them in underground cooking pits for 12 hours and ate them with meat or fish (Turner 1997).

According to Edward Curtis (1913), the Coast Salish never pit-cooked bracken, but rather roasted them as follows:

“The long bracken-roots...were placed upon a bed of glowing embers until the black outer skin was scorched. This was then scraped away, and the roots were softened by pounding, cut into lengths of about twelve inches, and served. Extending through the centre of the roots is a core of white, tough pith. When the rather stringy, edible portion had been eaten, the women gathered up the pieces of root and extracted the pithy cores, fashioned them into long braids, and hung them up on the beams of the walls to dry for weeks or months. The pith was then parched for a day or more over a hot fire until it was perfectly dry and quite brittle, and by means of a mortar and pestle it was reduced to flour. Crushed salmon roe was mixed with it to form a doughy mass, which was shaped into balls and eaten without further preparation.”

The Lower Chinook (Ray 1938), Stó:lō (Galloway 1982), Ditidaht (Turner et al. 1983) and Kwakwaka'wakw (Turner and Bell 1973) also roasted the rhizomes directly on hot coals, turning them frequently to keep them from burning and cooking them until the bark was blackened. The rhizomes were roasted in hot ashes by the Chehalis, Cowlitz, Green River, Klallam, Lummi, Makah, Quileute, Quinault, Skagit, Skokomish, Snohomish, Squaxin, and Swinomish (Gunther 1983; Theodoratus 1989), as well as the Nuxalk (Turner 1973). Once cooked, the rhizomes were peeled and eaten by all these groups. The Salish beat the roasted roots to release the inner fibers before they were dipped in seal or porpoise oil and eaten as dessert (Jenness

n.d.). The Kwakwaka'wakw also beat the roasted rhizomes to remove the fibers and ate them with salmon eggs or eulachon grease (Turner and Bell 1973). The Lower Chinook ate them with salmon eggs (Ray 1938). The Samish, Lummi, Nooksack (Suttles 1974), and probably the Skagit (Sampson 1972) pounded a “flour” from the roasted roots and the former three groups made a bread that was baked in the ashes. Gibbs (1877) also reported that “from the ferns [the Coast Salish] make a species of flour which is baked into bread.”

A few groups did not immediately cook the rhizomes. The Hoh and Quileute pounded fresh rhizomes “to a pulp, dried the pulp, mixed it into a sort of dough and baked bread from it, which they claim was pretty good bread” (Reagan 1934). The Nisqually pounded or mashed raw rhizomes in a stone mortar, mixed the pulp with deer tallow and shaped the resulting dough into small flat cakes. These cakes were dried and could be stored for future use. They had to be soaked and boiled before they were eaten (Smith 1940). The Klallam first dried the roots, then laid them on a rock, beat with a bone club to release “a kind of flour, which was mixed with fish eggs and made into a cake (Eells 1889).” The Nlaka'pamux and Sto:lo dried the roots, roasted them over a fire, beat them with a stick to loosen the bark, and ate them with fish and sometimes pounded the roots into flour (Turner et al. 1990). In early August of 1825, David Douglas collected the fern near Vancouver, WA and noted that “the roots are dried and eaten by the natives, when boiled or roasted” (Douglas 1914).

In her excellent article on bracken use in Western Washington, Hellen Norton (1979a) discusses another potential product produced from bracken rhizomes: a “white paste” that could be stored for later use. Like most starchy foods, it is clear that bracken rhizomes can be prepared many ways.

The flavor of bracken rhizome is described as tasting sweet by the Nlaka'pamux (Turner et al 1990), like milk with “fine flavor” by the Tolowa (Merriam 1967), and “like sweet potatoes” by both the Hesquiaht (Turner and Efrat 1982) and William Clark, who tasted roots prepared by either the Lower Chinook or Clatsop on January 22, 1806. However, Meriweather Lewis sampled them on the same day and found them to have “a pungency... disagreeable” to him, but he also noted they are eaten “very voraciously” by his hosts (University of Nebraska Press 2022).

The crosiers do not have nearly the legacy of use as the rhizomes, but were eaten by a few groups including the Costanoan (Bocek 1984), Yana (Elsasser 1981), Atsugewi (Garth 1953), Stó:lō (Galloway 1982), and Nuu-chah-nulth (Turner and Bell 1971). The Nlaka'pamux also eat the crosiers, but this may have been learned from Japanese immigrants (Turner et al. 1990), an argument that may explain more limited use across our region. According to John Romero (1954), a Mahuna from Southern California, bracken crosiers were eaten like asparagus and were relished because they contain “much oil which is extremely rich in flavor when the shoots are properly cut and cooked.” Based on this account, some ethnobotanists have sug-

gested that this plant was used to make oil (Lloyd 1964), and researchers in Africa have shown that the ferns are indeed high in oil (Nwiloh et al. 2014). However, Romero does not say that the oil was removed from the plant, and no such oil is referred to anywhere else in the ethnographic record of this region.

Brackens were an important enough food resource to warrant active ownership and management. Among the Straits Salish, Wayne Suttles (1960) recorded that “not all, but the best camas beds, fern beds, wapato ponds and clam beds were owned by extended families with control exercised by individuals.” However, accounts specific to bracken were limited to Christine Charles, a Musqueam woman who stated that Musqueam families owned beds of brackens near Point Gray (Suttles 2005). The Upper Skagit managed bracken meadows along with tiger lily (*Lilium columbianum*), wild carrot (*Pteridaria montana*), and camas in plots that were owned and inherited by women (Collins 1974).

The Quilleute and Hoh burned prairies to maintain bracken patches (Norton 1979b). The Makah also burned every year or so to “keep down the trees” and favor for bracken (Vanderhoof in Anderson 2009). The Skagit, Kikialos, Snohomish, and Clallam used fire to manage bracken, camas, and nettles (*Urtica gracilis*, formerly *U. dioica*) on Whidbey and Camano islands in deep, fertile soils. They burned in the fall when the dead fronds accelerated the blaze and the plant was safe in dormancy, deep underground. Trees and shrubs that weren’t killed by the blaze were weeded out by hand (White 1999).

Conclusion

Brackens were once among the most important traditional root foods of the Pacific slope. If carcinogenic illudanes are present in the rhizomes but not present in processed bracken starch, then it is possible that the traditional processing techniques employed by Native Americans and First Peoples in our region evolved to limit exposure to these toxins (and probably improve their flavor). All groups selectively removed portions of the rhizome such as the black bark and core fibers. Furthermore, cooking, drying, and storing the rhizomes were commonplace. Is it safe to assume that the “flour,” “bread,” “cakes,” and “white paste” products described in this region were pure starch, and therefore free of ptaquiloside and toxins? I would like to think so but ultimately it will take further efforts on the part of food chemists and community mobilizers to bring this forgotten food out of the history books and back onto the plate. The culinary cousin of camas deserves a second chance!

