



Sego Lily

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Stone's Draba Recognized	2	Know Your UNPS Chapters	16
\$550,000 BLM Grant Award.....	6	UNPS Achievement Award	17
You are Wanted	6	Utah Rare Plant Meeting 2023 .	18
New Cactus Nomenclature.....	7	Abstracts	19-24
Help Fight Weeds	14	Volunteers Represent UNPS.....	25
Sundancer Daisy.....	15	Zach Coury Photos	5, 24, 25

Stone's Draba Finally Officially Recognized as New to Science

by Tony Frates

A plant species previously named in 1941 in honor of the late [Dr. Bassett Maguire](#) (botany professor at herbarium curator at Utah State University in Logan, Utah from 1931 until 1942 and then a curator and scientist at the New York Botanic Garden until his death in 1991) now once again is being recognized as having two infraspecific taxa based on recently published genetic studies ([March 2023](#)).

Plant species aren't necessarily named for the first person to make a plant collection of that ultimately named species. But in this case, Dr. Maguire along with Dean Hobson and Ralph Gierisch on June 2, 1936 made a high elevation collection in Cache County in the Bear River Range that they knew was a species of *Draba* in the mustard family, but without identification of the species within that genus:

The genus *Draba* is sometimes referred to as "Whitlow



Maguire 13687 deposited at the Gray Herbarium (Harvard University) subsp. *maguirei*



Stone 1804 of subsp. *stonei* (note the premature var. designation and author names)

Cover photo: Fine leaf detail of Maguire's draba (*Draba maguirei*), Mustard family (Brassicaceae). Photo courtesy of Andrey Zharkih

grass" and other related variations but it is not a grass species.

In 1941, C.L. Hitchcock named this plant as a new species, *Draba maguirei*, with two intraspecific varieties: var. *maguirei* and var. *burkei*.

On July 7, 1995, Doug Stone with Frank "Buddy" Smith made a collection of a plant in the Monte Cristo Range similar to *D. maguirei* at an elevation that was 1800 feet lower than the 1936 collection and brought it to the attention of mustard expert Dr. Michael Windham:

Windham collected it in 1997:



Windham 97-118 subsp. *stonei* (note the premature var. designation and author names)

This same plant, as it turns out, was collected by the USU's Dr. Richard Shaw in June of 1983.

Since var. *stonei* was never published (until published as subsp. *stonei* in March of 2023), the annotations of the name to the specimens above was premature; it was based on the same understanding of research that had already been largely conducted in the late 1990's, and sometimes specimen sheets make reference to unpublished or



Shaw 3132 subsp. *stonei* (with a handwritten premature var. designation and author names)

expected names. But, often there never is a publication of that name. The naming of a species however requires a publication that meets the minimum threshold requirements of the ICBN (International Code of Botanical Nomenclature). Just writing a proposed name on a herbarium collection sheet (or "voucher") does not constitute a publication.

In May of 1999, USU's Dr. Mary Barkworth collected this later named taxon in Logan Canyon.

Botanists Duane Atwood and Joel Tuhy separately also collected this same lower elevation plant in the 1980's long before being now described as *Draba maguirei* C.L. Hitchc. subsp. *stonei* Windham via the recent publication. Until now, those plants (as well as those referenced above) have simply been classified as *Draba maguirei* var. *maguirei*.

Based on chromosome counts and analysis provided in a 2004 paper, Windham and Beilstein moved *Draba burkei*, previously named as a variety of *D. maguirei*, to the species level.

It was thought that an analysis of plants still considered to be *D. maguirei* other than "burkei" was going to be made by



Barkworth 99.010 subsp. *stonei* at NYBG

2005 based on initial conferences that I participated in relating to the Utah Rare Plant Guide (URPG) project. Preparations were being made going back as far as 2003 to add "var." *stonei* to the URPG (with the same author assumptions, i.e. by Windham and Beilstein) but those efforts then were paused awaiting a future publication, which in 2023 has now finally happened

Link to the publication: <https://pubmed.ncbi.nlm.nih.gov/36779544/>. Full PDF.

Citation:

Windham MD, Picard KT, Pryer KM. 2023. An in-depth investigation of cryptic taxonomic diversity in the rare endemic mustard *Draba maguirei*. American Journal of Botany e16138.

Related prior article:

<https://www.jstor.org/stable/41425341>

The taxa in this complex have different ploidy levels:

Draba maguirei subsp. *maguirei* n=16

Draba maguirei subsp. *stonei* n=8

Draba burkei (syn. *D. maguirei* var. *burkei*) n=10

All three taxa are northern Utah endemics. Their ranges however do not overlap. *D. burkei* occurs in Box Elder, Cache, Morgan (barely) and Weber Cos. The *D. maguirei* subspecies only occur in Cache County with subsp. *stonei*



Oldest *Draba burkei* collection (May 1932, Box Elder Co.) by Melvin Burke (holotype)

occurring somewhat to the south at lower elevations than subsp. *maguirei*.

All three have yellow flowers with oblong leaves in basal rosettes. The flowering stems are scapose (i.e. lacking leaves). *D. maguirei* plants have longer leaves than *D. burkei*. There are differences in leaf and fruit trichomes (hairs). *D. burkei* only has trichomes along its leaf margins. This tends to be true also with subsp. *maguirei* whereas subsp. *stonei* has trichomes on blade surfaces. Unlike the short-stalked and usually four-rayed trichomes of subsp. *maguirei*, subsp. *stonei* mostly has 2-rayed (bifurcate) trichomes; *D. burkei* has unbranched trichomes.

D. maguirei and *D. burkei* are both on the Forest Service's (Intermountain Region, R4) sensitive species list that has not been updated since 2010. Both currently have G2 (Imperiled) NatureServe rankings, They have been included in Utah Native Plant Society rare plant lists since at least 2003 on-line and have been ranked with a conservation priority of "Watch" (third highest). These now newly recognized subspecies have not yet been ranked and their conservation priority could end up being now higher when ultimately re-reviewed. *D. maguirei* was also included in the 1991 *Utah Endangered, Threatened and Sensitive Plant Field*



Draba maguirei subsp. *stonei* (Teresa Prendusi, May 23, 2004, Logan Canyon, Utah)

Guide, so has been on the radar for a long time.

The URPG has accordingly been updated. *Utah Rare Plant Guide* links to each of these three taxa follow:

https://www.utahrareplants.org/pdf/Draba_burkei.pdf

https://www.utahrareplants.org/pdf/Draba_maguirei_subsp_maguirei.pdf

https://www.utahrareplants.org/pdf/Draba_maguirei_subsp_stonei.pdf

Supplemental page to the above:

https://www.utahrareplants.org/pdf/Draba_maguirei_subsp_stonei_supp.pdf



Draba maguirei subsp. *stonei* leaves (Teresa Prendusi, May 2004, Logan Canyon, Utah)

Note: it is coincidental that the plants in this complex have all been named for individuals that have a last letter of "e" in their names, i.e.: Maguire, Burke, and Stone. These individuals were all males so hence the "i" ending in the corresponding scientific names.



Calochortus flexuosus against a backdrop of *Opuntia erinacea*. 24 April, Washington County. Photo by Zach Coury.



Townsendia aprica with unusually pale rays. This species is notable in the genus for its yellow coloring. 28 April, Wayne County. Photo by Zach Coury.

