



Newsletter of the Idaho Native Plant Society • Promoting Interest in Idaho's Native Flora

## What Good Are Herbaria?

By Peter Lesica, Friends of the University of Montana Herbarium, Newsletter Editor

Herbaria have been around for centuries. They are often considered museums, but they lack things that the average person considers interesting. There are no stuffed animals, no awe-inspiring artwork and no interesting hands-on learning machines. Most people think of herbaria (if they think of them at all) as a work place for eccentric plant taxonomists. But these days there is a lot going on.

Herbaria have historically served several functions. The majority of visitors to the University of Montana Herbarium (MONTU) are interested in using the collections to verify specimens they collected during their field work. Perhaps the most important use of the collections in the past has been for taxonomic studies where taxonomists request loans in order to examine examples of Montana plants first-hand. A recent history of MONTU specimen loans can be found by examining the "Loans for Research" section in past newsletters (umt.edu). Recent loans have included specimens of *Sphagnum*, *Stellaria* and *Tofieldia*. Herbarium specimens also provide data on plant geographic distributions such as those presented in local and regional floras<sup>9,16</sup>. These functions have been greatly facilitated by the recent drive to database and photograph herbarium specimens, allowing researchers to acquire data on location, habitat and gross morphology from across North America and the world by simply going online. MONTU received a National Science Foundation grant in 2005 to digitize our specimens.

More recently, herbarium collections have provided data for studies in several other fields of diverse biological research. The Montana Natural Heritage Program employs herbarium data to conduct niche modelling where climate, soil and geo-

graphic variables are used to determine potentially unknown locations for rare and endangered plants. Doug Soltis used herbarium data to elucidate hotspots of plant endemism in Florida<sup>36</sup>. A different endangered plant study conducted across eastern North America compared the size of a valuable medicinal plant, American ginseng (*Panax quinquefolius*) over the course of almost two centuries. Ginseng plants collected from northern populations did not decline in size, while plants from midwestern, Appalachian and southern states showed sharp declines in stature. Human harvest could explain the rapid change in ginseng stature<sup>21</sup>.

Herbarium collections have also proved useful in studies on the evolution of morphological traits. Australian researchers used over 1900 herbarium specimens to demonstrate that morphological traits of introduced plants have shown significant

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**Letter from the President**

This is really one big thank you letter. The Sawtooth Mountains provided a majestic backdrop for this year's INPS Annual Meeting, hosted by the Wood River Chapter. Sharing outstanding presentations, a diverse set of field trips, and warm comradery made for an educational and fun event. With a little over 100 participants, including members from every INPS Chapter, it was the best attended Annual Meeting ever. This success did not materialize out of pixie dust. It took more than a year of an incredible amount of planning, coordination, and hard work by Wood River Chapter member volunteers to make the Annual Meeting such a great success. Lisa Horton led the team of Jay Dorr, Patti Dorr, Pam Ephgrave, Renoir Finizio, Kristin Fletcher, Diane James, Allison Kennedy, Cindy Lunte, Mary McClanahan, Kathy Noble, Rose Rumball-Petre, Linda Ries, Paul Ries, Deanna Schrell, Cindy Shearstone, Ted Stout, Kimber Traue, Ann Hastings, Mark Trentin, Poo Wright-Pulliam, and Susan Woodruff. Exemplary teamwork allowed this team of volunteers to overcome several special challenges to having the Annual Meeting in such a popular place as the Sawtooth Valley. My heartfelt thanks to every one of these volunteers. Field trips included botany in meadow, forest, wetland, and shrub-steppe habitats; from valley floor to subalpine elevations. Some trips included elements of geology, history, or forest resource management. A sincere thank you to all field trip leaders, Paul Allen, Steve Botti, Steve Bunting, Beth Corbin, Jay Dorr, Kristin Fletcher, Robin Garwood, Lynn Kinter, Paul Link, Don Mansfield, Mary McClanahan, Penny Morgan, Paul Ries, John Shelly, Eva Strand, Tim Frazier, Matt Filbert and Poo Wright-Pulliam.

An announcement about the new INPS Scholarship Program was one of several highlights at the well-attended dinner held at the Stanley Community Center on the second night of the Annual Meeting. Penny Morgan summarized the INPS Scholarship Program and acknowledged fellow Scholarship Committee members who took the concept of a scholarship and made it a reality. Paul Ries followed by telling us about the two recipients being awarded the first INPS scholarships. Hearing their stories gave the scholarship a personal touch and reminded us all that education will always be a key part of the INPS mission. My sincere gratitude to INPS Scholarship Committee members Lindsey Barber (Calypso), Bill Bridges (Loasa), Liz Martin (White Pine), Penny Morgan (White Pine), Don Morishita (Loasa), and Paul Ries (Wood River). You all did an amazing job and INPS now has a framework in place to award scholarships annually.

For better or worse I was re-elected INPS President during the Business Meeting part of the Annual Meeting. This outcome means you will have to put up with me for another two-year term. The INPS Secretary was another Board position up for election this year. Mary McClanahan (Wood River Chapter) graciously agreed to place her name in the hat and was elected the new INPS Secretary. Thank you Mary. Mary replaces Janet Bala, who served as the INPS Secretary starting in 2015. Before this position, Janet was the ERIG Committee Chairperson and also the INPS Vice-President for one term in 2009-2010. A long-time Sawabi Chapter member, Janet has served as this chapter's President, Vice-president, and Treasurer over the years. It is easy to see that Janet has served INPS for many years and she looks forward to continuing this service in new capacities. I leaned heavily on Janet to navigate my first term as INPS President. I cannot thank Janet enough for all her time and effort on behalf of INPS. I look forward to working with her in the future on other INPS endeavors.

*Michael Mancuso, INPS President*

## Announcements

### INPS Instagram Hits 1,000 Followers!

By Anna Lindquist, Former Instagram Manager

The INPS Instagram continues to grow, reaching 1,000 followers this August. That's 1,000 plant loving people, organizations, and businesses! Knowing there are that many plant enthusiasts out there gives me hope and it's why INPS started the Instagram account—to share knowledge and love of Idaho's plants with a diverse audience.

INPS is lucky to have several enthusiastic and Instagram savvy members who have recently taken over management of the INPS account: Peggy Faith, Sarah Hill, Daniel Murphy, and Kristy Snyder. Thank you! However, social media content curation takes time and we'd like to encourage more folks to participate. So, if you're like me and there are more photos of plants on your phone than anything else, share them with us! We know our mem-

bers have some great plant photos and stories to tell and hope that the INPS Instagram can be representative not only of the adventures of these Pahove Chapter members, but also of the incredible plant diversity around the state and within other chapters.

If you'd like to contribute photos to the INPS Instagram, send an email to [inpsocialmedia@gmail.com](mailto:inpsocialmedia@gmail.com). Please include your name for photo credit and a description of the photo content (i.e. the name of the plants, people, and/or places in the photo). If you have a specific caption in mind for the photo, share that, too! We welcome photos of plants, landscapes, insects and wildlife enjoying native plants, and plant people. Make sure to follow, like, and share the INPS Instagram and cheers to the next 1,000 plant lovers! •

### INPS Sponsors Botanical Illustration in Flora of North America Vol. 11

By Karie Pappani, Pahove Chapter

The State INPS and White Pine Chapter sponsored an illustration of *Lupinus lepidus* var. *cusickii* in the *Flora of North America* Vol. 11 in 2018. In April 2023, we received an art print of the species and a thank you letter for our sponsorship of this illustration, mentioning that it has been a long time in the making and a massive undertaking. This volume can be pre-ordered from Oxford University Press ([www.oup.com](http://www.oup.com)).

Opportunity still exists to sponsor an illustration as part of the Flora project. The Flora of North America As-

sociation (FNA) brings the scientific knowledge of many botanists together in what will be 30 volumes that contain botanical illustrations drawn by professional artists. •



*Flora of North America*

April 24, 2023

Idaho Native Plant Society  
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Dear Idaho Native Plant Society friends,

Thank you so much for sponsoring the illustration of *Lupinus lepidus* var. *cusickii*, by Yevonn Wilson-Ramsey in *Flora of North America* Volume 11. This volume has been a long time in the making, truly a massive undertaking. Part 1 is 541 pages, and Part 2 is 567 pages, not including front matter. It covers 153 genera and 1245 species, the work of 67 authors, more than 90 reviewers, and multiple editors. Both parts of volume 11 will be sold together as a set, and the pagination is continuous between the two parts. The Literature Cited and the Index are in part 2. The volume is currently listed for preordering at \$95.00 for both parts, available from Oxford University Press ([www.oup.com](http://www.oup.com)).

I'm enclosing a high-resolution print of the art on archival paper. When we first started the sponsorship program, I said a digital file would be sent on a CD as well. Often the CDs did not work correctly and in any event many computers no longer take them, so I have discontinued that. If you would like a digital copy, let me know and I will email it to you.

I'm happy to tell you that Volume 14, which contains Gentianaceae, Apocynaceae, Convolvulaceae, and Solanaceae, is in press, expected to be published this October. Volume 13 is nearly ready to go to press, but there is still time to sponsor art in it—I would need to know by May 8 if you want to sponsor anything (for it to be included in the print volume). We are inviting sponsors for the last volumes, 15, 16, 18, and 29. Lists for those are enclosed, with the list of volumes published. Sponsoring FNA artwork makes it possible for us to pay the technical editors working on these final volumes.

