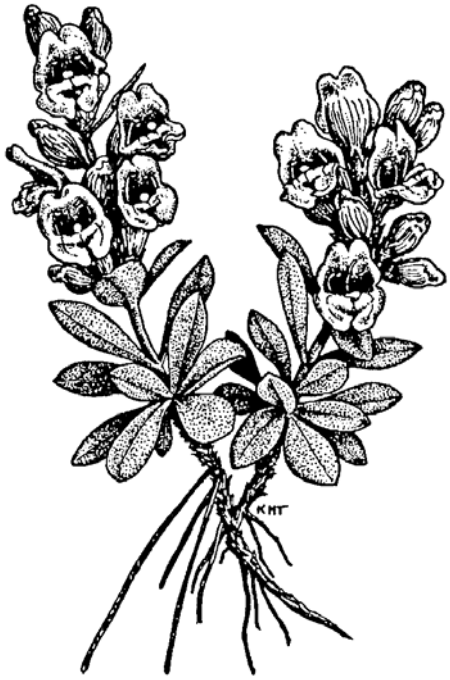
Sego Lily
Newsletter of the Utah Native Plant Society

March 2007 Volume 30 No. 2



Graham's penstemon by Kaye Thorne

In this issue:

No Listing for Two Rare Utah Plants

USFWS to drop Deseret milkvetch and Graham's penstemon from the Threatened and Candidate lists

By Walter Fertig

Two of Utah's rarest native plant species will not be protected under the Endangered Species Act (ESA) as a result of two rulemaking decisions by the US Fish and Wildlife Service (USFWS) in mid-December and late January. Graham's penstemon (*Penstemon grahamii*) had been proposed for listing as a Threatened species under the ESA in January 2006 following a court settlement between the Service and several conservation groups, including the Center for Native Ecosystems (CNE) and the Utah and Colorado native plant societies. On December 19, 2006, USFWS withdrew the listing proposal, citing a lack of imminent threats. In a separate decision, dated January 25, 2007, USFWS announced its intention to remove Deseret milkvetch (*Astragalus desereticus*) from the Threatened species list, citing a reduction in threats due to a new Conservation Agreement reached between the Service and the State of Utah. This new ruling came in response to another legal challenge from CNE, Forest Guardians, and the Utah Native Plant Society calling for USFWS to designate Critical Habitat for the plant*.
Continued on page 4.

* Critical Habitat is defined in the Endangered Species Act as the specific geographic areas that contain features essential to the survival of a listed species and which may require special management attention. The Service is required to evaluate critical habitat when listing a species but may decline to designate such areas if doing so draws unwanted attention to the location of a species (resulting in vandalism, poaching, or other heightened threats) or will not otherwise benefit the species.

Utah Native Plant Society

Officers
President: Bill Gray (Salt Lake Co)
Vice President: Bill King (Salt Lake Co)
Treasurer: Celeste Kennard (Utah Co)
Secretary: vacant
Board Chair: Mindy Wheeler (Summit Co)

UNPS Board: Walter Fertig (Kane Co), Robert Fitts (Utah Co), Jackie Freshwater (Box Elder Co), Susan Garvin (Utah Co), Marie Griffiths (Salt Lake Co), Ty Harrison (Salt Lake Co), Kipp Lee (Salt Lake Co), Margaret Malm (Washington Co), Larry Meyer (Salt Lake Co), Therese Meyer (Salt Lake Co), Jeff Mitchell (Utah Co), Dave Wallace (Cache Co), Winnie Washburn (Iron Co), Maggie Wolf (Salt Lake Co), Loreen Woolstenhulme (Utah Co).

Committees
Communications: Larry Meyer
Conservation: Bill King and Tony Frates
Education: Mindy Wheeler
Horticulture: Maggie Wolf
Invasive Weeds: Susan Garvin
Rare Plants: Walter Fertig

Chapters and Chapter Presidents
Cache: Steve Ripple
Escalante (Garfield Co): Allysia Angus
Manzanita (Kane Co): Walter Fertig
Mountain (Summit Co): Mindy Wheeler
Price (Carbon Co): Mike Hubbard
Salt Lake: Kipp Lee
Southern (Washington Co): Margaret Malm
Utah Valley (Utah Co): Celeste Kennard

Sego Lily Editor: Walter Fertig (walt@kanab.net). Articles, photos, and illustrations from members are welcome and encouraged. The deadline for the May 2007 Sego Lily is 15 April 2007.

Website: For late-breaking news, the UNPS store, the Sego Lily archives, Chapter events, links to other websites (including sources of native plants and 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 (582-0432) or Susan Garvin (356-5108), or write to UNPS, PO Box 520041, Salt Lake City, UT, 84152-0041 or email unps@unps.org

---

Chapter News and Events

Cache: The Cache Chapter of UNPS, Cache County Extension, and Master Gardeners of Cache Valley will be holding three sessions of the Waterwise/ Native Plant Propagation Workshop on Saturday March 3rd (9-11 AM and 1-3 PM) and Thursday, March 8th (6-8 PM). Attendees will learn to grow waterwise and native Utah plants from seed and cuttings. Participants will also receive one flat of 72 plants, and the information to grow these plants in their landscape. Cost is $15 for UNPS or Master Gardener members, $20 for everyone else. Preregistration is required with Cache County Extension at (435)752-6263. The workshop will be held at the USU Teaching Greenhouse, 1389 North 800 East, Logan, UT - Corner of 800 East and 1400 North

Among the plants this year are: *Acer grandidentatum, Aquilegia flavescens, Arctostaphylos nevadensis, Artemisia ludoviciana, Astragalus utahensis, Iliamna rivularis, Iris missouriensis, Linum kingii, Mahonia repens, Penstemon eatonii, Penstemon whippleanus, Petrophyton caespitosum, Sphaeralcea caespitosa, Sporobolus cryptandrus,* and others. - *Steve Ripple*

Escalante (Garfield County): In December we had the chapter holiday party at the home of Larry and Louise Barnes. The location was lovely, the food great, and we had a good turnout, with members donating canned and non-perishable food for the local food bank.

Molly Waters, former UT Dept of Water Resources Conservation Program Director, presented a program on Utah's Water Conservation efforts for our January meeting. She discussed Utah's Waterwise plant program and how the state determined to focus a portion of it's approach on water conservation on home landscapes. Molly shared several of the State's water conservation publications and brochures with the chapter.

