



Castilleja linariifolia

# Castilleja

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## The Endangered Species Act at 40: a Hundred Reasons to Celebrate

By Bonnie Heidel, Wyoming Natural Diversity Database

*(The Endangered Species Act has shaped public perception of plant conservation and of the botany profession in Wyoming. The influence of the Act remains widespread even though there are just four Threatened and Endangered plants in the state.)*

The Endangered Species Act (ESA) turns 40 on December 28 this year, an anniversary with over 100 resounding reasons to celebrate. By unofficial tallies, there have been 105 vascular plant species in Wyoming that were proposed for review or listing, but 99 of them did *not* need protections of the ESA as Threatened, Endangered, or Candidate (Table 1). As we celebrate four decades of the ESA, we recognize those plants that are protected, the 99 other plants that did not become wards of the ESA, and the people who ensure(d) these species' place on the Wyoming landscape.

Wyoming's first list of rare plant species was prepared for the Natural Resource Conservation Service (Kimsey 1976), based on the nationwide list of the Smithsonian Institution (1975) and its publication later in the Federal Register for ESA consideration (USDI Fish & Wildlife Service 1975). It was expanded by Dorn (1977) in an appendix as part of the first complete state flora. For the next 20 years, there was a stiff pace of field surveys to document what was truly rare. At the same time, a series of species lists appeared in the Federal Register, called "notices of review of plant taxa for listing as Endangered or Threatened species."

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Above: Clustered lady's-slipper (*Cypripedium fasciculatum*) was first flagged for ESA status review in 1982, later designated sensitive by the U.S. Forest Service (1994, 2002) and a Wyoming Species of Concern. It is currently a Species of Local Concern on Medicine Bow Natl. Forest and on the Wyoming watch list. It is often found in low numbers but now known from 64 townships in Albany and Carbon cos., WY and other states. Photo by Ben Legler.

In 1996, the species review lists ended, by which time 58 of the 99 species had been dropped from consideration whether by reason of data showing them to be more abundant or widespread than previously known (48 species); or else taxonomic results documenting they were not distinct taxa meeting the ESA definition of "species" (10 species). Of the remaining 41 species, many were designated sensitive by the Bureau of Land Management (USDI BLM 2010), or designated sensitive by the Forest Service (USDA FS 1994, 2013). Agency efforts generally precluded needs to list sensitive species. We can celebrate the success of rare plant species management through sensitive species policies rather than through ESA regulations. (Cont. p. 5)



## WYNPS News

**RENEW AND CAST YOUR VOTES:** Enclosed is your ballot for 2014 Board elections and By-Laws votes, accompanying the 2014 membership renewal form (see *President's Message*). Vote for both by 24 Jan. (mail, or email sent to [amb749@yahoo.com](mailto:amb749@yahoo.com)). Every member is encouraged to VOTE.

**ONCE IN A BLUE MOON:** At the 2013 annual meeting, members endorsed Board action to raise the annual dues. This is linked to unfolding Board plans to enable members to renew on-line (using PayPal) and to vote on-line (these features will be available on our website in the near future). Starting on January 1st the annual dues for 2014 will be \$10, marking only the third time in the 33-year history of Wyoming Native Plant Society that dues have increased. ...A Bargain!

**2014 ANNUAL MEETING:** We will gather at the Sweetwater River in southern Fremont County next summer. Watch for more information online and in the next newsletter.

**SCHOLARSHIP/GRANT ANNOUNCEMENT:** See the enclosed call for proposals, also posted on-line. Submittals can be mailed or electronic, due 15 Feb.

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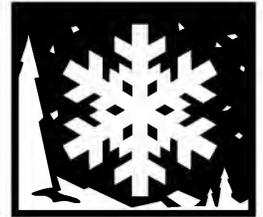
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**Treasurer's Report:** Balance as of 20 November 2013: Scholarship = \$1,463; General = \$5,789; Total = \$7,252.

**NEW MEMBERS:** Please welcome the following new members to WYNPS: Barbara Ertter, Boise, ID; Daniel Hein, Cross Plains, WI; William Lauenroth and Indy Burke, Laramie; Robert Schaffarzick, Kemmerer.



