Vol. 39 No. 4 December 2017

Sage Notes

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

Notes on the Ecology of Tweedy's Reedgrass

Article and photos by Steven K. Rust, Nature's Capital, LLC

Calamagrostis tweedyi—Tweedy's reedgrass (formerly Cascade reedgrass) is a low-growing, rhizomatous, perennial grass species. It presents an intriguing case of rarity. The distinct taxon is relatively easy to identify and readily distinguished from similar species. The species is regionally distributed, but occurs at relatively few geographically separated population centers. Where it occurs it is often abundant, but clonal. It appears to be resistant to human-caused disturbance.

Hitchcock et al. (1969) describe Tweedy's reedgrass as having short, stout rhizomes with flowering stems 6 to 15 dm tall. Stem leaves are flat and broad (7 to 13 mm). A twisted, geniculate, awn extends mid-length from the back of the lemma and exceeds the glumes by 5 mm. This species is distinguished within its range by its rhizomatous growth habit; broad, flat leaves; and (when flowers present) long awn.

The global range of Tweedy's reedgrass includes five principal geographically separated population centers: (1) Entiat Mountains, Chelan County, Washington; (2) Manashtash Ridge—South Cle Elem Ridge area of Kittitas County, Washington; (3) Salmon River Mountains, Idaho County, Idaho; (4) Mineral Range—Ninemile Divide area centered in Mineral County, Montana; and (5) Sapphire Mountains, Ravalli County, Montana. Plants are also reported from near Crater Lake, Klamath County, Oregon. Using herbarium collections as an indirect measure of the species' regional abundance, 54 herbaria records for specimens from the global range of the species represent 32 unique collector numbers. By comparison, pine grass *(Calamagrostis rubescens)*, a common and widely distributed congener is represented by 763 regional herbaria records (CPNWH 2017).

Due to the species' restricted, though geographically dispersed range, relatively few occurrences, lack of protected occurrences, and effects of historic fire exclusion, Tweedy's reedgrass is considered globally vulnerable. The species is considered critically imperiled[1] in Oregon, imperiled in Idaho and vulnerable in Washington and Montana (NatureServe 2017, Oregon Biodiversity Information Center 2016).

In Idaho, Tweedy's reedgrass occurs on gentle to moderately steep northwest- to northeast-facing ridges of the Salmon River Mountains. Loam soils on these subalpine sites overlay granitic residuum of the Idaho Batholith. Pole- or medium-sized lodgepole pine *(Pinus contorta)* are typically dominant in these mid-seral stands of the subalpine fir/beargrass, grouse whortleberry *(Abies lasiocarpa/Xerophyllum tenax*, V*accinium scoparium)* habitat type. This habitat type is

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Letter from the President

I have about 4 acres of native plant evaluation plots planted here at the University of Idaho's Aberdeen R & E Center. Yesterday, I spent about 4 hours working in the plots and managed to finish up my work for the 2017 growing season. The plots are cleaned, pruned, clipped, and weeded—ready to be put to bed for the winter. I have mixed feelings about wrapping up the work for another year. On one hand I am very happy to put down my hoe and relax, especially given the fact that I have been dreadfully behind all year due to absence this past spring; a result of serious heart problems. On the other hand, I find great joy in walking through the plots and observing the incredible diversity and beauty expressed in these plants. My life is made richer by what they teach me about the interplay of life in the natural world. For the next 5 months there will be no flowers to brighten my days. During these months, the memories of drudgery due to hard labor will fade into obscurity and the hunger for blossoms will condition me for a new season. In the mean time I guess I will have to catalogue some photos, attend some chapter meetings, make plans for excursions into the wild to collect some new plants, and generally fill my native plant addiction with things that are interesting but pale somewhat in comparison to the real thing. Oh well, the next season will come. Patience, my son. Patience.

Stephen Love, INPS President

Announcements

2018 Idaho Rare Plant Conference—February 27–March 1

The 28th Idaho Rare Plant Conference will take place from the afternoon on Tuesday, February 27 through the morning of Thursday, March 1, 2018 at the Washington Group Plaza, 720 Park Boulevard in Boise.

The Idaho Rare Plant Conference (RPC) is organized by the INPS in co-operation with various agencies (Bureau of Land Management, Idaho Department of Fish and Game, US Fish and Wildlife Service, Forest Service, etc.), academics, consultants, and others interested in Idaho's rare plants. The conference is an opportunity to learn about rare plants in Idaho, other information relevant to native plants in the state, and to share information and network with other folks having similar interests. Updating the INPS Rare Plant List based on new information is a substantial portion of the RPC. In addition, there will be a number of talks/presentations on rare plants, conservation issues, or related topics.

Penstemon salmonensis and other newly discovered and described species will be our highlights this year, but we will discuss many other rare and interesting plants during the conference. A dinner banquet will be held on Wednesday evening with Dr. Eric Yensen as the guest speaker.

A request for presentations and posters for the Conference is open until January 19, 2018. (See form next page.) We will have a "To The Point" session (10 minute presentations) to provide a great opportunity to quickly update colleagues on any topic of interest related to Idaho native plants. We will also have and time for some longer (20 minute) presentations. We are especially interested in new plant species for Idaho and inspiring presentations. Please visit our webpage for more information and a registration form: https://idahonativeplants.org/rare-plant-conference/

Idaho Rare Plant Conference—Call For Papers

This is a request for presentations and posters for the Idaho Rare Plant Conference to be held February 27–March 1, 2018 in Boise. Student papers and posters are especially encouraged.

Abstracts and associated information must be submitted by January 19, 2018 to Janet Bala balajane@isu.edu. Authors will be notified about the selection of their presentation by February 5, 2018.

For those interested in presenting during the "To The Point" session (10 minute presentations), you need only submit your name, contact information, presentation title, and a brief presentation description (2-3 sentences). The "To The Point" presentations are good opportunities to update colleagues on interesting observations that could lead to future research or projects you are initiating, have in progress, or have preliminary results to share.

For all other presenters, please submit the following information as a word document (use Microsoft Word 2000 or later version):

- Presentations will be 20 minutes in length, including an introduction of the presenter and time for questions.
- Posters will be limited to a 4x8 display board.

1) Background information, including name, mailing address, phone, fax, e-mail.

Please indicate two topics that would best fit your presentation:

Plant ecology	_____	Landscape ecology	_____
Pollinator ecology	_____	New species	_____
Survey methods	_____	Modeling	_____
Genetics	_____	Population dynamics	_____
Threats	_____	Other	_____

Preferred presentation type: Oral presentation _____ Poster _____

Student presenter? Yes No

2) Biographical sketch (2-3 sentences to be used by session chairs in their introductions).

