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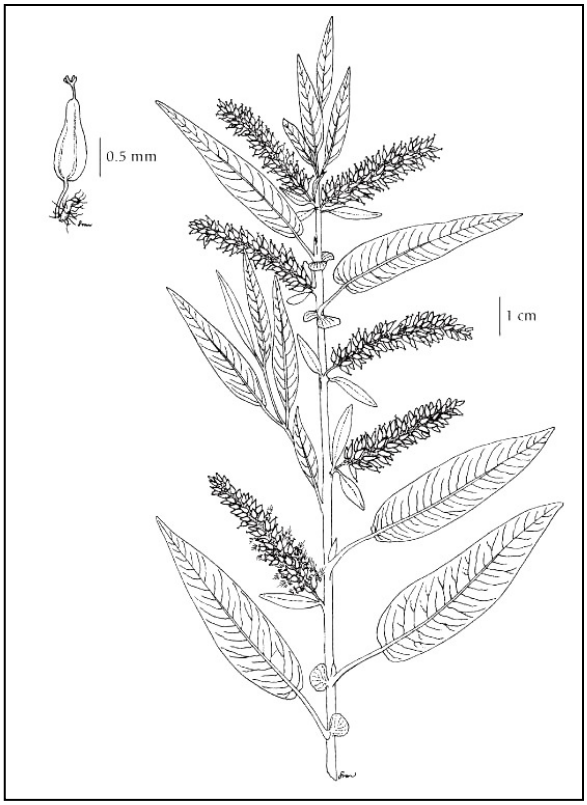
Diamonds in Our Midst

Wyoming's treasury of plant life includes those that produce diamonds, the "diamond willows" of our waterways. The name refers to the distinct diamond-shaped cavities along stems which, when carved, reveal striking contrasts between the whitish sapwood and the recessed reddish-brown heartwood.

"Diamond willow" has a reputation for durability and longevity even if it does not last forever like the gemstone. It is widely-used for canes, walking sticks and furniture pieces.

This botanical gem defies taxonomic pigeonholes, and diamonds can form on at least three tall shrub members of the willow (*Salix*) genus in Wyoming: Bebb's willow (*Salix bebbiana*), pussy willow (*Salix discolor*) and Mackenzie's willow (*Salix eriocephala* var. *mackenzieana*; syn. *S. prolixa*). The development of diamonds on different species in the genus was well-documented in Alaska and discussed as a morphological feature rather than a diagnostic taxonomic feature by Lutz (1958). The main "diamond-producer" in Alaska and Montana is Bebb's willow (Lutz 1958, Tesky 1992), a species that spans nearly all counties and elevations in Wyoming (Dorn 1997). (continued p. 6)

In this issue:



Right: *Salix eriocephala* var. *mackenzieana*; syn. *S. prolixa*. From: Douglas, G.W., D.V. Meidinger, and J. Pojar (editors). 2000. *Illustrated Flora of British Columbia. Volume 5: Dicotyledons (Salicaceae Through Zygophyllaceae) and Pteridophytes.* B.C. Ministry of Environment, Lands & Parks and B.C. Ministry of Forests. Victoria. In: Klinkenberg, Brian. (Editor) 2009. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca].

There are other diamonds in our midst - two technical publications on the *Salix* genus available on-line for willow enthusiasts:

NEW *The Genus Salix in North America North of Mexico* by Robert Dorn, March 2010. This 59 page publication includes pistillate and staminate keys, descriptions, and distribution maps for all North American taxa. It can be downloaded free at www.lulu.com/content/8538913. A 35 page supplement of color photos of all North American taxa is also available at www.lulu.com/content/8540320. A printed copy of the 59 page black and white publication only is available for $7.00, shipping included, from Mountain West Environmental Services, 8481 Road 39, Lingle, WY 82223.

Guide to the Willows of Shoshone National Forest by Walter Fertig and Stuart Markow, 2001. Gen. Tech. Rep. RMRS-GTR-83. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 79 p. This guide describes the 29 willows that are known to occur on the Shoshone National Forest, Wyoming. Keys to pistillate catkins and leaf morphology are included with illustrations and plant descriptions. It can be downloaded free at http://www.treesearch.fs.fed.us/pubs/29200 .