In February, Carolyn Shelton (Interpretive Specialist for Grand Staircase-Escalante National Monument) presented a lively and engaging, pre-Valentine's Day program on Plant Reproduction (aka 'Sex in the Garden'... can we say that?) using cut flowers and other hands-on props. – *Allysia Angus*

Manzanita (Kane County): Becky Mann of the USGS gave a presentation on techniques and applications of monitoring rare plant populations to kick off our January meeting. On February 12, the Kanab group held its first plant propagation workshop, spearheaded by Holly Beck (botanist, Grand Staircase-Escalante NM) and Cheryl Decker (horticulturist and restoration biologist for Zion National Park). The event drew 47 people, of which more than half were not current members. Those in attendance were treated to seeds, containers, and useful tips from the experts. Our next meeting will be on Monday, March 12th and feature Carolyn Shelton on the topic of creating a personal nature journal. – *Walter Fertig*

Salt Lake: On February 7th, Tony Frates, Conservation Co-chair of UNPS, gave a presentation titled "Saving Utah's Native Plants: rare, medium rare, and

rare, and the rarely rare." Tony has spent countless hours fighting on behalf of Utah's most endangered plant species, particularly several in Washington County and the Uintah Basin. We met in our new location in the Wasatch Board Room at REI.

March Meeting: Wednesday, March 7th, 7 PM, Wildflower Photography Workshop. Mr Ray Taggart, owner of Pixel's Foto and Frame Shop in Sandy, will present a program on the fundamentals of digital photography and its application in wildflower photography. Following, Dr. Paul Zuckerman will give a brief presentation on the use of alternate lighting.

Sunday, March 18th, 1-3:00 PM, Stansbury Island Field Trip: Join us in search of *Ranunculus andersonii, Fritillaria pudica, Cymopterus purpurascens* and other early blooming treasures. Directions: Please contact Kipp about car-pooling, or to get detailed instructions if you have to go independently.

April Meeting: Wednesday, April 4th, 7PM Amber Richman, USDA-APHIS-PPQ Biological Control will discuss various biocontrols used on several invasive species in the state of Utah. She will talk about how biocontrols are tested before being released and the impacts that they have on the environment.

We will begin weekly wildflower hikes this month on Saturday mornings around 10 AM. Locations will be announced on the website and chapter newsletter.

Chapter Officers: Kipp Lee - President, Liz Schubert – Communication, Paul Zuckerman – Treasurer, Richard Jonas – Education, Paul Daniels - Invasive Species. For information about meetings email Liz Schubert at Liz@utahrox.com. For membership information email Kipp Lee at kipp_lee@comcast.net.

Southern (Washington County): On Sat. Feb. 3 the Southern Chapter/Zion Canyon Field Institute held a very successful propagation workshop at the greenhouse in Zion. Fifteen (the maximum) were signed up, and 4 more "walk-ons" were also accommodated, as we had made up a few extra planters. The seed was all locally collected. Rick Heflebower was the instructor; he gave an excellent run-down on the species provided, and there were lots of questions and answers. All seemed to enjoy themselves very much, and left with happy smiles on their faces. - *Margaret Malm*

UNPS News and Upcoming Events

Life Member Update: Lois Arnow (co-author of Flora of the Central Wasatch Front, Utah grass expert, and eternally commemorated by *Poa arnowiae* and *Stipa arnowiae*) became our 27th lifetime member in January of this year.

Sixth Annual Utah Rare Plant Conference: Red Butte Garden and UNPS are co-sponsoring the annual UT rare plant meeting on Tuesday, March 6th in Salt Lake City from 10 AM to 5 PM. The agenda will feature an array of speakers discussing research on Utah rare plants and other topics pertaining to plant conservation. Space is limited, so if you are interested in attending please contact unps@unps.org for more information.

UNPS Spring Conference in Kanab: The Manzanita Chapter will be hosting the state board meeting on the weekend of May 18-20. In conjunction with this event, the chapter will also be sponsoring an evening lecture/dessert social on the evening of Friday, May 18, followed by morning field trips on Saturday, May 19 and Sunday, May 20 to outstanding botanical areas of the Grand Staircase-Escalante National Monument. The board meeting itself will be held in the afternoon of May 19. All of these events are open to any members of UNPS and their friends. Look for more details in the May *Sego Lily*. – *Walter Fertig*

Utah Native Plant Propagation Workshop: Saturday, March 17, 2007. 8AM -12Noon. Salt Lake County USU Extension, 2001 S. State St., Salt Lake City. Room S-1007/8. Open to UNPS, INPGA, or WRGS members only. For every 2 flats you plant for a Fall 2007 workshop, plant one for yourself FREE! Containers provided or wash your previously-used Rootrainers and bring them with you - fill them with fresh sterile media at the workshop, then plant your seeds. You may bring seeds to share or plant for yourself. The following seed will be provided: pinyon pine, Utah juniper, fernbush, apache plume, Great Basin wildrye, desert four o'clock, yucca sp., Palmer penstemon, Rocky Mtn penstemon, blue grama grass, silver buckwheat. Plus, limited quantities of green mormon tea, Indian ricegrass, little bluestem, chokecherry, firechalice, purple crazypea, meadow fire, and more. Please register with Maggie Wolf, 801-468-3171 (leave name and contact info on voice mail) or by e-mail at maggiew@ext.usu.edu. – *Maggie Wolf*

Purge your Spurge! Myrtle Spurge/Native Plant Exchange: This April, don't miss out on a great opportunity to purge your spurge and rid your garden of myrtle spurge (or as some call it donkey tail spurge) and receive free Utah native plants in exchange! Myrtle spurge (*Euphorbia myrsinites*) is a non-native, highly invasive, garden plant that is rapidly spreading in our foothills and canyons, crowding out the native vegetation.

Join the Bonneville CWMA, the Great Salt Lake RC&D, and the Salt Lake Soil Conservation District, along with volunteers from the Intermountain Native Plant Growers Association and the Utah Native Plant Society, at the Millcreek REI as we work to protect our canyons by preventing the spread of myrtle spurge in our foothills.

