Sego Lily
Newsletter of the Utah Native Plant Society
May 2012 (volume 35 number 3)

In this issue:

Shrubby reed-mustard (*Hesperidanthus suffrutescens,* a.k.a. *Schoenocrambe suffrutescens* or *Glaucocarpum suffrutescens*) is endemic to the Uinta Basin of northeastern Utah and has been listed as Endangered by the US Fish and Wildlife Service since 1987. Utah State University graduate student Matt Lewis and his advisor, Geno Schupp, have been studying the reproductive ecology of this species and presented their findings at the 2012 UNPS-Red Butte Garden Utah Rare Plant meeting (see pages 5-7 for selected abstracts). Lewis has documented that self-pollination within the same flower, or from pollen from a different flower on the same plant is less frequent in Shrubby reed-mustard than once suspected. Outcrossed flowers produce more fruits and seeds, especially when facilitated by hand-pollination. These results suggest that the number of insect pollinators in the wild is limiting the reproductive success of Shrubby reed-mustard. Managers tasked with conserving this species need to pay more attention to the life history and habitat needs of its pollinators. Photo by Matt Lewis from vicinity of Big Pack Mountain, Utah.

Utah Native Plant Society

Website: For late-breaking news, the UNPS store, the *Sego Lily* archives, Chapter events, sources of native plants, the digital Utah Rare Plant Field Guide, and more, go to unps.org. **Many thanks to Xmission for sponsoring our website.**

For more information on UNPS: Contact Bill King (801-582-0432) or Susan Fitts (801-756-6177), or write to UNPS, PO Box 520041, Salt Lake City, UT, 84152-0041 or email

Sego Lily Editor: Walter Fertig (walt@kanab.net). The deadline for the July 2012 *Sego Lily* is 15 June 2012.

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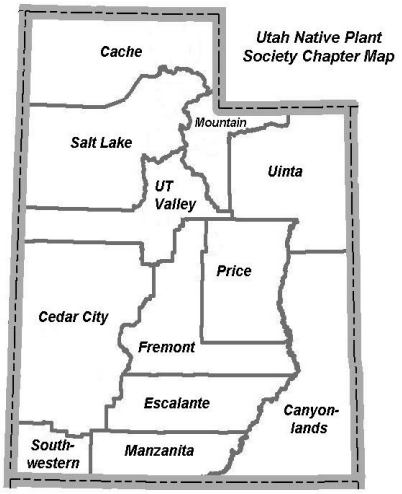
Chapter News

Fremont (Richfield Area): The chapter is sponsoring the 4th annual Penstemon festival June 8-9 at the Sevier County Fairgrounds. See page 4 for more information on speakers, events, and registration.

Manzanita (Kane County): The chapter's field trip to the Toroweap Overlook of the Grand Canyon on April 28 was a success—despite flat tires to two of the five vehicles in our caravan! We were treated to mild temperatures and an outstanding display of desert wildflowers. All told, we found 91 different vascular plant species, as well as many lichens and mosses.

Our May speaker was Victor Cooper, famous Kanab restaurateur, speaking about the flora and fauna (well, mostly fauna) of the Falkland Islands, South Georgia, and Antarctica. On May 12, Janett Warner will be in town for our spring native plant sale at the Kanab Farmer's Market from 9-12 AM. - *W. Fertig*



Salt Lake Chapter: Wednesday, June 6th at REI: Joel Tuhy, Director of Conservation Science at The Nature Conservancy's Moab office will present "Wildflowers by the Letter". Joel is an avid photographer of the wildflowers and habitats of Utah and creates programs of slides and sounds that have become a regular feature of an interpretative series presented by the Canyonlands Natural History Association. Joel's challenge is to show local native wildflowers whose names begin with all the letters of the alphabet—at least one wildflower for each of the 26 letters. Can he do it? How hard could it be? Guess you'll have to show up to find out. - *Bill Gray*

Southwest Chapter: Tuesday, May 15: Bill Gray will compare Zion Park's early pioneer landscapes with today's photographs in a presentation on Marcus E. Jones—Utah's pioneer botanist. On Monday, June 11, Peter Stempel will celebrate pollination month with a presentation on bees. Both talks will be held at 7PM in the Canyon Community Center, Springdale. Call 772-9525 for more information.—*Barbara Farnsworth*

Utah Valley Chapter: Saturday, May 19 Rush Valley Field Trip: *Astragalus lentiginosus* var. *pohlii* is a rare plant found in Rush Valley and Skull Valley. A field trip to look for this plant will be Saturday May 19. Meet at the Park and Ride lot on the west side of the American Fork Main Street exit on I-15. [continued on bottom of page 3]

Bulletin Board

Purge Your Spurge, May 12: On May 12, mark your calendars for the 6th annual "Purge your Spurge" weed exchange, native plant sale, and Grandeur Peak weed pull! This program provides an incentive for residents to voluntarily remove the noxious invader Myrtle spurge (*Euphorbia myrsinites*) and exchange it for native plants.