### PRESIDENT'S MESSAGE

I was visiting my mom at the local nursing home yesterday, when I was greeted by an elderly gentleman. We briefly discussed the short day length, and I, ever the optimist, mentioned that soon the days will get longer again. His rejoinder: As the days begin to lengthen, the cold begins to strengthen. I guess I knew that, but here you have it in unforgettable rhyme.

Shortening days and lengthening nights mean many things to many critters—time to hibernate (I certainly feel that way), time to increase the concentration of proteins and sugars in the sap (happens to me unintentionally), time to migrate (don't I wish!). Short days also mean **Time To Renew Your WYNPS Membership and Vote for Officers**. This time, there are also a number of by-law changes to consider. The WYNPS Board recommends all of the changes; you may vote to accept all at once, or reject them one by one, but please vote! A copy of the current by-laws is available on our website.

This is also a good time to look forward to spring, and next summer's WYNPS annual meeting. I look forward to seeing everyone there for some great botanizing! As always, your comments and suggestions are welcome. Please feel to contact me at any time. Enjoy the winter!

*Dorothy*

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## Bryophyte Flora of the Medicine Bow National Forest

By Yelena I. Kosovich-Anderson

Conservation of biodiversity is a goal of many national lands throughout the world. National forests of Wyoming are in the high country of the Rocky Mountains, harboring some of the greatest topographic relief, wettest climates and geological complexity of federal lands in the state, all of which favor bryophyte diversity. My study area encompasses the Medicine Bow National Forest (MBNF). Although the vascular plant flora of the MBNF is well known (e.g., Lukas et al. 2012, Nelson 1984), until now, basic floristic information on the bryophytes (mosses and liverworts) was scarce. Bryophytes are integral parts of Wyoming biodiversity, vegetation and ecological processes.

### Did you know?

The bryophyte flora of the MBNF has been unevenly documented. The portion of the Forest within Albany County has been better collected due to a number of unique landforms (e.g., peaks of the Snowy Range) that attracted researchers, and also due to its proximity to the University of Wyoming (UW) with its Rocky Mountain Herbarium (RM). The first bryophyte collecting in the MBNF was by A. Nelson in the late 19<sup>th</sup> century, later expanded by C.L. Porter in the 1930s and F.J. Hermann in the 1960s-1970s. Their collecting efforts resulted in the first publications citing bryophyte species from within the modern borders of the MBNF. The history of early bryological research in the MBNF also includes the outstanding names of T.C. Frye, L.N. Goodding, E. Lawton, and W.G. Solheim, whose bryological “trophies” contained some interesting liverworts and a number of uncommon mosses. During the 1980-90s, bryology experts from the leading institutions of the eastern part of the United States were attracted to Wyoming (W.R. Buck, P.M. Eckel, N.G. Miller, W.D. Reese and others), however, their field research was very limited. At the beginning of my research, many sections of the MBNF remained totally unexplored bryologically and the label information for many species was sketchy.

The Markow Grant of Wyoming Native Plant Society (WYNPS) has enabled me to complete an extensive bryophyte inventory of the MBNF, my long-term project. The study area spans about 1,000,000 acres (1550 mi<sup>2</sup>) ranging in elevation from 6,500 to 12,000 ft. (approx. 2000-3650 m). Grant funds were used to conduct field work in the least-explored areas of the Forest to expand the species list and broaden

information on species distribution and ecology. The alpine bryophyte flora was of special interest because it was the most poorly known in the state. Five extended collecting trips were made from June through October of 2013, resulting in about 800 voucher bryophyte specimens. The habitats of each species were carefully labeled, and each specimen was provided with detailed Global Positioning System (GPS) data.

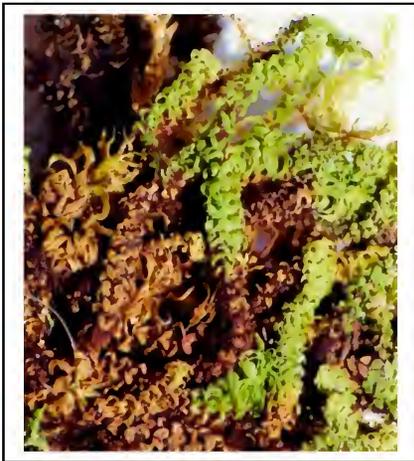


Above: Spore-bearing capsules of leafy liverworts. Liverworts were the most incompletely documented segment of the MBNF bryophyte flora. Photo by Y.I. Kosovich-Anderson.