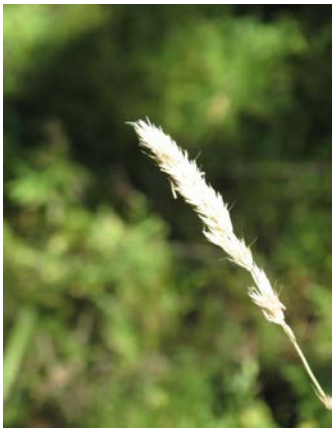
3) Abstract.

Please follow the abstract format for a peer-reviewed journal, such as Northwest Science or Western North American Naturalist. Abstracts not meeting this format will be returned for editing and re-submission.

- Please use Times New Roman 11 point font
- The title should be capitalized and in bold font
- Capitalize the name of the presenting author
- Student presenters should put an * at the end of their name
- Include affiliation and location information (city, state, and zip code)
- Include a single space between the title block and the abstract
- The abstract should be no longer than 300 words

Zygadenus elegans, elegant death camas. By Karie Pappani.

grouped into the Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland ecological system. These sites are characterized by moderately long-interval (35 to 100+ years) mixed-severity and stand replacement fire. Succession following fire on these sites may result in a repeated cycle of the establishment of dense lodgepole pine, self-thinning, followed by mixed severity or stand replacement fire (Crane and Fisher 1986, LANDFIRE 2017).



Tweedy's reedgrass inflorescence.

In central Idaho, tree mortality due to mountain pine beetle also influences forest stand structure and composition. In lodgepole pine dominated stands, tree mortality due to mountain pine beetle gives rise to canopy gaps that may promote growth of understory species.

The role of fire is a consistent theme in discussion of Tweedy's reedgrass in Idaho. In 1988, Bob Moseley with the Idaho Natural Heritage Program completed an extensive survey for the species in central Idaho. He expanded knowledge of the species' distribution in Idaho considerably. Since then few additional occurrences have been located. Moseley (1988) found the species to be more abundant in early seral stands and less abundant in mid-seral stands where the species persists in a vegetative state. He concluded an important threat (among others) to the long-term viability of Tweedy's reedgrass populations in Idaho is the exclusion of wildfire.

Following the 1994 Chicken Complex Fire, Kathy Geier-Hayes (Forest Service) established permanent monitoring transects to assess the effects of fire on populations of Tweedy's reedgrass. Chantelle DeLay (Forest Service) resampled the Geier-Hayes transects in 1996 and 2002. Geier-Hayes (1995) and DeLay (2004) found Tweedy's reedgrass was more abundant on sites with high- and low-severity fire effects compared to an unburned site.

In 2009, I sampled Tweedy's reedgrass populations within the perimeters of the 2007 Zena-Loon and Raines fires. The objective was to relocate populations of the grass species and document population status with respect to the wildfire event. To document the species' response to wildfire and census the occurrences, nested 1 m and 10 m radius circular plots were used to count stems and rhizomatous clones, respectively. Vegetative and reproductive stems were counted on 1 m radius circular plots spaced on transects at 10 m intervals. On 1 m radius plots where no stems were present, the species was recorded as absent. Along most transects, clonal stem clusters of the rhizomatous species were counted on one 10 m radius circular plot superimposed on a representative 1 m radius circular plot. Wildfire effects were rated as high-severity, mixed-severity, low-severity, or unburned[2].

Within the northern portion of the range of Tweedy's reedgrass in Idaho I counted vegetative and reproductive stems on 100 1 m radius plots and rhizomatous clones on 14 10 m radius plots. The 1 m radius plots occurred in 12, 23, 3, and 62 high-severity, mixed-severity, low-severity, and unburned sites, respectively. Progressive tree mortality due to pine beetles was also present at many sites. Tweedy's reedgrass was present on 100% of the high-severity plots and 75% of the plots in each of the other fire effects classes. On average, there were significantly more vegetative and reproductive stems on high- and mixed-severity sites compared to unburned sites (30.1 vegetative and 11.0 reproductive stems/m^2; 35.9 and 7.2 stems/m^2; versus 20.9 vegetation and 0.5 reproductive stems/m^2 on high- and mixed-severity versus unburned sites, respectively).

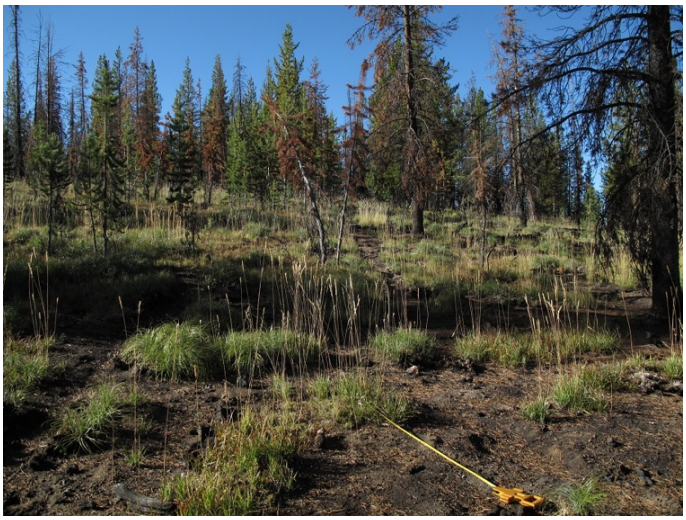
The 10 m radius plots occurred on 3, 5, 1, and 5 high-severity, mixed-severity, low-severity, and unburn sites, respectively. On average, significantly more Tweedy's reedgrass clonal stem clusters were present on high-severity sites compared to mixed-severity and unburned sites (14, 4, and 6 clones per 100 m^2 on high-severity, mixed-severity, and unburned sites, respectively).

These results support previous observations that flowering and vegetative growth in Tweedy's reedgrass are stimulated by fire. The results do not, however, demonstrate that the species benefits from fire. For example, though fire may have stimulated flowering, we do not know if flowers produced viable seed or if a viable seed crop was followed by successful establishment and survival of Tweedy's reedgrass seedlings. Perhaps the result that plants were present on 100% of the high-severity plots (compared to 75% in all other fire effects classes) suggests the data are biased against sites most severely impacted by fire—where plants of the species were likely consumed by fire.

Though the number of observations is low, it seems counter intuitive that over twice as many clonal stem clusters were observed on high-severity sites compared to unburned sites. While fire appears to have the effect of trimming outlying rhizomatous shoots, fire may also act to subdivide individual clones—thus contributing to the

vegetative reproduction and spread of an individual genet.