Paiute Tribal Native Plant Center funded by the Bureau of Land Management

Dr. Jacqualine Grant and her partners, Dr. Sarah Barga (USDA Forest Service) and the Paiute Indian Tribe of Utah (PITU), were awarded an award of \$550,000 from the Bureau of Land Management as part of the President's Investing in America Agenda. Dr. Grant authored the proposal as part of her work as a Fulbright Scholar in New Zealand. The purpose of this award is threefold. It will be used to (1) Develop a Paiute Tribal Native Plant Center that specializes in native plant materials development, (2) Build relationships between the Tribe, university scientists, federal scientists, and the Intertribal Nursery Council, and (3) Provide native plant-related workforce training opportunities for members of the Paiute Indian Tribe of Utah (PITU), youth, community members residing in rural southern Utah and eastern Nevada, and members of other regional Native American groups.

The activities to be performed include the construction of a Tribal Nursery and facilities; developing relationships between Tribal members in Nevada and Utah, university faculty and students, and federal botanists; and the training of seed collectors. Project components include the design and construction of three greenhouse nurseries; design and construction of an outbuilding equipped with essential seed processing, drying, and cleaning equipment; construction of a fenced production field and common garden experimental area; joining the Intertribal Nursery Council; creation of a tribal nursery advisory council; and development of a native plant seed collection and nursery management training program.

Work on the project begins in September of 2023, and will last for five years. Dr. Grant and her partners are really excited to bring native plant-related jobs to southern Utah and eastern Nevada, and to develop interest in native plants, habitat restoration, and human uses of plants in our incredible area. Contact Dr. Jackie Grant at jacqualinegrant@suu.edu for more information.

WANTED

You as the new

• UNPS Treasurer •

The Utah Native Plant Society is looking for a volunteer Treasurer to help write out a few checks a month and to help with accounting and reports.

Some experience is helpful but will train.

Contact Bill King for more details:
mzzzyt@aol.com or call 801-582-0432

New nomenclatural combinations and types for Cactaceae in Utah

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Photos by A. Dean Stock and Blake Wellard.

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Haseltonia 30: 6–13. 2023

In preparation for the publication of *The Cactus Flora of Utah*, we are making several nomenclatural and type changes based on the results of more than 10 years of field observations and chromosome analysis.

OPUNTIA POLYACANTHA HAW.

One of the most important of these changes is the correction of the “*Opuntia polyacantha* complex” as circumscribed by Parfitt (1998), in preparation for work to be published in *Flora of North America* (FNA). Parfitt published a short revision (1998), with no data or explanation, involving several distinct species that he arranged as varieties of the tetraploid species, *Opuntia polyacantha*. This arrangement included two diploids, *O. arenaria* Engelm. and *O. trichophora* (Engelm. & J.M. Bigelow) Britton & Rose. The latter was included within *O. polyacantha* without varietal rank, and essentially treated as simply a spine length variation of that species. Tetraploid *O. erinacea* Engelm. & J.M. Bigelow and hexaploid *Opuntia nicholii* L.D. Benson were also included within *O. polyacantha* as varieties. Parfitt’s arrangement was flawed since it produced a polyphyletic group (i.e., a taxonomic designation with multiple ancestors). Monophyly (a single common ancestor) is the basic tenet of modern taxonomy and systematics (Simpson 2010). One of the basic principles of phylogenetics is also that ancestral taxa are extinct. However, that is not always the case in reticulate evolution involving polyploids derived from diploid ancestors. This is especially true in reticulate, relatively rapidly evolving species groups in *Opuntia*. In attempting to understand the phyletic relationships of this group of dry fruited, western North American *Opuntia* (*Xerocarpa* sensu Majure et al. 2012), one must first

understand and recognize the ancestral diploids. All subsequent polyploids are derived from them. We regard the diploids as ancestral in polyploid groups since diploids can produce polyploids by chromosome doubling in hybrids and by non-disjunction in ovule and pollen formation. Polyploids generally cannot produce diploids in Cactaceae. Parfitt did not recognize *Opuntia trichophora* despite its diploid status. Since *O. trichophora* is the putative ancestor of *O. polyacantha*, it cannot be considered conspecific with that species or arranged as a variety or subspecies of the allotetraploid *O. polyacantha*.

Furthermore, all diploid *Opuntia* in North America except *O. basilaris* Engelm. & J.M. Bigelow have yellow flowers. *Opuntia basilaris* is likely the contributing source for all pink flowered forms in western North America. *Opuntia polyacantha* has both yellow and pink flowered populations, indicating that it is an allotetraploid derived from hybridization. If it were an autopolyploid, it would have only yellow flowers and longer spines. This means that it cannot properly be considered conspecific with *Opuntia trichophora*, which is a wide ranging, and easily recognized, ancestral diploid. If the argument is made that *O. trichophora* is not ancestral to *O. polyacantha*, it is still not proper to include it within *O. polyacantha*, at any level, and for the same reasons. None of the other species included within *O. polyacantha* are properly circumscribed within that taxon, at any level, and we make additional comments under each species. Our conclusion is that there is no “*Opuntia polyacantha* complex.” Based on extensive field work and chromosome data, we recognize the following species previously included within *O. polyacantha* by Parfitt (1998) and Pinkava (2012).

ANCESTRAL DIPLOIDS: (2N=22)

Opuntia trichophora (Engelmann & J.M. Bigelow)
Britton and Rose

This species is a wide ranging, ancestral diploid documented as occurring in Texas, New Mexico, Oklahoma, Colorado, Arizona and Utah (Fig. 1).

Opuntia arenaria Engelm.

This is a small, sand loving, diploid which has no apparent close relationship to *Opuntia polyacantha*. It is documented as occurring in New Mexico, Texas and Mexico (Fig. 2).

Opuntia diploursina Stock, Hussey, & Beckstrom
We include this diploid here, although described more recently (2014), since Parfitt annotated two specimens of it, in the Arizona State University herbarium, as *O. polyacantha* var. *erinacea*. This Mojave Desert diploid is one of the putative ancestors of the allotetraploid *Opuntia erinacea* (Fig. 3).



Figure 1. *Opuntia trichophora*. Plant in culture. Originally from near Arches National Monument, San Juan Co., Utah.

ALLOTETRAPLOIDS:

Opuntia polyacantha Haw.

We regard this wide-ranging species as having no varieties or subspecies and occurring in Utah only in the northern tier of counties and in the Uintah Basin. It has both yellow and pink flowered populations and seldom has long central spines. It is a grassland species (Fig. 4).

Opuntia erinacea Engelm. and J. M. Bigelow

This allotetraploid is wide-ranging in western Utah, Nevada, western Arizona and southern California. It has both pink and yellow flowered populations but pink is



Figure 2. *Opuntia arenaria*. Plant in culture.



Figure 3. *Opuntia diploursina*. Beaver Dam Wash, Washington Co., Utah.

more common in Utah. Some individuals have very long spines, especially on older cladodes. It is a Mojave



Figure 4. *Opuntia polyacantha*. North of Vernal, Uintah Co., Utah.



Figure 5. *Opuntia erinacea*. St. George, Washington Co., Utah.

Desert and Great Basin species (Fig. 5).

Opuntia erinacea* var. *hystricina (Engelm. & J.M. Bigelow) L.D. Benson

This allotetraploid was viewed by Parfitt (1998) and O. Pinkava (2012) as a variety of *O. polyacantha*, with a wide range from northern Arizona, the Colorado



Figure 6. *Opuntia erinacea* var. *hystricina*. Plant in culture, from near Woodruff, Arizona.

Plateau of Utah, and west across Utah to eastern Nevada. Examination of the type (photo) revealed that the spine arrangement is typical of *O. erinacea* and not *O. polyacantha*.

The plants in western Utah are tetraploid *O. erinacea*, while those on the Colorado Plateau of Utah are hexaploid *O. nicholii*. We restrict the taxon *Opuntia erinacea* var. *hystricina* from the type locality region of the valley of the Little Colorado River, east of Flagstaff, Arizona, then south in Arizona to near Snowflake (Fig. 6).

