

Kelseya

Newsletter of the Montana Native Plant Society



Kelseya uniflora
ill. by Bonnie Heidel

SMALL GRANT REPORT *Appraising the Crown Jewel*

By Jeff Copeland, Valley of Flowers Chapter



Burke Park, looking north across the Burke Park ridge top toward the Bridger Mountains.
Photo courtesy of Matt Lavin.

Burke Park, the crown jewel of Bozeman's parks, is located at the east end of the old town, just south of Main Street. Covering about 40 acres, the park consists of a portion of a north-south trending ridge and west-facing slope that continues south to the foothills of the Hyalite Mountains. An integral part of Bozeman's trail system and a beloved spot for viewing sunsets, the park is one of the few remaining — and by far most spectacular — native landscapes left within the city limits of Bozeman.

Obsidian tools still found on the site indicate the long span of human presence here. European settlers occupied the area starting in the late 1860s. Peet's Hill, as the area is still locally known, was named for John M. Peet, whose family ran a dairy on the property, which the city shut down after an outbreak of typhoid fever in Bozeman's water supply. The property was lightly used as a horse pasture for decades until the city purchased it in 1993.



Chapter Events

Calypso Chapter

Info: Catherine Cain at 498-6198, nativeplants@montana.com.

Saturday, August 11, 10:00 a.m. “Mountain Meadow Stroll” The subalpine meadows above Upper Branham Lake in the Tobacco Root range offer spectacular wildflower displays and boast three members of the gentian family (if our timing is right, we might find arctic gentian). The lake is accessed by an 11-mile drive on a road that is well-traveled but unpaved, with steep sections. The hike from Upper Branham Lake (9,510 feet) is a comfortable one-mile with switch-backs. If time permits, we may stop on the way back and botanize at the Smugglers Mine town site. At the end of the trip, we could also stop and admire Sheridan’s beautiful community garden — Jackson’s Garden. Meet at the USDA Service Center, south end of Sheridan. Please RSVP. Info: Elizabeth Bergstrom at 581-6571, dodecatheon16@gmail.com.

Clark Fork Chapter

Info: Anne Garde at 721-7627, anniegarde@yahoo.com.

July, date/time TDB. “Shoofly Meadows Research Natural Area.” Shoofly Meadows contains a complex of wetlands, including a rare-for-Montana peat moss (Sphagnum) riparium. We’ll tour the diverse wetland habitats and their varied flora, including waterlily, cottongrass, sundew, few-flowered spike-rush, small-leaved laurel and Labrador tea. We should be able to see a number of different butterflies as well. Bring water, lunch, footwear that can get wet, and your favorite insect repellent. Info: Clare at 728-0189, clare.beelman@gmail.com. Watch for date and time at www.mtnativeplants.org/Clark_Fork and facebook.com/MNPSClarkForkChapter/events.

September, date/time TDB. “Primm Meadow.” Often described as “cathedral-like,” Primm Meadow, situated in the Gold Creek drainage of the Blackfoot River on the Lolo National Forest, contains many ponderosa pine trees that are more than 500 years old. Currently owned and managed by The Nature Conservancy, you can see and touch a rich history of human presence here (Native American harvest of cambium and European homesteading, for example). Info: Clare at 728-0189, clare.beelman@gmail.com. Watch for date and time at www.mtnativeplants.org/Clark_Fork and facebook.com/MNPSClarkForkChapter/events.

Thursday, October 11, 7:00 p.m. “Flower Photos with the Camera in Your Pocket.” Many of us prefer to hike with a smaller, lighter camera, but often times the great picture you thought you took is not so great. Kristi DuBois will discuss the challenges of taking photos with your phone or small camera and provide some tips and tricks for close-ups. She’ll show you how these small cameras can really shine. Bring your camera or phone. Room L09, Gallagher Business Bldg., UM Campus.