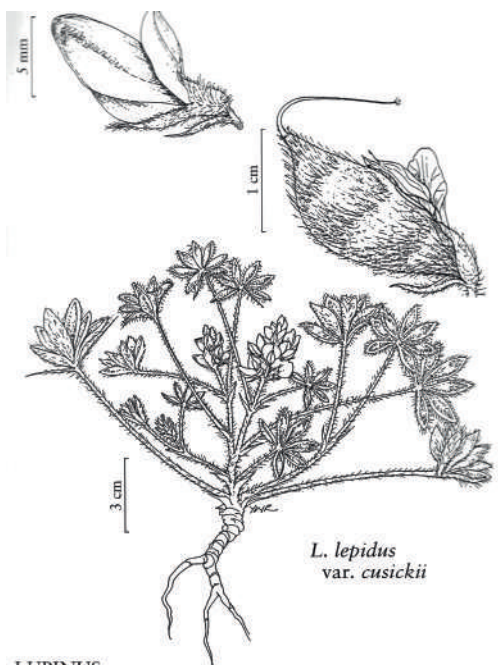
We are very grateful for your support.

Best wishes,

  
Nancy R. Morin

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change during the last 150 years<sup>4</sup>. The results suggest that rapid evolution in introduced plant species could be common. Similarly, herbarium specimens from the last 140 years were used to understand the evolution of common ragweed (*Ambrosia artemisiifolia*) as it became more invasive under the influence of human disturbance in eastern North America<sup>18</sup>. Researchers in Belgium used molecular genetics methods to examine herbarium specimens of European tumble mustard (*Sisymbrium austriacum*) and found strong divergence in flowering time genes over the past 100 years, indicating that rapid genetic adaptation preceded the spread of this species and possibly assisted in overcoming environmental constraints<sup>38</sup>. Grass taxonomists used molecular markers from herbarium specimens to elucidate the patterns of speciation in the bluestem grasses<sup>20</sup>. Researchers from Canada and Europe used herbarium specimens from the past two centuries to determine that modern farming methods have enhanced the evolution and speed of invasion in the agricultural weed waterhemp (*Amaranthus tuberculatus*)<sup>14</sup>.

The most common use of herbarium specimens in this age of molecular genetics has been exploration of human-caused global changes. There have been numerous studies of changes in the timing of annual plant developmental stages (phenology). A recent study showed that herbarium records did provide accurate estimates of the mean flowering date over almost two centuries<sup>5</sup>. Numerous studies of flowering phenology based on herbarium specimens have been employed to examine the effects of climate change<sup>25,27,33</sup>. In 2021 the California Botanical Society published an entire issue of their journal, *Madroño* (Vo. 68, No.4) on plant phenology. More than one-third of the articles used herbarium data to determine how climate change was altering flowering date both within and among species and how these changes might affect plant persistence<sup>19,28,29,37,42</sup>. Based on herbarium specimens, flowering date of rare species in the Central Rocky Mountains has become 42 days earlier since the late 1800s, with plants in sagebrush basins showing the strongest accelerations. High winter temperatures were associated with the acceleration of phenology in low elevation sagebrush habitats, whereas high spring temperatures explained accelerated phenology in the high elevation alpine habitat<sup>26</sup>. Similarly across New England, the mean leaf-out dates across all species and sites were circa one half day earlier per decade<sup>7</sup>.

Herbarium specimens can also be used to document temporal changes in plant morphology. Researchers in French Guiana analyzed herbarium specimens of the rainforest species *Humiria balsamifera* that date as far

back as 1788 and showed that as atmospheric carbon dioxide levels increased with industrialization, plants responded by increasing photosynthetic activity and using more water<sup>3</sup>. Herbarium specimens of 42 species across three continents documented a response in floral pigmentation to anthropogenic climatic change, suggesting that global change may alter pollination through its impact on floral color, with repercussions for plant reproductive fitness<sup>13</sup>. Researchers in Kansas used 13 decades of foliar isotopes from herbarium specimens to find that nitrogen availability has declined in spite of anthropogenic increases in deposition. These results suggest that declines are driven by increased ecosystem N storage as a result of increased atmospheric CO<sub>2</sub><sup>22</sup>.

Long-term data from herbarium specimens can provide information to resource managers, helping to prioritize needs, make effective management decisions, and develop targeted prevention<sup>2</sup>. Researchers in Indianapolis, Indiana compared pre-1940 herbarium records with their current flora. They found a 2.4 species/year rate of decline for native species with a 1.4 exotic species/year increase over the past 70 years in Indianapolis<sup>6</sup>. Invasion researchers used herbarium specimens to determine whether exotic species exhibited morphological changes following their invasion into the United Kingdom. They found that trait changes occurred early in their invasion and these changes were still occurring one to two centuries after their introduction. They suggest that this information provides important clues for their appropriate management<sup>8</sup>.

Pressed plants, especially mosses, can often act as storage sites for atmospheric pollutants. Spanish researchers found that mineral concentrations in north and east regions of Spain have substantially changed throughout the twentieth century<sup>32</sup>. Concentrations of nitrogen as well as phosphorus and sulphur have increased in the last decades<sup>31</sup>, and atmospheric CO<sub>2</sub> concentration has increased by 25% over preindustrial levels<sup>30</sup>. Over the past century herbarium moss specimens showed a strong trend of increasing foliar nitrogen content in South Africa<sup>40</sup>. On the bright side, over the past century, lead has declined in both northern England<sup>35</sup> and Rhode Island<sup>34</sup>.

Herbarium specimens provide information on the presence of and susceptibility to insect pests and disease. For example, researchers from across the United States examined herbarium specimens to determine that the lengthening growing seasons are resulting in more extensive insect damage<sup>24</sup>. European researchers studying the horse-chestnut leaf-mining moth used amplified nuclear and mitochondrial DNA fragments from larvae pressed within leaves of herbarium samples collected across Eu-

rope from the past 150 years. They determined that this highly invasive moth had a Balkan origin and set back its history in Europe by more than a century<sup>15</sup>. Climate scientists in Raleigh, North Carolina used historical specimens to find that an herbivorous scale insect has increased in the hottest parts of the city and during the hottest years in nearby forests<sup>41</sup>. Researchers from the University of Virginia and Amherst College examined thousands of herbarium specimens to determine the range of anther-smut in the eastern United States. The disease occurred exclusively on perennial plants, and incidence in *Silene virginica* and *S. caroliniana* increased significantly over the past century and was higher in marginal populations<sup>11,12</sup>. Herbarium specimens of infected plants provide an historical record of both the geographic distribution and genetic diversity of citrus bacterial canker. An exact match of pathogen genotypes from Japan and Florida demonstrated that Japan was the source of the original outbreak of the canker in Florida in 1911<sup>17</sup>.

The above examples of recent research using herbaria are far from exhaustive. Many more examples can be found in recent review articles<sup>10,11,39</sup>, and many uses of herbarium specimens are just beginning to happen<sup>23</sup>. So next time you walk into the University of Montana Herbarium, think of it as a time capsule for plant biology. •

***This article first appeared in the Friends of the UM Herbarium 2023 newsletter (<https://www.umt.edu/herbarium/documents/newsletters/2023-foh-newsletter.pdf>).***

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## 2023 INPS Annual Meeting Summary

By Kristin Fletcher, Wood River Chapter President

Each year the INPS Annual Meeting and Campout attracts members and friends to explore an area of our state. This year, over 100 folks participated in the 2023 “Heart of Idaho” Campout hosted by the Wood River Chapter based at Sunny Gulch Campground in Central Idaho near Stanley.

We were delighted to be your hosts and share the beauty and diversity of all Central Idaho has to offer. The weather cooperated magnificently and the flora was simply outstanding. Who’s ever seen meadows of stonecrop before?!

Special thanks to those of you from other chapters who agreed to lead field trips. You were awesome and your expertise added so much to everyone’s experiences. Our small chapter located far from universities and colleges simply couldn’t have done it without you. Thank you!



Ross Fork Fire hike participants. Photo by Robie Wilson Litchfield.

Fabulous evening presenters included Tim Frazier who took us into deep space through his amazing telescopes and introduced participants to a month-old supernova despite a bright moon. Dr. Paul Link, emeritus geology professor from Idaho State University, introduced us to the fascinating and mind bogglingly complex geology of Central Idaho. Steve Botti, Mayor of Stanley and creator of the gorgeous *Illustrated Guide to the Flora of Yosemite National Park*, walked us through the complexities of his newest project, a top-notch local taxonomy for the Sawtooth National Recreation Area. A sidenote: Steve’s looking for a botanical illustrator, [sjbotti@gmail.com](mailto:sjbotti@gmail.com).

Hats off to the amazing planning committee, some dozen strong, so capably led by Lisa Horton. You folks were beyond awesome!!

Last, but not least, special thanks to participants who graciously adapted to the paucity of group campsites



Malm Gulch. Photo by Sarah Walker.

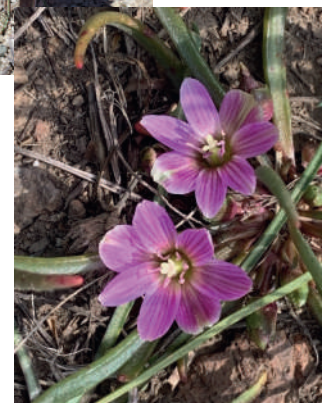
available in the Sawtooth Valley with good humor and carpooling. We reserved the only 3 group sites in the Valley, realizing it would mean extra driving and inconveniences, but, hopefully, resulted in new friendships!

Plant lists, including Steve Botti’s draft Asteraceae key, can be found at the Wood River Chapter website <https://woodriverinps.wixsite.com/wrinks/about-4>. Email any updates or changes to [woodriver-inps@gmail.com](mailto:woodriver-inps@gmail.com).