Tweedy's reedgrass presents an intriguing case of vascular plant rarity. The restricted global distribution of Tweedy's reedgrass suggests that the species does not effectively reproduce by seed—either due to low seed viability or low rates of seedling establishment—or has poor dispersal mechanisms. Though seemingly locally abundant, occurrences of Tweedy's reedgrass may represent relatively few genetically distinct individuals. Genetic diversity in the rhizomatous grass may be low.



Tweedy's reedgrass response to mixed-severity fire.

Tweedy's reedgrass response to high-severity fire.

Tweedy's reedgrass on an unburned site.

Based on observations from a portion of the species' range in Idaho, I propose the following hypothesis for the species' ecological profile: Through a wide amplitude of physiological capabilities and morphological adjustments, the species possesses mechanisms for persisting in a range of habitat conditions. In an open, well-lit environment, growth is allocated to above ground vegetative and reproductive shoots; rhizomatous expansion is low; clonal stem clusters are discrete and tightly compressed. In a shaded environment, growth is allocated to below ground rhizomatous expansion; clonal stem clusters are widely spreading, elongated and diffuse.

Open-grown plants appear to present an adaptive strategy most suited for competition—for example, to compete with a new generation of lodgepole pine seedlings following mixed-severity fire. Shade-grown plants, on the other hand, appear to present an adaptive strategy most suited to respond to chance factors of disturbance. For example, to grow opportunistically into a new canopy gap or escape mortality by wildfire in one location by spreading vegetatively over many locations. •

[1] Critically Imperiled: at very high risk of extinction globally or in the state due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. Imperiled: at high risk of extirpation globally or in the state due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors. Vulnerable: at moderate risk of extirpation globally or in the state due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

[2] High-severity: near 100% tree mortality coupled with near 100% consumption of understory shrub and herb above ground shoots. Mixed-severity: a patchy mosaic of high-severity effects intermingled with low-severity fire effects or unburned sites. Low-severity: patchy consumption of understory shrub and herb above ground stems. Unburned: no evidence of recent fire activity.

References

Consortium of Pacific Northwest Herbaria Specimen Database (CPNWH). 2017. Website http://www.pnwherbaria.org (accessed May 2017).

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2017 Statewide Annual Meeting: A Family's Journey

Article and photos by Karie Pappani, Pahove Chapter

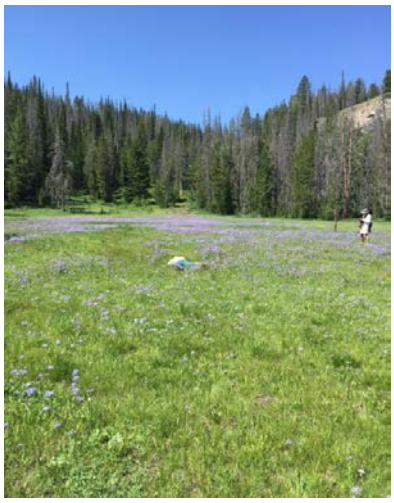
Last summer our INPS annual meeting was held in Challis, Idaho, at Living Waters Ranch, from July 14-17, 2017. Bill Bridges, president of the Loasa Chapter (Twin Falls area), organized much of the event. The Living Waters Ranch is set in a canyon carved by Garden Creek, a tributary to the Salmon River. Living Waters Ranch was very hospitable with halls for dining, recreation play rooms, and a variety of lodging options including cool camp spots next to the creek. Most attendees arrived on Friday and settled into their cabins.

Saturday offered a choice of field trips (Railroad Ridge, Chilly Slough, Malm Gulch, and Bayhorse Lakes and Ghost Town). Railroad Ridge was cancelled due to an impassable road, but the group was able to do some exploring near an old mining area in East Fork of the Salmon River area. Years ago I attended an amazing field trip to Malm Gulch lead by Michael Mancuso. Back then I was pregnant with my daughter. My husband and I actively corralled my young son during our hike through this unique area with a volcanic past culminating in a petrified sequoia forest. This time, our family, around 10 years later, decided to join in on the trip to Little and Big Bayhorse Lakes.

Mentzelia laevicaulis.

I have much more distant memories of travelling from Salmon (my hometown) to Challis to go to Bayhorse Lake with my grandfather, uncle, and brother. But as often happens, I remember the mishap of the trip, which was entertaining, and had forgotten the scenic beauty—not to mention the botany of this high mountain area. My grandfather's camper broke down on HWY 93 South and we ended up spending the night in Challis while it got repaired. After talking with my brother and uncle, I now recall that the day was not lost and we spent it successfully fishing at Bayhorse Lake. My uncle still has a painting that I did in my early teens to commemorate the trip.

Luckily during the INPS annual meeting our vehicle carried us all the way there and back over somewhat narrow and bumpy but maneuverable roads. Along the road up to the lakes we found some spectacular plants including *Penstemon montanus*, *Chaenactis douglasii*, *Mentzelia laevicaulis*, *Stephanomaria* sp., *Penstemon rydbergii*, *Lewisia pygmaea*, and *Astragalus* sp.

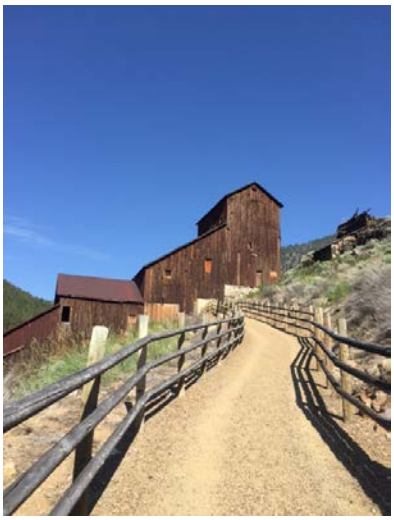


Steve Love lying in a field of Penstemon.

Little Bayhorse Lake was beautiful. We skirted the lake along a lush path and ended in an open meadow. Steve Love, our INPS state president, laid down amongst the wildflowers, taking it all in. The walk to that meadow showcased *Aquilegia formosa*, *Zigadenus elegans*, *Veronica americana*, *Polygonum bistortoides*, *Penstemon procerus*, *Epilobium angustifolium*, *Frageria virginiana*, *Lonicera utahensis*, *Arnica cordifolia*, *Geum triflorum*, *Iris missouriensis*, *Castilleja miniata*, and *Pedicularis groenlandica*. While I enjoyed my opportunity to botanize with fellow plant enthusiasts, my husband and two children spent their time observing various life stages of the Columbian spotted frogs that they found, along with leeches, in the shallow waters of the lake.