Eastern At-Large

Info: Jennifer Lyman at 426-1227, jenclyman@gmail.com

Sunday, July 15, 9:00 a.m. “Ear Mountain Natural Area and Yeager Flats Hike.” This moderately difficult, five-mile round-trip hike passes through limber pine savannah, narrow-leaved cottonwood groves, sagebrush, Douglas-fir/Englemann spruce forest, a portion of the 2000 Ear Mountain fire, and ends up in a vast, high-elevation native fescue prairie. In these varied habitats grow a variety of shrubs, grasses, and forbs, including bitterroot and several orchid species. Clark’s nutcracker, chickadees, and other birds are common, and prairie falcons nest on cliff faces. This is also good mule deer, elk, mountain sheep, and black and grizzly bear country. A short portion of this hike is actually on the Old North Trail, so archaeology and history as well as Rocky Mountain Front geology, wildlife and management issues will be discussed. Meet at the Chateau Information Center parking lot at the north end of town on Highway 89, then drive to the Ear Mountain trailhead up the Teton River. This hike is co-sponsored by the Montana Wilderness Association. Register online at www.wildmontana.org/walks. Info: Dave at 466-2161.

Flathead Chapter

Info: Tara Carolin at 260-7533, mnps.flathead@gmail.com.

Sunday, July 15, 10:00 a.m. “Lost Trail National Wildlife Refuge.” Spalding’s catchfly is one of the rare plants we might see on this trip led by a botanist, ecologist, and a couple of wildlife biologists. Our leaders will help you appreciate the nuances of this unique vegetation and discover more. Meet at 9:00 a.m. behind Bojangles Diner, 275 Corporate Dr., Kalispell, in front of the Social Security and Montana Driver Services, or at 10:00 a.m. at the Lost Trail National Wildlife Refuge headquarters. Info: Rebecca Lawrence at 888-7836.

Kelsey Chapter

Info: Bob Person at 443-4678, thepersons@mcn.net.

Maka Flora Chapter

Info: Dave Branson, dhbranson@gmail.com.

Valley of Flowers Chapter

Info: Jeff Copeland at 539-6029, jouzelcopeland@gmail.com.

Saturday, July 7, 10:00 a.m. “Bridger Foothills Wildflowers.” The west-facing, open slopes of the Bridger Mountains are a riot of blooms in early summer, while moisture-loving plants flower more subtly in the canyon bottoms below. This three-mile walk includes a short but steep bushwhack. Bring water, lunch, and wear boots. We’ll start from the Truman Gulch trailhead. Meet at the north end of the old Kmart parking lot (across Oak St. from the Bozeman Walmart). Info: Gretchen at 586-8363, beesgrmt@gmail.com.

Saturday, July 14, 10:00 a.m. “Wild About Wildflowers.” Join botanist Ryan Quire for a stroll through lush wildflower displays in the meadows and open slopes of the Bridger Mountains. The Shaft House trail offers a diversity of plant species and spectacular views. This approximately five-mile hike is moderately strenuous, starting at 6,000 feet and climbing to 8,000. Bring water, lunch, and wear hiking boots. Meet at the north end of the old Kmart parking lot (across Oak St. from the Bozeman Walmart). Info: Ryan at (502) 330-8433, rquire@confluenceinc.com.

Western At-Large

Info: Pat McLeod at 295-4343, pat_mcleod@yahoo.com.

Saturday, July 7, 8:30 a.m. “St. Paul Lake.” Join botanist Peter Lesica to explore a trail in the Cabinet Mountain Wilderness. We expect to see crazy white Jacob’s ladder on a trail described as having a “rain forest” feel, including an abundance of moss and large-diameter trees. The hike to St. Paul Lake (4,780 feet), with Elephant Peak and St. Paul Peak towering above, is almost four miles, starting at 3,000 feet. Most of the elevation gain is in the second half of the hike, along with a challenging, bridge-less crossing of Isabella Creek. Bring water, lunch, appropriate clothing and footwear. Bear spray is recommended. Meet at the rest area near Troy, junction of Highways 2 and 56, to carpool. Otherwise, meet at the Kootenai National Forest Trail #646 at 9:30. Take Highway 58 to milepost 8, turn east onto FSR #407 and travel approximately 5.6 miles to FSR #407A, follow for 0.18 miles to the trailhead. RSVP appreciated to estimate group size. Info: Pat McLeod at 295-4343, pat_mcleod@yahoo.com.