Abe Lloyd is a senior instructor at Western Washington University and enjoys researching Indigenous foods. He can be reached at lloyd@wwu.edu.



Symbolic Native Botanicals of Washington State

by Becky Chaney, WNPS Conservation Committee Chair

State Flower, State Tree, State Grass... Washington legally recognizes various state symbols, from flag to mineral to fruit, that are important in some way to the state. Where do they come from? Us! Designation proposals are initiated through a grassroots process led by interested individuals, school children, and hobbyists. If approved by the legislature, items are officially recognized in the Revised Code of Washington (commonly known as the RCWs). Currently, three native plants are included in Washington’s state symbols.

Washington State Symbols, current native botanicals (descriptions from the Washington Legislature)

State Flower—coast rhododendron
(*Rhododendron macrophyllum*)



Coast rhododendron (*Rhododendron macrophyllum*) blossoms & foliage. PHOTO: MARK TURNER

In 1892, before they had the right to vote, Washington women selected the coast rhododendron as the state flower. They wanted an official flower to enter in a floral exhibit at the 1893 World’s Fair in Chicago. Six flowers were considered,

but the final decision was narrowed to clover and the “rhodie,” and voting booths were set up for ladies throughout the state. When the ballots were counted, the rhododendron had been chosen as the Washington state flower. In 1959, the Legislature designated the native species, *Rhododendron macrophyllum*, as the official flower of the state of Washington. (RCW 1.20.030)

State Tree—western hemlock (*Tsuga heterophylla*)

In 1946, an Oregon newspaper teased Washington for not having a state tree. The Portland *Oregonian* picked out the western hemlock, *Tsuga heterophylla* for us, but Washington newspapers decided to choose their own and selected the popular western red cedar (*Thuja plicata*). State Representative George Adams of Mason County pleaded with the Legislature to adopt the western hemlock. The hemlock, he said, would become “the backbone of this state’s forest industry.” Adams’ bill passed the Legislature and was signed into law in 1947. (RCW 1.20.020)



Western hemlock (*Tsuga heterophylla*) cones among foliage. PHOTO: MARK TURNER

State Grass—bluebunch wheatgrass (*Pseudoroegneria spicata*)

Although many state symbols are readily identifiable with the western part of the state, bluebunch wheatgrass is a state symbol that is unique to eastern Washington. Bluebunch wheatgrass was a blessing to Washington’s pioneer farmers and continues to play a major role in our agriculture industry today. It was adopted by the 1989 Legislature as the official state grass. RCW 1.20.025 uses the former botanical name, *Agropyron spicatum*.



Bluebunch wheatgrass (*Pseudoroegneria spicata*). PHOTO: MARK TURNER

And now, with great excitement, I’m announcing WNPS support for a fourth botanical designation, the basalt cactus (*Pediocactus nigrispinus*). Initiated by the Cascade

Cactus and Succulent Society and supported by Discovery Lab, an Ellensburg elementary school, this designation request has started strong. With additional public and political support, and plenty of persistence, I am convinced the basalt cactus will officially join our three existing native botanical Washington symbols.

Washington Native Plant Society Proposed Addition

Written by Ron Bockelman

State Cactus (proposed)—basalt cactus (*Pediocactus nigrispinus*)

The first thing a state cactus should have is spectacular flowers, and the profuse ones of *P. nigrispinus* have brilliant pinkish-red petals surrounding a multitude of showy yellow stamens. *P. nigrispinus* is Washington’s only ball cactus, making it unique and easy to distinguish from the other two native cacti, both of which are *Opuntia* species. Historically, archaeological studies in Tekison Rockshelter found buried *P. nigrispinus* spines, suggesting it was used by Native Americans about 600 years ago. *P. nigrispinus* is a plant species of conservation concern in Washington, so designating it as the state cactus would make people more aware of the threats that increased rangeland wildfires and climate change pose to this regionally-endemic species.