The weed exchange and native plant sale will take place at the Salt Lake REI, located at 3285 East 3300 South from 10 AM to 3 PM. To participate, dig up your Myrtle spurge (trying to get as much of the root as possible) and bring it to REI, where volunteers will exchange your spurge for 5 free native plants. Additional native plants will be available for sale; see the Salt Lake Conservation District website (www.saltlakeconservation.org) or call 801-542-8208 for a list of plants and prices.

You can also help make a difference by joining the Salt Lake County Open Space and Utah Open Lands on the 2nd annual Grandeur Peak Weed Pull. Meet at 8 AM at the Grandeur Peak Trailhead, located at 2900 South Wasatch Blvd. Wear gloves, long sleeves, long pants, and eye protection, and bring a spade or shovel. For more details, call Julie Peck-Dabling at 385-468-7000 or visit www.openspace.slco.org.

For more information on the Purge your Spurge event and the ecological impacts of myrtle spurge, contact Salt Lake County Weed Program staff at 385-468-6131 or on the web at www.weeds.slco.org. The Spurge purge is sponsored by Salt Lake County Weed Program, Salt Lake Conservation District, Salt Lake County Open Space, and Utah Open Lands, REI, Utah Native Plant Society, US Forest Service, Utah Division of Forestry, Fire, and State Lands, and the Bonneville CWMA.

UVU Herbarium night, Thursday May 24: The UVU Herbarium is sponsoring another series of volunteer days for mounting the backlog of plant specimens. The herbarium will also be hosting a Utah Valley Chapter meeting toward the end of the volunteer session. Plant mounting will take place in the Herbarium, room 108 in the Pope Science Building and run from 4 PM until 7 PM and the meeting will start around 6 PM. We will also tour the new UVU herbarium facilities. For the meeting, I will be presenting the first parts in a series of educational seminars titled: Pictorial Introduction to the Morphology of Utah's Beardtongues. Parking is available at the Sorenson Visitor Lot (behind the Student Center near the wolverine statue), the Lakeside Visitor Lot (at the south entrance past the traffic circle off University Avenue), and the UCCU Visitor Lot (next to the events center). These are toll booth visitor lots, but four-hour parking validations will be provided. For further information, please call me (801-863-6806) or email (alexanja@uvu.edu) - *Jason Alexander*

Utah Natural Heritage Volunteers: Many UNPS members help the Utah Natural Heritage Program by sending in rare plant (and animal) locations. This is a great help to our organization. Now you can help even more by becoming an official volunteer! The BLM is offering matching funds through the Challenge Cost Share Program, and they will match with dollars for volunteer hours. There are plants throughout the state to look for. We can give suggestions to anyone wishing to look for plants. There are also opportunities to learn how to use GIS to map in our office, and gathering information from the college herbaria in Utah. Contact me at robertdrake.fitts@aggiemail. usu.edu or call 801-538-4742. - *Robert Fitts*

Zion Canyon Field Institute Offers $10 Discount on Selected 2012 Plant Classes for UNPS Members: As if you needed another reason to become a UNPS member, the Zion Canyon Field Institute (ZCFI) of the Zion Natural History Association is offering UNPS members $10 off on several botany classes in southwest Utah this year. Normally these classes cost $60 per person. Contact ZCFI director Michael Plyler (435-772-3264; plyler.zcfi@yahoo.com) or the ZCFI website (www.zionpark.org/zcfi_schedule_new_2008.php) to register and for more specific details. Classes include Kolob Wildflowers (May 12), Zion's hanging gardens (May 18), Cedar Mountain wildflowers (July 9), and Fall wildflowers (Sept 15), all taught by Walter Fertig, and Ferns of Zion (October 13) by pteridologist Steve McKee.

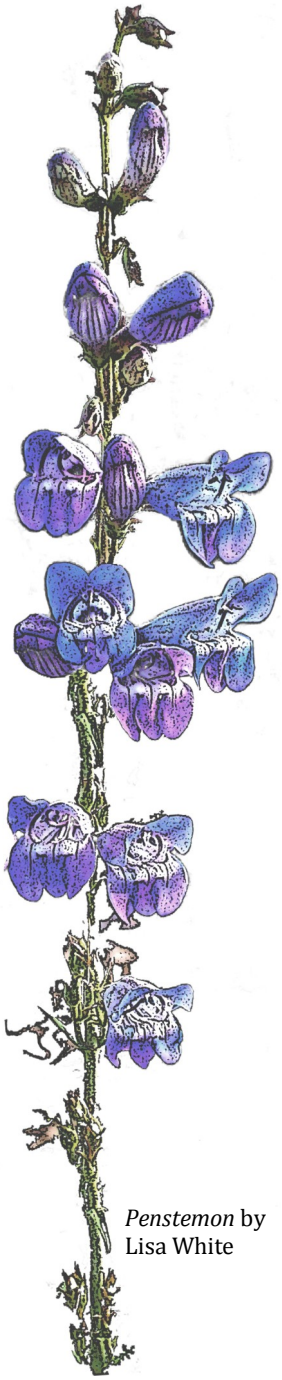
New UNPS Life Member: Andrea Winbauer of Salt Lake City became our most recent UNPS life member in April. Thank you!

