



Sego Lily

Newsletter of the Utah Native Plant Society

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Palmer's buckwheat (*Eriogonum palmeri*) is an annual member of the buckwheat family (Polygonaceae) that occurs widely across southern Utah. Although a dicot, buckwheat flowers have 3 sepals and 3 petals, like lilies and other monocots. The petals and sepals are indistinguishable except by their position (sepals always form the outermost whorl). A clever botanist came up with the term tepal (an anagram of petal) to describe sepals and petals that look alike. Photo by Al Schneider from his website

Utah Native Plant Society



Utah Native Plant Society

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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.**

Sego Lily Editor: Walter Fertig (waltola64@gmail.com). The deadline for the November *Sego Lily* is 1 November 2014.

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Utah Native Plant Society Chapters

Unidentified Flowering Object

This month's UFO is a DYC found in sagebrush and juniper communities of the Grouse Creek and Pilot ranges of northern Utah, as well as the basin and foothill country of southern Canada, the Pacific Northwest, Idaho, and Wyoming (the photo actually comes from Wyoming and was submitted by Julie Kraft). Any guesses?

The May Unidentified Flowering Object was *Orogenia linearifolia* in the Parsley family (Apiaceae or Umbelliferae) submitted by Steve Hegji.

Have a UFO to share? Send it in! - *W. Fertig*

In Quotes: A man doesn't plant a tree for himself. He plants it for posterity. *Alexander Smith, Scottish Poet, 1830-1867.*

Bulletin Board

UNPS Annual Members Meeting, Saturday October 25: The Utah Native Plant Society annual members meeting is scheduled for Saturday, October 25 at Swaner Preserve and EcoCenter, 1258 Center Drive, in Park City. Setup for the potluck and presentation will begin at 12:30. The formal meeting will begin at 1 PM with a short UNPS business meeting, which will include a summary of projects from the past year and election of a new slate of board members. The board meeting will be followed by a presentation by Tony Frates, co-chair of the Society's Conservation Committee. Tony will be presenting a short update on his work on Uinta Basin penstemons followed by a presentation on collaborative efforts at restoring marshlands in Davis and Salt Lake County. Afterwards, there will be a potluck dinner with a New World cuisine theme. All members are invited to attend to meet other members and UNPS officers, share their favorite foods from North and South America, and learn about some rare Penstemons and wetland plants along the Wasatch Front. For more information, contact Mindy Wheeler (wheelermindy@yahoo.com or 801-699-5459).

The Swaner Preserve is open from 10 AM to 4 PM. Admission is free, but a \$3 donation is appreciated to help them defray costs. See the Swaner Preserve website for detailed driving directions from Salt Lake City or Camas/Coalville (www.swanerecocenter.org/about_us/hours-admission-directions.html).

UNPS Board Seeking New Members: Are you interested in helping guide the Utah Native Plant Society by volunteering as an officer, board member, or member of a committee? UNPS is seeking new individuals for these posts. If you are interested, or want to suggest someone, please contact UNPS president Jason Alexander before October 25.



Red Butte Garden Looking for Conservation Volunteers: The Red Butte Conservation Research crew can use your help. We are in need of 1 or 2 additional volunteers to join us on an upcoming field trip. The trip is from Sept 29-Oct 1 (Mon-Wed) and we will be traveling to an area in the AZ Strip just south of St. George, Utah. The project is to monitor our restoration plots for Gierisch's globe mallow, a recently listed Endangered species. We will be camping at a BLM campground near the site (trailers are permitted). The work does involve a significant amount of kneeling and being outside all day. If you are interested, please contact me for details as soon as possible—Rita Reisor, director of Native Plant Research, Red Butte Garden (801-585-5853/

Department of Corrections: Several alert readers noted a typographic error that your umbel editor missed in the May-July issue of the *Sego Lily*. On page 5 of Dorde Woodruff's article "A tale of two sileris", the fourth sentence of the fifth paragraph under the heading "Causes for Confusion between these two species" should read "Arp placed *Sclerocactus* into *Pediocactus*, not ***Pediocactus into Sclerocactus***." Fortunately the cacti know who they are! - *W. Fertig*

Have a botanical meeting or chapter event to publicize? Send announcements to the editor.

Above: Hoary aster (Machaeranthera canescens) being visited by a fly. Photo by Steve Hegji.

Penstemaniacs Descend on Southern Utah

Text and photos by Walter Fertig

Penstemonia is defined as the insatiable need to observe and grow members of the genus *Penstemon* (Scrophulariaceae or Plantaginaceae, depending on one's taxonomic preference). *Penstemon* is the largest genus of flowering plants restricted to North and Central America, with nearly 270 species recognized. The beardtongues are quite showy, coming in many shades of blue, purple, red, and white and relatively easy to grow in cultivation. Many species have restricted ranges, making *Penstemon*-hunting an enjoyable pastime for the true penstemaniac.

The American Penstemon Society was founded in 1946 to promote the study of *Penstemons* in the wild and their culture in the garden. Each year the Society sponsors a field trip to a different state (usually in

the west, where the vast majority of native penstemons occur). After meeting in Wyoming and Idaho the previous two years, the Society decided to visit southwestern Utah for their 2014 field trip.

Mikel Stevens, a plant geneticist and penstemaniac from Brigham Young University was charged with organizing the 2014 meeting. Mike deputized me to help find interesting places to find native beardtongues in the St. George and Cedar City area. We also enlisted the Utah Native Society, UNPS's Southwestern/Bearclaw poppy chapter, Zion National Park, and the city of Springdale for help. Barbara Farnsworth and Margaret Malm of the Southwestern chapter helped with local logistics, Fred Armstrong of Zion NP provided free admission and staff support for field

trips, and Julie Hancock provided free accommodations at Springdale's community center.

After more than a year of planning, the Penstemon Society meeting began on the evening of May 16th with a reception in Springdale. I presented an illustrated slide show on the flora of Zion National Park and its native *Penstemon* taxa. At least 17 beardtongue species have been

reported from Zion and another dozen are known from adjoining areas of southwestern Utah. Keynote speaker (and Dr. *Penstemon*) Noel Holmgren described the native beardtongues of southern Utah in greater detail at the Society banquet the following night.

Saturday and Sunday were field trip days. On both days Mike Stevens and Robert Johnson (collections



manager of the BYU herbarium) led the 180 mile vehicle caravan from Springdale to Old Iron Town (west of Cedar City), the Beaver Dam Mountains, and Sand Hollow on a quest for penstemons. The road to historic Old Iron Town (site of a pioneer mine and smelting operation) offered seven different beardtongues in a half acre- including the local endemic *Penstemon pinorum*. Befitting its name, Sand Hollow was full of psammophytic (sand loving) plants including the peculiar *Penstemon ambiguus* with its flattened, phlox-like whitish-pink blooms. The highlight was the foothills of the Beaver Dams where Mike and Robert treated the group to a display of fuchsia-colored *Penstemon petiolatus* (photo above), a local endemic restricted to

dolomite cliffs and boulders in the tri-state (NV-UT-AZ) area.

