

Sego Lily

Newsletter of the Utah Native Plant Society

Winter 2022 Volume 45 Number 1



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A Bears Ears Rare Cactus

by A. Dean Stock, Kipp Lee and Jared Higgs

On October 8, 2021, President Biden restored Bears Ears and Grand Staircase/Escalante National Monuments to their original size. We have studied the cactus flora of both monuments in our forthcoming work on the *Cactus Flora of Utah*. Our research indicates that the cactus species in the monuments are not well treated or understood in even the most recent literature. Currently available lists of species present in Utah National Parks and National Monuments are very outdated and largely in error. We present here our observations on the cactus flora of Bears Ears National Monument with special attention to a rare *Cylindropuntia* species.

We have documented *Opuntia trichophora*, *O. phaeacantha*, *O. macrorhiza*, *O. fragilis*, *O. nicholii*, *Sclerocactus parviflorus*, *Pediocactus simpsonii*, *Escobaria (Coryphantha) vivipara*, *Echinocereus mojavensis* and *Cylindropuntia x viridiflora*. *Echinocereus engelmannii* occurs close to the Monument but has not yet been found to occur within its boundaries.

Of these species, only *Cylindropuntia x viridiflora* is of conservation concern. Current literature sources barely mention the occurrence of *C. x viridiflora* in Utah, if it is recognized at all. *Cylindropuntia x viridiflora* is a natural hybrid between *Cylindropuntia imbricata* and *Cylindropuntia whipplei*. The growth habit is generally low and brushy although some plants approach

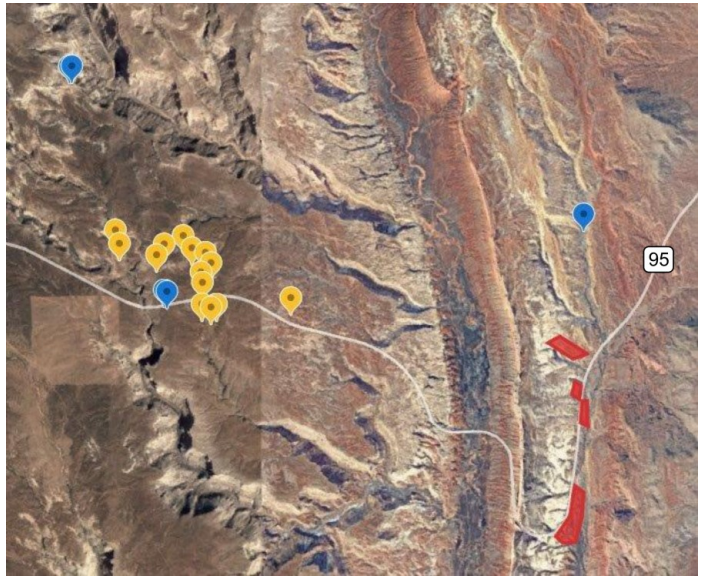


Cylindropuntia x viridiflora. "Flowers vary from yellow through shades of pink to red..."



Cylindropuntia x viridiflora from west of Comb Ridge Wash. It appears closer to *C. whipplei* in some characteristics.

Cover photo: *Cylindropuntia X viridiflora*—Bear's Ears National Monument. All photos included in this article by Jared Higgs.



Bears Ears map of known *C. x viridiflora* populations in the Comb Ridge area. The road is highway 95. Blue dots are herbarium records from SIENet; yellow dots are survey locations where yellow flowered forms occur which are closer to *C. whipplei* in spine and stem morphology. Red areas denote populations with predominantly orange to rose colored flowers and stem tubercle and spine morphology showing more *C. imbricata* influence.

C. imbricata in form. Flowers vary from yellow through shades of pink to red; spine pattern is irregular and monomorphic; stem tubercles are elongated and more like those of *C. imbricata* than those of *C. whipplei*, especially on older stems. *Cylindropuntia imbricata* is not a naturally occurring species in Utah and *C. whipplei* has a range generally to the southwest of *C. x viridiflora* in Utah and no other species of *Cylindropuntia* were observed within Bear Ears National Monument.

Barnett and Barnett, in the *Cactus Flora of Colorado* (2016) list three specimens of *Cylindropuntia viridiflora* from Utah. The records are from Hovenweep National Monument, Comb Ridge west of Blanding and River House Ruins near the San Juan River. They regarded the Utah material as belonging to their new “species,” *Cylindropuntia x anasaziensis*, which they described as new, based mainly on smaller flower size and sterile to nearly sterile anthers. We regard *Cylindropuntia x anasaziensis* as an unneeded, re-naming of *Cylindropuntia x viridiflora*.