ALLOHEXAPLOID:

Opuntia nicholii L. D. Benson

This long spined plant occurs extensively from Gray Mountain and the North Rim of the Grand Canyon to, at least, the Monument Valley of Arizona; north to all of the Colorado Plateau/Canyonlands of Utah. Like many allohexaploids, *O. nicholii* is variable in spine length, spine color and the amount of distinction between radial and central spines. White spine forms occur predominantly in Kane Co. Utah and west to Toroweap in Mojave Co., Arizona. Plants at high altitudes such as the north rim of the Grand Canyon typically have shorter white spines as do those in the northern part of its range in Carbon Co., Utah. The highest percentage of dark



Figure 7a. *Opuntia nicholii*. Dark spine form, San Juan Co., Utah.



Figure 8a. *Opuntia aurea* in bloom. Plant in culture from Kane Co., Utah.



Figure 7b. *Opuntia nicholii* in bloom. Dark spine form, San Juan Co., Utah.



Figure 8b. *Opuntia aurea*. Plant in culture from Kane Co., Utah.

spined forms occurs between Mexican Hat and Blanding in San Juan Co., Utah. Plants in Carbon Co., Utah were viewed by Parfitt (1998) and Pinkava (2012), to be tetraploid var. *hystricina*. Extensive field work and chromosome counts from plants across the region confirmed that hexaploid *Opuntia nicholii* is present and not tetraploid var. *hystricina*. We have not documented var. *hystricina* in Utah (Figs. 7a and b).

ADDITIONAL NOMENCLATURE CHANGES

Opuntia aurea E. M. Baxter

Opuntia aurea E.M. Baxter, Cact. Succ. J. (Los Angeles)

5: 489. 1933. (P. McCabe & H. McCabe, *s.n.*, .5 mi N of Pipe Springs, Kaibab Indian reservation, Mohave, Co., Arizona, 1930, holotype: no. 213750 DS [sheet and box].) **Epitype: designated here**, approx. 11.5 miles NW of Kanab, south side of highway 89, Kane Co., Utah. A.D. Stock 1885, June 3, 2015 (UTC).

Opuntia aurea was described from a complex zone of hybridization with *O. pinkavae*. The name has been applied to the hybrids, which may have some spines on the fruit and cladodes, and flower colors varying from yellow to peach, pink and red. The hybrids are often larger than the non-introgressed plants to the north of the type locality, and often grow in long chains. Baxter



Figure 9a. *Opuntia x woodburyi*. Warner Valley, Washington Co., Utah.

clearly intended to describe a yellow flowered plant with small size and few to no spines. Further, there is no convenient place in the spectrum of hybrids, at the type locality, to distinguish *O. aurea* from *O. pinkavae*. We prefer to restrict the taxon *Opuntia aurea* to the yellow flowered, nearly spineless, hexaploid form, that occurs across much of Kane Co., Utah, north of the original type locality. An epitype is required to accomplish this (Figs. 8a and b).

ALLOOCTOPLIOD

Opuntia x woodburyi (Earle ex S.L. Welsh) A. D. Stock comb. nov.

Opuntia x woodburyi (Earle ex S. L. Welsh) Stock, based on *O. basilaris* var. *woodburyi* Earle ex S.L. Welsh in Great Basin Naturalist 42: 177, 1982 or *Opuntia basilaris* (Engelm. & J.M. Bigelow.) var. *woodburyi* Earle. Saguroland Bull. 34: 15. 1980. Washington Co., Fort Pierce Wash, Woodbury 2060 A, 1977 (BRY) not found 2014, 2016. **Lectotype**, designated by Majure et al. (2015), and if not, designated here: Utah.

Washington Co.: 16 mi S/SW of Hurricane on Fort Pierce Wash, elev. 3680 [ft], 3 Oct 1978, W.H. Earle s.n. (stem segment and mature seeds in packet, 108725, barcode ASU0019063, and excluding the dried flowers);

Epitype, designated here: Utah, Washington Co., Warner Valley, red sand area at east end of valley, elev. 3285 ft., April 4, 2012., A. D. Stock 1864, UTC, **isoepitypes** A.D. Stock 1865 , A.D. Stock 1866): UT. (Fig. 9a and b).



Figure 9b. *Opuntia x woodburyi*. Warner Valley, Washington Co., Utah.

This taxon, endemic to Warner Valley, Washington Co., Utah, has had a confusing history. Earle's original publication (1980) was problematic because he did not indicate a single specimen as the type and the original stem segments and flowers now on the sheets were taken at different times and from different localities and appear to be a mixed gathering. S. L. Welsh (1982) in his publication of Utah plant types, cited the following: "*Opuntia basilaris* Engelm. & Bigel. var. *woodburyi* Earle, Saguroland Bull. 34: 15. 1980. Cactaceae, Washington Co., Fort Pierce Wash, Woodbury 2060 A, 1977 (BRY)."

After discussions with a number of other parties, there is disagreement as to whether Earle validly published the name, or whether Welsh later validated it. There is also a disagreement as to what the type is if Welsh later validly published; while Majure et al., designated a lectotype for the Earle name, they did not mention the Welsh collection. Other problems include the fact that the *woodburyi* specimen cited by Welsh could not be located at BRY in 2014 or 2016, and there are no *Opuntia* at the location cited by Earle. In order to address these problems, we publish our new combination by citing both the Earle and Welsh names and designate the same lectotype for the Welsh name as that designated by Majure for the Earle name, and an epitype to clarify the treatment of the taxon, both because of the incorrect locality and the fact that specimens do not include the flowers.

While Parfitt stated that *O. basilaris* var. *woodburyi* is a form of *O. pinkavae* and included Earle's specimen as a paratype, it is in fact a hybrid of *Opuntia aurea* and *Opuntia pinkavae* and therefore a different taxon. This taxon has consistently been misidentified and it

is a unique hybrid population involving *Opuntia aurea* and *O. pinkavae*. Earle identified the taxon as a variety of *Opuntia basilaris* without noting the presence of long spines on the upper part of the cladode on many plants and pink flowers with a green stigma. These characteristics rule out infraspecific rank within that species. Later, Parfitt (1997) included Earle's *O. basilaris* var. *woodburyi* within his circumscription of *Opuntia pinkavae*, which is a related octoploid occurring just to the south and southeast of *O. x woodburyi*. Parfitt (1991) studied the hybrid swarm between *O. aurea* (hexaploid) and *O. pinkavae* (octaploid) which occurs a few miles to the east of Warner Valley, Utah near Colorado City, Arizona. He likely was aware that the *woodburyi* population in Warner Valley, Utah was also a hybrid derived population. He stated that the Warner Valley plants differed in some distinct ways from his *O. pinkavae*, and described the Warner Valley plants as "a robust, somewhat tuberculate stemmed form." Parfitt (1997) in his description of *O. pinkavae*, compared the Warner Valley population only with *O. basilaris* and did not mention *O. aurea* even though the Warner Valley plants share features, such as a greatly reduced spine count, with *O. aurea*. Warner Valley is a relatively short distance from similar plants he described as hybrids between *O. aurea* and *O. pinkavae* (Parfitt, 1991). Parfitt (1997) included two plants from the Warner Valley-Fort Pierce Wash area as paratypes of *O. pinkavae*. These are Gierisch 5049 and Earle s.n. (ASU) 108725. Both of these Utah specimens should be viewed as *O. x woodburyi* and not *O. pinkavae* paratypes. Earle (1980) referred to the type locality of his *O. basilaris* var. *woodburyi* as Fort Pierce Wash, Washington County, Utah, which is not entirely correct. The plants occur on deep red sands north of Fort Pierce Wash in Warner Valley. The small valley is bordered by red sandstone cliffs on the north and Fort Pierce Wash, entering from Arizona, on the south. Old Fort Pierce is situated on the wash near the middle of the valley. *O. x woodburyi* occurs only on the deep sands east and west of Old Fort Pierce. The two areas of deep sand are interrupted by an area of more gravelly substrate in mid-valley, which is inhabited only by *Opuntia erinacea*. The Fort Pierce Wash proper has no deep sand habitat for *O. x woodburyi* and is prone to massive flash floods. The elevation given by Earle in the description of *O. basilaris* var. *woodburyi* is 1341 meters to 1402 meters. The lectotype sheet is labeled 16 miles S/SW of Hurricane on Fort Pierce Wash, el.