WNPS News

2010 Annual Meeting!!

Come see a CAPITAL wildflower display June 18-20 near Cheyenne. The 2010 Annual Meeting of Wyoming Native Plant Society features four main events, including hikes at Belvoir Ranch in cooperation with the City of Cheyenne. The City only allows access by escort, so pre-registration by 7 June is strongly encouraged – see the events and registration info in this issue.

2010 Scholarship Winners:
We are proud to announce first-place tie awards to: Nicholas Dowie for research on "A unique pinedrops collection; an ancient lineage in danger?", and to Emma Sage, for research on "Determining the future carbon use of key Wyoming prairie species." Both are UW Botany Department graduate students, awarded $300 by Wyoming Native Plant Society.

New Members: Please welcome the following new member to WNPS: Marti Aitken, Walden, CO; Allison Louthan, Laramie; Lori Spoelhof, Livingston, TX; and Wendy Velman, Iona, ID.

Treasurer's Report: Balance as of 1 May 2010 - $1,337.50 in the Markow Scholarship Fund plus $1,835.18 in general funds for a total of $3,172.68.

Contributors to this Issue: Tyler Abbott, Ann Boelter, Karen Clause, Hannah Griscom, Bonnie Heidel, Susan Winslow.

The next newsletter deadline is 20 Sept 2010.

This newsletter is printed on 100% post-consumer recycled paper.

Fieldtrip Announcements:
See the Field Trip insert, this issue, and updates on the Wyoming Native Plant Society homepage (www.uwyo.edu/wyndd/wnps).

Editor's Note: Wyoming native plants have more to offer than a pretty petal! They are the infrastructure of a dazzling array of wetland and riparian communities, healing agents in the wake of large-scale development, the underpinnings of our ranching industry, the saving grace for xeriscape gardening, and the real estate of threatened, endangered and sensitive animal species; and also include threatened, endangered or sensitive plant species. The breadth of newsletter material is limited more by ignorance than by lack of news. A special ***thanks*** to this issue's contributors for helping push the limits.

Wyoming Native Plant Society
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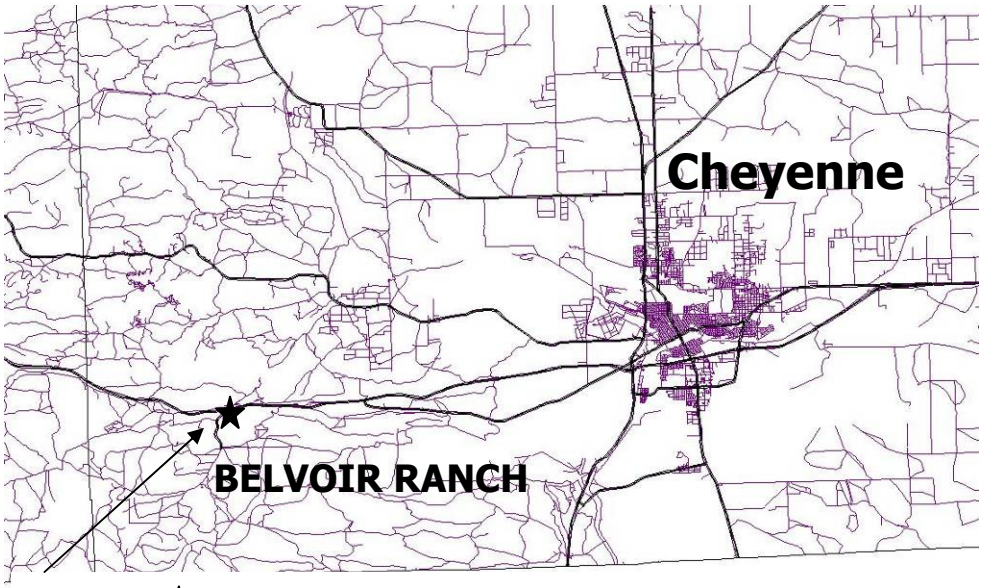
Look who's on Facebook: As part of the American Society of Plant Taxonomists' outreach efforts, the organization is now on Facebook (http://www.facebook.com/pages/American-Society-of-Plant-Taxonomists/369127495877?ref=ts) and Twitter http://twitter.com/amsocplanttaxon).

Coming soon to…



Meet at ★ Willadsen School for Ranch Tour. Take Harriman Rd. (exit 342 off I-80), then south to the school.