WELCOME NEW MEMBERS

The Montana Native Plant Society welcomes the following new members:

Calypso Chapter

Renewing business lifetime member
Thomas J. Elpel, Hops Press

Clark Fork Chapter

Julia Duggan, Mary Hildebrandt, Rob and Sharon Holden, Christiane Holmquist, Patricia Petrilli, Mary LaPorte Rial, Rebecca Shoemaker, Israel Tockman, Mari Von Hoffman, Dana Warren, Vicki Watson and Elizabeth White

Eastern-At-Large

Sandra Abraham, Zoe Axhelm and Linda Todd

Flathead Chapter

Eric Dickinson and Emily Murphree

Kelsey Chapter

Anne Bauer, Teresa Hastings, Rennan Rieke, Brian Schrage and Klara Varga

Valley of Flowers Chapter

Wendy Roberts and Tamara Satterwhite

Western-At-Large

Denay Horn and Wildcraft by Nature

This year’s Annual Membership Meeting, recently held in Lincoln, MT, featured an evening talk about post-fire plant succession in central Montana by Wayne Phillips, and a bonanza of Saturday field trips. There were hikes through burned areas up to Lewis and Clark Pass and in the Copper Creek area; to wetlands and rare fen environments along Bear Creek, Kleinschmidt Lake and Indian Meadows near the Scapegoat Wilderness; and to alpine areas from Rogers Pass and to Red Mountain in the Bob Marshall Wilderness. There was also time to explore Lincoln’s new nine-acre community park, featuring the Sculpture in the Wild International Art Park with works by artists from Germany, Ireland, Denmark, Finland, Great Britain, and the United States. Look for stories and photos from these outings, as well as a roundup of other MNPS news, in the Fall issue of *Kelsey*.

MONTANA NATIVE PLANT SOCIETY

2018
Lincoln, MT

Poster by Dorothea Kast

Wildfires to Wildflowers



Iliamna rivularis
Mountain hollyhock



MNPS News

Does Montana Need a Statewide Rare Plant Strategy?

By Andrea Pipp, Kelsey Chapter

This was the discussion topic during the Montana Plant Conservation Conference, hosted by the Montana Native Plant Society last March. Montana's rare plants contribute to biodiversity, are a component of functioning ecosystems, and are an irreplaceable part of our natural heritage. In Montana, 351 plant taxa — about 12 percent of our flora — are recognized as Species of Concern (SOC) by the Montana Natural Heritage Program. A preliminary assessment of these SOC plants found that 91 taxa are globally rare and have at least one identified statewide threat caused by habitat loss, recreation, livestock grazing, road construction, invasive species encroachment, or another factor. At the same time, Montana has very few state laws or policies that address or protect rare plants, leaving conservation up to landowners or land management agencies. Montana Plant Conservation Conference participants agreed that Montana could benefit from a publication that guides rare plant conservation across the state.

Out of the conference discussion, we formed a working group whose members are: Andrea Pipp, Montana Natural Heritage Program botanist; Wendy Velman, Montana/Dakotas Bureau of Land Management state botanist; Steve Shelly, U.S. Forest Service Region 1 botanist; and Maria Mantas, botanist representing the Montana Native Plant Society. With funding from the Montana Native Plant Society, this team currently is pursuing Phase 1, which will lay the groundwork for researching, building a partnership, developing an outline, and seeking out funding sources. Colorado and New Mexico both have completed Statewide Rare Plant Conservation Strategies, and we have already held conversations with those authors to understand their process, learn from their successes, and anticipate where challenges may come. You can read about these strategies at http://www.cnhp.colostate.edu/download/documents/2009/CO_Plant_Conservation_Strategy_Report-



Above: *Astragalus ceramicus* var. *apus* (painted milkvetch) is known only from the upper Snake River Plains of southeast Idaho and adjacent Montana, where it is restricted to the Centennial Valley of Beaverhead County.

Left: *Penstemon angustifolius* (narrowleaf penstemon) Over a dozen, small extant and/or presumed extant occurrences are known in southeast Montana, plus a few historical collections from the same area.

Photos courtesy of Matt Lavin.

links.pdf and http://www.emnrd.state.nm.us/SFD/documents/NMRarePlantConsStrategy_Final_reduced.pdf.

We are now starting to assemble a collaboration that could include many federal, state, and tribal agencies; non-profit organizations; private companies; academia; and others entities that have a vested interest in rare plant conservation and management. Before the end of the year, we will prepare an outline that provides direction for

the partnership, identifies steps for creating a strategy, develops a budget, and identifies practical funding sources.