3680 [ft]. The isolectotype sheet gives the elevation as 3650 ft. Our elevation reading from the red sand areas where *O. x woodburyi* occur are. East end population: 3185 ft. elevation at N 37 00. 779 W 113 20.587; west end of valley: 3071 ft elevation at N 37 01.567 W 113 26. 359.

Parfitt (1997) noted that the cladode surface of both *O. aurea* and *O. pinkavae* had trichomes as in *O. basilaris*. Majure et al. (2012), published DNA sequence data (as *O. aurea*) from a plant from Warner Valley and demonstrated that the population had *Opuntia basilaris* as one parent, thus confirming the hybrid status of the population and the contribution of *O. basilaris* to *O. aurea* and *O. pinkavae*.

***Pelecyphora chlorantha* (Engelmann) A.D. Stock comb. nov**

Mammillaria chlorantha Engelmann in J.T. Rothrock, Rep. U.S. Geogr. Survey, Wheeler 6: 127. 1878.

Coryphantha chlorantha (Engelm.) Britton & Rose, Publ. Carnegie Inst. Washington 248 (4); 43. 1923.

Pelycyphora chlorantha (Englm. Ex Wheeler) P. B. Breslin & Majure. Am. J. Bot. 2022: 109: 1472-1487. Illegitimate combination, wrong basionym. **Type:** (C.C. Parry s.n. St. George, Utah, May 1874; lectotype by L.D. Benson, Cacti U.S. Can. 961. 1982. At MO, sheet no 20173).

Mammillaria deserti (Engelm.) Bot. of California 2: 449. 1880. *Escobaria vivipara* var. *deserti* (Engelm.) Buxb. Oesterr. Bot. Z. 98: 78. 1951. *Escobaria vivipara* var. *deserti* (Engelm.) D.R. Hunt. Cact. Succ. J. Gr. Britt. 40: 13, 1978. *Coryphantha chlorantha* var. *deserti* (Engelm.) Bakeb., Cactaceae 5: 3003. 1961. *Pelecyphora vivipara* (in part) (Nutt.) D. Aquino & D. Sanchez. Phytokeys 188: 137. 2022.

Type: United States, California, at Ivanpah, 30 miles northeast of San Bernardino, S.B. Parrish 455, **Lectotype** (first step), designated by Benson, Cact. U.S. Canada: 961. 1982: MO (22671690; (second step) sheet no. 2017375 at MO, by A.M. Salywon & W.C. Hodgson; isolectotypes: DS, F, MO [2 sheets], NY, PH) = ***chlorantha***.

The taxonomic history of this plant has long been confused. It was originally described as *Mammillaria chlorantha* by Engelmann in 1878. In 1880 Engelmann applied the name *Mammillaria deserti* to a similar plant collected in California. These two collections were at the northern and southern extremes of the range of the species and the two taxa have frequently been treated as separate populations at



Figure 10. *Pelecyphora chlorantha*. Plant in culture from Washington, Co., Utah. The yellow flowers do not open as fully as do the pink flowers of *Pelecyphora vivipara*.

various taxonomic levels. Several authors have used the species name *deserti* for this population, ignoring the fact that the name *chlorantha* was used two years prior by the same author. Zimmerman & Parfitt, in *Flora of North America* (FNA 2004), treated the plant as *Coryphantha chlorantha*. More recently, Van Buren, et al. (2011) also used the name *Coryphantha chlorantha*, which is clearly the earliest species name available. Sanchez, et al., (2022) presented DNA sequence and morphological data supporting recognition of a distinct *Escobaria* clade separate from *Coryphantha*. The *Escobaria* clade also included species within *Pelecyphora*. The genus *Pelecyphora* was published in 1843 by Ehrenburg, while *Escobaria* was published in 1923, 80 years later, by Britton & Rose. As with the name *chlorantha*, *Pelecyphora* has priority of publication according to the Principle III, of the International Code of Nomenclature (Turland et al. 2018) (Fig. 10).

ACKNOWLEDGEMENTS

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HELP FIGHT WEEDS ON OUR PUBLIC LANDS



Please join the Logan Ranger District, Bridgerland Audubon Society, the Utah Native Plant Society and Logan City as we work to protect our land by preventing the spread of noxious weeds in Cache County.

What: 5th Annual Weed Day

When: Saturday, May 20, 2023, 9:00 a.m. – 1:00 p.m.

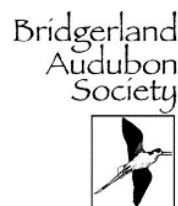
Where: Canyon Entrance Park Pavilion (First Dam), US 89 & Canyon Road, Logan, UT

Contact: Anthony VonNiederhausern, Rangeland Management Specialist,
Anthony.vonniederhausern@usda.gov, 435-994-9424

Wear protective clothing, including gloves, long pants, long sleeved shirts, sturdy footwear and bring lots of drinking water. Some tools will be provided but bring your own heavy-duty weeding tools if you can.

The goal of this project is to help reduce and eradicate invasive weeds threatening the native plant community of the local area. Target weeds include, dyers woad, burdock, houndstongue, Scotch thistle and other invasive weeds. Control methods will include hand pulling, digging and possible bagging.

For more information, contact Anthony VonNiederhausern, Rangeland Management Specialist, Logan Ranger District, (435) 994-9424, Dave Wallace, Utah Native Plant Society, (435) 750-5913, or Hilary Shughart, Bridgerland Audubon, hilary.shughart@gmail.com.



Grow the Native Sundancer Daisy, *Tetraneris ivesiana*

Also known as Perky Sue, Angelita daisy, or Ives' four-nerved daisy

by John Stireman, UNPS co-editor

The garden nursery offering of 'Sundancer Daisy' is a medium size perennial of about eight to twelve inches tall in flower and spreading at the base up to about eight inches wide with narrow, almost grass-like leaves in a tuft only a few inches high. Flower stems are long, thin, and almost leafless, each topped with a bright yellow daisy that is easily animated by a breeze, making Sundancer Daisy a fitting name. And those stems never flop. Flowering can begin in early summer and I have had my plants in flower well into November.

This is an excellent landscaping perennial and an easy plant to grow, reveling in full sunlight and requiring little water once established and requiring minimal maintenance. In my garden, the foliage dies down completely by mid-winter and, in early spring, the dry remains can be cut completely to the ground without fear of damaging the plant since new growth appears in late spring.



Tetraneris ivesiana in habitat. The species ranges through Arizona, Colorado, New Mexico, and Utah. The image for *Tetraneris acaulis* v. *ivesiana* at High Country Gardens online appears to be *T. acaulis* v. *arizonica*. <https://www.highcountrygardens.com/perennial-plants/unique-plants/hymenoxys-acaulis-ivesiana>

Habitat photo courtesy of Andrey Zharkikh.

The nursery trade appears to have settled upon 'Sundancer Daisy' as a common name for *Tetraneris ivesiana*. It can also be found in garden literature, and possibly at nurseries, as *Tetraneris acaulis* v. *ivesiana* or *Hymenoxys acaulis* v. *ivesiana*. The similar, but smaller and highly variable in nature, *Tetraneris acaulis* is often offered and differs in stature as well as usually having shorter and wider leaves and, unlike *T. ivesiana*, maintains a compact rosette of evergreen leaves through winter.

