

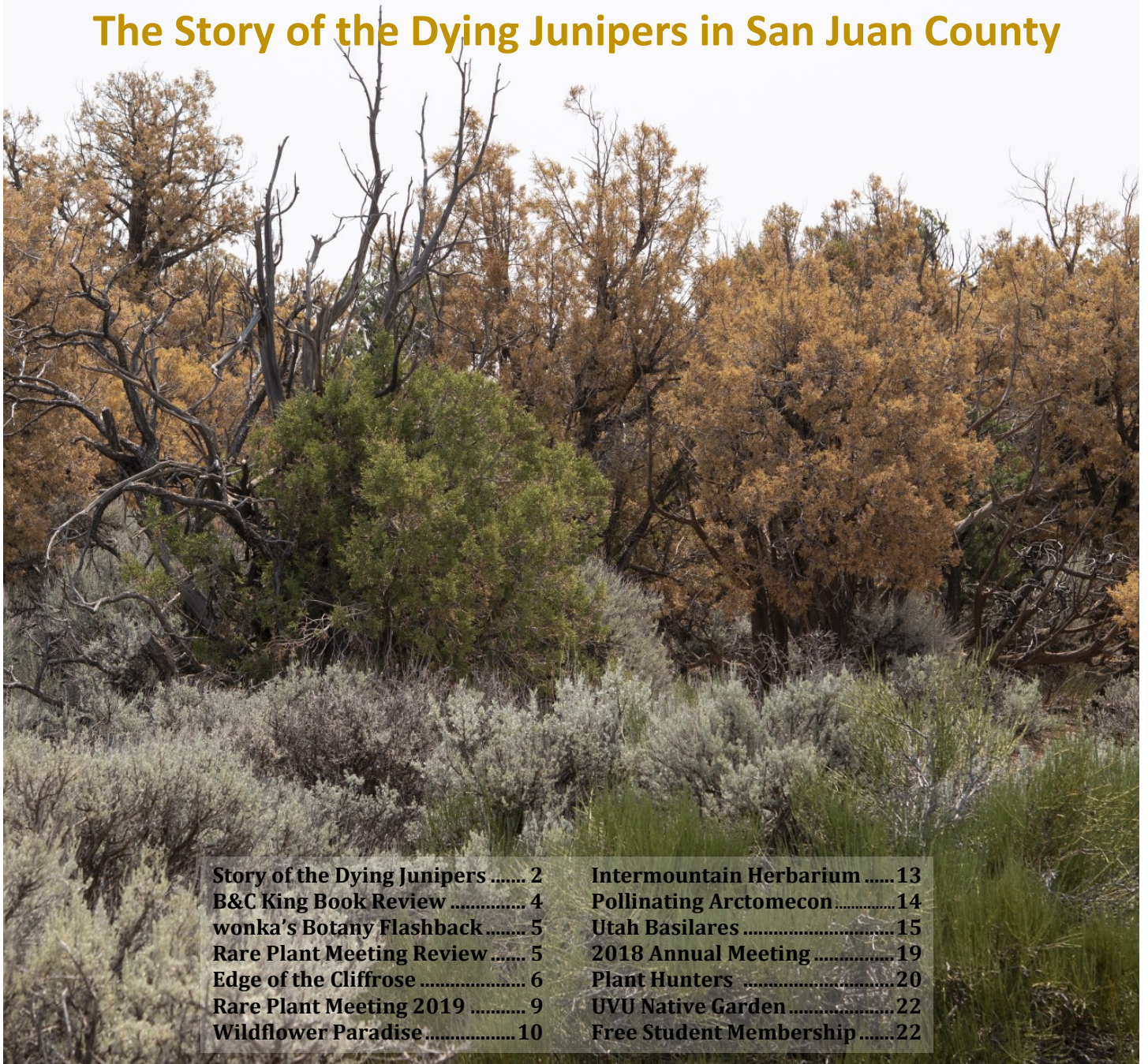


Sego Lily

Newsletter of the Utah Native Plant Society

Winter 2019 Volume 42 Number 1

The Story of the Dying Junipers in San Juan County



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The Story of the Dying Junipers In San Juan County, Utah 2018

by Kay Shumway

My wife, Patsy, and I visited the area west of Blanding frequently in April, May and early June of 2018 without paying much attention to the condition of the junipers.

On June 20th this all changed rather dramatically. We went out to photograph the fabulous views from Muley Point and this time noticed the large number of dying junipers at the south end of Cedar Mesa around mile marker 10 on state road 264. This die-off shows up as a yellowing of the juniper needles. The dying/dead needles would turn yellow and make the trees stand out and easy to spot.

This was very impressive to us as we could easily see the big changes that had taken place since our visit on 25 May. We stopped and photographed with a land camera and a drone. The drone videos and stills showed that the die-off extended well beyond the road on both sides, especially to the east. I walked around among the junipers amazed at the number of dying ones. The ages of the dying junipers was very broad from trees that I would guess were less than ten years old, to trees that are probably over 200-300 years old.

Also there were dead trees well spaced from any others and dead trees that were growing close to each other. This observation indicates that drought is not the main factor. Substantiating this idea is the fact that the pinyons, which are normally considered to be more susceptible to drought, were green and healthy looking. It is worth noting here

that the die-off is spotty in the sense that a large area would have many dying junipers and other areas would have few or no dying junipers.

The observations on 20 June alarmed me enough that I started to drive around the county to see how widespread the die-off was. I checked on junipers: on Mustang Mesa, on Alkali Ridge, on Murphy point, on Black Mesa, 4 miles north of Blanding on highway 191, on West Water point and directly east of Blanding. The die-off was everywhere I looked. This is mainly true in the southern part of the county, starting about 5 miles north of Blanding.

On the 30th of July we noticed that not only did the die-off seem to have spread north at the south end of Cedar Mesa but there were now dying junipers on the northeast portion of Cedar Mesa near mile marker 103 on highway 95.

Being a curious person with a scientific background, I decided to examine some dying trees by stripping the bark from the main trunk and side branch to expose the phloem. At this point I could see that flat headed larvae were living on the phloem and that the result of several larvae making galleries was a girdling of the trees. So my first hypothesis was that a bark beetle had laid eggs on the bark, the eggs had developed into larvae which in turn fed on the phloem. Since the phloem conducts photosynthetic products to the roots from the needles, the larvae were cutting off the flow to the roots and the roots die. When the roots die and can no longer take up water to be conducted to the needles through the xylem the needles and the tree dies. The paths



the larvae follow as they chew away on the phloem are called galleries and are easy to spot once the bark is removed. Since I am not an entomologist this may be an oversimplification. I have posted several aerial videos on YouTube, Vimeo and Facebook showing the die-off in several locations. Some videos include live larva.



Bark is removed to show phloem and xylem.

This girdling model was tested by examining trees in 7 or 8 locations. The only exception to finding larvae in dying junipers was Black Mesa. I did not even find galleries on those. I don't know what to make of this.

I noticed that the Flagstaff office of the BLM/Forest Service encouraged citizens to bring samples of forest problems to their attention. So we mailed them some photos of dying junipers, larvae in isopropyl alcohol and a small sample of a dead branch. I learned later that these samples were sent to the Forest Health Protection Field Office in Ogden, Utah.

On July 16 at the suggestion of Al Schneider of Cortez, Colorado, I sent an email to Mary O'Brien asking her if she knew about the junipers dying in large numbers. Al and I

have been hiking and photographing flowers together for years. He is the author of the excellent site on Colorado wildflowers which includes Southeastern Utah. Mary quickly responded expressing interest and wrote that she would ask a couple of people about it. The publicity about the dying junipers began there and has continued to grow. Articles about the dying junipers in San Juan County have also been published in the *San Juan Record* and by Brian Maffly in the *Salt Lake Tribune*. Jim Stiles, editor of the *Zephyr* has also used his online magazine to help spread the word.