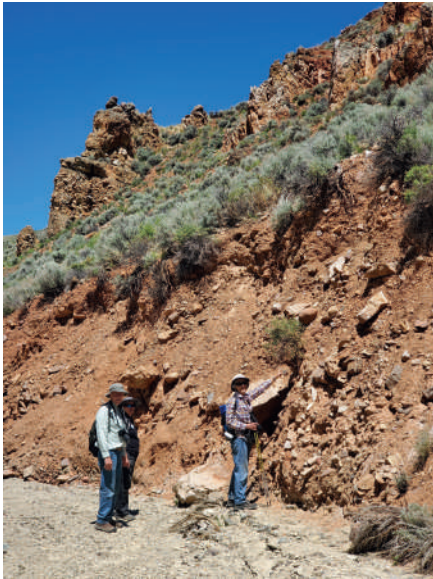
The Calypso Chapter will host next year’s annual meeting and campout near Sandpoint in gorgeous North Idaho. Stay tuned for details! •



Prickly pear cactus, Malm Gulch. Photo by Kristin Fletcher.



Pygmy bitterroot. Photo by Deanna Schrell.



*Steve and Monaquita Love and Sarah Walker in Malm Gulch. Photo by Kristin Fletcher.*



*View from Sunny Gulch Campground. Photo by Lisa Horton.*



*Stonecrop. Photo by Sarah Walker.*



*Paul Link. Photo by Sarah Walker.*



*Wildfire Sapsucker holes. Photo by Kristin Fletcher.*



*Wildfire ecologist Penny Morgan and Ketchum District Ranger Matt Filbert. Photo by Kristin Fletcher.*

# INPS Annual Meeting Elk Meadow Field Trip

By Michael Mancuso, INPS President

A series of peaks exceeding 9000 feet elevation form the headwaters for Elk Creek in the Sawtooth National Recreation Area. The gradient for Elk Creek flattens and its valley widens considerably approximately 5 miles downstream of these headwater peaks. This change in topography is the setting for Elk Meadow, a large wetland complex that extends nearly 2.5 miles. The lower end of this meadow complex was the destination for one of the July 2nd field trip options during the INPS Annual Meeting. Reaching the meadow required a 2.5 mile hike from the Elk Meadow trailhead, itself located approximately 8 miles northwest of Stanley.

Before reaching the meadow, the trail passed through lodgepole pine-dominated forest habitat. In many places, trees near the trail were relatively short and small diameter, indicative of a younger forest stand. However, taller, larger diameter trees occurred in other sections. Whortleberry (*Vaccinium scoparium*) was probably the most consistently common forest understory plant species along the trail. Unfortunately, it was still too early in the summer to indulge in this species' delicious berries. The flowers of prairie lupine (*Lupinus lepidus*) provided a sweet fragrance wherever patches of this species occurred. In several places, we could smell this species before seeing it. One consequence of the wet spring/early summer was an abundance of several tiny annual plant species no more than an inch or two tall, such as blue-eyed Mary (*Collinsia parviflora*), annual phlox (*Microsteris gracilis*), and closeleaf knotweed (*Polygonum polygaloides*). It was eye-opening to some field trip participants that flowers could be so small. At one point we stopped at several dead lodgepole pine to look for telltale insect galleries under the bark, verifying mountain pine beetle to be the culprit of the tree's demise. Encountering several different mushrooms along the trail provided an opportunity to discuss the importance of mycorrhizae fungi in forest ecosystems. After finding a few small whitebark pine (*Pinus albicaulis*) trees we discussed white pine blister rust, a serious introduced fungal pathogen to five-needle pines in North America. We talked about fungi in a different context after coming across a large patch of *Cladonia* lichen growing on soil in a shaded area right along the trail.

Within sight of Elk Meadow we stopped for lunch to take advantage of the last patch of shade before entering open meadow habitat. The meadow contained many species not seen earlier on our hike. A few examples in-



Elk Meadow field trip participants. Photo by Michael Mancuso.

cluded several sedges (*Carex* spp.), several willows (*Salix* spp.), white bog orchid (*Platanthera dilatata*), our only orchid for the day, western polemonium (*Polemonium occidentale*), and primrose monkeyflower (*Erythranthe primuloides*). We did not try to identify the several moss species present. Crista O'Conner kept a running tally of the plant species we saw during the field trip. By the time we returned to the trailhead, the list numbered 95 species in 31 different plant families (Table 1). It's a good day when everyone learns a few new plants. Field trip participants included Patti Dorr, Don Essig, Peggy Faith, Samuel Flynn, Valdon Hancock, Mike Mancuso, Janelle Nelson, Crista O'Conner, Deanna Schrell, Mark Trentin, Carol Wade, and Mike Wade. •



**Table 1.** Plant list (Scientific Name, Common Name) for Elk Meadow field trip, July 2, 2023. Compiled by Crista O'Conner with assistance from other field trip participants. \* = non-native

<b>Apiaceae (Parsley family)</b>		<b>Orchidaceae (Orchid family)</b>	
<i>Ligusticum tenuifolium</i>	slenderleaf lovage	<i>Platanthera dilatata</i>	white bog orchid
<b>Asteraceae (Sunflower family)</b>		<b>Orobanchaceae (Broomrape family)</b>	
<i>Agoseris aurantiaca</i>	orange agoseris	<i>Castilleja cusickii</i>	Cusick's paintbrush
<i>Agoseris glauca</i>	short-beaked agoseris	<i>Castilleja gracillima</i>	slender paintbrush
<i>Antennaria corymbosa</i>	flattop pussytoes	<i>Castilleja miniata</i>	scarlet paintbrush
<i>Antennaria microphylla</i>	white pussytoes	<i>Pedicularis bracteosa</i>	bracted lousewort
<i>Arnica cordifolia</i>	heartleaf arnica	<b>Phrymaceae (Lopseed family)</b>	
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	mountain big sagebrush	<i>Erythranthe primuloides</i>	primrose monkeyflower
<i>Cirsium scariosum</i>	elk thistle	<b>Pinaceae (Pine family)</b>	
<i>Erigeron glacialis</i>	glacier fleabane	<i>Abies lasiocarpa</i>	subalpine fir
<i>Nothocalais nigrescens</i>	speckled false dandelion	<i>Pinus albicaulis</i>	whitebark pine
<i>Packera streptanthifolia</i>	cleftleaf groundsel	<i>Pinus contorta</i>	lodgpole pine
<i>Senecio integerrimus</i>	western groundsel	<b>Plantaginaceae (Plantago family)</b>	
<i>Senecio triangularis</i>	arrowleaf groundsel	<i>Collinsia parviflora</i>	blue-eyed Mary
<i>Stenotus lanuginosus</i>	wooly goldenweed	<i>Penstemon globosus</i>	globe penstemon
<i>Taraxacum officinale</i> *	common dandelion	<i>Penstemon procerus</i>	small-flower penstemon
<i>Wyethia amplexicaulis</i>	white mule's-ears	<b>Poaceae (Grass family)</b>	
<b>Betulaceae (Birch family)</b>		<i>Achnatherum</i> sp.	needlegrass
<i>Betula glandulosa</i>	bog birch	<i>Hordeum brachycarpum</i>	meadow barley
<b>Boraginaceae (Borage family)</b>		<i>Phleum alpinum</i>	alpine timothy
<i>Mertensia</i> sp.	bluebells	<i>Poa bulbosa</i> *	bulbous bluegrass
<i>Plagiobothrys</i> sp.	popcorn-flower	<i>Poa pratensis</i> *	Kentucky bluegrass
<b>Brassicaceae (Mustard family)</b>		<i>Poa secunda</i>	Sandberg bluegrass
<i>Rorippa</i> sp.	yellowcress	<i>Poa wheeleri</i>	Wheeler's bluegrass
<b>Caryophyllaceae (Carnation family)</b>		<b>Polemoniaceae (Phlox family)</b>	
<i>Eremogone congesta</i>	ballhead sandwort	<i>Leptosiphon harknessii</i>	Harkness linanthus
<i>Spergularia rubra</i> *	red sandspurry	<i>Microsteris gracilis</i>	annual phlox
<b>Caprifoliaceae</b>		<i>Polemonium occidentale</i>	western polemonium
<i>Lonicera involucrata</i>	black twin-berry	<b>Polygonaceae (Knotweed family)</b>	
<i>Lonicera utahensis</i>	Utah honeysuckle	<i>Eriogonum flavum</i>	yellow buckwheat
<b>Cupressaceae (Cypress family)</b>		<i>Polygonum douglasii</i>	Douglas' knotweed
<i>Juniperus communis</i>	common juniper	<i>Polygonum polygaloides</i>	closeleaf knotweed
<b>Cyperaceae (Sedge family)</b>		<i>Rumex</i> sp.	sorrel
<i>Carex geyeri</i>	elk sedge	<b>Primulaceae (Primrose family)</b>	
<i>Carex lenticularis</i>	shore sedge	<i>Dodecatheon pullchellum</i>	pretty shooting star
<i>Carex</i> sp.	at least 2 other species	<b>Ranunculaceae (Buttercup family)</b>	
<b>Ericaceae (Heath family)</b>		<i>Caltha leptosepala</i>	common marsh-marigold
<i>Vaccinium scoparium</i>	whortleberry	<i>Delphinium bicolor</i>	little larkspur
<i>Vaccinium uliginosum</i> ssp. <i>occidentale</i>	bog huckleberry	<i>Delphinium</i> sp.	larkspur
<b>Fabaceae (Pea family)</b>		<i>Ranunculus alisimifolius</i>	plantainleaf buttercup
<i>Lupinus lepidus</i>	prairie lupine	<i>Thalictrum occidentale</i>	western meadowrue
<i>Lupinus sericeus</i>	silky lupine	<b>Roseaceae (Rose family)</b>	
<i>Trifolium longipes</i>	long-stalked clover	<i>Dasiphora fruticosa</i>	shrubby cinquefoil
<b>Grossulariaceae (Currant family)</b>		<i>Fragaria virginiana</i>	mountain strawberry
<i>Ribes cereum</i>	wax currant	<i>Geum macrophyllum</i>	large-leaved avens
<i>Ribes lacustre</i>	swamp gooseberry	<i>Geum triflorum</i>	prairie smoke
<i>Ribes viscosissimum</i>	sticky currant	<i>Potentilla glaucophylla</i>	vari-leaf cinquefoil
<b>Hydrophyllaceae (Waterleaf family)</b>		<i>Potentilla gracilis</i>	graceful cinquefoil
<i>Nemophila breviflora</i>	Great Basin nemophila	<b>Salicaceae (Willow family)</b>	
<i>Phacelia idahoensis</i>	Idaho phacelia	<i>Populus tremuloides</i>	aspen
<b>Juncaceae (Rush family)</b>		<i>Salix eastwoodiae</i>	Eastwood's willow
<i>Juncus balticus</i>	Baltic rush	<i>Salix planifolia</i>	plane-leaf willow
<i>Juncus</i> sp.	at least 2 other rush species	<i>Salix wolfii</i>	Wolf's willow
<i>Luzula</i> sp.	woodrush	<b>Saxifragaceae (Saxifrage family)</b>	
<b>Montiaceae (Miner's lettuce family)</b>		<i>Heuchera</i> sp.	alumroot
<i>Calyptridium umbellatum</i>	pussypaws	<i>Lithophragma parviflorum</i>	smallflower prairie star
<i>Montia chamisso</i>	water montia	<i>Micranthes oregana</i>	bog saxifrage
<b>Onagraceae (Evening-primrose family)</b>		<b>Valerianaceae (Valerian family)</b>	
<i>Epilobium ciliatum</i>	common willow-herb	<i>Valeriana sitchensis</i>	Sitka valerian
<i>Epilobium glandulosum</i>	glandular willow-herb	<b>Violaceae (Violet family)</b>	
<i>Taraxia subacaulis</i>	long-leaf goldeneggs	<i>Viola adunca</i>	blue violet