Utah Valley News, continued: Plan for an 8AM departure. A land exchange involving some of the habitat for this species is in the works, so this is an important field trip. Those wishing to meet in Rush Valley, or survey another day, please contact Robert Fitts at Fitts_R_D@yahoo.com or call 801-756-6177.

Unidentified Flowering Object:

The March UFO was *Ranunculus andersonii* var. *juniperinus,* our only pink-flowered buttercup. Each spring I receive 3-4 email requests for identification of this plant — more than any other species!

Steve Hegji supplied this months UFO. This woody subshrub is atypical in its genus for flowering in the spring. Any guesses? - *W. Fertig*



Penstemon by Lisa White

Utah Native Plant Society 4th Annual Penstemon Festival

June 8th & 9th 2012, Sevier County Fairgrounds, Richfield, UT

Penstemons are some of our most beautiful wildflowers and found only in North America. These members of the figwort family occur in a wide variety of habitats from the mountains to the deserts. Utah is privileged to be the home of 76 of the 280 known species of *Penstemon*, ranging in size from one inch to five feet tall and coming in all colors of the rainbow.

The *Penstemon* festival is not the every day 'Garden Variety' festival. If you are a discriminating homeowner who craves a unique landscape that is spectacular year-round and waterwise, this is the festival for you. You'll enjoy an afternoon and evening with instructors who are the top experts in their fields. They will teach you the basic groundwork of plant selection and designing a waterwise, native plant landscape. With the information you gain, you will be able to create a landscape that reflects the natural beauty of the mountain west in your own yard.

The following events are planned:

Friday, June 8th, Sevier County Fairgrounds, 400 East 200 South, Richfield
* 1-5 PM: Native Plant Sale and Gardeners Market featuring garden art, seeds, books, postcards, and much more
* 1 PM: Landscaping with Native Plants, by Dr. Stephen Love, University of Idaho Extenstion horticulture specialist
* 2 PM: Water-efficient Landscaping in the Intermountain West, by Dr. Heidi Kratsch, State Horticulture Specialist, University of Nevada Cooperative Extension
* 3 PM: Woody Plants of Utah, by Dr. Renee Van Buren, Utah Valley University
* 4 PM: Xeriscape 101, by Tim Clarke, landscape architect, Kanab, UT and Allysia Angus, landscape architect, Grand Staircase-Escalante National Monument
* 6 PM: Social Hour
* 7 PM: **Keynote Address**, Dispelling the Native Plant Myth, by David Salman, waterwise educator and founder and chief horticulturist at High Country Gardens in New Mexico.

Saturday, June 9th:
* 8 AM-noon: Guided hikes in Richfield area (easy, intermediate, advanced)
* 8 AM-non: Self-guided garden tours in Richfield area

The *Penstemon* festival is sponsored by Great Basin Natives, Wildland Nursery, Utah Native Plant Society, Fremont Chapter of UNPS, Sevier County Travel Council, Panoramaland Resource Conservation and Development, Brooklyn Gardens, and the Intermountain Native Plant Growers Association (INPGA).

For more information, consult unps.org, or the websites for Great Basin Natives, Wildland Nursery, or INPGA.

Vendors wishing to participate should contact Janett Warner at 435-527-1234 or janettwildland@gmail.com

Registration Form

Name: _____

Address: _____

City: _____ ST___ Zip_____

Phone: _____

Email _____

Send to: Fremont Chapter, UNPS
c/o Janet Nielson, PO Box 104,
Elsinore, UT, 84724

Payment (please no cash)
___ Check or money order enclosed

___ Paypal (credit/debit card or e-check): pay securely at https://www.paypal.com. Click on Send Money, indicate the amount and that you are purchasing something, and make payment to: fremontchapter@unps.org

Pre-registration per person: $17.00
At Door, per person: $20.00

Camping Sites are available at Sam Stowe Campground in Fremont Indian State Park; call 800-322-3770

Ask area hotels for *Penstemon* rates!
Best Western: 800-780-7234
Comfort Inn: 435-893-0119
Days Inn: 800-225-3297
Fairfield Inn: 435-896-9191
Holiday Inn Express: 435-896-8552
Quality Inn: 435-896-5465

Highlights of the 2012 Utah Rare Plant Meeting

By Walter Fertig

The 2012 Utah Rare Plant meeting was held on March 6 at Red Butte Garden. This annual event is sponsored by the Garden and UNPS (this year the BLM Utah State Office also provided financial support). Over 50 professional and amateur botanists attended the meeting to hear presentations, view posters, and interact with friends and peers.

Some highlights of the meeting included:

* A special behind-the-scenes tour of Red Butte Garden's rare plant greenhouse by conservation botanist Rita Reisor. Among the species on hand were various Uinta Basin Sclerocacti and Holmgren's milkvetch (*Astragalus holmgreniorum*) in full flower. Rita also proudly showed off the freezer containing seed samples from many rare species.