UNPS member Steve Dahl of the Manzanita (Kane County) chapter and Becca Lieberg of Zion National Park, guided a field trip on the upper East Rim Trail near the east entrance to Zion National Park. Group size was limited on this trail because it falls within designated Wilderness, but participants were rewarded with *Penstemon laevis*, *Penstemon pachyphyllus*, and the unusual natural hybrid, *P. x jonesii*. Named for pioneer Utah botanist Marcus E. Jones, this hybrid between blue-flowered *P. laevis* and red-flowered *P. eatonii* is restricted to Zion and nearby areas of southern Utah.

I led the other hikes with the able assistance of local botanist Doug Reynolds and Zion NP botanical prodigy Dan McConnell. In the morning, we hiked the lower end of the East Rim Trail, starting from the bottom of Zion Canyon near Weeping Rock. Being a spring weekend, we shared the trail with hundreds of tourists, some of whom wondered why so many seemingly normal adults were huddled around various wildflowers. The lower East Rim Trail offered the Zion endemic *Penstemon humilis* var. *obtusifolius*, *P. eatonii*, *P. palmeri*, and a possible *P. x jonesii* – although experts in the group debated whether it was true *jonesii*, a backcross with *eatonii*, or an F1 hybrid. We all could agree that the burgundy-flowered plants would make fine garden specimens. And like true scientists, we concurred that more study was needed.

My afternoon trip on Saturday took the group to Pocket Mesa and Lava Point in the Kolob Terrace portion of Zion National Park. Normally, both sites are full of flowering beardtongues in mid May, but unfortunately Zion had been hit by a cold snap and a spring snowstorm just a week earlier, throwing off all our preparations. I had hoped to show people the local endemic *Penstemon*

higginsii in bloom, but unfortunately only a few were even in bud and most were vegetative. We did find the showy white-flowered *Lewisia brachycalyx*, a cousin of the bitterroot (*L. rediviva*) in bloom as a consolation prize.

On Sunday I changed plans and had my group explore sand dunes north of Toquerville for *Penstemon ambiguus* and Spring Creek Canyon near Kanarraville for *Penstemon confusus*, *P. linarioides*, *P. eatonii*, and other wildflowers. These sites are at a lower elevation than the Kolob Terrace and were less affected by the cold weather.

For those who could not get enough *Penstemons*, the Penstemon Society and UNPS sponsored an additional expedition to Kane and Garfield counties on the following Monday. In Johnson Canyon east of Kanab, we ascended a low mesa topped by thick sand dunes for the narrow endemic *Penstemon ammophilus* (photo at left with a bee approaching). This unusual species has partly inflated stems covered with sticky glands that



catch sand grains. From here we proceeded to Red Canyon outside of Bryce Canyon National Park to see tiny *Penstemon bracteatus*. Unfortunately, the wild populations were late in flowering, but one atypically robust plant was blooming in the native plant garden maintained by the US Forest Service at the Red Canyon Visitor Center. Finally, a few intrepid penstemon fans continued on towards Escalante, where Mike Stevens showed us a disjunct population of the Kaiparowits endemic *Penstemon atwoodii* that he recently discovered. It was the perfect culmination to a weekend of penstemanian.

The 2015 Penstemon Society meeting will be in California. To learn more about the Society or join (basic membership is only \$15), go to their website (<http://apsdev.org/>).

Climate Change and Land Use History Enflame a New Range War Over Public Lands

By Jason Andrew Alexander, Ph.D., President of the Utah Native Plant Society

This past April I was researching the widespread use of cultivars of exotic and native plants by the U.S.D.A Agricultural Research Service (ARS) in revegetation projects on disturbed rangelands in the western U.S. By coincidence, a "New Sagebrush Rebellion" was in its infancy in southern Nevada, instigated by rancher Cliven Bundy and his 20 year-long grazing fee dispute with the Bureau of Land Management (BLM). These events may seem, at first, to be unrelated. But after studying the exploration, settlement, and establishment of public lands in Arizona, Nevada, and Utah for the past two decades I believe there are many obscure historical and modern links that forge them together.

My first serious investigation into the history of public lands grazing in this region started in 1997, while I was working for the National Park Service at Pipe Spring National Monument in northern Mohave County, Arizona. Through educational pamphlets and trail signs, visitors to Pipe Spring are told first-hand narratives of the explorers and ranchers finding a diverse, rich grassland across the Arizona Strip in the mid-19th century. In some accounts the grass was "as high as a horse's belly." The Arizona Strip today is very different ecologically. Decades of over-grazing have replaced these grasslands with a mixed desert shrubland, mostly dominated by species of *Atriplex* and *Chrysothamnus*. As part of my job with the park service, I was tasked with finding any first-hand accounts or photographs of the ranch prior to 1870 that would aid in the identification of the species composition of this vast grassland. In my travels that summer, I visited nearly every special collections photograph archive in Arizona and Utah. I never did find any pictures of the pre-settlement vegetation around Pipe Spring nor specific descriptions of the grasses that could aid identification. However, this was my first exposure to evidence of the extinction of an entire plant community in the modern era, something that I was taught last happened 8,000 - 10,000 years ago after the retreat of the last Ice Age. From that point, I was obsessed with finding the reason for this extinction. Was it just simply too many cattle grazing over a period of several decades? Did the weather patterns fluctuate erratically?

Until recently, data on the climate conditions prior to 1900 were non-existent, so attempting to correlate events with climate patterns was not possible. Over the past decade, tree ring analyses have made a resurgence following the increased scientific interest in historic and modern climate phenomena. By using sophisticated statistical analyses of tree ring data, Meko et al. (2007) reconstructed estimates of the amount of water flowing each year in the Colorado River at Lees Ferry from A.D. 782

until 2005. These data can be used to estimate the amount of precipitation across the region-- a valuable tool for investigating the timing and intensity of historic droughts in the Great Basin and Colorado Plateau.

Table 1 (adapted from Meko et al. 2007) shows the water-year flow estimates for the period between 1848 and 2013. Water-years follow the period between October of the current year and September of the following year, not the typical calendar year. The estimates for the most recent drought, between 2006 and 2013, come from U.S. Bureau of Reclamation (USBR) reports of the unregulated inflows into Lake Powell (Bureau of Reclamation, 2014b). These inflows are used herein as an estimate of the most recent flows along the Colorado River, since the data from Meko et al.(2007) were calculated only up to 2005. Glen Canyon Dam regulates the flow of the Colorado River at a nearly constant rate year-round, therefore, monthly gauge readings from Lees Ferry (as reported by the USBR) cannot be used for climate estimates. Observed and historical Colorado River flows have to be calculated by other statistical methods. Over the entire period of the Meko et al. study, the water-year flows at Lees Ferry averaged 18 billion cubic meters (BCM). The average flow during the 20th century was not that much higher at 18.7 BCM per water-year. Therefore, a value of 18 BCM value was interpreted by Meko et al.(2007) as a year with average precipitation. Anything below that value is interpreted as a dry year, with values near or below 10 BCM being an extremely dry, drought year.

The history of the public lands in Arizona, Nevada, and Utah are intimately connected to the climate events shown in the tree ring analysis results in Table 1. In 1849, the first settlers to this region arrived to find a very grass-rich environment, prime for agricultural and ranching development. Between 1848 and 1876, the Colorado Plateau underwent a period of sustained above average precipitation, with 19 out of 29 years with flow in the upper Colorado River Basin of 18 BCM or above. This extremely wet period coincided with the aforementioned observations of widespread grassland communities and the subsequent establishment of the majority of the first agricultural settlements and ranching homesteads across the Great Basin and Colorado Plateau.