I initiated bryophyte inventory of MBNF in 2004 under the auspices of the Junior Faculty Development Program, funded by the U.S. Department of State while visiting the Botany Department (UW). Inventory continued independently from 2007 to present (Kosovich-Anderson 2007, 2008; Kosovich-Anderson & Anderson 2009). The first annotated checklist of bryophytes of the MBNF is under preparation, based on microscopic identification of approximately 6,000 of my specimens (including 2013 collections) from more than 300 MBNF sites across the Medicine Bow Mountains, Pole Mountain, Laramie Range, Sierra Madre and their foothills.

The preliminary number of bryophyte species that I have recorded in the MBNF is 230-240, which constitutes about 60-70 % of the known bryophyte flora of Wyoming. Bryophytes are abundant in many types of montane and subalpine fens, especially in peatlands (e.g., *Aulacomnium palustre*, *Sarmentypnum exannulatum*, *Sphagnum warnstorffii*, etc.). In rocky streamsides, north exposures of granite cliffs and boulders are commonly covered by immense pure carpets of *Hypnum revolutum*, occasionally mixed with *Syntrichia ruralis* and *Orthotrichum* spp.; rocks

submerged in creeks are frequently overgrown by mosses from the genera *Fontinalis*, *Hygrohypnum* and *Schistidium*. The largest bryophyte diversity was in wet old-growth subalpine *Picea engelmannii* and *Abies lasiocarpa* forests and their transition zone to alpine tundra. In these communities, bryophytes can be found in a great variety of microhabitats: on soil and duff (*Brachythecium* spp., *Mnium arizonicum*, *Polytrichum juniperinum*, *Sanionia uncinata*, *Syntrichia ruralis*), shaded rotten logs, old stumps and exposed bare roots of trees (*Amblystegium serpens*, *Dicranoweisia crispula*, *Pohlia nutans*, *Lophozia* spp.), in forest seeps, brooks, and snow-melt streamlets (*Marchantia alpestris*, *Brachythecium rivulare*, *Sciuro-hypnum latifolium*, *Philonotis fontana*, etc.), on shaded surfaces of boulders, debris and outcrops of different origin, under the canopy of trees (*Grimmia*, *Hypnum*, *Orthotrichum*, and *Syntrichia*).



Above: *Paludella squarrosa* is a regionally rare species documented in MBNF subalpine fens. This beautiful moss can be recognized in the field by its remarkable squarrose-recurved leaves. Photo by Belinda Lo.

I found that *Paludella squarrosa*, recognized as rare in both Colorado and Montana, occurs in subalpine fens of the Medicine Bow Mountains, and sporadically elsewhere in the state. I did not find any new populations of *Sphagnum jensenii*, that I previously documented as a state record (Andrus & Kosovich-Anderson 2011), supporting the case for recognizing it as a rare species in the state. The forthcoming checklist of the MBNF bryophytes will contain similar surprises...

Upon completion of specimen processing and identification and subsequent publication of the full version of the annotated checklist / conspectus of the bryophyte flora of the MBNF, voucher collections will be transferred to the Rocky Mountain Herbarium

where my bryophyte specimens from all across Wyoming are being added to the on-line database (Rocky Mountain Herbarium 2008). The information on common and rare bryophyte taxa can be used by botanists, ecologists, and the general public throughout Wyoming in plant conservation programs, vegetation sampling and monitoring, and exploring these miniature wonders of Wyoming.

(Editor's note: *Yelena Kosovich-Anderson is Wyoming's only botanist to focus on bryophytes, and was recipient of the 2013 Markow Grant. Right: The author with one of the largest MBNF mosses, Sarmientypnum exannulatum.*)



### Acknowledgements

I am grateful to Wyoming Native Plant Society for financial support of the concluding stage of this collecting project. Special thanks go to Ronald D. Anderson who, as always, shared challenges of the expedition life in the remote corners of Wyoming.

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The Endangered Species Act at 40, cont. from p. 1

Wyoming Native Plant Society was an active participant in the species status discussions, organizing regular Wyoming Rare Plant Workshops to go over the latest status information on the rarest species, rotating the workshop around the state, most recently held in 2002. About that time, the botanical dialogue and churning process of list reviews ramped up for agency sensitive species lists while tapering off for ESA, underscoring the place of agency lists and of institutions that build and maintain species information (Rocky Mountain Herbarium and Wyoming Natural Diversity Database). Lawsuits still happened under the ESA, including a “batch lawsuit” that petitioned the listing of the 206 unprotected species ranked most globally imperiled in midwestern and western states. Most Wyoming plant species petitioned in this set were on species review lists on or before 1996 (Table 1), and only the *Boechnera pusilla* was found warranted for listing.