<https://conservationgardenpark.org/plants/1735/western-sundancer-daisy>

https://en.wikipedia.org/wiki/Tetraneris_ivesiana

<https://www.swcoloradowildflowers.com/Yellow%20Enlarged%20Photo%20Pages/tetraneris%20ivesiana.htm>



Tetraneris acaulis in a garden setting. This is a taller form with long leaves. Some forms are hardly two inches in height and with much shorter leaves.



Getting to Know Our UNPS Chapters

You may notice some changes in the map on the last page of this edition of the *Sego Lily*. *Map? Last page of Sego Lily?* Right, most of you have probably paid little attention or even noticed this small image of our state on the last page of our newsletter. Yet, this map has always inspired me as co-chair of the membership committee. With an interest in cultivating and maintaining UNPS chapters, this map represented a daunting number of inactive chapters.

The good news is I did not fully understand what the map was telling me. Fact is, this map was initially created to display **potential** chapters. There never have been 13 chapters in UNPS, according to Cathy King. Yes, I suppose in a perfect world, Utah native plants would welcome a much greater representation, yet UNPS has been functioning well with fewer chapters.

Moving forward, we celebrate and cherish our newest chapters. The UNPS board recently recognized two newly reactivated chapters. Kati Gyulassy has been successful at restarting the Mountain chapter based out of Park City. In partnership with the local library, they are entertaining healthy crowds with the help of a number of expert speakers on botanical and natural history talks. Reach out to her if you are interested in helping grow this chapter.

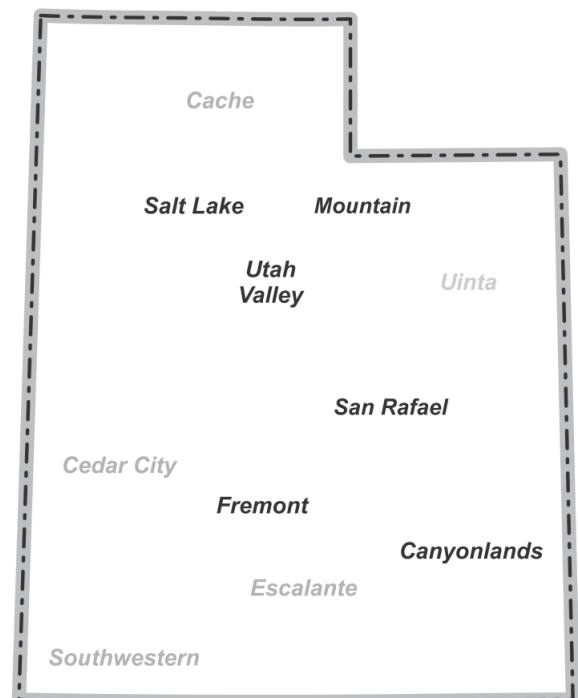
Jared Higgs from the Price area also achieved his goal to restart the Price chapter. He is working with a core group of colleagues and friends who are working out future strategies for the renamed San Rafael chapter.

Take a look at the new map and if you are not an active member of a chapter and want to be or if you want to know if there is a chapter near you, contact the chapter chairs listed below or Diane Ackerman dianeackerman13@yahoo.com, membership committee.

UNPS CHAPTERS & CONTACTS

Cache	no current chapter
Canyonlands	Diane Ackerman... dianeackerman13@yahoo.com
Cedar City	no current chapter, Jackie Grant... jacquelinegrant@suu.edu
Fremont	Lynn Belcher & Rosalie Gunnel... Rosalie.gunnell@gmail.com
Mountain	Kati Gyulassy... katihites@gmail.com
San Rafael	Jared Higgs... jaredhiggs@gmail.com
Salt Lake	Cathy King... cathy.king@gmail.com
Utah Valley	Robert Fitts... fitts_r_d@yahoo.com

UNPS Chapter Map *Inactive



UNPS Lifetime Achievement Award



Dr. Mary E. Barkworth received the Lifetime Achievement Award from the board of directors of the Utah Native Plant Society at the Rare Plant Meeting on March 7, 2023.

Mary Barkworth grew up in the United Kingdom and emigrated to Utah State University via British Columbia, then moving on to Western Washington University to earn a masters degree in education with an emphasis in mathematics and physics and completing a doctorate with her thesis on *Brodiaea douglasii*, commonly known as wild hyacinth (which grows in northern Utah).

She moved to USU in 1979 where she served as an associate professor and the director of the Intermountain Herbarium. Her contributions to publications on grasses are invaluable, including her work on the *Manual of Grasses for North America*, the *Flora of North America* (Vols. 24 and 25) on grasses and countless



other publications along with her work on digitizing herbarium collections at openherbarium.org. She has traveled extensively, especially in Pakistan and Somaliland, and made collections in her travels that have been added to OpenHerbarium.org.

While at the USU Intermountain Herbarium, Mary led botanical forays to areas seldom collected in Utah, such as the Raft River Range, to expand the collections at the herbarium.

The Utah Native Plant Society recognizes the many important contributions that Mary Barkworth has made to Utah botany and education and appreciates her large body of botanical work.

The UNPS Lifetime Achievement Award was presented to Mary Barkworth at the Rare Plant Meeting by Kris Valles, manager of the USU Intermountain Herbarium. It can be viewed on the [UNPS YouTube channel](#).



Utah Rare Plant Meeting 2023

The annual Utah Rare Plant Meeting 2023 was hosted again this year by the Utah Native Plant Society virtually via Zoom. There were fifteen presentations given on a variety of topics from species and agency updates to demographic studies and even a community native plant project report.

Representatives from the Bureau of Land Management, US Fish and Wildlife Service, US Forest Service, Brigham Young University, Northern Arizona University, Utah Valley University, the Great Salt Lake Institute, Grand Canyon Trust, Western Water Assessment, Project Eleven Hundred, Manzanita Botanical Consulting, Draper Wetland Rangers and the Utah Native Plant Society shared current information about the status of rare plants in the state of Utah. Their participation is much appreciated in this symposium that keeps everyone abreast of important issues protecting the rare and endangered plants of our state.

The agenda and abstracts from the meeting are reprinted below. The Utah Rare Plant Meeting is scheduled for next year on **Tuesday, March 5, 2024–SAVE the DATE!** We are hoping to hold this meeting in person at the Natural History Museum of Utah but also offer it virtually in a “hybrid” meeting.

Videos from the 2023 Rare Plant Meeting can be viewed on the UNPS YouTube Channel, <https://www.youtube.com/channel/UCx07-R3WWYQCGZYpgb3Khdw>.