## 2023 Education, Research, and Inventory Grant Program Awards

By Steve Rust, ERIG Committee Chair

The INPS Education, Research, and Inventory Grants (ERIG) Program seeks to stimulate and promote research, conservation, and educational activities which contribute to the appreciation, conservation, or knowledge of Idaho's native flora and plant communities. Announcement of the 2023 grant opportunity was printed in the December 2022 issue of *Sage Notes*. In response, thirteen proposals were received. Though each proposal had specific merits, the ERIG Committee unanimously selected six proposals which stood out from the others. The INPS Board funded five ERIG proposals, the sixth proposal, titled *Revisit to GLORIA Monitoring Sites in the Lemhi Mountains, Idaho*, was funded independent of the ERIG Program. Following is a summary of the ERIG Program lineup for 2023.

### ***Long Term Monitoring of a Wildflower Community in the Bear Lake Region***

Submitted by Emily Burgess, Utah State University, the objective of this project is to contribute to our understanding of how native plant communities are responding to climate change, and the consequences they might experience as climate change continues to progress. The phenological monitoring study will build on plant community data collected by Dr. Theodore Daniel (Utah State University) in the late 1960s. Contemporary data collected through the ERIG-supported project will provide a unique opportunity to understand how the phenology and composition of this wildflower community has changed over the last 45 years.

### ***Idaho Native Plants and Pollinators—Go Hand in Hand!***

Submitted by the City of Hailey, this project will focus on educating the public about the benefits of native plants in nurturing native pollinators including bumble bees, mason bees and leaf cutter bees. Established in 1996, The Hailey Native Plant Arboretum provides an outdoor learning laboratory for education about the value of native plants. Two past ERIG grants funded the creation of individual plant signs which list scientific, common names, and plant characteristics. This grant will contribute to the acquisition of permanently placed, full color display panels on native bee identification and how to use native plants in landscaping to encourage native bees and other pollinators.

### ***Demonstrating Importance of Idaho Native Plants through Weiser Depot's Landscape Design***

The Weiser Depot Landscape Committee (consisting of the Weiser Architectural Preservation Committee and Weiser Garden Club) will utilize ERIG funding to improve landscaping at the historic Oregon Short Line Railroad depot located in Weiser, ID. The Committee's goal is to develop more purposeful plantings and model environmentally friendly gardening practices. Specifically, its objectives are to make environment-friendly, low-maintenance choices, display Idaho native plants that encourage pollinators, and educate community members about the importance of native plants and pollinators.

### ***Phylogeny and Taxonomy of the *Eriogonum deflexum* Complex (Polygonaceae)***

*Eriogonum* is the fourth most species-rich plant genera in the United States. Knowledge of the phylogeny of *Eriogonum* is, however, incomplete. Fifty species of *Eriogonum* occur within Idaho, thirteen of which are on the Idaho Rare Plants List (May 2022). With support of the ERIG program, Mahima Dixit, California Botanic Garden/Claremont Graduate University, we will work on the phylogeny of the *Eriogonum deflexum* complex (subgenus *Ganysma*)—a group whose flowers are oriented upside-down. The study will include Idaho annuals *Eriogonum cernuum*, *E. hookeri*, and *E. watsonii*. Objectives of the study are to determine how many times downward-pointing involucre and flowers have evolved in *Eriogonum*; determine how the annuals are related to the perennial *Eriogonum austrinum* and one undescribed species; and test the existing classification and propose improvements as needed, including changes in circumscription and description of new taxa.

### ***Idaho Falls Area Native Plant Demonstration and Education Gardens***

Happyville Farm, a non-profit urban farm, was established in Idaho Falls in 2019 with the mission to offer outdoor environmental education to all ages, grow fresh organic produce for donation to food-insecure people in our community, and support both the natural world and people's social and physical health by providing a vibrant outdoor green space. 2023 ERIG funding will support four planting projects: a xeriscape planting along the sidewalk median; native grasses, forbs, and shrubs to

support insects of the region's shrub-steppe ecosystem; a bed of native plants that support Monarch butterflies; and an area of native shade-tolerant plant species.

Many thanks to ERIG Committee members Cara Hastings, Derek Antonelli, Janet Bala, Penny Morgan, and Ray Corbin for their help in making this work possible. •

## ERIG Project Report

### Native Plant Demonstration Garden Signage Project

Article and Photos by Adam West, Extension Educator—Horticulture, University of Idaho Extension, Twin Falls County

Years ago, the University of Idaho Extension Twin Falls County Office and the Southern Idaho Master Gardener Association working with the Twin Falls County Commissioners installed a penstemon demonstration garden at the Twin Falls County West Building. The garden has been a focal point for many years and additional varieties have been added over the years. The signage was installed using laminated printed signs that were 2 x 3 inches which have photo-degraded over time and left the plants unlabeled for the last few years.



Due to the success of this garden, I was approached by the county commissioners and offered another spot on the grounds of the building to install another demonstration garden. I worked with Dr. Steve Love from the University of Idaho Aberdeen Research and Extension Center to select plants for this area. We determined that a buckwheat demonstration garden would be good for this location as it has no supplemental irrigation. The first planting happened in September, with a follow up planting in June the next year. This garden has become a focal point as it sits on the corner of the property at the intersection of a busy road.

In the fall of 2019, a new group of Advanced Master Gardeners were working on a project to complete their certification. The project chosen was a native pollinator demonstration garden. Proposals were made to the county commissioners for a couple of locations and at the County West Building and a site was selected. Then COVID-19 happened, and the project was delayed. Site preparation began early fall with the first round of planting going in in late-September. Additional plants were added in the spring and the ERIG funding with the Idaho

Native Plant Society was applied for to provide signage to all three demonstration gardens.



Due to complications of plants being stolen and issues with getting plants established during the dry winter of 2021-2022, the signage project was delayed. After another round of spring planting, we were ready to put in the signage. Working with the Orton Botanical Garden, we looked at different signage options and decided to go with a larger 5 x 7-inch engraved sign for the plant material. Sign bases were purchased and a local engraving company began the task to engrave the sign plates.

Thanks to this grant from the Idaho Native Plant Society, we have highly visible, durable, and easy to read signage for the plant materials in our demonstration gardens. These gardens are important to the Master Gardeners and Advanced Master Gardeners, building occupants, the University of Idaho Extension Office, Twin Falls Pollinator Council, local schools, and the public to demonstrate water conservation, pollinator habitat, and native plants in the landscape. Thanks to this new signage we will be able to demonstrate these plants for many years. •



# Floristic Inventory of the Caribou-Targhee National Forest and Curlew National Grassland in Idaho, Utah, and Wyoming

Article and Photos by Michael Daines, USDA Forest Service, Idaho Falls

This article reports on research that was generously funded by an Idaho Native Plant Society Education, Research, and Inventory Grant (ERIG) and is condensed and adapted from my MS thesis based on this research (Daines 2023). Due to a relative paucity of historical collections in parts of the Caribou-Targhee National Forest and Curlew National Grassland in eastern Idaho, northern Utah, and western Wyoming, an updated inventory for the area was needed. I report here a brief floristic summary of the vascular plants documented from the Caribou-Targhee National Forest and Curlew National Grassland (CTNF-CNG).