In the mid- to late 19th century, most of the large ranching operations in southwestern Utah and northwestern Arizona were owned by the Church of Jesus Christ of Latter-day Saints (LDS). In 1870, Brigham Young purchased the ranch at Pipe Spring, the largest ranch at the time on the western part of the Arizona Strip. He selected it to be the next ranch for the relocation of tithing cattle herds, since all of the pastures around St. George

Table 1. A summary table of the reconstructed water-year flows along the Colorado River at Lees Ferry, Coconino County, Arizona, adapted from Meko et al. 2007.

Water-Year	Average reconstructed flow, billion cubic meters (BCM)	Highest Flows (Year, BCM)	Lowest Flows (Year, BCM)	Notes:
Data Summary				
762-2005	18.08	N/A	N/A	total mean flow over study period
1118-1179	14.16	1128, 22.92	1147, 11.26	longest sustained series of droughts on record, the Medieval Climate Anomaly (62 years)
1579-1592	14.62	1586, 20.73	1584, 6.25	longest, most severe drought between A.D. 1500 and 1999 (14 years)
1900-1999	18.70	N/A	N/A	mean reconstructed flow for the 20th century
2000-2013	12.79	2005, 20.59	2002, 5.51	current drought (13+ years)
1848-1876	19.00	1849, 28.80 1866, 27.78 1867, 28.89	1851, 4.97 1861, 9.22 1871, 10.56	above average precipitation; 19 of 29 years above 18 BCM
1877-1883	14.32	1880, 16.79	1879, 9.62	below average precipitation; ~7 year drought
1884-1898	17.61	1884, 22.12	1896, 11.16	average precipitation; 8 out of 15 years above 18 BCM
1899-1902	12.50	1899, 14.51	1902, 7.68	below average precipitation; ~4 year drought
1903-1930	20.43	1917, 26.78 1921, 27.09	1925, 13.97	above average precipitation; 22 of 28 years above 18 BCM
1931-1936	15.93	1932, 21.14	1934, 8.9	Dust Bowl event; below average precipitation; ~6 year drought
1937-1958	18.28	1941, 24.12 1942, 25.68	1946, 11.45	average precipitation; 7 of 10 years above 18 BCM
1959-1961	13.44	1962, 21.01	1959, 9.9	below average precipitation; ~3 year drought
1962-1987	19.60	1983, 28.93 1984, 26.3 1985, 26.68 1986, 26.91	1976, 12.74 1977, 4.44 1981, 12.17	above average precipitation; 17 of 26 years above 18 BCM
1988-1990	13.97	1988, 15.71	1990, 10.72	below average precipitation; ~3 year drought
1991-1999	19.60	1995, 21.39 1998, 21.43	1994, 14.34	above average precipitation; 8 of 9 years above 18 BCM
2000-2002	10.433	2000, 13.18 2001, 12.61	2002, 5.51	below average precipitation, ~3 year drought
2003-2005	18.78	2005, 20.59	2004, 17.44	average precipitation; 1 year of 3 above 18 bcm
2006-2013	11.42	2011, 19.71	2012, 6.04 2013, 6.31	below average precipitation, 7+ year drought

were stocked to capacity. In 1871, to assist with the increased demands for food and supplies for the building of the temple in St. George, Brigham Young incorporated the New Canaan Stock Company, with James Andrus as superintendent. A new headquarters was built at Canaan Ranch near Canaan Springs, 3 miles northwest of the present day towns of Hildale and Colorado City. The New Canaan Stock Company managed additional tithing herds being relocated to the Canaan Ranch. For a short time, while the demands for supplies for the building of the temple were highest, the herds and dairy operations at Pipe Spring were overseen by the newly formed Winsor Castle Stock Growing Company, owned by Anson Winsor, Brigham Young, and the LDS Church. By 1879, a couple years after the temple was finished, the church consolidated the two to form the Canaan Cooperative Cattle Company. Afterwards, the company established the Parashant Ranch and dairy at Oak Grove (north of Mount Dellenbaugh, Mohave County, Arizona). This ranch became a major purveyor of supplies and dairy products to the mines and sawmills operating on the Shivwits Plateau. By 1880, the Canaan Cooperative Cattle Company had acquired a majority of the regional water resources which allowed the Church to graze cattle throughout the western Arizona Strip (Fairley 1989).

The next large cattle company formed by the LDS Church, the United Order of Orderville, formed in 1874, was established by a cooperative of smaller ranches established by John D. Lee, Levi Stewart, Lewis Allen, Jacob Hamblin, and David Udall. The primary headquarters of the United Order was located in communal settlements around Orderville in Kane County (located about 15 miles north of Kanab along present day U.S. Highway 89). As the United Order grew, so did the demand for cattle. By 1880, the United Order controlled the majority of the grazing resources from all of the family-owned ranches on the Kanab Plateau eastward across the Kaibab Plateau and onto the winter grazing pastures of House Rock Valley. Most of these ranching families joined with the United Order willingly, inspired by the success of the communal-living settlements in Orderville (Fairley 1989). The success of the United Order communal farms and ranches was short-lived, unfortunately.

By 1883, overgrazing had transformed the Arizona Strip. The grassland plant communities that were once widespread across the valleys and plateaus were nearly extinct. The rancher Jacob Hamblin, in an 1880 letter to John Wesley Powell, wrote that "... the foothills that yielded hundreds of acres of sunflowers which produced quantities of rich seed, the grass also that grew so luxuriantly...the seed of which was gathered with little labor, and many other plants that produced food for the natives is all eat out [sic] by stock." (Pipe Spring National Monument 2014).

Clarence E. Dutton, an associate of John Wesley Powell and a geologist working for the United States Geological Survey, passed through this region multiple times during the 1870's and 1880's while studying the geology of this region for *A Tertiary History of the Grand Canyon District*

(Dutton 1882). During his field research, he stopped at Pipe Spring in 1880 and observed:

"Ten years ago the desert spaces outspreading to the southward were covered with abundant grasses, affording rich pasturage to horses and cattle. Today hardly a blade of grass is to be found within ten miles of the spring, unless upon the crags and mesas of the Vermillion Cliffs behind it. The horses and cattle have disappeared, and the bones of many of the latter are bleached upon the plains in front of it. The cause of the failure of pasturage is twofold. There is little doubt that during the last ten or twelve years the climate of the surrounding country has grown more arid. The occasional summer showers which kept the grasses alive seldom come now, and through the long summer and autumn droughts the grasses perished even to their roots before they had time to seed. All of them belong to varieties which reproduce from seed, and whose roots live but three or four years. Even if there had been no drought the feeding of cattle would have impoverished and perhaps wholly destroyed the grass by cropping it clean before the seeds were mature, as has been the case very generally throughout Utah and Nevada" (Dutton 1882:78-79).

The drought Dutton observed was one of the most severe and prolonged in the region in over a century. The severity of this drought was similar to the droughts during the Medieval Climate Anomaly (1118-1179) and the 14 year long drought from 1579-1592 (Table 1).

