



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

Idaho's Monarch Butterfly Connection

By Beth Waterbury, Wildlife Biologist, Idaho Department of Fish and Game, Salmon Region

Few species spark people's wonder and passion like the monarch butterfly. With its fiery-orange and black pattern and large wingspan, the monarch is among the most recognized insects in North America. Its life cycle is a complex marvel involving a lengthy migration completed relay-style by several generations in a single year. During their summer wanderings, female monarchs lay their eggs on the leaves of milkweeds—the sole food source for their striking yellow, white, and black-striped caterpillars. Milkweeds are the essential links of the chain that connect monarch breeding populations across North America.

Monarch butterflies have made their mark on Idaho as the official state insect. Idaho is one of 11 western states that contribute to the western monarch population. Most western monarchs migrate to hundreds of small, wooded groves along the California coast to overwinter. In contrast, the much larger eastern population (generally found east of the Rocky Mountains) migrates to high elevation fir forests in central Mexico. Both migrations are spectacular natural phenomena for an insect weighing less than a gram, rivaling the epic migrations of songbirds and salmon.

The North American monarch is now facing an uncertain future. Overwintering monarch populations have declined by 74% in coastal California and more than 80% in central Mexico since monitoring began about 20 years ago. Loss of milkweed has been identified as the most significant factor contributing to declines in the eastern U.S. But little is known about the reasons for decline west of the Rockies. Until a few years ago, very

little was known about milkweed and breeding monarch distribution in the West. This was certainly the case for Idaho, where as recently as 2014, only a handful of monarch and milkweed records existed for the entire state.

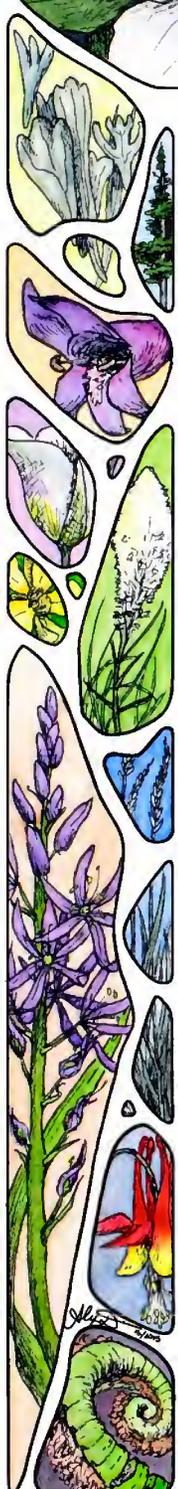
Federal grant helps to leverage monarch work in Idaho and Washington

Through a grant from the U.S. Fish and Wildlife Service, Idaho Department of Fish and Game (IDFG), Washington Department of Fish and Wildlife (WDFW), and the Xerces Society for Invertebrate Conservation partnered on a multi-faceted project to address monarch and milkweed data gaps in Idaho and Washington. Starting in 2016, partners worked to compile monarch and milkweed occurrence records for Idaho and Washington from museum vouchers, online herbaria, scientific literature, butterfly researchers, botanists, land managers, and many other sources to gather a baseline dataset. Surveys for monarchs and milkweeds were conducted from late May through September 2016. In Idaho, surveys covered portions of the Panhandle, lower Clearwater Basin, and the entire east-west span of the

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PO Box 9451, Boise, ID 83707
www.idahonativeplants.org
public3@idahonativeplants.org

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President's Letter

I am just happy I have the opportunity to write this letter. It's amazing what we appreciate when the things we love are almost lost. Most of you are probably aware that I suffered a massive heart attack last summer while collecting plants in the Frank Church Wilderness for the Stillinger Herbarium. I won't bore you with the details, but suffice it to say that I am very lucky to be alive, much less functional. I was recipient of an amazing chain of miracles demonstrating God's willingness to let me have a few more years of life. I am also in deep debt to my hiking companions, Tony McCammon (INPS Vice President), Paul Allen (INPS Sawabi member), and Wayne Jones (UI County Educator in Idaho Falls), who did some amazing things to keep me alive and get me out of the wilderness and on the way to hospital care. It has been a long road to recovery, but I am now back to work full-time and chipping away at my INPS Presidential duties. Not to say I am back to full health. Having an artificial heart makes a normal life somewhat unattainable. But I am alive and looking at life through a pair of rose-colored glasses. And more than ever, I am truly looking forward to our annual meeting this summer. Bill Bridges and Tony McCammon have done yeomans duty putting together arrangements and programs. They will be hosting the meeting in Challis, the doorstep to some of Idaho's most spectacular country. One of the tour destinations planned for the meeting is Railroad Ridge and the nearby Chinese Wall. If you have never visited this high alpine habitat, you are in for the double fudge, a la mode, chocolate chip-sprinkled, whip cream-covered version of native plant heaven. Other wonderful stops are planned as well, interspersed with informative programs such as a presentation by Bill Varga, retired University of Utah ethnobotanist. I plan to load up my extra battery packs and other supplies for keeping my heart operational and have the time of my life. I hope you will join me.

Stephen Love

INPS President

Announcements

Applications Sought for American Penstemon Society 2017 Special Project Grants

The purpose of the American Penstemon Society (APS) Special Projects Program is to stimulate activities that promote knowledge and appreciation of Penstemons. The Society is particularly interested in funding projects that: (1) promote conservation of Penstemon species in the wild, especially rare or sensitive ones, through understanding of factors that affect their survival, or (2) promote appreciation for the diversity and beauty of Penstemons in wild and domestic landscapes, through horticultural research, dissemination of information of interest to gardeners, or the construction or enhancement of educational display gardens.

All applicants must be current members of APS, and may join APS for the purpose of submitting a proposal. Maximum award amount is \$1000. Awards are not intended to pay wages or travel to meetings. The number of successful awards in any year will be determined by the number of high-quality proposals, value of the awards, and the annual budget. Awardees are required to submit a final project report, due one year after the award is made, and provide either an article for the newsletter or an oral presentation at an annual meeting.

More information about the APS and the Special Project Grants proposal application process and format can be found at Penstemons.org. Proposals are due by March 31, 2017.

Annual Botanical Foray 2017

The annual Idaho Botanical Foray celebrates its 10th anniversary in 2017. This year the event will take place July 6-9 in Bear Valley, located approximately 25 miles north of Lowman, Idaho, in the Boise National Forest. This is a region of large high meadows surrounded by higher mountains in country that forms some of the Middle Fork Salmon River headwaters. The foray is a fun opportunity to improve your botany skills, contribute to the collection of plants for Idaho herbaria, meet and spend time with fellow plant enthusiasts, and enjoy time in the Idaho backcountry. The event typically attracts a mix of professional botanists from various colleges, universities, and agencies, students, and a host of other folks interested in Idaho botany. The 2017 Foray is being sponsored by Boise State University. More detailed information about directions, camping, and other logistics will be available soon on the INPS webpage and on Facebook on the Idaho Botanical Foray link.

2017 Idaho Native Plant Society Annual Meeting Reminder

The 2017 Idaho Native Plant Society Annual Meeting will be held July 14-17. Base Camp will be the Living Waters Ranch, located 4 miles west of Highway 93 on Main Street in Challis (3 miles west of the Golf Course). Living Waters Ranch will provide dinner Friday and Saturday night. If you have any questions, call Bill Bridges at (208) 293-2426.

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Website: www.livingwatersranch.org

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Announcements, Continued

Orton Botanical Garden Receives Special Use Permit

The Twin Falls Planning and Zoning Commission (P&Z) on February 28, 2017, granted Orton Botanical Garden (OBG) a special use permit (SUP). All seven Commissioners voted for the SUP, several commenting that it will benefit Twin Falls' tourism and open space. The garden is now recognized as a city-approved botanical garden, rather than just LaMar and Rosalie Orton's backyard. The SUP opens up new possibilities for the garden such as signage, regular visitor hours, conversion of an adjacent rental home to a garden office, classes with 12–18 attendees, and allows some public events in addition to the annual open house/plant sale and Christmas light display. The SUP also provides assurance that the garden can continue into the future and allows greater fund raising capabilities for its 501(c)(3) corporation.

The SUP hearing was upbeat and run in a friendly, receptive style. LaMar Orton gave a thorough, carefully prepared presentation to the P&Z. Then many OBG fans spoke in favor of the SUP, including four other board members—Ann DeBolt, Rosalie Orton, Caroline Morris, and Lisa Detweiler (who brought along her new 3-month old daughter, a cute child who stayed quiet thanks to gentle rocking by her father, another OBG board member, Mike Barker). Several nearby neighbors said they enjoyed the Garden's proximity. Two men from other parts of Twin Falls lauded OBG's greenspace and

its wonders for children. They also praised OBG for its xeric landscape versus the water-demanding green lawns in too many Twin Falls subdivisions. We learned that five of the seven Commissioners had visited OBG (avoiding whether they went only to see the holiday lights). Rosalie lovingly spoke for the interests of OBG's resident quail, song birds and pollinators. Ann's persuasive talk emphasized the Garden's unique botanical importance and collaborations, along with the vast numbers of educational tourists and volunteers shepherded there. Several other supporters sent favorable email statements.

Preparations for the hearing required many hours by many people, who all were delighted with the positive results. Quoting INPS member Alice Crockett: "Yahoo! I love it when good things happen." Visitors to OBG will continue to need appointments until there is adequate staff or volunteer coverage. Extensive new, durable plant signage should be installed during 2017, depending on grant funding. If you have time and interest to volunteer at OBG, please contact LaMar Orton, (208) 734-7959 or plantasiacactusgardens.com. What a gorgeous Garden!

The OBG will be having a plant sale May 18–20 and May 25–27. This would be a great opportunity to visit and enjoy OBG, and maybe even pick up some beautiful plants for your own garden.

— Caroline Morris, Pahove Chapter

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Freshly emerged from their chrysalises, adult monarch butterflies sip nectar from the flowers of showy milkweed (*Asclepias speciosa*). Photo by Beth Waterbury.

Snake River Plain. Field crews searched for new milkweed populations and breeding monarchs, and collected important data on habitat associations, management impacts, and potential threats to breeding areas.

The grant also supported a well-attended workshop co-hosted by IDFG and Xerces Society titled "Monarch Butterfly and Milkweed Conservation for Resource Managers," held at Deer Flat National Wildlife Refuge near Nampa in July 2016. IDFG and partners also netted, tagged, and released nearly 300 monarch butterflies to gain insights on the direction, route, and destination of monarch migratory movements. Tagged monarchs from Idaho in previous years have been recovered in California, but there is also intriguing evidence of a migration trajectory towards Mexico.



Monarch caterpillars feed exclusively on milkweed. They sequester chemicals, known as cardenolides, from milkweed, making them toxic to predators as both caterpillars and adults. Photo by Beth Waterbury.

New western monarch and milkweed website launched

A highlight of the project is the recent development and launch of the Western Monarch Milkweed Mapper (www.monarchmilkweedmapper.org/about), a web-based repository for milkweed and monarch occurrences across the West. The website will directly address remaining data gaps by encouraging users to report monarch and milkweed occurrences in 11 western states. All that's needed is a smart phone or a digital camera and access to a computer. In addition, users can use an interactive milkweed ID tool to identify 46 milkweeds to species, learn more about monarch conservation efforts in the West, and participate in other citizen science projects. A special feature of the website is the ability to explore and download over 40,000 western monarch and milkweed records, from historic to present day. All data submitted through the website will feed directly into this growing database.



Participants in the 2016 Monarch Butterfly and Milkweed Conservation for Resource Managers workshop head to the field to observe monarch life stages. Photo by Beth Waterbury.

Looking ahead to the 2017 field season

For 2017, project activities in Idaho will include surveys of remaining areas with data gaps, development of a monarch/milkweed habitat suitability model, hosting a monarch/milkweed workshop for citizen scientists, and tagging of migratory generation monarchs. Collectively, these efforts will help to identify key areas in Idaho to conserve and restore native milkweed stands and nectar corridors with the ultimate goal of keeping Idaho's monarchs connected across the western landscape.

For more information on the Idaho Milkweed and Monarch Survey, contact Salmon Region Wildlife Biologist Beth Waterbury at beth.waterbury@idfg.idaho.gov or (208) 756-2271, x-245.

Note: This article is also available on the Idaho Department of Fish and Game homepage. •

Alpine Plant Communities at Sheep Mountain, Lemhi Mountains

By Michael Mancuso and Rose Lehman, Idaho Native Plant Society

Idaho is renowned for its mountains that lend an aura of ruggedness and remoteness to many parts of the state. At their highest elevations, most mountains across Idaho support subalpine forest/woodland or shrubland



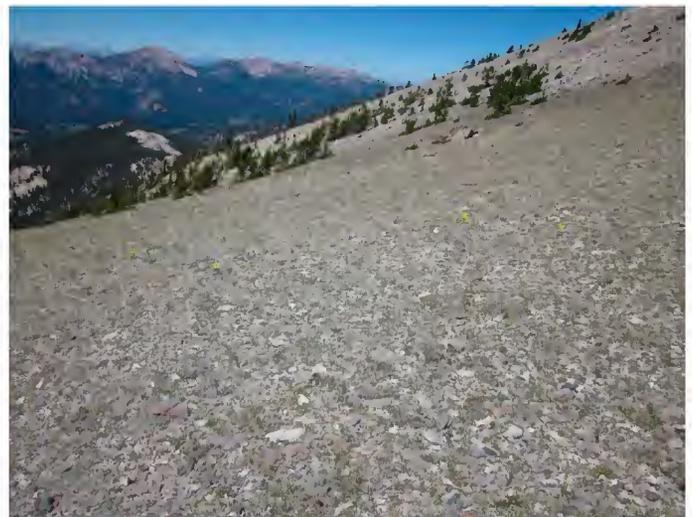
Sheep Mountain, Lemhi Range. Photo by Michael Mancuso.

habitat intermixed with rock outcrops and other openings. These areas lack the elevation and associated abiotic conditions necessary for the exclusion of trees and development of a distinct alpine treeline. Alpine habitat occupies a zone above upper treeline and in Idaho is limited to mountain ranges in the central and east-central portions of the state. However, topography even in these mountains tends to restrict alpine vegetation to a narrow band extending along the highest crests. Although wind, soil attributes, and other factors play a role influencing upper treeline formation, most research indicates heat deficiency is the primary factor determining alpine (and arctic) treelines (Knight 1994). Plants need to carry out photosynthesis, a temperature dependent process. In the northern hemisphere, trees are typically absent where the mean July temperature is lower than 50°F, or the mean July maximum temperature is lower than 52°F. In these areas, temperature is apparently too low for too much of the growing season to permit sufficient photosynthesis for large plants like trees. A walk in the alpine is an opportunity to pass through a vegetation mosaic influenced by slope, aspect, topographic position, and other factors that give rise to changes in plant composition, plant species ratios, abundance, and productivity ranging from subtle to the dramatic. The alpine is also an area where one minute you can be worried about sunburn and a short time later about freezing.

Alpine areas in Idaho provide some of the state's most picturesque landscapes. Nonetheless, alpine plant

communities have received little study in Idaho over the years. One exception is the Sheep Mountain area in the Lemhi Range, located approximately 20 miles south of the small town of Leadore. In 1992, Steve Urbanczyk conducted an alpine plant community classification study in the Sheep Mountain area as his graduate research project for the University of Idaho (Urbanczyk 1993). The project included collecting community-level plant composition and canopy cover data at a series of 77 plots. Basic environmental and topographic data were also collected at each plot. The resulting classification and ordination recognized eight alpine plant community types linked to apparent habitat preferences (Urbanczyk and Henderson 1994).