Each of the plants in Table 1 has a story behind it. Information about Wyoming’s current Threatened and Endangered plant species can be found on the U.S. Fish & Wildlife Service – WY Ecological Services homepage (<http://www.fws.gov/wyominges/>). They are also represented with all state species of concern on the Wyoming Natural Diversity Database homepage (<http://www.uwyo.edu/wyndd/>) and by the on-line specimen database of the Rocky Mountain Herbarium (<http://www.rmh.uwyo.edu/>).

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Table 1. Wyoming Vascular Plant Species in the Federal Register Under Endangered Species Act <sup>1</sup>

Current ESA Status	Review status by or before 1996	Plant Name (generally Dorn 2001)	Plant Name Synonym as it appeared in Federal Register (if different from Dorn)
	C2	<i>Abronia</i>	
	3C	<i>Achnatherum contracta</i>	<i>Oryzopsis hymenoides</i> var. <i>contracta</i>
	3C	<i>Achnatherum swallenii</i>	<i>Oryzopsis swallenii</i>
	C2	<i>Agrostis rossiae</i>	
	C2	<i>Aletes humilis</i>	
	C2	<i>Antennaria arcuata</i>	
	3C	<i>Antennaria aromatica</i>	
	3C	<i>Aquilegia jonesii</i>	
	C2	<i>Aquilegia laramiensis</i>	
	C2	<i>Artemisia biennis</i> var. <i>diffusa</i>	
	3C	<i>Artemisia porteri</i>	
	C2	<i>Asclepias uncialis</i>	
	3C	<i>Astragalus barrii</i>	
	3C	<i>Astragalus drabelliformis</i>	
	C2	<i>Astragalus gilviflorus</i> var. <i>purpureus</i>	
	C2	<i>Astragalus jejunus</i> var. <i>articulatus</i>	
	C2	<i>Astragalus paysonii</i>	
	C2	<i>Astragalus proimanthus</i>	

<sup>1</sup> The list includes all vascular plant species of Wyoming that appeared in the Federal Register, excluding those that were falsely reported for Wyoming, as compiled by Wyoming Natural Diversity Database staff over time. Under the Act at present, the term “Candidate” refers to species for which the Service has sufficient information on biological vulnerability and threats(s) to support proposals to list them as endangered or threatened species, but the rules have not yet been issued because the action is precluded by other listing activity. However, up to 1996, the term “Candidate” included many species placed in “Category 2” as taxa for which information indicated that proposing to list as endangered or threatened was possibly appropriate, but for which sufficient data on biological vulnerability and threat were not available to support proposed rules. This use of the Category 2 term and the review process were discontinued.

Current ESA Status	Review status by or before 1996	Plant Name (generally Dorn 2001)	Plant Name Synonym as it appeared in Federal Register (if different from Dorn)
	3C	<i>Astragalus shultziorum</i>	
	3C	<i>Boechea</i>	<i>Arabis</i>
	3C	<i>Boechea demissa</i> var. <i>languida</i>	<i>Arabis demissa</i> var. <i>languida</i>
	3C	<i>Boechea demissa</i> var. <i>russeola</i>	<i>Arabis demissa</i> var. <i>russeola</i>
Candidate	C1	<i>Boechea pusilla</i>	<i>Arabis pusilla</i>
	3C	<i>Boechea williamsii</i> var.	<i>Arabis williamsii</i>
	C2	<i>Botrychium ascendens</i>	
	3C	<i>Botrychium crenulatum</i>	
Listing petition denied	not known from WY in 1996	<i>Botrychium lineare</i>	
	3C	<i>Chamaechaenactis scaposa</i>	
	C2	<i>Cirsium aridum</i>	
	C2	<i>Cirsium ownbeyi</i>	
	3C	<i>Claytonia macrorhiza</i>	<i>Claytonia bellidifolia</i>
	C2	<i>Cleome multicaulis</i>	
	3C	<i>Cryptantha</i>	
	3C	<i>Cryptantha stricta</i>	
	3C	<i>Cryptantha subcapitata</i>	
	C2	<i>Cuscuta plattensis</i>	
	3C	<i>Cymopterus evertii</i>	
	3C	<i>Cymopterus williamsii</i>	
	C2	<i>Cypripedium fasciculatum</i>	
	3C	<i>Cypripedium montanum</i>	
	C2	<i>Descurainia torulosa</i>	
	3C	<i>Draba juniperina</i>	
	C2	<i>Draba pectinipila</i>	
	3C	[ <i>Draba porsildii</i> ]	<i>Draba nivalis</i> var. <i>brevicula</i>
	3C	<i>Erigeron allocotus</i>	
	3C	<i>Erigeron ochroleucus</i> var. <i>ochroleucus</i>	
	C2	<i>Eriogonum brevicale</i> var. <i>canum</i>	<i>Eriogonum lagopus</i>
	C2	<i>Festuca hallii</i>	
Threatened	C1	<i>Gaura neomexicana</i> var. <i>coloradensis</i>	<i>Gaura neomexicana</i> ssp. <i>coloradensis</i>
	3C	<i>Halimobolus virgata</i>	
	C2	<i>Ipomopsis aggregata</i> var. <i>weberi</i>	