Next we headed to Big Bayhorse Lake. This montane lake was surrounded by an abundant field of wildflowers including *Senecio* sp., multiple *Epilobium* spp., *Hackelia floribunda*, *Phlox austromontana*, *Erigeron* sp., *Lupinus argenteus*, C*astilleja cusickii*, and many others. We had just enough time to eat lunch and explore our surroundings before an afternoon thunderstorm rolled through the area.

Before returning to Challis, my family took the opportunity to visit the Bayhorse Ghost Town, a historic town and mining district, which now offers an interpretive walking tour as well as the Land of the Yankee Fork State Park Visitor Center where my kids enjoyed a scavenger hunt and panning for gold.



Bayhorse ghost town.

On Sunday we departed Challis and decided to take the 46 mile Custer Motorway Adventure Road—unconcerned that our vehicle would break down. This historic mining driving tour connects Challis to Sunbeam with stops at Custer and Bonzana townsites. We visited the Yankee Fork Gold Dredge just before getting to Sunbeam. This dredge used to mine stream gravel for gold and silver. Its effects on the stream and the surrounding habitat are significant as first seen in the numerous tailings in the area. The Yankee Fork Rehabilitation Project is a group of state, tribal, and federal staff as well as landowners, sportsmen, and Trout Unlimited working towards restoring natural stream channel sinuosity, pools and riffles, and streamside habitat to improve fisheries. Learning about the prospecting and mining past of this area added to the trip, but the most rewarding stretch of the Custer Motorway for me was a small roadside section with a population of what I think was *Platanthera dilata*, white rein orchid, growing in a seep with *Mimulus lewisii* and *Saxifraga* sp. There were no mishaps on our trip this time around, and hopefully these pleasant memories will stay with me and my family. •

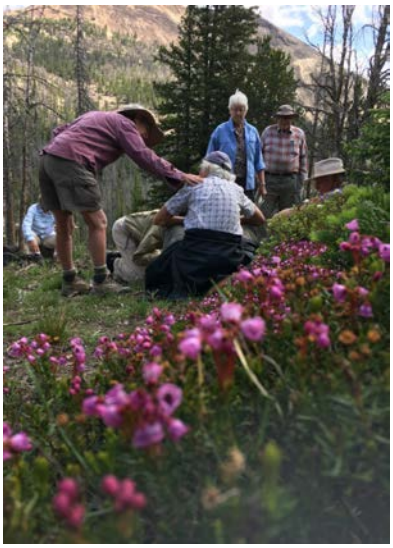
2017 Statewide Annual Meeting in Challis

Article and photos by Tony McCammon, INPS Vice President

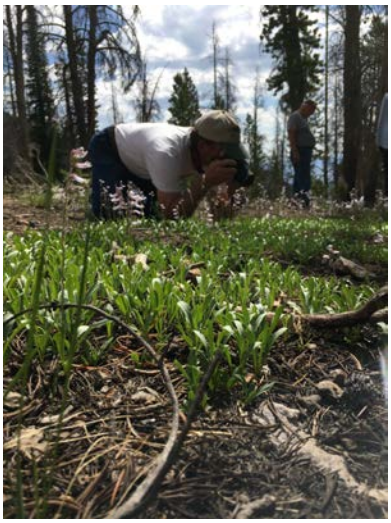
The INPS summer meeting hosted by the Loasa chapter under the direction of Bill Bridges, was well attended in the foothills surrounding Challis. We were welcomed to the Living Waters Ranch and had excellent speakers address us. Bill Varga of Utah State University spoke to us about ethnobotany and Karen Launchbaugh from Moscow shared a thought provoking presentation on rangeland ecology. Overall we had a fabulous meeting.

Astragalus amblytropis, below the Bayhorse mining town.

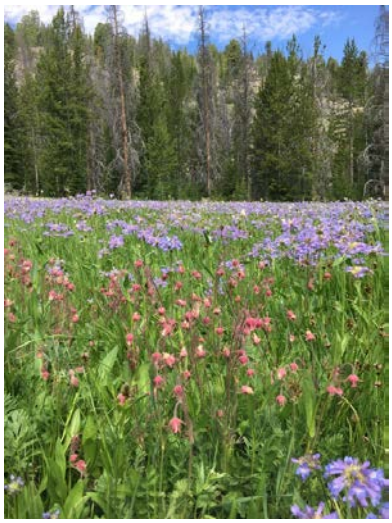
The highlight of the week came with the opportunity to see Dr. Steve Love up and hiking in the mountains. The celebration was only heightened by the beautiful display of wildflowers we saw on the Bayhorse Lake tour and Monday's surprise tour of Twin Peaks. Other tours included Malm Gulch and Railroad Ridge. Early hot dry summer days cooked most of the plants in the Malm Gulch area, and the road to Railroad Ridge was washed out from heavy spring runoff. However, an outspoken Trump supporter who manages the abandoned mining complex at the base of Railroad Ridge offered us a tour of the area below the ridge.•



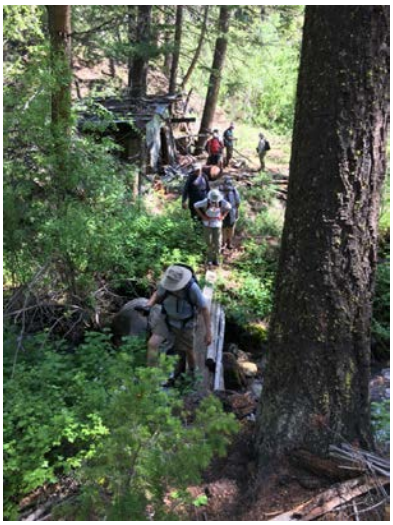
Botanizing with mountain heather below the Twin Peaks lookout tower.



Pussypaws and scutellaria were in abundance for photographers on the saddle between Twin Peaks.



Prairie smoke and Rydberg's penstemon in full glory. Upper Bayhorse Lake area.



The 'Love' Shack a tribute to the B-52's, with Steve Love, just below Railroad ridge.

This issue of Sage Notes includes articles that summarize three recent projects partially funded by the INPS ERIG program. Submitting an article for Sage Notes is one of the requirements to receive ERIG funds. This ensures the INPS membership can be aware of projects funded by the ERIG program.