The predominant alpine plant communities produced by the classification were the curly sedge (*Carex rupestris*), blackroot sedge (*Carex elynoides*), and purple reedgrass/blackroot sedge (*Calamagrostis purpurascens/Carex elynoides*) community types. Other less common plant community types included blackroot sedge/Hayden's clover (*Carex elynoides/Trifolium haydenii*), spike fescue (*Leucopoa kingii*), eightpetal mountain-avens (*Dryas octopetala*), snow willow (*Salix nivalis*), and Rocky Mountain goldenrod/Hayden's clover (*Solidago multiradiata/Trifolium haydenii*). The original classification showed the alpine zone at Sheep Mountain to be dominated by dry, turf-like vegetation, with occasional snowbed-influenced communities contributing to the



Upper treeline on the western flank of Sheep Mountain. Photo by Michael Mancuso.

overall vegetation mosaic. Sheep Mountain remains one of the few alpine locations in Idaho with a quantitative plant community dataset.



View south from Sheep Mountain towards Bell Mountain and other peaks of the Lemhi Range. Photo by Michael Mancuso.

In 2016, we collaborated with the Caribou-Targhee National Forest (NF) and Salmon-Challis NF on a project to resample a subset of the alpine plant community plots originally included in Urbanczyk's Sheep Mountain study (Mancuso and Lehman 2016). We based our sampling on the same methods used in 1992. This resampling presented an opportunity to compare, assess, and document plant community-level changes that may have occurred within the alpine vegetation at Sheep Mountain during the intervening 24 years. We succeeded in establishing and sampling 10 plots in July 2016, with data collection including 6 of the 8 plant community types originally described for Sheep Mountain. Although based on only limited sampling in 2016, comparison of the 2016 and 1992 datasets suggested a general similarity in species composition and relative abundance patterns for the 6 resampled community types. The comparisons did not point to any clear, large-scale differences in the alpine vegetation at Sheep Mountain since 1992. Plant communities dominated or co-dominated by blackroot sedge



Klara Varga and Rose Lehman sampling during a rain squall. Photo by Michael Mancuso.

or curly sedge covered a large percentage of the Sheep Mountain alpine zone in 2016, just as they did in 1992.

Most plots included in the original 1992 study were located within the boundaries of what would become the Sheep Mountain Research Natural Area (RNA) in 1996. This designation conferred special management directives, opportunities, and protection. It also officially recognized the alpine ecosystem at Sheep Mountain to be an important ecological reference area and its role in research, education, and maintaining biological diversity. Centered along the crest of Sheep Mountain, the RNA encompasses 1542 acres at elevations ranging from 9840 feet to 10,865 feet. The RNA is dominated by alpine vegetation, but also contains areas supporting whitebark pine (*Pinus albicaulis*) communities. The RNA designation provided extra incentive to resample some of Urbanczyk's original plots in 2016. We view the 2016 project as a first step in using the original 1992 dataset as a baseline to track and assess possible changes to Sheep Mountain's alpine vegetation over time. The alpine zone represents an ecosystem at a climate extreme and very temperature dependent. We anticipate information from Sheep Mountain to become more timely and relevant over time in light of climate change concerns in alpine environments. Data collection has applicability beyond just Sheep Mountain. Other portions of the southern Lemhi Range share vegetation, topographic, and geologic similarities to Sheep Mountain. Information learned at Sheep Mountain may prove useful to land managers responsible for alpine habitat conservation elsewhere in the general region.

Knight, D.H. 1994. Mountains and plains—the ecology of Wyoming landscapes. Yale University Press, New Haven, CT. 338 pp.

Mancuso, M. and R. Lehman. 2016. Alpine plant community sampling and stewardship assessment in the Sheep Mountain Research Natural Area, Lemhi Mountains, Idaho. Report prepared for the Caribou-Targhee National Forest, Idaho Falls, ID and Salmon-Challis National Forest, Salmon, ID. 21 pp. plus appendices.

Urbanczyk, S.M. 1993. Classification and ordination of alpine plant communities, Sheep Mountain, Lemhi County, Idaho. M.S. thesis. University of Idaho, Moscow. 54 pp.

Urbanczyk, S.M. and D.M. Henderson. 1994. Classification and ordination of alpine plant communities, Sheep Mountain, Lemhi County, ID. *Madrono* 41(3):205-223. •

More photos on page 8

Sheep Mountain Alpine Vegetation



Michael sampling alpine vegetation. Photo by Rose Lehman.



Lloydia serotina. Photo by Rose Lehman.



Castilleja pallascens. Photo by Rose Lehman.



Dryas octopetala. Photo by Rose Lehman.



Townsendia parryi. Photo by Rose Lehman.



Lewisia pygmaea. Photo by Rose Lehman.



Eritrichium namum. Photo by Rose Lehman.



Hymenoxys grandiflora. Photo by Rose Lehman.

All About Yew

By Lynn Kinter, Idaho Department of Fish and Game

It's not often that a rather ordinary-looking shrub grabs the news headlines. But yew (*Taxus spp.*), a common landscaping shrub has gained notoriety this winter since it has caused wildlife deaths in multiple incidents



Pruned *Taxus* shrubs in landscape setting. Photo by Lynn Kinter.

across Idaho. Concern about yew arose last winter when it was implicated in the poisoning deaths of 20 elk in Blaine County. The winter of 2017 has been even worse, with more than 85 confirmed wildlife fatalities from yew. Incidents have been reported across Idaho, including the Payette, Boise, Challis, North Fork, Idaho Falls, and Preston

areas. Yew poisoning has killed elk, deer, moose, and pronghorn antelope this winter, with events ranging from individual animals to a group of 50 pronghorn antelope in the town of Payette.

Yews are very popular in residential and commercial landscapes across Idaho and the US. They are attractive, easy to prune, easy to grow evergreen shrubs tolerant of shade and a variety of soil types. Yews are conifers and in most cases dioecious, having pollen-bearing and ovulate-bearing reproductive structures on separate plants. Unlike most other conifers, yew seeds are not borne in a cone or cone-like structure. Instead, they produce a bright red, fleshy, berry-like structure called an aril that surrounds most of the solitary seed.

Despite yews' popularity as an ornamental shrub or tree, they have long been recognized as toxic to livestock and humans. The English or European yew (*Taxus baccata*), has been described as a toxic plant for over 2000 years. In Julius Caesar's book on the Gallic Wars, which occurred ~55 BC, he referred to a king who committed suicide by drinking juice from the yew tree. English yew is renowned as one of the most poisonous plants in Europe, and Japanese yew is even more toxic.

Shakespeare references yew poison in several plays: Macbeth (the three witches making their brew): "Double, double toil and trouble; fire burn, and cauldron bubble...gall of goat and slips of yew slivered in the moon's eclipse." Twelfth Night: "I am slain by a fair cruel maid. My shroud of white, stuck all with yew." Richard II: "The very beadsmen bend their bows of double-fatal yew against thy state."

Yew's toxic effects

Toxic alkaloids in all parts of the plant except the fleshy aril cause breathing difficulties, convulsions, coma, heart failure, and death. These alkaloids, called taxines, affect sodium and calcium channels in the heart. The potent poison acts quickly, and only a small amount is needed to stop an elk in its tracks. Animals can die from eating less than 1% of their body weight in plant material. Dogs can die from carrying the pruned branches in their mouths. Some birds can eat the fleshy aril safely because they excrete the poisonous seed without digesting it. However, chickens and other bird species have died from the poison, as have many types of wild and domestic mammals. Despite yew's toxicity, wildlife may be attracted to it, particularly when snow covers most other forage, making it one of the few green plants available.

Types of yews

Four types of yews or their hybrids are commonly found in residential and commercial landscapes across the western US. All four are poisonous, though the amount of poison varies among the types and varieties. Japanese yew and its hybrid with English yew are the main ones planted in southern Idaho.

1) Japanese yew (*Taxus cuspidata*)—native to Japan and neighboring regions; many varieties are widely planted in the US; a shrub or small tree, with some varieties reaching 40 feet tall.

2) English yew, or European yew (*Taxus baccata*)—native to Eurasia; many varieties are widely planted in the US; a shrub or small tree, with some varieties reaching 50 feet tall.

3) Chinese yew (*Taxus chinensis*, *T. sumatrana*, *T. celebica*)—native to Asia; a few varieties of these three species are sometimes planted in the US; a shrub or small tree.

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4) Canadian yew (*Taxus canadensis*)—native to eastern North America; a few varieties are planted in the US; a low-growing shrub to 5 feet tall.

Pacific yew, or western yew (*Taxus brevifolia*) is native to the northwestern US and adjacent Canada, and is found in Idaho from Valley and Washington Counties northward. It is a shrub or medium-sized tree reaching 60 feet tall that occurs in moist, shady habitats. It is not typically used in landscaping in southern Idaho—probably because of its high water requirement. Pacific yew has only very low levels of taxine, and provides important winter forage for moose, elk, and deer. Canadian yew in its native range is also eaten by white-tailed deer. The deer can metabolize taxine to some extent, but Canadian yew may also have lower levels of the toxin, particularly in certain areas.

Identification

Yews can be identified by their short, flat evergreen leaves or needles that are approximately 1 inch long and 1/8 inch wide with a short pointed leaf tip, and a 2-rank arrangement along the branch. In addition, female plants have pea-sized, fleshy, bright red arils with an opening that shows a single hard, brown seed inside. This aril is distinctive—no other evergreens in Idaho have one. However, arils can be hard to find in the winter, when they have dried and fallen off the shrubs, and they are absent on male shrubs.



Taxus needles and aril. Photo by Lynn Kinter.

Yews look superficially similar to several other common Idaho conifers such as hemlock, spruce, fir, and Douglas-fir. But all of these evergreen trees have cones, as well as differences in needle shape and/or arrangement. In addition, they usually grow as a single trunk, not as a multi-stemmed shrub. Spruce trees are very

common in residential landscapes of Idaho, along with other conifers such as cedar, juniper, and pine.

Options for landowners and homeowners

For yews currently planted in landscaping, there are two options: (1) Wrap yews in burlap for the winter, until grazing animals have migrated away. (2) Remove the plants and dispose of in a covered landfill. Be aware that dead yews or dry, pruned branches retain the poisonous compounds. Also, yews resprout from cut stumps, so all large roots need to be dug out unless an herbicide has been used to kill the roots.

Alternative shrubs that can be planted instead

Part of the popularity of yew in landscaping is that it is evergreen and grows well on shady sites. These Idaho native evergreens are non-toxic and can tolerate at least some shade:

- Western swordfern (*Polystichum munitum*)—shade or part shade, medium water; 2 to 4 feet tall
- Oregon boxleaf (*Pachystima myrsinites*)—shade or part shade, medium water; 2 to 4 feet tall
- Curl-leaf mountain mahogany (*Cercocarpus ledifolius*)—part sun or full sun, low water
- Russet buffaloberry (*Shepherdia canadensis*)—part sun or full sun, medium to low water
- Oakleaf sumac (*Rhus trilobata*)—part sun or full sun, low water
- Oregon grape-holly (*Berberis aquifolium*, = *Mahonia aquifolium*)—full shade to part shade, medium water; may spread

Several other Idaho native shrubs tolerate at least some shade, but are not evergreen:

- Red-twig dogwood (*Cornus sericea*)—full shade to part sun, medium to high water; beautiful red branches; a yellow-twig cultivar is also available
- Syringa (*Philadelphus lewisii*)—part shade to full sun, low water; Idaho's state flower
- Woods rose (*Rosa woodsii*)—full shade to full sun, low water
- Thimbleberry (*Rubus parviflorus*)—full shade to part sun, medium water
- Oceanspray (*Holodiscus discolor*)—part shade to full sun, medium water
- Mallow ninebark (*Physocarpus malvaceus*)—part shade to full sun, low water
- Rocky mountain maple (*Acer glabrum*)—part shade to full sun, low water
- Golden currant (*Ribes aureum*)—part shade to full sun, low to medium water

- Red flowering currant (*Ribes sanguineum*)—part shade to part sun, low to medium water
- Common snowberry (*Symphoricarpos albus*)—full shade to part sun, low water
- Highbush cranberry/mooseberry (*Viburnum edule*)—full shade to part shade, medium water
- Serviceberry (*Amelanchier alnifolia*, *A. utahensis*)—part shade to part sun, medium water
- Twin berry honeysuckle (*Lonicera involucrata*)—full shade to full sun, high water

- Mountain ash (*Sorbus scopulina*)—part shade to full sun, medium water
- Mountain huckleberry (*Vaccinium membranaceum*)—part shade, medium water

Several non-native evergreen shrubs that tolerate at least some shade are also commonly available.

For more information on poisonous plants, including yew:

Brownie, C.F. 2017. Merck veterinary manual. Merck & Co., Inc., Kenilworth, New Jersey. Accessed 1 Feb 2017 at: <http://www.merckvetmanual.com/toxicology/poisonous-plants/houseplants-and-ornamentals>

Kingsbury, J.M. 1964. Poisonous plants of the United States and Canada. 3rd Edition. Prentice Hall, Englewood Cliffs, New Jersey.

Panter, K.E., et al. 2011. Plants poisonous to livestock in the Western States. U.S. Department of Agriculture, Agriculture Bulletin No. 415. Agricultural Research Service, Poisonous Plant Research Laboratory, Logan, Utah. Accessed 1 Feb 2017 at: <https://www.ars.usda.gov/is/np/PoisonousPlants/PoisonousPlants.pdf>

Tirmenstein, D.A. 1990. *Taxus brevifolia*. Fire Effects Information System, online. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Accessed 1 Feb 2017 at: <https://www.fs.fed.us/database/feis/plants/tree/taxbre/all.html>

For more information on alternative species to plant:

Parkinson, H. et al. 2003. Landscaping with native plants of the Intermountain Region. Technical Reference 1730-3. Bureau of Land Management, Boise, Idaho. Accessed 1 Feb 2017: <https://www.blm.gov/style/medialib/blm/id/publications.Par.71153.File.dat/Landscaping-small.pdf> •

Idaho Mystery Plant

This photo was taken by Lisa Harloe on an ash bed in northern Owyhee County. What is your guess for this plant? The answer will be revealed in the next edition of *Sage Notes*. The Idaho Mystery Plant in the December 2016 issue was alpine springbeauty (*Claytonia megarhiza*), a species in the springbeauty family (*Montiaceae*) that occurs in moist gravels, talus, and rock crevices typically near or above upper timberline. It seems to have a spotty distribution across the central Idaho mountains, but extends from the Canadian Rockies southward to California and New Mexico. Have an Idaho Mystery Plant to share? Send it in to the editor:

sage-editor@idahonativeplants.org

— Michael Mancuso



INPS Chapter News

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: Meetings 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

Upcoming events:

March 15: North Idaho Rare Plant Working Group, 9:30 am to 3:30 pm, Idaho Fish and Game Office, 2885 W Kathleen Ave, Coeur d'Alene. The working group discusses issues related to Idaho rare plants.

March 25: TGWO "Thank God Winter's Over" hike, 10:00 am, meet in Coeur d'Alene at Tubbs Hill east entrance parking lot.

April 5: Chapter meeting—Tentative Presentation: Ponderosa Pine and Douglas-fir Forests of North Idaho.

April 22: Earth Day, time TBD, Coeur d'Alene Library. We will have a booth.

April: Plant Hike TBD, a volunteer to organize and lead this hike is needed.

May 3: Chapter meeting—Tentative Presentation: Diversity of North Idaho Marsh and Aquatic Plants.

May 13: Antoine Peak Conservation Area Hike/Survey, 10:00 am, meet at the Walgreens at Appleway and US 95 to carpool.

May: Cedar Mountain Perennials Field Trip, date and time TBD.

Spring/summer: Rare Plant Surveys—Derek Antonelli will be leading rare plant surveys throughout the season around the area. Contact Derek if you would like to help out or tag along.

Summer: Plant Hikes TBD, let us know your ideas.

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

Upcoming events:

March 16: The Chapter meeting will feature Kelley Weston speaking about Using Native Plants for Landscaping.

April 20: Speaker TBD.