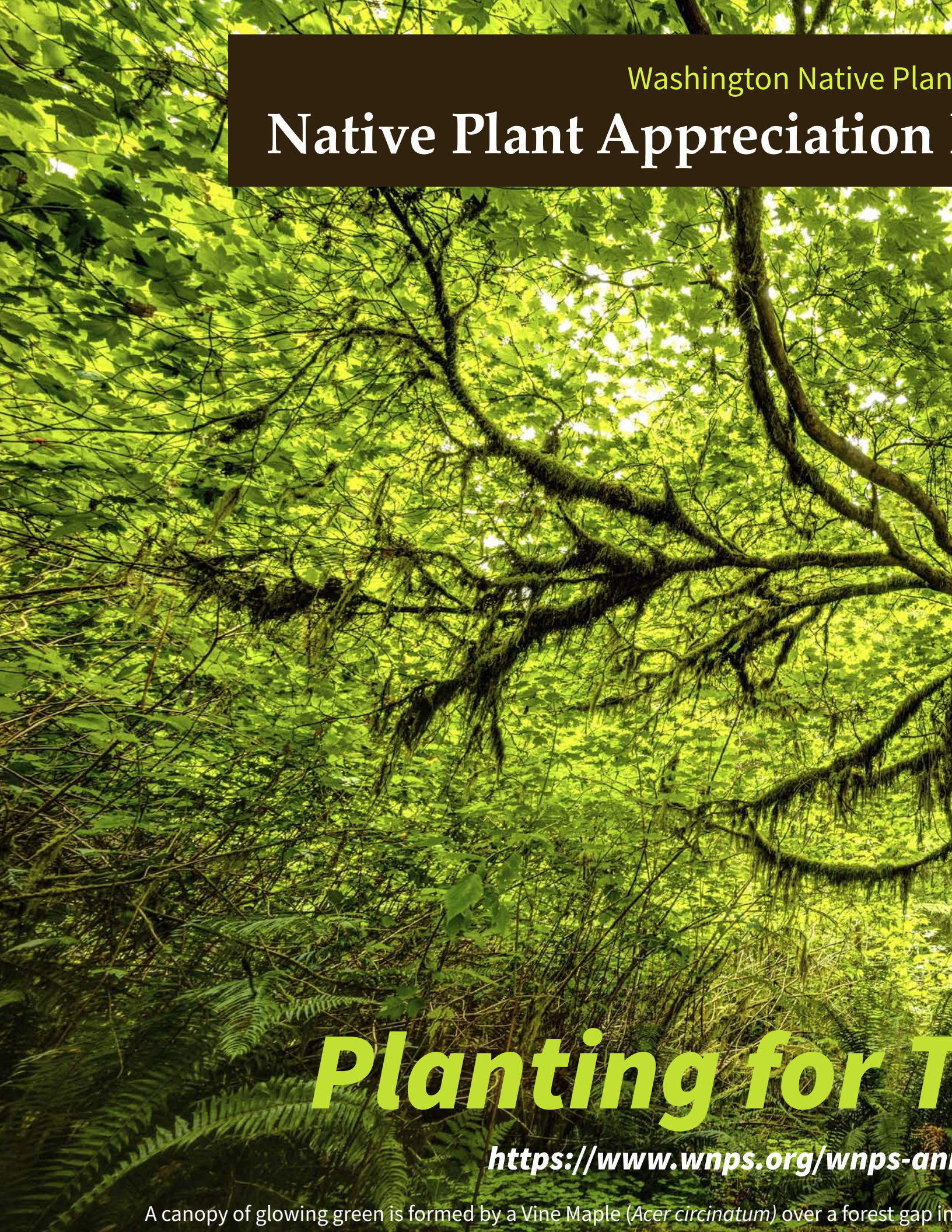


Basalt cactus (*Pediocactus nigrispinus*). PHOTO: MARK TURNER

Introduced in 2023 by Senator Judy Warnick, SB 5698 (2023-24) “AN ACT Relating to the state cactus,” has made it into the legislative process and has been assigned to the State Government Committee. The bill is still in committee, so it will not be considered further until 2024. Whether it can progress further will depend on how many community voices join together to help push the bill forward. Watch for additional opportunities to make your voice heard! The WNPS Conservation Committee is committed to cheering on this new addition to the Washington’s State Symbols.

Becky can be reached via e-mail at conservation@wnps.org. She is always happy to hear your conservation interests, concerns, and comments. Ideas for conservation-oriented webinars are also welcome.





Washington Native Plant Society

Native Plant Appreciation

Planting for T

<https://www.wnps.org/wnps-annual>

A canopy of glowing green is formed by a Vine Maple (*Acer circinatum*) over a forest gap in

t Society

Month - April 2023

tomorrow

[annual-events/npam](#)

Washington's temperate rainforest. Photograph by Eric DeChaine.

WNPS is a 501c3 organization dedicated to the promotion of appreciation and conservation of Washington's native plants and their habitats through study, education, and advocacy.



Washington Native
Plant Society



Circle Peak, A Hike with a Limestone Streak

By David E. Giblin

The Cascade Range in Washington State is geologically diverse due in large part to its proximity to the Cascadia Subduction Zone that runs from Vancouver Island to northern California. Hundreds of millions of years of tectonic plate movement and volcanic activity along this strip distributed and deposited rocks of various types and origins across the Cascades. Perhaps the most well-known example of geologic diversity in Washington is the serpentinite and related rock groups found in the Wenatchee Mountains. The soil derived from these rocks contributed to the evolution of some plant species that occur nowhere else in the world.

Interestingly, limestone rock is poorly represented throughout the Cascades region. Yes, there are pockets of it here and there (e.g., the town of Concrete in Skagit County), but nothing at the scale where it profoundly shapes the flora as in the Wenatchees. Limestone is of interest to plants, and by extension botanists, because the soils derived from it tend to be of neutral pH (7 on a scale of 0 to 14) or slightly basic (greater than 7). In many parts of the world, these “sweeter” soils often support plant species that have evolved to thrive in these conditions.

Such is the background for a plant collecting trip that I made with Ed Alverson and Peter Zika, at Ed’s suggestion. As a fern expert, Ed was hoping that a limestone ridgeline he knew about just east of Darrington might have some uncommon ferns or at least unexpected distribution occurrences. Not knowing anything about this area, Peter and I accepted Ed’s invitation. We made our way to Circle Peak, the highest and most accessible point along the ridgeline, and in the process discovered a most rewarding hike.

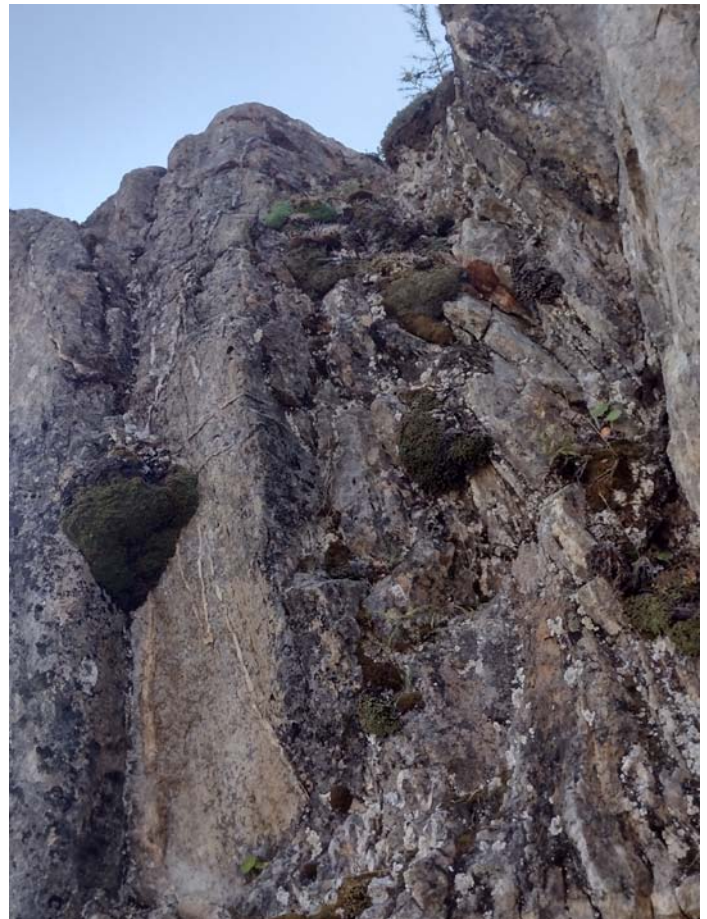


Ed Alverson amid huckleberry (*Vaccinium* spp.) shrubs and fruiting stalks of bracted lousewort (*Pedicularis bracteosa*) and Sitka valerian (*Valeriana sitchensis*) with Circle Peak in the background. PHOTO: DAVID GIBLIN

After talking our way past two work crews on the Suiattle River Road (one fire prevention, the other road maintenance), we reached the trailhead (see notes at end of article). There is a brand-new sign, which seems out of place because there was no other sign of human activity for the 30 minutes of driving once we left the Suiattle River Road. The first 100-200 feet of the trail are steep—like, “what did I agree to” steep. This is only to get you to the main trail (go left). Once on it, the rest of the 2-mile, 1200-foot elevation gain hike to the summit is moderately steep at worst. The Washington Trails Association has done recent work in this area (hence the new sign), so the trail is in great shape.