ERIG: Hawthorne Elementary School Native Plant Garden, Boise

By Amy Pence-Brown, School Garden Coordinator, Hawthorne Elementary School

Hawthorne Elementary is a small Title 1 elementary school in the Boise School District, in the Boise Bench neighborhood. We are excited to announce our recent grand opening celebration and the ribbon cutting of our Idaho Native Plants Learning Landscape & Teaching Garden on October 17, 2017. The school received numerous grants and worked with a handful of expert community partners on the three-year-long project. This included $30,000 from the City of Boise Mayor's Neighborhood Reinvestment Grant as part of the Vista Neighborhood Association and the Boise Public Schools. The parent-led crew worked hard to replace nearly a half-acre of unused grass space at the school with an innovative, revolutionary, and educational space.

Sign at main entrance to the native plant garden. Photo by Amy Pence-Brown.

Five years ago I approached the school principal with an idea of starting a small vegetable garden. We did it, and the past few years have shown growth in the interest of environmental projects in our classrooms. From worm composting to a tiny trout hatchery, we are doing, teaching, and exploring wonderful things regarding the outdoors and wildlife in our classrooms. We wanted to continue to foster that education beyond our brick walls. I lead a committed Garden Advisory Team at Hawthorne, including the principal, three teachers, five parents and a group of students. We have been supported and provided training and grants by several local organizations, including: the Idaho Botanical Gardens, Whole Foods, Boise State University, University of Idaho, Boise Urban Garden School, Idaho Department of Fish & Game, Idaho Bureau of Land Management, and the Idaho Native Plant Society.

Holly Beck, botanist for the BLM, is an expert in native Idaho landscapes and has created smaller arid desert gardens for schools like Roosevelt Elementary School in Boise and Bruneau Elementary School in Bruneau, Idaho. "So much research has been done on the benefits of creative environmental education," says Beck. "These type of gardens give kids a profound connection to the native flora of the sagebrush steppe and the Idaho landscape."

Getting native plants into the ground. Photo by Jason Sievers.

Hawthorne Elementary School principal, James Bright, also sees the benefit of not only taking the education beyond the brick walls, but also the benefit to the neighborhood as a whole. "It's great to see ideas about school landscapes changing. Adding more opportunities to bring the kids outdoors to learn in a revolutionary space like this will not only benefit Hawthorne, but makes our school a more inviting place for our neighbors in the Vista neighborhood as well," explains Bright.

The project goals are to: 1) encourage an appreciation for Idaho native plants and geology, 2) expose students and the neighborhood at large to hands-on environmental education, and 3) enhance the curriculum by connecting it to the natural world.

Additional benefits: Recent trends and statistics for children and their knowledge of the natural world point to a strong need for increased outdoor experiences. Examples include: 1) The amount of outdoor, environmental education programs offered in our local schools has been decreasing in the last 10 years. 2) The average

Kindergarten class in the native plant garden amphitheater. Photo by Amy Pence-Brown.

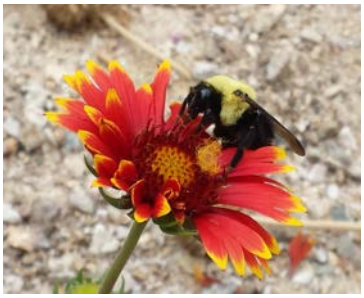
American child can recognize 1,000 corporate logos but can't identify 10 plants or animals native to his or her own region. 3) There is a strong correlation to whether people have nature experiences as they grow up and whether, as adults, they will be concerned about policies that affect nature.

The space includes pubic art and sculptural signage by local artists Sue Latta, Stephanie Inman, and Ken McCall, as well as a sandstone outdoor amphitheater, a teacher's meeting area, a sensory garden, an artist garden, a pollinator garden, and an experimental garden for students. The native landscape will be a venue for educating students on the unique plants and geology of their area. It will also serve as an outdoor learning space where teachers can conduct classes. Opportunities for art and science in the garden will be created and the BLM will assist with curriculum development. To align with state-wide curriculum elements, we have included plants that have a place in Idaho's history such as syringa or have traditional Native American uses such as basin wildrye and serviceberry, most grown from seed for us by Draggin' Wing Farms in Boise and Steve Love at the University of Idaho–Aberdeen. Themes within the native landscape will mirror curriculum to assist teachers in incorporating the outdoor classroom and will be the first stepping stone to part of the larger initiative to engage Idaho schools with the lands that surround them. •

ERIG: Sage International School Native Plant Garden, Boise

Article and photos by Kristin Gnojewski

"Nothing smells quite as good as fresh dirt on your hands." This quote came from a middle school student while she enthusiastically added new plants purchased with Education, Research, and Inventory Grant (ERIG) funds to the Sage International School garden last spring. The garden includes a small wetland, a native plant area and several raised beds for veggies. Over the past three years, Sage International School students and families have volunteered time, energy, and resources in order to make the garden come to life. The ERIG grant from the Idaho Native Plant Society funded the purchase of dozens of native Idaho plants to fill in many of the gaps that once existed in the garden. Much of the planting occurred during Sage's Earth Day celebration in April 2017, during which over one hundred middle school students had the opportunity to contribute to the garden.



Bumblebee on blanket flower in the Sage Garden.

Watching what was once a trash and weed filled abandoned strip of land transform into rich habitat with numerous species of native plants, pollinators, insects, birds, reptiles, and even a few mammals has been such a rewarding experience. In addition to funding the plants for the main garden, ERIG funds were used to purchase native plants for concrete planters in the front of Sage's K-2 building. The plants were installed by kindergarten through second grade students last spring. Throughout the spring and summer, these plants were host to a wide range of bees and butterflies.

The Sage Garden Committee is incredibly grateful for the support of the Idaho Native Plant Society. Thank you for supporting our community and the next generation of conservationists. •

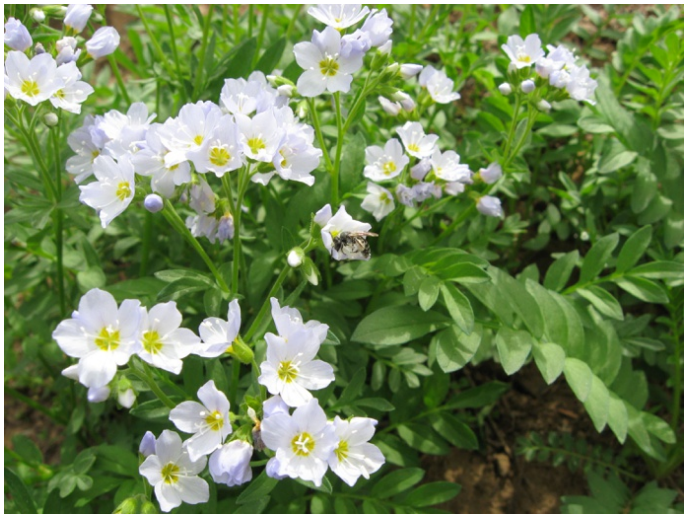
Sage Middle School students adding native plants to the garden.