If we are successful with Phase 1, the partnership will raise funds (Phase 2) and write a strategy (Phase 3). The overarching goal is to have a statewide strategy that guides conservation efforts, increases awareness of rare plants, promotes education, and identifies research and conservation needs. Stay tuned as we keep you informed about this exciting process! 🌸

Andrea Pipp is Program Botanist with the Montana Natural Heritage Program.

President's Platform

Thinking About Plants and Fire

Last year's fire season seemed particularly rough in Montana. Wildfires burned over hundreds of thousands of acres, from the prairies of central Montana up to timberline in our western mountains. Many of us dealt with changing travel plans at the least, if not weeks of choking smoke, lost business, and concern for un-housed friends and neighbors. Fire ecologists tell us to expect more of the same in future years, as climate change drives more and fiercer fires. How might we, as fans of native plant communities, best think about and even take advantage of this phenomenon?

Post-fire, I believe it's completely appropriate to mourn what we've lost. A cherished landscape has been rendered a blackened moonscape. Yes, there will be lovely fireweed and arnica next year, but that's hardly the same as the wonderful density and diversity of life we appreciated in the past. And that diversity will likely not return in our lifetime.

At the same time, it helps to try to take a longer view. Headline writers love to wax hysterical – "XX thousand acres have been destroyed!!" No, the acres are still there, it's just the current plant matter that's been consumed. Plant communities will re-establish themselves, and diversity will increase. Taking an even longer view, changed climate may mean that completely new communities establish themselves in burned areas. We can watch for this. I monitor a couple of lower-elevation mountainsides that burned nearly 20 years ago. So far, my hypothesis that lower timberline is moving uphill more or less permanently has not been disproved.

Burned landscapes have a lot to offer, if we get out there and explore. Especially in areas that burned lightly, there's great biological richness. I was one of hundreds (thousands? tens



of thousands?) of Montanans who recently brought home an abundance of black morels from forests that burned last summer. I've also encountered a handsome elk calf tucked quietly into a burned hillside, and enormous new sediment deposits where denuded hillsides have eroded dramatically. Like other backcountry skiers, I've come to find satisfaction in traversing a forest of trees that are burned but standing. Shussing downhill over a network of stark, linear shadows is a hallucinatory experience, no drugs required.

What should the Montana Native Plant Society be doing vis-à-vis wildfire? This year's annual meeting, with its "Wildfires to Wildflowers" focus, is the perfect forum to educate ourselves and develop appreciation of the changes wrought by fire. This isn't the first Annual Meeting with this focus and it shouldn't be the last. Individual Chapters can also sponsor field trips with a casual or more scientific approach. For 10 years following the Yellowstone fires of 1988, the Valley of Flowers Chapter visited a specific burn there, censusing the plants that re-populated a particular area, for example.

In summary, wildfire can be deeply distressing but it has a lot to offer Montana naturalists. We just need to round up our friends, ask questions, and get out and explore!

— Gretchen Rupp



Alice Creek Fire smoke column, August 28, 2017, burning north of Lincoln in the Lewis and Clark National Forest. Photo courtesy US Forest Service



The grazing and other land uses apparently were not too detrimental to the vegetation or its recovery — a survey conducted from 2004 to 2006 by Montana State University Professor Matt Lavin and his graduate students Denise Culver and Tulli Kerstetter found that the Park harbored a rich flora of more than 270 vascular plant species, including a diversity of shrubs, perennial grasses, and forbs. The ridge top contains a remnant piece of mountain big sagebrush steppe that is representative of sagebrush habitat found throughout Southwestern Montana. The dominant shrubs include *Artemisia cana* ssp. *cana* (silver sagebrush) and *Artemisia tridentata* ssp. *vaseyana*, while the habitat can be classified following Mueggler and Stewart (1980) as the mountain big sagebrush and Idaho fescue (*Artemisia tridentata*/*Festuca idahoensis*) habitat type.

Although livestock are long gone, the wildflowers of Burke Park again are under threat — this time by a rapidly growing urban and suburban community — and use of the Park is sky-rocketing. Many fear it is being loved to death — at least the plants. Trampling by dogs and an increase in dog excrement, people and bikes straying off the trail, and the replacement of

native plants by exotic species following this disturbance are all causes of concern. Some of these issues have been addressed to varying degrees by the Parks Department. Fences were built to keep people on designated paths, but these were removed years ago; now signs suggest that people stay on trails and

not trample the flowers. Dogs are still allowed off-leash. The city sprayed herbicides on portions of Burke Park in 2012 and 2013 to control sulphur cinquefoil and other state-listed noxious weeds.