June 9–10: The Master Gardeners in Twin Falls are proposing to have a Native Plant conference in Twin Falls. This conference will be for gardeners in the Magic Valley.

Learn how to use Native Plants in your garden. Friday night: Drive to several gardens in Twin Falls and see what others are doing. Saturday: Meet 9:00 am–4:00 pm at CSI for presentations by several speakers.

PAHOVE CHAPTER

When: Meetings are held on the second Tuesday of each month from September–April at 7:00 pm. Dates and times 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:

<http://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 of the INPS website, or email Karie Pappani at pahove.chapter.president@gmail.com

Upcoming events:

March 14: The Tuesday Trifecta: Three presentations, all in one night.

1) "Bee City USA" - Garden City is the first city in Idaho to be listed as a "Bee City." Judy Snow will give a brief talk on how she and the Chinden Gardeners Club are working for pollinators and how they got their city listed.

2) "A Ghost in the Making: Searching for the Rusty-patched Bumble Bee"—a 20 minute film about the once abundant native pollinator. On January 10, 2017, it became the first bee in the continental U.S. to be listed under the Endangered Species Act.

3) I-Naturalist with Dr. Charles Peterson of Idaho State University. Dr. Peterson will teach us how we can contribute to science by using our devices to record and share our findings in scientific data repositories.

April 11: Presentation by Bert Bowler about fire and invasive species in the Boise Foothills.

April 28–29: Go Native! Annual Plant Sale—featuring many firewise and waterwise plants. Member sale Friday 5:00–7:00 pm and public sale Saturday 10:00 am–1:00 pm. We have lots to celebrate with the coming of spring in April. Earth Day is April 22 and Arbor Day is April 28. In addition, Native Plant Appreciation Week is officially recognized during this time. Please consider volunteering and/or attending our annual native plant sale, and help spread the word to neighbors and friends.

Spring Wildflower Walks

Each spring, Idaho Botanical Garden (IBG) offers free, guided tours in the Boise foothills to see and appreciate

our native (and not so native) flora. Walks are led by IBG botanist, Ann DeBolt, along with other area botanists. Walks this year will be held on April 27 and May 4 beginning at 6:30 pm. Participants meet at the IBG administration building at 2355 Old Penitentiary Road in Boise and are led into the foothills from there. The walks are free of charge, but registration is encouraged so that arrangements can be made to accommodate all who are interested. For more information call (208) 343-8649 or visit www.idahobotanicalgarden.org

Board Position Opening

The Pahove chapter is seeking a new board president. Current president, Karie Pappani, has served the chapter exceptionally for 5+ years, and the time has come to select her successor. Interested individuals are encouraged to contact the board at pahove.chapter.president@gmail.com

SAWABI CHAPER

When: Meetings are the first Monday of the month.

Where: Earl Pond Student Union Building on the Idaho State University campus during the winter months.

Contact: Karl Holte at plantprof@live.com, (208) 241-8358

Upcoming events:

April 3: The Sawabi Chapter Annual Meeting at 5:30 pm. This will be a no-host dinner and meeting at the Puerto Vallarta restaurant in Pocatello. Field trip suggestions will be solicited and officers for 2017 will be elected.

May 1: Photo Share Program at 7:00 pm in the North Fork Room of the Earl Pond Student Union Building on the Idaho State University campus. Members have the opportunity to share photos of plants or activities from the past year. If you wish to do a photo share, contact Paul Allen (pokyallen@hotmail.com). The public is invited.

Past Events:

Dr. Karl Holte, the Sawabi Chapter co-president, was awarded the distinction of "Naturalist of the Year" at the Idaho Museum of Natural History's Mardi Gras Masquerade Ball and fundraiser on March 4.

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

Upcoming events:

March 9: Fred Rabe, University of Idaho Emeritus Professor of Biology, will present "Diversity of Aquatic Ecosystem Types in Northern Idaho." As Dr. Rabe points out, "There's an interest in identifying different kinds of birds, plants and other natural objects. Why not add ecosystem types to the list? Have you visited our largest water bodies? Do you know anything about types of high mountain lakes, vernal pools, streams, beaver ponds, waterfalls or wetlands? Are you acquainted with our large river systems and watersheds to which they belong?" A list of these ecosystem types will be provided to aid discussion.

April 25: Trish Heekin (Planner, Latah Soil and Water Conservation District), and Susan Firor (Terragraphics) will present a program with the intriguing title: "Wetland and Riparian Restoration in the Potlatch Watershed—from Faux Beaver Dams to Skinny Weasel Graves."* They will present an overview of restoration projects completed over the last decade in the Potlatch River Watershed. The impetus for these projects is protection and enhancement of habitat for endangered steelhead. But we take a larger view of habitat, and some of the elements they have implemented might surprise you. Topics will range from beavers to vegetation, and cover many concepts in between! (*No weasels were injured in the making of this restoration project!)

May 20: The White Pine Annual Native Plant Sale. Members\$help will be needed to set up on May 19 as well.

June 3: (Date tentative, depending on snow pack.) Mike Hays, Forest Service Botanist out of Grangeville, will lead a trip to Mud Springs or Center Ridge west of Lucille. We will be looking at a wide array of native plants and searching for the invasive weed, common crupina. This area has some beautiful grassland habitat. We will be hiking in and around *Silene spaldingii* populations during this field trip. *Silene* will not be blooming yet, but many

Continued on page 14

Continued from page 13

other native plants will be. As we enjoy the native bloomers, we will be pulling crupina wherever we see it, so bring your gloves.

Past events:

Despite the snowy weather, a large and diverse crowd showed up for the January 31 presentation “Palouse Prairie Remnants in Whitman County—Surveys of 2015 and 2016.” James Riser PhD, Palouse Conservation District Botanist, demonstrated the many ways that native plant ecology traverses the states of Idaho and Washington. He spoke on how Palouse Prairie is defined by soils and climate, issues of weed invasion, and of a project to catalog and assess prairie remnants in the area. A working definition of potential Palouse Prairie designation became “Never been tilled or drilled.” James shared how the project to assess private land with potential Palouse Prairie remnant vegetation was carried out in three phases:

Phase 1) Initial GIS-based inventory of potential remnants; completed in 2012; 1,120 potential remnants identified covering 9,646 acres.

Phase 2) Landowners contacted, offering brief education and reassurances information, and securing permission to survey remnants; completed 2013/2014; approximately 1,000 landowners contacted; 10% replied—some landowners proud to be involved, others wondered why

the survey was interested in those “weeds”; permission granted to survey 1,200 acres. Phase 3) Survey of remnants initiated summer 2015 and continued in 2016; 115 potential remnants to survey; 61 landowners; visited remnants were assessed for ecological condition and presence of rare plant species.

Palouse Prairie condition rank, based on native species cover:

| <u>Category</u> | <u>Percent cover</u> | <u>Total acres</u> |
|------------------|----------------------|--------------------|
| A Rank | 75-100% | 59 |
| B Rank | 50-75% | 57 |
| C Rank | 25-50% | 124 |
| D Rank | 10-25% | 11 |
| Converted Upland | <10% | 158 |

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. •



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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/>

Sage Notes is published quarterly by the Idaho Native Plant Society. Past issues can be viewed online at: <http://idahonativeplants.org/sage-notes/>

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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Editor: Michael Mancuso,
sage-editor@idahonativeplants.org



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

Evidence of Varietal Differentiation in *Eriogonum calcareum*

By Brittni Brown

Islands offer unique opportunities to study differentiation in plant species. Although the Intermountain West is fresh out of the tropical islands that typically come to mind when thinking about paradise, it does have an array of barren ash-outcrops scattered across it that create islands of unique edaphic (soil-influenced) habitats surrounded by a sea of sagebrush-steppe (or at least former sagebrush-steppe). These ash-outcrop islands vary greatly in color, texture, deposition history, and chemical composition—attributes that seem to encourage high rates of endemism in resident species. However, despite the large number of plant species endemic to these barren ash-outcrops (Table 1), few studies have investigated the relationship between soil properties and either species' distribution or their evolution. With that in mind, Don Mansfield (Biology Department, College of Idaho) and I struck out to investigate differences in morphology and geographic distribution in the ash-endemic buckwheat *Eriogonum calcareum* (Harper wild buckwheat).

Eriogonum calcareum is restricted to barren outcrops of the Glens Ferry Formation in southwestern Idaho and the Deer Butte and Bully Creek Formations in southeastern Oregon. Two varieties of the species have been recognized: var. *calcareum* and *sceptrum*. However, some Idaho field botanists have long questioned if varietal differentiation is justified; after all, the varieties may be similar enough to simply be two extreme forms on a continuum rather than distinct varieties. If they are distinct, they should have either separate geographic distributions, distinct ecological settings, or both. We tested the hypothesis that the

two varieties do have differing morphological and geographic characteristics, and are adapted to different soil characteristics.

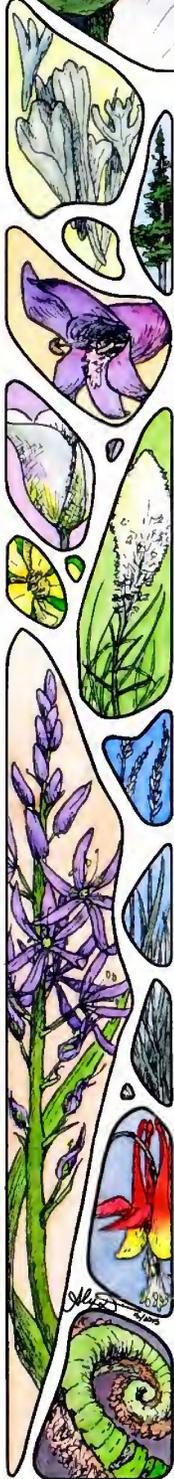
To test morphological differentiation, we measured four distinguishing characteristics—scape length, leaf width, peduncle length, and the proportion of the involucre covered by vestiture—across the full geographic range represented by 27 specimens present in the College of Idaho's Harold M. Tucker Herbarium. Based upon our measurements, we divided our specimens into four groupings—unambiguous *calcareum*, unambiguous *sceptrum*, *calcareum* approaching *sceptrum*, or *sceptrum* approaching *calcareum*. We then examined soil properties by collecting samples at nine outcrops across the species' geographic range and having them analyzed for pH and the extractable cations magnesium, potassium, calcium, and sodium.

Our analysis found the two varieties are indeed distinct, not only morphologically, but by geographic distribution and edaphic properties as well! Twenty-one of 27 specimens were classified as either unambiguous *calcareum* or

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Announcements

2017 Idaho Botanical Foray

The annual Idaho Botanical Foray celebrates its 10th anniversary in 2017. This year the event will take place July 6-9 in Bear Valley, located approximately 25 miles north of Lowman, Idaho, on the Boise National Forest. This area contains a mix: a meadow, riparian, forest, and rocky mountain habitats. The foray is an opportunity to improve your botany skills, contribute to the collection of plants for Idaho herbaria, meet and spend time with fellow plant enthusiasts, and enjoy time in the Idaho backcountry. The event is being sponsored by Boise State University and open to everyone interested in Idaho botany.

The current plan is to stay at the Bear Valley Campground, the largest campground in the area with 10 sites. Although reservations cannot be made for this campground, several folks from Boise plan to arrive early and claim camping sites. If needed, two other smaller campgrounds also occur in the general area. These primitive campgrounds have no potable water. Everyone will need to bring their own water, food, and camping gear. Maps, presses, cardboards, newspaper, sharpies, and notebooks will be provided, but bring your own plant collecting gear (digging tools, clippers, GPS) if possible.

As usual, there will be a Saturday potluck dinner, so please bring something to share for that night. And don't forget to bring something from home or work to burn in the campfire that evening. There is still a chance the heavy snowfall from this past winter will preclude the suitability of Bear Valley in early July. If there are any changes for the Foray, new information will be posted on the Idaho Botanical Foray Facebook page. More detailed information about the Foray is also available on [Facebook](#).

2017 INPS Annual Meeting Reminder

The 2017 Idaho Native Plant Society Annual Meeting will be held July 14-17. (See Registration Form next page.) Base Camp will be the Living Waters Ranch, located 4 miles west of Highway 93 on Main Street in Challis (3 miles west of the Golf Course). Living Waters Ranch will provide dinner Friday and Saturday nights.

Make your own reservations with the Living Waters Ranch: Tents: \$12/day; RV: \$15/day; RV with full hook-up: \$18/day; Bunk House: \$14/day; Motel rooms 2 twin beds: \$48/day; Chalets 2 or 3 bedrooms with kitchen: \$110/day; Mini Lodges: 8 bedrooms, each with 2 twins or a queen bed and private bath, large kitchen, \$66 per room, 5 rooms minimum.

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2017 INPS Annual Meeting Registration Form

**Annual Meeting July 14, 15, 16, 17
Challis, Idaho**

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(208) 879-2888
Fax: (208) 879-2182
Email: iwrinc@custertel.net
Website: www.livingwatersranch.org

Registration for Events: _____ \$20 per person - Covers two speakers and all field trips.
Friday (7/14) Dinner: _____ \$11 per person
Saturday (7/15) Dinner: _____ \$11 per person
Total Fees: _____

The INPS annual business meeting will be held after the Saturday evening dinner. Speakers are being lined up for Friday and Saturday evenings.

Field Trips:

Saturday: 7/15

Railroad Ridge _____ Bay Horse Lake _____
Chilly Slough Wetland _____ Malm Gulch _____

Sunday: 7/16

Railroad Ridge _____ Bay Horse Ghost Town _____

Monday: 7/17

Railroad Ridge _____

Due to the sensitivity of the high elevation vegetation, only 25 people per day (5 cars) will be traveling to Railroad Ridge.

Please mail Registration (and registration fee) to:

(Checks payable to: Idaho Native Plant Society)

Lois Rohay
PO Box 5985
Twin Falls, ID 83303-5985

Registrant(s):

Name: _____
Address: _____

Phone: _____
Email: _____

Questions? Call Bill Bridges (208) 293-2426

Announcements

Changes Proposed to INPS Bylaws

As needs within an organization change over the years, modifications to the organization's bylaws are needed from time to time. The INPS Board of Directors is recommending that certain changes to the bylaws be made. The proposed changes will be voted on at the annual meeting in July. The proposed changes:

1. Move certain membership responsibilities from the Treasurer to the Membership Committee Chair; clarify the Treasurer's responsibilities for receiving membership dues whether paid in cash or electronically to the Society; clarify notification requirements for the portion of dues paid to the chapters and that the Treasurer shall receive all payments whether cash or electronically received which pertain to special events and coordinate those with the event manager.
2. Show Membership Committee Chair is added as a member of the Board of Directors.
3. State duties of the Membership Committee Chair that are moved from the Treasurer, and clarify those duties and state who may access the membership database maintained by the Membership Committee Chair.
4. Clarify that the newsletter editor or his/her designee shall attend Board meetings in a non-voting capacity.

The exact wording of the proposed changes can be found at http://idahonativeplants.org/inps/Proposed_2017_bylaws_changes_May2017.pdf. The current INPS bylaws can be found at http://idahonativeplants.org/inps/INPS_bylaws_amended_2013.pdf.

unambiguous *sceptrum*. Means of all four measured morphological characteristics differed significantly between the two unambiguous varieties. Geographically, we found that all the unambiguous *calcareum* specimens occurred in the northwestern portion of the species' range, and all north of the Snake River (or west as the river turns north near the Oregon-Idaho border). Alternatively, all unambiguous *sceptrum* specimens occurred in the southeastern portion of the species' distribution, all south or within half a mile north of the Snake River. Morphologically ambiguous occurrences were located along the edges of the variety they most closely represented. Finally, we found the var. *calcareum* sites had significantly higher levels of potassium and magnesium, and lower calcium-magnesium ratios and pH values, than var. *sceptrum* sites.