ERIG: Polemonium in Idaho

Article and photo by Jeffrey Rose, University of Wisconsin–Madison

I am currently a Ph.D. student at the University of Wisconsin-Madison and was a recipient of an ERIG grant from the Idaho Native Plant Society in 2014. My dissertation research focuses on understanding the evolutionary relationships between species of Jacobs' Ladder and Sky Pilot (*Polemonium*) in the phlox family (Polemoniaceae). While Polemonium isn't as diverse in Idaho as in California or Washington, the diversity within Idaho includes variation that has proved difficult for taxonomists to sort into species. As a result of varying taxonomic interpretations, inconsistencies and incorrect information exists in floristic treatments. This causes difficulties for basic identification in the field as well as for scientific analyses. Therefore, the morphological limits and defining features of these species need to be clarified. Specifically, my grant proposal focused on using DNA to answer two questions related to *Polemonium* in Idaho. First, I hoped to better understand relationships in the *Polemonium pulcherrimum* group. In Idaho, this includes *P. pulcherrimum* and *P. californicum*. *Polemonium californicum* has sometimes been treated as a variety of *P. pulcherrimum* (var. *calycinum*). For this objective, I also hoped to assess if *P. delicatum* occurs in the Mount Harrison area of southern Idaho as variation in herbarium specimens might suggest. Second, I wanted to clarify to what group of *Polemonium* the recently described *P. elusum* (endemic to the Salmon River area) is related to, specifically if it is close to the narrowly endemic *P. nevadense* of the Santa Rosa Range in Nevada. Both species share many morphological features, most notably whorled leaflets.

I planned my fieldwork for July-August 2014 to overlap with both the flowering time of *Polemonium* as well as the Botanical Society of America Meeting in Boise. On 26 July after having collected *P. nevadense* near Winnemucca, Nevada, I drove up to Boise. The next day, I drove up to the Snowbank Mountain area in Valley County to collect *P. californicum*. This species was abundant along the road to the summit. At lower elevation, plants were already well in fruit (growing with *Ipomopsis aggregata*, skyrocket), while towards the summit, plants were still flowering or in bud in areas still covered with patches of snow (growing with *Phlox diffusa*, spreading phlox). After collecting at Snowbank Mountain I then drove a little further north to collect *P. occidentale* along a swale between cow pastures just north of Donnelly. After the very enjoyable meeting in Boise (during which I presented on some preliminary molecular results), I then travelled southeast towards Salt Lake City. On the way, I stopped at Mount Harrison to collect samples from a population that I initially suspected might be an occurrence of the slightly more southeastern *P. delicatum*. Unfortunately, this population turned out to be more *P. californicum*. On Mount Harrison, *Polemonium* is abundant under spruces at the summit (nearly forming a monoculture) and along road banks near Lake Cleveland (with *Leptosiphon nuttallii*, Nuttall's linanthus). It was also exciting to see the narrowly endemic *Castilleja christii* (Christ's Indian paintbrush) at Mt. Harrison.



Polemonium californicum visited by a bee near Lake Cleveland on Mount Harrison, Idaho.

After my field season ended on 19 August, I returned to the lab to extract DNA from my new samples as well as samples of *P. elusum* kindly provided to me from Idaho Native Plant Society member Alexa DiNicola. This DNA was analysed using a relatively new method that generates DNA sequences for approximately 500 genes at relatively low cost. After analysis, these genes provided an evolutionary tree of *Polemonium* with high statistical support. Based on these molecular results and close study of herbarium specimens I found the following: (1) *Polemonium pulcherrimum* and *P. californicum* are closely related but well-differentiated molecularly and morphologically (see key below). However, taxonomic names for additional variants in *P. pulcherrimum* need further study. (2) *Polemonium delicatum* and *P. californicum* are poorly differentiated morphologically (see key below) and especially poorly differentiated molecularly. These two species have generally been separated based on calyx size. While *P. delicatum* tends to run smaller in calyx size, there is an extreme amount of overlap in this

trait. Future study should examine if molecular differentiation is correlated with morphological differences and what the taxonomic implications of this variation might be. (3) *Polemonium elusum* is most closely related to *P. nevadense* and they are both distinct morphologically. These are in turn the closest relatives of a group of Sky Pilot *(P. viscosum)* found in the Intermountain region. *Polemonium elusum* and *P. nevadense* both share elongate, whorled leaflets, rotate corollas, and yellow anthers. However, *P. elusum* differs from *P. nevadense* in its more linear leaflets, stricter inflorescence, glabrous instead of finely glandular calyx, and white as opposed to blue corollas. Below is a key to the *Polemonium pulcherrimum* group. •

Key to Polemonium pulcherrimum and relatives in Idaho and Adjacent States

1. Anthers orange or yellow, never white in this part of the range.....other Polemonium
1. Anthers white (*Polemonium pulcherrimum* group).....2
   2. Leaflets rounded or slightly oblong, densely to sparsely short-glandular.....3
      3. Leaflets densely glandular; calyx of long glandular hairs with clear glands; corolla tube length about equaling lobes; Washington state .....P. elegans Greene
      3. Leaflets more sparely pubescent, resinous glandular or nearly glabrous; calyx of short glandular hairs with resinous glands; corolla tube length 0.5 times the length of the lobes; widespread.....P. pulcherrimum Hook. ssp. pulcherrimum
   2. Leaflets elongate, ovate or lanceolate, hairy with a mixture of long glandular and eglandular hairs.....4
      4. Calyx 3-7 mm long; Rocky Mountains absent from Idaho.....P. delicatum Rydb.
      4. Calyx larger, 5-8 mm long; SE Idaho and westward.....P. californicum Eastw.

Tweedy's Reedgrass.....*Continued from Page 5*

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Education, Research, and Inventory Grant—Call for Proposals

The Idaho Native Plant Society (INPS) is soliciting proposals for its Education, Research, and Inventory Grant (ERIG) program. Grants of up to $1,000 will be awarded in 2018 to support projects that contribute to the appreciation, conservation, or knowledge of Idaho's native flora and vegetation. The purpose of the ERIG program is to stimulate and lend support to educational, research, and conservation activities that promote an appreciation for native plants and plant communities in Idaho. The ERIG committee encourages you to submit a proposal if you have a project that may qualify. The deadline for submitting a proposal is March 31, 2018.