The plants we have examined from Bears Ears National Monument have abundant pollen on all flowers examined and constitute what appears to be a breeding population. The Bears Ears plants differ little from those we have examined from New Mexico. The *Cylindropuntia x viridiflora* population at Hovenweep National Monument consists of about 100 plants. The

population in the Comb Ridge area of Bears Ears National Monument consists of at least 100 plants. This population has not yet been well surveyed and extends from the San Juan River at River House Ruin, north along both sides of Comb Ridge to, and somewhat beyond, highway 95. The population extends west of the Comb Wash onto brushy slopes but it is not yet known how far west of Comb Wash the plants occur. Much more field work is needed to understand the extent and origins of this remarkable plant in Utah.

The presence of this hybrid derived population in Utah, removed from the present natural range of either parental species, is somewhat of a mystery. It is generally regarded as having been distributed by Native Americans that inhabited the region, as mentioned by Pinkava and Baker in *Intermountain Flora*, Vol. 2, part A (2012). Barnett and Barnett in the *Cactus of Colorado* (2016), present greater details of possible origin and describe this hybrid population as being derived from natural hybridization between *C. imbricata* plants, cultured by “Ancient Pueblo People,” and *C. whipplei* that also grew in the region.

We believe that the occurrence of *Cylindropuntia x viridiflora* in the Comb Ridge region of Bears Ears National Monument may be due to migration of the plants up the San Juan River and into Comb Wash during

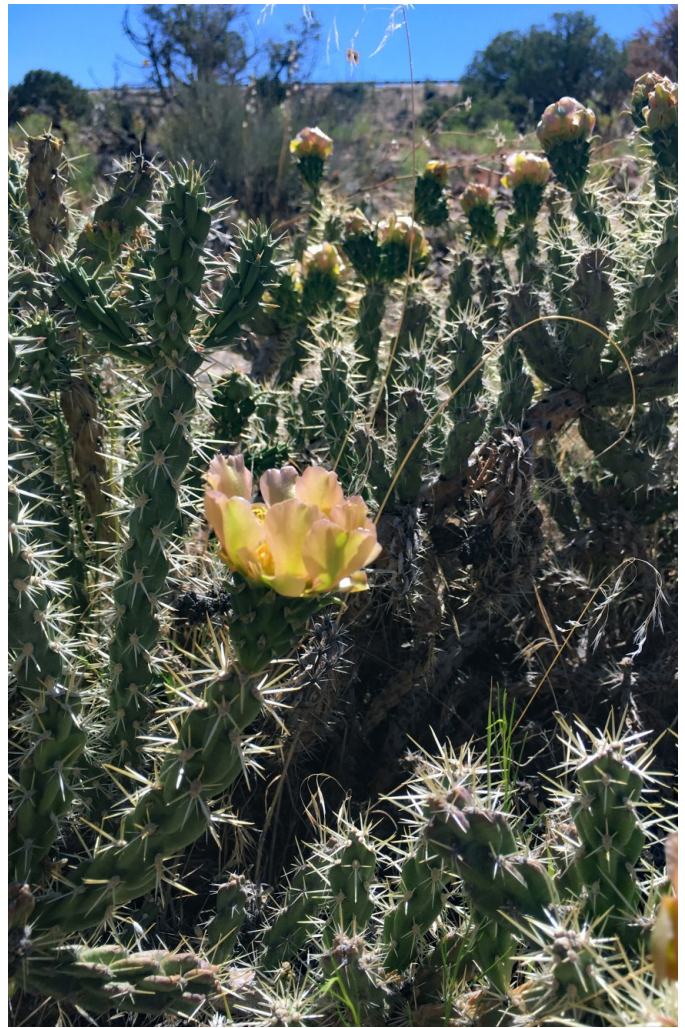
an earlier warm period and not due to actual cultivation or introduction by ancient Native Americans. More field work is needed to understand the origins of these plants and to determine the reproductive potential of the population.