In preparing our work for publication, we spent a lot of time acquainting ourselves with the geological history of the area to build an understanding of why soil properties of the outcrops might differ between regions. Although few studies have been completed on the exact mineral composition of the numerous outcrops supporting *Eriogonum calcareum*, we do know the outcrops occupied by the two different varieties have different origins and compositions. Much of the region

occupied by var. *sceptrum* is in the Glens Ferry Formation, which is comprised of lacustrine and fluvial sediments of Miocene and Pleistocene Lake Idaho, including oolitic limestones. The region occupied by var. *calcareum* is similarly made up of lacustrine and fluvial sediments, but lacks the oolitic limestone deposits. This could be due to differences in depth and sedimentation patterns for the western section of Lake Idaho. We believe the higher calcium-magnesium ratios and pH level of the var. *sceptrum*-occupied outcrops may be explained by the decomposition of the oolitic calcareous deposits, which tend to have much higher calcium levels.

The impact of these soil chemical differences on morphological variation between varieties is not completely clear. However, it is possible some of the differences could be the results of non-genetic effects rather than adaptation, or some morphological differences could emerge because of different selection pressures experi-

enced by the two populations. We do know that extreme mineral compositions can impose selection pressures on plant populations and drive significant adaptation. However, the levels of minerals in the outcrops we measured were not as extreme as environments where these adaptations have been demonstrated elsewhere. Many of



Eriogonum calcareum var. *calcareum* pressed specimen (from north of Snake River). Photo by Don Mansfield.

our soil property measurements were well within the range that normally impose no stress to plant functions. It is possible selection forces are operating more slowly



Eriogonum calcareum var. *calcareum* habitat in Payette County, Idaho. Photo by Michael Mancuso.

here than in the extreme sites examined in previous studies, or alternatively, that selection pressures could be a result of one of many soil chemistry components unstudied in these outcrops.

We believe morphological variation between the two varieties could also be explained by isolation resulting in reduced gene flow. Outcrops throughout the region vary in size from less than a hectare to hundreds of hectares in size, and all are patchy in nature. Outcrops occupied by unambiguous *calcareum* specimens are no closer than 84 km from outcrops occupied by unambiguous *sceptrum*, and the heavily developed Treasure Valley generally lies between the two sets of populations. The importance of geographic separation and its effect on gene flow and adaptation will have to await further study on genetic interchange and pollinator interaction between the two varieties.

Tracking down one of the two varieties of *E. calcareum* in the field is most easily done by searching for large white-colored ash outcrops either on a program such as Google Earth or by sight from one of the many backroads crisscrossing southwestern Idaho and southeastern Oregon. The most obvious difference to distinguish the two varieties in the field is that mature *E. calcareum* var. *sceptrum* is a taller, more erect, narrower plant while var. *calcareum* tends to have a more matted, broader habit.

For more information regarding our study, methodology, and results, please see our publication in the journal *Madroño* (Vol. 64, Issue 1, January 2017). •

Table 1. Vascular plant species endemic to silicic volcanic ash outcrops in southwestern Idaho and southeastern Oregon.

Outcrops of highly weathered, clay-rich Miocene deposits of the Sucker Creek Formation.

- Cymopterus glomeratus* var. *greeleyorum*
- Lomatium bentonitum*
- Lomatium packardiae*
- Mentzelia mollis*
- Phacelia lutea* var. *calva*

Outcrops of lithified ash-tuff of the Leslie Gulch unit of the Sucker Creek Formation.

- Ivesia rhypara* var. *rhypara*
- Mentzelia packardiae*
- Monardella angustifolia*
- Phacelia lutea* var. *mackenzieorum*
- Senecio ertterae*
- Trifolium owyheense*

Outcrops of Deer Butte, Bully Creek, Chalk Hills and/or Glenns Ferry Formation.

- Astragalus cusickii* var. *sterilis*
- Astragalus nudisiliquus*
- Chaenactis cusickii*
- Cryptantha propria*
- Eriogonum calcareum*
- Eriogonum chrysops*
- Eriogonum novonudum*
- Eriogonum salicornioides*
- Penstemon miser*

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Are Herbaria Still Relevant in the 21st Century?

By Walter Fertig, Moenave Botanical Consulting, Kanab, Utah

Originally published in Segoe Lily, Utah Native Plant Society newsletter, Winter 2016.

The oldest herbaria date to the Middle Ages when European physicians first learned that dried and pressed plants could retain their color and appearance for decades if properly preserved. Initially specimens were bound in books to provide doctors with a handy reference for identifying the sources of herbal medicines. Over time it became more convenient to keep specimens on loose sheets that could be arranged in various ways. Nascent taxonomists could even begin to organize their collections according to patterns. Linnaeus, the creator of our modern taxonomic system, had a home herbarium that he could rearrange as he saw fit, and other scholars kept personal collections too. Ultimately, small collections coalesced into larger public repositories, often housed in major universities or botanical gardens. In the 19th and early to mid-20th centuries, herbaria were at the forefront of research into the genealogical relationships of plants based on outward appearance (morphology) and internal anatomy.

Such work continues to this day, but has long been overshadowed by more sophisticated techniques and more modern analytical tools. Not surprisingly, traditional herbarium taxonomy has declined in prestige and funding. In the past twenty years one herbarium in seven has closed due to budget cuts or shifts in academic priorities (Deng 2015). In most cases, these collections have been absorbed by larger institutions, such as the recent merger of the University of Missouri Herbarium with the Missouri Botanical Garden. More ominous is the growing trend of vacant positions not being refilled, degree programs in botany disappearing, and reduced hours of operation. Recently, a major National Science Foundation program that has traditionally

funded specimen digitization and large capital expenses (such as new cabinets) was suspended.

If herbaria are to survive, those of us who care about them need to do a better job of demonstrating their value to society. While conventional taxonomic research remains important, herbaria are also increasingly relevant in the fields of ecology, biogeography, and conservation biology. Specimens are also valuable for building public appreciation of plants and of botany in general. Rather than hiding our specimens behind cabinet doors, we need to make them more accessible, especially digitally.

Each herbarium sheet has three main pieces of information. The most obvious is the physical specimen itself: stems, leaves, roots, flowers, and fruits. From these, researchers can determine the identity of the species and recognize the diversity among individual plants within and between populations. Measurements and observations of specimens are the basis for species descriptions and identification keys. Additional information can be gleaned from the internal chemistry of the specimens, especially genetic data from nuclear and organelle DNA. Such data can be used to reconstruct phylogenetic relationships among species, genera, and families. Perhaps the most useful information, however, comes from the specimen label which records the name of the species (and any subsequent changes or corrections), the collector, the date of the collection, locality, and other data on habitat, elevation, associ-

ated species, or abundance. These three datasets are the foundation of taxonomic research and can be especially useful in studies of ecology and conservation biology.

For taxonomists, the most important specimens are the type collections, which provide the basis for species names and taxonomic concepts. When a new species is



Herbarium specimen of Datura wrightii (Sacred datura or jimsonweed) from the Arizona State University herbarium. Such specimens are useful to taxonomists studying the range of morphological variation across plant populations. The locality information on the label, especially if mapped in a digital database, is increasingly important for predicting species distributions, determining gaps in protection, and tracking the spread of weeds or response of species to climate change. More importantly, specimens are beautiful and build public appreciation for plants and botany.

discovered, a holotype is designated and deposited in an herbarium to serve as the standard (or archetype) for which all other individuals of the species are compared. A recent study found that nearly one-quarter of all newly documented species were already found within existing herbarium collections but had been initially misidentified or unidentified (Bebber et al. 2010). The authors even suggested that as many as 70,000 undescribed plant species might still be lurking within the world's herbaria.

Herbarium specimens can also be a source for new records of pathogens and parasites. In the 1990s, the late John Baxter, a retired mycologist, discovered over 30 Wyoming state records of rust and smut fungi growing on plant specimens in the Rocky Mountain Herbarium at the University of Wyoming. One of these was *Puccinia yosemitana*, a rust from California and Colorado that was new to Wyoming. Baxter found it growing on a specimen of Opal phlox (*Phlox opalensis*) that I had collected in southwestern Wyoming a few years earlier. I had failed to notice the yellow-orange fruiting structures when making the voucher as part of a rare plant survey.

Specimen vouchers (deposited in herbaria) are important for documenting new occurrences of rare and unusual plants. Compared to observation records or photographs, physical specimens are easier to corroborate if there is any debate about a report's authenticity. This can be especially important in ecological studies or when developing checklists for protected areas, such as national parks or wildlife refuges.

In the past, users of specimen data had to either visit herbaria in person or arrange to borrow material. With the advent of digital databases, herbarium records are now readily available around the clock and from any home, office, or mobile device that has internet access (even in the field). Online databases include standard label information (species name, collector, date, locality, habitat) and often have maps of collection sites and digital images of the actual specimen. These data can be queried in numerous ways to create local or rangewide distribution maps or customized species lists. Individual herbaria are increasingly pooling their digital data into regional and national networks, such as SEINet (Southwest Environmental Information Network), the Consortium of Intermountain Herbaria, or the Consortium of Pacific Northwest Herbaria, allowing users to access millions of records with ease. Other digital products, such as interactive keys, image libraries, and links to original botanical literature, are greatly increasing the utility and scope of herbarium information.

Brick-and-mortar herbaria (and the professional staff needed to maintain them) are still vital for plant identi-

fication services. Potential clients range from farmers and ranchers, government biologists, and industry consultants to home gardeners, amateur naturalists, and school children: essentially anyone who might need assistance identifying mystery plants. Sometimes herbarium staff are asked to provide expertise on plant fragments rather than whole specimens. Such "forensic botany" can help archeologists interpret prehistoric sites, paleoecologists infer past climates, and law enforcement officers solve crimes.

Herbaria can also be thought of as vast genetic libraries. Rather than having to travel around the world to gather samples, researchers have millions of collections at their disposal, already identified to species and with collection dates and localities provided. In the case of extinct or protected species, herbarium specimens may be the only material available for study. Older specimens can offer a window into changes in genetic structure in populations and evidence of ongoing evolution.

There have been challenges in utilizing herbarium collections in molecular research. Initially researchers had difficulty extracting sufficient quantities of DNA from old collections. DNA may have been altered if specimens were pickled or dried improperly. Some species are reluctant to give up their genetic resources, especially succulents or plants rich in sap or resins.

Recent advances in molecular techniques are resolving many of these problems. A recent study (Choi et al. 2015) found no relationship between the age of a specimen and the purity of DNA that could be extracted and later amplified. Ames and Spooner (2008) used DNA from 200-year old herbarium specimens of Irish potato in Europe to match unique genetic markers with their source populations in the Andes and lowlands of Chile and help determine the multiple points of origin of this important crop plant.

Herbarium specimens can also be time capsules of past environmental conditions. Atmospheric carbon dioxide levels have been recorded in herbarium specimens collected in the late 1700s and compared with recently collected plants to document changes in the concentration of greenhouse gases since the industrial revolution (Bonal et al. 2011). Lichens are particularly useful bioindicators of air pollution and historical collections have been used by researchers to trace the decrease in air quality and subsequent changes in the lichen flora in the Los Angeles area over the past century (Riddell et al. 2011).

Locality data from herbarium specimens are also useful in studying the spread of invasive weeds. One example is Stinknet (*Oncosiphon piluliferum*), a

Continued on Page 8

malodorous annual weed from South Africa that recently became established in the American Southwest. Based on herbarium collections, this species was first collected in Los Angeles and Phoenix in 1981. It remained uncommon and infrequently documented until about 2005, when populations began to appear regularly in southern California and central Arizona. At first the invader was a mystery, but again herbaria demonstrated their worth by providing weed specialists with the correct identification. Information from collections is marking the steady progress of this species as it marches south towards Mexico.

Digital locality data from herbarium specimens can be used in modeling the potential distribution of weeds, rare plants, and other species of high management interest. At the University of Wyoming, I used more than 325,000 digital records in the Rocky Mountain herbarium database to identify patterns in the presence and inferred absence of 200 randomly selected plant species with a mix of environmental variables (average monthly temperature and precipitation, bedrock geology, soil type, vegetation, etc.). The resulting models identified areas of likely and unlikely habitat that could then be checked to determine if the target species was present. This study resulted in the discovery of several new populations of critically endangered plant species.

Locality data from herbarium collections can also be used to identify gaps in the network of protected areas, such as national parks, wilderness areas, special botanical areas, and Nature Conservancy preserves. In Wyoming, 10.6% of the state is “protected”, but these areas tend to be concentrated nonrandomly in the northwest corner of the state and at high elevations. Based on herbarium records, I found that 18% of Wyoming’s plant species were completely absent from these protected areas. Unprotected plants tended to be restricted to specific habitats and regions (such as deserts, grasslands, and the Black Hills) that were not well represented in the existing protected area network. In addition, rare species were more than twice as likely to be unprotected as common species. These results should be helpful in targeting specific areas and species in need of conservation attention (Fertig 2011).

Making herbaria relevant again

Hopefully the preceding examples have demonstrated the ongoing value of herbaria in contemporary research on plant taxonomy, ecology, and conservation biology. Herbarium supporters need to share this message with the public, our academic colleagues, and those who control research funding. I recommend the following actions:

1. Stop using images of scientists standing in front of open herbarium cabinets to illustrate our work (visit any herbarium home page and you will see what I am referring to). Our focus needs to be on the contents of the cabinets and not the cabinets themselves!
2. Expand the reach and quality of digital specimen databases and keep access to them free.
3. Provide technical services to the public, such as help with plant identifications, and do so with a smile.
4. Support and participate in research across disciplines and at local, state, regional, and international scales (no working in isolation!).
5. Create a positive environment for students, colleagues, and visitors.
6. Hold more outreach events with the public. Remember that people really like plants and are just as fascinated as we are by their diverse forms, colors, and beauty. There is something about seeing (and holding) a plant in person, even if dried and pressed, that is far superior to a photograph or video. Engaging visitors is a great way to recruit potential volunteers to mount, database, and file specimens and builds crucial support for the work that we do and love. •

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Fungus Flowers Fool a Botanist

By Peter Lesica, Conservation Biology Research, Missoula, Montana

Adapted from an article that originally appeared in Kelseyia, newsletter of the Montana Native Plant Society, Spring 1998.

Buttercups are usually the first flowers on the grassy hills around Missoula, Montana. They rarely occur on the stony ridgetops, but prefer the deeper soils of the slopes and flats. Often at this time of year my eye will fall on a yellow spot of color among the green foliage, and I'll bend over to see what it is, only to find it's not a flower at all. It's the right size for a buttercup, but it looks like a cluster of light yellow leaves covered with small crystal-line pustules.

This plant is our common rockcress (*Arabis* or *Boechera holboellii*) in the mustard family. Rockcress usually produces long stems with numerous white flowers later in the spring. But this plant is infected with a rust fungus in the genus *Puccinia*. Infection of rockcress occurs in the fall, and the fungus grows in the host plant during the fall and winter, altering the buds that produce next year's growth. In the spring, the plant is stunted with numerous short leaves instead of a normal, tall flower stem. Near the tip of the stunted stem the leaves are clustered and yellow with the reproductive structures of the fungus. A sugary nectar and even a mild scent are produced by the fungus at the same time. These yellow clusters of leaves that produce nectar are called pseudoflowers. Flies and sometimes even bees are attracted to these pseudoflowers, and these insects are required for sexual reproduction between different strains of the rust fungus occurring in the same area. Pseudoflowers serve the same function for the fungus as real flowers perform for plants; they affect mating. But since the fungus can't produce flowers of its own, it resorts to forcing its host to do the job for it. But that's only part of

the story. Barbara Roy studied buttercups and the buttercup-like pseudoflowers of rockcress where they occur together in Colorado.