Under the leadership of Liz Hebertson, PhD, the plant pathologist at the Forest Health Protection Ogden Field Office, a field trip was planned with several professional employees from the Bureau of Land Management (BLM), the Park Service, the Forest Service, and Mike Popejoy from Grand Canyon Trust and Brian Maffly from the *Salt Lake Tribune*.

We met at the Blanding city visitors center on November 28. Approximately 20 people were there. We first went to Alkali Ridge where my explanation to the group of how I knew that larvae were involved drew a mild rebuke from the BLM people because I did not have a permit to do what I did on my own. Since the BLM has been cutting down large numbers of junipers and burning them, it had never crossed my mind that I needed a permit to strip the bark from 10-12 dead junipers. I am now in the process of obtaining a permit.

The group cut down several juniper trees on Alkali Ridge and examined trees by stripping the bark. Samples were collected to take back to their labs for further examination.

We then went to the northeast portion of Cedar Mesa, near milepost 104 on state highway 95. The rest of the day was spent there cutting down dead junipers, digging to examine roots, collecting samples of larvae and looking for bark beetles.

I hope that as soon as possible a report of the findings will be published and made public.

San Juan Record "Junipers mysteriously dying off by the thousands"

http://www.sjrnews.com/view/full_story/27599223/article-Junipers-mysteriously-dying-off-by-the-thousands?instance=home_news_1st_right

Salt Lake Tribune "The juniper mystery: Why is a tree that's supposed to withstand drought suddenly dying in southern Utah?" <https://www.sltrib.com/news/environment/2018/11/18/juniper-mystery-why-is/>

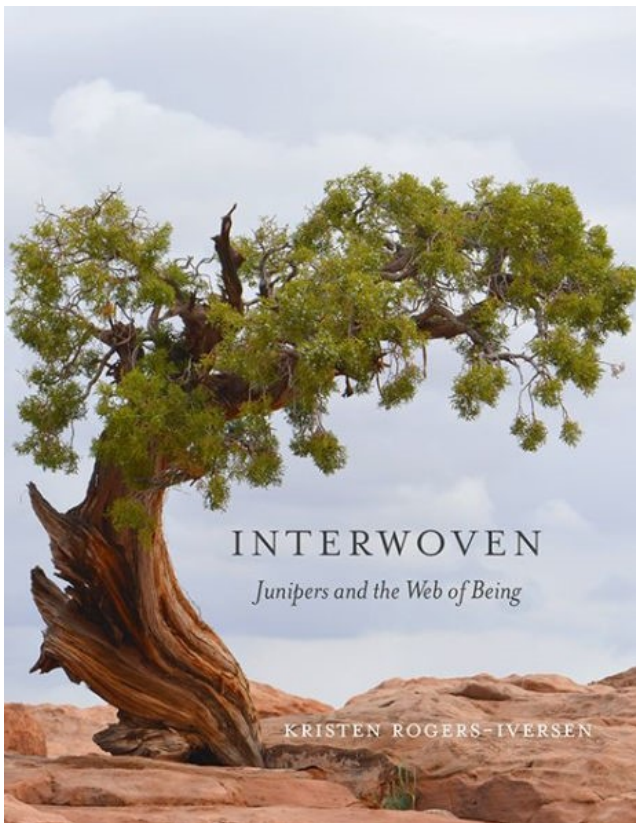
The Durango Herald "Juniper trees across Southwest Colorado are taking a mysterious turn" <https://durangoherald.com/articles/203269>

Book Review by Bill and Cathy King

Interwoven: Junipers and the Web of Being

by Kristen Rogers-Iversen

Published jointly by the University of Utah Press and Utah State Historical Society, Salt Lake City, Utah 2018. Paperback, 213 pages Author Kristen Rogers-Iversen is an administrator at the Utah Division of State History and has worked as an independent writer, editor, and a therapeutic musician for hospice patients.



Interwoven is a culmination of a lifetime infatuation with junipers and eight years of research by not only Rogers-Iversen but her photographer husband as well.

The book is well organized with a Table of Contents and Illustrations, has extensive endnotes by chapter as well as a selected bibliography and a comprehensive index.

There are nearly 50 high quality, black and white photos dispersed throughout the book and 24 wonderful color plates inserted in the center, mostly taken by her husband Ed Iversen. It is broken down into eleven well-defined chapters: Roots, Germination, Survival, Spirals,

Leaves and Seeds, Wood, Smoke, Spread, Relationships, Restoration and Kin, each of which are so well-defined they could easily stand on their own and be read separately, almost like reading short stories. But the themes within the chapters describe the relationships of humans and nature and how they are “interwoven” with junipers. Many juniper species are discussed in the book, but most specifically the junipers of Utah, which are Utah Juniper, *Juniperus osteosperma*, Rocky Mountain Juniper, *Juniperus scopulorum*, and the Common Juniper, *Juniperus communis*.

From a literary point of view, it is a great read. Rogers-Iversen has spun a story based on both the science and history of the juniper. As she herself explains in the *Prologue*:

“I have chosen to intertwine the stories in this book, echoing how living things, events, and ideas intertwine in reality. This is fair warning, in case you were expecting a linear path through juniper facts.”

The stories range from cutting “cedar” trees (as junipers are commonly called in Utah) for Christmas trees to the uses of all parts of the juniper for medicinal purposes in ancient and more modern Native American cultures and then on to a reference to its uses in the 1653 herbal guide written by Nicholas Culpepper. Further on, in the “Spread” chapter, is a discussion of fire suppression, poor range management, Aldo Leopold and biological crusts. What might sound slightly manic, actually flows rather smoothly and only piques the curiosity further and can easily be followed up further, if so desired, by looking into the endnotes and bibliography.

The chapter on “Survival” describes the ability of junipers to survive in the most severe drought conditions where even pinyon pines perish. Rogers-Iversen gives a clearly understandable description of the process of cavitation and how junipers have evolved a process to resist it. Cavitation destroys the circulation within the tree and ultimately kills it when it can no longer process water through its veins (xylem). Since the publication of the book, the long-held reputation of junipers to withstand drought has come into question, see Kay Shumway’s article in this issue.

We would highly recommend this book to amateurs as well as professionals who are interested in junipers and the role they play across Utah. It does have lengthy explanations of some things which those in the sciences may find overly detailed.

At \$24.95, *Interwoven* is a good value with full color plates and will provide enjoyable and informative reading. There is the risk it will get you itching to put on your hiking boots and head out for a walk among the junipers.

wonka's Botany Flashback

Mountain Cedar Stereoscopic

In early September of 1869, William Henry Jackson took this stereo view of Mountain Cedar (Juniper) in Echo Canyon, Summit County, Utah. This was one of many views that he took in Utah of scenery along the Union Pacific section of the transcontinental railroad which had just been completed on May 10, 1869 (almost 150 years ago). Jackson went on to become one of the most famous photographers of the West, especially in Yellowstone. Stereo views of two slightly different photos give a 3 -D effect when looked at in a viewer.



Highlights of the UNPS Rare Plant Ranking Meeting

by Robert Fitts

The Utah Native Plant Society Rare Plant Ranking Meeting took place on October 26, 2018, the day before the Annual Meeting of the UNPS. We met at the Life Science Museum at Brigham Young University. Eight people attended the meeting and four people called in. Renee Zauner from Utah Valley University started off the meeting with some proposed rank changes. Utah's recently described species were added to the list. Loreen Flinders gave a detailed report on *Boecheras* and added ranks on species she has been studying.