So, are the flowers disappearing? Burke Park has been surveyed for plant diversity since the middle 1990s. Beginning in 2004, Matt Lavin and another graduate student, Tim Seipel, established 15 permanent 50- by 10-meter plots. Within each plot they marked 15 randomized one-half by one-meter quadrats along a 50-meter transect. Among the data gathered for each quadrat was the canopy cover of each plant species. This sampling yielded 134 vascular plant species from the 15 plots located just along the park's ridge.

In 2013, MSU ecologists repeated the vegetation monitoring for Transects 1 through 7, which included Transects 1 through 4 in the area targeted with herbicides. In the summer of 2017, supported by a Montana Native Plant Society Small Grant, volunteers more permanently marked, accurately mapped, and replicated the monitoring methodology for Transects 1 through 10.

The simplest measure of plant diversity is species richness, an overall list of species found in a given area. Species abundance is

measured by counting how often a species is found, a measure of how rare or common a species is. This is done by counting how many quadrats a species is found in — occupancy. Changes in species richness and abundance over time reveal trends in the diversity of the plant community.



Liatris punctata. Photo courtesy of Matt Lavin.

**Many fear
the park is
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plants.**

However, these three snapshots in time, of a small portion of the area of concern, provide only a limited view of a natural landscape that is constantly changing. For this brief discussion, just the presence/absence data for the 100 quadrats of Transects 1 through 7 were examined. Even so, making sense of this limited data is daunting. A more in-depth exploration of changes in diversity and possible causes of decline will require the use of existing canopy-cover data not used in this discussion, more robust statistical modeling, and additional research.

Results

A preliminary examination of the data reveals an overall decline in biodiversity over 12 years, mainly the result of a decline in native perennial forbs — the beautiful plants with colorful flowers so loved by the public. While this decline was most pronounced in the northern transects that were sprayed with herbicides in 2012, the other quadrats also experienced a decline.

The monitoring conducted in 2005 found 83 plant species — 62 native, 21 non-native. By 2017, only 67 species were found — a decline of almost 20 percent — while native forbs declined by over 25 percent. Many species were found in fewer quadrats such that total occupancy fell overall by approximately 10 percent, from 1,186 in 2005 to 1,060 in 2017. Native forbs declined even more drastically — these species declined 23 percent in relative abundance, while occupancy of exotic forbs increased 14 percent.

The 2013 data showed how effective herbicides were with a drastic decline in forbs in the sprayed area. *Potentilla recta*, found in 10 quadrats in 2005, was only found in three by 2013. Although the

herbicides were spot-sprayed, the impacts to non-target species in the spray zone was significant. The big losers were the native forbs, declining by more than 25 percent. This includes a loss of 14 species, including *Fritillaria pudica*, *Besseyia wyomingensis* and *Helianthus rigida*. Many other native forbs were less common, including *Gaura coccinea*, *Liatris punctata* and *Solidago missouriensis*.

Even in 2017, four years after herbicide application, the sprayed quadrats had almost 30 percent fewer species of native forbs than were found in the original 2005 sample, while the other quadrats had a decline of 12 percent. The amount of bare ground is not increasing; rather, the quadrats in general are growing less diverse and fewer species are becoming more dominant. The winners are the exotic grasses and to a lesser degree the exotic annuals. Although trampling and the impact of increasing amounts of dog poop cannot be written off, it appears that exotic grasses are playing a role in the conversion of the plant community.

Exotic Grasses

Preliminary analysis of the Burke Park plant data show that while the native forbs were growing rarer, exotic grasses increased in occupancy by over 24 percent. Of the seven species of exotic grasses found in the study area — *Bromus inermis*, *B. tectorum*, *B. japonicus*, *Dactylis glomerata*, *Phleum pratense*, *Poa compressa* and *P. pratensis* — smooth brome (*Bromus inermis*) is the most likely to be correlated with a decline in other species. Smooth brome expanded from six quadrats in 2005 to 37 in 2017, an increase in occupancy greater than 500 percent! This means that a random quadrat in 2005, with high native plant diversity and lacking smooth brome, was by 2017 likely to show reduced levels of native plant diversity and a greater likelihood of being occupied by smooth brome. However, correlation does not necessarily mean causation. Did smooth brome displace the original species or merely move into an available niche? The ecologists involved in Burke Park research have yet to reach a consensus, although they do agree that smooth brome is persistent – and doesn't like company.