On April 14 & 21, 2007 bring your bagged myrtle spurge to REI at 3200 East 3300 South, where volunteers will be on hand to take your plants and give you up to five potted Utah native plants in exchange. In addition, receive a planting guide and learn about noxious and invasive species in Salt Lake and what you can do to help prevent their spread.

For more information contact Salt Lake County Weed Program staff at 801-468-2861 or on the web at www.weeds.slco.org – *Sage Fitch*

No Listing for Two Rare Utah Plants

[continued from page 1]

Graham's Penstemon: a Candidate No More

Graham's penstemon is a low-growing perennial with exceptionally large (up to 1 ¼ inches), tube-shaped lavender flowers. *Penstemon grahamii* is currently known from 5 extant population clusters containing a total of 6200-7000 individuals across the Uinta Basin in Duchesne, Carbon, Uintah (UT) and Rio Blanco (CO) counties. This species is restricted to sparsely vegetated whitish shale barrens and knolls of the Green River Formation.

Penstemon grahamii has been of conservation concern since the 1970s due to its unfortunate habit of growing on geologic formations rich in oil, natural gas, and oil shale. At present, 63% of all known *P. grahamii* subpopulations are leased for oil and natural gas drilling or are within active fields and 88% of all populations occur within active seismic exploration areas. The 2005 Energy Policy Act and other changes in Bureau of Land Management (BLM) policy to promote energy development on federal lands will only enhance mineral exploration and development in the basin over the coming decades. BLM is responsible for most of the lands or mineral resources under development and has attempted to minimize direct impacts on penstemon habitat by regulating the location of well pads, access roads, pipelines, and other infrastructure. There are, however, many secondary effects of mineral development, including habitat fragmentation, increased spread of noxious weeds, and reduction of pollinator populations that may place additional stress on this species.

By far the greatest potential threat to Graham's penstemon is development of oil shale (or kerogen). The Green River Formation of NE Utah, NW Colorado, and SW Wyoming has the world's largest known deposits of oil shale – an estimated 1 trillion barrels. Interest in processing oil shale into more conventional petroleum products peaked in the late 1970s in response to the energy crisis and government research and development incentives. Reaching the kerogen-rich deposits has typically involved open pit mining in which the overburden of rock, soil, and vegetation is removed. To date, extensive development of oil shale has been stymied by high production costs and the ready availability of more accessible and profitable oil and natural gas reserves in the Uinta Basin. This could change quickly, however, if rising oil prices or technological breakthroughs make oil shale economically competitive. An analogous situation existed with coalbed methane reserves in the west until a cost-effective extraction method was discovered in the 1990s that made methane production highly profitable. The ensuing production boom has vastly outstripped the ability of federal agencies to cope with the resulting impacts.

Several other threats were identified in the Service's January 2006 listing proposal. A recent pollination biology study by Red Butte Garden found that impacts of sheep grazing on flower and seed production were significant. The large, showy flowers and rarity of Graham's penstemon make it desirable to penstemon fanciers and thus vulnerable to over-collection of live plants or seed (as a group, penstemons are among the most sought out native plants by collectors after cacti and orchids). Lastly, Graham's penstemon receives no formal protection under state or federal law (although it remains listed as Sensitive by the BLM) and none of its habitat is permanently protected in a designated protected area.

Despite these impacts, the USFWS ruled in December that Graham's penstemon was not sufficiently threatened to warrant listing under the Endangered Species Act. This ruling also removes the species from the service's roster of official candidate species. While candidate status does not confer any official protection under the ESA, other federal agencies traditionally afford candidates extra management attention so that government actions do not further imperil the species. USFWS relied heavily on comments provided by BLM and industry that downplayed the threats from mineral development and exploration. BLM noted that its existing regulations protect Graham's penstemon from direct harm by new oil and natural gas wells and pipelines, and that as a Sensitive species it will continue to receive sufficient management attention. Impacts from oil shale development were considered unlikely in the next two decades due to low interest from industry under current economic conditions. Even if development were to accelerate, the BLM noted that the prime areas for oil shale development are in the Piceance Basin of Colorado, beyond the known range of this species. The Service also dismissed other identified threats from its own January 2006 proposal as not being significant or imminent. USFWS is pursuing a Conservation Agreement with the BLM to promote conservation actions that, if followed, would be sufficient to preclude future listing.

Deseret Milkvetch: Delisting in the Works

Deseret milkvetch (*Astragalus desereticus*) is a low-growing, nearly stemless, white-flowered member of the pea family with distinctive woolly fruit pods borne on elongated stalks. This species was first collected in the 1890s but remained unnamed until its unique characteristics were recognized by legume expert Rupert Barneby in 1964. Deseret milkvetch was thought to be extinct until 1981, when it was rediscovered near Birdseye (Utah County) by Elizabeth Neese. Deseret milkvetch is known from a single population on a steeply sloping conglomerate lens of the Moroni Formation. The entire population

(estimated at 5000-10,000 plants) is found on private and state lands in the Northwest Manti Wildlife Management Area (managed by the Utah Division of Wildlife Resources [UDWR]) and is mostly within 300 yards of US Highway 89.

Due to threats from potential highway expansion, urban sprawl, and herbivory and trampling by livestock and wildlife, Deseret milkvetch was listed as Threatened by the USFWS in October 1999. At the time of listing, the Service declined to designate critical habitat, citing that such an action would not directly benefit the species. This failure was legally challenged in July 2005 and in a settlement USFWS agreed to submit a new critical habitat designation by January 2007. At the deadline, USFWS again ruled that no critical habitat was necessary. More significantly, the service announced that it would pursue delisting of Deseret milkvetch due to a reduction in threats to the species following establishment of a Conservation Agreement with the state of Utah (representing the UDWR, UT Department of Transportation, and UT School and Institutional Trust Lands Administration).

What Happens Next?

The decision to withdraw Graham's penstemon is final and took effect on December 19, 2006. Delisting Deseret milkvetch is a proposed rule and the Service is soliciting additional information and comments through March 26, 2007.* As of this writing, additional legal appeals are probable for the Graham's penstemon but have not been filed. Legal challenges may also ensue if Deseret milkvetch is officially delisted.