Notable Rankings:

<i>Astragalus desereticus</i>	Ranked Extremely High Priority	Recently delisted, part of the habitat is for sale, possible the land could be developed.
<i>Boechera duchesnensis</i>	Ranked Extremely High Priority	Rare Uinta Basin plant.
<i>Boechera caeruleamontana</i>	Ranked Watch List	
<i>Descurainia brownii</i>	Ranked Need Data List	Not much known about this species from Brian Head.
<i>Echinocereus relictus</i>	Ranked Extremely High Priority	
<i>Mentzelia memorabilis</i>	Ranked Watch List	
<i>Musineon naomiensis</i>	Ranked Watch list	
<i>Najas flexilis</i>	_____	This Fish Lake endemic is considered extinct after search by Blake Wellard and Ben Gibbons in 2018.
<i>Orthocarpus holmgreniorum</i>	Ranked Need Data List	
<i>Stephanomeria occultata</i>	Ranked Extremely High Priority	
<i>Terraria haydenii</i>	Ranked High Priority	

At the Edge of the Cliffrose: *A Call for Volunteers*

by William Gray

In the words of Wikipedia ***This article is a stub***. It is basically a short introduction to what could be a fascinating story, but there are presently more questions than answers. This coming Spring offers a chance for UNPS members to help gather field data even while the questions are being formulated. If you read this and feel that you might be interested in contributing please contact me and I will send details of how best you can help – it could be as simple as keeping your eyes open while walking the dog.



Figure 1. Flowers of Cliffrose (*Purshia stansburyana*). Note the multi-lobed glandular leaves near top.

Two of Utah's most beautiful shrubs are the Cliffrose and Bitterbrush. Both are members of the Rose family and produce spectacular displays of white to cream flowers from April to June (Figure 1). Overall they are very similar but their seeds differ in an important way. Those of Cliffrose have a long feathery tuft, similar to that on Mountain Mahogany seeds, which enables them to be dispersed long distances by wind. Those of Bitterbrush are short and stubby, not wind dispersed but probably spread locally by rodents. This difference

becomes very important when thinking about recolonization of the Great Basin since the ice ages.

Both plants have a venerable botanical history. Bitterbrush was described first from plants found in Montana by Lewis and Clark on their epic exploration (1806) and named *Purshia tridentata* in 1817. Cliffrose was discovered by Stansbury during his expedition to the Great Salt Lake in 1850 on what is now Stansbury Island. What else to call it except *Cowania stansburyana* based on its close similarity to *Cowania mexicana* (described from Mexico in 1825)? Sometimes it is considered as merely a variety of the latter.

A third related species in the Intermountain region is Desert Bitterbrush found mainly further West but reported in Utah from the Beaverdam area. It was first described in 1885 from the Mojave Desert in California, and resembles Bitterbrush except for having glandular leaves and twigs. Accordingly it was named *Purshia glandulosa*. Again the difference may be of ecological significance because deer avoid browsing such glandular plants. Since Cliffrose is also glandular it has long been thought that Desert Bitterbrush may have arisen from hybridization between the other two species.

Stutz and Thomas¹ made a systematic study of variation among plants in Utah and Idaho and identified some notable aspects of hybridization between them. Bitterbrush tends to bloom about a month earlier than Cliffrose, so only late-blooming Bitterbrush can breed with early-blooming Cliffrose. Cross-breeding can be even more restrictive if the male and female parts are also out of synchrony in the two species.

Partly based on that analysis it has become widely accepted that all plants belong in the same genus: the earlier published name *Purshia* takes precedence².

Purshia along the Wasatch Front

Utah represents the northernmost limit for Cliffrose with a cutoff line stretching from Salt Lake City to the Pilot Range on the Nevada border: so the original plant found by Stansbury was right on the edge of its range. In contrast Bitterbrush is abundant at these latitudes and extends from Arizona almost to the Canadian border.

My interest in *Purshia* was triggered by finding an individual shrub above the Salt Lake City cemetery with all the hallmarks of Desert Bitterbrush (*Purshia glandulosa*) a plant usually found much further south and west. The only other purshias close by were an isolated Cliffrose (*P. stansburyana*) and a small population of Bitterbrush (*P. tridentata*). The Cliffrose was unusual in that most of its seeds failed to develop a long plume: although very fuzzy they remained stunted and attached to the parent plant even into December. This suggested that we might have a situation where the Cliffrose was receiving pollen mainly from Bitterbrush, most seeds being abortive but with an occasional successful hybrid looking for all the world like Desert Bitterbrush! Subsequent searching located vigorous populations of Cliffrose and Bitterbrush about a quarter

mile away. Another lone putative hybrid was later found in City Creek Canyon two miles to the Northwest.

Figure 2 illustrates leaves and seeds from the three species/hybrids.

Cliffrose (Fig. 2a) normally sets many small seeds per flower, each bearing a lovely feathery plume: the seeds readily disperse in late summer, leaving an empty cup. Mismatched pollen may still produce many seeds (Fig 2b) but these remain stunted and fail to disperse: they can stay around into the winter and beyond. Leaves of Cliffrose are usually narrow, multi-lobed, tightly rolled back at the edges, and have glands which start out sticky but dry out chalky. The individual Cliffrose in Figure 3, surrounded by Bitterbrush, but with several other Cliffrose plants nearby, has both kinds of seed.



Figure 2. Leaves and seeds of *Purshia*: (a) Cliffrose, *Purshia stansburyana* with normal plumose seeds; (b) Cliffrose, *Purshia stansburyana* with infertile seeds, probably pollinated by *Purshia tridentata*; (c) Bitterbrush, *Purshia tridentata* showing flat non-glandular leaves and non-plumose seeds; (d) Desert Bitterbrush/Hybrid *Purshia glandulosa* with multi-lobed glandular leaves and non-plumose seeds; (e) Desert Bitterbrush/Hybrid *Purshia glandulosa*, young stem with highly glandular twig and tridentate glandular leaves.



Figure 3. Cliffrose and Bitterbrush coexisting: (a) a single robust plant of *Purshia stansburyana* is surrounded on 3 sides by heavily browsed *Purshia tridentata*. Other plants of *Purshia stansburyana* occur very close by so the main plant receives pollen from both species – and produces both normal and infertile seed; (b) the same plants as seen from the air in a Google Earth Image dated 6/4/13.

Bitterbrush (Fig 2c) usually sets only one or infrequently two much larger seeds, bristly, but not plumed. Leaves are almost all 3-lobed, non-glandular, but hairy. They occur in two distinct forms. Some are flat, about as broad as they are long, and rarely persist through the winter in the Salt Lake area. Leaves on new twigs are narrow and tightly rolled, lasting out the winter as a target for deer.

Desert Bitterbrush (Fig 2 d-e) combines characters of both: leaves and glands like those of Cliffrose, but seeds like those of Bitterbrush. Figures 2d-e illustrate these features by way of the hybrid plant found in Salt Lake City. Many of the leaves in one photograph have multiple lobes, but on another twig from the same plant they are only 3-lobed.

In their studies Stutz & Thomas found glandular forms of Bitterbrush in Idaho, far to the north of both Cliffrose and Desert Bitterbrush at the present time. They suggested either that Cliffrose and Bitterbrush occurred together there during a warmer episode of the Pleistocene, or that hybridization has been spreading the genes for glandular character northwards in a stepwise fashion. Although they leaned towards the second explanation it should be pointed out that Cottam's famous hybrid oaks present in our northern foothills almost certainly are mementos of when *Turbinella* Oak (*Quercus turbinella*) occurred this far north in the pleistocene.

Any way we look at it Cliffrose along the Wasatch Front is at a frontier providing an opportunity to study a plant

at the very limit of its range – at a time when that range may be expanding due to a warming climate, with both natural and human components.