* Loreen Allphin discussed an undergraduate research project she is overseeing at BYU on the population genetics of *Dodecatheon dentatum* var. *utahense* (now considered part of *Primula* by some taxonomists), a narrow endemic restricted to Big Cottonwood Canyon. Preliminary work by the students using electrophoresis of selected allozymes suggests limited crossing between populations and high homozygosity from inbreeding. Managers may need to transfer seed or pollen between populations to ensure long-term persistence.

* University of Utah graduate student Blake Wellard reported on his innovative research on dispersal mechanisms and herbivory of Holmgren's milkvetch seeds at a site south of St. George. Blake used UV-reflective nail polish to mark individual seeds and fruits

Above: Red Butte Garden conservation botanist Rita Reisor leading a tour of the Garden's rare plant greenhouse at the conclusion of the 2012 rare plant meeting. Photo by W. Fertig.

and track their movement by animals, water, or wind. Harvester ants were observed moving seeds, though they did not use them for food. Caches of seeds often accumulated in low depressions that also hold water (and may account for the species' clumped distribution pattern). Water is important for opening the hard valves of the fruit in late summer. Invasive weeds that compete with seedlings for cover appear to be an important factor limiting reproduction.

* Joan Degiorgio of The Nature Conservancy discussed the purchase of 28 acres in the Uinta Basin from a willing seller to protect the locally endemic Flowers' penstemon (*Penstemon flowersii*) between Roosevelt and Duchesne.

* BLM state botanist Ron Bolander summarized recent inventory and monitoring projects for several sensitive plant species, including Jones cycladenia, Goose Creek milkvetch, and a suite of endemics from the Frisco Mountains.

* Utah State University graduate student Alicia Langton discussed her research on the DeBeque phacelia (*Phacelia scopulina* var. *submutica*) in Colorado

* On behalf of John Spence I discussed the importance of taking a regional perspective on plant conservation and recent efforts to create a new group (the Southwestern Plant Conservation Initiative) focusing on issues in the southwestern U.S. and northern Mexico.

* Bill Gray gave a presentation on his work revisiting sites photographed by Marcus E. Jones.

* Dorde Woodruff described her research on *Opuntia basilaris* var. *heilii* (see article on page 10).

The following are abridged abstracts from some of the other papers that were presented at the meeting:

Soil and Landscape Characteristics of *Hesperidanthus suffrutescens* by Janis L. Boettinger, Lauren S. Kelly, and Brook B. Fonnesbeck, Dept. of Plants, Soils, and Climate, Utah State University. *Hesperidanthus suffrutescens* (shrubby reed-mustard) occurs in the Green River Formation at four sites on federal lands in the Uinta Basin. We described and sampled 30 soil profiles from these sites (18 in occupied reed-mustard habitat and 12 in unoccupied habitat) and described vegetation, soil surface features, and landscape characteristics. Shrubby reed-mustard grows where little else does and appears to dominate a unique niche. Conversely, black sagebrush (*Artemisia nova*) dominates in nearby areas. Reed-

mustard grows exclusively on shale and in shallow soils, but not in soils dominated by sandstone. pH values were higher, soluble calcium concentrations lower, and soluble copper, lead, potassium, and nickel higher in occupied reed-mustard soils than in unoccupied soils. This species may be able to tolerate low nutrient soils of seemingly inhospitable areas.

Analysis of Landsat 5 TM data indicated that the Green River Formation where Shrubby reed-mustard occurs is spectrally unique. While the spatial resolution of the Landsat data (30 m pixel) are coarse, the Big Pack Mountain, Johnson Draw, and Gray Knolls populations fell within this spectral class. However, vast areas in between these populations were also spectrally similar. The spectral data may help indicate potential *H. suffrutescens* habitat, especially if coupled with an on-site decision tree that includes vegetation, soil, and landscape characteristics.

Dust and proximity to dirt roads correlated with decreased reproduction of an endangered Utah endemic shrub by Matthew B. Lewis, Utah State University. Energy development on the Colorado Plateau has lead to increased fragmentation of open space by roads with negative consequences for native plant species. Roads reduce available habitat, spread exotic species, and create barriers to dispersal. In addition, unpaved roads also increase dust loads on leaves and floral structures, which may significantly reduce the growth and reproduction of nearby plants. I studied the effects of an unpaved road on the successful reproduction of the Endangered Utah endemic shrub *Hesperidanthus suffrutescens* (shrubby reed-mustard). My colleagues and I measured the size and reproductive output of 156 plants and dust deposition at increasing distances from the road. Additionally, we dusted 3 leaves on 30 plants and measured stomatal conductance pre-dust, post-dust, and after washing. We also dusted 3 flowers on 10 plants prior to hand pollination and measured fruit set. Differences in stomatal conductance were analyzed using a paired t-test and generalized mixed models were used to determine significant correlations between reproduction, proximity to the road, and dust.