Grant guidelines.

The ERIG program is intended to support direct project costs. Grant proposals should not include expenses for salary and personal benefits, the purchase of personal equipment, or other expenses not essential to the project. Here are some examples of costs the grant may cover:

- Direct costs of travel, meals, and lodging for the project.
- Supply and service expenses used for the sole purpose of the project (e.g., native plant material, interpretive signs, lab materials).
- Printing costs for public outreach material or research publications.

Application procedure and requirements.

Proposals should contain the following information:

1. Project Title.
2. Contact Information: Name, address, phone number, organization/affiliation, and email.
3. Project description: Outline the project objectives, methods, and final product. Explain how the project will benefit the appreciation, conservation, or knowledge of Idaho's native flora or vegetation. Describe how project success will be evaluated.
4. Itemized budget: Outline an overall project budget, including the amount you are requesting (up to $1,000), as well as other funding sources.
5. Timeline: Please provide a timeline for completion of all major milestones associated with the project, including presentation of the results.

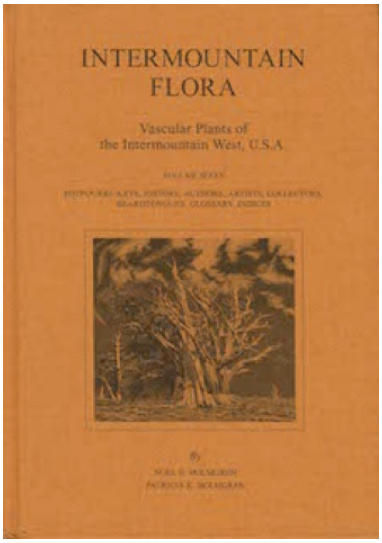
Project proposals must pertain to native plants of Idaho. Please limit grant requests to a maximum of $1,000, and be aware that less may be awarded due to INPS budget constraints and the number of applications submitted. Recipients of these awards will have a timeline of two years from the date of the written award to complete their projects. Successful applicants will be required to submit a final report to the INPS documenting project accomplishments and a summary of the project to be published in the INPS newsletter, *Sage Notes*. We encourage applicants to become an INPS member if they are not already, however, membership is not a prerequisite to apply for, or receive an ERIG.

Please submit proposals by email to Bob McCoy at sawabi.inps@gmail.com or by post to: ATTN: ERIG Committee Chair, Idaho Native Plant Society, P.O. Box 9451, Boise, ID 83707. •

Book Review

Intermountain Flora, Vascular Plants of the Intermountain West, U.S.A. Volume Seven Potpourri: Keys, History, Authors, Artists, Collectors, Beardtongues, Glossary, Indices. Noel H. Holmgren and Patricia K. Holmgren. Published by the New York Botanical Garden, 2017

Intermountain Flora has been a trusted friend if you practice botany in southern Idaho or elsewhere in the intermountain west region. Volume 1 was published in 1972, Volume 7 in 2017—a labor of love and dedication spanning 45 years. And really even longer than that, when you read in Volume 7 that Basset Maguire first envisioned a flora for the intermountain west region in 1931. Volume 7 provides a fitting capstone to the *Intermountain Flora* project. The authors call the book a "potpourri". But instead of an arrangement of dried flower petals and spices to scent the air, *Intermountain Flora* Volume 7 provides a potpourri of botanical scholarship and human spirit to fill its 303 pages.



Volume 7 starts off with a handy list of plant families covered in each of the earlier volumes, arranged by volume and corresponding page number. This is followed by several pages of acknowledgements and other introductory material. Next are keys to the plant families represented in the flora. The inclusion of separate keys for plants with flowers and for plants with fruits is a nice bonus. I have used the keys successfully, being grateful they minimize the use of difficult to distinguish characteristics and overly technical terminology. Chapters 3 through 6 bring the *Intermountain Flora* project to life, telling well the history of the project and providing biographies of the principal authors and botanical artists. I appreciate the storytelling-like writing style that makes people in the biographies seem more human and accessible. I have always felt the botanical illustrations render each of the *Intermountain Flora* volumes as much works of art as scientific scholarship. So, the short biographies for artists Jeanne Janish and Bobbi Angell are a special treat to me.

For many people, the highlight of the book may be the 350+ photographs of intermountain region plant collectors, dating from the 1800s to the present day. This photographic compendium includes famous botanist such as Marcus Jones and Arthur Cronquist, to the less renowned. Names important to Idaho floristics are well-represented. Now you can attach a face to names you might be familiar with, such as Anna Isabel Mulford, Ray J. Davis, John Christ, Charles Leo Hitchcock, Douglass Henderson, Steven Brunsfeld, and Charles Wellner, to name just a few.

Students of *Penstemon* will be especially drawn to the updated treatment for the genus in Chapter 7. This section of the book reminds us that floristics and taxonomy are not static. For example, the number of *Penstemon* species in the intermountain region has increased from 104 to 119 since the genus was originally treated in Volume 4, published in 1984. The new treatment includes an updated key to *Penstemon* in the region. It also provides descriptions for the new and altered *Penstemon* taxa since the 1984 treatment.

Volume 7 finishes with a chapter that explains the geographic boundaries delineating the intermountain flora, a list of selected references, a glossary with well over 1000 botanical-related terms, a cumulative index for all the taxa included in Volumes 1-6, and for the people whose photographs appear in Volumes 1-7, and other topics.

I thank Noel H. and Patricia K. Holmgren for sharing their skills in producing Volume 7 of *Intermountain Flora*. It is a valuable, useful, and enjoyable contribution to the *Intermountain Flora* set. You will especially want to own this book if your botanical heart includes the intermountain west region. The front piece for Volume 7 has an image of *Pinus longaeva* (Intermountain bristlecone pine) one of the more remarkable, but mysterious plants in the intermountain region. *Intermountain Flora* is a remarkable achievement, but there is no mystery how it came to be completed—the passion and many years of hard work by Noel H. and Patricia K. Holmgren, their predecessors, and other colleagues.