Bios:

A. Dean Stock, Ph.D. Retired Medical Geneticist/ Cytogeneticist. Master's degree in mammalian taxonomy, paleontology. University of Utah. Ph.D. Univ. of Oklahoma. Working on cytogenetics and taxonomy of *Opuntia* cactus for over a decade with emphasis on taxonomy, origins, and distribution of the *Cactus Flora of Utah*. stockspallone@kanab.net

Jared Higgs is a high school biology teacher, interested in Utah cacti. He is taking a break from teaching to be a stay-at-home dad and further his education.

Kipp Lee has had an interest in native plants for 40 years. He studied biology with an emphasis in botany at the University of Utah. Kipp has served on the UNPS Board of Directors for over 15 years and as UNPS state president and Salt Lake City Chapter president. He has participated in numerous rare plant surveys with the BLM, FWS, Grand Canyon Trust and The Nature Conservancy. He has also taught numerous classes on native plant horticulture. Currently he is working on a guide to the native cacti of Utah with Dean Stock.



Utah Rare Plant Meeting

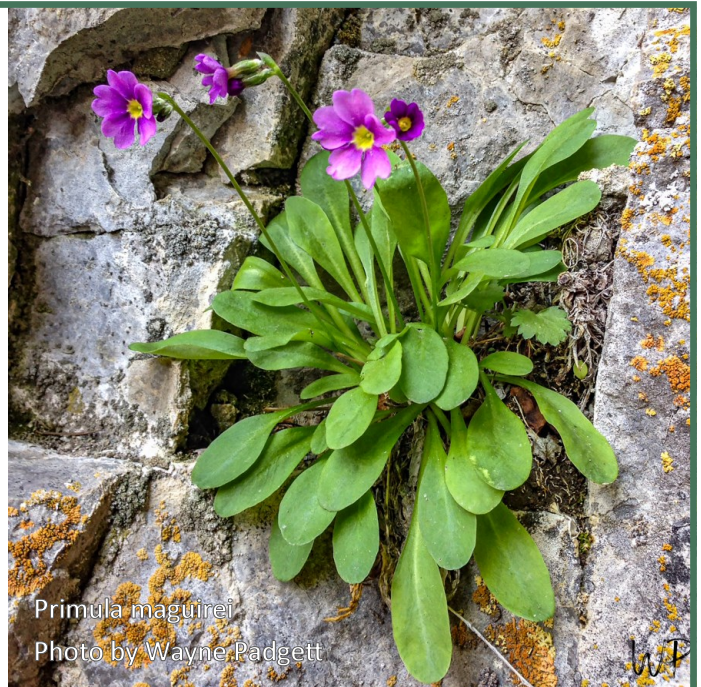
Tuesday, March 1, 2022

Via Zoom 9:00 am - 4:00 pm

Registration: \$10* for Zoom link which includes the ability to ask questions real time and to be included in the chat rooms. Register at unps.org

Non-registered participants can watch free on Facebook Live.

*All net proceeds will go to the Small Grants Fund. Additional donations are welcome.



Primula magillii

Photo by Wayne Padgett

What's in a Name? Mimulus or Erythranthe?

by Steve Hegji; photos by Steve Hegji

I'd like to start with an altered portion of the romantic balcony scene from Shakespeare's "Romeo and Juliet" (2.2.38-49):

*"'Tis but thy name that is my enemy;
Thou art thyself, though not a Mimulus.
What's Mimulus? It is nor leaf, nor root,
Nor petiole, nor corolla, nor any other part
Belonging to a monkeyflower. O, be some other name!
What's in a name? that which we call a rose
By any other name would smell as sweet;
So Erythranthe would, were he not Erythranthe call'd
Retain that dear perfection which he owes
Without that title. Erythranthe, doff thy name,
And for that name which is no part of thee
Take all myself."*

If you've been out and about much in Utah you've likely encountered the common monkeyflower (*Mimulus guttatus*). And hopefully you've seen the stunning and tropical-appearing Lewis' monkeyflower (*Mimulus lewisii*). I've included some photos of these plants for your enjoyment. The other twelve species of *Mimulus* native to Utah are less commonly seen but a treat to find. However, as the title of this article implies, you may have noticed the genus name *Erythranthe* appearing in place of *Mimulus*. What follows is a short summary of the story behind that name change. The story is not finished; more chapters remain to be written.