The CTNF-CNG is a diverse and geographically spread-out area that includes low-elevation sagebrush steppe (as low as about 1400 m/4,600 ft elevation) in the Curlew National Grassland and at the margins of some of the mountains (Figure 1), mid-elevation aspen and



**Figure 1.** *Pediocactus simpsonii* and *Castilleja angustifolia* in a sagebrush-grassland community, west side of the Beaverhead Mountains, Clark Co., ID (the Lemhi Range is in the background).

conifer forests in many of the mountain ranges (Figure 2), and high-elevation alpine tundra, especially in the Teton Range, Henry's Lake Mountains, Centennial Range, Beaverhead Mountains, and Lemhi Range (up to about 3,718 m/12,198 ft elevation at the summit of Diamond Peak; Figure 3). The flora of the region is broadly influenced by several major floristic regions, including the Pacific Northwest, the northwestern Great Plains, the

Great Basin, the Wasatch Range, and the deserts of southwestern Wyoming (Ertter and Moseley 1992, Henderson 1992, Irwin 2014, Johnson 2019), evidenced by the inclusion of parts of the study area in five EPA Level III Ecoregions.

In all, my MS advisor, Neil Snow, and I collected 3,189 new voucher specimens in and near the CTNF-CNG. Collection information for all collections is available on any Symbiota-connected botanical Consortium portal or website (e.g., [intermountainbiota.org](http://intermountainbiota.org), [\[versity.org\]\(http://versity.org\)\). In addition to newly collected specimens, online botanical databases were consulted to determine which taxa to include in the resulting annotated checklist, which accompanies my MS thesis. The taxonomy we employed largely follows that used in the PC program Floristic Synthesis, produced by the Biota of North America Program \(Kartesz 2022\).](http://swbioti-</a></p>
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Based on both new and historical collections, a total of 1557 vascular plant taxa (including species, subspecies, varieties, and hybrids) are known to occur in the CTNF-CNG. A total of at least three state records and 137 county records were documented, a few of which were reported previously (Daines et al. 2022). In addition, we documented 38 new records for the CTNF-CNG.

*Sphaeralcea parvifolia*, collected in the Curlew National Grassland, was a state record (Daines et al. 2022).

*Sphaeralcea parvifolia* may be best viewed as an adventive (non-native) taxon in Idaho, as one possible source was an experimental planting in the Curlew Valley (Pendery and Rumbaugh 1990).

*Draba thompsonii*, collected in the alpine zone of the Lemhi Range, in the Pass Creek drainage (Figure 3), also represents a state record and a disjunction of approximately 700 km from the nearest populations in the Cascade Range of Washington (Kartesz 2022). Otherwise,



**Figure 3.** A view of the alpine zone in one of the north forks of Pass Creek, Lemhi Range, Butte Co., ID, including a view of Diamond Peak (at the right).



**Figure 2.** Mixed shrubland, aspen, and mixed conifer communities in the Gannett Hills east of Meade Peak, Caribou Co., ID.



**Figure 4.** A specimen of *Draba thompsonii*, collected in the alpine zone of one of the north forks of Pass Creek, Lemhi Range, Butte Co., ID.

*D. thompsonii* can be distinguished by its broader, fewer-seeded, consistently twisted fruits (Hitchcock and Cronquist 2018; Figure 4).

*Boechera lasiocarpa*, another state record, was collected in the Bear River Range in Bear Lake County in extreme southeastern Idaho. *B. lasiocarpa* is otherwise known from a relatively narrow region in northern Utah, including the southern Bear River Range, but had not been collected in the Idaho portion of the Bear River Range (Kartesz 2022, Al-Shehbaz and Windham 2010, [intermountainbiota.org](http://intermountainbiota.org)). I collected a specimen essentially identifiable as *B. lasiocarpa* on the south ridge of Sherman Peak in subalpine rock outcroppings. However, certain morphological features of my specimen do not match perfectly with *B. lasiocarpa*. Further collections and possibly expert confirmation would be helpful.

One notable county record was the documentation of *Ericameria parryi* var. *montana* (commonly known as Centennial rabbitbrush) in the Lemhi Range in Butte



**Figure 5.** *Ericameria parryi* var. *montana* (Centennial rabbitbrush), in situ on the ridge between Rocky Canyon and Sawmill Canyon, Lemhi Range, Butte Co., ID.

the species is known from British Columbia and Yukon (Kartesz 2022, I. Al-Shehbaz, pers. comm., Mar. 2023); further surveys in alpine areas in and near the Lemhi Range may be warranted because the species may be more common than we previously realized (I. Al-Shehbaz, pers. comm., Mar. 2023). *D. thompsonii* resembles the widespread *D. lonchocarpa*, but *D. thompsonii* can be distinguished by its broader, fewer-seeded, consistently twisted fruits (Hitchcock and Cronquist 2018; Figure 4).

County, Idaho (Figure 5). The presence of this taxon on the divide between Rocky Canyon and Sawmill Canyon in the Lemhi Range came by surprise, since all previous literature reported the variety to be narrowly endemic to the Red Conglomerate Peak area in Clark Co., Idaho and Beaverhead Co., Montana (Gary Baird, pers. comm., Sept. 2022; e.g., Mancuso and Moseley 1990, Hitchcock and Cronquist 2018). Future surveys could target other subalpine/alpine ecotones in the general vicinity around Rocky Canyon.

Some of the first records for the CTNF-CNG were relatively conspicuous plants that had likely been noticed by others but had not been collected, vouchered, and databased online. One of these species is *Hydrophyllum occidentale*, which was found to be abundant to dominant in the understory of some *Acer grandidentatum*



**Figure 6.** A forest dominated by *Acer grandidentatum* (in the overstory) and *Hydrophyllum occidentale* (in the understory) in the central Bannock Range, Oneida Co., ID.

forests in the central Bannock Range, north-north-west of Malad (Figure 6). Another conspicuous species that apparently had not been collected in the study area was *Pinus ponderosa*, which was found growing in Mink Creek Canyon, Bannock Co. (Daines et al. 2022), in Table Rock Canyon in the Big Hole Mountains in Bonneville Co., and along US 20 on the Island Park Plateau in Fremont Co. The population in Bannock Co. was derived from plantings at a nearby guard station (Rose Lehman, pers. comm., May 2023), but is clearly naturalized over a fairly wide area with trees of differing age classes (Daines et al. 2022); the other two populations each consisted of only one or two to about ten trees and are of less obvious origin. In addition, a plantation of *P. ponderosa* occurs somewhere on the CTNF in the Dubois Ranger District (Rose Lehman, pers. comm., May 2023).

In addition to specific county, state, and study area records, my study highlights regional trends in vascular plant diversity. Significant hotspots of diversity in the CTNF-CNG occur in the low to mid-elevation wetlands

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on plateaus in Fremont Co., Idaho (Moseley et al. 1991) and Teton Co., Wyoming (Heidel 2019), as well as surrounding mountains such as the Teton Range and Henry's Lake Mountains. In fact, Fremont Co., Idaho overall has the greatest vascular plant richness by county in the study area at 916 taxa, followed by Teton Co., Wyoming at 792 taxa (Table 1). •

**Table 1.** Number and percentage of vascular plant taxa documented by county in the Caribou-Targhee National Forest and Curlew National Grassland.

County	Number of taxa	Percentage of total taxa
Fremont	916	58.9%
Teton, WY	792	50.9%
Clark	747	48.0%
Bonneville	699	44.9%
Bear Lake	537	34.5%
Teton, ID	529	34.0%
Caribou	506	32.5%
Franklin	419	26.9%
Bannock	404	26.0%
Madison	359	23.1%
Lincoln	303	19.5%
Oneida	299	19.2%
Lemhi	298	19.2%
Butte	233	15.0%
Box Elder, UT	32	2.1%
Power	31	2.0%
Cache, UT	3	0.2%

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## Rooting for Idaho: Establishing Archaeological Identification Criteria for Edible Roots

Article and photos by Molly Carney, Assistant Professor, Dept of Anthropology, University of Arkansas

For many Indigenous Native American communities throughout present-day Idaho and Northwestern North America, tuberous root foods were commonly consumed as plant food staples. Most Idaho citizens are familiar with the role of salmon, trout, deer, wapiti, bison, or camas bulbs in Indigenous foodways. Called First Foods by Indigenous Native communities, these staples were important in both subsistence and cultural practices. Edible roots, however, are the less well-known First Foods. These plant foods were available early in the spring and could be easily dried, stored, and prepared throughout the year. Plants such as kouse or biscuitroot (*Lomatium* spp.), bitterroot (*Lewisia rediviva*), or balsamorhiza (*Balsamorhiza sagittata*) were among the most common and valuable plant foods that sustained Native American communities throughout Idaho for millennia.

Today, there is a growing movement among tribal communities in promoting those First Foods traditions and working to revitalize Indigenous diets and taste buds. Part of the larger food security and sovereignty movements, people throughout the Northwest are working to reclaim autonomy over their food systems and to guarantee access to culturally important foods. As an ethnobotanist and archaeologist, much of my work over the last 10 years has been in examining the ways people harvested, prepared, stored, and managed plant foods through time. Lately, this work has shifted to highlighting the creative food systems and cuisines that Indigenous peoples developed specifically to support traditional harvesting and preparation practices and to reinvigorate a taste for these First Foods for people today. By looking



*Lewisia rediviva* in early spring at the right time to harvest, before the flower opens.

at the plant remains within archaeological sites we can better understand what and how plant foods were managed or cared for by Indigenous peoples, how they were prepared and consumed as these descendant communities continue to reincorporate these practices and foods into their everyday lives. Unfortunately, however, we



*Balsamorhiza sagittata* in Hells Canyon.

still know very little about these histories of subsistence as there's been very little archaeological research targeting plant remains in the past. Luckily, that's changing.