About halfway to the summit you encounter a large wet-meadow complex on your right. Here you will find a massive and only the second known population of smooth horsetail (*Equisetum laevigatum*) west of the Cascades crest. The intrepid might poke around more and find the mountain mare’s-tail (*Hippuris montana*) growing in and along the edge of seasonal standing water. While not rare, mountain horse-mane is an overlooked element of our aquatic to semi-aquatic flora. Lots of marsh violet (*Viola palustris*) to be found here as well. We were there in early September, so the peak of mosquito season had passed. You might not be able to linger here too long earlier in the season.

Looking up from this meadow you can see the long, white, craggy, limestone ridgeline whose northern terminus is Circle



Beehive-like masses of purple mountain saxifrage (*Saxifraga oppositifolia*) on a rock face near the summit of Circle Peak. PHOTO: DAVID GIBLIN



Peter Zika atop the true summit of Circle Peak. PHOTO: DAVID GIBLIN

Peak, which at that point is behind trees and off to your left. Seeing such a continuous streak of white rock in the Washington Cascades is quite unusual. The trail continues upward modestly to an open slope adjacent to a cirque on the north side of Circle Peak. I am quite sure that from late-July to mid-August this hillside meadow is awash in columbine, lupines, lovage, paintbrush, Sitka valerian, and a bunch of other subalpine meadow species (they were in fruit as we ascended the gentle switchbacks). We encountered a ridiculous amount of huckleberries (*Vaccinium deliciosum* and *V. membranaceum*), and the berries were some of the largest I'd ever seen. I kept thinking that there had to be a bear around here somewhere. I've seen photos of this hillside in late September, and it is just a sea of burning red foliage from the huckleberries.

The trail terminates at the false summit, where one needs to watch their step if going to the true summit (punctuated with a dilapidated mailbox). There is a narrow section separating the two with some pretty good exposure, but nothing dangerous. I am sure that the views from here are spectacular, but we had ours compromised by the late-summer, west-side fires of 2022 (we were there the day before the big one near Index). Glacier Peak dominates the view to the south, with White Chuck, Whitehorse, and Three-Finger Jack prominent to the southwest.

What is remarkable about the summit area is the abundance of true alpine species at such a low elevation (about 5980 feet). There are large populations of moss campion (*Silene acaulis*) and purple mountain saxifrage (*Saxifraga oppositifolia*), plants typically found at much higher elevations. We located the southernmost population of *Anemone parviflora* west of the Cascades crest in western North America, as well as green spleenwort (*Asplenium viride*). The latter species is not rare, but it is uncommon in Washington and always a welcomed encounter for me. On the northeast face of the ridgeline (do not descend) you can see a nice stand of alpine willow (*Salix petrophila*). An interesting form of common harebell (*Campanula rotundifolia*) occurs just before the false summit—the plants have single flowers, suggesting it is Parry's harebell (*C. parryi*), but don't be fooled. There are other characters that definitely

make this common harebell. You can see photos of many of the plants that we saw in Ed Alverson's report on iNaturalist: (https://www.inaturalist.org/observations?nelat=48.22810082167973&nelng=-121.3052147762286&place_id=any&subview=map&swlat=48.21323249870508&swlng=-121.3372296237714)

We created a plant list in the WNPS database for the Circle Peak summit area, but that website is currently unavailable (hopefully it will be back online by the time of reading).

You are unlikely to see too many people on this trail in part because an outdated trip report at Washington Trails Association says that the road to the trailhead is closed and it is a 16-mile hike (<https://www.wta.org/go-hiking/hikes/circle-peak#hike-full-description>). Not true!! The directions at the bottom of that page will get you to the trailhead. Like us, you may drive past the trailhead, but don't worry, the road ends in 200 yards, so just turn around and look more closely. As you can imagine, no parking pass is needed here.



Hippuris montana (mountain mare's-tail) in fruit. PHOTO: BEN LEGLER

Circle Peak is a hidden gem botanically, geologically, scenically, and for its solitude. To learn more about the remarkable geology of Washington's Cascade Range written and illustrated in non-technical fashion, visit the outstanding Washington Department of Natural Resources's Geologic Provinces of Washington website (<https://www.dnr.wa.gov/programs-and-services/geology/explore-popular-geology/geologic-provinces-washington>).



Supporting Local Wildlife, One Native Plant at a Time

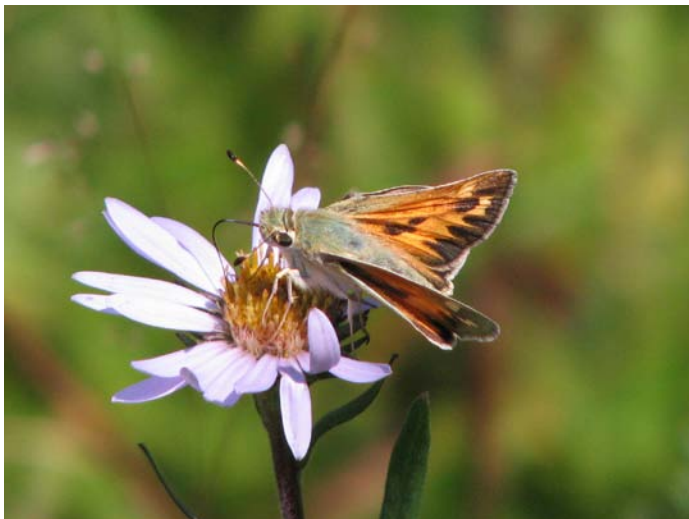
Adding Habitat Elements to Support Wildlife in Your Native Plant Gardens

by Niki Desautels, *Habitat at Home Coordinator,*
Washington Department of Fish and Wildlife

Habitat at Home is the Washington Department of Fish and Wildlife's (WDFW) program devoted to helping Washington residents create wildlife habitat where they live, work, and play. WDFW has certifications for small-space habitats like container gardens, balconies, patios, habitats in backyards, acreage, and other larger spaces, and for shared community habitats like schools, community centers or gardens, and businesses. Certifying your habitat symbolizes your commitment to being a space for wildlife, shows commitment to sustainable practices, and helps promote the idea of creating wildlife habitat in your community. Providing habitat for species to thrive benefits all of us by strengthening local ecosystems and reducing conflicts between people and wildlife.