Above: Increasing energy development looms in the habitat of Shrubby reed-mustard (Hesperidanthus or Schoenocrambe suffrutescens) *in Utah's Uinta Basin. Photo by Matt Lewis.*

When controlling for plant size and distance, fruit set decreased with increasing levels of dust deposition. The number of seeds per plant, the mean seed weight, and the proportion of hand-pollinated flowers that set fruit were also negatively correlated with dust, although not significantly. Stomatal conductance was significantly reduced by the application of road dust. Eighty percent of hand-pollinated flowers set fruit after dusting, suggesting that dust did not prevent pollination. However, the process of applying pollen by hand could have removed any dust on the stigma. Overall, these results suggest that dust may impact fruit set through reduced physiological processes. Further research into the effects of roads and dust are needed.

***Ex Situ* Conservation: An Integrated Approach** by Rita Reisor, Red Butte Garden. *Ex situ* conservation is the management of genetic material at an off-site location for the purpose of preservation of genetic material. Historically viewed as a stand-alone type of conservation practice, *ex situ* methodology is often poorly understood and underutilized. Also called gene-banking or seed-banking, *ex situ* conservation is not useful as a tool on its own and must be considered as part of an integrated approach to applied conservation and management practices. The process of *ex situ* conservation involves many steps such as evaluating wild populations, gathering seeds, propagation, curation, storage, monitoring, and release. The Center for Plant Conservation and National Center for Genetic Resource Preservation together have worked to develop a rigorously tested protocol for the collection, care, and management of plant material in *ex situ* storage, which has been replicated internationally. As with every scientific method there are values, limitations, and risks associated with the processes.

A large portion of the research conducted at Red Butte Garden is in the form of *ex situ* conservation. Red Butte's on site conservation seed collection represents 418 accessions from 112 taxa. Twenty

federally Threatened or Endangered species are represented as are 12 candidate or potentially threatened species. While quantity is one way to evaluate a collection, the real value of an *ex situ* collection is how it is used to support other conservation efforts.

The Intermountain Block Checklist Project and the Role of Herbaria as a Tool for Monitoring the Long-term Effects of Climate Change by Jason Alexander, Utah Valley University. Plant identification has been one of the most important services that herbaria offer. However, the traditional roles of herbaria in botanical research are dramatically changing in the age of whole genome DNA sequencing. The ability to inexpensively determine the species of a plant sample without knowing a single morphological characteristic of the original sample (and by extension to be able to determine if a sample is an entirely new species just based on DNA) is rapidly becoming a reality. Even just a few years ago (at least in plants) this was in the realm of science fiction. Combined with ever decreasing operating funds and staff, these trends indicate that herbaria need to emphasize the importance of other roles to the scientific community.

One underutilized role for herbaria is to be a source of biodiversity data and a tool for documenting climate change. Checklists of herbarium specimens have been commonly used as a source for the current species composition of a region. In its simplest form, a block checklist is similar to a traditional checklist. However, for this project, checklists are created from georeferenced specimen data from multiple on-line herbaria. These data were combined with a GIS shapefile of the state of Nevada and Utah that was divided Into blocks of 6 x 6 township/ range units (about 90 blocks per state). Individual checklists were generated to determine the species composition of each of these blocks along with the year each was collected. Having both a geographical and a temporal component to these checklists make them useful as a baseline for documenting change in species composition over time in each block.

Overall, the project goals are: 1) to find the most recent, verified specimen for each taxon found in a block; 2) to revisit and document every population of every listed and high priority species in each block using georeferenced photographs of individual plants and their habitat; and 3) to recollect or verify specimens of any taxon not seen in 10-20 years. Recollecting such "historical" taxa gives a temporal component to the data.

How many taxa are undergoing range contraction or range expansion? Which taxa were more commonly collected in the past than in the present? Both of these questions are going to become more important as the effects of climate change or loss of habitat due to the many other human and natural disturbances become noticeable in our region.

The goals of this project are ambitious and cannot be accomplished with just herbarium staff and professional botanists alone. In the next several years, I hope that this project will become a robust example of a citizen and scientist collaborative effort, much like those promoted by the National Audubon Society.

* * *

Thanks to all those who presented and attended the meeting. The 2013 meeting is already scheduled for March 5 at Red Butte Garden.

Rare Plant Committee Updates UNPS Rare Plant List

In conjunction with the annual rare plant meeting, the UNPS rare plant committee met on Monday, March 5th at Red Butte Garden to consider updates or changes in status to the UNPS rare plant list (see November 2009 *Sego Lily*). The 8 participants evaluated a total of 30 species. When the dust settled, 8 new species were added to the UNPS list, 12 had changes in status, and 10 remained unchanged. Some of the more significant changes included:

* *Astragalus kelseyae*: this recently named species (see the July issue for more) was provisionally added to Need Data list, but may warrant Extremely High priority status
* *Boechera* (*Arabis*) *duchesnensis*: added to Need Data list
* *Coryphantha vivipara* var. *deserti*: added to Need Data list
* *Cypripedium calceolus* var. *parviflorum*: changed from low to high priority based on number of extirpated populations
* *Echinocactus polycephalus* var. *xeranthemoides*: changed from Watch to Need Data (may not be in Utah)
* *Eriogonum corymbosum* var. *aureum*: Added to Watch list
* *Eriogonum corymbosum* var. *nilesii*: Added to Need Data list, still some questions about the validity of UT reports
* *Eriogonum mortonianum*: added to Watch list
* *Ferocactus acanthodes*: changed from watch to high priority based on increased threat;
* *Frasera ackermanniae*: new to High priority list (recently described)
* *Opuntia pinkavae*: added to Need Data list
* *Scleroactus blainei*: added to Watch list
* *Sclerocactus wetlandicus*: changed from Extremely High to High priority
* *Sisyrinchium douglasii*: changed from low priority to Watch list
* *Viola beckwithii*: changed from low to high priority