Current ESA Status	Review status by or before 1996	Plant Name (generally Dorn 2001)	Plant Name Synonym as it appeared in Federal Register (if different from Dorn)
	C2	<i>Ipomopsis spicata</i> var. <i>robruthii</i>	
	C2	<i>Lepidium integrifolium</i>	
	3C	<i>Lesquerella carinata</i>	
	3C	<i>Lesquerella fremontii</i>	
	C2	<i>Lesquerella macrocarpa</i>	
	C2	<i>Lesquerella paysonii</i>	
	3C	<i>Loefligia squarrosa</i> var.	
	3C	<i>Lomatium attenuatum</i>	
	3C	<i>Mertensia viridis</i> var. <i>dilatata</i>	
	3C	<i>Oxytropis besseyi</i> var. <i>obnapiformis</i>	
	3C	<i>Parrya nudicaulis</i>	
	3C	<i>Parthenium alpinum</i>	
	3C	<i>Penstemon absarokensis</i>	
	C2	<i>Penstemon acaulis</i>	
	C2	<i>Penstemon caryi</i>	
	C2	<i>Penstemon gibbensii</i>	
Endangered	not known from WY in 1996	<i>Penstemon haydenii</i>	
	3C	<i>Penstemon paysoniorum</i>	
	3C	<i>Phacelia salina</i>	
	3C	<i>Phacelia scopulina</i>	
	3C	<i>Phippsia algida</i>	
	3C	<i>Phlox opalensis</i>	
	3C	<i>Phlox pungens</i>	
	3C	<i>Physaria condensata</i>	
	C2	<i>Physaria dornii</i>	
	C2	<i>Physaria eburniflora</i>	
	C2	<i>Physaria saximontana</i> var. <i>saximontana</i>	
Candidate	not considered in 1996	<i>Pinus albicaulis</i>	
	C2	<i>Pyrrocoma carthamoides</i> var. <i>subsquarrosa</i>	<i>Haplopappus carthamoides</i> var.
	C2	<i>Rorippa calycina</i>	
	3C	<i>Saussurea weberi</i>	
	C2	<i>Shoshonea pulvinata</i>	