Gardening with native plants is beneficial for many reasons, but the importance to our local wildlife cannot be overstated. Washington's native plants evolved alongside the state's many species of wildlife and are adapted to the local environment. Native plants provide the most nutritional value and provide food for wildlife when they need it most.

Native plants support a greater number of species and life cycles than non-native plants. Research shows that native plants are four times more attractive to pollinators than non-natives.¹ Another study indicates that native oaks support more than 550 different species of butterflies and moths alone, unlike non-native trees². Native flowers bloom at times that match the breeding seasons of our native pollinators. When we provide local wildlife with plants that are better suited to support their habitat needs, we increase their chances of survival.



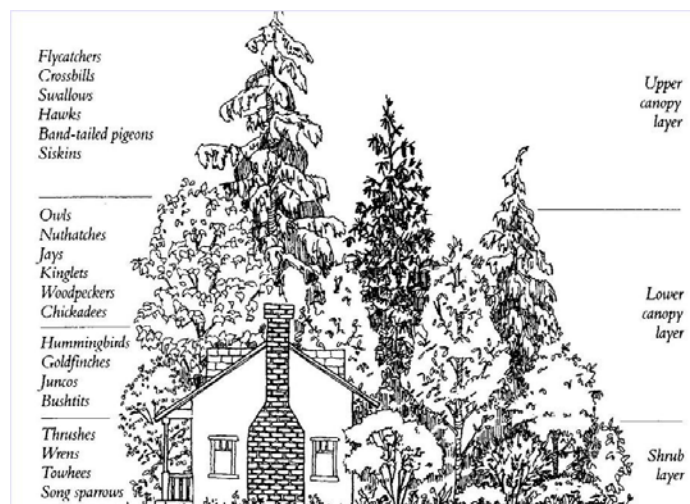
Skipper butterfly on on a fleabane (*Erigeron* sp.) flower. PHOTO: WDFW
STAFF

Plants make up the basis of the food chain. When we choose what we plant, we directly decide who we support in our space. The greater the diversity of plant species, especially native ones, the more variety of foods are available to insects and other animals. The more variety of insects and plants available, the higher the diversity of species such as birds, bats, and amphibians that are supported by those resources.

Biodiversity, simply put, is a variety of life. It is the term we use to describe the diversity of species in an area, the variety of the populations within that species type, and the different ecosystems that exist within an area. The higher the biodiversity (or the more variety), the more resilient species and ecosystems are to external forces such as climate change, habitat loss, disease, invasive species, overexploitation, and pollution. By diversifying the plants in your area, you make your habitat stronger and more resilient for wildlife.

Shelter

Shelter is more than the places where wildlife hide. Different species use the same habitat in different ways. Planting a variety of native species can provide layers of vegetation for wildlife to spread out, find food, create nests or burrows, and be protected from weather and predators³.



- Overstory canopy—Above the treetops is important hunting ground for many bird and bat species. Maintaining stands of trees or planting trees in cleared areas can help provide robust tree canopies many species rely on.
- Understory canopy—Trees also provide habitat for all the life that lives among the branches and leaves.
- Shrub and flower layer—Known as the midstory in a forest habitat, this layer is where ground-based wildlife make their homes, move through their territory, and find food. Shrubs provide shelter and nesting habitat for everyone from wrens and turkeys to coyotes and deer while providing year-round food through their leaves, fruits, and seeds. Flowers bloom in this layer and support pollinators.

- Ground layer—also referred to as groundcover. These plants grow low and can spread, filling the space with a variety of foods, water gathering spots, and areas for fallen vegetation to feed natural composters like slugs and snails. Sparrows forage in ground cover while amphibians and reptiles make their home under the leaves, logs, and soil.

By providing shelter for wildlife at each of these levels, we create a balanced ecosystem in our habitat with a diversity of species. Tall, medium, and low spaces allow more species to coexist within a smaller footprint.



A beautiful male California Quail wanders through grasses and sage near the bottom floor of Swakane Canyon. Chelan Wildlife Area, WA. PHOTO: WDFW STAFF



Pacific chorus frog rests in a flower petal. PHOTO: WDFW STAFF

Space to Raise Young

If we plan our habitat to provide shelter at all layers, many wildlife species will find what they need to create nests and raise their young. We can also intentionally create additional spaces for wildlife to raise their young and support more species in need:

- Birdhouses are great for bringing in wildlife that you can view and enjoy throughout the spring. To best support the birds in your area, it's important to research and get the right bird house for the right species. Nest Watch ([https://nest-](https://nest-watch.org/learn/all-about-birdhouses/right-bird-right-house/)

[watch.org/learn/all-about-birdhouses/right-bird-right-house/](https://nest-watch.org/learn/all-about-birdhouses/right-bird-right-house/)) from Cornell Lab of Ornithology provides area-based lists, and you can use the WDFW building plans (<https://wdfw.wa.gov/species-habitats/living/woodworking-projects>).

- Bat houses supplement essential tree roosts being lost every year. Knowing what local species need will help you provide the best habitat for bats in your area. Learn more about Northwest Bat Houses (<https://wdfw.medium.com/adventures-with-pacific-northwest-bat-houses-1db3c1940343>) on WDFW's blog.
- Toad abodes are a fun and easy addition to any habitat. You can use items you already own to loosen dirt and include shelters for native amphibians. Smart landscapes —Toad Abodes video (<https://www.youtube.com/watch?v=IclWa3Ylcec>) can show you how.
- Leave the leaves —not only is leaf cover great compost and protection for your plants, but it is essential wildlife habitat. Many pollinators use leaf cover to lay their eggs. Piles of leaves, rocks, sticks, and other natural debris are used as nest and egg sites for so many different species.



A woodpecker tends to its nest in Dayton, WA. PHOTO: WDFW STAFF

Be extra aware when pruning or cleaning up your yard or garden for the spring. Early nesters, like hummingbirds and several ground nesting birds will already be building nests or laying eggs. Tromping through brush, mowing lawns, or pruning trees can inadvertently destroy nests or flush out brooding mothers. Look closely, listen carefully, and leave the space if your presence draws a strong reaction.

Water

Just as wildlife come in sizes big and small, so should their water sources. Even if your space is small, you can provide a water source that wildlife needs. If you can, try to diversify the ways you offer water. Having multiple options will cut down on competition and allow smaller species to get what they need.

- Pollinators like bees, moths, and butterflies can't swim and need shallow places where they won't fall in. Use a shallow pan or dish, fill it partway with water, and scatter the bottom with small and medium rocks. Provide access to other water sources by creating a low sloped entry so they can walk in.