In contrast, the Legislature of the Territory of Arizona largely ignored these observations of the degradation of the rangelands across Arizona. In a series of reports from 1880-1883 promoting the agricultural and mining resources of the Arizona Territory, Patrick Hamilton stated:

"Of the 114,000 square miles which constitute her area it is safe to say that 60,000, or more than one-half, are excellent grazing lands. From the borders of Utah to the boundary of Sonora, and from the line of New Mexico almost to the Colorado, Arizona is one vast grazing ground... On the Colorado plateau they attain a strong and vigorous growth. After the summer rains—which usually begin in July and end in August—valley, plain and hillside is a rolling sea of living green. The grass shoots up with wonderful luxuriance, and myriads of wild flowers lend a charm to the landscape... Here [the stockman] is not compelled to put up large quantities of feed to keep his stock during that period. Here he runs scarcely one of the many risks that attend the stockman's calling in less favored lands. Here the climate is almost perpetual spring, and even in the driest season the feed never fails... Nor need he have any fear about 'eating up' the range. After being grazed down to the roots, the sweet gramma grass shoots up next season with fresh vigor and luxuriance. Ranges over which cattle have roamed for years show no falling off in the quantity or quality of the feed. In fact, it is claimed by some that the ground is enriched by the cattle, and that the native grasses attain a stronger growth after being pastured for a few years" (Hamilton 1883:169-172).

By 1884, weather patterns had started to shift. Although the years 1884-1898 were a period of average precipitation (17.61 BCM), only 3 consecutive years

(1890-1892) had precipitation that was above average. The remaining wet years were followed by short cycles of 1 or 2 dry years, a pattern not seen during the previous above-average period between 1848 and 1876 (Meko et al. 2007). The cycles of average rainfall followed by short periods of drought apparently did not provide enough moisture for the grasslands to recover to their pre-settlement vigor, which greatly impacted the success of ranching and farming by small family-owned operations and large cattle companies alike.

In northern Arizona, both the United Order and the Canaan Cooperative Cattle Company started to sell off parts of their ranching operations to private buyers in the 1880's. John W. Young, a son of Brigham Young, purchased the United Order holdings on the eastern Arizona Strip and formed the Kaibab Cattle Company. The Canaan Cooperative Cattle Company divested itself of the majority of its ranching operation on the Shivwits Plateau by selling the Parashant Ranch to Benjamin F. Saunders, a wealthy non-Mormon businessman from northern Utah. The remaining ranches held by the United Order and the Canaan Cooperative Cattle Company were largely broken up and sold to private individuals after the passage of the Edmunds-Tucker Act in 1887. The act prohibited the practice of polygamy and forced the LDS Church to dis-incorporate and sell any commercial assets worth over \$50,000. In reality, the act only hastened the sale of assets already brought on by the previous drought and overgrazing. The breakup of the United Order and the Canaan Cooperative Cattle Company, the largest cattle companies in northern Arizona at the time, signaled the end to the dominance of LDS church and family-owned

ranching operations in this region for several decades (Fairley 1989).

As a result, ranching on the Arizona Strip was moving toward a period of large-scale cattle ranches owned by wealthy cattle barons. Benjamin Saunders was the first of the cattle barons to occupy large tracts of rangeland on the Arizona Strip. After purchasing Pipe Spring, he proceeded to develop other water sources across the western Arizona Strip. Anthony Ivins purchased the Parashant Ranch and used it as the base of operations for his Mojave Land and Cattle Company. By 1892, Saunders and Ivins had bought out the majority of the pioneer ranches and church operations formerly managed by Canaan Cooperative Cattle Company (Fairley 1989).

The last wealthy cattle baron to dominate the rangelands of the Arizona Strip was Preston Nutter, an opportunistic businessman who moved to northern Utah to establish a cattle ranch. In 1893, Nutter purchased 5,000 cattle from various ranchers in Arizona who were desperate to sell due to the poor precipitation over the past year (1893 was the first drought year after a short, wet period between 1890 and 1892). His plan was to drive the cattle to central Utah by crossing the Colorado River by ferry and drive the herd north into Nevada and Utah along the Scanlon Ferry Road. His late-season arrival in Saint George forced him to overwinter his livestock on the Arizona Strip. However, very little precipitation fell on the Strip in late 1893 and early 1894. Since few of the water resources were legally owned by either Saunders or Ivins, Nutter was able to force his cattle onto the range and occupy the springs much like previous generations of ranchers did (Price & Darby 1964, Fairley 1989).



Above: West Cabin Spring (foreground) and West Cabin in Pipe Spring National Monument, Mohave County, Arizona, circa 2008. Photo by Walter Fertig.

Since he had not suffered any significant losses in the region due to any of the previous drought years, Nutter had the asset and monetary advantage. The degradation of the rangelands due to overgrazing and the lack of a sustained wet period following the 1877-1883 severe drought was heavily impacting the profit margins of the two largest cattle companies on the Strip, owned and operated by Saunders and Ivins. By this time, Saunders was ready to divest himself of all his holdings and sold the ranch at Pipe Spring and his claims to springs throughout the western Arizona Strip to Nutter (Anonymous 1964, Price & Darby 1964, Fairley 1989). Ivins would have persisted through the droughts and continued ranching in this region, however, the LDS Church called him to service to establish new polygamist colonies in northern Mexico. This obligation forced Ivins to sell all of the land and assets of the Mojave Land and Cattle Company to Nutter, including the Parashant Ranch. By 1895, Preston Nutter became the single largest land-holder and cattle rancher on the western Arizona Strip (Anonymous 1964, Price & Darby 1964, Fairley 1989).

Preston Nutter was not satisfied with just occupying the water resources of the strip, however. He became more interested in establishing a permanent winter grazing operation in the region by legally obtaining the ownership rights to all the water resources on the western Arizona Strip. Few ranchers prior to Nutter held legal ownership to the water resources used by their cattle (Anonymous 1964, Price & Darby 1964, Fairley 1989). Nutter took legal action under the "Forest Lieu Act" of 1897 to acquire legal rights to nearly every other water resource on the Strip. Although the act was originally written to allow Native Americans, homesteaders, and ranchers with private lands that were located within newly created Forest Preserves (the predecessor to modern National Forests) to swap their inholding for other public lands of equal value, the majority of land swaps were manipulated by large corporations and wealthy individuals in order to further their own acquisition of large tracts of public lands (McIntosh 1974). Nutter purchased private inholdings within Forest Preserves in several states, including Montana and California. Afterwards, he would exchange these lands for the legal ownership rights for lands surrounding springs and other water resources in western Arizona. Fraudulent land purchases were so pervasive as a result of this act that it was repealed in 1905. By that time, however, Nutter owned at least 21 springs and the majority of the best rangeland on the Strip (Anonymous 1964, Price & Darby 1964, Fairley 1989).