With the support of the ERIG grant, this project sought to bring together historic, ethnographic, and botanical resources and literature to fully characterize the ways people engaged with common edible roots in the past and also to predict what these plant remains might actually look like after they were processed or prepared. However, correctly identifying these root foods within archaeological sites can be quite tricky. For plants to preserve for hundreds to thousands of years, they must be carbonized and fossilized by fire, or they must be left in extremely dry and protected places like rock shelters. Secondly, roots are not like other plant organs—they contain very little lignin and even if the roots preserve, their cellular morphology might not remain intact, making it extraordinarily difficult to identify the plants based upon cellular anatomy. Finally, many of these root foods are quite starchy and may have left behind starch grains on tools or in soils. The main goal with this project, then, was to collect specimens of the most commonly consumed roots throughout Idaho (Table 1) and document tissue structures and starch grain morphology within these roots.

Before I went into the field to collect plant specimens, I wanted to know more about how Native American communities used these plants. Many Indigenous root diggers in the past and present have shared their ethnobotanical knowledge with the scientific community and these oral and written records offer windows into worlds

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of people-plant relationships. For example, specific harvesting tools such as digging sticks, often made of ocean spray (*Holodiscus discolor*) or antler, were perfectly designed to remove roots from the soil without breaking the edible portion.



Contemporary welded digging stick.

Cultural norms also guided the timing and art of harvests. Bitterroot is harvested before the plant flowers in spring. Water parsnip or wild carrot may be harvested both in spring and a second time in summer. Harvesting root foods was also done with an eye towards future harvests

and sustainable food systems. For balsamoroot, only the smaller “carrot-sized” roots were collected and the larger plants with woodier taproots left to go to seed and continue growing. Roots were also prepared for winter storage or as valuable trade items. Young *Lomatium* roots and tubers were harvested and processed by removing the epidermis and either baking or air-drying roots. These dried *Lomatiums* could then be pounded into pat-

ties or cakes and stored for long periods of time or traded widely. All these practices were tied to specific months, guiding the movements and daily patterns of people throughout the year as they harvested specific plants (and animals) in time with the changing seasons.

Next, I looked to the Global Biodiversity Information Facility (GBIF – [gbif.org](http://gbif.org)) to pinpoint public lands and spaces where other native plant enthusiasts had identified some of our target species. The GBIF brings together herbaria data with crowd-sourced, citizen science-derived GPS locations and taxonomic identifications to allow scientists, researchers, and any other interested laypeople to explore the rich biotic communities throughout our planet.



An example of an archaeological slate knife from North Idaho that may have been used as a hoe or other digging/food processing tool. Date unknown. It may be possible to test this tool or others like it for starch grains.

I was specifically interested in working with the GBIF, as it is open access and free to use online, making the data accessible to anyone. I was also interested in exploring and contributing to plant locations on public lands so that others too could follow in our footsteps. I did not want to infringe on Tribal lands and specifically wanted

**Table 1.** Edible plants collected for this study. Ethnobotanical uses are drawn primarily from Nancy Turner’s 2007 *Food Plants of Interior First Peoples*, Royal BC Museum handbook and Eugene Hunn and David French’s 1981 paper *Lomatium: A Key Resource for Columbia Plateau Native Subsistence*, *Northwest Science* 55(2):87-94.

Scientific Name	Common Names	Ethnobotanical Uses
<i>Balsamorhiza sagittata</i>	Arrow-leaved balasamoroot, wild sunflower	Peeled and roasted or steamed and could be dried and stored.
<i>Lomatium canbyi</i>	Canby’s biscuitroot, white camas, snowdrops	Cooked fresh, boiled, or air-dried whole. Could be made into patties or cakes.
<i>Lomatium cous</i>	Biscuitroot, cous, kouse	Boiled, dried whole, ground, or created into small cakes.
<i>Lomatium dissectum</i>	Chocolate tips, fernleaf biscuitroot, wild celery	Young roots eaten, used as medicine, or in hide tanning.
<i>Lomatium geyeri</i>	Geyer’s biscuitroot	Sprouts eaten, roots formerly eaten but little information.
<i>Lomatium macrocarpum</i>	Wild carrot, desert parsley, sweet potato	Usually roasted or boiled with other foods such as lichen, tiger lily bulb, or meat.
<i>Lomatium triternatum</i>	Wild celery, narrow-leaved desert parsley	Greens consumed, but few references to root cooking.
<i>Lewisia rediviva</i>	Bitterroot, sand or desert rose	Eaten raw or boiled, baked, added to stews, or air-dried.
<i>Perideridia gairdneri</i>	Wild caraway, yampah, wild carrot	Peeled immediately after August harvest and eaten raw, mashed, boiled, or pit steamed.
<i>Sium suave</i>	Water parsnip or wild carrot	Can be eaten raw, steamed, or fried.



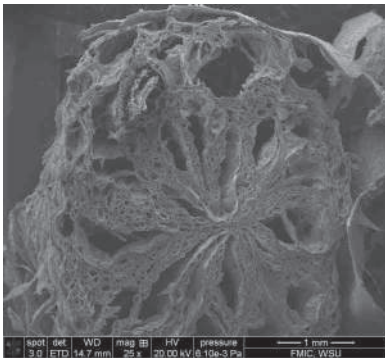
to respect those locational data to protect those populations because edible and medicinal plant knowledge can be protected and private knowledge for some Indigenous communities.

Between the spring and summers of 2022 and 2023, I visited several locations across north Idaho to collect experimental and voucher specimens of each of the plants listed in Table 1. These plant specimens were brought back to Washington State University and the University of Arkansas where we separated specimens into three groups: 1) for experimental charring to see what the plants might look like archaeologically, 2) for thin-sectioning using a microtome to better characterize the interior root cellular morphology, and 3) for processing to isolate starch grains. I also brought some of the experimentally charred roots to the scanning electron microscopy lab at the University of Arkansas to generate high resolution images of these plant remains.

My current students and I are still working on describing the features and anatomy of roots and starch grains to create those reference guidelines for other archaeologists and ethnobotanists. There are, however, a few emerging examples where other teams have been able to identify some of these plants in archaeological sites. Tuberosous roots identifiable to the *Lomatium* spp. genus were noted in an approximately 500-year-old roasting pit near Wenatchee Lake, Washington. These roots were roasted with ponderosa pine and alder wood,



White camas (*L. canbyi*) (left) and bitterroot (*L. rediviva*) (right), peeled and dried for storage.

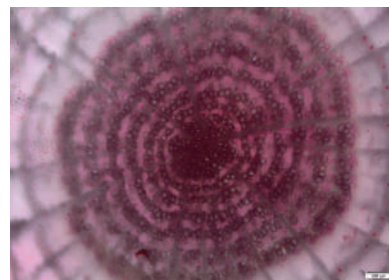


Experimentally charred *Sium suave* cross section.

perhaps adding a desired smoky flavoring. Others have had success using sonicating toothbrushes on ground stone mortar to extract biscuitroot (*Lomatium* sp.) starch grains in eastern Oregon. Our project aims to help refine those identifications to species while also helping out archaeologists working in Idaho and beyond to trace these

histories of plant use. Our larger goals too are to look at the vast diversity of root foods that people consumed and better understand subsistence decisions, recipes, and food-related conservation or management practices specifically to share with our partners, to hand off the decision-making and conservation process, and make it possible for the old foods to come back into the limelight.

One of the other goals of this project is to upload our reference images and information to an open access database (*Cultural and Historic Guide to Northwest Native Plants*) to allow anyone interested to view and contribute to this project. Although university herbaria, printed plant guides, and websites like the GBIF are fantastic resources, they aren't often geared toward the features archaeologists are interested in. Paleoethnobotanists usually make their own reference collections, but this can also take quite a bit of time. By uploading these images in an online database, we can continuously update identification criteria and other ethnobotanical facts and also create com-



*Lomatium macrocarpum* pith stained showing anatomical features and location of starch grains within root.

munity. If you are interested in the project or just in learning more about the ethnobotanical uses of native plants in our region, please check out the website at [nwnativeplants.org](http://nwnativeplants.org)!

**About the author:** Molly Carney was a postdoctoral scholar at Washington State University before joining the University of Arkansas as an assistant professor of archaeology. You can see what the Paleoethnobotany Lab is up to at <https://paleoethnobotany.uark.edu/> and meet some of the Arkansas students involved in this work. She can be contacted at [mc143@uark.edu](mailto:mc143@uark.edu).

# INPS Scholarships for the Next Generation of Native Plant Advocates

By Penny Morgan, Paul Ries, and Lindsey Barber, Scholarship Committee Members

Your INPS Scholarship Committee has great news to share! We awarded our first two scholarships. Our committee members from INPS chapters across the state included: Lindsey Barber (chair and member of Calypso chapter), Penny Morgan (White Pine), Bill Bridges (Loasa), Liz Martin (White Pine), Paul Ries (Wood River), and Don Morishita (Loasa). Next year, Liz Martin will be chair as Lindsey and her family are moving to Denmark for new jobs for Lindsey and her husband. Our committee established the criteria for eligibility, determined how applicants would be evaluated, detailed the funding, and agreed on how to administer the award. So many people learned about INPS as we contacted a long list of people working with students in related academic programs across the state and created social media posts and informative flyers for wider dissemination. Idaho college or university students demonstrating an interest in native plants and plant communities are eligible for the \$2000 scholarship award each. We had 28 applicants from five 2- and 4-year colleges in Idaho.