She found that more insects visited the true buttercups when they were with rockcress pseudoflowers than when they were with other buttercups. And more insects visited the fungally-produced pseudoflowers when they were with buttercups. Each receives more insect visits when in the



company of the other than by themselves. Roy found that buttercups produce a large pollen reward for visiting insects but have little nectar. On the other hand, the fungal pseudoflowers produce no pollen but have copious nectar. Apparently the pollen and nectar rewards together are more attractive than either alone. The more visiting insects, the more likely is successful mating for both buttercups and fungus. In this unlikely way, the buttercup and fungus help each other produce more offspring.

Nature sometimes makes strange bedfellows. The fungus can infect the hapless rockcress and fool the insects, but it won't fool me again... at least not until next year. •

Additional reading: Roy, B. A. 1994. The effects of pathogen-induced pseudoflowers and buttercups on each other's insect visitation. *Ecology* 75: 352-358.



Idaho Mystery Plant

This photo was taken by Lisa Harloe in a moist graminoid-dominated meadow in east-central Idaho's Little Lost River Valley. What is your guess for this plant? The answer will be revealed in the next edition of *Sage Notes*. The Idaho Mystery Plant in the March 2017 issue was smooth blazingstar (*Mentzelia mollis*), a species in the Loasaceae family (Loasaceae) that occurs on sparsely vegetated, heavy clay slopes and bluffs derived from volcanic ash. Its main distribution includes Owyhee County, Idaho, and adjacent Malheur County, Oregon. Disjunct populations also occur in western Humboldt County, Nevada. Have an Idaho Mystery Plant to share? Send it in to the editor:

sage-editor@idahonativeplants.org.

— Michael Mancuso

Aase's Onion Rescue in the Boise Foothills

By Michael Mancuso, Pahove Chapter

Aase's onion (*Allium aaseae*) is a low-growing perennial plant known only from southwestern Idaho, occurring primarily in the Boise to Emmett Foothills, but also with a few disjunct populations in the Weiser area. Its display of small, vivid pink flowers make it one of the more striking wildflowers to welcome the region's early spring season each year. Aase's onion occupies dry, open,



Michael Mancuso points to the area in the Boise Foothills where the new transplants are located. Photo by Jody Hull.

relatively sparsely vegetated, well drained sandy soil areas, usually within bitterbrush or bitterbrush–big sagebrush plant communities. Portions of multiple occurrences have been destroyed in recent decades, mainly due to urban development in the Boise Foothills area. Aase's onion is on the INPS state rare plant list and a species of conservation concern because of its restricted geographic range; the documented loss and degradation of its habitat; the vulnerability of its habitat to threats such as wildfire, weed invasion, sand mining, and foothills development; and the location of most occurrences on private land, where conservation options are often limited.

In spring 2016, an occurrence of Aase's onion was discovered in the Boise Foothills on private land slated for a new housing development. With permission from the developer, INPS members Karie Pappani, Kris Barrash, Peggy Faith, and Mike Mancuso salvaged approximately 1000 Aase's onion bulbs from the property. This had to be done in a timely manner while the plants still had flowers because all above-ground portions quickly disappear from sight until next year upon seed set. The bulbs were dug up, placed in pots, and covered with sand collected on-site.

An arrangement was made with the Land Trust of the Treasure Valley (LTTV) to conduct a transplant experiment with a subset of the collected Aase's onion bulbs. The experiment would take place at Harrison Hollow, an open space reserve in the Boise Foothills managed by LTTV and located within 1 mile of the original collection site. A total of 400 Aase's onion bulbs were transplanted in October, 2016 by Eric Willadsen with LTTV, and INPS members Kris Barrash, Colleen Greenwalt, Peggy Faith, and Mike Mancuso. The bulbs varied in size from approximately lentil-size to larger than a pea. Bulbs were buried several inches deep into a series of small sandy openings over an approximately 0.1 acre area. Twenty bulbs were planted in each sandy patch, with each patch mapped in reference to a nearby fencepost. Transplanting occurred just downslope of a popular trail and a split rail fence built to protect a small population of Mulford's milkvetch (*Astragalus mulfordiae*)—another plant species of conservation concern that occurs in the Boise Foothills area. And then it was time to wait until the next spring.



Newly transplanted Aase's onion in bloom. Photo by Jody Hull.

Eric Willadsen, Kris Barrash, Colleen Greenwalt, Jody Hull, and Mike Mancuso returned to the transplant site in early April 2017 to assess the success (or not) of the experiment. We tallied a total of 260 Aase's onion plants, accounting for 65% of all the bulbs planted several months earlier. At least a few Aase's onion plants were found in or near most of the mapped patches. However, a few patches had no plants, and several plants showed up in places not mapped. It was great to see the transplant had some success. All above-ground evidence of Aase's onion was absent upon a return visit to the transplant site a couple weeks later. Perhaps the ephemeral seasonal appearance is part of the anticipation and allure of Aase's onion. What will we find next year? •

INPS NEWS

2017 ERIG Grants Awarded

The INPS Education, Research and Inventory Grant (ERIG) Program for 2017 awarded a total of \$2700.00 to five recipients. We want to thank the Idaho Rare Plant Conference for donating funds to help with ERIG grants and also all the individual members who give extra contributions to ERIG.

1) Idaho Native Plant Sign Improvement Project for Orton Botanical Garden. The project's goal is to improve signage and add signs within the garden. This would include labels for the Idaho natives among the botanical garden's 400+ plant species and varieties. Individual labels will include the plant's common, scientific and family names, with its geographic distribution. Larger plaques explaining habitats within the garden will also be included.

2) Reconciliation of the Wellner Collections. Charles A. (Chuck Wellner (1911-2001) former USDA Forest Service employee and charter member of the White Pine Chapter) was instrumental in the initial exploration and eventual establishment of highly significant conservation sites including research natural areas, special interest botanical areas, and other natural areas throughout Idaho. The objectives of the proposed Reconciliation of the Wellner Collections project are to (1) reconcile information shown on Wellner's natural area plant species lists with herbarium records for Wellner's plant collections and (2) (to the extent possible) annotate herbaria collections to refine species identification (e.g., many collections of *Artemisia tridentata* are not identified to subspecies).

3) Collister Elementary School Garden, Boise, Idaho. A garden is being started at Collister elementary to be called the Collister Legacy Garden. The school is partnering with Edward's Greenhouse, located nearby. The garden will teach students how to grow vegetables but will also grow native plants as well. The school is within 1/2 mile of the sagebrush foothills of north Boise, so learning about native plants in the high desert will be beneficial. This fits in the 3rd and 4th grade Social Studies and Science curriculum as these plants were found along the Oregon Trails. While the plant purchases have already been funded the school is asking for money to provide gardening tools for the students.

4) Ponderosa State Park Native Plant Restoration Project. The University of Idaho McCall Outdoor Science School (MOSS) is restoring degraded areas of the state park. This project targets the southern half of the park near the activity center and at the lily marsh. The

objective is to decommission unwanted trails to reduce impacts on existing natural plant communities and, to plant native wildflower and shrub seedlings to improve biodiversity and restore natural ecosystem functions. The project would allow the MOSS program to continue utilizing the area for education and provide additional educational opportunities focused on native plants and the importance of environmental stewardship. The award will allow them to purchase native herbs and shrubs.

5) A taxonomic revision of the state sensitive species complex. One of the first steps to understanding and conserving biological diversity is to document the presence of morphological and genetic variation across the landscape, and if possible across time. Michael Ottenlips, graduate student at Boise State University, is planning to construct an evolutionary tree and potentially describe new rare species in the *Lomatium packardiae* (Apiaceae) complex in western North America. The funds received from ERIG will be used for travel costs related to field research.

The ERIG committee is excited for the diversity of the grants funded this year. From native gardens at a school, signing at a botanical garden to restoring native plants at a state park, and biological research on a specific group of *Lomatium* as well as taxonomic herbarium work, all of these projects fall within the education and research of native plants in Idaho. All projects funded are responsible for submitting an article to *Sage Notes* describing the purpose and results of the projects. Stay tuned in the years to come to learn more about the success of these projects.

If you enjoy knowing that our society is working hard to promote native plant awareness and conservation within our state, please consider giving to the ERIG program on a monthly or yearly basis. With automatic payments from PayPal, it is easy to contribute to our worthy cause. Thank you to members, LaMar and Rosalie Orton, Gerry Queener, Jessica Irwin, Janet and Ed Bala, Kris Barrash and Chris Treccani for your donations in the first quarter of 2017.

Thank you to everyone in our society for your interest in native plants and for your continued support of the ERIG program.

Respectfully,
Janet Bala
ERIG Chairperson

Pahove's Native Plant Sale - From Pots to Truckloads

By Caroline Morris, Pahove Chapter

Has your INPS chapter held or considered a native plant sale? Read about Pahove's experience to see whether it has useful lessons for you.

In the late 1980s, Pahove member and INPS' computer and website advisor Paul Shaffer, suggested that a native plant sale would be a real money-maker for our INPS chapter. Without his persuasive nudging, then Pahove president Ann DeBolt believes this now very successful annual late April Native Plant Sale probably never would have started. During the Sale's three-decade history, organizational, venue, and leadership changes have changed it substantially.

Until 1990, Ann and others dug native plants grown in Pahove members' yards, particularly Joe Duff's and Bob Steele's. They sold the plants in recycled containers on Earth Day at a booth shared with the Idaho Conservation League located at the Old Penitentiary in Boise. Lacking expenses, all income from the sale was profit. Then the owners of Buffalo Berry Farm in McCall attended the Pahove native plant event and asked to be the Sale's commercial native plant vendor, providing more variety, consistent quality, larger quantities, and new or unusual botanical treats. Buffalo Berry was the exclusive vendor for years, but as customers and demand for inventory increased, the Sale added other vendors, including Plants of the Wild, of Tekoa, Washington. More recent sources for Idaho-grown native plants are Draggin' Wing Farm and Xeric Gardening of Boise.

Although staying in Boise, Sale locations changed over time too—from the Old Penitentiary to Barber Park, Hyde Park, and Julia Davis Park. Eventually the crowds became too chaotic for these venues. In 2005 Susan Ziebarth, a 15-year INPS member and fulltime Idaho Fish and Game employee as Landscape and Facilities Coordinator at MK Nature Center (MKNC) in Boise, offered use of the MKNC, where the Sale finally found a permanent home. Two years ago, anticipated rain moved the Sale from its prior outdoor location into an MKNC shed/garage that became an ideal weather-proof facility, with the added benefit of easier overnight security. The annual date of the Sale remains close to Earth Day, when gardening sounds appealing.

After assisting Ann DeBolt for three years, Susan assumed the "Plant Sale Czar" position in 2008. In 2011, the Pahove Board approved Susan's implementing a "Member's Only" sale the day before opening the Sale to the public. This gives current INPS members more time to calmly select and buy plants, compared to the crowded



Ready for business at the 2017 Pahove Chapter Native Plant Sale. Photo by Jody Hull.

public sale. It also encouraged new INPS memberships. "Member's Only" Sale admission requires current INPS membership status, creating a busy forced renewal opportunity. Typical Sale hours are Friday 5-7 pm for INPS members and Saturday 10 am-1 pm for the public.

Preparing for the Sale requires a tremendous amount of time and effort by Susan. Sometimes she may think discontinuing the Sale would be wonderful. In addition to her "day job" with IDFG, Susan serves Pahove as its sales manager, meetings venue coordinator, and INPS P.O. Box Mail Retriever/Distributor. Nevertheless, Susan persists with good cheer. She is convinced that native plants sold at the Sale enhance urban wildlife and pollinator habitat, making the effort worthwhile.

The 2017 Sale sold more than 3000 plants, ranging in size from small tubes to 3 foot tall shrubs and tree saplings. Most Sale plants are nearly impossible to find at local nurseries, causing customers to return year after year. One Sale volunteer wryly observed that they must return to replace their die-offs.

After extensive advance planning, Susan works night and day for at least the month before the Sale creating spreadsheets to determine which grower has which plants, placing orders with those growers, designing and printing Point of Sale species signs, plant labels, posters, fliers and banners. Then there are the all the "last minute" details that this complex event involves. Other tasks for Susan include unloading a large, early delivery of plants into the MKNC greenhouse. Then potting and keeping these plants alive until the Sale date. Susan also maintains unsold plants from the previous year, recruits and coordinates the Sale's valuable volunteer manual

labor force, arranges for a security guard, negotiates a truck rental for plant pickups, prepares a detailed plant availability list and planting guide for the chapter website page, printing roughly 3000 plant labels, and more.

This Sale could not happen without the talented and dedicated volunteer work force of Pahove members, Idaho Master Naturalists, friends and spouses, and a few well-instructed interns. It must all come together during the "Friday Frenzy" set-up day. This requires arranging dozens of tables, unloading all the plants from the MKNC greenhouse and the other suppliers, inserting labels for each plant, and placing plant trays on the appropriate tables (sun, shade, firewise, etc.). Volunteers advise customers about suitable plants and combinations during the entire Sale. Afterwards, volunteers need to store equipment and place remaining plants wherever Susan directs. Many Pahove members have worked at the Sale for years, enjoying the camaraderie and tasty snacks, even when doing grungy tasks.

Transferring leftover plants, deciphering membership forms, counting money, paying state sales taxes, and finalizing the accounting wraps up the Sale for another year. Counting the money is fun! Susan is a rapid cash-counter from her past commercial sales experience. Our recent Sale received \$5505 in \$5 bills alone—that's 1101 individual bills to count accurately. We miscounted by just one \$5 bill, according to our credit union's official calculation.

Profits from the Sale go in many directions, including 25% to MKNC, an annual Education & Enrichment

Award enabling a Pahove member to attend a selected plant conference, college student intern payments, community plant donations, Rare Plant Conference support, and plant education resource materials.

Pahove is incredibly fortunate and grateful to have benefitted from Ann DeBolt's and Susan Ziebarth's amazing Plant Sale leadership efforts. All sparked by Paul Shaffer's wise suggestion many years ago. Of course, we hope to see all the volunteers again next April. •



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INPS Chapter News

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: Meetings 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

Upcoming events:

June 17: Coeur d'Alene River/Mountains plant hike. Meet at 8:00 am to carpool from Walgreen's at US 95 and Appleway. Stage for hike at Bumblebee Campground at 9:00 am.

June 22: Idaho Master Naturalist plant hike. Meet at Rapid Lightning Creek Wildlife Habitat Area parking lot at 5:00 pm. Contact Derek Antonelli for details.

July 8: Antoine Peak Conservation Area hike/survey. Meet at 8:00 am to carpool from Walgreen's parking lot.

August 10: Idaho Master Naturalist plant hike. Meet at 9:00 am at Avista recreation site at Highway 200 and Trestle Creek Road. We will caravan to a mountain lake hike. Contact Derek Antonelli for details.

August (TBD): Tentative plant hike to Hager Lake and Huff Lake.

October 4: Tentative presentation for Chapter meeting - Plants of ponderosa pine/Douglas-fir forest habitat types.

October 17: North Idaho Rare Plant Working Group meeting, 9:30 am to 3:30 pm, location TBD.

Previous events:

May: Bob Wilson of the Cedar Mountain Perennials Nursery provided a very interesting talk on the propagation of native plants at the October 2016 Calypso Chapter meeting. This May, the Chapter took the opportunity to tour the nursery and see Bob's propagation techniques in operation.



Calypso Chapter tours Cedar Mountain Perennials Nursery owner Bob Wilson in green shirt. Photo by Derek Antonelli.

Also in May, the Calypso Chapter hiked the newly established Upper Falls Community Forest in Post Falls. The Upper Falls Community Forest adds 438 acres and two miles of frontage along the Spokane River to the existing 58 acres of Quiln Park. The forest is home to many beautiful native plant species.

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 and times 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:

<http://idahonativeplants.org/local-chapters/pahove/>

Where: The MK Nature Center Auditorium, 600 S. Walnut Street, Boise, Idaho

Contact: For more information about Pahove Chapter activities please visit the Pahove Chapter page of the INPS website, or email Karie Pappani at pahove.chapter.president@gmail.com

Upcoming events:

The Pahove Chapter wrapped up another season of fantastic talks and presentations in April. We will kick off the 2017/2018 season in September with our annual pizza party at Idaho Botanical Garden. Date/time TBD.