The first decades of Nutter's reign as the dominant cattle baron in northern Arizona was another period of widespread land-use and environmental change in this region. Dutton's observations in the early 1880's of the destruction of the Arizona grasslands were nearly forgotten by 1890. By 1900, the many reports of the endless grasslands of Arizona, such as those written by

Hamilton (1883) and others, were replaced with widespread observations of the near complete destruction of the ranching industry. At a meeting of the American Forestry Association in Denver Colorado, R. H. Forbes, Director of the Arizona Agricultural Experiment Station, warned of the increasing degradation of the rangelands across the southwest:

"In seasons of scarcity, when feed was short, the cattle began to perish from starvation, devouring in their desperate struggle for existence, almost every vestige of growth upon the plains. Being compelled in their wanderings back and forth between the higher and lower grounds, to take twenty steps for a mouthful of food where formerly but one was necessary, they deepened their paths from place to place; the prevailing winds blew the dust from these paths until they lay inches below the general surface, and then, upon a country prepared for destruction, came the rains. The water, collecting in the trails from the bared and devastated surface of the country, fell swiftly to lower levels, gulying the trails as it ran, and gathering in destructive freshets in the larger valleys. The bunch grasses, having been depleted by the starving cattle, were no longer able to withstand the rush of the floods, and the gulying process began on a large scale through the very heart of what were formerly - the most luxuriantly grassy regions... The ruinous methods which seem inevitable upon a public range... have so destroyed its value, and have so changed the original condition of the country that in many cases, in spite of the present high prices of cattle, the ranges now carry but a tithe of what they once did.. Based upon observation and conversation... with the stockmen of this depleted range... [the cattle industry has been] almost commercially destroyed. In the San Simon valley [Cochise and Graham counties, AZ] alone, it is judged, on these grounds, that within the past decade the number of cattle has fallen off from 75 to 90 per cent. In the Sulphur Spring valley [eastern Cochise County], it is stated that during the season of 1900, which was a very severe one, the losses of cattle by starvation were from 15 to 50 per cent... These instances represent the condition of the cattle industry in scores of great valleys, And from the stockman's point of view, indicates the urgent need of administrative measures planned for the salvation of this great industry (Forbes 1901: 218-219).

By some estimates, Nutter alone was grazing over 25,000 head of cattle on the western Arizona Strip after 1900 (Grand-Canyon Parashant National Monument 2014). During the drought between 1899 and 1904, there was only a single year with flows along the Colorado River above 18 BCM (1903; Meko et al. 2007). It is not known how much his herds suffered from die-off during this time due to drought. Nutter was fortunate to have moved into dominance on the rangelands of northern Arizona and central Utah during this drought because it was followed by an extended, above average period of precipitation not seen since the mid-19th century. Between 1903 and 1930, the Colorado River had flows of 18 BCM or higher in 22 out of 28 years. With the high precipitation, new land-use changes to the



region followed. The Railroad companies started a leasing program to sheep herders throughout Utah and Arizona. Herds of 10,000 sheep or more were frequently driven from railheads across the open range to the leased railroad-owned property. The sheep directly competed with the open range cattle for resources and were the cause of many resource-related range wars between cattle ranchers and sheepherders in the early 20th century (Price and Darby 1964, Fairley 1989).

The high precipitation and resulting re-growth of some of the region's grasslands also brought about changes in agriculture. Wetter conditions prompted the federal government to pass another series of homestead acts. In 1909, the Enlarged Homestead Act expanded the size of homesteads to 320 acres, a size at the time thought to be ideal for the establishment of "Campbell System" dry-farming communities across the western United States (Buffum 1909, Fairley 1989). The Campbell System was promoted for arid lands where precipitation was too low for typical farming techniques. The tilling or plowing methods developed for this system attempted to prevent moisture loss in the soil in preparation for crops of winter wheat to be planted (Buffum 1909).

Other amendments to the Homestead Act followed during the next 20 years. In 1912, the Three-year Homestead Act reduced the homestead time period from five to three years. The Stock Raising Homestead

Above: Flats northeast of Winsor Castle in Pipe Spring National Monument are dominated by woody shrubs today, rather than the desert grasslands reported by early pioneers. Photo by W. Fertig.

Act followed in 1916 with the addition of cattle ranching to the land-use allowed for establishing homesteads and allowed homesteads to increase to a size of 640 acres (Fairley 1989, Bureau of Land Management 2014). It was not a coincidence that the legislature of the newly established State of Arizona took advantage of this wet period and, as their predecessors did by hiring Patrick Hamilton in 1883, funded another series of publications advertising the natural resource opportunities of Arizona. Field investigations in 1914 for northern Arizona were led by Dr. A. M. McOmie, the head of the Arizona Experimental Station. Pipe Spring Valley, once denuded of all vegetation by cattle by the late 1880's, was reported by McOmie to have "*as far as the eye can reach.. a wonderful tract of excellent agricultural land, the best north of the [Grand] Canyon... and evidently enough rainfall, as indicated by a gauge at Kanab which for three years registered an average of 15 inches annually. These valleys running from Pipe Springs by the Short Creek country to Hurricane Ledge and thence southward through Antelope Valley must contain close to three-fourths of a million acres of fine agricultural land*" (McOmie 1915: 13-14). The "three years" of rainfall reported by McOmie was the end of an extremely wet

period between 1909-1913 when the flows along the Colorado River were between 20 and 23 BCM, with only a single year (1913) having a slightly lower than average 16.8 BCM. This was the wettest consecutive series of water-years in this region since the period from 1865 to 1869 (Meko et al. 2007). Between 1915 and 1930, homesteading communities were established throughout the Arizona strip from Short Creek south to the Shivwits Plateau and east to House Rock Valley. At its peak, Short Creek had over 50 residents. Bundyville, established by Cliven Bundy's ancestor Abraham Bundy, was the most successful and long-lived, dry-farming community on the Strip and at its peak had over 300 residents (Fairley 1989, Kelly 2002).

Unfortunately for the settlers who moved onto the Arizona Strip to establish farm and ranch homesteads, the weather patterns between 1903 and 1930 were an unusually wet climate event. If the wet period had persisted, perhaps McOmie's field investigation would have been a more accurate assessment of the water, agricultural and ranching resources in northern Arizona. Economic and environmental changes however forced the bankruptcy of many of the farm and ranch homesteads on the Arizona Strip established after 1915. Between 1931 and the end of the Dust Bowl Era in 1936, there were only two average precipitation years. During the remaining years, the Colorado River flow ranged between 8.9 and 16.7 BCM. Although the Arizona Strip was not hit as hard by the Dust Bowl Era as the mid-west, the impact of the drought forced most homesteaders to abandon their Arizona Strip farms and ranches by 1940 (Fairley 1989).

By 1934, the driest of the Dust Bowl years, the impacts of the severe droughts and the overgrazing in the western United States forced the Federal Government to develop a series of management plans for public lands in order to mitigate the losses and end the conflicts that were characteristics of the drought years. The Taylor Grazing Act in 1936 and a few years later, the establishment of the Bureau of Land Management (BLM), effectively ended the open range overgrazing that was the cause of the loss of the grasslands throughout northern Arizona. On the Arizona Strip, where over 100,000 cattle were grazed on open rangelands at their peak, the BLM allowed only 117 permit holders to run a total of 15,000 head. That is 10,000 fewer head than Preston Nutter alone grazed on his lands during the peak of his ranching operations on the western Arizona Strip (Fairley 1989, Grand-Canyon Parashant National Monument, 2014).

In the 19th and early 20th centuries, ranchers, farmers and sheepmen engaged each other in often violent conflicts for water and land during severe droughts. In the late 20th and early 21st century, drought conflicts have not subsided. Now, due to the management of the public lands by the BLM and Forest Service, ranchers have only one stakeholder to fight: the federal government.