2010 Wyoming Native Plant Society Meeting

Cheyenne, Wyoming
June 18-20, 2010

Friday, June 18. Guided evening plant walk in the Vedauwoo/Devil's Playground area at 6:30 pm, in the Medicine Bow National Forest about 30 miles west of Cheyenne. We will meet at the trailhead at 6:30 pm and walk for about 2 hours; more details and directions will be posted soon.

Saturday, June 19. Guided hikes at Belvoir Ranch at 9 am (pre-register by June 7), with mid-day picnic. This is one of the first public tours of the Belvoir Ranch, a grand newly-acquired 17,000 acre area owned by the City of Cheyenne. Bring snacks, lunch and drinks, sunscreen, and gear for weather changes. Meet at 9 am at the Willadsen School near the Harriman Road Exit (Exit 342), south off of Interstate 80. We will carpool from there and return to the school at about 5 pm. *If you are interested in attending please pre-register by sending your name and number of people to: amb749@yahoo.com; or to WNPS, PO Box 2500 Laramie, WY, 82073. A registration form is on the back newsletter page.*

Saturday evening. Potluck and meeting at 6:30 pm, at the Old Community House in Cheyenne, 600 S. Lions Park Drive, including a potluck supper and annual business meeting. Some food will be provided so don't worry if you are from out of town and can't bring a lot, everyone is welcome!

Sunday, June 20. High Plains Grassland Research Station near Cheyenne at 9 am, for a tour and information about research projects there. More details and directions to the station will be posted soon.

All maps will be posted on: www.uwyo.edu/wynd/wnps. All events are free and open to the public!

Re-vegetation Trials in the High Desert

Karen J. Clause, Rangeland Management Specialist in Pinedale, WY, and
Susan R. Winslow, Agronomist at the Bridger Plant Materials Center in Bridger, MT

The USDA Natural Resources Conservation Service (NRCS), USDI Bureau of Land Management (BLM), and the Wyoming Game and Fish Department (WGFD) have partnered to implement a Field Evaluation Planting (FEP) near Pinedale in cooperation with the Shell Exploration and Production Company (Shell). The trial consists of 72 entries (32 grasses, 24 forbs, and 16 shrubs, all but 2 are native to the Intermountain West) in a replicated, single species precision-planted plot as well as 2 different seed mixtures both broadcast and drill seeded adjacent to the replicated plots on an oil and gas well site in need of reclamation. The site is contained inside a livestock and antelope-proof woven wire fence. The plots were seeded in the fall of 2005.

The results of the trial will be used to better inform industry and private landowners on appropriate species, varieties, and seeding methods to use in reclamation for southwestern Wyoming, also supporting the release (or not) of accessions in the trial that are being evaluated for potential increase and release to the commercial seed market. For instance, Continental was entered into the trial as L-45 accession, but was released last year under the name Continental using data from this along with other trials in the region. This is the second NRCS cooperative replicated plot trial in the Pinedale area over the past 20 years. However, NRCS conducts a wide variety of FEP trials across the state.

Four years of evaluation data have been collected and analyzed using height, density, stand, and vigor and production (grasses only during 2nd and 3rd years). Top performing grasses include:

- three accessions of thickspike wheatgrass (Critana, Sodar, and Bannock),
- two accessions of western wheatgrass (Rodan and Rosana),
- five accessions of basin wildrye (Continental, Washoe, L-46, Trailhead, and Magnar),
- three accessions of bluebunch wheatgrass (P-24, P-19, and Anatone), and
- one accession of bottlebrush squirreltail originating in the Ten Sleep area

Top performing forbs include:

- one accession of western yarrow,
- Appar blue flax (non-native),
- Maple Grove prairie flax,
- sulfur-flowered buckwheat,
- Rocky Mountain beeplant, and
- Palmer's penstemon (non-native)

Top performing shrubs include:

- two accession of fourwing saltbush (Wytana and Snake River Plains),
- Gardner's saltbush, and
- two accessions of winterfat (Hatch and Open Range)

Below: Five of the 14 top performers among 32 grass accessions tested are of basin wildrye. Photo by K. Clause.

The site experienced above normal spring temperatures and below normal precipitation for the first three years, followed by a cool wet spring in 2009. Throughout this period, germination was observed in over 90% of the replicated plots. The seed mixtures were variable in individual species expression and persistence as well as overall plant density.