Current ESA Status	Review status by or before 1996	Plant Name (generally Dorn 2001)	Plant Name Synonym as it appeared in Federal Register (if different from Dorn)
	3C	<i>Sidalcea candida</i>	
	3C	<i>Sisyrinchium pallidum</i>	
	C2	<i>Sphaeromeria simplex</i>	
Threatened	Threatened	<i>Spiranthes diluvialis</i>	
	3C	<i>Sullivantia hapemani</i>	
	3C	<i>Symphotrichum molle</i>	<i>Aster mollis</i>
	C2	<i>Thelesperma caespitosum</i>	
	C2	<i>Thelesperma pubescens</i>	
	C2	<i>Townsendia microcephala</i>	
	3C	<i>Townsendia spathulata</i>	
	C2	<i>Trifolium barnebyi</i>	
Threatened	C2	<i>Yermo xanthocephalus</i>	
	3B	[ <i>Boechera microphylla?</i> Hybrid?]	<i>Arnica fruticosa</i>
	3B	[ <i>Arnica cordifolia</i> ]	<i>Arnica</i>
	3B	[misidentified: <i>Carex macloviana</i> ]	<i>Carex arapahoensis</i>
	3B	[ <i>Carex microptera</i> ]	<i>Carex microptera</i>
	3B	[ <i>Claytonia lanceolata</i> ]	<i>Claytonia lanceolata</i> var. <i>flava</i>
	3B	[Invalid taxon]	<i>Erigeron</i> sp.
	3B	[ <i>Physaria integrifolia</i> ]	<i>Physaria integrifolia</i> var. <i>monticola</i>
	3B	[ <i>Pyrrocoma uniflora</i> ]	<i>Haplopappus contractus</i>
	3B	[ <i>Stanleya pinnata</i> ]	<i>Stanleya pinnata</i> var.
	3B	[ <i>Tofieldia glutinosa</i> var. <i>montana</i> ]	<i>Tofieldia glutinosa</i> ssp. <i>montana</i>



Above: Narrowleaf moonwort (*Botrychium lineare*) was petitioned for listing in 1999, recognized as a candidate for listing in 2001, and discovered in South Dakota and Wyoming for the first times in 2003 (Black Hills National Forest). Finally, in 2007, it was removed from Candidate status by which time it had been documented in two more new states and two additional provinces. As a former Candidate species, it remains on the sensitive list of the U.S. Forest Service. Photo by Ben Legler.



just look at lots of pretty pictures. [Go Orchids](http://goorchids.northamericanorchidcenter.org/) is a tool to explore orchids native to the U.S. and Canada.

[Go Orchids](http://goorchids.northamericanorchidcenter.org/) will initially focus on orchids in New England and the mid-Atlantic region. Orchids of the southeast and Alaska will be added early in 2014. This site will be similar to [Go Botany](http://www.newenglandwildflowersociety.org/), developed by the New England Wild Flower Society and will eventually include all of the orchid species in the U.S. and Canada. [Go Orchids](http://goorchids.northamericanorchidcenter.org/) has been developed to interact across a variety of platforms, including smart phones and tablets. ...Check out Amerorchis!

## Go Orchids Interactive Website Has Launched

More than half of North America's orchids are threatened or endangered somewhere in their native range. The North American Orchid Conservation Center (NAOCC) just launched [Go Orchids](http://goorchids.northamericanorchidcenter.org/) <<http://goorchids.northamericanorchidcenter.org/>>, a searchable database where users can see which ones are in danger, find the orchids nearest them.or

## Growing Native Plants

### Part 10. Short Perennial Forbs

By Robert Dorn

Short perennial forbs are used mostly in front of taller forbs in flower beds or sometimes in a flower bed of their own. They are also suitable for small planters or pots. To see the following five examples in color, go to the Society website.

*Abronia fragrans*, Sand verbena, grows to 6 inches tall with several stems spreading from a central base and then turning up. The spread can be 2 feet or more in var. *fragrans* but more compact in var. *elliptica* (sometimes treated as a separate species, *Abronia elliptica*). The leaves are up to 3 inches long and half as wide. The flowers are white to pinkish, to 1 inch long, in dense rounded clusters up to 4 inches across, and fragrant. They fully open in the evening but partly close by late morning if in the sun. They bloom for a relatively long period between June and early September. The plants occur naturally in sandy or gravelly soils in the plains and basins, var. *fragrans* in the eastern third of Wyoming and var. *elliptica* in the western two-thirds sometimes on clay soils. They prefer full sun and well drained, sandy or



*Abronia fragrans*, Goshen County

gravelly soil. Small plants can be transplanted. They can also be grown from rootstock cuttings and seeds. Sow seed outdoors in fall. If spring sown, first scarify the seed or soak in water for 8 hours. Seed is commercially available.

*Callirhoe involucrata*, Purple Poppymallow or Winecup, is a sprawling plant up to 12 inches tall but usually much less. The stems can spread up to 4 feet or more from the center of the plant which has a very large, deep taproot. The leaves are deeply lobed, to 2 inches long and slightly wider. The flowers are rose to purple, cupped, up to 2.5 inches across, and solitary in the upper leaf axils. Blooming is from May to September. The plants occur naturally on dry plains.