A particularly intriguing aspect is the asymmetry of seed dispersal by the various players: they either fly or crawl. Fliers are produced *only* by Cliffrose plants whether pollen comes from Cliffrose or Bitterbrush, and can act as long distance colonizers. Going north from here, however, unless a significant population gets established they will not encounter other Cliffrose but will be pollinated only by Bitterbrush or a hybrid. Further flights northward should then be only by a new generation of hybrids and that will be it until a new wave of fliers comes from further south. Conversely, seeds produced on anything except Cliffrose plants are expected to disperse only by 'crawling'. This is likely to include situations in which hybrids are produced from pollination of Bitterbrush by Cliffrose.

The ability to spread also depends on physiological factors. Both parent species readily colonize disturbed slopes such as the edge of road cuts. However, Cliffrose thrives in warmer more protected sites while Bitterbrush occupies more mesic ones. Susceptibility to browsing, as mentioned, is another factor: non-glandular plants at the wild-urban interface can be eaten to the ground while glandular ones survive unscathed.

In the past few months I have begun to compile data on purshias of the Wasatch Front, starting with Salt Lake Valley. Members of our Salt Lake Chapter were asked to

share locations of any Cliffrose plants they knew of and several came forward. With their help I was able to locate four small populations. Two of these are likely places where Cliffrose had been collected in the 1880s. Because the plants are partially evergreen it is fairly easy to check them out even in Winter. The broad picture so far is that significant populations have been found only on steep south-facing slopes of the northern benches and Ensign Peak above Salt Lake City, with just scattered plants elsewhere. I strongly expect there will turn out to be others when volunteers have done more exploration. Many populations of Bitterbrush have been sampled. There is a lot of variation in leaf morphology but surprisingly little sign of hybridization. Several good populations of Cliffrose are known from Utah County and will be investigated.

Many of the most interesting questions revolve around flowering and seed set. When this occurs in April to June plants become very easy to spot even from a distance – including from the air! Figure 3a shows a single tall Cliffrose surrounded by heavily browsed Bitterbrush; Figure 3b is of the same plants as seen in a Google Earth image dated June 4, 2013. Bitterbrush is no longer in flower, while Cliffrose is ablaze.

I would love to hear from volunteers throughout the state, but especially along the Wasatch Front and westwards, letting me know when plants start to bloom and, if possible to send me photos. Leaves especially are most helpful for determining species.

Bill Gray cyberflora@xmission.com

References:

- ¹Stutz, H.C. and L. K. Thomas. 1964. Hybridization and Introgression in *Cowania* and *Purshia*. *Evolution* 18: 183-195.
- ²Formally this was done by Henrickson (*Phytologia* 60: 468, 1986) who later emended the spelling to *P. stansburyana* rather than *P. stansburiana* (FNA 9: 2015).

Acknowledgments:

I thank the various UNPS members who reported their sightings of *Purshia* around the Salt Lake Valley, and will welcome their further participation in this project.

Utah Rare Plant Meeting

Tuesday, March 5, 2019



Astragalus desereticus photo credit Daniela Roth

Swaner Forum, Natural History Museum of Utah

Register online <https://www.unps.org/urpm2019.html>

co-sponsored by Utah Native Plant Society and
Garrett Herbarium of the Natural History Museum of Utah

Wildflower Paradise in the Stansbury Mountains

by Steve Hegji

Introduction

In less than an hour and a half from where I live in Utah County, I can be parked at the Loop Campground up South Willow Canyon in the Stansbury Mountains. It's an even shorter trip if you live in Salt Lake County. If you've not been here before and hiked up the trail a bit, you're missing one of best wildflower jewels in northern Utah and I would encourage you to plan a trip there this coming summer. In this article I will give you some background information about the Stansbury Mountains, and then briefly describe – with text and images – my recommendations for wildflower explorations.

Background

(The following material is extracted from “Flora of the Stansbury Mountains, Utah” by Alan C. Taye, Great Basin Naturalist, Volume 34|Number 4, Article 11)

Geology

The range has a length of 28 miles and a width of 13 miles...The elevation ranges from 4200 feet in the valleys to 11,031 feet at the summit of Deseret Peak...Structurally, the Stansbury Mountains are a "gigantic eastward tilted fault block". The western escarpment rises abruptly from the floor of Skull Valley and is dissected by steep-walled canyons. The eastern side of the range is generally less rugged except in the vicinity of Deseret Peak, where Pleistocene glacial activity has produced sheer canyon walls and several well-defined horns formed from coalescing glacial cirques. At least 17 cirque basins, two of which contain small lakes, occur in the range. Skirting the base of the range are terraces, wave-cut cliffs, spits, and other features produced by Lake Bonneville. Pediment surfaces, bajadas, and alluvial fans are present on the western and eastern edges of the range.



East face of Deseret Peak showing couloirs.

Climate and Soils

The climate for the area is classified as cold semiarid or steppe...Precipitation in the Great Basin is strongly influenced by the orographic effect, with mountains receiving greater amounts than the valleys. Tooele receives an average annual precipitation of 16.3 inches...A precipitation station located at 9250 ft on the lee side of Deseret Peak receives an average of 55.2 inches...Soils are diverse in the study area...Types of soils range from the strongly alkaline, light-colored soil typical of the valley greasewood community to the strongly acidic, dark-colored soil of the montane spruce-fir community.

Vegetation

Eight somewhat distinct vegetation zones or communities, are present in the Stansbury Mountains. In order of increasing elevation, they are the shadscale, sagebrush-grass, juniper-pinyon, Douglas fir-white fir, upper

subalpine conifer community, and its presence in the Stansburys marks its northern and eastern limits of distribution in the Bonneville Basin....Statistical comparison of the Stansbury flora with neighboring mountain floras indicates that the Wasatch Mountains lying 40 miles to the east have probably been the primary source area for development of the Stansbury flora. Many lowland species, especially those inhabiting sandy areas, apparently have migrated to the area from the south.

Wildflower Recommendations

All my trips to the Stansbury Mountains (if you exclude Stansbury Island) have been done in July, at South Willow Canyon. In the future I hope to do Spring and Fall trips, and I hope to visit areas to the north and south of South Willow Canyon. In what follows my focus will be on botanical aspects of taking a trip to this area. You can find other information in hiking books, hiking apps, and on the internet.



Delphinium and east face of cirque that contains South Willow Lake



Jacob's Ladder in bloom, Apiaceae in fruit

sagebrush-grass, Engelmann spruce-subalpine fir, limber pine-bristlecone pine, and alpine zone. The vegetational zonation in the Stansbury Mountains is transitional between the Wasatch type and the Basin Range type. Gambel oak (*Quercus gambelii*), a dominant species in the central and southern Wasatch Mountains, and common on the opposite side of Tooele Valley in the Oquirrh Mountains, is conspicuously absent from the Stansburys. The oak habitat is dominated instead by a well-developed Utah juniper (*Juniperis osteosperma*) woodland. Blue spruce (*Picea pungens*), a component of the Douglas fir-white fir-blue spruce zone in the Wasatch range, is also apparently absent from the Stansburys. Bristlecone pine (*Pinus longaeva*) is a major component of the Great Basin

You can get to South Willow Canyon by heading south on 400 West in Grantsville and proceeding for about 5 miles to the (signed) turn for South Willow Canyon. Immediately after the turn keep your eye out for blooming plants – *Tetradymia*, *Argemone*, and *Mentzelia* being common. As you get further into the canyon you'll glimpse South Willow Creek with patches of Yellow Monkeyflower (*Mimulus guttatus*), and Western Columbine (*Aquilegia Formosa*). You can stop at any of the public campgrounds along the way and explore the creek if you desire.