The Federal Land Policy and Management Act of 1976 (FLPMA), brought an end to the homesteading era

when the federal government actively promoted the sale of public lands to private individuals. The public lands agencies had to now manage lands with a "multiple-use" philosophy. The BLM has to contact permittees each year to develop grazing management plans for their allotments. Decisions on the number of stock allowed, on and off dates, and other management terms are made in light of drought conditions, whether an allotment is meeting rangeland health standards, impacts from recent wildfires or reseeding efforts, or demands for forage from wildlife or free-ranging horses and burros (Nevada State Office BLM 2014).

The lack of direct control over land use is the source of the public land conflicts that started in 1976 with the first "sagebrush rebellion" and have persisted until this day. The clash between Cliven Bundy and the BLM is not the first such conflict to have arisen, although it has been the only one in recent memory to include armed private militia organizations. Similar conflicts over grazing fees and the retirement of grazing allotments have happened many times. One of the first in Nevada was between the BLM and John J. Casey, owner of the Holland Livestock Ranch, who in the late 1970's grazed his cattle on public lands surrounding his private in-holding without paying grazing fees. Raymond Yowell, a Shoshone Indian, had his cattle confiscated in 2002 after refusing to pay grazing fees for the past decade because he believes that his grazing allotment is owned by his tribe and not by the federal government. Pete and Lynn Tomera, ranchers from the Battle Mountain area, had their allotments rested and cannot graze their cattle in 2014 due to drought.

A repeal of FLPMA could result in the deeding of federal lands to the states. Ranchers like Cliven Bundy and Pete Tomera may regain a short-lived freedom to manage their livestock as they choose. The history of land ownership in the arid southwest is not characterized by the long-term ownership of farms and ranches by homesteaders, however. Far more farms and ranches have been abandoned than the number currently occupied by descendants of homesteaders. What might happen if federal lands are privatized? Consider the answer to the following question: Who now owns the Preston Nutter Ranch in central Utah, his headquarters after he established his winter ranch on the Arizona Strip?

The Nutter Ranch is currently owned by the Hoodoo Land and Cattle Company, a subsidiary of Hunt Consolidated, Inc. The lands owned by Hoodoo are operated as ranches and farms only to mitigate the costs of holding the land until it becomes valuable for resale. From their website (<http://www.hoodooilandandcattle.com/OpsOverview.aspx>), this company "buys and holds large tracts of undeveloped land for future use in real estate development and/or mineral exploitation... Our properties are periodically evaluated to determine their part in Hunt's long-term strategy. Depending on the circumstances, the properties will either be kept until the market determines that there is an opportunity for real estate development or mineral exploitation, or they will

be sold or traded." This could be the future of millions of acres of public lands. The local ranchers currently grazing on BLM allotments will likely not have control over their grazing allotments for long, especially if droughts continue to be longer and more frequent as a result of climate change. In the private sector, and even in state government, grazing will continue to take a back seat in negotiations between the state and private investors who want to purchase lands for development. Only the most degraded and least valuable lands for grazing, energy extraction, and development will remain in public use. As happened in the early 20th century, businessmen will buy up the most valuable tracts of public lands and use them as a long-term investment vehicle for wealth. Today, however, multinational energy companies would become the largest land holders in the western United States, not opportunistic, self-made businessmen like Preston Nutter.

Have we reached a tipping-point in the conflicts between stakeholders on public lands? Have all the public grazing lands in semi-arid climates fundamentally changed to the point where the plant communities will never return to pre-settlement conditions? Long-term scientific studies have been performed examining different grazing practices on public lands (see for example, the National Science Foundation-funded Jornada Basin Long-Term Ecological Research Project). New protocols for assessing rangeland health have been developed as tools for the scientific management of range lands (Pellant et al. 2005). In one study performed in Arizona between 1997 and 2004, Loeser et al. (2007) conducted several long-term experiments on grazing lands in northern Arizona, examining the impacts of different grazing regimes on plant community diversity. Their study found that high-impact grazing, comparable to the intensity during the late 19th century, was detrimental to the productivity of the land, reducing desirable species, plant community diversity, and increasing invasive species richness. A similar pattern, including an increase in invasive species richness, was even found on plots where grazing was removed for the study period. Loeser et al. concluded that after 150 years of grazing and periods of drought and high-impact grazing, public grazing lands in poor condition will not significantly recover by entirely removing grazing for short periods of time (1-3 years). The impact of the competition with invasive species such as cheatgrass impedes the re-establishment of a native plant communities. Their results combined with evidence from other studies suggests that a 20 year period may be necessary for an overgrazed rangeland to recover the diversity similar to a native plant community. Successive droughts during the grazing-rest period are likely to increase the time necessary for recovery. For lands that are consistently grazed (such as BLM allotments), a moderate grazing regime reduces the exotic species richness over time, interspersed with period of rest during droughts (Loeser et al. 2007).

If you combine these grazing data with the other disturbances happening on public lands-- overgrazing due to wild horse populations, disturbance from the increasing intensity of recreational activities, or an increase in the frequency and intensity of fire disturbances, the return of any of our public lands to a native, healthy plant community regime appears unlikely. It may in fact be impossible to utilize seed mixes composed entirely native species in restoration projects, if high-impact disturbances are characteristic of the land-use history of a project area. Within the paradigm of a climate regime where droughts may be more frequent and severe than in the past, it may even be necessary to mitigate dust hazards from disturbed areas with seeds of grazing-resistant species known to quickly and successfully establish. Blowing dust from overgrazed rangelands, recent fires, and droughts have region-wide impacts. The dust from deserts across Arizona, Colorado, Nevada, New Mexico, and Utah were deposited on snowpacks in the mountains of Colorado during a unusual windy weather event in the Spring of 2009. This heavy layer of dust increased the rate of snow melt across the mountain ranges of western Colorado such that it affected the timing of spring floods by over a month. Changes in the timing of snowmelt can have dramatic effects on the availability of water during the summer across the upper Colorado River Basin. It will impact municipal water supplies, livestock grazing, and natural resource extraction activities as well as recreational activities that rely on year-round river flows such as boating, kayaking, and fishing (Kedrowski & Tomer 2010). As a result, the need to mitigate the region-wide spread of dust as a result of drought and soil disturbance will become an ever-increasing priority for land use managers.

This reality has been one of several motivators for the Agricultural Research Service to spend millions of dollars on grants to develop cultivars of grasses and forbs (both exotic and native species) that are drought and disturbance tolerant. The USDA lab specializing in the development of these new rangeland genetic cultivars is the Forest and Range Research Lab in Logan, Utah (http://www.ars.usda.gov/main/site_main.htm?modecode=54-28-10-00). One of the primary objectives for this lab is to "improve pasture and rangeland management practices and forage nutritional quality through improved genetics for structure/variation, stand establishment, forage quality, nutrient cycling and persistence characteristics for use on disturbed and semi-arid rangelands in the Great Basin and eastern Upper Mojave Desert, through collection, characterization, improvement and evaluation of grass, legume, and forb germplasm."

The widespread use of non-natives, as well as cultivars of natives, in revegetation projects by the ARS is an issue of concern with a number of native plant societies in the western United States (see November 2013 *Sego Lily*). In March 2014, ARS met with federal rangeland



scientists and representatives of state native plant societies by conference call to discuss the issue. Although the majority of native plant society representatives were still highly concerned with the research priorities of the ARS scientists and the impacts of restoration projects using non-natives and disturbance-tolerant cultivars have on rare plant populations, both sides were willing to continue the discussion, in an attempt to find common ground in the future. It may be necessary for us as concerned members of native plant societies to volunteer our time to manually restore sensitive plant communities that have been unintentionally impacted by disturbance-tolerant cultivars. Alternatively, it may be necessary for us to help reseed areas with natives that have been previously reclaimed using these cultivars, in order to nudge the natural process of plant succession back to native plant communities.