Graham's penstemon and Deseret milkvetch are the latest in a series of rare plant and animal species that have been denied ESA protection by the USFWS. In recent years the Gunnison sage grouse (known from 4000 individuals in SW Colorado and adjacent UT), Gunnison's prairie dog (90% loss of historic range), and at least 9 other species have been denied listing protection based on decisions by high level Department of Interior officials that reversed the recommendations of USFWS's own field staff. The Union of Concerned Scientists in 2005 released a survey of USFWS scientists that documented pervasive political interference from Washington in scientific decisions. In the case of Graham's penstemon, USFWS ignored the findings of all three of its outside reviewers in support of the January 2006 listing proposal, instead drawing heavily on input from the BLM and industry to forgo listing (the BLM would be the agency most affected by listing).

* Written comments can be sent to Larry England, US Fish and Wildlife Service, 2369 West Orton Circle, Suite 50, West Valley City, UT 84119 or by email (larry_england@fws.gov). Email comments should include the tagline "Attn: Astragalus desereticus". All comments are considered part of the public record, although you may request anonymity.

*Above: Deseret milkvetch (*Astragalus desereticus*) by Kaye Thorne.*

Increasingly, USFWS is turning to Conservation Agreements as a tool to promote tangible conservation actions and avert listing. Conservation Agreements are formal agreements between the Service and private landowners or government agencies in which all parties agree to voluntarily conduct conservation measures that will reduce threats or improve population conditions so that listing under the ESA is less likely. Typically conservation agreements are drafted while species are still at the candidate stage of the listing process. Implicit in all agreements is the threat that failure to implement conservation actions may lead to listing and full protection under the ESA. Ideally, the Conservation Agreement for Graham's penstemon will institute some of the conservation measures needed for this species, but if the signatories fail to fulfill their obligations the 'club' of potential listing will be more difficult for USFWS to wield, as *P. grahamii* now has no candidate status. Likewise, the regulatory club of listing will be removed for *Astragalus desereticus* even before compliance with the Conservation Agreement has been confirmed.

Regardless of whether these species are formally listed or more informally covered by Conservation Agreements, several conservation actions will need to be undertaken in the coming years to ensure that these two rare Utah plants continue to survive. Updated status surveys are badly needed for Graham's penstemon throughout its range (some populations have not been resurveyed since the early 1980s). Recent research on pollination biology and life history, initiated by Red Butte Garden, needs to continue. Additional monitoring is needed to quantify impacts and assess population and habitat condition trends. Developments in the oil shale industry also need to be carefully followed to assess if threats from exploration are realized. For Deseret

milkvetch, additional monitoring data are needed to determine whether population increases detected in 2005 represent positive long-term growth and response to management changes or were influenced by atypically wet weather that year. The performance of USFWS and the state of Utah in meeting the obligations of the Conservation Agreement also needs to be vigilantly scrutinized.

It is ironic that legal 'victories' over USFWS have so far resulted in a net reduction in protection for these two species. Although further appeals may be successful (courts typically take a dim view of their decisions being ignored), the strategy of legal challenges to USFWS over the remainder of the Bush administration may not be worth the unintended consequences. Until a more favorable administration is in place, Utah conservationists might be better off pursuing their goals through more collaborative methods, such as funding or conducting necessary survey and monitoring work, contributing expertise to the development of Conservation Agreements, or providing educational outreach. After all, our goal is to help plants like Graham's penstemon and Deseret milkvetch, not inadvertently bring them greater harm.

Rare Utah Cactus Turns Up at Salt Lake Chapter Meeting

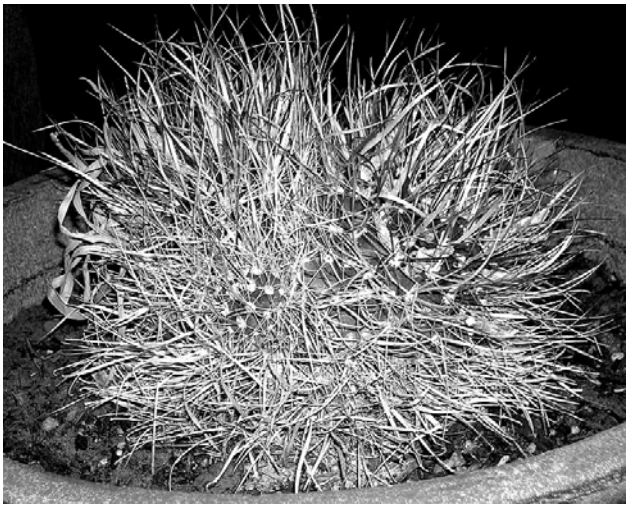
By Dorde W. Woodruff

Those of us who watch for such things have been noticing a page on the website of the Cactus Art Nursery in Ravenna, Italy, which posts a large collection of cactus photos*. This particular website has photos of the habitat and individuals of a rare western cactus named *Sclerocactus blainei*, or *S. spinosior* ssp. *blainei*. The photos were taken by Fred and Judy White near Cedar City, Utah. The desert slopes look like our West Desert; I assumed the location was in western Iron County (near Nevada), where this taxon is better documented.

Fred White turned up at the December meeting of the Salt Lake Chapter with these very plants. That the cacti came from the NE edge of Cedar City itself was a surprise. Fred salvaged them from private land when they were soon to be overrun with house construction (which has now happened).

Blaine's fishhook cactus is barely documented from Utah. There are no Utah specimens at the major state herbaria, as of when I visited them in 2005-2007. One collection by Joseph Busek is at the herbarium of San Juan College in New Mexico.

* see www.cactus-art.biz/schede/ SCLEROCACTUS/ Sclerocactus_spinosior/Sclerocactus_spinosior_blainei_Iron_Co_UT/Sclerocactus_spinosior_ssp_blainei_Iron_Co-UT.htm for this webpage.)



Above: Blaine's fishhook cactus. Photo by D. Woodruff.

Nevada's Rare Plant website lists it as questionable in Utah. Utah's Rare Plants website doesn't list it at all. Heil and Porter's revision of *Sclerocactus* from *Haseltonia* (1994) cites the Busek specimen. Although Welsh and Thorne described the taxon in *Great Basin Naturalist* in 1985 from Nevada, the 2003 revision of *A Utah Flora* doesn't mention it for Utah. The cactus is named after Stan Welsh's son Blaine who used to do fieldwork with him. Cactophiles who specialize in rare plants, and drive and hike many miles to find them, didn't expect it at Cedar City.