After about 7.2 miles the road ends at the Loop

Campground (elev. 7450') – the west end of which has a small parking area next to some vault toilets and the Deseret Peak trailhead. The lower portion trail has been altered in recent years and it travels mostly through woodland on the north side of the creek, and not next to the creek. I've seen some incredible patches of *Orobanche uniflora* here. After about 0.75 miles (and 470' of elev. gain) you'll reach the first crossing of the creek – there is no bridge but it has never proven to be difficult. At this point you'll see more of the Western Columbine and Yellow Monkeyflower, as well as patches of Lewis' Monkeyflower (*Mimulus lewisii*) that hint at the glory to come.

About 20 yards beyond the creek the trail forks – which marks the spot where the two ends of the “Deseret Peak Loop Trail” meet. You can choose a clockwise rotation by staying left, or counter-clockwise by going right. If your goal is solely to find wildflowers and not summit Deseret Peak, then I recommend you head to the right. The trail begins to switchback up the hill on the south side of the creek – which at this point is the Dry Fork portion of South Willow Creek. I've never seen it dry in July. As you climb up the hill, the vegetation will be very similar to what you see in the Aspen zone on the Wasatch. One notable exception is the beautiful, multi-hued *Penstemon speciosus* – you will not find that in the Wasatch.

As you continue up the hillside, generally heading north and west, you'll begin to get glimpses of Deseret Peak and the very steep couloirs (pronounced kool-war) cut into the eastern face of the peak. They've always had snow in them in July – which is important because the snow melt feeds the glory you're about to see. When the trail turns sharply northward and leads down to the creek, you're now 1000' above your car and in the good stuff. From this point the trail, in the space of about a quarter mile, crosses multiple streams and rivulets that converge downhill of your position. Each stream is outlined on both banks with the shocking pink of blooming Lewis' monkeyflower – interspersed with patches of Yellow

Monkeyflower. The best display of Monkeyflower I've ever seen! In between the streams the hummocky terrain is covered with masses of white Jacob's Ladder (*Polemonium foliosissimum*) and mint (*Agastache urticifolia*) – with butterflies flitting everywhere. The streams and rivulets abound in different water-loving plants and every few steps on the path drive the photographer in me crazy. You could happily spend a couple hours here and call it a day. And to top it off, you'll be lucky to see 10 *Homo sapiens* all day (caveat: I've never been here on a weekend)

I've gone beyond this little paradise twice – once to South Willow Lake, and once up to Deseret Peak and then back down around the other side of the loop. If you go to South Willow Lake, you'll see the occasional beautiful spot. But the best is in the glacial hummocky



Lewis' Monkeyflower, *Mimulus lewisii*.

area just below the cirque the lake sits in. It is covered in acres of Larkspur. And the outlet stream from the lake enjoys the same beautiful set of water-loving plants I described earlier. Long before you get to South Willow Lake you'll encounter a fork in the trail – going left will take you up to Deseret Peak. You'll find some beautiful high elevation plants up there such as: *Astragalus kentrophyta*, *Cirsium eatonii*, *Erigeron compositus*, *Geum rossii*, *Lewisia pygmaea*, *Lychnis drummondii*, and *Phlox pulvinata*. Although the view from Deseret Peak is

fabulous, it's a bit bracing for "height challenged" people like me, and you need to be able to handle an 8.5 mile (loop), 3,600 elevation gain, high altitude hike.

For the Conservation Minded (including content from Marc Coles-Ritchie)

In Appendix B of the "Utah Mountain Goat Statewide Management Plan", approved on November 29, 2018, we can note that Utah DWR/DNR plans to do an "Initial transplant" of mountain goats in the Stansbury Mountains. Mountain goats are not native to Utah but DNR repeatedly transplants them to Utah for hunting and wildlife viewing. Marc Coles-Ritchie from the Grand Canyon trust spoke to UNPS at a Salt Lake Chapter meeting last year about the introduction of mountain goats in Utah, specifically to the La Sal Mountains where they are causing major damage to alpine plants and soil

(read about it here: <https://www.grandcanyontrust.org/modified-mountain-goats>). UNPS and Grand Canyon Trust have filed a lawsuit against the Forest Service asking them to remove this non-native species from the Mount Peale Research Natural Area – a spectacular alpine ecosystem in the La Sal Mountains. We must also resist introduction of mountain goats to the Stansbury Mountains. If these non-native animals are introduced we would like to establish vegetation monitoring plots at the higher elevations (where mountain goats graze and dig wallows, and cause damage to the fragile alpine ecosystem) of the Stansbury Mountains to collect data before the introduction of the goats. That would allow us to document any changes and damage caused by the mountain goats. Anyone interested in working on this please contact stevehegji53@gmail.com.

Notes from the Intermountain Herbarium

New County Aquatic Weed Record *by Michael B. Piep*

Recently Eric Wagner, of the Utah DNR – Fisheries Experiment Station has been bringing in aquatic plant species for deposit and confirmation to the Intermountain Herbarium (UTC) at USU. Many of the specimens are not yet represented by records found on-line via <http://intermountainbiota.org/portal/>, but have been recorded from the county in the printed literature.

Recently, Eric brought in a bag of *Najas marina* L. from the fish hatchery outside of Big Water in Kane County. After a search in the literature and on-line, we have determined that this record constitutes a new county record. Its presence in the Lake Powell area is not surprising, and should be expected. It is found downstream in Mohave County Arizona in the Colorado River and in Lake Mead, as well as upstream in Navajo County Arizona. It has also been reported from adjacent Coconino County Arizona (though I have not been able to locate an on-line specimen to confirm the report).

The specimen received by UTC, was entangled in *Zannichellia palustris* L. Specimens of each were made and images taken prior to pressing. Duplicate specimens have been made and will be distributed to other herbaria, and the label data and images are now available on-line.



Najas marina L.



Najas marina L.



Zannichellia palustris L.

Hand Pollinating *Arctomecon humilis*: Patching the Pollination Web?

by Alyson DeNittis

Arctomecon humilis (Dwarf Bear-poppy) is a familiar sight for rare plant conservationists in Utah, but its rare oligolectic pollinator *Perdita meconis* hasn't been seen in a long time. Based on troubling observations reported from researchers Vincent Tepedino and Zachary Portman, *P. meconis* is believed to be locally extirpated from the St. George area. The Center for Biological Diversity has recently petitioned for the bee to be listed under the ESA. In addition to increasingly heavy pressure from urban development, the potential loss of this native specialist pollinator and appearance of the invasive Africanized honeybee is particularly concerning for the Dwarf Bear-poppy.

Shinob Kibe is a habitat preserve that supports a small, isolated population of poppies that consists of two parcels of land owned by The Nature Conservancy and the Bureau of Land Management in Washington, Utah. Despite fencing surrounding the population, the BLM portion continues to experience OHV disturbance. There is also substantial ongoing development and construction along the entire fence line. In addition to its close proximity to urban development, this population is particularly vulnerable due to its small size and geographical isolation from other *A. humilis* populations. Observation from previous years showed that pollinators are also not sufficiently abundant near the population, resulting in low visitation rates and an abysmally low 12% fruit set in 2016.

Due to these risks and heeding previous management recommendations, the TNC and UNPS Grant-In-Aid program funded a hand pollination study to augment natural pollinator activity during the 2018 season in an attempt to increase fruit set at Shinob Kibe. Experimental pollination treatments using pollen from plants within the Shinob Kibe population (intrapopulation) and donor pollen from the White Dome population (interpopulation) were carried out to determine the efficacy and feasibility of hand pollination and genetic rescue as potential conservation tools to ensure the endurance of small, isolated populations of *A. humilis*.