In 1753 Linnaeus named the genus *Mimulus* (common name "Monkeyflower"). The plant he used as the "Type" for describing the genus was a specimen of *Mimulus ringens*. This species is found in the eastern half of North America and thus its use as the type specimen for *Mimulus* is somewhat of an historical artifact. The real center of diversity for monkeyflowers lies in the western half of North America. Of the 74 known North American species, only a few are found in the eastern half of North America. But in 1753, Linnaeus only had access to the eastern species. If it were to be redone today, probably *Mimulus guttatus* would be chosen as the genus type as it is the most broadly distributed *Mimulus* in the center of *Mimulus* diversity.

In 2012 a paper was published in *Phytoneuron* (Barker et al) based on some molecular phylogenetic analysis of *Mimulus* and related genera. Two different types of DNA sequencing were performed in an attempt to develop a species tree. The different tests involved were: nuclear loci (nrDNA) and chloroplast loci (cpDNA). These data



Mimulus lewisii left and *Mimulus guttatus* right.



showed (1) several other small genera appear to be included in the *Mimulus* species tree; (2) the data were not consistent - each generated a different model of the *Mimulus* species tree. This last conclusion might be best understood with a simplistic analogy. If you were to give the same pile of marbles to two persons, one with red-green color blindness and the other with blue-yellow color blindness, and then asked them to group and classify the marbles, you'd get two different results. The two persons each had an incomplete view of the color spectrum; similarly nrDNA and cpDNA have known levels of uncertainty with respect to plant DNA.

Barker et al proposed four options:

1. Minimize species name changes by allowing *Mimulus* to remain a polyphyletic grouping. (Note: ideally monophyletic groupings are chosen for genera names)
2. Minimize species name changes by grouping all involved genera into *Mimulus*.
3. Minimize species name changes by using a new type to describe *Mimulus* (probably *M. guttatus* instead of *M. ringens*).
4. Divide *Mimulus* into multiple new genera, resulting in many name changes.

Barker et al chose option 4 and their nomenclatural suggestions, which split *Mimulus* into *Mimulus*, *Erythranthe*, and *Diplacus*, have now been adopted by multiple Floras, including The Plants of the World Online, the Flora of North America, the Oregon Flora Project, and Jepson eFlora. I refer you to their publication for a broader discussion of why they rejected options 1-3.

In 2019 a "Point of View" was published titled "The case for the continued use of the name *Mimulus* for all monkeyflowers." The signatories of the publication were individuals from departments (Biology, Botany, etc.) at thirty-six universities in the US, Canada, and the UK. Without getting into the fine detail, their three main reasons for keeping the name *Mimulus* are:

1. The botanical community needs a stable circumscription for monkeyflowers. They felt the phylogenetic data was too limited to warrant a name change and that future data would force more revisions.
2. They don't believe the name changes were necessary and that a variety of subjective opinions exist.
3. *Mimulus* is well recognized in the scientific community, not only by botanists, but also by officers at the National Science Foundation, Department of Energy, and National Institutes of Health.

Why does it matter? It turns out that our lowly little *Mimulus* has been at the center of a hotbed of ecological and evolutionary study since the mid-20th century. There

are now more than 40 labs worldwide that focus their research effort primarily, if not exclusively on *Mimulus*. *Mimulus guttatus* was one of the first plants to be selected for full genome sequencing. *Mimulus* has played a key role in advancing our understanding of: the evolution of pollinator shifts, adaptation, speciation, meiotic drive, polyploidy, range limits, circadian rhythms, genetic recombination, mating systems, and developmental biology. Based on the importance of *Mimulus*, it seems likely its species tree and the naming of *Mimulus*/*Erythranthe* could be a hot topic at the International Botanical Congress in 2023.

I do find this topic fascinating and I understand the importance of accurately classifying plants. Even before the advent of DNA studies botanists regularly argued taxonomy. For those of us who identify plants as a hobby, this can be disconcerting. But I've come to understand it's a normal part of the process of refining our knowledge. As a hobby-level botanist with zero span of control; I find myself giving a Gallic shrug and pulling out my camera to take another picture of these stunning plants, while looking forward to another chapter of the *Mimulus*/*Erythranthe* story.

Literature Cited

Barker et al, 2012. A taxonomic conspectus of Phrymaceae: A narrowed circumscription for *Mimulus*, new and resurrected genera, and new names and combinations. *Phytoneuron* 2012-39: 1-60.