The seed mixtures were part of the trial to test individual species expression within a mix as well as compare seeding methods. Species expression was measured using density, and seeding method was compared using overall stand density. Both mixtures have shown species expression for all of the species

(exception: scarlet globemallow), however some species have not persisted. The seed mixtures have shown interesting results over time. While the Bridger Mix established well with both seeding methods, the Shell mix established better with broadcast seeding. The drilled seedings have been slower to establish, but stand density has been increasing over time. The broadcast seedings have peaked earlier with higher stand densities that are now decreasing, possibly indicating that initial germination rates exceeded the carrying capacity of the site. The preferred seeding mixture and method for establishment of native vegetation resembling the historic reference community appears to be the Bridger mixture using the broadcast seeding method.

The trial will continue to be evaluated in 2010, after which portions of the fence will be removed to observe wildlife preferences prior to livestock accessing the area. For more information, contact karen.clause@wy.usda.gov or susan.winslow@mt.usda.gov .

Sensitive Species List Update by Bureau of Land Management

On 31 March 2010, the Bureau of Land Management - Wyoming State Office updated the Wyoming sensitive species list (Instruction Memorandum No. WY-2010-027) with addition of eleven species and deletion of four. Six of the added species were plants and the four deletions were also plants, totaling 40 plant species currently designated.

2010 BLM Wyoming Sensitive Plant List Changes

Additions	Deletions
Meadow milkvetch (*Astragalus diversifolius*)	Mystery wormwood (*Artemisia biennis* var. *diffusa*)
Slender moonwort (*Botrychium lineare*)	Nelson's milkvetch (*Astragalus nelsonianus* or *Astragalus pectinatus* var. *platyphyllus*)
Dune wildrye (*Elymus simplex* var. *luxurians*)	Weber's scarlet gilia (*Ipomopsis aggregata* ssp. *weberi*)
Winward's narrow leaf goldenweed (*Ericameria discoidea* var. *winwardii* or *Ericameria winwardii*)	Western bladderpod (*Lesquerella multiceps*)
Whitebark pine (*Pinus albicaulis*)	
Limber pine (*Pinus flexilis*)	

Criteria for designating sensitive species were set forth in the 0.2A section of the 6840 Manual:

1. Species designated as Bureau sensitive must be native species found on BLM-administrated lands for which BLM has the capability to significantly affect the conservation status of the species through management, and either:
    a. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range, or
    b. The species depends on ecological refugia or specialized or unique habitats on BLM-administrated lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk.
2. All federally designated candidate species, proposed species, and delisted species in the 5 years following their delisting shall be conserved as Bureau sensitive species.

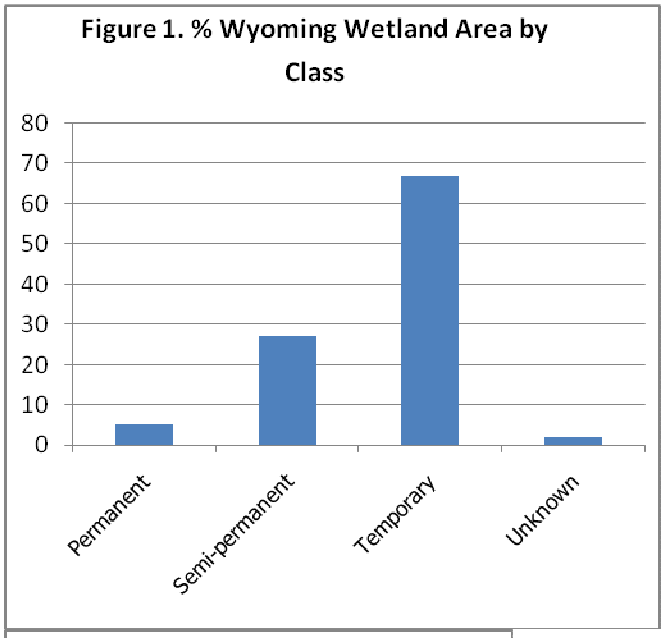
The complete BLM sensitive species list and policy will be posted at: http://www.blm.gov/wy/st/en/programs/plant_conservation/status.html . For further information, please contact: Tyler Abbott, BLM Endangered Species Program Lead, (307) 775-6090, or tyler_abbott@blm.gov .