Sadly, it may not be there any more. Fred reports that he and Judy searched extensively and didn't see any more (besides the ones they rescued). Based on geology maps, the Cedar City population apparently occurred on Navajo sandstone, another surprise since it is reported from calcareous or igneous soils in the Bonneville Basin. Little Navajo sandstone is exposed in the Cedar City area, so chances of finding another colony are not good if it is indeed restricted to this substrate there.

Some workers consider *S. blainei* to be no more than a variety of the closely related *S. spinosior* (which has more and longer spines and larger plant bodies and flowers). It may not be so uncommon as supposed from the lack of documentation. According to D. Ferguson (quoted on the TRAFFIC website, 2002) "[t]reatment of *S. spinosior* ssp. *blainei* as a discrete taxon is questionable. It may be an erroneously defined variant of *S. spinosior* that replaces the nominate variety in south-west Utah and Nevada. *S. spinosior* comprises a number of regional and local forms, which may result in multiple taxonomic treatments and potential confusion ... the species is purportedly locally common and occurs in widely scattered populations in Iron County, Utah, where thousands of specimens have been observed." However, many *Sclerocactus* populations suffered terribly due to the 2002 drought; the condition of the populations in western Iron County at this time is unknown.

Utah State University and Utah Botanical Center Work to Boost Native Plant Seed Supplies for Commercial and Conservation Purposes

By Maggie Wolf, UNPS Horticulture Committee Chair

Increasingly appreciated for their drought-tolerance, benefits to wildlife, and natural beauty, Utah native plants are sought for revegetation projects as well as suburban landscapes. Ecologists and landscapers are often limited to seed and/or plants that are commercially available; non-native species are usually planted out of necessity. To help promote and increase native plantings, Utah State University (USU) and the Utah Botanical Center (UBC) cooperate in the Great Basin Native Plant Selection and Increase Project (GBNPSIP).

At the Utah Botanical Center several ongoing projects work towards making Utah's native plants more available. Besides the GBNPSIP, Anderson grows several Utah's Choice species in "seed increase" plots. Some of the seed produced there will supplement the Intermountain Native Plant Growers Association's (INPGA) seed bank, a collection of 42 species.

As Utah's land grant institution, USU has a long tradition of helping farmers improve their productivity and profitability. Through the GBNPSIP, USU hopes not only to increase native plant seed availability but also to open new crop opportunities for Utah's dryland farmers.

"We're evaluating the cultural requirements for field production," explains Richard Anderson, UBC Nursery and Greenhouse Manager. By discovering how much irrigation, fertilization and pest control are required for profitable seed production, Utah farmers are more likely to expand their farm operation by growing native plant seed. "Ultimately, we're trying to produce more native plant seeds for conservation and commercial purposes," Anderson says.

Another aspect of increasing native plant seed production is quality control. Michael Bouck, a Research Associate at Utah State University, supervises the Seed Certification Program for the Utah Crop Improvement Association. Native plants species, he notes, have highly variable characteristics depending on where the seed was grown.

"One of the things we struggle with is that the plants we grow from seed will perform to consumer's expectations. Seed from plants growing outside Utah may not survive as well or even look the same as plants grown from Utah seed. Some plant species seem to be very site-sensitive," Bouck says. Certified seed must conform to standards set by the Association of Official Seed Certifying Agencies.

"Utah leads the industry in wildland-collected seed," says Bouck. "We certify seed as "source-identified" once we verify the species and seed collection site." Most of this seed is used in wildland revegetation projects.

At the Utah Botanical Center, several ongoing projects work towards making Utah's native plants more available. Besides the GBNPSIP, Anderson grows several Utah's Choice species in "seed increase" plots. Some of the seed produced there will supplement the INPGA seed bank. The UBC also aims to grow native plants for demonstration purposes, so that the general public can witness our native plants' beauty first-hand.

Related links: Utah Botanical Center, at http://utahbotanicalcenter.org.

Utah Crop Improvement Association, at http://www.utahcrop.org

Utah's Choice and Intermountain Native Plant Growers Association, at http://utahschoice.org

Utah State University, at http://www.usu.edu
Great Basin Native Plant Selection and Increase Project, at http://www.nsl.fs.fed.us/great_basin_native_plants.html

_____

Utah Heritage Gardens - where are they now?
If you are or were instrumental in one of the UHGs featured on the UNPS website, please contact Maggie Wolf, UNPS Horticulture Committee Chair, 801-468-3171 or maggiew@ext.usu.edu. I will be visiting existing UHGs and seeking out new sites. If you know of a native planting that is accessible to the public and is not currently listed as a UHG, please let me know about it. Seeing is believing; help Utahns recognize and appreciate Utah native plants by supporting this program. – *Maggie Wolf*

Department of Corrections: In my haste to get the January *Sego Lily* to the printers before Christmas, I made several errors in proofing Therese Meyer's *Sphaeralcea* article. The photo of a field of globemallows at the top of page 9 should have been attributed to Tana Pitts. I neglected to give Therese Meyer credit for the leaf drawings accompanying each of the species descriptions. Lastly, the article itself came from a presentation given by Dr. Michael Piep of Utah State University to the Seed Collectors Workshop of 22 September 2005. My apologies to Tana, Therese, and Michael for the errors. – *Walter Fertig*

Talinum brevifolium. This photo was taken in Capitol Reef NP. The population found in Arches NP had white flowers.

Veg Mappers Find "New" Plants for Utah National Parks

Text and photo by Sarah Topp

What goes on behind the scenes in your national parks? Park visitors see rangers, interpreters, and other helpful people at the entrance booths and visitor centers. But public service is only part of the picture, and research activities are generally not well-publicized. Moab is home to the Southeast Utah Group (SEUG), which functions, in part, as the resource management arm for Arches and Canyonlands National Parks, and for Natural Bridges and Hovenweep National Monuments. Part of what SEUG does is inventory and monitor plant and animal populations. As part of this larger program, plant inventory has been conducted in these parks, and in additional parks on the Northern Colorado Plateau, including (in Colorado) Dinosaur, Black Canyon of the Gunnison, and Colorado National Monuments, and (in Utah) Cedar Breaks National Monument, and Bryce Canyon and Capitol Reef National Parks.