We congratulate Abbey Moody and Richard Rachman, first recipients of the Idaho Native Plant Society Scholarship. All applicants received a free 1-year membership in INPS. In alignment with our INPS mission, we sought to award our scholarship to students interested in understanding and increasing the appreciation of our native flora. Through the scholarship, INPS supports the education of those who will carry on the INPS mission for years to come. Our committee found it very challenging to choose Abbey and Richard from the 28 great applicants.

**Abbey Moody**, our undergraduate student recipient, is a sophomore at Boise State University studying Biology with an emphasis in Evolution, Ecology and Behavior along with an additional emphasis in Secondary Education and a Teaching Endorsement in Natural Sciences. She is a Presidential Scholarship Awardee who plans to work towards a master's degree and eventually a doctorate. Her goal is to become a researcher and science professor. This summer she is working as an Outdoor Educator at the Boise Foothills Learning Center teaching students about native and invasive species and helping them better understand ecological processes. She received an enthusiastic letter of recommendation (and he said that twice in the letter) from Professor Stephen Novak in Boise State's Department of Biological Sciences. He has been so impressed by her in his classes that he offered her a position working in his lab starting in the fall.

She will be collecting data and conducting genetic analysis on native European populations of *ventenata* grass, which is an invasive in western rangelands. The goal is to identify the source populations of *ventenata* we have in the Western U.S. and assess the genetic and evolutionary consequences of this invasion. In her application, Abbey said she first became interested in native plants and invasives she saw while trail running in the Boise foothills. She became so interested she began doing research, which led her to change her major from Veterinary Medicine to Ecology. She is self-supporting and says this scholarship will help her reduce her work hours this coming year so she can more fully focus on her education.

**Richard Rachman**, our graduate student recipient, describes himself as "first and foremost a native plant nerd" and says his love of plants and field identification started in Community College as an avid iNaturalist user. He went on to study at Cal State Northridge and earn both a BS in Ecology with a minor in GIS, where he received a competitive scholarship studying dendrochronology of sagebrush, and a masters in Biology studying the relationship between wildfire and invasive species. In his letter of recommendation, his current research advisor says Richard has the best botanical skills of any student he has ever worked with and regularly teaches other students how to identify local plants.

Richard is an active member of the LGBTQI+ professional organization, Out to Innovate (<https://noglstp.org/>), has served on the student board for the California Native Plant Society, and was active on the board of the Southern California Botanists where he helped establish a scholarship program to help low-income students attend the annual symposium. Richard worked for the National Park Service studying the 2018 Woolsey Fire, leading wildflower hikes with women's groups, native plant nurseries, and various LGBTQI+ outdoor organizations, and also worked alongside the BLM and USGS as a field technician studying plants and Greater sage-grouse in sagebrush steppe.

In his free time, he volunteers with the Xerces Society coordinating volunteer efforts to conserve monarch butterflies. His efforts were featured in the Los Angeles Times. In his current endeavors as a Ph.D. student in the Caughlin Lab at Boise State University, he will be investigating the use of drone imagery to understand changes in the spatial distribution of plant communities after wildfires. He will also be mapping the probabilities of goat-

head abundance to aid in eradication efforts. One of his goals is to continue to integrate science communication and education outreach into his research to make it meaningful for local communities. He believes bringing the process of scientific research together with community partners and the public is imperative to preserve native plant habitats.

Please encourage students you know to apply next year. For more information, including the criteria used to select the best candidates, please visit the INPS website at <https://idahonativeplants.org/scholarship-news/>. We welcome your comments and questions at INPSScholar-

ship@gmail.com. If you wish to donate to future INPS Scholarships you may do so using PayPal at <https://idahonativeplants.org/scholarship-news/>. You can also mail a check to INPS stating your desire for it to go towards the scholarship program. Your contributions will help us continue to offer scholarships well into the future. We thank Mike Mancuso and the INPS board for establishing the scholarship program, and for funding two (instead of the one initially planned) awards and the INPS membership given to all the students who applied. We also thank all the applicants and those who wrote recommendation letters for them—we welcome you all to be active in INPS. •

## Conservation in Action

### Adopt a Habitat!

Article and Photos by Alice Crockett, Pahove Chapter

The plea gained momentum this Spring 2023. The City of Boise, Golden Eagle Audubon, Idaho Fish and Game, Ada County, Idaho Parks and Recreation, etc. all voiced their requests. Volunteers were needed to adopt, restore, weed/plant, clean up, and spruce up the community land we, the citizenry, all share. ADOPT-A-HABITAT



*Alan Crockett hard at work.*

by Parks and Recreation is the one Crockett & Company chose to support. The original (2001) Oregon Trail Parkway Plan provides a bit of history about the entire Oregon Trail Parkway project (<https://www.cityofboise.org/media/3619/oregon-trail-parkway-plan-2001.pdf>).

In February 2023, Alan Crockett contacted the City of Boise's Martha Brabec and Kristin Gnojewski about adopting the Oregon Trail Parkway Habitat section along Boise Avenue between Bown Crossing and Law Avenue. They enthusiastically gave their "YES" to the adoption. And so it began...

Mother Nature joined our efforts in the first couple of months by showering, raining and giving drinks to newly planted seedlings. Pruning, weeding, and clearing of overgrown and dead vegetation came next. Then came the pickup and hauling or chipping of the pruning, weeding and clearing.

As spring and summer heated up, the seedlings (sagebrush, antelope bitterbrush, goldenrod, black hawthorne, golden currant, fern bush, mountain mahogany, etc.) needed water weekly. The Ridenbaugh Canal is on one side of this Habitat, a sidewalk and Boise Avenue are on the other. The Canal Company has Siberian elms and

chain link fence to separate their responsibilities from (now) our adopted habitat. To begin with, we watered the seedlings by filling 2 ½ gallon jugs with culinary water at home and watered the seedlings, one at a time, directly into their little water wells. They got more of a sip than a drink.

July!!! Days heated up. The question: how to keep the surviving seedlings alive (and us, too) in this heat? Alan's solution worked!!! How? The Answer: Go to "Opera in the Park" in Julia Davis Park on July 8th. At intermission, gather discarded pint beer cups from the Beer Garden vendors. Enjoy the lovely, musical evening and, after waving your 'light stick' at the finale, bring the plastic cups home. In the morning of July 9th, Alan borrowed a large hat pin

from my pin cushion, poked a small hole in the side at the bottom of each beer cup. We loaded the truck with empty beer cups and full water jugs. Watering thirsty Oregon Trail seedlings came next. The beer cups collected at the Opera worked perfectly as a slow drip for plants. When we filled the cup with water, the tiny pinhole spout slowly



*Beer cup drip waterer.*

watered the thirsty plant. We even returned to the Gene Harris Bandshell that morning for more cups. (Alan jumped into a recycle bin and retrieved about 70 more.) It did take time to water the seedlings this way, but after we finished, we could backtrack and pick up the empty beer cups. The plants said "Thank you." We came home. •

**Crockett & Company:** Alan & Alice Crockett, Ann DeBolt, Roger Rosentreter, Mike & Chris O'Brien, Howard Sheppa, Dwight Allen

## Volunteer Recognition

### Pam Brunsfeld: Field Trip Leader and Extraordinary Botanist

By Penny Morgan, White Pine Chapter President

Our White Pine Chapter board and members presented Pam Brunsfeld with the White Pine Cone Award during the 2023 annual meeting of INPS. Pam is one of the first recipients of this new award given by our White Pine Chapter to members who have made outstanding contributions over the years. As Judy Ferguson said, “Pam has phenomenal plant identification skills. She is also fondly renowned for both her great love of penstemons and of honey bees. Her field trips have sparked many people's interests in learning to identify native plants.” As Bettie Hoff said, “Pam loves to help people learn about plants,” and she is gifted at it!



Pam, a professional botanist for 50 years, is widely recognized for her botanical expertise. Pam is the retired Director of the Stillinger Herbarium at the University of Idaho where she was instrumental in having the Stillinger Herbarium be part of the Consortium of Pacific Northwest Herbaria (with Matthew Parks). Pam conducted botanical work for the Challis National Forest. She worked on the alpine flora of east central Idaho and did numerous endangered and threatened plant surveys. With her late husband, Steve, and now on her own, she runs Brunsfeld Botanical, conducting botanical surveys throughout Washington, Idaho, and Oregon, mainly for endangered and threatened plants, and now identifying Palouse Prairie remnants for Whitman County. Pam is much admired and sought after for her knowledge.

Pam helped establish the White Pine Chapter of INPS. She was our first secretary. She has served as President, Vice President, and Secretary for the Chapter, and as state secretary of INPS. She has led field trips—at least one per year—for our chapter. She has been a field trip leader for three annual meetings of INPS—last year she led three field trips in one annual meeting. Her species lists are amazing—complete, with updated and older names. We especially appreciate her enthusiastic presentation of taxonomy and memorable information about individual species. She has given numerous talks and workshops. Pam has led tours of her yard where we have

seen all 33 species of penstemons growing amongst many other plants. Pam is an artist working with stained glass and with hand-woven baskets—she has contributed both to the silent auctions to support the ERIG program. Pam has mentored many students who have gone on to become botanists and professionals in natural resources.

Pam taught general botany and systematic botany, and she worked with students at the Stillinger Herbarium at the University of Idaho. Upon retirement, Pam became a beekeeper. Pam now concentrates on native plants for pollinators and xeriscaping. She has presented on that subject to Latah County Extension, Palouse Clearwater Environmental Institute, Moscow Garden Club, and other organizations. She currently serves on the Moscow Tree Commission and Bee City Committee. We look forward to her forthcoming book about native plants for pollinators.