Contrast these methods with those used by the armed militia members who attended the protest demonstrations facilitated by Cliven Bundy in Bunkerville in April 2014. The rise of aggressive, politically-motivated people and organizations should be a warning to all of us seeking change in the policies of the federal agencies. Bundy's "New Sagebrush Rebellion" is only the extreme end of a spectrum of groups seeking quick ways to reverse over 60 years of federal legislation on public lands. Other similar actions include the Legislature of Utah passing laws in an attempt to force the Federal Government to effectively nullify the Federal Land

Above: Fenced plot of replanted native perennial grasses outside the Pipe Spring National Monument Visitor Center. With the exception of the clumps of introduced cheatgrass, this grassland may be similar to what the 19th Century pioneers encountered on the Arizona Strip. Photo by W. Fertig.

Policy and Management Act of 1976, the coalition of Uinta County government and energy company representatives seeking to circumvent the listing of two *Pentstemon* species under the Endangered Species Act, and Iron County ranchers and elected county officials attempting to round-up wild horses in direct violation of the Wild Free-Roaming Horses and Burros Act of 1971. These groups are not interested in changing laws through the normal process of proposing new bills and lobbying for them across the country.

It is not a coincidence that all of these actions are happening during one of the most severe, prolonged droughts in the past 100 years. As of July 2014, Lake Powell (despite having a snowpack in the upper Colorado River Basin exceeding 111% in April) will end the water year at 61% of capacity (Bureau of Reclamation, 2014b). Lake Mead in the lower Colorado River Basin is at 39% capacity and is at the lowest level ever recorded since the dam was built in 1939 (Bureau of Reclamation, 2014a). The current drought is more severe than the longest drought recorded in the past 400 years (1579-1592, see table 1). More political conflicts are sure to arise before this drought ends as public lands become more heavily impacted. The methods used by

these groups are a call for all people, whether you are passionate about the preservation of rare plants or are an active recreational user of public lands, to engage with the federal land management agencies and help them preserve and restore the public lands. Only by discussing our concerns with the land managers and negotiating with them to create alternative methods to mitigate against activities that cause chronic disturbance and uncontrolled invasions of exotic weeds will progress toward our long-term preservation goals be made. Sometimes the federal agencies will choose the least politically treacherous route to the detriment of the conservation of native species and ecosystems. At precisely that moment, we must voice our opinions, engage the people working for the federal agencies, and promote change.

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Postscript:

US Fish and Wildlife Service Signs Off on Conservation Agreement For Uinta Basin Penstemons

In the latest twist in the ongoing conservation saga of Graham's penstemon (*Penstemon grahamii*) and White River penstemon (*P. scariosus* var. *albifluvis*), the US Fish and Wildlife Service officially withdrew its proposal to list these rare Uinta Basin endemic plants under the Endangered Species Act on August 5, 2014. According to the Service's official notice "...the best scientific and commercial data available indicate that the threats to the species and their habitats have been reduced so that the two species no longer meet the statutory definition of threatened or endangered species" (*Federal Register*, <http://www.gpo.gov/fdsys/pkg/FR-2014-08-06/pdf/2014-18368.pdf>).

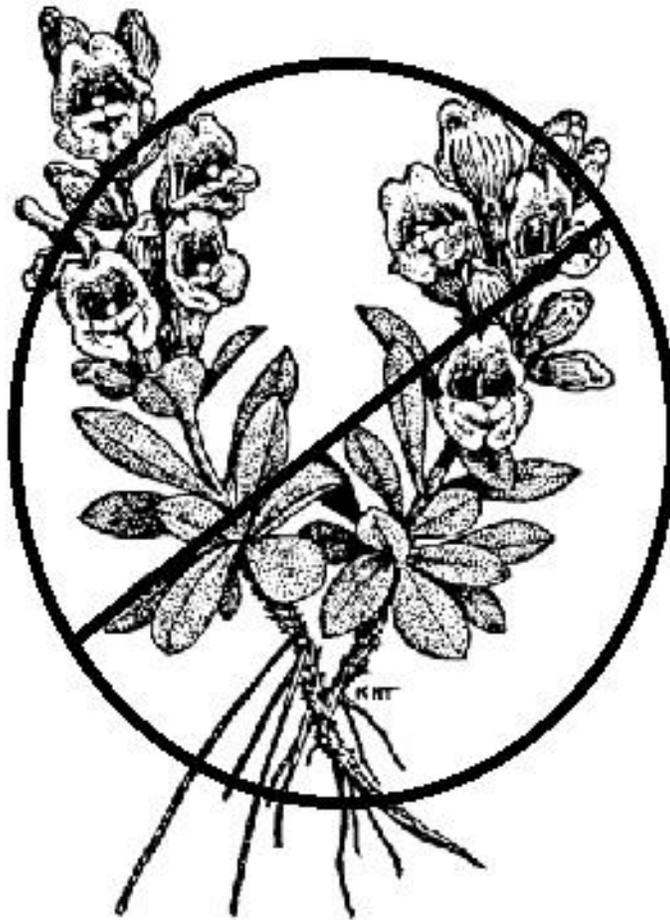
Instead of listing, the Service will adopt the Conservation Agreement described in the May 2014 issue of the *Sego Lily*. The agreement is between the US Fish and Wildlife Service, Uintah County, state of Utah, the Utah State Institutional Trust Lands Administration (SITLA), Utah Division of Natural Resources (UDNR), and the Bureau of Land Management (BLM) and was signed in late July 2014 in response to the Service's August 2013 proposal to list both *Penstemon* species. According to the Service, the new agreement will "...provide conservation for both species to ensure long-term persistence and population stability while allowing for continued activities including energy development and livestock

grazing within the species habitat." *

Among the specific actions promised by the conservation agreement is the creation of a set of Penstemon Conservation Areas and Interim Conservation Areas covering 49,000 acres in 14 areas occupied by the two species. All other sites inhabited by the plants would be open to oil and gas leasing

and development without restriction. Even within the proposed conservation areas, ground disturbances would still be allowed within as much as 5% of the protected area and could occur up to 300 feet from individual plants. Interim Conservation Areas would be protected until such time as mineral development was slated to begin. All of the boundaries of the proposed conservation areas could be redrawn or replaced periodically. Proposed protective actions on private lands are all voluntary and could be changed at any time.

Most of the actions proposed under the 2014 Penstemon Conservation Agreement provide less protection than the Graham's and White River beardtongues would have



USFWS says no to listing Graham's penstemon under the Endangered Species Act. Again.

Agreement provide less protection than the Graham's and White River beardtongues would have

*Page 15 of "PECE Evaluation for the Graham's and White River beardtongues 2014 Conservation Agreement and Strategy" dated July 25, 2014.

received if listed under the ESA. The 2013 listing proposal called for nearly 83,000 acres of critical habitat for both species. Critical habitat would be managed with an emphasis on providing for the long-term persistence of the penstemons. If listed, federal land management agencies (like the BLM) would be required to confer with USFWS to reduce potential impacts from new development activities. Listing would provide less protection for populations found on private lands, but the plants would still be protected from interstate trade (penstemons are popular garden plants) and from collection or harm by trespassers.