Time	Presenter	Organization	Topic
9am	Cathy King	UNPS	Welcome, announcements, grants
9:10	Bill King	UNPS	UNPS accomplishments
9:20	Mindy Wheeler	Utah Rare Plant Program	Update from the Utah Rare Plant Team
9:40	Aaron Roe	BLM	BLM Botany Updates
10:00	Jared Higgs & Kipp Lee	(UNPS board members)	Two Rare and Misunderstood Utah Cacti
10:25	Ian Eggleston and Ashley N. Egan	Utah Valley University	Using ecological niche modeling to better understand <i>Pediomelum aromaticum</i> , a threatened Utah plant
Break			
11:00	Rita Reisor	US Fish and Wildlife Service	USFWS Listed Plant Updates
11:20	Mikel Stevens and Robert Johnson	Brigham Young University	Updates on Rare Penstemon of Utah
11:40	J. Hope Hornbeck	Manzanita Botanical Consulting	Demographic shifts in Uinta Basin hookless cactus populations 2012-2022
Noon	Kris Valles	USU Herbarium	Award presentation
Lunch			

1:10	Announcements (Kipp)		
1:20	Seth Arens and Marc Coles-Ritchie	Western Water Assessment & Grand Canyon Trust	Recovery of riparian and hanging garden ecosystems in Glen Canyon as a consequence of drought in the Lake Powell region
1:40	Shannon Lencioni	Northern Arizona Univer-	Arizona Willow: A study to understand its
2:00	David Parrott	Great Salt Lake Institute	Great Salt Lake Shoreline Plants and Their Unique Rhizosphere Microbiomes
Break			
2:40	Jake Henrie and Megan DeTemple	Brigham Young University	Floral Biology and Pollination Ecology of <i>Penstemon sepalulus</i> , an Endemic Utah Wildflower
3:00	Loreen Allphin	Brigham Young University	Update on monitoring of Populations from Five, Rare, High Elevation Endemics in the Tushar Mountains, Fishlake National Forest, Utah
3:20	Mary O'Brien	Project Eleven Hundred	La Sal Mountains Groundsel (<i>Senecio fremontii</i> var. <i>inexpectatus</i>): "Canary" in a small alpine
3:40	Susan Meyer	US Forest Service	Dwarf Bear Poppy (<i>Arctomecon humilis</i>) Demographic Studies
4pm	Stephen and Dean Kennedy	Local community	Draper Wetland Rangers: Local Kids at Work in our Local Wetlands

Abstracts

Utah Rare Plant Meeting

Hosted by the
Utah Native Plant Society

March 7, 2023

Online Meeting via Zoom

(in alphabetical order by last name of presenter)



Abstracts:

Loreen Allphin, Department of Plant and Wildlife Sciences, Brigham Young University, Provo, UT, loreen_allphin@byu.edu, 801.422.5603.

Madison Hue, Department of Plant and Wildlife Sciences, Brigham Young University

Steven Flinders·Beaver Ranger District, Fishlake National Forest, US Forest Service

Update on monitoring of Populations from Five, Rare, High Elevation Endemics in the Tushar Mountains, Fishlake National Forest, Utah

The Tushar Mountains in the Fishlake National Forest contain multiple peaks above 3600m in elevation with four additional peaks above 3300 m, making the Tushars the third-highest mountain range in Utah. The Tushar Mountains provide critical alpine habitat for a variety of flora and fauna, including 28 endemic plant species. Mountain goats (*Oreamnos americanus*) were introduced into the Tushar Mountains in 1986. These alpine communities are also popular areas for off-trail biking/hiking, marathons, and winter recreation. In 2018, we established long-term monitoring plots for five of the rare, alpine endemics of the Tushar Mountains (*Castilleja parvula* var. *parvula*, *Draba sobolifera*, *Draba ramulosa*, *Packera castoreus*, and *Ipomopsis spicata* ssp. *tridactyla*). Each of these five taxa have been considered high priority for conservation. Our objectives were to 1) assess population trends for these rare plant species, 2) determine any conservation threats to these taxa and their alpine communities and, 3) examine foraging behavior of mountain goats and other ungulates in these alpine plant communities. For each long-term monitoring plot, 50-100 plants in 2-4 populations per taxon were tagged and measured for characteristics, including height, clump diameter, herbivory, and reproductive output. Plant density and composition of associated plant communities were also determined. Camera traps were set at the long-term sites to document conservation threats and herbivore species utilizing these communities. Our data show population density decreases in all five taxa over the study period. Each of the taxa has their own unique conservation concerns. *Castilleja parvula* var. *parvula* appears to be disappearing in part of its range partly due to non-native herbivores (mountain goats and domestic cattle). *Draba sobolifera* has disappeared over the study period in part of its range, likely due to drought and irregularities in the snow pack.

Seth Arens, Western Water Assessment of the University of Colorado - CIRES and University of Utah - GCSC, wwa.arens@gmail.com. 801.831.8712

Marc Coles-Ritchie, Grand Canyon Trust.

Recovery of riparian and hanging garden ecosystems in Glen Canyon as a consequence of drought in the Lake Powell region

As water has declined in Lake Powell, tributaries to Glen Canyon on the Colorado River have emerged after decades of inundation by the reservoir. Stream and riparian ecosystems are re-establishing in Glen Canyon. We surveyed these newly emerging canyons and documented vegetation that is recovering after the reservoir has receded. Near Lake Powell there are many colonizer plant species – annuals and other plants that can quickly grow on bare sediment, which includes many non-native plants. Moving upstream, to areas that have been uncovered for longer, there is much native riparian vegetation as well as hanging gardens that are re-establishing and thriving. This presentation briefly tells the story of this spontaneous ecosystem restoration.

Megan DeTemple, Brigham Young University, meganfenton6130@gmail.com. 801.824.4736, Provo,Utah.

Jake Henrie, BYU

Pollination ecology and floral biology of *Penstemon sepalulus*, an endemic Utah wildflower

Pollinators are key to the reproductive success of flowering plants (Crepet 2000). While there is a wide variety of different pollinators including bees, flies, beetles, wasps, and birds, a pattern emerges when comparing floral traits to their pollinators. For instance, hummingbirds are usually attracted to red flowers, while insects typically prefer blue or yellow flowers (Wilson et al. 2004). These floral traits that are associated with certain pollinators are known as pollination syndromes. North American *Penstemon* is a model system for studying plant-pollinator evolution because they have a flower morphology that spans the spectrum of attracting bees, hummingbirds, or both (Salas-Arcos et al. 2017). Our purpose is to identify where *Penstemon sepalulus* (A. Nelson), a Utah native flower, falls on this spectrum and if its pollination syndrome matches its expected pollinators. We measured various pollination syndromes (nectar concentration and floral dimensions) and collected pollinators at three different locations spanning the morning, afternoon, and evening. We

found that *P. sepalulus* exhibits a bee pollination syndrome but attracts generalist pollinators. The principal pollinators that we captured include *Megachilidea* (mason bees), *Masarinae* (pollen wasps), and *Apidae* (bumblebees). Additionally, we observed other pollinators such as *Pieris rapae* (cabbage butterfly) and *Selasphorus platycercus* (broad-tailed hummingbird).

Ashley N. Egan, Utah Valley University, aegan@uvu.edu, 801.367.9148, Orem, UT.

Ian Eggleston, Utah Valley University, ian.r.eggleston@gmail.com.

Using ecological niche modeling to better understand *Pediomelum aromaticum*, a threatened Utah plant.

Ecological Niche Modeling (ENM) is a useful technique that gives insight into species' present and future ranges, habitats, and niches. These models can also be useful for things like conservation to determine/define some of the major impactors of a species' habitat, particularly for climate variables. By understanding what areas a species may inhabit we can determine likely areas for preservation, restoration efforts, and can also use ENM models to try and find previously undocumented populations in unexplored areas. For this project the goal is to create an ENM for the rare plant species *Pediomelum aromaticum*, a species that includes 3 varieties: vars. *aromaticum*, *barnebyi*, and *tuhyi*. Within each of the states in which the species resides, one or more varieties are considered sensitive or threatened. This model would serve an important role in helping us more fully understand *P. aromaticum* and the areas in which it may inhabit. This model could also be used to help discover new populations, help conserve current populations, discover suitable areas for conservation management through propagation, and help us understand how climate change will impact *P. aromaticum*.

Jared Higgs, Price, UT, 801-821-8136, jaredhiggs@gmail.com and Kipp Lee, Salt Lake City, UT, 84102, 385.414.9985, Kipp_lee@comcast.net, UNPS board of director members.