Montana Listed Noxious Weeds and Other Exotic Forbs

Although much of what is happening to the native plants in Burke Park remains unexplained, Montana Noxious Weeds cannot solely take the blame. *Potentilla recta*, found in 10 quadrats in 2005, by 2013 was only found in five quadrats, and by 2017 this had further declined to two occurrences. Canada thistle (*Cirsium arvense*) was found in five quadrats outside the spray zone in 2005, and hasn't been found since. Spotted knapweed (*Centaurea stoebe*) increased from four occurrences in 2005 to seven in 2017. If this plant spreads like wildfire, it is an extremely slow moving one.

Of course, other than the time, money, and herbicides spent on controlling them, Montana Noxious Weeds are not particularly special, compared to many of the other exotic plants already found

in Montana or on their way. For example, *Thesium arvense*, an herbaceous perennial from Eurasia, was detected in one quadrat in 2005. By 2017, it was recorded in six quadrats.

Land management decisions that protect native landscapes require good science-based guidance. How do we educate the public and public land managers to use the science available to preserve Burke Park before it becomes a field of smooth brome dotted with the occasional yellow bloom of the western salsify? 🌼

Jeff Copeland has been an environmental consultant for 20 years, focusing on weed management and vegetation monitoring. His partner on the MNPS Small Grant project was Jeannie Knox, with help from Matt Lavin; Tim Seipel, MSU Extension; Lisa Rew and Bruce Maxwell, Professors in LRES land resources and environmental sciences.



Thesium arvense (top) and *Bromus inermis* (bottom). Photos courtesy of Matt Lavin.



Numa Fen is north of and above Bowman Lake

Photos courtesy of Peter Lesica

Montana Peat Mosses

By Joe Elliott, Conservation Biology Research Corporation

Species of the genus *Sphagnum*, commonly called peat moss, are the most ecologically and economically important group of bryophytes. Their role in acidifying wetlands, thereby influencing the species composition of other plants [what other plants grow there], has been well established, and their potential role as indicators of climate change warrants looking closely at their distribution, species diversity, ecology, and conservation status.

The Montana Natural Heritage Program (MNHP) evaluates and tracks the status of plants and animals that are of elevated conservation concern. Twenty species of *Sphagnum* have been reported for Montana, of which 11 have been designated as Species of Concern (SOC) by the MNHP. The conservation status of SOC is based on factors such as rarity, restricted distribution, threats to populations, or losses in habitat.

Sphagnum, a mostly circumboreal genus, is restricted to cool, wet habitats of fens and other wetlands worldwide. In Montana, *Sphagnum* habitats include wetlands that accumulate peat (fens) and wet sites at margins of streams, springs, lakes, swamps, and marshes. Peat consists of partially decomposed plants that grow in Montana fens, where cold groundwater seeps to the surface. When biomass production of grasses, sedges, mosses, and other plants exceeds the rate of decomposition, peat accumulates at the rate of a few millimeters per year. Fens in Montana can have peat deposits more than five feet thick, indicating that they are thousands of years old. Peatlands are crucial habitat for many rare plants and animals (bog lemmings, for example) and are important globally as a factor in climate warming associated with the release of methane, a greenhouse gas. In Idaho, an estimated 10 to 15 percent of the state's rare flora is restricted to peatlands.

Habitats in Montana that support *Sphagnum* occupy a relatively tiny area of the landscape, with soils, vegetation, and hydrological conditions that differ from the surrounding forest or treeless alpine areas. In contrast, the arctic and northern boreal landscapes have extensive bogs and fens underlain by permafrost that support a diversity of peat moss species. About one-third of the forested areas of neighboring Alberta are covered by peatland. Centers of distribution of many Montana species are in the more northerly latitudes, with most of the Montana *Sphagnum* species near the southern extent of their range.