During the 2006 field season, the inventory crew (also known as veg mappers) worked in Arches and Bryce Canyon National Parks. The goal of veg mapping is to create a comprehensive map of plant associations commonly found growing together across the park landscape, for example, Ponderosa pine and manzanita, a common forest type on the Paunsaugunt Plateau in Bryce Canyon NP. Typically, certain plant species are often found growing together based on factors such as soil type, aspect, elevation and fire history. The veg mapping crew collects data in the field, visiting several hundred sample sites having various combinations of these factors within each park. Once data are analyzed and photo interpretation completed, the vegetation map will provide information designed to assist resource managers in a variety of ways, as well as serving as a baseline for monitoring change over time.

Each park has a list of plants considered "present in the park" and this list is backed up by voucher specimens for every species, housed in each park's herbarium. Our friend and advisor, Walt Fertig, compiled the current lists through a series of herbarium reviews for several parks over the last few winters. Walt also confirmed the identification of all the specimens subsequently collected. Each park's herbarium serves then, as a museum and also as a reference point for future botanical researchers interested in identification and location information of plant species found within the park. Over time, populations of species may increase in size, remain virtually the same, or may disappear altogether, for various reasons.

Under the guidelines of our research permit, we were authorized to make collections for the herbarium of plant species not already represented in the herbarium with a voucher. These plant finds are considered "new" plant records for the park, although not necessarily new to science.

In 2006, the park service crew consisted of four people, often working in remote areas of the parks. Traveling cross-country, using aerial photographs, satellite imaging and GPS units, the crew found and made collections of 61 new species, including 5 new families, and several new genera within families already represented. Of these 61 species, 48 are natives and 13 are non-natives.

The crew worked in Arches NP during April and May, where we found 41 new species records. Four species represented new genera, and one, *Talinum brevifolium*, introduced a new family for the park, Portulacaceae, the Purslane Family. Sausage-leaf talinum grows in sandstone depressions and crevices primarily in the southeastern counties, and was found in a remote area of the park overlooking Clover Canyon. Another new species, *Asclepias ruthiae* (Ruth's milkweed), is uncommon and previously was known in Grand County from just a couple of records - one from the early 1980's and one from the mid 1990's. This small milkweed was found in an area where grazing had occurred previous to the park's establishment.

The months of June, July and August were spent working in Bryce Canyon NP where we found 30 new species for the park. The most interesting Bryce Canyon finds were in the Chenopodiaceae (Goosefoot Family). These plants are commonly found on saline, shaley and silty soils in what are generally thought of as "wastelands" or "badlands". On the Tropic Shale Formation in Bryce Canyon NP, we found 7 new species in the Goosefoot Family. This soil type is uncommon in Bryce Canyon, which has soils predominantly derived from limestone; due to their unique photo signature, we targeted these sites for our inventory work. A couple of our more common shrubs, *Sarcobatus vermiculatus* (greasewood), and *Atriplex confertifolia* (shadscale) were among the new finds. A less common shrub,

Zuckia brandegeei (siltbush) is certainly one of the more graceful members of this family.

Near the southern end of the park, 2 new families were added for Bryce Canyon. One, Typhaceae (Cattail Family), was represented by the broad-leaved cattail, *Typha latifolia* which was flourishing along the edges of a remote spring. The other new family, Hydrophyllaceae (Waterleaf Family), was represented by a robust *Phacelia mammilariensis* found growing on a steep adobe hillside.

I wondered how so many new plant species could be found in parks that are 40+ years old. The explanation is probably a combination of things: a lack of funding for botanical research, being in the right place at the right time (especially where the fleeting period and irregular blooming cycles of annuals is concerned), travel to remote sites within the parks, and the possibility of new arrivals, especially in areas of high traffic where more "weedy" species may be introduced over time. In Arches NP, the new finds along the Colorado River corridor may have been due to timing, as we surveyed there in August when the water was low with easy shoreline access. In any case, it was very exciting and rewarding for everyone involved, and we are looking forward to more discoveries in future years.

Sarah Topp (*scarletgilia@hotmail.com*) lives in Moab, UT, and currently works on the Inventory and Monitoring Program for the National Park Service.

New Vascular Plant Records from Arches and Bryce Canyon National Parks – 2006

Nomenclature follows Welsh et al. (2003) *A Utah Flora, third edition*. All specimens are deposited in the ARCH or BRCA herbaria.

Arches National Park

Aegilops cylindrica (Fertig 22651)
Amaranthus retroflexus (Fertig 22998)
Asclepias ruthiae (Topp ST05180601)
Aster hesperius (Fertig 22992)
Bassia scoparia (Moran s.n.)
Bothriochloa ischaemum (Moran s.n.)
Bromus japonicus (Topp ST08080602)
Calamagrostis scopulorum (Fertig 22994)
Chamaesyce glyptosperma (Fertig 22991)
Chloris virgata (Moran s.n.)
Chorispora tenella (Topp ST05070603)
Chrysothamnus nauseosus var. *consimilis* (Fertig 22993)
Cyperus esculentus (Fertig 23008)
Datura wrightii (Topp ST05090601)
Descurainia sophia (Topp ST05070601)
Digitaria sanguinalis (Fertig 22999)
Elymus cinereus (Topp ST08080606)
Eremopyrum triticeum (Topp ST04210602)
Eriogonum inflatum var. *fusiforme* (Fertig 22658)
*Festuca pratensis (*Fertig 22653)
Gaillardia pulchella (Fertig 22996)
Galium aparine var. *echinospermon* (Topp ST05020602)
Galium multiflorum var. *multiflorum* (Topp ST08080601)
Hibiscus trionum (Fertig 23006)

Asclepias ruthiae. Voucher specimen deposited in Arches NP herbarium.

Juniperus scopulorum (Fertig 22646)
Lactuca serriola (Topp ST05200602)
Lepidium moabense (Moran s.n.)
*Lythrum salicaria (*Topp ST08230601)
Munroa squarrosa (Fertig 22997)
Oxytenia acerosa (Fertig 23000)
Panicum obtusum (Topp ST08220607)
Panicum virgatum (Fertig 22648)
Philadelphus microphyllus (Topp ST05150602)
Physalis longifolia (Fertig 23007)
Polygonum lapathifolium (Topp ST080605)
Populus x intercurrens (Topp ST05020604)
Scirpus maritimus (Topp ST08230603)
Spartina gracilis (Topp ST08070601)
Spartina pectinata (Topp ST08230605)
Talinum breviflorum (Topp ST05200601)
Tridens muticus (Topp s.n.)