Two Rare and Misunderstood Utah Cacti

Utah is home to over 3 dozen cacti species, many of which are endemic. Some have had confusing taxonomic histories and others were unknown until recent years. *Opuntia x woodburyi* is a hybrid derived cactus of Southwest Utah that has had an interesting history. *Cylindropuntia x viridiflora* is another hybrid cactus that

was recently discovered in Southeastern Utah. Until recently, both were misunderstood as to their parentage and even origins. We will clear up the taxonomic issues for *O. x woodburyi* and illustrate how unique and threatened this entity is. We will also show the history and origins of *C. x viridiflora*.

J. Hope Hornbeck, Manzanita Botanical Consulting, hope@manzanitabotanical.com, 801.803.3809, Salt Lake City, UT.

Demographic shifts in Uinta Basin hookless cactus populations 2012-2022

Uinta Basin hookless cactus (*Sclerocactus wetlandicus*; Fed-Threatened) is endemic to the Uinta Basin of northeastern Utah. Observations from 2012-2022 indicate that trampling by livestock and feral horses, invasive weeds, and negative synergies between native herbivores and possibly other anthropogenic threats have resulted in significant changes to population structure and behavior. Population viability analyses completed from 2013-2022 have demonstrated that this species possesses size-driven demography - with the size of above ground stems driving survival, growth, and fecundity, and the largest individuals make outsized contributions to population growth and long-term viability relative to their proportion of the population. High intensity trampling by livestock followed by widespread herbivory from 2016-2017 resulted in the loss of 57% of the large plants in the 2012 monitoring cohort (n= 379). Range-wide monitoring of 1,384 Uinta Basin hookless cactus individuals from 2012 to 2022 demonstrated that: 1) population structure has shifted from stasis-driven to ruderal population growth; 2) large individuals have been reduced by approximately half since 2012 and are not being replaced; and 3) formerly strong positive interactions between size and survival have dissolved. Despite the high recruitment rates currently maintaining stable population growth rates, the population is declining. A return to pre-2016 conditions for this long-lived, slow-growing desert perennial is unlikely to occur without active interventions to reduce chronic disturbance.

Stephen and Dean Kennedy, local youth, Draper Wetland Rangers

The Draper Wetland Rangers: Local Kids at Work in our Local Wetlands

Funded by a grant from the Utah Native Plant Society, on November 12, 2022, youth members of the Wetland

Rangers group, along with their families and neighbors, installed a total of 16 plant identification signs in the Mehraban Wetland Park in Draper. They also planted dozens of willows to stabilize the banks of one of the park's ponds.

The Wetland Rangers are mostly elementary and middle school students who live in the neighborhoods around the wetlands...The wetland habitat is currently threatened by invasive phragmites, whitetop, Russian olives, and an overpopulation of ducks and geese that eat willows and other native plants stabilizing the pond banks. In recent years the Wetland Rangers have waged a war against invasive species, meeting throughout the summer for working hours spent clearing or spading phragmites.

(excerpt from *Sego Lily* article (Fall, 45 issue 4) by Melissa Inouye.

Shannon Lencioni, Northern Arizona University and USGS, sl2782@nau.edu, 775.221.2531, Flagstaff, Arizona. Liza Holeski (NAU) and Rob Massatti (USGS)

Arizona Willow: A study to understand its defense chemistry

Salix arizonica is a rare species that occurs only in the four corner states. Populations have been in decline since monitoring efforts started in the 1990's. I will be investigating the effects that browsing has on individuals throughout their known occurrences.

Susan E. Meyer, Senior Research Ecologist, USDA Forest Service, Rocky Mountain Research Station, semeyer@xmission.com, 385.254.8244, Elk Ridge, UT, and Kody R. Rominger, Research Fellow, Southern Utah University

Dwarf Bear Poppy (Arctomecon humilis) Demographic Studies

Demographic studies of rare plants are intended to provide information on population status and also to illuminate features of species life history. They involve multiple-year monitoring of individual marked plants to determine survival, growth, and reproductive output. Such a study was initiated in 1992 for dwarf bear poppy by Renee Van Buren and Kimball Harper. They marked and followed all established individuals on a 700-m² plot at Red Bluffs for 22 years following that large establishment event. In 2013, Renee asked me to help her develop this data set, as well as seed production and seed bank persistence data collected by Ally Searle, into

a matrix model framework to synthesize these results and make management recommendations. We completed this population viability analysis in 2015, but it left many questions unanswered. One problem was the reliability of projecting results from this one very small area to populations across the species range. In 2017 there was another large dwarf bear poppy establishment event. Kody Rominger and I decided to see if it would be possible to monitor dwarf bear poppy populations, including collection of demographic data, using drone imagery. We initiated pilot studies in 2018, and in 2019 obtained a large grant to scale up these studies. We followed individual plants on nine 0.6 ha plots at the White Dome, Beehive Dome, Tonaquint (part of Red Bluffs), and Shinob Kibe populations from 2019 through 2022. This enabled us to track literally thousands of individuals over a very large area (>20 ha). These new data, along with additional on-the-ground studies, will enable us to create a much-improved population matrix model for dwarf bear poppy and will also guide our efforts to augment populations and establish new populations of this species through direct seeding.

Mary O'Brien, Director, Project Eleven Hundred, HC 64 Box 2604, Castle Valley, UT 84532, 541.556.8801, www.projectelevenhundred.org.

La Sal Mountains Groundsel (Senecio fremontii var. inexpectatus): "Canary" in a small alpine community?

It is being said that Great Salt Lake is Utah's canary in the coal mine for water in the Southwest. The largest freshwater lake in the western hemisphere is drying up, primarily because our use of water is incompatible with what the Great Salt Lake requires to remain a functioning ecosystem. Down in southeastern Utah, a small area of La Sal Mountain reaches above 11,000' to support one of the few alpine communities on the Colorado Plateau. This alpine community is being used by non-native Mountain goats first brought to the mountain 11 years ago by Utah Division of Wildlife Resources. *Senecio fremontii* var. *inexpectatus* (La Sal Mountains' groundsel), categorized as critically imperiled by NatureServe guidelines, is one of eleven US Forest Service plant species of conservation Concern in this small alpine area. A five-year study of this alpine community indicates forb cover has been consistently declining over the five years, and *S. fremontii* var. *inexpectatus* is declining where goat use is high and recreation use is low. Should this species be regarded as a canary in the use of Utah's alpine communities by mountain goats amid predictions of increasing temperature?

David Parrott (Westminster College),
dparrott@westminstercollege.edu, 801.832.2429, Salt
Lake City UT.

Great Salt Lake Shoreline Plants and Their Unique Rhizosphere Microbiomes

The saline soils comprising the shoreline of Great Salt Lake, Utah (GSL) provide a unique habitat for microorganisms and a select few halophytes (salt-tolerant plants). However, until recently, little has been known about the microbial diversity of these soils. Here we present the results of a three-year study characterizing the microbiome of both plant-free bare soil and that of the halophyte rhizosphere at two GSL locations; the more saline North Arm near the artwork, Robert Smithson's Spiral Jetty (SJ), and the less saline South Arm on Antelope Island (AI). Plant-free bare soil and the rhizosphere of *Salicornia utahensis* (Pickleweed) and *Suaeda erecta* (Seepweed) located along the shoreline at both SJ and AI locations were sampled over a five-year period. For each sample, soil salinity was quantified, and DNA was isolated. Our data suggest differences in the composition of plant-free bare soil and rhizosphere microbiomes of *Salicornia* and *Sueda* depending on location, soil type and salinity. Decreased diversity of archaeal, bacterial, and fungal species was observed in both plant-free bare soil and both rhizospheres at SJ compared to AI. Interestingly, a corresponding increase in the representation of halophilic archaea at SJ was observed, possibly linked to the much higher salt concentration in the North Arm. Our results provide insight into the microbial diversity of GSL shoreline soils, whether plant-free or the rhizosphere of halophytes and seek to expand our knowledge of halophyte-halophile relationships.