- Running water is the best choice for bird baths. If that's not an option, clean baths regularly and add fresh water to reduce the spread of disease. Consider multiple bird baths at different sizes and places to reduce competition between species. Placing a bird bath under a tree will allow smaller birds to use it without fear of attack from above.
- Wildlife passing through an area often use large water sources such as pools and troughs. For example, deer will use troughs when natural sources are low. Bats don't land to drink; they swoop down and drink "on the wing" and need large water sources to do so.

Allowing wildlife to escape drowning is something to consider with all open water sources in your habitat. Google "wildlife escape ramps" to find solutions for every size and shape space; from ramps to floating surfaces to gradients; we can make sure wildlife can get to water without becoming trapped.

As our summer temperatures become more extreme, keep wildlife in mind. Place extra water dishes outside, especially under bushes and trees where wildlife will go to escape the heat. If they don't have to travel to find water, they will be better able to conserve their energy and survive the heat wave.

Food

Native plants help feed birds and wildlife and keep our ecosystems in balance and wildlife populations healthy. If you want to provide additional food for birds (<https://wdfw.wa.gov/species-habitats/living/habitat-at-home#bird-feeder-best-practices>), it's important to understand the impacts feeders can have, and strive to avoid conflicts or unintentionally attracting other wildlife.

- Bird seed attracts more than birds. Squirrels love feeders and seeds that fall on the ground can attract rodents, which can impact you and your neighbors, especially in urban areas. Be sure your feeder has a tray to capture fallen seeds or clean up regularly.
- Bears like bird seed too! WDFW commonly gets reports of bears going after bird seed feeders when they are passing through certain areas. If you live in bear country, learn the common times of year when they are out and bring your bird feeders in for a few weeks while bears are present. In Washington it is illegal to intentionally feed or negligently attract bears and other carnivores.
- If you have domestic livestock or pets that are in danger from hawks, consider skipping the feeders and sticking with native plants, or move the feeders far away from domestic animals. Feeders bring in concentrations of small birds and animals, which will bring in more predators.
- Skip the peanuts. They cause more problems than they solve. Squirrels and corvids (like jays and crows) love them but are resourceful and capable of finding the food they need. Most of the peanuts get cached (meaning buried or stored away for later) and while they don't grow into trees, they do attract rodents.

Remember that bird feeders are just a small part of a bird's diet. Some species of nestling birds rely solely on caterpillars, and many birds eat a large portion of insects as part of their diet. In addition to seed, natural nuts, fruit, and berries are essential at different times of the year⁴. Think of bird feeders as supplemental to their main diet which they find through the plants and insects in their habitats.



Black bear and cub visit a bird feeder. PHOTO: WDFW STAFF

Do not feed mammals. Mammal species can become habituated to humans, and this will always cause problems (<https://wdfw.wa.gov/species-habitats/living/wildlife-feeding>). Feeding deer, raccoons, and other mammals doesn't support healthy nutrition, disrupts natural population control, creates problems for human communities, and endangers wildlife⁵. The long-term effects always outweigh the short-term benefits. **Don't feed the animals.**

Living with Wildlife

Planning ahead goes a long way to living alongside wildlife. Understanding who lives in your area, and who may pass through seasonally, will help you avoid things that may attract an unwanted guest. When working to provide habitat for your favorite species, remember that more of one animal may bring in their predators as well. Unintended food sources for wildlife

such as garbage, compost, or outdoor cat food are the main reasons for unwanted wildlife visitors. Keep your outdoor areas clean, be intentional in your food offerings for wildlife, and work to create a balanced habitat that allows wildlife to keep themselves in check.

Throughout Washington, wildlife face increasing pressures from human development, wildfire, and drought. These factors result in the displacement of many animals. As these pressures mount, more wildlife is forced into the resource-rich areas around human developments. We encourage you to think of wildlife habitat you create by planting with native plants as a relief value, providing for the needs of wildlife while increasing the space where all species can coexist peacefully.

For more detailed information on local species and ways to mitigate conflicts, visit the Living with Wildlife pages (<https://wdfw.wa.gov/species-habitats/living>) on the WDFW website.



A barred owl sits on a fence in Kittitas County. PHOTO: WDFW STAFF

Certify your wildlife habitat on the Habitat at Home page on WDFW's website. The program is free and available to all Washington residents, regardless of the size of your habitat. More information is available at: wdfw.wa.gov/habitat-at-home

You can reach WDFW's Habitat at Home Coordinator at HabitatAtHome@dfw.wa.gov.

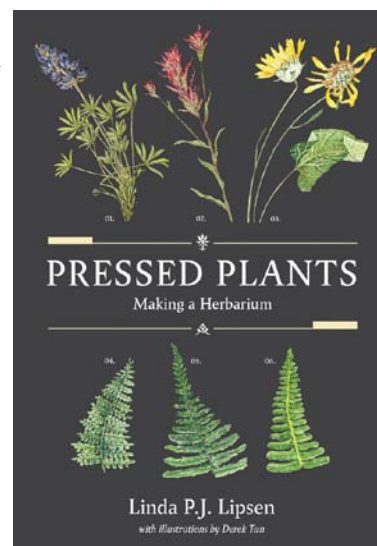


Shrubby penstemon (*Penstemon fruticosus*) in Dave Flotree & Ellen Hauptmann's Shoreline garden. PHOTO: MARK TURNER

***Pressed Plants: Making a Herbarium* by Linda P.J. Lipsen**

Reviewed by Katherine Darrow

The value of a well-curated herbarium specimen begins with the curiosity and education of the collector. The ultimate goal is to make a long-term contribution to our cultural and scientific understanding of plant geography, ecology, genetics, and evolution. Author Linda Lipsen has produced a beautifully designed primer, enhanced with elegant drawings by artist Derek Tan, on how to create a well-preserved pressed plant for both personal and professional collections.



Having worked in herbariums at five different institutions over the past four decades, I found her detailed instructions and side-notes to be comprehensive and easy to understand. I especially appreciated her inclusion of ethical considerations for collecting plant specimens, including permitting and guidelines for what NOT to collect. Her checklist of details for making "the all-important field notes" is also helpful for anyone getting started in this fundamental botanical practice. When instructions like this are attended to, each herbarium sheet represents many hours of careful technique and expertise, enriching our understanding of plant diversity far beyond what photographs can provide (although photographs may be included on an herbarium sheet too!).

One way that *Pressed Plants* might be useful to WNPS chapters would be to inspire the organization of collection projects that would complement regional inventories and contribute to gaps in existing archives. A guided tour of a local college or university herbarium collection would help folks who are new to this craft to better understand the process. A personal or group copy of *Pressed Plants* would be an excellent tool to help WNPS chapters get started.