The revised list will be posted on the UNPS website. - *W. Fertig*

Botanist's Bookshelf:

Summer Reading, Part I (to be continued in July)

Summertime will be upon us soon, and that means time to string up the hammock, ice down some lemonade, and enjoy a new book (or two!). The following are some recent titles that might be of interest to the discerning botanist:

Woody Plants of Utah: A Field Guide with Identification Keys to Native and Naturalized Trees, Shrubs, Cacti, and Vines. By Renée Van Buren, Janet G. Cooper, Leila M. Shultz, and Kimball T. Harper. 2011. Utah State University Press, Logan, UT. 513 pp. $39.95.

Woody plants are characterized by the presence of lignified ("woody") cells that provide strength and rigidity to stems. The presence of woody tissue allows trees and shrubs to reach great heights or become increasingly wide in girth. This gives woody species a competitive advantage over shorter plants for sunlight and helps protect them from herbivory. Woody species tend to be among our most ecologically and economically important plant species, providing habitat for wildlife in forests and shrublands, and wood and fiber for human use.

Those who are interested in woody plants will be pleased with the arrival of the new, all-color, guide to the *Woody Plants of Utah*. This book covers more than 400 native and naturalized tree, shrub, vine, cactus, and subshrub species found in Utah and elsewhere in the west (thus residents of adjacent states should find it useful too). Each species is treated with a succinct, non-technical description of its appearance, habitat, and distribution (accompanied by a range map), as well as comments on similar species, the origin of its name, its use in landscaping, and other natural history lore. Most species also have a color photograph depicting it in flower, fruit, or leaf. Species are arranged alphabetically by family (with gymnosperms appearing before the flowering plants). Readers should be forewarned that the family classification follows the recent publications of the Angiosperm Phylogeny Group (see September 2010 *Sego Lily*) and some familiar species are now in new groups.

Hardcore botanists will also appreciate the key to woody species near the beginning of the book. Rather than leading to families as in most keys, the key in *Woody Plants of Utah* leads to individual species. This arrangement should be especially helpful to beginning or intermediate keyers. An illustrated glossary helps users of all skill levels with tricky terminology. Fortunately, the index identifies the pages in the key were each species is identified, making it easier to compare similar taxa.

Deciding which species to include and which to leave out must have been a difficult task for the authors. This is particularly true for perennial wildflowers with woody bases, but non-woody stems. For example, nearly all of the state's *Penstemon* species have woody bases, but only 6 are described in the text. One could also question the inclusion of all Utah cactus species, when only the chollas are really woody. Having a current treatment of this important family, however, outweighs such technicalities.

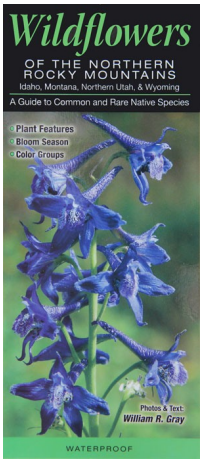
Woody Plants is a good complement to more technical manuals on the western flora. Hopefully, the authors (or others) will use this book as a template for other illustrated guides to perennial wildflowers, ferns, grasses and sedges, or other groups of plants that would benefit from a similar treatment.

Sadly, co-author Kim Harper passed away last fall just before the book was released. *Woody Plants of Utah* will be a nice tribute to his memory each time it is taken off the shelf. - *W. Fertig*

Wildflowers of Central and Southern Utah

Wildflowers of the Northern Rocky Mountains both by William R. Gray, 2012. Quick Reference Publ., Austin, TX. $7.95

UNPS stalwart Bill Gray is the photographer and author of two new lavishly illustrated booklets on common and rare wildflowers of central and southern Utah and the Northern Rockies (from Montana and Idaho to northern Utah and Wyoming). Each laminated, 6-fold pocket guide has color photos and very brief bullets on the floral features, leaves, habitat, stature, and flowering period for more than 90 showy plant species. The species are arranged by color rather than phylogenetically. The guides are geared for travelers who may not be versed in taxonomy or the full floristic richness of the west. Any plant lover will appreciate the sharp, beautiful photographs. You will need to buy 2 copies, though, if you want to unfold the guides and display them on the wall!