We honor Pam for all this and more that she does for BOTH our chapter and for Idaho Native Plant Society state-wide. We gave Pam a beautiful cone of western white pine (*Pinus monticola*) from a tree planted by Ray Hoff, a long-time member of our chapter (we thank his wife Bettie for selecting a particularly beautiful cone!). Western white pine is an icon of the forests of northern Idaho, and it is the state tree of Idaho. Congratulations, Pam. You are richly deserving of recognition. •



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## Chapter Activities

# 2023 Pahove Chapter Mother's Day Wildflower+ Show

Article and Photos by Barbara Ertter, Pahove Chapter

Pahove Chapter's 5th Annual Mother's Day Wildflower+ Show, held at the Idaho Botanical Garden on May 14, was another smashing success! About 135 species were represented, in spite of the late spring, and we could easily have had more if there had been additional collecting teams (mostly by me with some helpers in the Boise Front, plus collections by Beth Corbin and Carol Prentice in the Owyhee Front). We probably had the largest attendance yet, with an estimated 20-30 people at a time during peak hours. As a special attraction, this year's "+" in "Wildflower+" was Amy Dolan's table on Idaho bees and the new Master Melittologist Apprentice Program (Oregon State University Extension Service), which was very popular.

As so often happens, the weather turned out to be perfect for an outdoor setting, but only AFTER we had committed to holding it indoors (again). This year we had more and better signage directing people to the classroom building (thank you, Susan, Peg, and Eric), augmented by Kevin Laughlin's initiative of manning the "teaser" table, acting as greeter/barker to encourage Garden attendees to check out the Wildflower+ Show, and pointing them in the right direction. A total of 12 Master Naturalists volunteered to help with set-up and/or clean-up, doing an absolutely phenomenal job. Bob Moseley and BSU student Chadwick DeFehr were also invaluable coworkers for nearly the entire stint, as well as helping with the collecting. And I can't thank IBG event staff enough for making all this possible! BIG thanks to everyone!!! •



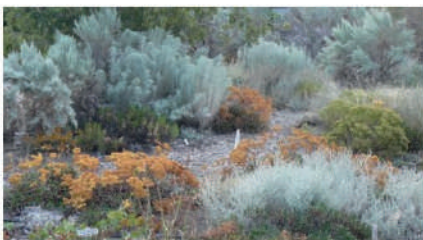
Labeled vases for each species.

Kevin Laughlin enticing garden visitors to the Wildflower+ Show.



Amy Dolan sharing her enthusiasm for bumble- and other bees.

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Arrangement for show, before the crowds arrive.

## Chapter News

### CALYPSO CHAPTER

**When:** Chapter meetings are held on the first Wednesday evenings of March, April, May, and October. The public is invited to all chapter activities, which may change, so watch chapter emails for updates.

**Where:** Meetings are held in the Wildlife Building, North Idaho Fairgrounds, Coeur d'Alene.

**Contact:** For more information about Calypso Chapter activities, contact Derek Antonelli: ds.ca.antonelli@gmail.com, (208) 691-1070.

#### Upcoming Events

**October 4:** Calypso Chapter meeting at 7:00 pm. The presentation topic for this meeting has not been determined yet. Please submit topic suggestions.

### LOASA CHAPTER

**When:** Meetings are held third Thursday of each month at 7:00 p.m.

**Where:** Taylor Building, Room 247, College of Southern Idaho, Twin Falls.

**Contact:** Bill Bridges, bridgesbill34@yahoo.com

### PAHOVE CHAPTER

**When:** Chapter meetings with intriguing presentations are held the second Tuesday of each month from October–April starting at 7:00 pm. Times, dates, and topics are tentative. Current information will be sent to members via email. Announcements are also posted on the Pahove Chapter page of the INPS website:

<https://idahonativeplants.org/pahove/>

**Where:** Chapter presentations currently offer hybrid viewing formats, both in-person at MK Nature Center and a Zoom link for at-home enjoyment.

**Contact:** For more information about Pahove Chapter activities visit the website: [www.idahonativeplants.org](http://www.idahonativeplants.org) or email Karie Pappani at pahove.chapter.president@gmail.com.

#### Past Events

For the second year in a row, the Pahove Chapter had a table at the "**First Time Adventure**" event at Lucky Peak State Park on Saturday, June 17. Attendance was unfortunately minimal due to cool overcast (very pleasant for us, but not what draws people to the park) and *E. coli* restrictions in effect. It was still a good opportunity to refine the whole tabling concept and expand our outreach to a wider demographic. And we all enjoyed learning how to make twine out of hemp dogbane (*Apocynum cannabinum*) under the careful tutelage of Peg Faith!



*Pahove table ready for action, with Peg Faith and Ti Macklin. Photo by Barbara Ertter.*



*Visitors to the Pahove table, being helped by Peg Faith and Ti Macklin. Photo by Barbara Ertter.*

#### Upcoming Events

**September 26:** Fall Kick-Off Party and Seed Exchange at Smokey Mountain Pizzeria and Grill (1805 State Street), 6:00 pm.

**October 10:** Carol Prentice will present on "Timothy E. Wilcox: Army Surgeon at Fort Boise, Boise's First Resident Botanist/Naturalist."

**November 14:** Kerry Byrne, Cal Poly, will present "Beneath our feet: Harnessing the power of the soil seed bank for restoration."

**December 12:** Cathy Ford, Idaho Transportation Department, will talk about their "Roadside Pollinator Project."

### SAWABI CHAPTER

**When:** Board meetings are held at least quarterly and will be announced. An autumn potluck is also planned.

**Where:** Winter programs are presented in the North Fork room of the ISU Student Union Building in Pocatello. Field trips generally car-pool from the bison statue in front of the ISU Museum of Natural History.

**Contact:** Paul Allen at pokyalen@hotmail.com, 208-241-5265

### UPPER SNAKE CHAPTER (INACTIVE)

**Contact:** Kristin Kaser, kaser.kristin@gmail.com

## WHITE PINE CHAPTER

**When:** Meetings are typically held the third Thursday of the month, September through April. Current information is posted on our chapter webpage:

<https://www.whitepineinps.org/WPSchedule.html>

**Where:** We are currently offering hybrid meetings. The in-person meetings are held at the 1912 Center in Moscow with a Zoom link for virtual attendance.

**Contact:** For more information about White Pine Chapter activities, contact us at INPS, White Pine Chapter, PO Box 8481, Moscow, ID 83843 or [whitepine.chapter@gmail.com](mailto:whitepine.chapter@gmail.com). Visit the chapter website (<https://www.whitepineinps.org/>) for upcoming event information and visit our YouTube Channel for video recordings of past talks (<https://whitepineinps.org/WPYoutube.html>).

### Upcoming Events

We will post our fall schedule of speakers as they are confirmed. Check our webpage for the most up-to-date information.

## WOOD RIVER CHAPTER

**When:** Typically we have talks in the cold months and walks in the warm ones. Non-members are welcome. Please see our website or email newsletter for information on all programs.

**Where:** Field trip and talk locations and details will be included with the description, posted online and emailed to members and other interested parties.

**Contact:** For more information about Wood River Chapter activities: email: [woodriverinps@gmail.com](mailto:woodriverinps@gmail.com); website: <https://woodriverinps.wixsite.com/wrinps>; phone: Mary (559) 696-9953; to subscribe to the newsletter: email us.

## Past Events

**August 16:** Our popular Hailey Alley Walk is back. Attendees explored the alleyways of Hailey with members of the Wood River Chapter. They talked about garden escapees, invasive plants, Idaho natives, trees and more.

### Upcoming Events

**September 16:** Noxious Weeds, TBA. There are, unfortunately, plenty of examples of these plants in our valley. Learn why they are so successful, why they are unwelcome and how to control them. We will also talk about the difference between a weed and a noxious weed.

**October TBA:** Members Only Hike. We are still scheming on this one, but it will likely involve ponderosa pines, just as a teaser. More details will be forthcoming.

**November TBA:** Fall Potluck Share a meal and play botany bingo for great prizes. Election of Chapter Officers for 2024 is also held at this time. •

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### Chapter Affiliation:

- Calypso (Coeur d'Alene)
- Loasa (Twin Falls)
- Pahove (Boise)
- Sawabi (Pocatello)
- Upper Snake (Idaho Falls) - *Inactive*
- White Pine (Moscow)
- Wood River (Ketchum/Sun Valley)
- No Chapter

### Membership Level:

- Student \$10
- Senior \$15
- Individual \$20
- Household \$25
- Household-Senior \$25
- Sustaining \$40
- Patron \$100+

Please indicate if your membership is:  New  Renewal  
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Memberships run calendar year. New memberships enrolled after June 1 include the following year. **Renew or join online:** <https://idahonativeplants.org/membership/>

**Sage Notes** is published quarterly by the Idaho Native Plant Society.

**Editor:** Karie Pappani  
[sage-editor@idahonativeplants.org](mailto:sage-editor@idahonativeplants.org)  
**Layout Editor:** Jody Hull  
**Reviewers:** Nancy Miller, Caroline Morris, Michael Mancuso

**Submissions:** Members and non-members may submit material for publication. Relevant articles, essays, poetry, news, announcements, photographs and artwork are welcome. Authors, artists and photographers retain copyright to their work and are credited in *Sage Notes*. Send all submissions electronically to the editor at the email address above. Please provide a phone number and/or email address with your submission. Submission deadlines are January 8, April 1, August 1 and November 1.

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