***Douglasia* Wants Your Stories!**

Submissions for *Douglasia* from WNPS members or other native plant enthusiasts are always welcomed and encouraged. Have something interesting to share? Email douglasia@wnps.org with your ideas or drafts, or go to wnps.org/douglasia for more information.

Ten Things You Might Not Know About Penstemons (but were afraid to ask)

by Walter Fertig

Penstemonia is a medical condition characterized by excessive enthusiasm or obsession with *Penstemons*. In honor of the American Penstemon Society's annual meeting in Washington (weekend of July 21-24 in Walla Walla and the Blue Mountains, see <https://penstemons.org/index.php/annual-meetings> for more information), I prepared the following annotated collection of *Penstemon* facts to help readers self-diagnose if they have this affliction.



Gairdner's penstemon (*Penstemon gairdneri*). PHOTO: MARK TURNER

1. Just what is a *Penstemon*? Penstemons are perennial wildflowers characterized by large, colorful petals fused into a slender to inflated, bilaterally symmetrical corolla tube. The mouth of the corolla resembles a pair of lips, with the upper lip consisting of two lobes and the lower lip with three. In some species the rim of the corolla or the tube is hairy or glandular. The majority of *Penstemon* species have blue or purple flowers, though occasional species are white, pink, yellow, or red.

2. The scientific name *Penstemon* does not translate as “five stamens” as often cited in the popular literature. It is true that the Greek suffix *penta* means five (as in a five-sided shape, or pentagon). But according to beardtongue expert Noel Holmgren, the “pen” in *Penstemon* comes from the Latin word *paene* meaning “nearly.” Thus, *Penstemon* actually means “nearly a stamen,” in reference to the sterile fifth stamen found in each beardtongue flower. If the genus were named for having five stamens (hardly a unique character among dicots), the name would be “Pentastemon”!

3. The common name beardtongue also refers to the sterile fifth stamen, technically known as the staminode. Typically, the staminode is widest at the tip (vaguely resembling a tongue in shape) and beset with crinkly, golden-yellow hairs (the beard). In a few species, the staminode lacks hairs, and is

thus beardless. Unlike the other four stamens of the *Penstemon* androecium, the staminode lacks anther sacs and is incapable of producing pollen. Staminodes may function to either block nectar robbers from gaining access, or help position pollinators to receive a blast of pollen to the correct portion of their anatomy.

4. Traditionally, penstemons were included in the figwort family (Scrophulariaceae), along with such familiar genera as *Castilleja*, *Mimulus*, and *Pedicularis*. Genetic studies over the past quarter century have demonstrated that the scrophs are an unnatural assemblage of genera that really belong to multiple families. Today, the Scrophulariaceae is a relatively small family, consisting of a few genera, such as *Limosella*, *Scrophularia*, and *Verbascum* (at least in Washington). *Penstemon*, along with *Collinsia*, *Veronica*, and others would be transferred to the Plantaginaceae or plantain family (formerly a small family of minutely 4-petaled weedy species). While this may reflect evolutionary origin, the Plantaginaceae is now difficult to define based on morphological characters and appears quite “unnatural” to the casual observer.

5. *Penstemon* is the largest genus of vascular plants restricted to North and Central America. Some 240-270 species are recognized, ranging from Alaska to Guatemala. In the past, a single beardtongue species was recognized in eastern Asia, but that species has been transferred to its own genus, *Penellianthus*. Only *Carex* (sedges) and *Astragalus* (milkvetches) have more species in North America than *Penstemon*. Washington has 32 *Penstemon* species (41 taxa total, with varieties included), making it the sixth-most species-rich genus in the state flora. By comparison, Utah has 73 full species and 96 total taxa of *Penstemon*. Twenty-five species and varieties of *Penstemon* from Washington are local or regional endemics, including several that are rare or uncommon (see #10).



Pincushion penstemon blossom (*Penstemon procerus*). PHOTO: MARK TURNER

6. Anther characteristics are among the most useful features for identifying different species of *Penstemon*. Each of the four fertile stamens of a *Penstemon* flower consists of a pair of anther sacs joined at the base by a long stalk or filament. The area where the two anther sacs meet is called the connective. *Penstemon* anther sacs split open at maturity to release their pollen along one or two lines of dehiscence. These sutures may be located at the very tips of each anther sac, across most of the sac's face (sometimes including the connective), or only across the top of the connective. Anthers also differ in size, color, degree of hairiness, and shape (with sacs either oriented at right angles to each other or being horseshoe-shaped). The variability in anther appearance and dehiscence is frequently correlated with the pollination biology of the *Penstemon* plant.

7. Flower color and shape in *Penstemon* is largely driven by its primary pollinators, bees or hummingbirds. Beardtongues with blue, purple, pink, or white flowers tend to be pollinated by bees, while those with orange, yellow, or red flowers are serviced by hummingbirds. Among the bee-pollinated species, those with inflated (ampliate) corolla tubes are usually pollinated by large-bodied bees, while those with slender tubes are visited by small bees. Most bee-pollinated flowers have a sturdy lower lip to provide a landing platform. Hummingbird-pollinated species have flowers that are drooping and do not offer a landing surface. The anthers of hummingbird flowers also tend to release their pollen quickly, to take advantage of their speedy pollinators.



Hot rock penstemon blossoms (*Penstemon deustus*). PHOTO: MARK TURNER

8. Why are there so many *Penstemon* species? A recent study by Dr. Andrea Kramer and colleagues from the Chicago Botanic Garden and University of Illinois at Chicago suggest that pollinator behavior may influence genetic structure and divergence of *Penstemon* populations. Kramer's research team

studied two bee-pollinated species (*P. deustus* and *P. pachyphylus*) and one hummingbird-pollinated one (*P. rostriflorus*) on isolated mountain tops across the Great Basin and found that the bee-pollinated taxa were more genetically distinct in each mountain range than the bird-pollinated species. The researchers attributed this to the limited foraging range of bumblebees, which were far less likely to cross valleys between mountain ranges to spread pollen than the wide-ranging hummingbirds. Genetic isolation on mountain tops can, over time, result in the formation of new varieties or species. Not surprisingly, there are many more blue and purple (bee pollinated) taxa of *Penstemon* than there are red or orange (hummingbird-pollinated) forms.