Bryce Canyon National Park

Arabis selbyi (Topp ST06150604)
Aster hesperius (Topp ST07290601)
Atriplex confertifolia (Ballenger EB07270601)
Atriplex powellii var. *powellii* (Topp ST07280604)
Bassia scoparia (Topp ST07280609)
Carex duriuscula (Topp ST06140601)
Carex interior (Topp ST07290601)
Carex pellita (Topp ST06290603)
Chrysothamnus linifolius (Topp ST07280601)
Chrysothamnus nauseosus var. *gnaphalodes* (Fertig 23060)
Cirsium scariosum var. *scariosum* (Topp ST07160602)
Cleomella palmeriana var. *palmeriana* (Topp ST07280602)
Distichlis spicata (Topp ST07280606)
Elaeagnus angustifolia (Topp ST06150603)
Halogeton glomeratus (Topp ST07280611)
Opuntia fragilis (Topp ST06140601)
Phacelia mammillariensis (Topp ST06150606)
Populus x intercurrens (Topp ST06150601)
Potentilla pensylvanica) (Topp ST06280602)
Salix eriocephala var. *watsonii* (Topp s.n.)
Sarcobatus vermiculatus (Topp ST06290601)
Senecio hydrophilus (Ballenger EB07290601)
Spartina gracilis (Topp ST06150607)
Sporobolus cryptandrus (Topp ST07290602)
Suaeda torreyana var. *torreyana* (Topp ST07280605)
Thelypodiopsis sagittata var. *ovalifolia* (Topp ST07110601)
Thlaspi montanum var. *montanum* (Fertig 22534)
Typha latifolia (Ballenger EB07290602)
Ulmus pumila (Fertig 22543)
Zuckia brandegeei var. *plummeri* (Topp ST07280608)

Seed Dormancy and Native Plant Propagation

By Doug Reynolds
Pinyon51@yahoo.com

To germinate and establish, seeds need four things: Water, oxygen, appropriate temperatures, and light. Seeds of most horticulturally important species have been selected by growers to germinate quickly the first time these factors are present; take most garden variety seeds from their package, put them in a pot of soil on a sunny, warm windowsill, and you get a high percentage of germination within a few days. Seeds of many of our native species, however, show dormancy, which can simply be defined as not germinating initially when good growing conditions are present. In some species that ripen seeds late in the season, the cold temperatures of fall prevent germination. But many species produce mature seeds in summer when conditions are favorable for some growth but not for the completion of their lifecycle. We believe that dormancy mechanisms evolved to allow species to time their germination to periods when successful growth and reproduction are most likely. One can imagine that plants whose seeds germinated on an unusually warm October day would be killed by subsequent frost and disappear from the population compared to plants whose seeds delayed germination until the first warm days of spring.

Dormancy mechanisms can be simply classified into two categories, mechanical or chemical. In mechanical dormancy the seed coat prevents water and/or oxygen from reaching the embryo and associated tissues inside to stimulate development. This mechanism is often present in seeds with hard, thick coats or shiny seed coats with an impervious waxy coating. In nature, this resistant seed coat prevents germination until time has passed and the seed coat has been broken down by abrasion, freezing and thawing, or the action of soil microorganisms. Not only does this delay germination immediately after the seeds ripen but, since the breakdown may occur at different rates in different seeds depending upon their specific circumstances, it spreads germination out over a period of weeks or months. In this way, a plant doesn't have all its "germination in one basket", i.e., all seeds germinate at once, only to be killed by drought, leaving the plant with no descendents. Examples of common native species in Utah with mechanical dormancy are lupines and milkvetches (*Astragalus* species).

In raising native species for our gardens we want the seeds to germinate quickly. There are a number of ways to overcome mechanical dormancy through a process called scarification. This can be accomplished by physical or chemical means. For large-seeded species like lupines, the thick seed coat can be nicked with a razor blade to let water and oxygen in. Germination then follows quickly. Smaller seeds can be rubbed between two sheets of fine sandpaper to abrade away the thick or waterproof coating. In both cases, you should take care not to abrade too deeply and damage internal tissues.

Other methods of scarification use a hot water soak or abrade the seed coat in a solution of Hydrogen Peroxide or Sulfuric Acid. When using these methods you should consult references to find the right amount of time of soaking to break down the seed coat without damaging internal tissues.

The most low tech way to scarify is to put the seeds out in pots or in the garden in the fall and let natural mechanisms of wetting and drying, freezing and thawing or microbial attack break down of the seed coat.

The second type of dormancy is known as chemical dormancy where a chemical inhibitor within the seed prevents the development of the embryo even when water, oxygen, warmth, and light are present. Many of our native *Penstemons* and *Eriogonums*, for example, show this type of dormancy. To achieve germination the chemical inhibitor in the seed must be removed or broken down and then germination will occur.

Seeds of some native species, especially desert annuals, from habitats where drought is more of a risk to success than cold temperatures, contain a water soluble inhibitor. In nature, a significant rainstorm removes the chemical and germination proceeds. To remove this type of inhibitor you can simply soak the seeds in running water to encourage germination. But for seeds of many species from colder climates, the inhibitor is only broken down during the cold, moist conditions of winter. Then, the warm, moist conditions of spring lead to germination.

The technique to overcome this type of dormancy is called "stratification" and simulates natural winter conditions. This can be done in several ways. You can plant the seeds in containers and subject them to a cold, moist period in an unheated garage or porch. Studies have shown that the inhibitor breaks down most quickly at temperatures around 40 degrees F. Some species require only a few weeks of these conditions but others require up to three months or more. Often, once the inhibitor is broken down, germination occurs, even at low temperatures just above freezing. A space-saving technique to stratify lots of seeds is to put them in plastic baggies along with something to hold moisture. Long stranded peat moss is effective and its acidity retards the mold growth that can kill the seeds. I have also successfully placed seeds between two pieces of moist paper towel, previously microwaved to kill fungi (before the seeds are added) and then put them in the baggie. The temperature in a normal refrigerator drawer, not the freezer, is just about perfect for

for stratifying although my guests have often been surprised to open my refrigerator to see it full of baggies of seeds rather than food. I usually put seeds to stratify in the refrigerator at the beginning of January and then plant them on a warm windowsill or in a greenhouse at the beginning of March to have them ready for outdoor transplanting in late spring.