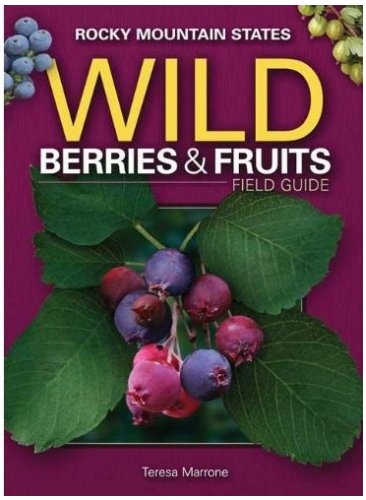
These pocket guides are part of a series that also includes birds, butterflies, and wildflowers of the Southern Rocky Mountains (by Janis Lindsey Huggins). Bill Gray is offering guides to UNPS members at a discount; consult the UNPS homepage 'store' for ordering details. - *W. Fertig*

Rocky Mountain States Wild Berries & Fruits Field Guide

Cooking with Wild Berries & Fruits Both by Teresa Marrone. 2012. Adventure Publications.

Review by Dorde W. Woodruff

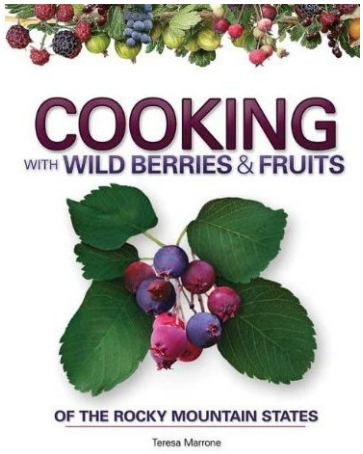
We know that foraging for fruits or berries is a popular subject with our members, because Ty Harrison's January lecture on gathering and cooking wild fruits played to an overflow crowd at the Salt Lake Chapter monthly meeting.



Wild foods have more valuable nutrition than cultivated foods which, when selected for yield and tenderness, tend to leave behind nutrients, vitamins, minerals, healthful plant pigments, and fiber, in favor of sugar and starch.

Adventure Publications specializes in handy small field guides, easily carried in packs, or even a pocket. Teresa Marrone is an expert on wild fruits and their preparation, with twenty years of experience and 13 other publications on the subject in print. Her newest book, *Rocky Mountain States Wild Berries & Fruits Field Guide* is a useable and very portable work. The format is concise, with two pages for each species (one of photos and one of text). Fruits are organized by color, with general information on types of fruit, range, and habitat zones at the front. Naturalized fruits are included and also inedible and toxic ones to aid in identification. I'm well used to gathering wild fruits from having grown up in a Midwestern suburb still furnished with wild woods. When I first moved to Utah, being stuck at home with a tiny baby, I sent my husband up the canyon to gather some berries — if we'd had this book, he would have known better than to include snowberry.

Handy icons at the top of each text page include ratings as to edibility (delicious to toxic), plant growth form (tree to tender leafy plant), distinguishing characters (compound leaves to cactus), season, and range maps. The book covers Idaho, Montana, Wyoming, Colorado, New Mexico, and Utah, so some species are included that we won't find in Utah. If the full page (4 ⅜" x 6") photo of each species doesn't show the ripe fruit clearly enough, there is an inset.



Cooking with Wild Berries & Fruits is also the product of Teresa's long experience. In addition to the usual jam and jelly recipes, there are more adventurous ones, all tested by Teresa and her western cousins in high-altitude kitchens. Photos from the mountains and local lore are also included for some species.

As Teresa says, wild fruits vary in quality from plant to plant. Our local prickly pears (*Opuntia*) are no exception. Perhaps Utah's most bountiful wild fruit comes from several species of prickly pear, including *O. phaeacantha* (from the far south West Desert, East Desert from Moab south, and the southern plateaus), and *O. engelmanii* hybrids of the Zion Park area. (In Utah's Dixie the cultivated form of the Texas species Cows' Tongue cactus is also good.) Prickly pears can be steam-juiced without even bothering to remove the pesky glochids and peel (others taste too "stemmy" when processed this way). If you find a good prickly pear patch, or elderberry patch, or serviceberry, etc., you can return to it year after year.

One of Teresa's nicest contributions is precise recipes for small batch jellies (some with added pectin and some without, depending on the fruit) since wild fruits are apt to be gathered in small amounts.

After I heard about these books, I was surprised to find out that the "Teresa" in ForageAhead, a helpful Yahoo email group that I belong to (http://tech.groups.yahoo.com/group/ForageAhead/) was the author Teresa Marrone. This forum is a great resource for those interested in foraging for wild foods.

List prices for the two books are $14.94 and 12.95 respectively (a little lower on Amazon). If you are interested in this subject, these two books are uniquely valuable. The cookbook comes in a handy, alternate, spiral bound form that lays flat to refer to while cooking.

Opuntia basilaris var. *heilii*, a Rare Utah Endemic

By Dorde W. Woodruff

Seeing Heil's beavertail cactus (*Opuntia basilaris* var. *heilii*) in one of its two known areas of greatest abundance, you might wonder why it is a rare plant. It is rare because of its restricted distribution in certain places within a polygon only 24 by 29 miles across. In the photo above (a low bench between the north end of the Henry Mountains and the Fremont River) plants are especially large and numerous. They are also abundant on the south end of the Factory Butte road.