Results from the study show some promise for the future of the Shinob Kibe population, with a high 85% fruit set in unmanipulated flowers. After a large recruitment year in 2017, 2018 may have been a better reproductive year than 2016 due to higher population density and yearling plants flowering. The interpopulation donor pollen treatment group had a higher 96% fruit set. Although

hand pollination resulted in higher fruit set, the number of seeds produced per fruit was not significantly different between groups, and seeds from fruit in both manipulated treatments were significantly smaller. Between all flowering plants observed at Shinob Kibe, an estimated 86,000 seeds were added to its seed bank. Despite the implications of smaller seeds, the introduction of genetic material (such as seeds and pollen) from other populations should still be an important consideration in the management of this population. If natural pollinator activity is superior to artificial means, adding seeds from other populations to



the seed bank at Shinob Kibe may provide a more beneficial long-term solution to decreased gene flow and risk of inbreeding depression while minimizing disturbance inevitably incurred during successive hand pollination visits.

Another interesting finding from the Shinob Kibe study was that interplant distance and floral display, which was shown to have a strong effect on reproductive success for *A. humilis* in the past, had no effect on reproductive output. This suggests that in the absence of *P. meconis*, other generalist native and nonnative pollinators with longer foraging ranges are supporting poppy populations and may be critically supportive during years when populations are sparse. It is worth noting that these species are not immune to threats resulting in major global pollinator decline. It is unclear how sustainable these pollinator relationships are and how to best restore *P. meconis* populations, but it may be the saving grace for the Dwarf Bear-poppy in the interim.

Alyson DeNittis will be the featured speaker for the
UNPS Salt Lake Chapter meeting

Wednesday, February 6, 2019, 7 p.m.

REI Community Room, 3285 E 3300 S, SLC

Utah Basilares Section of the Cactaceae

by Tony Frates and Dorde W. Woodruff

There has not yet been a key that encompasses what we believe are three taxa in Utah representing the Basilares section of the Cactaceae. The occurrence of three taxa has been discussed at some length by Woodruff (2011, 2012a, 2012b). In naming *Opuntia basilaris* var. *heilii*, a comparison was not made by renowned Utah botanists and taxonomists Stanley Welsh and Elizabeth Neese (Welsh, 1983) to other known taxa in the Basilares section which has led to confusion and misinterpretation of specimens. To help clarify these taxa which have been studied in the field and in herbariums, we present the following key and brief discussion to point out an alternative interpretation than has been presented elsewhere.

Utah Basilares section taxonomy and key:

1 Spineless (except in hybrids) with erect-decumbent stems, white stigma, mature fruits dry and spineless, seeds subspheric, flowers light pink to red-violet*, filaments pinkish red, anthers yellow, $2n=22$ ($2x$) - *O. basilaris* (Beavertail pricklypear)

2 Stems erect, glaucous (bluish and/or grayish), pads tending to curl/fold and remaining erect in winter with long/narrow and straight transverse lines when dessicated, densely papillose, typically cordate to broadly obovate (or obovate), basal growth habit, with conspicuous closely spaced and typically pitted areoles 1 to 1.2 cm apart with brown to red-brown glochids, areoles 9-11 (or many more) per diagonal row crossing midstem, flowers often a vivid/hot pink, Mojave desert communities peripherally occurring in southwestern Utah - var. *basilaris* (Mojave Beavertail Pricklypear)



2' Stems erect-decumbent, yellow-green, glabrous to papillose, obovate to spatulate (or slightly cordate), less basal growth habit, less conspicuous yellow-brown or yellow glochids, areoles not pitted, 4-9 per diagonal row crossing midstem, mostly spaced 1.3 to 2.5 cm apart, Colorado plateau

3 Stems obovate to spatulate, closely set areoles 6-9 at midstem, pads tending to curl and remaining more or less erect in winter, habit somewhat sprawling, yellow-brown glochids, dense to few papillae, mature pads glaucous, flowers pink, restricted to Colorado River drainage system in southeastern Utah and northern Arizona - var. *longiareolata* (Grand Canyon Beavertail Pricklypear)



3' Stems obovate to elliptical, widely spaced areoles mostly 4-6 at midstem, becoming procumbent/prostrate in winter, pads with irregular and with short transverse wrinkle lines when stressed without curving, more sprawling habit, lighter colored with yellow glochids becoming less conspicuous, glabrous, mature pads not glaucous, flowers most often pale to light pink, filaments normally pinkish red but sometimes yellow, in desert shrub or salt desert shrub communities and restricted to south-central Utah - var. *heilii* (Heil's Beavertail Pricklypear)



*There are reports of var. *basilaris* outside of Utah having white flowers.

See the ***Opuntia basilaris* varieties compared** table https://www.unps.org/miscpdf/Utah_Basilares.pdf. This table was prepared principally based on analysis of available herbarium specimens.

Links to the two rare plant meeting presentations made by Dorde Woodruff as well as to an article written by her that includes more pictures and distribution information is contained within the reference section at the end of this article.

The Utah Basilares are all diploid; the only other native *Opuntia* species native to Utah that are diploid are *Opuntia trichophora* and *O. chlorotica*. Their pink flowers with white to cream stigma lobes coupled with spineless (except in hybrids) pads and receptacles/fruits place them in this group.

A species that has been often highly confused with the Basilares section is *Opuntia aurea*. It has been particularly confusing to visitors of Zion National Park. Var. *basilaris* occurs near and perhaps just to the west of the park, but it is not what visitors typically see and think is a "Beavertail cactus." Instead those mostly spineless plants at Zion with green stigma lobes and pink flowers are *O. aurea* hybrids (and have larger pads and terminal spines that are largely uncharacteristic of true *aurea*). Even as strictly interpreted with its smaller mostly spineless cladodes with yellow flowers and naked receptacles/fruits, the characteristics of the hexaploid *O. aurea* most closely align themselves with the *Polyacantha* complex even though one of its parents may indeed have been a diploid *O. basilaris* (Parfitt, 1991). *O. aurea* has stems that are minutely pubescent, and tend to have 7-11 areoles at midstem.

Reduced spination and even near spinelessness can also be a characteristic of hybridization which commonly exists in other forms of *Opuntia* that occur throughout the state. The lack of sufficient sun exposure can also lead to reduced spines or near spinelessness in other species.

Discussion:

Var. *longiareolata* has been obscurely known to Utah botanists/taxonomists in a manner parallel to the obscurity of the understanding of var. *heilii* by most

workers from outside of Utah. Each treatment has lumped one into the other. Part of the reason that has happened also relates to the relatively remote and sometimes difficult to reach areas that these taxa occur in (especially var. *longiareolata* as it occurs in Utah). In fact, however, they appear to be clearly distinct entities that can normally be readily distinguished in the field and in herbarium specimens.

The three taxa largely occupy very distinct plant communities. As with *Opuntia* in general, they hybridize when they come into contact with other species in the genus which can then lead to intermediate forms and confusion. Var. *heilii* and var. *longiareolata* however are disjunct from one another by at least 40 aerial miles and are separated by exceptionally rugged terrain.



Opuntia basilaris v. *heilii* pad. Photo by Tony Frates.

Var. *heilii* and var. *longiareolata* tend to become flattened in winter (var. *heilii* even more so) whereas var. *basilaris* does not. These and other characteristics remain true when the plants are grown far outside of their normal habitats. Because of its usually wide pads and more closely spaced areoles, var. *basilaris* exhibits closer and both longer and straighter horizontal wrinkling when they become desiccated. Var. *basilariis* also tends to have stems that become somewhat curved

or slightly wavy. Var. *heilii* exhibits the lightest colored cladodes, the least conspicuous glochids, and most widely spaced areoles, and these characteristics are consistent in its restricted habitat. All may appear somewhat reddish to purplish in winter.