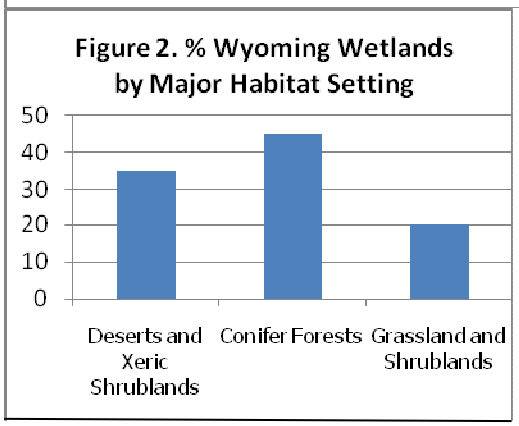
Wet Side of Wyoming

Wyoming ranks as the fifth driest state in the country in terms of average annual precipitation. Yet, over 1.4% of the state land area is wetland[1][1]! The abundance and ubiquity of wetlands across our arid landscape have only recently been documented and heralded in a synthesis of Wyoming wetlands data.

Systematic wetland mapping is available through the National Wetlands Inventory (NWI[2]; USDI Fish & Wildlife Service 2010) in which there have been 280,591 wetlands mapped in Wyoming totaling 371,758 ha (918,634 ac). A majority (90%) are less than two ha (4.9 ac) and most wetlands are temporary (67%; determinations by Copeland et al. 2010).

Wyoming areas containing high densities of wetlands have also been identified and mapped by Copeland et al. (2010), along with "Major Wetland Complexes" previously identified by Wyoming Game and Fish. Further geospatial analysis documented that the majority of Wyoming wetlands are the shallowest (temporary wetlands; 67% of area – Figure 1), and that all three major landscapes of the state harbor collectively extensive areas of wetlands (Figure 2), though the most extensive and highest densities are in temperate conifer forests, corresponding with much of the montane zone. Highlights of these results are represented below. For further information, see Copeland et al. 2010 (posted on: doi:10.1016/j.ecolind.2010.01.011.)





The synthesis of Wyoming wetlands data were developed as a foundation for a wetland assessment protocol in the state, to assist agencies and organizations in their efforts to protect and restore wetlands and wetland-dependent wildlife, and to inform the Wyoming State Wildlife Action Plan for effective wetlands conservation (Copeland et al. 2010). BH

[1] Data based on National Wetland Inventory, synthesized in Copeland et al. (2010).

[2] NWI mapping data are available through the Wyoming GeoLibrary maintained by Wyoming Geographic Information Science Center. As an online application: http://www.fws.gov/wetlands/Data/Mapper.html As a WMS: http://www.fws.gov/wetlands/Data/WebMapServices.html KML For viewing in google earth: http://www.fws.gov/wetlands/Data/GoogleEarth.html The download page: http://www.fws.gov/wetlands/data/DataDownload.html Download Wyoming as a geodatabase: http://137.227.242.32/wetlands/_downloads/20100122_WY_wetlands.zip Download Wyoming as a shapefile: http://137.227.242.32/wetlands/_downloads/20100122_WY_shapefile_wetlands.zip

References

Copeland, H.E., S.A. Tessman, E.H. Girvetz, L. Roberts, C. Enquist, A. Orabona, S. Patla and J. Kiesecker. 2010. A geospatial assessment on the distribution, condition, and vulnerability of Wyoming's wetlands. Ecological Indicators 10(2010): 869-879.

USDI Fish and Wildlife Service. 2010. National Wetland and Deepwater Habitats. Posted in Wyoming GeoLibrary at: http://www.fws.gov/wetlands/Data/Mapper.html; and nationally at: http://www.fws.gov/wetlands/data/DataDownload.html.

Wyoming Pocket Gopher – Denizen of the Desert Scrub

Hannah Griscom, WYNDD

Wyoming pocket gopher (*Thomomys clusius*) is Wyoming's only endemic mammal and has a special taste in real estate. New habitat analyses data for *T. clusius* suggests a habitat preference among Gardner's saltbush (*Atriplex gardneri*) and winterfat (*Krascheninnikovia lanata*) on gentle slopes with bare ground where big sagebrush (*Artemisia tridentata*) is absent or limited (Griscom et al. 2010). Thus, soils with *T. clusius* burrows tend to have higher salt and clay content and fewer coarse fragments when compared to control sites and those occupied by the more common northern pocket gopher (*T. talpoides*).