Previous events:

April: Pahove's annual Native Plant Sale on April 28-29 was a big success. Approximately 3000 native tree, shrub, forb and grass plants found new homes in the Treasure Valley area thanks to the plant sale. In addition, a dozen new members joined INPS.

May: In late June 2016, a human-caused wildfire burned approximately 2500 acres in the Table Rock area in the Boise foothills. In late May, Pahove members toured and learned about the fire restoration that began last autumn. Our well-informed guide was Martha Brabec, an ecologist who is the Foothills Restoration Specialist with Boise's Department of Parks & Recreation. She is involved because the fire burned 164 acres owned by the City of Boise (including all the trails we traveled). Other landowners included the Idaho Department of Lands and

the Idaho Department of Fish and Game. These organizations have been coordinating restoration efforts.

The two evening hikes used different scenic trails, one was on a hilltop, the other on a hillside. Common themes discussed by our guide were: "fertile islands" (the nutrition-rich burn zone surrounding blackened shrub skeletons); planting 3500 new sagebrush and antelope bitterbrush shrubs and additional hoary asters by 500 volunteers; surprising rejuvenation of existing native plants; fire resistance of hackberry trees; heavy invasive weed growth; minimal success with both broadcasting seeds and herbicides; and plans for using Zoo Boise's \$100,000 grant. All participants became more plant-firewise and weed-smarter on these very informative tours.



Martha Brabec discussing post-fire restoration efforts for the Table Rock area. Photo by Vicki Henderson.



Pahove members on a tour of the post-fire Table Rock restoration area. Photo by Vicki Henderson.

Board Position Opening:

Pahove chapter is seeking a new board president. Current president, Karie Pappani, has served the chapter exceptionally for 5+ years, and the time has come to select her successor. Interested individuals are encouraged to contact the board at pahove.chapter.president@gmail.com

SAWABI CHAPTER

Contact: Paul Allen at pokyalen@hotmail.com

Upcoming events:

During summer months, the Sawabi Chapter holds Monday night plant identification walks and Saturday field trips to different sites in southeastern Idaho. The summer schedule can be found on the Sawabi Chapter

page of the INPS website:

<https://idahonativeplants.org/sawabi/> and click on "2017 Field Trip Schedule Here".

Previous Events:

April 15: The Sawabi Chapter participated in the Pocatello Environmental Fair on April 15. We provided information on the Idaho Native Plant Society, including a schedule of our plant walks this summer. Volunteers handed out plants started by Steve Love from the University of Idaho Extension Service and from the gardens of various members. Children participated in a plant identification game to earn a "passport stamp" from our booth as a requirement to enter a prize drawing.

April 22: Several chapter members "Marched for Science" on April 22, and participated in an after-event presentation. The public was invited to peer through microscopes and discover the beautiful details of individual flowers.

UPPER SNAKE CHAPTER

The Upper Snake Chapter is currently inactive.

Contact: Rose Lehman, jojorose@cablone.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 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).

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

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. •



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Sage Notes is published quarterly by the Idaho Native Plant Society. Past issues can be viewed online at: <http://idahonativeplants.org/sage-notes/>

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

Spalding's Catchfly: A Monitoring Challenge

By Janice Hill, Idaho Natural Heritage Program (IDNHP), Idaho Department of Fish and Game

It is a common belief that plants are easier to monitor than animals; they can't run away. Most plant demography studies assume all plants will be detected, i.e., their detection probability = 1; however, values <1 are widespread in demography studies and can lead to biased results (Kéry and Gregg 2003). Some plants exhibit prolonged dormancy in which a plant remains alive but invisible belowground for one or more growing seasons. This presents an obvious detection problem. Tracking marked plants in permanent plots for consecutive years is needed to distinguish dormant from dead plants. Additionally, for plants with an unobservable dormant stage, all plants emerging aboveground for a growing season need to be detected with certainty or dormancy will be overestimated (Kéry et al. 2005). Aboveground plants, however, often go undetected as well due to such factors as stage class size, surrounding vegetation, herbivory, and observer ability.

The Threatened plant Spalding's catchfly (*Silene spaldingii*) is a long-lived perennial forb with whitish flowers and glandular stems that occurs in Palouse and canyon grasslands, sagebrush steppe, and open-canopy pine stands of the inland Pacific Northwest. Aboveground portions of the plant die back completely over winter and emerge in late May/early June as either rosette plants, single-stemmed plants, or multi-stemmed plants from an underground stem, the caudex. Flowering occurs from mid-July into October. This species is known to exhibit prolonged dormancy (Lesica 1997).

Most surveys and monitoring have been conducted at flowering time. A Montana demographic study conducted at flowering time reported high

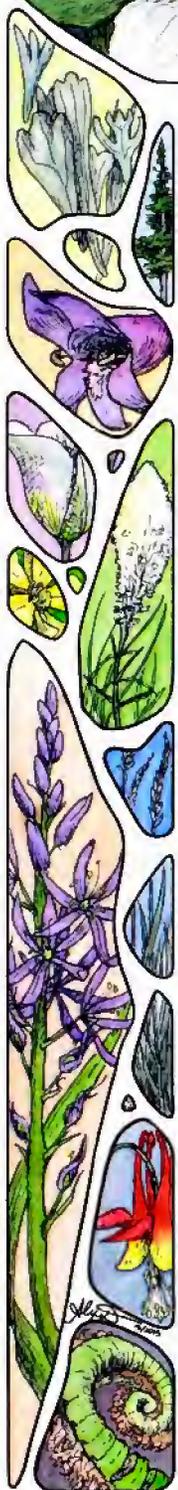
levels of prolonged dormancy, up to 50% annually, and considered all rosettes to be recruits (Lesica 1997). Other researchers also reported high levels of prolonged dormancy and considered rosettes to be recruits or questioned whether rosettes can be adults (Taylor et al. 2012, Luke 2013). Studies of this species in Idaho canyon grasslands, however, documented: 1) several stemmed plants flagged early in the season had disappeared completely by flowering (Hill and Gray 2000), and 2) several rosette plants were connected to mature caudices and/or occurred at sites that supported reproductive stemmed plants in previous years (Hill and Fuchs 2003, Hill and Weddell 2003). This indicated that all aboveground plants may not be detected at flowering and that rosette plants may be adult plants.

The Recovery Plan for Spalding's catchfly (U.S. Fish and Wildlife Service 2007) stipulates: 1) demographic monitoring for 10 consecutive years to obtain good estimates for population viability studies, and 2) trend monitoring every 5-10 years

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Letter from the President

As I write this letter, I am sitting in my camp trailer, parked on the Right Fork of Iron Bog Creek in the Pioneer Mountains. I'm here with my wife and we plan to watch the eclipse before we set out for home next week. This is one of my favorite places in the entire world and I visit often. I find peace in this secluded location and it helps me bring focus back to the important things in my life. In this country, we are remarkably blessed to have public lands that we can access and enjoy. It is a rare privilege in a world where exclusion is the rule. Keeping these public lands healthy and accessible is one of the reasons I am a part of the Idaho Native Plant Society. This organization is made up of a group of like-minded people who feel the value of protected public wildlands. This organization gives a unified voice to the conservation of both rare and common plants and the habitats they colonize. It brings influence to help us accomplish that goal. I thank all those who feel strongly enough about conservation issues to invest a small part of their lives to this society. I applaud your efforts.

Stephen Love
INPS President

Idaho Mystery Plant

This photo was taken by Paul Allen in east-central Idaho's Lemhi Mountains. What is your guess for this plant? The answer will be revealed in the next edition of *Sage Notes*. The Idaho Mystery Plant in the June 2017 issue was marsh felwort (*Lomatogonium rotatum*) in the gentian family (Gentianaceae). It can be found in alkaline or saline soil wetlands. The distribution of marsh felwort includes the Rocky Mountains from Alaska southward to New Mexico.



Have an Idaho Mystery Plant to share? Send it in to the editor:
sage-editor@idahonativeplants.org.
— *Michael Mancuso*

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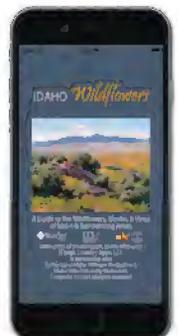
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Announcements

Idaho Native Plant Society 2018 Annual Meeting

The 2018 Idaho Native Plant Society's annual meeting will be held in the Coeur d'Alene Mountains along the North Fork of the Coeur d'Alene River. The meeting is scheduled from Friday, June 29, to Monday, July 2. We have reserved the group camp site at the US Forest Service Bumblebee Campground, located between Wallace and Coeur d'Alene. The campground is eight miles north of the Kingston exit (Exit 43) off of Interstate 90. The camping fee will be included in the registration fee for the annual meeting. The campground has no RV hook-ups or electricity. It does have picnic tables, campfire grills, potable water, and vault toilets.

Anyone not wishing to camp will need to make arrangements in the nearby towns of Kellogg (16 miles), Wallace (27 miles), or Coeur d'Alene (39 miles). Rooms range from \$40 to well over \$100. Spokane's Hoopfest will be going on the same weekend driving up demand for motel rooms in the entire region so make your reservations early (as in now). Several private RV Parks with hook-ups can also be found within a few miles of our group camp site.

Registration procedures, costs, schedule of events, and specific hikes/tours are still to be determined. Our rough schedule of events is as follows. Check in will occur Friday afternoon. Friday evening we will have an informal get-together. Saturday and Sunday we will have hikes and tours during the day to enjoy the many native plant species found in the North Idaho mesic forests. Specific hikes and tours have not been finalized yet, but could include hikes into subalpine mountain lakes and along



Revette Lake is one of several subalpine lakes being considered for the 2018 INPS Annual Meeting. Photo by Derek Antonelli.

forest streams and tours of giant western red cedar groves. Saturday evening will be a catered dinner provided by the Snake Pit (a historic local establishment). The dinner will be followed by the formal INPS meeting and then an informative talk by noted naturalist and award-winning author, Jack Nisbet. Jack has written a number of books including works about northwest explorer and fur trader, David Thompson, and pioneer plant collector, David Douglas. Sunday evening we'll have an informal campfire gathering. We may also have an optional plant identification session for those who would like to participate.

— *Derek Antonelli*

White Pine Native Plant Sale, *continued from Page 12*

growing. In 2017, we sold over 1500 plants at the sale, varying in size from cone tubes to gallon pots. Most of the plants we sell are not available at local nurseries so customers looking for a specific native know to come to our sale.

The White Pine Chapter has benefited greatly from Pamela's leadership. And each year we have more plants, more customers, and raise more money. Now that our bank account is richer we've been able to consider other ways to help native plant enthusiasts. We started small with donations to the INPS ERIG program, signage projects, support for public landscaping, etc. The chapter has now established a grant program to support education projects at local schools, possible scholarships for region-

al research, and restoration and other landscaping projects. Our grant program is described on our chapter website at <http://www.whitepineinps.org/WPgrant.html>. Our first major grant was to Palouse-Clearwater Environmental Institute (PCEI) in Moscow to improve nursery and trail interpretive signage at their John Crock Nursery. John was owner of Hyperspod in Moscow for years and supported all aspects of recreation on the Palouse and elsewhere.

Pamela's work will take her out of the country at the time of the next sale, but before leaving town she promises to aid her successors and the chapter navigating the challenges of the sale. The chapter appreciates very much her efforts and support of INPS. •

Spaulding's Catchfly continued from Page 1

to determine if populations demonstrate stable or increasing trends for at least 20 years. These monitoring programs are part of a comprehensive plan for recovery of this Threatened species that also includes other on-going conservation efforts such as additional field surveys, weed control efforts, genetic research, pollinator studies, seed collection/propagation/plantings, habitat restoration, and research to determine effects of fire and livestock grazing.



Spaulding's catchfly. Photo by Karen Gray.

Two Demography Studies

Two demography studies of Spaulding's catchfly were conducted by IDNHP botanists in the canyon grasslands in the Craig Mountain area of west-central Idaho: 1) the BLM study funded primarily by the Bureau of Land Management from 2002-2011 (Hill 2012), and 2) the FWS study funded primarily by the U.S. Fish and Wildlife Service from 2004-2013 (Gray et al. 2011, Hill et al. 2014). To detect all aboveground plants and clarify the status of the rosette plant, we included two complete monitoring periods each year, one soon after emergence and one at flowering time, and included ground-level searches for small rosette plants at both periods. Both studies tracked individual plants in permanent plots (meter-wide belt transects) for 10 consecutive years. During sampling, meter tapes were extended the length of the transects and two reference coordinates, the linear distance along the tape and the perpendicular distance to the tape, were recorded for each Spaulding's catchfly plant. We followed a total of 947 plants (152 BLM) and (795 FWS) during the studies. We identified four stage classes: three aboveground stage classes based on features consistently recognizable at both early and late monitoring: 1) R (rosette): no visible stem between sets of leaves; vegetative; did not bolt into stemmed stages, 2) S (single-stem):

one stem; capable of reproduction, 3) M (multi-stem): more than one stem; capable of reproduction, and one belowground stage class: 4) D (dormant): produces no aboveground vegetation. Demographic estimates were based on stage-based transition matrix and mark-recapture analyses.

Results

Our two studies had different sites, plot designs, and primary observers, and were conducted over slightly different time periods; however, the results of both studies were very similar (Hill and Garton 2017). Our results differed considerably, however, from studies that monitored at flowering (Lesica 1997) or did not conduct ground-level searches for R plants (Taylor et al. 2012).

Detection of Aboveground Plants:

The two monitoring periods allowed us to determine that we detected essentially all (99.9%) aboveground plants at early monitoring; however, by flowering time, 48% of these aboveground plants were not detectable (disappeared or became unidentifiable). Therefore, we based the determination of demographic parameters on our early data when all aboveground plants were detected. Although early monitoring cannot provide reproductive data, it does provide the total number of plants present in the plots, a number that is essential for determining several demographic parameters, including percent flowering, stage class distribution, transition probabilities, percent recruitment, dormancy, and mortality.



Canyon grassland habitat, Craig Mountain, Idaho. Photo by Janice Hill.

Plant Numbers and Stage Distribution:

Plant numbers changed over the study periods. Two periods of high mortality occurred in both studies associated with two cycles of high rodent activity. This resulted

in a large decrease in plant numbers at the beginning of the BLM study and further decrease at the end of the study; low levels of recruitment (1% annually) did little to offset this decline and plant numbers were considerably reduced at the end of the study. Levels of recruitment were slightly higher early in the FWS study (5% annually), plant numbers were more stable, and large increases in recruitment during the last three years of the study (22% annually) resulted in increasing plant numbers at the end of the study. Although stage class proportions varied annually, averages based on the middle eight years of the studies indicate plants spent 42% (BLM) and 38% (FWS) of their lives in the S stage, 31% (BLM) and 36% (FWS) in the R stage, 19% (BLM) and 18% (FWS) in the M stage, and 8% (both studies) in the D stage.



Adult R plant (3-4 cm) at least 9 years old; was an S, M, and D plant in previous years; no cotyledons. Photo by Janice Hill.

Status of the Rosette:

Other demography studies considered all R plants to be only recruits (Lesica 1997, Taylor et al. 2012). However, our studies showed the R stage was a major vegetative stage for the species with over 1/3 of plants emerging as R plants each year. Most R plants (>65%) were established plants present in previous years as either D, R, S, or M plants. R plants could be either: 1) a first-year recruit (was a seedling the previous year), 2) a juvenile (has not reproduced; remains in the R stage four to six years before reproducing as S or M plants), or 3) an adult (has reproduced as an S or M plant in previous years). The R plant was not a seedling; it lacked the distinctive cotyledons that were present on the much smaller seedlings. Plants often remained as R plants several years, i.e., 28% (BLM) and 38% (FWS) of plants were R plants for three years or longer; several were R plants all 10 years of the studies.