Sphagnum species are found in a range of wetland habitats; however, habitats with the greatest species richness of *Sphagnum* are fens. These wetlands harbor rare plants, including numerous mosses in addition to *Sphagnum*, and have complex ecologies associated with mineral nutrition, hydrology, and substrate chemistry. Studies have found that the occurrence of *Sphagnum* species is correlated with specific types of peatlands, based on nutrient gradients, pH, and hydrology. *Sphagnum* has the capacity to acidify the substrate by releasing hydrogen ions in exchange for calcium, magnesium, potassium, sodium and other cations. The spatial distribution of *Sphagnum* in peatlands is directed by gradients within the wetland environment, with many species occupying microsites along wet-to-dry gradients, nutrient gradients (closely correlated with pH), and the degree of exposure to sunlight.

Through modification of the pH of the wetland substrate, *Sphagnum* directs ecological succession in peatlands and affects the species composition of vascular plants and other mosses. Nutrient, pH, and moisture gradients associated with the micro-relief of peatland substrates contribute to the habitat diversity and

species richness of fen-growing vascular plants and other mosses, which often form unique plant communities.

Although Sphagnum is present at wetland sites other than fens, the most species-rich sites for Sphagnum are peatland habitats. The most species-rich Montana fens have eight species of Sphagnum. The peat mat at Fish Lake in Glacier National Park and the Purcell Fen, in the Purcell Mountains of extreme northwestern Montana, each has eight Sphagnum species.

Montana Sphagnum species, with the exception of *S. medocinum*, are circumboreal, occurring over a broad geographic range in North America and Eurasia. Because of the widespread distribution of most Montana species, there are few that are rare or imperiled on a global basis. Conversely, species considered narrow or regional endemics are at greater risk from threats to population viability. The only Montana Sphagnum that is a regional endemic is *S. mendocinum*. This species has been most frequently collected in Washington, Oregon, and British Columbia, with a few locations in Idaho and Montana.

Conservation rankings of Sphagnum may have increasing relevance in the context of climate change. Because most Montana Sphagnum species are at the southern edge of their distribution range, increases in temperature could stress populations, particularly at lower elevation, warmer habitats. Sites where Sphagnum currently grows likely will become drier and warmer, resulting in moisture stress and increased vulnerability to fire. Fire could directly and indirectly affect Sphagnum habitat.

Sphagnum species demonstrate habitat specificity, mostly being restricted to cool, moist fens and other wetlands that make up a very small part of the natural landscape. Increased temperatures associated with climate change would have the potential to melt mountain snow earlier in the season, increase evapotranspiration,



Cody Lake Fen in the Salish Range



Needles Fen near Mount Edith in the Belt Mountains

and increase the incidence and severity of fires. Although fires do not usually severely burn the wet substrates of wetlands harboring Sphagnum, they reduce vegetation cover and litter on slopes, increasing erosion and mass soil movement. Because fens and other wetlands often occupy the lower topographic positions on the landscape, they have the potential to collect runoff and sediment resulting from fires. This could smother the herbaceous layers of fens and other wetlands and substantially alter the substrate and water chemistry of Sphagnum habitats, rendering them unsuitable for some species.

Historically, large, high-intensity wildfires and logging have had the most potential to affect the quality of Sphagnum habitat by altering the overstory canopy and site hydrology. Roads built to facilitate access to timber, dating from the early 1900s, typically were constructed in drainage bottoms, in or adjacent to wetland habitats that harbor Sphagnum and associated vascular plant species. Currently

there are few roads being built and most timber harvest is associated with salvage after fires. Although traditional logging from stands of unburned timber has declined over recent decades, it is likely that timber harvest associated with fire will continue to become more common and widespread. Salvage logging operations that take place on burned areas vulnerable to soil erosion and mass movement would likely increase the potential for downslope movement of water with high concentrations of suspended sediments and ash, and thus would have the potential to adversely affect Sphagnum and other wetland species. 🌸

Joe Elliott is a retired ecological consultant with more than forty years' experience working on projects that affect natural resources in the western United States, Canada, Kenya, Ghana, Peru, and Bolivia. His work has been to gather and analyze biological information in compliance with environmental laws that address wetlands, endangered species, biodiversity, and environmental policy. He has studied with some renowned moss men and continues to be an aspiring bryologist.



Gardener's Notebook

Using Native Plants in Backyard Landscaping

[We hope to make this a regular feature in Kelsey, focusing on how to use Montana native plants in domestic landscapes. It seems only appropriate that our inaugural feature should be about hollyhock – the poster plant for this year's Annual Membership Meeting in Lincoln. If you have a story about using local native plants in your yard – successfully or not – or photos of your garden – please send them to me, Caroline Kurtz, at carokurtz@gmail.com. Tell us about what worked or what didn't, and why. Thank you!]