Lowry & all, 2019 "The case for the continued use of the genus name *Mimulus* for all monkeyflowers"

Summit County UNPS Chapter Meeting

**March 11th, 6pm
at Summit County Library
Kimball Junction Branch Auditorium
1885 West Ute Blvd
Park City, Utah**

The first meeting of Summit County's Native Plant Society - Mountain Chapter of UNPS. Guest speaker Dr. Richard Ford, Professor Emeritus of Weber State University, from the Department of Earth & Environmental Studies, will hold a presentation on the history of our local geology and substrate in the Wasatch Range- an essential backdrop for the native and endemic plants we find in this region. Meet & greet, refreshments, and door prizes offered.

Hiking with Aromatic Plants

by Tyler M. Wilson; photos by Tyler M. Wilson

Research: Tyler M. Wilson, Ariel Poulson, & Emma Andrews, D. Gary Young Research Institute

I enjoy going for hikes in the beautiful mountains of Utah as much as the next person. As the pandemic settled in, I found my usual hiking trails on the East Bench more crowded than ever. I began spending more and more time hiking in the Oquirrh Mountains. I now regret not giving them much of a chance before last year; they're really beautiful and diverse mountains. Depending on whether I hike alone or with a friend, the experience is somewhat different. If I'm alone, my nose is on the lookout for aromatic plants and, luckily, there are an abundance of aromatic plants throughout our mountains.

One of my favorite trails starts in a pinyon-juniper forest (*Pinus edulis*, *Juniperus osteosperma*) which smells coniferous, herbaceous, and medicinal. This is due to certain prominent volatile compounds created by the two plant species, primarily monoterpenes, including alpha-pinene, delta-3-carene, ethyl octanoate, camphor, and bornyl acetate (Poulson et al. 2020; Wilson et al. 2019). As you climb higher up the mountain, there is a large patch of snowbrush ceanothus (*Ceanothus velutinus*). If you brush against



Ceanothus velutinus



Agastache urticifolia

the older, leathery leaves, especially on a warm and sunny day, a fresh and deep aroma covers the hillside. The aroma is tenacious and unmistakable, unlike anything I've smelt before. This is due to the presence of other volatile compounds, including beta-selinene and 2-methyl-benzofuran. After another hour of hiking, the mountain peak rewards you with both a beautiful view of the Salt Lake Valley and more aromatic plants.

On the exposed side of the peak are thick patches of two mint species: nettle leaf giant hyssop (*Agastache urticifolia*) and coyote mint (*Monardella odoratissima*). Both species are a beautiful sight of pink and purples hues if you catch them at their flowering peak, with large inflorescences frequented by multiple species of bee and butterfly. Each has a typical mint-like aroma (likely due to the small amounts of the volatile compounds menthone and isomenthone) but stand apart from our household mints (due to the abundance of limonene and pulegone in both species). Their aroma reminds me of pennyroyal mint tea (*Mentha pulegium*), whose flavor is due to an abundance of pulegone.

On the backside of the peak is a large grove of Douglas fir and throughout the understory are thousands of



Monardella odoratissima



Valeriana acutiloba

subalpine valerian flowers (*Valeriana acutiloba*). The beautiful flowering tops, which are predominately white with touches of pink and extend to knee-height at the most, are not aromatic but their roots have an extremely strong scent. Their aroma is similar to the roots of common valerian (*Valeriana officinalis*) – which admittedly is not everyone’s favorite. But the aroma of this species also has a nice floral note to it due to the abundance of the volatile compounds bornyl acetate, β -gurjunene, and kessane. Secondary metabolites produced by many valerian species have

been long used for relaxing, or even sleep-inducing properties. A shady subalpine valerian grove, especially after a long hike in the summer, is a great place to take a rest, or even a nap, at the end of a long hike.

[Both articles cited can be found online: www.phytologia.org. We anticipate publishing our findings on *C. velutinus*, *A. urticifolia*, *M. odoratissima*, and *V. acutiloba* before the end of 2022.]

UNPS Virtual Book Club

The Utah Native Plant Society is excited to announce that we will be hosting a virtual book club once per month. We will be focusing on a wide variety of issues related to plants, land management, citizen science education, and academic literature related to current topics in plant science. Our goals are to support the appreciation, preservation, conservation, and responsible use of the native plant and plant communities found in the state of Utah and the Intermountain West. We are also open to having discussions and book suggestions regarding field guides, taxonomic keys and similar topics.