— Michael Mancuso, Idaho Native Plant Society

CALYPSO CHAPTER

When: Meetings are the first Wednesdays of March, April, May and October at 7:00 pm. Field trips take place during the spring, summer, and early fall months.
Where: Meeting are held in the conference room of Idaho Department of Fish and Game, 2885 W. Kathleen Ave., Coeur d'Alene.
Contact: Derek Antonelli, ds.ca.antonelli@gmail.com

LOASA CHAPTER

When: Meetings are held the third Thursday of each month at 7:00 pm.
Where: Taylor Building, Room 248, College of Southern Idaho, Twin Falls.
Contact: Bill Bridges, bridgesbill34@yahoo.com

PAHOVE CHAPTER

When: Meetings are held on the second Tuesday of each month from September–April at 7:00 pm. Dates, times, or topics are occasionally subject to change. Upcoming meeting information is sent to members via postcard and/or email. Events are also posted on the Pahove Chapter page of the INPS website:
https://idahonativeplants.org/local-chapters/pahove/
Where: The MK Nature Center Auditorium, 600 S. Walnut Street, Boise.
Contact: For more information about Pahove Chapter activities please visit the Pahove Chapter page on the INPS website, or email Karie Pappani at pahove.chapter.president@gmail.com

Board Position Opening:

Pahove chapter is seeking a new board president. Current president, Karie Pappani, has served the chapter exceptionally for 6+ years, and the time has come to select her successor. Interested individuals are encouraged to contact the board at:
pahove.chapter.president@gmail.com

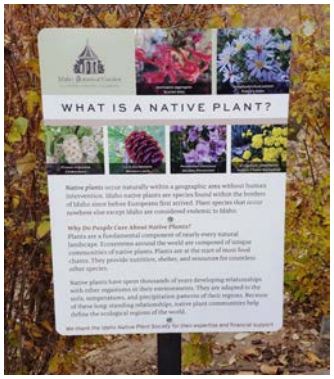
Past events:

December 12: James Smith discussed ongoing research on the genus *Lomatium*, including a newly described species in the Boise Foothills.

Upcoming events:

January 9: Francis Kilkenny, Rocky Mountain Research Station/Great Basin Native Plant Project. Topic TBD.
February 13: Lynn Kinter presents Unique Orchids of Idaho.
March 13: Roger Rosentreter will discuss plant palatability and wildlife.
April 10: Leon Powers presents Natural History Experiences in Idaho.
April 27-28: Annual Native Plant Sale at MK Nature Center.
May 12: Wildflower Show at Foothills Learning Center.
May 22 or 23 (tentative): Field trip to Orton Botanical Garden in Twin Falls.

New Native Plant Interpretive Signage at IBG



Pahove Chapter members and Idaho Botanical Garden (IBG) staff worked together to produce two interpretive signs for the Idaho Native Plant Garden at IBG. The project was funded by the Pahove Chapter, and the signs were installed this fall. The signs were created as part of a collaborative effort to improve the educational value and increase the plant collections of the Idaho Native Plant Garden.

SAWABI CHAPTER

When: Fall/winter programs are held on the first Monday of the month at 7:00 pm. Before each main speaker, Dr. Karl Holte will do a brief presentation about "The Plant Family of the Month". Refreshments are available after the meeting.
Where: The North Fork Room (3rd floor) in the Earl Pond Student Union Building on the Idaho State University Campus in Pocatello.
Contact: Karl Holte at plantprof@live.com; (208) 241-8358.

Past events:

November 6: Exploring the Great Basin, The Palmetto Mountains and Mt. Magruder. Presented by Bob McCoy.
December 9: The Sawabi Christmas Party Potluck was held at 4:00 pm at the home of Cathy McPherson.

Upcoming events:

January 8: Presentation by Robert Pitman, University of Idaho Agricultural Extension.
February 5: Scotland. Presented by Geoff Hogander.
April 2: The Sawabi Annual Meeting.

UPPER SNAKE CHAPTER

The Upper Snake Chapter is currently inactive.
Contact: Rose Lehman, jojorose@cableone.net
If anyone is interested in reviving the chapter, they are welcome to contact Rose.

WHITE PINE CHAPTER

When: Meetings are held once a month except during the summer. Field trips can occur most any month. Please check the chapter website at www.whitepineinps.org for events which may be scheduled or finalized after *Sage Notes* is printed; or email the chapter officers at whitepine.chapter@gmail.com.

Where: Great Room of the 1912 Building, 412 East Third St. in Moscow (between Adams and Van Buren) at 7:00 pm.

Contact: INPS, White Pine Chapter, PO Box 8481, Moscow, ID 83843 or whitepine.chapter@gmail.com

Upcoming events:

January 18: Touring the Super Bloom in the Southwest in the Spring of 2017. Pamela Brunsfeld will take us along on a spectacular trip she made through the blooming desert Southwest last spring. After more than 7 inches of rain in many areas of the Southwest last winter, the desert came alive with a "super bloom". It had been close to 20 years since flower displays such as these last occurred. Come chase away the winter blahs with Pam's wonderful photos.

February 15: Island Biogeographics and Plants. Christine Parent will present a program on how native plants conform to island biogeographics.

March 8: Native Bees, Pollinators and a Rare Endemic Plant *(Silene spaldingii)*: Untangling a Pollination-system Mutualism within the Channeled Scablands Ecosystem. In this presentation Tim Hatten will present results from an ongoing study of the Spalding's catchfly *(S. spaldingii)* pollination system in the Channeled Scablands of eastern Washington. Results focus on: 1) the native bee community at Key Conservation Areas for *S. spaldingii*; 2) bee visitors to the plant and their foraging patterns; 3) canopy and flowering characteristics of the plant; 4) plant community characteristics of remnant grasslands where the plant occurs; and 5) influence of the plant community on bee visitation rates.

April 19: Two Idaho Rare Plants, Idaho Phlox *(Phlox idahonis)* and Water Howellia *(Howellia aquatilis)*. Juanita Lichthardt will discuss two of our favorite rare plants, Idaho phlox and water howellia. She will provide updates on survey results and how populations are doing.

WOOD RIVER CHAPTER

When: Meetings are held various weekday evenings beginning at 7:00 pm.

Where: Meetings are held at the Sawtooth Botanical Garden, located three miles south of Ketchum, on Highway 75 and Gimlet Road.

Contact: Cynthia Langlois at: cplangloisACRP@msn.com for information about fieldtrips and presentations. Also, check the Sawtooth Botanical Garden website: sbgarden.org for updates on presentations. •

IDAHO NATIVE PLANT SOCIETY
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Time to renew for 2018!

Idaho Native Plant Society Membership Form

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☐ Wood River (Ketchum/Sun Valley)
☐ No Chapter

Membership Level:
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☐ Senior $10
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I would prefer to receive ***Sage Notes***: ☐ Print ☐ Electronic ☐ Both

Send completed form and full remittance to:
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P.O. Box 9451
Boise, ID 83707

Memberships run calendar year. New memberships enrolled after June 1 include the following year. ***Renew or join online:*** *https://idahonativeplants.org/membership/*

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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 link below. 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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