WILD HOLLYHOCK

[Adapted with permission from "The Magic of Montana Native Plants," by Sheila Morrison]

A perennial crowd-pleaser, wild hollyhock (*Iliamna rivularis*) reaches three to five feet tall, has big, maple-like leaves, and showy wands of shell-pink flowers that bloom in mid-summer. In a good spot, this native hollyhock is also long-lived. Although it is not "supposed to" germinate without having gone through a wildfire, in fact it sometimes does reseed itself in a garden. Also called mountain hollyhock, *I. rivularis* grows more at moderate elevations than high in the mountains.

Its native habitat is deep soils by stream banks, or even in disturbed sites of foothills and mountains. It is uncommon east of the Continental Divide. If you want to start from seed indoors, the seeds need to be scarified. They then need two weeks of cold treatment, followed by germination within two weeks at 70 degrees.

Or, if you prefer to plant outdoors in the early spring, nick the seeds as above and plant immediately, barely covering the seed. An occasional seed will germinate without being nicked, by planting in the fall. However, much better germination is achieved by nicking and planting in springtime. In the wild, this is a plant that primarily depends on wildfire to penetrate the seed coat to allow germination.

You will need sandy loam soils with good drainage; wild hollyhock likes full sun to partial shade and adequate water. The amount given to an average lawn should be enough if planted in partial shade, though it will tolerate more than that. In full sun, of course, increased water is necessary.

Iliamna rivularis
The moist montane setting, tall stature, rose to pink petals, and capitate stigmas combine to distinguish this monotypic genus in the Malvaceae.

Photos courtesy of Matt Lavin.



MNPS Chapters and the Areas They Serve

CALYPSO CHAPTER - Beaverhead, Madison, Deer Lodge, and Silver Bow Counties; southwestern Montana

CLARK FORK CHAPTER - Lake, Mineral, Missoula, Powell, and Ravalli Counties

FLATHEAD CHAPTER - Flathead and Lake Counties plus Glacier National Park

KELSEY CHAPTER - Lewis & Clark, Jefferson, and Broadwater Counties

MAKA FLORA CHAPTER - Richland, Roosevelt, McCone, Sheridan, and Daniels Counties

VALLEY OF FLOWERS CHAPTER - Gallatin, Park, and Sweet Grass Counties plus Yellowstone National Park

All MNPS chapters welcome members from areas other than those indicated. Alternatively, you may choose to be a member At-Large. We've listed counties just to give you some idea of what part of the state is served by each chapter. Watch for meeting announcements in your local newspaper. Ten paid members are required for a chapter to be eligible for acceptance in MNPS.

Moving? Please notify us promptly of address changes at mtnativeplantmembership@gmail.com.

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About Montana Native Plant Society

The Montana Native Plant Society (MNPS) is a 501(c)(3) not-for-profit corporation chartered for the purpose of preserving, conserving, and studying the native plants and plant communities of Montana, and educating the public about the value of our native flora. Contributions to MNPS are tax deductible, and may be designated for a specific project or chapter, for the Small Grants fund, or the general operating fund.

Your yearly membership fee includes a subscription to *Kelsey*, the quarterly newsletter of MNPS. We welcome your articles, field trip reports, book review, or anything that relates to native plants or the Society. Please include a line or two of "bio" information with each article. Drawings should be in black ink or a good quality photocopy. All items should be emailed to: carokurtz@gmail.com or mailed to *Kelsey* Editor, 645 Beverly Avenue, Missoula, MT, 59801.

Changes of address and inquiries about membership should be sent to MNPS Membership, 398 Jeffers Road, Ennis, MT 59729. Advertising space is available in each issue at \$5/column inch. Ads must be camera-ready and must meet the guidelines set by the Board of Directors for suitable subject matter; that is, be related in some way to native plants or the interests of MNPS members.

The deadline for each issue is Fall–September 10; Winter–December 10; Spring–March 10; Field Trip Guide–April 10; Summer–June 10. Please send web items to our webmaster concurrent with these dates.

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For Facebook posts, contact Clare Beelman at: clare.beelman@gmail.com**

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