Heil's beavertail cactus is confined to sandy-clay or clayey-sand substrates. It is often on mesas and benches, but also sometimes on hillsides that are not too steep. Distribution stretches from the very southwest corner of the San Rafael Swell to the benches on the north side of the Henry Mountains and from just outside Hanksville to the west side of North Caineville Reef, with an outlier in eastern Cathedral Valley.

The late, prominent Utah botanist Elizabeth Neese came across Heil's beavertail cactus in her PhD study of the flora of the Henry Mountains. Stan Welsh and Neese published the taxon as a variety in 1983 in *Great Basin Naturalist* (now *Western American Naturalist*). They deposited 10 specimens at the Brigham Young University herbarium. Only two other herbarium specimens are known, one at the University of Utah and one at San Juan College. My colleagues and I will be depositing more.

The plant is not hard to find on some of the better-traveled dirt roads of the area, such as Bert Avery Road, Coal Mine-Factory Road, and Wild Horse Road, but it would be difficult to find in all its discontinuous pockets in this rugged country. Once one of the BLM's Hanksville people had a vehicle break down in the back country northwest of Factory Butte. He had to walk out 25 miles.

Since var. *heilii* is easy to find within its limited area, it is surprising that it has not been studied since Neese and Welsh's early work. The taxon has not always been well accepted outside of Utah. But this is because out-of–state botanists have not studied it (or even looked at it), not because it does not deserve recognition. It is the most divergent of the *Basilares* series of dry-fruited pricklypears.

The closest relative of Heil's beavertail cactus is var. *longiareolata* which grows in Grand Canyon, Marble Canyon, lower Glen Canyon below the dam, and Cataract Canyon. It is reasonable to speculate that var. *longiareolata* came up the Dirty Devil in a favorable time and could have crossed with the upland dry-fruited *Opuntia*s to become more hardy when the climate changed.

Var. *longiareolata* mostly grows in narrow river canyons. It was only reported once (in 1938, as *O. brachyclada*, a different member of the *Basilares)* from the more open part of Glen Canyon, where it must have largely died out.

Var. *heilii* comes from a colder environment, with more open terrain, and different parent rocks and soil. It also differs from var. *longiareolata* in having paler flowers, generally wider pads without elongated narrow pad bases, yellow glochids instead of yellow-brown, little or no trichomes on the pads, a less glaucous epidermis, a somewhat less tightly-clustered habit, and more widely spaced areoles (the specialized meristems on cactus pads that can give rise to spines, glochids, or new pads).

Compared to flowers of var. *longiareolata,* var. *heilii* flowers may have a slight yellow hue. White stigmas are diagnostic in all the *Basilares*, differentiating them from *O. aurea* with which *O. basilaris* is often confused by laypersons, with its more common, green stigmas.

A surprise was a blonde plant, the most aberrant individual of the *Basilares* I've seen. The pads had more betaxanthin, the yellow pigment of the cacti, and the flower buds were yellow not reddish. Because of this I expected the flowers to be yellow, but the petals were mostly very pale pink, with filaments yellow instead of the usual pinkish red. Two plants nearby had a smaller dose of the yellow pigment.

The plants are not entirely predictable in where they will grow. I went up Cow Dung Road looking for a place to camp and it was so weird and desolate I couldn't stand to stay there. The road is named for the lumpy-looking brown Dakota formation rocks. Plants, any plants, are scarce. Cow Dung Road is so other-worldly and barren that the Mars Society has their experimental Mars Station here. On another day, in just one place on Cow Dung Road, I saw that a few plants had found a home — a few var. *heilii* were growing with *Atriplex corrugata*, as it often does.

Another less-common location is on the Curtis formation near Goblin Valley. The Curtis here is generally caprock, but it is accessible from one side road going up to a sizeable outcrop from the Wild Horse road. Also on the Curtis are plants not usually seen in the immediate area, such as *Wyethia scabra*.

Left: Opuntia basilaris *var.* heilii *with pale pink flowers.*
Bottom, left: var. heilii *in early spring.*
Bottom, right: blonde phase of var. heilii *with relatively broad pads that taper less to the base than in var.* longiareolata.

Var. *heilii* wrinkles in the winter, becomes dessicated, and in Salt Lake lies right down and looks very bad. But it recovers, starting about mid-March. In its home, the earliest I've seen it is the 3rd of April when it was still a bit wrinkled and had the reddish winter coloring that indicates an accumulation of protective sugar-bound pigment. Var. *longiareolata* can flower as early as March 21st at Lees Ferry. In its different environment, var. *longiareolata* was not wrinkled nor reddish colored, but beginning to bud, looking more like the phenological stage of var. *heilii* at the end of April.

Our UNPS cactus study group is not finished with the study of var. *heilii*, and may decide to raise it to specific rank when we publish. Keeping it in varietal rank preserves its relationship to the rest of the *Basilares* in its latin name. But it has more than sufficient differences to justify specific rank. *Opuntia heilii* was erroneously listed in *Flora of North America* as a synonym, but has not been formally named as a species.

Trapped where it is on its favorable but limited piece of desert, between sites with heavy clays or loose sand, who knows what climate change will do to Heil's beavertail.

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