In 2009, a small army of biologists from the private, public, and non-profit sectors in Wyoming collaborated with Wyoming Natural Diversity Database (WYNDD) biologists to collect basic habitat and distribution information about the species. Through live trapping and habitat data collection across southern Wyoming, 20 new occurrences of *T. clusius* were discovered in 2009 and used to build range, distribution and habitat models for the species (Griscom et al. 2010). Genetic analyses of tissue samples collected from captured gophers confirm that *T. clusius* is clearly a distinct species from the other pocket gophers that occur in the state and can be clearly identified in hand (McDonald and Parchman 2010, Griscom et al. 2010). Despite extensive surveying, the range of *T. clusius* appears to be limited to south-central Wyoming in parts of Carbon and Sweetwater cos.

Above: Wyoming pocket gopher, WYNDD photo files.

The data were collected to inform the listing decision that was recently issued by the U.S. Fish and Wildlife Service (USFWS) regarding its status under the Endangered Species Act. On 14 April 2010, the USFWS determined that current and future energy development within the range of *T. clusius* could impact the species, but that listing was not warranted due to limited information about these impacts.

References

Griscom, H.R., D.A. Keinath, and M. Andersen. 2010. Pocket Gopher Surveys in Southwestern Wyoming. Wyoming Natural Diversity Database, University of Wyoming, Laramie, WY. Report prepared for the Wyoming Game and Fish Department. Report available online at http://uwadmnweb.uwyo.edu/wyndd/info.asp?p=7531

McDonald, D.B., and T.L. Parchman. 2010. Genetics of the Wyoming pocket gopher, *Thomomys clusius*. Department of Zoology and Physiology, University of Wyoming, Laramie, WY. Draft report to the Wyoming Game and Fish Department on March 31, 2010.

Diamonds in Our Midst, continued from p. 1

Finding "diamond willow" is a botanical treasure hunt because the diamonds do not form everywhere the appointed willow species grow. In Alaska, "diamond willows" were most often found on large rivers or white spruce swamps in dense willow clumps where competition was intense and soils were poor in nutrients (Lutz 1958).

Why do some willow individuals have diamonds while others have none? The diamonds are associated with a fungus, *Valsa sordida*, that causes cankers on willows and poplars (discussed in Lutz 1958). It is not clear whether the fungus invades only damaged nodes or can attack healthy buds. In any case, these diamonds-in-the-rough hint at the rewards to be found by the astute Wyoming willow enthusiast. BH

References

Dorn, R.D. 1997. Rocky Mountain Region Willow Identification Field Guide. United States Forest Service Region 2, Denver, Colorado.

Lutz, H.J. 1958. Observations on "diamond willow," with particular reference to its occurrence in Alaska. Amer. Midl. Nat. 60(1): 176-185.

Tesky, Julie L. 1992. *Salix bebbiana*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2010, April 29].

Register Here!

*Come see the Cheyenne hills in full flower**

2010 Wyoming Native Plant Society Annual Meeting, June 19, Belvoir Ranch

Name: _____

Number of people attending: _____

Please pre-register by sending your name and number of people to: amb749@yahoo.com; or mail the above to WNPS, PO Box 2500 Laramie, WY, 82073. Pre-registration is strongly encouraged.

All events are free and open to the public !

**See this issue for more details...*

Additional maps and information will be posted on: www.uwyo.edu/wynd/wnps.

Wyoming Native Plant Society
P.O. Box 2500
Laramie, WY 82073

Wyoming Native Plant Society is a non-profit organization established in 1981, dedicated to encouraging the appreciation and conservation of the native flora and plant communities of Wyoming. The Society promotes education and research on native plants of the state through its newsletter, field trips, and annual student scholarship award. Membership is open to individuals, families, or organizations. To join or renew, return this form to:

Wyoming Native Plant Society
P.O. Box 2500, Laramie, WY 82073

Name: _____

Address: _____

_____

Email: _____

___ $7.50 Regular Membership
___ $15.00 Scholarship Supporting Member

($7.50 goes to the Markow Scholarship Fund)

Check one:

_____New member
_____Renewing member

__Renewing members, check here if this is an address change.