There are far more complexities to seed germination than I have covered here but there are an increasing number of references where you can look up the " recipe" for the species you want to grow. Even for species you collect in the wild for which there is no published information, you can often guess what it will take by looking closely at the seeds. Is there a thick or shiny, waxy seed coat? Then try scarification. Small seeds often require light to germinate since they have few reserves in the seed and they must be planted shallowly. Stratification is often necessary for seeds from temperate climates and rarely hurts for most species.

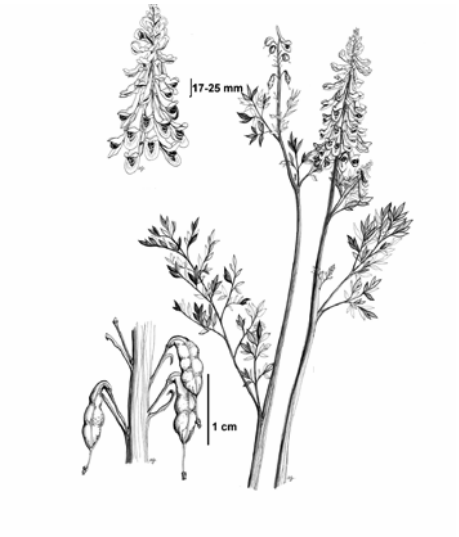
Here are some websites where germination and other propagation tips can be found for many of our Utah natives. If the specific species you're interested in isn't listed, the recipe for another member of the same genus from a similar geographical area will often work:

Native Plant Network:
http://www.nativeplantnetwork.org/network/search.asp
USDA Plants Database:
http://plants.usda.gov/java/factSheet
USFS Woody Plant Seed Manual:
http://www.nsl.fs.fed.us/wpsm/Genera.htm
USDA Fire Effects Database:
http://www.fs.fed.us/database/feis/plants/index
Ontario Rock Garden Society:
http://www.onrockgarden.com/ (Click on germination guide link)
Intermountain Native Plant Growers Association:
http://www.utahschoice.org/FactsheetLinkpage.htm
Alplains Nursery: A great commercial site for purchasing native seeds with germination recipes given for every species: www.alplains.com

A New Version of the Utah Rare Plant Guide

In 1991 a team of botanists led by Duane Atwood of UNPS created a beautifully illustrated guide known affectionately as the "Blue Book". Look up its full name on Google (*Utah Endangered, Threatened, and Sensitive Plant Field Guide*) and you get 150,000 references, attesting to its tremendous impact. It is heavily used by agencies responsible for managing public lands, and also by environmental consulting companies.

In 2003 Tony Frates produced a UNPS-hosted web version of the guide (www.utahrareplants.org), enabling much wider access and easier updating. Currently there are over 260 plants listed compared

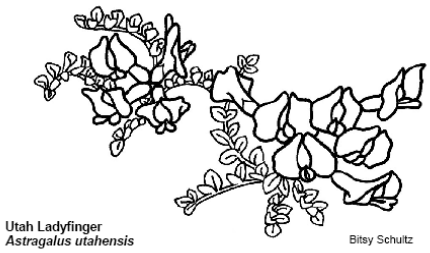


with the initial 181. Thirty of the originals are no longer listed – none have become extinct as far as we know, but priorities change, and we sometimes learn that a plant is not as rare as once thought.

Last year UNPS was invited to apply for a grant from the National Fish and Wildlife Foundation to produce a new version. In our application we proposed to obtain new botanical drawings for 35 species – such drawings highlight the minute details sometimes needed to distinguish between closely-related plants. We are also adding a new CD-rom version suitable for viewing on a laptop computer in the field: Internet is not available in most back-country campsites! This version, to be created by Bill Gray along the lines of his Cyberflora CD, will have many more photographs and maps than were available in the other formats.

Our application was successful, so over the next year and a half we shall be working hard to gather data, create drawings, and make a high quality finished product. You may be able to help in this. The original photographs, as published in the printed guide, were not digital and suffer badly when displayed on a computer screen. So we shall be trying to locate the originals and also to obtain new photographs. We would love to get everybody in UNPS involved by organizing field trips to various locations throughout the state. On the Rare Plant website there is a "wish list" page showing the most urgently wanted items, and this will be updated frequently. However, let us know if you have photographs of *any* of the species listed in the main guide – we have room for many more than could be fitted in the printed version. Contact Bill Gray (cyberflora@xmission.com) if you would like to help.

The principal people involved in this effort will be Duane Atwood (supervising the drawings to be made by April Jensen – see her wonderful illustration of Wasatch Fitweed above); Tony Frates (web-related activities and general manager of project); Bill Gray (digital photograph archive and CD-rom). – *Bill Gray, UNPS President*



Non-Profit Org.
U.S. Postage
PAID
Salt Lake City,
Utah PERMIT No.
327

Utah Native Plant Society

PO Box 520041

Salt Lake City, UT 84152-0041

Return Service Requested

Want to see the *Sego Lily* in color? Or read late breaking UNPS news and find links to other botanical websites? Or buy wildflower posters, cds, and other neat stuff at the UNPS store? Go to unps.org!

Utah Native Plant Society Membership

__ New Member
__ Renewal
__ Gift Membership

Membership Category

__ Student	$9.00
__ Senior	$12.00
__ Individual	$15.00
__ Household	$25.00
__ Sustaining	$40.00
__ Supporting Organization	$55.00
__ Corporate	$500.00
__ Lifetime	$250.00

Mailing
___ US Mail
___ Electronic

Name _____
Street _____
City _____ State _____
Zip _____
Email _____

Chapter _____

__ Please send a complimentary copy of the *Sego Lily* to the above individual.

Please enclose a check, payable to Utah Native Plant Society and send to:

Utah Native Plant Society
PO Box 520041
Salt Lake City, UT 84152-0041

Join or renew on-line at unps.org