No morphological differences could be distinguished between R plants that were first-year recruits, juveniles, or adults, making the determination of recruitment espe-

cially challenging. Several consecutive years of tracking individual plants in permanent plots and monitoring early with ground-level searches were needed to determine maturity status of R plants.

Prolonged Dormancy:

Our studies indicated prolonged dormancy was a relatively minor component of the life history of this species. Average annual dormancy rate was 10-11% (ranging from 3-19%) and dormancy duration was either one year (90-93%) or two years (7-10%). Other studies conducted at flowering or not including ground-level searches for R plants indicated much higher average annual dormancy rates, i.e., 50% (Lesica 1997), 33% (Lesica and Crone 2007), 42% (Taylor et al. 2012). Dormancy rates also varied considerably from year to year, ranging from 11-74% (Lesica 1997, Lesica and Crone 2007), and bouts of dormancy lasted up to six years (Lesica and Crone 2007).

Transition Probabilities and Life Cycle:

All possible transitions occurred between the four stage classes. The majority of aboveground stage class transitions were stasis transitions in which plants stayed in the same stage from year to year. Remaining transitions were equally divided between growth from smaller to larger stages and retrogression from larger to smaller stages. Another study that sampled at flowering indicated much higher probability of aboveground stages transitioning to the dormant stage (especially the R to D transition), much lower R to R stasis transitions, no growth transitions from R stage to the stemmed stages, and no retrogression transitions from the larger stemmed stages to the smaller R stage (Lesica 1997).

Response to Stress...Become Smaller:

Our studies were the first to document retrogression from the larger stemmed stages to the smaller R stage. These retrogression transitions increased with two episodes of high rodent activity (a major threat) and a July 2007 fire. The larger stemmed plants were more targeted by rodents [likely the montane vole (*Microtus montanus*)] than the smaller R plant. The R plant likely plays a major survival role for this species. Transitioning to a smaller form in response to disturbance or a harsh environment can result in a higher speed of recovery from disturbance than dying and requiring recruitment to replace that individual (Salguero-Gomez and Casper 2010).

Fire Increase Recruitment?:

A July 2007 wildfire burned the majority of our plots. Recruitment, which was relatively low prior to the fire

Continued on Page 6

Continued from Page 5

[1% (BLM) and 5% (FWS)], showed no increase for several years after the fire. The fire may have created conditions that inhibited recruitment (i.e., killed moss - a major ground cover in several plots), reduced plant litter and biomass, and darkened the soil surface. These conditions can increase soil temperature and evaporation and reduce moisture in upper soil layers (Redmann 1978, Defossé and Robberecht 1996). Recruitment increased markedly in the FWS study three to four years after the fire as mosses re-established. Dew deposition on moss may have aided seedling survival. Our findings differed from a demography study that considered rosettes to be only recruits and reported that fire enhanced recruitment (Lesica 1999).



Small seedlings (<1 cm) with distinct cotyledons. Photo by Juanita Lichthardt.

Detectability Declined over the Growing Season:

Almost half of aboveground plants disappeared or became undetectable or unidentifiable by flowering time. The R stage was disproportionately affected; on average, ~80% of them were not detectable at flowering. The R plant is ephemeral, i.e., it is present early but does not increase in size or bolt into a stemmed plant or become reproductive, and usually disappears completely by flowering. Some stemmed plants also disappeared by flowering, including 25%-30% of S plants and 15% of M plants. Another 15% of M plants became unidentifiable because they lost stem(s) and appeared to be S plants at flowering. Spalding's catchfly is a late-blooming species that occurs in areas characterized by hot, dry summers. Its long taproot enables it to survive, yet aboveground plant tissue is subject to desiccation, herbivory and fire damage that can reduce detectability over the growing season.

Detection probability at flowering showed high annual variability and was considerably reduced from that of

~1.0 for each aboveground stage at early monitoring. Average detection probability at flowering time (averaged over the 10 years of both studies) was 0.21 ± 0.15 for the R stage, 0.73 ± 0.27 for the S stage, and 0.65 ± 0.28 for the M stage. This high annual variability decreases the usefulness of using these average detection probabilities as correction factors for monitoring at flowering.

Bias of Late Monitoring:

How biased would our results have been if we had monitored only at flowering time in our studies after almost half of the plants had disappeared? Determination of demographic parameters based only on our late monitoring data showed: 1) underestimation of plants emerging aboveground each year by 48%, 2) underestimation of the number of plants in our plots by 40%, 3) overestimation of prolonged dormancy two to three times (70% of indicated dormancies were false), 4) missing 90% of recruitments, 5) over-representing the D stage and the role of dormancy in this species, 6) underestimating the R stage and its importance for survival, 8) many false positives (recruitments, dormancies and mortalities that had not actually occurred) and false negatives (missed recruitments, dormancies and mortalities that had actually occurred), and 9) declining plant numbers the last three years of the FWS study (plant numbers actually increased during this time). Monitoring only at flowering time misses most recruitments and juvenile periods. New recruits are R plants, they remain in the R stage for four to six years before reproducing as stemmed plants, and 80% (on average) of R plants have disappeared or become undetectable/unidentifiable by flowering. A detailed analysis of the influence that time of monitoring has on demographic estimates for this species is presented in Hill and Garton (2017).

Monitoring Challenges:

Monitoring should occur soon after emergence when all aboveground plants can be detected. Experienced observers are needed to identify vegetative Spalding's catchfly plants, locate the small R plant on the ground surface, and distinguish it from several similar-appearing rosettes of associated forbs such as western groundsel (*Senecio integerrimus*) and shooting star (*Dodecatheon* sp.) In our plots, the presence of retrorse cilia hairs was the distinguishing feature for Spalding's catchfly, but confirming their presence required examining the R plant, in place, with a hand-lens.....not an easy task!

It is also difficult to determine what constitutes an individual plant because of belowground connections of shoots to the caudices, the presence of both single-stem

and multi-stem plants at the same site, and the tendency for several plants to occur in close proximity from recruitment events (individual plants can occur within two to three cm of each other). Some researchers have considered each stem as a plant, while others have included all stems within a 20 cm-diameter as an individual plant. A couple methods we used were finger-tracing stems below the ground surface or moving one stem to detect movement in an adjacent stem.



Looking for retrorse hairs on *R* plant leaves requires close inspection. Photo by Karen Gray.

Trend Monitoring:

Methodology for monitoring population trend is currently being developed (U.S. Fish and Wildlife Service 2012). The results of our studies indicate an effective and accurate trend monitoring method that could be accomplished with minimal time and effort. The number of plants in plots could be determined by following marked plants in permanent plots for two consecutive years, monitoring once each year soon after emergence and including ground-level searches for *R* plants. Count all plants seen the first year and add any additional plants seen in the second year; this will detect any plant in a one-year dormancy and probably at least one of the years of any plant in a two-year dormancy. This procedure could be conducted every 5-10 years to determine trend.

Conclusion

Spalding's catchfly is a challenge to monitor due to detection problems with both dormant and aboveground plants. The detection of all plants that are visible aboveground, including those that are small or only visible for a brief period of time, is a critical factor in determining the number of dormant plants that are invisible belowground. When and how monitoring occurs is extremely important in obtaining unbiased demographic data. Our demographic studies demonstrated that 1) essentially all

plants emerging aboveground for a growing season are present and detectable soon after emergence, 2) many plants disappear/become undetectable or unidentifiable by flowering time, and 3) monitoring only at flowering time has high potential to considerably bias demographic estimates. Early monitoring that includes ground-level searches for small *R* plants can eliminate detection problems of aboveground plants and allow for unbiased estimates of prolonged dormancy and other demographic parameters. Our studies have implications for other plants with small, inconspicuous, ephemeral, or dormant stage classes, and those with long growing seasons in harsh environments where detectability of aboveground plant tissue may decrease over the growing season.

Acknowledgements

The Bureau of Land Management, U.S. Fish and Wildlife Service, The Nature Conservancy, and Palouse-Clearwater Environmental Institute provided funding. Idaho Natural Heritage Program botanists, Karen Gray, Juanita Lichthardt, Janice Hill, Kristen Pekas, and Lynn Kinter conducted the studies. Dr. Edward O. Garton (Department of Fish and Wildlife Sciences, University of Idaho) provided assistance with mark-recapture analyses. Joel Sauder and Tom Schrempp (Idaho Department of Fish and Game) conducted rodent trapping. Others providing assistance included Bertie Weddell and Sam Fuchs. •

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White Pine Chapter Awards First Grant

By Judy Ferguson, White Pine Chapter

The White Pine Chapter of INPS is now sponsoring a grant program. The proceeds to fund this program come from profits from our annual native plant sale. This program was developed to promote awareness and use of local native plants across the many landscapes and plant communities found in north-central Idaho (as well as neighboring parts of eastern Washington). A few examples of projects that are appropriate for this program include: restoration of degraded sites using native plants, incorporating native plants into landscaping projects in public places, trail or other educational signs, seed collection, and research that involves all aspects of native plants. We want to make sure that teachers, graduate students, land management entities involved in ongoing research, and other potential applicants are aware of our program. We hope to use the local grant program as a supplement to the State INPS ERIG (Education Research Inventory Grant) program. For more information on ap-

plying, please see the White Pine Chapter website (<http://www.whitepineinps.org/>).

The first White Pine Chapter grant was awarded to the Palouse-Clearwater Environmental Institute (PCEI). The \$1000 grant award will help PCEI expand the breadth of their outdoor educational programming with permanent native plant identification signage. Their project fits the purposes of the White Pine Chapter grant program—to promote awareness of and the use of local native plant species in habitat restoration and landscaping in our region. PCEI hosts field trips year-round for local school children, who come to tour the group's hiking trails and native plant nursery. The White Pine Grant Committee agreed that PCEI provides a very effective learning environment. The addition of signs with common and scientific names and information about native plants on site will help to further educate both school children and the public about native plants. •

A New *Lomatium* Species in the Boise Foothills

By Jim Smith, Boise State University

Ongoing collaborative research between Boise State University and the College of Idaho has discovered that one of the more common wildflowers in the Boise foothills is a currently undescribed species. It is perhaps the most common early, yellow-flowered plant in Military Reserve, a popular open-space area in Boise's east end. The research involves tracing the evolutionary history of species using DNA sequencing—essentially uncovering a "family tree" but at a much larger scale. While building the tree for the plant genus *Lomatium*, commonly referred to as biscuit-roots, it has become clear that one of the branches is not as closely related to previously named species as thought, and instead represents an entirely distinct lineage that lacks a name. This work has been a collaboration between Dr. James Smith of the Department of Biological Sciences at Boise State University, Dr. Don Mansfield at College of Idaho and undergraduates working in both of their labs.

We are seeking a donor who would like to support this research and, in return, to have the opportunity to name this new species. The donor will work directly with Drs. Smith and Mansfield to designate the new species name and to follow all nomenclatural rules (see terms below) to

assign the name which will be assigned forever to this unique plant. The opportunity to name a new species is a rare event and the rules of Botanical Nomenclature ensure that the name will persist in perpetuity.

The name might be based on your loved one, the name of someone you want to honor, real or fictional, living or deceased—all with the proper Greek or Latin formulation. We do ask that names not be used in a negative context (see terms below). The name will be in the genus *Lomatium*. Examples of existing names in this genus are *Lomatium basalticum*, *Lomatium cusickii*, and *Lomatium simplex*. The naming opportunity would be for the word that follows *Lomatium*, called the specific epithet.

A Boise State University webpage (URL below) has more detailed information on how to make a bid. The webpage also contains photographs of the species. Bidding for the opportunity to name the new *Lomatium* species will end in late October. Bidding will start at \$10,000. If you are interested and cannot find the page, contact Jim Smith at jfsmith@boisestate.edu.

<https://giving.boisestate.edu/name-boise-foothills-plant/> •

Grass and Weeds on the Palouse

By Judy Ferguson, White Pine Chapter



Weeding the Whelan Cemetery. Photo by Judy Ferguson.

The White Pine Chapter and the Palouse Prairie Foundation co-sponsored a Grass Identification Workshop in Pullman, Washington, on June 17 at the home of Joan Folwell. Dr. Richard Old, a well-known Palouse botanist, who developed an interactive weed ID guide called XID Services, gave a very informative workshop on grass identification to an enthusiastic group of 23 participants. He started this grass adventure by asking us to identify photos of several well-known people, who all had similar

human characteristics (brown eyes, long hair, and straight teeth). He assured us that it was not much different to recognize different characteristics in grass species, and there are far fewer grass species to learn than humans. First, Dr. Old taught us how to recognize different characteristics of grasses that aid in identification. We had to learn fast because the ID quizzes came next! We took quizzes on learning to differentiate perennial from annual/almost annual grasses, panicle types, stature, and stem characteristics. He even threw in a few ringers. One specimen was not even a grass! We learned a great deal about grasses while having fun, a rare combination.

After an enjoyable lunch provided by Joan Folwell and Charlotte Omoto, most people who attended the grass workshop group went to Whelan Cemetery, a pioneer cemetery, to pull weeds. Whelan Cemetery encloses a beautiful Palouse Prairie remnant. White Pine members really know how to get after those weeds. Many bags of weeds were removed. We also saw many lovely Palouse Prairie wildflowers in bloom, even the rare Palouse thistle (*Cirsium brevifolium*). •

2017 Idaho Botanical Foray

By Jim Smith, Boise State University

In mid-July 2016, I took a collecting trip to Bear Valley, north of Lowman, Idaho. The enormous meadows were amazing and I knew that a day trip with just me collecting would not scrape the surface of the area's botanical diversity. I thought this would be the ideal place for the 2017 Idaho Botanical Foray. Then in August of 2016 the Pioneer Fire started south of there and kept going. I thought a change in location for the foray would be necessary, but then decided it might be worthwhile sampling in an area one year after the burn.

Fortunately, most of the meadows and the forests north of the Bear Valley meadows did not burn and we were able to make some great collections. Early July was a perfect time and some of the meadows were a sea of pale purple with Penstemon. The first day a single group drove to Dagger Falls along the upper Middle Fork Salmon River and collected near the falls and campground—mostly forest understory species, but also with some interesting plants along the steep rock faces, including an unusual Jacob's ladder (*Polemonium* sp.).

Other days had groups venturing into the meadows and heading up the mountains. One road led to the Bear Valley Lookout, but we were not able to get to the summit due to snow drifts that covered parts of the road. We were able to get many of the species that just appear at snowmelt such as spring beauty (*Claytonia lanceolata*). Others that headed up the mountains found at least one steer's head (*Dicentra uniflora*).

We did eventually head into the burned area, south out of Bear Valley toward Lowman. The fire was intense with all the trees completely burned and the ground completely white in places. However, at Clear Creek summit there is a bit of a wetland and we were able to collect several species there that survived the blaze.

On the last day we headed up White Hawk Mountain Lookout road, again traveling through burned forest, but this was closer to the edge of the fire and the burn was not as intense. There were many patches of flowering plants including a large stand of wide-fruit mariposa (*Calochortus eurycarpus*). At the gate we parked and walked to the summit where there were large numbers of



A common penstemon in Bear Valley. Photo by Steve Martin.



Foray group photo. Photo by Steve Martin.

prairie lupine (*Lupinus lepidus*) and alpine buckwheat (*Eriogonum pyrolifolium*), and a population of Sacajawea's bitterroot (*Lewisia sacajaweaana*).

The collections returned to Boise State University, have been dried and sorted to family and now are ready to be keyed out. Keying workshops are planned for this coming October, November and December to assist in getting names on all of the collections. Everyone is welcome to attend. Dates will be posted by the of September. •

INPS Chapter News

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: Meetings 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

Upcoming events:

October 4: Tentative presentation for Chapter meeting - Plants of ponderosa pine/Douglas-fir forest habitat types.