Rita Reisor, U.S. Fish & Wildlife Service, West Valley
City, UT, rita_reisor@fws.gov.

USFWS Listed Plant Updates

Aaron Roe, Utah State Botanist, T & E Program Lead,
Bureau of Land Management, Utah, Interior Region 7,
aroe@blm.gov, o: 801.539.4065 m: 385.256.4848, Salt
Lake City, Utah

Updates on BLM HQ policy and projects funded in support of rare plant management in Utah

Updates on policy and projects relevant to the BLM Utah
botany and rare plant program.

Mikel R. Stevens, Emeritus Professor, Department of
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Brigham Young University, Provo, Utah 84602.
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Richmond, UT

Robert L. Johnson, Department of Biology, Brigham
Young University, Provo, Utah 84602,
robert_johnson@byu.edu.

Updates on Rare Penstemon of Utah

P. navajoa* and *P. strictus

In our late June 2022 field studies, we, with appropriate permits and a guide, searched Navajo Mountain and Abajo Mountain/Elk Ridge area for *P. navajoa*. On Navajo Mountain we found two forms of *P. navajoa*. At the lower elevation (~7500' elevation) we only found an erect form of *P. navajoa*. However, at the summit (~9400' elevation), we exclusively found decumbent

P. navajoa plants. In our search for *P. navajoa* at purported locations on Abajo Mountain/Elk Ridge we only found *P. strictus*. Our conclusions are that there appears to be two different forms of *P. navajoa* that are exclusive to Navajo Mountain, and we were only able to find populations of *P. strictus* on Abajo Mountain/Elk Ridge.

P. pseudoputus

Prior to late 2021 only one small population of *P. pseudoputus*, near the shores of Panguitch Lake, in Garfield County, had been identified, but not recollected since 1977. While carefully examining the specimens of *P. strictus* in the BYU Bean Museum herbarium, we identified a specimen of *P. pseudoputus* collected in 2009 which had been misidentified as *P. strictus*. Late June 2022, we visited the collection location of this specimen and confirmed that there is a population *P. pseudoputus* a short distance west of Canaan Peak in Garfield County. Specimens of this species were found infrequently within about 0.5-mile radius.

P. paysoniorum

Finally, mid-June 2022 we identified the first population of *P. paysoniorum* in Utah. This population is at least 0.5 miles long and was found along the border of Utah and Wyoming northeast of Woodruff, UT.

Mindy Wheeler, Native Plant Conservation Project Leader, Quinney College of Natural Resources, Wildland Resources Department, Utah State University, 385.235.1062, mindywheeler@utah.gov.

Update from the Utah Rare Plant Team

The date is quickly approaching for the Utah Division of Wildlife Resources to have a revised Wildlife Action Plan (WAP) finished (August 2025). The inclusion of plants and insects within the WAP has kept the Rare Plant Team busy with more conservation rankings, research and many meetings as to Utah's rare plants, their habitats and the multitude of threats for each one of them on the Utah landscape. To assure available data is incorporated in these conservation rankings, the Utah Rare Plant Team has been busy with abundant field work that includes surveys, monitoring and re-visiting rare plant population observations more than 30 or

more years old. The intrepid team took a trip through Desolation Canyon in 2022; half the team on the river (with BLM and academic botanists), the other approached from the top. The team found 3 new populations of *Cycladenia humilis* var. *jonesii* and possibly a new population of *Carex specuicola* (collection with *Carex* specialist). The team also found a new population of Shivwits milkvetch just southeast of Leeds - confirmed by Robert Johnson of BYU. We continue to improve and allow agencies and consultants to use our Field Maps app that streamlines the process by which new data is included in our database. In addition to rare plants, the team has participated and worked with the new Pollinator Habitat Program (UDAF) by collecting and cleaning regionally appropriate seed and helping to organize and hand out live native plants to applicants.

Save the Date!

The Utah Rare Plant Meeting is scheduled for next year on Tuesday, March 5, 2024—SAVE the DATE!
We are hoping to hold this meeting in person at the Natural History Museum of Utah
but also offer it virtually in a “hybrid” meeting.

More Zach Coury photos of native plants in habitat:



Primula specuicola in a south-facing seep. 2 April, Wayne County. Photo by Zach Coury.



A very small *Astragalus holmgreniorum*, 19 April, Washington County. We were only able to find one individual in flower. Photo by Zach Coury.



Uniquely inflated pods of *Astragalus ampullarioides*. 25 April, Washington County. Photo by Zach Coury.

UNPS Volunteers Meet with Gardeners

The annual spring plant sale at Red Butte Garden is stocked with thousands of plants, including a great selection of natives, and is attended by hordes of gardeners voracious for new plants and gardening ideas. For a number of years, volunteers from the Utah Native Plant Society, also representing the Wasatch Rock Garden Society, have staffed a table to interact with these gardeners, answering many questions, particularly pertaining to gardening with native plants.

UNPS members Tony and John Stireman and Bill and Cathy King spent Friday and Saturday at the plant sale in the UNPS booth situated right next to the new booth this year of Utah cold-hardy cactus set up by member Floyd Jacketta. Much plant nerd conversation was heard and enjoyed. Many thanks to Red Butte Garden for the spring and fall plant sales that feature so many native plants, they are a great service to the community.



More Zach Coury photos of native plants in habitat:



A roadside population of *Astragalus uncialis*, 14 April, Millard County. A couple odd individuals had unique white flowers. Photos by Zach Coury.



Your Membership

Your membership is vital to the Utah Native Plant Society. It is important that your information is correct and up to date for notifications and the delivery of The Sego Lily newsletter.

Any questions about your membership, Contact Tony Stireman, tstireman@gmail.com.

Summer is here... It is time to consider another issue of the Utah Native Plant Society *Sego Lily* which relies mostly upon articles from the society's membership. Please submit articles of your native plant stories and photos from hikes and field trips, conservation activities... whatever might be informative and interesting to fellow members.

The *Sego Lily* editors can use most any text format for articles (**PDFs can be troublesome**). Photos are always best submitted in original resolution and as individual files separate from text. You can indicate desired positioning within a document. We are looking forward to hearing from you. For submissions and/or questions: newsletter@unps.org or cathy.king@gmail.com.



Utah Native Plant Society

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PO Box 520041
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To contact an officer or committee chair write to:

Webmaster: unps@unps.org

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Website: For late-breaking news, the UNPS store (posters, etc.), the *Sego Lily* archives, Chapter events, sources of native plants, the digital Utah Rare Plant Field Guide at unps.org.

Webmaster inquiries at unps@unps.org

Many thanks to Xmission.com for sponsoring our web-site.

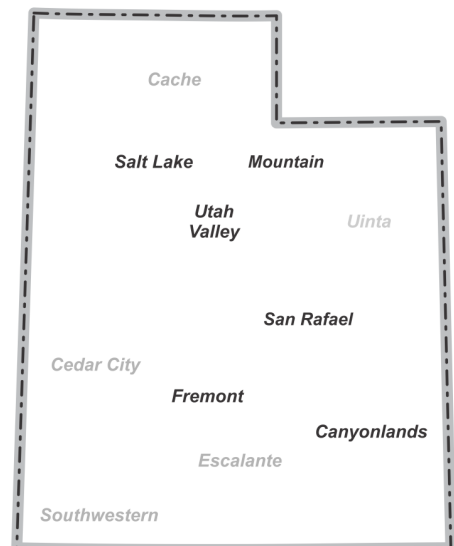
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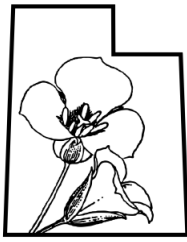
Submit articles to Cathy King:
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UNPS Chapter Map *Inactive





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