The number of areoles that cross the diagonal row at the midstem of *Opuntia* stems (referred to also cladodes or pads or joints) is a useful morphometric, however, the sheer size and maturity of the pad has to always be taken into account when looking at any particular stem. Younger/less mature pads will tend to be fewer in number than older/mature pads.

In their write-up for *Opuntia longiareolata* (later placed as a variety under *O. basilaris* by Lyman Benson), Elzada Clover and Lois Jotter indicated that the plants branch from the base, have elongated spathulate tomentose joints, measure 10-12 cm long and 4.5 cm across, have areoles 8 to 10 mm apart, first appearing circular becoming elongated (3 mm long x 1 mm wide) in age, and are blue-green in color at first becoming yellow-green in age (Clover, 1941). These characteristics in almost every respect are in sharp contrast to var. *heilii* (and to var. *basilaris*). A picture of the plant included in the 1941 article also seems to show a mature cladodes with at least some pitted areoles (suggesting perhaps an alliance closer with var. *basilaris* or possibly somewhat introgressed) and almost club-shaped.



Clover, page 418

In terms of distribution, var. *basilaris* occurs principally at low elevations. In Utah it occurs only in Washington County (2460 ft. to 3780 ft. in elevation) and disjunct and at somewhat higher elevation in southeastern Kane County; it is also found in Arizona, Nevada, California and northern Mexico.

Var. *longiareolata* primarily occurs in Arizona's Coconino County (type locality Granite Rapids, Grand Canyon) but is also apparently relictual along the Colorado River drainage in extreme northeastern Garfield and northwestern San Juan Co. (to be expected along the river drainage from almost to the Grand-San Juan County border south to Bullfrog).

In the same 1941 article by Clover and Jotter in which *O. longiareolata* was described, they stated:

"Members of the series Basilares occur at intervals from Cataract Canyon just below the confluence of the Green and the Colorado Rivers to Boulder Dam. Most of those in the upper Canyon are small and variable. Their existence seems to be precarious since they are usually

found half-buried in sand or lodged between boulder. Occasional plants may be found at the base of the steep talus a short distance above the river."

They also describe the presence of *O. basilaris* (presumably var. *basilaris*) along the Colorado River in Arizona and its tributaries as being usually rare and high on ledges (Clover, p. 414). Var. *basilaris* is not known to be present on ledges above the Colorado River in Utah (more specifically, not north of the Lake Powell area).

The flooding of Glen Canyon as a result of dam construction no doubt flooded some of var. *longiareolata*'s historic occupied range in the southernmost portion of the state. Its elevational range where it follows the river in Utah is primarily in the 3700 to 4000 ft. range, however, it may also be found on plateaus adjoining canyons of the Colorado River, and in Utah is expected to be occasionally found up to approximately 4500 ft. (and perhaps up to just over 5000 ft. when they are able to spread up to cliff top plateaus overlooking the Colorado River and its tributaries) within those drainage systems.

Given that Utah and Arizona plants belonging to var. *longiareolata* as treated here have become even more isolated and have had different influences over time, it is not surprising to see some differences (not considered taxonomically significant however) in these plants, and as outlined in the comparison table.

Var. *heilii* is known only from Emery and Wayne Cos. in Utah, a restricted endemic, found at elevations from 4860 ft. to 5600 ft. This taxon is of conservation concern and has been ranked by the UNPS rare plant committee as "medium" priority since more data is needed in terms of population sizes, potential threats, etc.

The two northernmost Basilares varieties that occur in Utah are isolated from one another with significant barriers that separate them in terms of both deep canyon systems as well as exceptionally harsh landscapes. It seems logical that var. *heilii* might have originated from plants that were spread northward via the Dirty Devil River. Currently we have no information with respect to whether any *O. basilaris* plants occur north of confluence of the Dirty Devil River with the Colorado River. Plants strongly resembling var. *longiareolata* are known from Cataract Canyon and seem to have influenced *Opuntia* in the Needles District growing within a relatively short distance from the river. An Atwood collection in 1991 places it potentially within less than 10 miles south of the Grand County line and is



Woodruff 2012 plant of *Opuntia basilaris* v. *heilii*



Woodruff 2012 distribution of *Opuntia basilaris* v. *heilii*

found right along/near the Colorado River in expected habitat. *Var. longiareolata* in fact seems to be content with remaining within the river drainage systems in Utah and Arizona whereas *var. heilii* grows in completely different, exceptionally harsh habitats. Regardless of the reason for those habitat preferences, there seems to be clear genetic differences between the two taxa that cannot be attributed solely to soil types or other environmental factors.

It would not be surprising if a zone of plants intermediate to *var. heilii* and *var. longiareolata* were to be found but this would still not likely change their taxonomic status.

Opuntia tend to hybridize when encountering other plants in the same genus (the genus is in fact driven by hybridization events). *Var. heilii* is no exception. Hybrids with some terminal spines presumably from introgression with the hexaploid *O. nicholii* and/or from other dry-fruited *Opuntia* plants in the region are known (for example in the Hanksville area).

We would also expect to find some seed differences among these taxa but have not yet had materials available to conduct that analysis.

In a number of ways, *var. heilii* is the most unusual in this group and should perhaps even be treated at the species level. For now, we feel that a conservative treatment is warranted.

It is extremely important that as these plants are studied in the future, representative individuals throughout the ranges of where they occur in both Arizona and Utah are included.

Conclusion:

As always, more field and other research with respect to this group of plants is very much needed to better determine their true relationships which should include detailed phylogenetic and other studies. Until that happens, we would urge the taxonomic recognition of all three entities as herein outlined.

End notes: This article would not have been possible without the meticulous research and extensive field investigations of the late Dorde W. Woodruff. She spent considerable time in the field, reviewed available herbarium specimens, prepared maps, and also wrote the comparison table included with this article (https://www.unps.org/miscpdf/Utah_Basilares.pdf). She also prepared and gave talks at two consecutive Utah rare plant conferences, and then also wrote a *Sego Lily* article (see reference section), all related to this same subject matter. While perhaps better known as a *Sclerocactus* and cactus specialist, she had a broad botanical knowledge and her enthusiasm and curiosity with respect to Utah native plants never abated. The initial text of this article was originally prepared in March of 2016 and a draft sent to Dorde in late April of 2016. At that time however Dorde was preparing for another busy field season at age 88, and that and other work kept her preoccupied until a mishap followed by declining health sadly led her to passing in July of 2018. She didn't provide any specific comments on the initial draft of this article nor was she able to participate in its completion, which is the only reason why she isn't listed as the primary author (since she can't be held responsible for everything included here). It is believed however that her views are fully represented.

Acknowledgments: We wish to thank the staff at the Stanley L. Welsh Herbarium (BRY) and at the Garrett Herbarium (UT) for their assistance. We also want to thank Kipp Lee for his insight with respect to both field and horticultural observations of these taxa, and for providing plant materials.

In-line article photo credits used in the key:

John Weiser (var. *basilaris*, left/right)

Anita Gould (var. *longiareolata* left)

Dorde Woodruff (var. *basilaris* center, var. *longiareolata* center, var. *heilii* center/right)

Tony Frates (var. *longiareolata* right, var. *heilii* left)

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UNPS Annual Meeting

The 40th Anniversary of the Utah Native Plant Society was celebrated at the Annual Meeting in Provo on October 27, 2018. The Utah Valley Chapter hosted the meeting in the Bullock Room at the historic Provo Library and provided the turkey, gravy and cranberries. The rest of the hearty and delicious New World potluck was provided by the attendees.