October 17: North Idaho Rare Plant Working Group meeting, 9:30 am to 3:30 pm, location TBD.

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 and times 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:

<http://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 of 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

Upcoming events:

September 12: Pizza Party/Season Kick-off at the Idaho Botanical Garden.

October 10: Peggy Faith will share what she learned at the National Native Seed Conference in Washington, D.C.

November 14: Martha Brabec will discuss ongoing post-wildfire restoration efforts at Table Rock in the Boise Foothills.

December 12: James Smith will discuss research on the genus *Lomatium* (biscuit-root), including the discovery of a new species in the Boise Foothills.

SAWABI CHAPTER

When: Meetings are held the first Monday of the month.

Where: The Wood River Room in the Earl Pond Student Union Building on the Idaho State University campus during the winter months. Meeting starts at 7:00 pm. Refreshments are available after the meeting.

Contact: Karl Holte at plantprof@live.com, (208) 241-8358.

UPPER SNAKE CHAPTER

The Upper Snake Chapter is currently inactive.

Contact: Rose Lehman, jojorose@cablone.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 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).

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

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.

White Pine Chapter's Native Plant Sale

Photos and article by Nancy Miller, White Pine Chapter

The White Pine Chapter held its 6th annual Native Plant Sale on May 20. We've come a long way since our first sale on May 26, 2012. Many factors influenced the chapter in deciding to hold a sale. Some thought it would be a good way to raise money for chapter activities; others were growing plants—particularly natives—but had no place to sell or make them available to others; others wanted to encourage fledgling nurseries who were raising native seed and native plants for restoration, but weren't connecting with the growing numbers of individuals who were asking for native plants for their personal plantings.



Let the plant sale begin.

One of the first to nudge the process along was Thad Davis, who grew a number of native plants on his Kendrick property. He had been part of a native plant society chapter nursery and sale project in Western Washington. His early idea was for the chapter to have a location in Moscow where natives could be grown and chapter members could be part of the growing process. He readily jumped on board for the first plant sale, growing many plants at home to bring to the sale and supplying helpful information based on his prior experience with native plant sales.

Two other people instrumental at the beginning, encouraging the chapter board to consider a native plant sale were Trish Heekin and Jacie Jensen. Jacie and Wayne Jensen had begun their company Thorn Creek Native Seed Farm in 2004. On some of their family's farmland they were growing native seed—and in particular seeds of Palouse Prairie native plants. The Jensen family is stewards of over 100 acres of Palouse Prairie on Paradise Ridge and realized that there was a need for a company to grow these native seeds to help those restor-

ing and preserving Palouse Prairie habitats. They had recently begun selling native plant seed in packets to individuals, in bulk to restoration projects, and to local nurseries who were growing native plants such as Wyeth's buckwheat, blanket flower, blue flax, mule's ears, and balsamroot primarily for restoration projects.

Trish Heekin was already involved with Palouse Prairie research and riparian restoration projects.



Trish Heekin and Liz Martin helping with set-up.

She too was growing some native plants in her backyard and was also looking for opportunities for the nurseries who serviced her projects to grow their businesses. She and Jacie, along with Dave Skinner, then of the Washington State University (WSU) Pullman Plant Materials Center, were actively involved in the Palouse Prairie Foundation which was promoting the preservation of Palouse Prairie areas. Our proposed sale dovetailed with their plans.

Nancy Miller knew Susan Ziebarth, the Pahove Chapter Native Plant Sale manager, through other INPS activities. When it looked like there actually would be a White Pine Chapter plant sale in the spring, our chapter had questions and Susan had answers. She was very gen-



Sale chairperson Pamela Pavek.

erous with her knowledge and provided much needed business information (such as where to get a nursery license from the state or how to figure the sales tax we owed) and practical advice (such as using color coded labels to indicate the pricing). After visiting several sites in Moscow we decided on the Arts Room of the 1912 Building in

downtown Moscow. With its concrete floors, easy access and parking, and helpful management (Thanks, Jenny Kosgrove!) it worked well for us that first year and all the subsequent years. And we thought “It’s close to the Farmers’ Market so perhaps people will come from there to the sale.”

That first winter and spring were very busy. We visited Pat Mason of Pleasant Hill Farms near Troy to see what plants she might provide. There were plant spreadsheets to be created and maintained, plant species display signs to research, design and assemble, plant labeling parties to arrange, publicity posters and flyers (and who would place them where), and newspaper announcements to write. Volunteers needed to be recruited for setup and the sale. Since it was our first one we overdid as new parents will.



Penny Morgan ready to sell some plants.

Pleasant Hill Farms grew 14 varieties of beautiful Palouse Prairie natives (from Jensen seed) accounting for 400 plants. Jacie allowed us to transplant some plants which were growing outside the plots at her farm. Chapter members planted seeds and divided their perennials—Thad Davis, Steve Flint, Maynard Fosberg, Trish Heekin, Ray and Bettie Hoff, Jacie Jensen, Nancy Miller, Gerry Queener, and Dave Skinner are on that first 2012 list and accounted for another 500 plants. In addition, Christine Nauman of Cricket’s Garden had a table with over 300 native plants for sale which were not counted in the total numbers or amounts. On setup day before the sale we packed the plants in and hoped for the best! It was a success! And we knew that a lot more native plants were growing on the Palouse!

The second year we visited Plants of the Wild in Tekoa, Washington to check their available plants and added more species—particularly some being grown from Jensen seed. More species meant more species display

signs to design, print and laminate. We tweaked the process, redid the new availability list, created more labels, recruited more volunteers to help with setup and publicity. Idaho Fish and Game provided some plants which were left over from restoration projects and the University of Idaho (UI) Nursery had some bareroot plants from their Arbor Day Sale. And thus we grew.



A happy customer.

The third year Pamela Pavek began her tenure as Plant Sale Chairperson. Her ‘get it done’ attitude, organizational skills, and specialized plant knowledge brought much to the 3rd, 4th, 5th and 6th sales. Her presentations to our chapter and other groups have gotten more people interested in growing natives. She has streamlined the sale processes considerably and gotten more volunteers involved. We tried a Friday members-only sale in 2016 to encourage more new members (and late membership renewals) and it worked. But we weren’t able to repeat the Friday sale in 2017 due to a time conflict at the 1912 Center. We will schedule our dates early now as having members come to the pre-sale cut down considerably on the congestion at the public sale. With Mother’s Day and UI and WSU graduations to factor in to the date calculation, there isn’t much leeway. And this year the UI Arboretum moved their sale to the same day as our White Pine Sale which gave us all goose bumps—but it was a win-win situation as more people were out looking for plants.

It has been great to have a wonderful group of volunteers—in addition to those helping customers at the sale, we’ve had very knowledgeable advisors and consultants, members willing to store supplies and equipment, write labels, design species and other signs, and especially manage the publicity to make the public aware of our sale and the benefits of growing native plants.

We usually do not have many leftover plants. Pat Mason takes any of hers back to sell to restoration projects. This year we did have some bareroot shrubs from the UI Nursery which are now potted, growing and looking for a winter home. Already some volunteers have seedlings

Continued on Page 3

White Pine Chapter Working Field Trip on Center Ridge

Photos and article by Nancy Miller, White Pine Chapter

On June 3, 10 members and friends of INPS White Pine Chapter accompanied Mike Hays of the Nez Perce and Clearwater National Forests for a day of pulling common crupina (*Crupina vulgaris*)—a noxious weed that threatens sites occupied by Spalding’s catchfly (*Silene spaldingii*), a federally listed Threatened plant species. Of course we also spent time identifying plants new to most of us, all while viewing some spectacular scenery.

Some participants came early from Moscow, others had stayed the night in Grangeville—all met up with Mike in Grangeville and we headed south on Highway 95. We then turned off onto the old Highway 95 and immediately onto FS Road 462. We traveled through some private forest areas and eventually made our way to our first stop—the Grave Point Lookout area.

We first checked an enclosure which is near the turnoff to the lookout. It seems to be a mystery as to why it’s there, but it gave us the opportunity to see some different plants and to discuss the differences between inside and outside the enclosure. Cattle grazing outside the enclosure definitely has affected this moist meadow at the forest edge. Tobacco root (*Valeriana edulis*) was one of the plants only seen inside the enclosure. One plant Mike identified and discussed was few-flowered shooting star (*Dodecatheon pulchellum*) which was blooming prolifically. He compared it to Cusick’s shooting star (*D. cusickii*) which is similar, but more typical of drier sites. In some areas of the forest such as Hog Meadow Creek you can see both species. We saw two violets—the dainty-looking (but tough) blue violet (*Viola adunca*) and the yellow-flowered, showier Nuttall’s violet (*V. nuttallii*). There were other discussions which got as botanical as one wanted—for example, the various species of potentilla—the different leaf shapes and arrangements and their variability even within a species which keeps botanists guessing. Cat’s ear (*Calochortus elegans*) were blooming everywhere, but broad-fruit mariposa



Balsamorhiza incana.

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(*C. nitidus*) was not blooming yet. Dwarf hesperochiron (*Hesperochiron pumilus*) was a new plant for most in the group.

Most vehicles made it up the rutted road to Grave Point Lookout—even the Tesla whose suspension had to be raised to make it (and it still may have scraped a little). From the lookout the views of the Snake River Canyon were very impressive. On the windswept rocky balds balsamroots with both flat and incised leaves were compared (sometimes with *Balsamorhiza incana* both types of leaves appear on the same plant—we didn’t feel so bad that sometimes the experts are confused). Several species of biscuit-root (*Lomatium* spp.) were pointed out and compared. Two larkspurs—*Delphinium depauperatum* and *D. nuttallianum* were discussed, as we would see both during the day. It was a strange place to see big sagebrush, but *Artemisia tridentata* (some say ssp. *vaseyana*) plants were in evidence.

Mike found one miniature flower of dwarf monkeyflower (*Diplacus nanus*) to show us. A locally endemic white composite, Engelmann’s daisy (*Erigeron engelmannii* var. *davisii*) was everywhere on the rocky slope—even in the two-track road—and was very photogenic when the wind died down enough for a photo-op. Other



Hesperochiron pumilus.

showy forbs included harsh paintbrush (*Castilleja hispida*, yellow), Fendler’s waterleaf (*Hydrophyllum fendleri*) with a larger ball head than ballhead waterleaf (*H. capitatum*), and a pink blooming sticky phlox (*Phlox viscida*). On the way down, a sighting of Brown’s peony (*Paeonia brownii*) was a treat for all, but especially those who had never seen it before.

We progressed south on the breaks to Center Ridge which is just north of Mud Springs Ridge (where one of the INPS 2016 annual meeting field trips took place). A lunch break was very welcome before starting the trek on the Center Ridge trail to the *Silene* location. Much of the way was through dry ponderosa pine habitat on a nar-



Center Ridge, north of Mud Springs Ridge.

row, dry, slippery trail. I believe it was longer (at least time-wise) than had been advertised. In compensation there were blooming lupines (*Lupinus* sp.), balsamroot, Douglas' triteleia (*Triteleia douglasii*) of the most intense purplish-blue I've ever seen, harsh paintbrush (reddish orange), delicate purple Jacob's ladder (*Polemonium* sp.), and death camas (*Zigadenus venenosus*). Eventually we came out on an open ridge with xeric blue-bunch wheatgrass grasslands interspersed with forbs (Idaho fescue was higher up in the moister ridge areas). We had been warned there would be an electric fence, but when we arrived it was not turned on. Mike discussed the history of the site and the politics of protecting the Threatened Spalding's catchfly. Below the trail the crupina was very thick in some areas, but it was sparse in the fenced area with the Spalding's catchfly. This Spalding's catchfly population was found in 2006 and at the time was very clean grasslands with only a few crupina plants.

We spread out across the ridge and moved up and across searching for crupina. It was generally about 6–7 inches high, light green, and with thin frilly leaves radiating from a central stock. We were trying to pull it before it grew several feet high and bloomed. The scenery here was grand, with snow-capped peaks to the east across the Salmon River Canyon. Below the trail, patches of greenish-gray curl-leaf mountain mahogany (*Cercocarpus ledifolius*) sat majestically on the steep hill among the rocks.

There remained the hike back to the vehicles. A few of us who walked more slowly reached the vehicles just before the faster walkers arrived as they had stayed to weed a bit longer. Time was running out, but most of us wanted to visit Cow Creek Saddle and see how it compared with last year in mid-June. At the saddle we didn't have to walk far from the vehicles as many forbs were in bloom, and most were different from what we'd seen

already on the trip. Even though this is a wind-swept saddle, the site is moister and the plants reflect that. Columbia lewisia (*Lewisia columbiana*) and sulphur buckwheat (*Eriogonum umbellatum*) on the rocky outcroppings; and Payette penstemon (*Penstemon payettensis*), sky rocket (*Ipomopsis aggregate*), silverleaf phacelia (*Phacelia hastata*), and varileaf phacelia (*P. heterophylla*) along the road cut. Lovely penstemon (*Penstemon elegantulus*), Cusick's paintbrush (*Castilleja cusickii*), and field chickweed (*Cerastium arvense*) were all in several areas. Thin-leaved owl's-clover (*Orthocarpus tenuifolius*), a good indicator for Spalding's catchfly in Idaho fescue grasslands, was another first time plant for some of the group.

Throughout the trip we remarked on how plants varied from usual appearances - perhaps because of the prior winter snow and very wet spring. Some plants looked to be on steroids and others were delayed in their flowering. This trip, as usual for one with Mike as leader, was a botanical and educational delight and a wonderful trip for photographers whether using long lenses or mobile phones.

Thanks to Charlotte Omoto, Susan Rounds, Reid and Nancy Miller, Penny Morgan and Steve Bunting, Molly and Dave Hallock and Mike's summer employee Jeremy and his partner Rebecca



Field trip leader, Mike Hays.

for their efforts. Special thanks to Mike Hays who always outperforms what we've come to expect of an outstanding field trip leader! •

Links

Field trip photos: <https://flic.kr/s/aHsm2Qas4z>

Flora associated with the field trip:

<https://flic.kr/s/aHsm2Xipj9>



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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 imperiled¹ 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*, *Vaccinium 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 cooperation 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



Zygodenus 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 unburned².

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/m²; 35.9 and 7.2 stems/m²; versus 20.9 vegetation and 0.5 reproductive stems/m² 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 m² 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 ef-



Tweedy's reedgrass response to mixed-severity fire.



Tweedy's reedgrass response to high-severity fire.



Tweedy's reedgrass on an unburned site.

fectively 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.

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. •

¹Critically 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.

²High-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 ex-



Mentzelia laevicaulis.

ploring 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.

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.

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*, *Fragaria 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*, *Castilleja 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.



Steve Love lying in a field of *Penstemon*.



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.

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.

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



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 com-



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

munity 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.

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



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

of the sagebrush steppe and the Idaho landscape." 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 public 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 teach-

ers 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



Bumblebee on blanket flower in the Sage Garden.

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.

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,

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

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



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

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.

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 sparsely 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. •



\$7.99



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

INPS Chapter News

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 post-card 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@cablone.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 Brunfeldt 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. •



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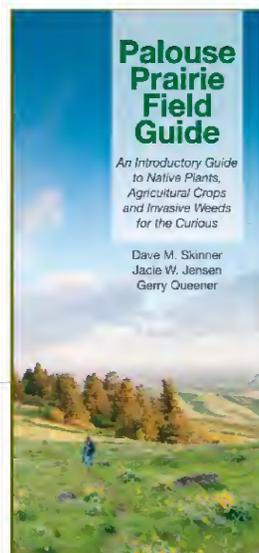
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I would prefer to receive *Sage Notes*: Print Electronic Both

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/>

Sage Notes is published quarterly by the Idaho Native Plant Society. Past issues can be viewed online at:
<https://idahonativeplants.org/sage-notes/>

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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Editor: Michael Mancuso,
sage-editor@idahonativeplants.org