An earlier Conservation Agreement was developed in 2007 by the Service, BLM, and UDNR (but was not ratified by SITLA or any county governments). This agreement committed funding resources for additional surveys and monitoring that have taken place over the past seven years. The Service found these regulatory efforts to be insufficient, however, in its 2013 analysis of the five criteria used to support listing species under the ESA (Federal Register 78(151):47607). In particular, the Service was concerned that if the penstemons were not listed under the ESA the BLM would not be required to manage the species as Sensitive, confer with the USFWS on mitigating impacts, or maintain its existing stipulations on mineral development.

A year later, the US Fish and Wildlife Service has done an about face. In its "Policy for Evaluation of Conservation Efforts" (or PECE) report on the 2014 Conservation Agreement, USFWS now maintains that inadequacy of existing regulatory mechanisms is not a threat to the Uinta Basin penstemons. The main differences between the 2007 and 2014 agreements is that SITLA and Uintah County are now formal signatories. Many of the same issues the Service raised about BLM management are unchanged between the two versions of the agreement.

The protective measures proposed in the Conservation Agreement are better than nothing. Unfortunately, the plants will receive less protection under the agreement than they would have if listed under the ESA. Furthermore, many of the proposed management actions have yet to be implemented or to be proven effective. The US Fish and Wildlife Service is putting a lot of faith in the good will of its partners in the Conservation Agreement (some of whom were actively fighting the listing of these species until just a few weeks

ago). Since many of the potential actions under the agreement are voluntary, cooperation may be difficult to confirm or enforce. The mild threat (stated on page 21 of the PECE) that if "... participants were to leave the agreement and discontinue funding, the two species may again be considered for listing" seems especially hollow considering the Service's nearly 40 year record of denying and postponing listing actions on Graham's penstemon and White River penstemon.

Most troubling, however, has been the exclusion of members of the scientific or conservation communities in the process of developing and implementing the Penstemon Conservation Agreement. On page 25 of the PECE, the Service touts the agreement as the "result of a multi-stakeholder effort" that includes only the signatories. None of the conservation groups that took the Service to court twice over its stonewalling on listing these species (winning both times) have been partners in trying to develop a strategy to conserve the beardtongues. It is difficult to believe that the USFWS really based its decision to go forward with the Conservation Agreement based on the best available science when contrary opinions appear to have been ignored. Certainly few of the comments the Service solicited from the public when it reopened the comment period on listing this past May seem to have been incorporated into the final documents. Aside from missing an opportunity to gain useful information, the Service's refusal to seriously engage its critics in the conservation and science communities has done little to instill trust or transparency in the process.

So far the conservation groups that have worked on the Uinta Basin penstemons for many years seem to be waiting to see if the management actions proposed in the Conservation Agreement are implemented. Many decisions, such as the designation of conservation areas, were required within three months of the document being signed in late July. It will be a few weeks still until it is known whether the Service and its partners pass their first test.

Hopefully conservationists and plant lovers will keep careful tabs on the rollout of the Conservation Agreement. This will require continual visits to the conservation areas outlined in the plan to observe if management actions are being taken in good faith. The Service should welcome this scrutiny. After all, we are all interested in the conservation of these rare penstemons. - *Walter Fertig*

Grow This:

Short Perennial Forbs

By Robert Dorn (adapted from *Castilleja*, newsletter of the Wyoming Native Plant Society, December 2013)

Short perennial forbs are used mostly in front of taller forbs in flower beds or sometimes in a flower bed of their own. They are also suitable for small planters or pots.

Abronia fragrans (Sand verbena) grows to 6 inches tall with several stems spreading from a central base and then turning up. Stems can spread two feet or more in var. *fragrans*, but are more compact in var. *elliptica* (sometimes considered a separate species). The leaves are up to 3 inches long and half as wide. The flowers are white to pinkish, up to 1 inch long, and are in dense rounded clusters up to 4 inches across and very fragrant. They fully open in the evening but partly close by late morning if in the sun.



They bloom for a relatively long period between June and early September. The plants occur naturally in sandy or gravelly soils in the plains and basins (sometimes on clay). Sand verbenas prefer full sun and well-drained, sandy or gravelly soil. Small plants can be transplanted. They can also be grown from rootstock cuttings and seeds. Sow seeds outdoors in fall. If spring sown, first scarify the seed or soak in water for 8 hours. Seed is commercially available.

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

Above: *Sand verbena* (*Abronia fragrans*) by Al Schneider (www.swcoloradowildflowers.com) from Corona Arch Trail, Utah. Many authorities consider Utah plants to belong to one of two varieties (sometimes considered full species): *fragrans* or *elliptica*. The two taxa differ in the shape and number of membranous wings on the mature fruit, but are difficult to distinguish otherwise. Var. *elliptica* is the common phase in the Great Basin, while var. *fragrans* is the typical form in the Great Plains.

Tradescantia occidentalis (Western spiderwort) grows to 18 inches tall and 12 inches wide with one to several stems. The leaves are narrow and arching to 12 inches long. The flowers are blue to blue-purple, up to 1.25 inches across, and clustered at the end of the stems and branches with many flowers per plant. Flowers may close under hot sun. It has a long blooming period from May to September. Spiderwort plants occur naturally in open areas of the plains and basins, usually on sandy soils. They prefer full sun and well-drained sandy soil. This species does not respond well to transplanting. It can be grown from seed barely covered to allow some light exposure. It is also in the nursery trade.

Utah Botanica: Odds and Ends from the World of Utah Botany

By Walter Fertig

Ratibida tagetes new to Utah

Cheryl Decker and Mary Moran of the National Park Service were driving the Island in the Sky Road in Canyonlands National Park this summer when they spotted a large clump of brown-headed composites growing along the grassy median. Suspecting they might have a new weed, the conscientious federal employees took a number of photos and collected a sample for the Southeast Utah Group herbarium in Moab.

The closest match they could make was with Mexican hat (*Ratibida columnifera*). This Great Plains species is known from Canyonlands NP based on a collection I made in the same general area in 2006. Certain features did not match, however, including the flower heads and ray flowers being shorter than typical *R. columnifera*. Decker and Moran suspected that the mystery plant might actually be Green prairie coneflower (*Ratibida tagetes*). They sent me several photos (including the ones at right) to get my opinion.

After consulting the *Flora of the Great Plains* and *Flora of North America*, and checking photos on the SEINet website, I came to the same conclusion: these plants were *R. tagetes* and represented a range extension and first record for Utah. Although native to the Great Plains, *R. tagetes* probably entered Utah through seed distributed by the state highway department for roadside restoration (several recent road projects in the Moab area have increased plant species richness). Viable seed might have also come from the muddy car of a tourist visiting all the national parks of the west. A number of Great Plains species reach southern Utah however (they skirt the Rocky Mountains, and come in from northern Arizona or New Mexico), so it is not impossible that native populations could occur in the Beehive State.

In the meantime, I need to recheck my 2006 collection of *Ratibida columnifera* from the same stretch of the ISKY road. Of course credit for a new state record really should go to those who identify it correctly first—so all credit for the discovery still belongs with Decker and Moran! Who knows what else is out there, still waiting to be found?



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