9. With so many *Penstemon* species, taxonomists ran out of names to describe them all and have resorted to memorializing famous (and not-so-famous) botanists. Just about every western botanist of the last two centuries seems to have a *Penstemon* named in their honor. Among those immortalized are Duane and Judy Atwood, Rupert Barneby, D.C. Eaton, John C. Fremont, Edward Graham, Sherel Goodrich, Larry Higgins, Marcus E. Jones (twice), the entire Holmgren family, Archibald Menzies, Edward Palmer, Edwin Payson, Francis Pennell, Per Axel Rydberg, John Scouler, Ellen Powell Thompson, Ivar Tidestrom, Lester Ward, and Sereno Watson. Some lesser-known Washington and Oregon plant collectors and naturalists



Barrett's penstemon (*Penstemon barrettiae*). PHOTO: MARK TURNER

have also been memorialized, including Almeta Hodge Barrett, James Cardwell, George Davidson, Meredith Gairdner, David Lyall, John Richardson, William Fraser Tolmie, Kirk Whited, and Earley Wilcox. In hindsight, it is unfortunate that more of these species (particularly the narrow endemics) were not named for geographic or Native American features, such as *Penstemon glandulosus* var. *chelanensis*.



Pennell's beardtongue (*Penstemon pennellianus*). PHOTO: MARK TURNER

10. A large number of *Penstemon* species are vulnerable to extinction, and several are federally listed under the Endangered Species Act. At least six Washington species are considered state Endangered, Threatened, or Sensitive. Barrett's penstemon (*P. barrettiae*) is a bluish-purple or rose-colored species forming bluish-green mats on basalt cliffs and is restricted to the Columbia River Gorge. Variable hot-rock penstemon (*P. deustus* var. *variabilis*) is a white-flowered species with whorls of entire to slightly-toothed leaves and is known only from southern Klickitat County in Washington (though also found more widely in central Oregon). Whited's fuzzy-tongue penstemon (*P. eriantherus* var. *whitedii*) is a central Washington endemic found mostly in the dry rocky foothills of the East Cascades and is characterized by an especially fuzzy staminode (thus the common moniker). Tall penstemon (*P. hesperius*), true to its name, has atypically tall stems (to five feet tall) and is found

in wet meadows and swamp forests along the lower Columbia River in Oregon and Washington. It was recently made an official candidate for listing under the Endangered Species Act (see Fall/Winter 2022 *Douglasia*). Pennell's beardtongue (*P. pennellianus*) has large sky-blue flowers and is only found in the Blue Mountains of southeast Washington and northeast Oregon. Lastly, Wilcox's penstemon (*P. wilcoxii*) is a blue-flowered species with toothed leaves that is more common in northern Idaho and western Montana, but barely crosses into eastern Washington. These and other *Penstemon* species may be impacted by mineral development, grazing, habitat destruction, and over-collection by gardeners. Because rare penstemons occur in so many different habitats they are a good umbrella for the conservation of less showy or charismatic wildflowers.

Walter Fertig is a self-diagnosed Penstemaniac, based out of the Marion Ownbey Herbarium at Washington State University in Pullman.



Plants and Fungi of Washington Image Gallery is Back!

by David E. Giblin



In November of 2022 the Burke Museum was the victim of a random ransomware attack (they encrypt your computer server and demand money to return access to your files; the University of Washington did not pay the ransom). This attack took the popular Plants and Fungi of Washington Image Gallery offline. I'm happy to report that as in mid-March the site was restored and can now be found at <https://burkeherbarium.org/imagecollection/> (the old URL will automatically direct you to the new one). The restoration would not have been possible without the assistance of Adam Schneider, WNPS member and Herbarium volunteer John Haskins, the Herbarium's Melissa Islam, and Herbarium undergraduate assistant Jason Xu. Josh Larios from the Burke Museum provided critical support at all times of day, night, and weekends. Thank you to everyone! Special thanks to the WNPS Olympic Chapter for providing financial support for this work.

The Washington Native Plant Society plant list database (<https://www.wnps.org/plant-lists>) was also taken offline because it relies on the Image Gallery data. I am currently working with Adam Schneider to restore that database, and we hope to have it available by the end of March.



Learn with the NPAM Webinar Series in April

REGISTER ONLINE NOW at
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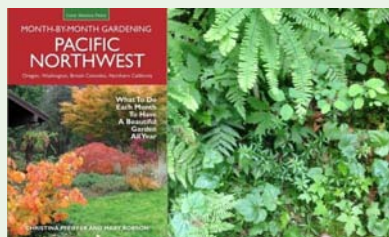
The Legacy of Dr. Art Kruckeberg

Dr. Richard Olmstead
 Friday, March 31, 7:00 pm



Gardening with Native Plants for the Future

Marcia Rivers Smith
 Thursday, April 6, 7:00 pm



Gardening Under Native Trees

Christina Pfeiffer
 Wednesday, April 12, 7:00 pm



The Heritage Gardens Program

Panel Discussion
 Tuesday, April 18, 7:00 pm



Underground Allies: Tiny Yet Mighty

David Montgomery & Anne Bikelé
 Monday, April 24, 7:00 pm



Risilient Gardens for Uncertain Futures

Clay Antieau
 Thursday, April 27, 7:00 pm

A Tribute to Gene Koselke

by *Don Schaechtel and Bre Bicknell*

WNPS gratefully received a \$7,500 estate gift from Gene Koselke, a WNPS member who died last year in Spokane at the age of 71. Gene's daughter Bre told me that he was an adventurous, kind person who always enjoyed being outdoors, taking risks, and laughing hard. Bre said her father included WNPS in his will because he believed we were doing something good for society.

Gene was born in the North Seattle area and attended Nathan Hale High School. He married in his 20s and moved to Camano Island. He worked as a logger in Skagit County, which was tough and dangerous work. In 1979, after a logging injury and while raising two young daughters, he studied forestry and graduated from Everett Community College.



Gene Koselke at age 29 in 1980.
 PHOTO: COURTESY OF THE FAMILY

He then worked as a forester in Washington for the next 20 years. In his work, Gene was most proud that he could preserve large portions of land for ecosystem management. In one case, he was able to preserve 1,400 acres of old-growth forest and adjacent rocky bluffs that provided wildlife habitat.

Gene retired at age 53 for health reasons and went back to school to study integrated plant medicine in Mt. Vernon. He enjoyed hiking with friends and family and sharing what he learned about the amazing powers of plants. In 2006 he built a home in Baja California, and led hiking groups there and shared what he learned about his new state's flora.



Gene in Mexico. PHOTO: COURTESY OF THE FAMILY

Estate gifts from members like Gene have helped WNPS fund projects and day-to-day operations and are always appreciated. We are very grateful to Gene and others who help ensure a future full of native plants in Washington.

For more information on planned giving call Business Manager Denise Mahnke or visit our planned giving webpage at www.wnps.org/donate/planned-giving.



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In Honor of all the amazing native plants everywhere, especially the Scrophulariaceae

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Whitebark pine
(*Pinus albicaulis*).
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