If you are interested in participating in the book club, please contact Morgan Abbott at abbott.morgan@yahoo.com or Allison Izaksonas allium.j@gmail.com for more details.

Tax Time Notice

by Bill Stockdale, Treasurer, UNPS

As you prepare to submit your taxes this year, keep in mind that the Utah Native Plant Society is recognized by both the State of Utah and the Internal Revenue Service as a charitable organization. We send acknowledgements to persons who donate \$500 or more, as required by law. If you are going to itemize your deductions this year and have not received an acknowledgment, I would be happy to send you an email with the letter attached for your records. Send me an email (bstockdale@msn.com) with your name and any amount donated. I will get letters out by April 1st.

During 2021, we received over \$3,000 dollars in general donations plus over \$900 specified for our new Research Grant fund. The money is being used to operate the business functions of your organization and support our activities such as the upcoming Rare Plant meeting (a premier showcase for botanical/conservation research),

field trips, speakers, meetings, and Chapter support. I noted that the Research Grant Fund was new. In the past, we co-mingled grant funds with general funds and paid for grants out of the general funds. We have recognized that inflation in costs for researchers has gone way up and have set up the separate fund to help solicit more donations and make bigger grants possible. In 2021, we paid over \$5,900 to support research and scholarship. We would like this to grow and some of us have dreams of a fund large enough to provide full scholarships to support botany/ecology students.

Another way of donating is through your estate planning. Members have remembered us in their wills. It is a simple addition for your estate planner; they will need our Federal Identification number: 87-03252935. The value of donating through estate planning varies from person to person. Check with your professional, I started my prep with an online search for "estate planning."

You can make donations of any size online at unps.org.

Utah Native Plant Society 2022 Grant Proposals

Due by April 15th

The Utah Native Plant Society (UNPS) is accepting grant applications for research projects that will increase the understanding of native plant communities or help restore and improve the functioning of native plant communities in the State of Utah. Successful projects must provide a public benefit and must align with UNPS conservation principles (see UNPS website). Grant recipients should provide UNPS a final report in an article that can be submitted to the *Sego Lily* editors for publication.

Applications will be evaluated for potential ecological benefit to be gained and the likelihood of project long-term success. It is anticipated that one or two grants will be awarded. The amount budgeted for research grants for 2022 is \$5,000 in total. Therefore, they will likely support existing funding sources. However, small projects will be considered as well. Grant applications will be accepted until midnight April 15, 2022.

Proposal requirements are as follows:

1. Introductory section containing a succinct purpose/objective of the project.
2. Narrative description of the project not to exceed 2-3 pages in length. Also discuss how goals and objectives will be accomplished.

3. Identify who the project will be and any others that will be involved in the project including any agencies or organizations. Provide a biographical sketch (one page).

4. Provide a one-page budget section identifying how funds will be spent. Include a breakdown by activity.

5. State how the results of the project will be published, if applicable.

6. Provide a transmittal letter containing a submission date, identification that a grant proposal is attached, applicant name, affiliated organization (if any), mailing address, telephone number, and e-mail address.

Grant applications should be submitted to:

grants@unps.org or unps@unps.org

Questions can be directed to any UNPS committee member.

Ronald Bolander r_bolander@comcast.net

Bill King mzzzyt@aol.com

Bill Stockdale bstockdale@msn.com

Hard copy proposals can also be submitted to:

Utah Native Plant Society
Attention: Grant in Aid Program
P.O. Box 520041
Salt Lake City, Utah 84152-0041

Evaluation Criteria

Detailed evaluation criteria are available for review in the Programs Section of the UNPS website, unps.org.

Duane Atwood

1938-2021

Tribute compiled by Cathy King

Duane Atwood, co-founder and first president of the Utah Native Plant Society, passed away on October 23, 2021. Duane was highly regarded in the world of native plants and received the Lifetime Achievement Award from UNPS in 2008.



March 2, 2005, Sugarhouse Garden Center, Salt Lake City, Utah, where annual Utah Native Plant Society rare plant conferences and other meetings were occasionally held. Photo by Tony Frates.