*Callirhoe involucrata*, Goshen County

They prefer full sun and well drained soils but will tolerate clay. They are drought tolerant once established. They can be grown from seed sown on the surface and kept moist. Sow in the fall or early spring. The seed may need to be scarified before planting. Transplanting of established plants is very difficult. Plants usually bloom the second year after growing from seed. There are several cultivars in the nursery trade.

*Campanula rotundifolia*, Harebell, is a short-lived perennial with one to several stems to 18 inches tall and 12 inches wide. The leaves are mostly to 3.5 inches long and 0.5 inch wide. Basal leaves are broader but wither early. The flowers are blue to blue-purple, nodding, bell shaped, up to 1 inch long, and one to few at the stem tip. Blooming is from June to September. The plants occur naturally in open woods and meadows in the high basins, valleys, and mountains. They prefer full sun to light shade and moist rich soil. They can be grown from spring divisions or from seed. Surface sow to allow some light exposure. There are many cultivars in the nursery trade.



*Campanula rotundifolia*, Carbon County

*Phlox andicola*, Plains Phlox, is one of many similar Phlox species. It forms loose, rounded mats up to 4 inches high and 8 inches across. The leaves are very narrow and up to 1.25 inches long. The flowers are white or rarely lavender, up to .75 inch across, and can completely cover the plant. Blooming is from May to August. The plants occur naturally in sandy places mostly on the plains. They prefer full sun and well drained, sandy soil. The plants can be grown from seed surface sown outdoors in fall.



*Phlox andicola*, Goshen County

*Tradescantia occidentalis*, Western Spiderwort, grows to 18 inches tall and 12 inches wide with one to several stems. The leaves are narrow and arching to 12 inches long. The flowers are blue to blue-purple, up to 1.25 inches across, and clustered at the ends of stems and branches with many flowers per

plant. Flowers may close under hot sun. It has a long blooming period from May to September. The plants occur naturally in open areas of the plains and basins usually on sandy soils. They prefer full sun and well drained, sandy soil. This species does not respond well to transplanting. It can be grown from seed barely covered to allow some light exposure. It is also in the nursery trade.



*Tradescantia bracteata*

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### Lichen Photo Gallery

If you have been searching all this time for enrichment, look no further:

<http://www.waysofenlichenment.net/lichens/>

The Enlichenment photo gallery is at an early stage of development but already includes more than 6000 images of more than 1200 North American lichen species.

This gallery has been prepared in support of an on-line lichen flora of western North America, north to the Beaufort Sea, south to Baja, and east to the 105th meridian. that lichenologists are now slowly assembling in collaboration with lichenologists from around the world.

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### How Does One Find Federal Botanists in Wyoming?

BLM directories of federal botanists, ecologists and other ecobot contacts were started this year by Adrienne Pilmanis, BLM Wyoming Office, covering all ten BLM field offices and the three district offices in Wyoming and addressing sensitive plants, seed collecting, native plant materials, pollinators and soil crusts. This fall it was expanded by Bonnie Heidel to include all federal agency botanists and other botany/ecology contacts in the state. Copies of the spreadsheet are available upon request by email ([bheidel@uwyo.edu](mailto:bheidel@uwyo.edu)).

**Wyoming Native Plant Society** is a non-profit organization established in 1981 to encourage the appreciation and conservation of the native plants and plant communities of Wyoming. The Society promotes education and research through its newsletter, field trips, annual student scholarship and small grants awards. Membership is open to individuals, families, or organizations. To join or renew, please return this form. See the return address below.

Wyoming Native Plant Society  
P.O. Box 2449  
Laramie, WY 82073

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Email : \_\_\_\_\_

Check one: [ ] New member [ ] Renewing member  
[ ] Renewing members, check here if this is an address change.  
[ ] Check here if you prefer to receive the newsletter electronically

Membership  
[ ] WYNPS annual membership: \$7.50  
[ ] WYNPS annual membership with scholarship support: \$15.00  
(\$7.50 for membership and \$7.50 for Scholarship fund)  
[ ] WYNPS Lifetime membership: \$200 (\$150 for membership and \$50 for Scholarship fund)  
[ ] Sublette Chapter annual membership: \$5.00  
[ ] Teton Chapter annual membership: \$5.00

Total enclosed: \_\_\_\_\_ **THANK YOU !**

Wyoming Native Plant Society  
P.O. Box 2449  
Laramie, WY 82073