A brief business meeting was brought to order by UNPS president Kipp Lee who introduced Board of Directors chair Bill King to conduct elections for the next year, a new board was duly elected.

Cathy King introduced speakers Dick Hildreth from Tucson and Dave Wallace in Oregon, who joined the interactive speaker panel via Skype to discuss the history of UNPS.

Bill King presented Dave Wallace the very first "Ty Harrison Service Award" for over 30 years of his outstanding service to the Utah Native Plant Society.

It was an enjoyable afternoon shared among UNPS members, many thanks to the Utah Valley Chapter.



Plant Hunters

by Tony McCammon

I am new to the Utah Native Plant Society but not new to native plants of the Intermountain West. I spent 15 years in Idaho as a University of Idaho professor in Horticulture and worked on a native plant domestication research program with my mentor, Dr. Stephen Love. I also served as vice president of the

local universities, including Utah State, University of Idaho, and BYU-Idaho.

We scouted the border of Nevada and Idaho's Owyhee Desert. Our plant foray for native wildflowers and shrubs included vast habitats from the flats of Duck Valley Reservation, NV (5400 elevation) to the top of Silver City, ID (8070 elevation). Longspur Lupine (*Lupinus arbustus*) was the predominant flowering species everywhere we went, its heavy fragrance overwhelming us. Even with the windows up the narcotic perfume floated through car vents. Each sampled location offered a plethora for each of our



Dr. Larry Rupp, Richard Sutton and Daniel Dewey.



Dr. Stephen Love

Idaho Native Plant Society for a couple years until my move to Utah. I have studied the design potential for native plants in traditional landscaping since my graduate studies at Utah State University. I also have extensive knowledge in the ethnobotanical uses of many of our native species by the native people.

Last spring I joined a contingency of 3 plant botanists, 3 horticulturalists, and an entomologist from different

disciplines. We spent the week discussing genomics, collecting plant samples, and dodging large mud puddles with our rigs. Some of the more interesting species were Bush Penstemon (*P. fruticosus*), a cross between White-flowered and Low Penstemon (*P. pratensis x humilis*), large fields of Northwest Indian Paintbrush (*Castilleja angustifolia*), mixed with Pale Indian Paintbrush (*C. inverta*), Bitterroot (*Lewisia rediviva*), Brown's Paeonia (*Paeonia brownii*), a single light yellow



Castilleja angustifolia, *Lewisia rediviva*, and *Lupinus arbustus*.



Clockwise: *Mirabilis multiflora*, *Cirsium foliosum*, *Mahonia fremontii*, and *Penstemon fruticosus*.

flowering *Wyethia* amongst a blanket of white Mule-ears (*Wyethia helianthoides*), and a dark purple Elk Thistle (*Cirsium foliosum*). The thistle wasn't a keeper for our propagation efforts but we gawked over the beauty of it anyway.

In 2018, I relocated my family to Washington County, Utah to expand my business. I fortunately was able to align myself with other outdoor enthusiasts and began traveling the over 22,000 miles of trails and BLM back roads. My love for the outdoors has fueled my interest even further in the search for endemic and beautiful native plants in Southern Utah. I have found a few gems on my travels including a patch of Four O'Clock (*Mirabilis multiflora*) on a hillside above Leeds, Ut. The Four O'Clock was on its second burst of color in late August and had flowers 2-2.5 inches wide. At the bottom of Balterguist Canyon, also above Leeds, I found a dwarf Fremont Holly or Barberry (*Mahonia fremontii*). Sticking from a crag, this holly was less than 5 feet tall and had short internodes with smaller leaves than its surrounding relatives. In December I was tromping through snow on the eastern side of Zion National Park,

just after exiting Birch Hollow I came across a Three-leaf Sumac (*Rhus trilobata*) that had lost its leaves but the abundant seed heads were a vibrant red, reminder of the summer past. After taking a few pictures, I talked my companions into sampling the berries with me. The native people used the berries to make a drink that could pass today for pink lemonade. They provided a tart, tangy zip to the final leg of our journey. I await the desert blooms of my favorite genera, namely *Penstemon* spp. and *Eriogonum* spp. I have five locations I have mapped out to find some of the endemic species. Let me know if you're in the area and we can go find them together.

If you are a Southern UNPS member and would like to organize some tours and meetings or maybe even form a local UNPS Chapter give me a call. Tony McCammon (435)767-1502.

Tony McCammon is a retired professor of horticulture, founder of Bloom Horticulture Specialists and runs a botanizing guide service in Southern Utah.



Planting Life Back Into the UVU Native Garden

by Alyson DeNittis

The Heritage Native Garden at Utah Valley University was planted by members of the Botany Club and Utah Native Plant Society in 2000. Unfortunately, the Native Garden had to be relocated to facilitate construction of the recently-completed Human Resources addition. In a coordinated effort between interdepartmental faculty, staff, and students, establishment of a new Native Garden is now underway. The recently prepared site features a large terraced area that will contain native plants, and a separate area for agricultural and ornamental species.

In order to better serve as a research and educational resource, the Native Garden will work hand-in-hand with the UVU Herbarium. An herbarium is a systematically-organized collection of plant specimens, like a plant library. Herbarium Curator Erin Riggs and the Botany Club are implementing a new Index Seminum program, an international seed exchange between botanical and academic institutions for the purposes of research, education, and conservation. As part of this program, native seeds are collected along with voucher specimens to be accessioned into the Herbarium at UVU. Collected or

cultivated seeds can then be used for propagation, exchange, or research with important source data recorded and held in perpetuity. In addition to Index Seminum, the UVU Herbarium will be accessioning live plants from the garden into a new database it is in the process of acquiring. This partnership with the UVU Herbarium will help to establish the Native Garden as an increasingly important resource at the university, community, and international levels.

Cultivation will begin this winter in the UVU greenhouses. Under the guidance of faculty and staff collaborators, the Botany Club is excited to help steward the new Native Garden and share progress with our partners at the Utah Native Plant Society.

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2019 ERIOGONUM SOCIETY ANNUAL MEETING

BEAVER, UTAH JUNE 20-24, 2019

Join us in Utah for the 10th annual meeting of the Eriogonum Society.

Our gathering place this year is the beautiful Eagle Point Resort in the mountains near Beaver, UT. We hope to see some narrowly endemic species in the region.

The 2019 Annual Meeting of the Eriogonum Society will be held at the Eagle Point Resort in the mountains near Beaver, Utah June 20-24th. For further details (as they become available) check their website:

http://www.eriogonum.org/index.php?option=com_content&view=article&id=106&Itemid=127

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. Susan Sims is our UNPS Membership Committee. You may direct any questions about and updates to your information to Susan at: membership@unps.org

WANTED: Membership Person

UNPS is looking for a **volunteer membership assistant** to keep membership records. Some data-base entry helpful, but will train. Contact Susan Sims, shsims@mac.com



Utah Native Plant Society

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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

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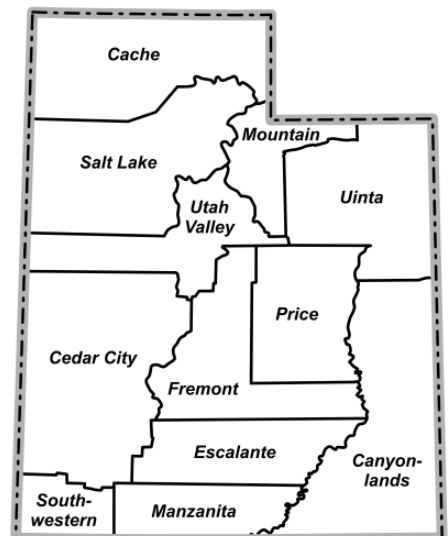
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Submit articles to Cathy King:
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Utah Native Plant Society



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