As Tony Frates, of UNPS, writes:

I first met Duane in 1981 at a small organizational meeting within the context of the Utah Native Plant Society (UNPS). He was then with the Forest Service and had been on the first UNPS board of directors of that organization and was its first president (including from 1979 to March of 1981). Even at that first meeting, it was apparent that Duane's energy was boundless and his enthusiasm contagious. He was always readily approachable, willing to help, and very friendly. We worked together on many issues in the 1980's trying to conserve Utah's rare plants regardless of where they occurred in the state and in trying to get state legislation for plants. Duane organized the earliest UNPS rare plant meetings throughout the 1980's, including meetings that I attended in Salt Lake City, Provo and Logan. While his UNPS involvement decreased after that initial decade, he still attended and provided critical comments in meetings that were held in the second and third decades to follow.

As a botanist/taxonomist, Duane's accomplishments were legendary. He primarily authored the *Utah Endangered, Threatened and Sensitive Plant Field Guide* (1991) and was a co-author of the five editions of the *Utah Flora* series which came out in 1987, 1993, 2003, 2008, and 2015. He was a *Phacelia* specialist. He discovered and/or was involved with naming numerous new taxa (primarily in Utah but in other states as well). Over the course of his career he made over 33,000 plant collections*. He was a field botanist with few peers. Dr. Stanley Welsh, primary *Utah Flora* author, has opined that no one was better than Duane in the field: no habitat was too steep nor too distant for him to explore.

(*His last collection appears to have been made on June 8, 2010, Atwood no. 33,528 in San Juan Co., Utah.)

Duane Atwood – A man who found where the rarest wildflowers were blooming and revealed them to us

by Teresa Prendusi, Retired Forest Service Regional Botanist

I first met Duane in 1995 when I was the Regional Botanist for the Forest Service in Albuquerque, NM. We had been working on a Conservation Agreement and Strategy (CAS) for the Arizona Willow (*Salix arizonica*) with the USFWS, Arizona Game & Fish, White Mountain Apache tribe, among others. The willow had been slated for federal listing under the Endangered Species Act (ESA) as it was thought to be

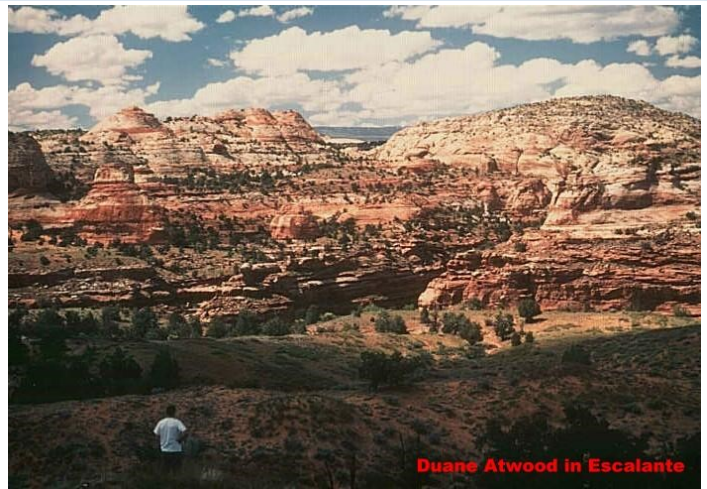


Early 1990 photo of Dale Robertson, Chief of the US Forest Service, and Regional Botanists taken in Washington DC. You may recognize some of these notable botanists which in addition to Duane Atwood include: Jim Shevock, Angie Evenden, Renee Galeano-Popp, Larry Stritch and Dean Longrie. Photographer unknown.



Duane in his "Celebrating Wildflowers" tee-shirt along with BLM's Lori Armstrong and Bruce Palmer, AZ FWS biologist on a 1995 rare plants tour of the Colorado Plateau. Photo by Teresa Prendusi.

under significant threat from livestock grazing on the Apache-Sitgreaves National Forest (A-S). Duane was Regional Botanist out of Ogden at the time and he called to tell me that he had found herbarium specimens indicating a possible historic location on the Dixie NF near Brian Head. After relocating and confirming its presence in Utah, Duane joined our team to craft an expanded CAS that would eventually come to include two Forest Service Regions, five National Forests (A-S, Dixie, Manti-LaSal, Carson and Rio Grande), the UT and AZ Fish and Wildlife Service offices as well as other partners. With Duane's involvement and leadership we were able to develop a CAS that essentially functioned



Duane taking in the view of Calf Creek in the Escalante wilderness in 1995. Photo by Teresa Prendusi.



The *Utah Rare Plant Field Guide* easy, portable format spurred on several other States to follow suit with their own popular versions. Photo by Teresa Prendusi.

as a species Recovery document leading to withdrawal of the Listing rule by the Dept. of the Interior in Washington DC.

Duane had demonstrated such leadership before. He was among the original cadre of Forest Service regional botanists hired in the early 1980's to develop and manage the Rare Plant conservation programs on NFS lands throughout the country. This stellar group of hires included notable folks like Angie Evenden, Jim Shevock, Dean Longrie, Reggie Fletcher and Larry Stritch. They developed Regional Forester Sensitive Species Lists, protocols for conducting surveys, monitoring, Biological Evaluations and Manual Direction for Sensitive Species. They provided field training for Forest staffs (wildlife biologists, range conservationists, etc.). Duane always trained non-botanists with humility and passion and got them to care and seek out rare plants in project areas.



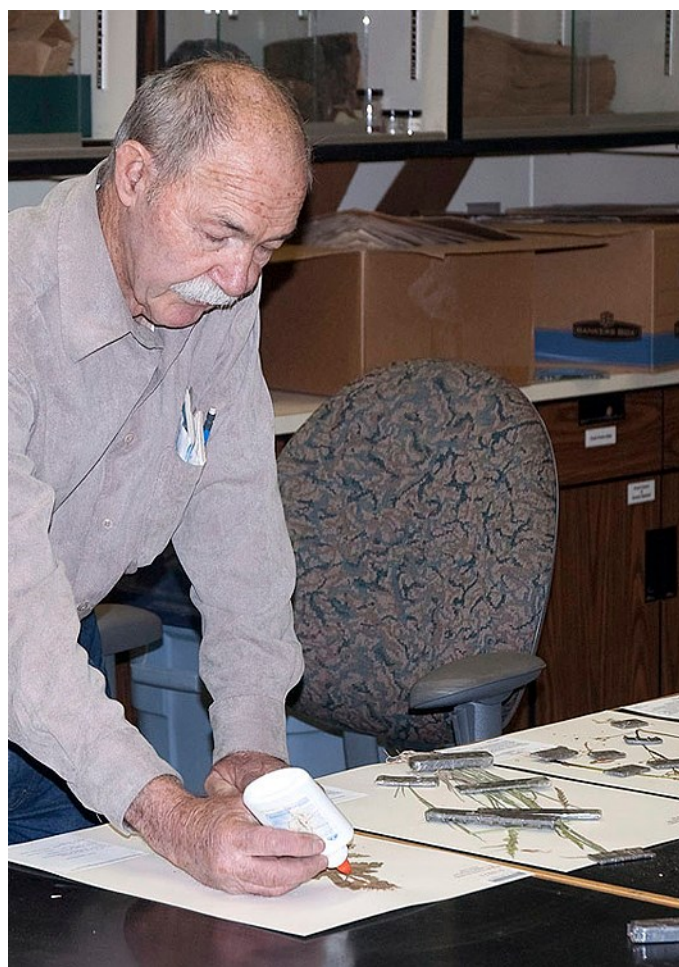
Duane Atwood and Alma Hanson, Payette NF botanist, at the 2009 Southwest Rare Plant Conference in Salt Lake City. Photo by Teresa Prendusi.

Duane also initiated the wildly popular series of statewide interagency Rare Plant Field Guides beginning with the *Utah Rare Plant Field Guide*, whose format was adopted by many western states, including: WY, ID, CO, AZ, NM, NV. Among Forest Service folks, Duane was also considered an accomplished Naturalist – equally expert on wildlife, big game, fisheries, birds, amphibians and reptiles, geology as any of the staffs holding those positions. And, he could wax poetic about fishing and hunting exploits with the best of them.

In the field, Duane was a wonder to behold. He was indefatigable. Field days would start at the break of dawn and end well after dark. I remember a trip to the Claron area of the Dixie NF where I had barely jumped out of the truck and was pulling plant presses out of the flatbed when I spied him out of the corner of my eye already on the ridgeline of a high scree slope. How the heck he had managed to do that in the couple of minutes it took me to get the field gear prepared was beyond me. His drive and energy were breathtaking. We all know what a prodigious collector he was and I would often tease him about his “haybailing” and urged him to leave some forage behind for the cows. He would just grin ear-to-ear. Campsites (always primitive, of course) were found by headlight and he would always fill the 4-foot tall plant presses before sitting down for dinner, which usually consisted of a couple of cold cans of beans and weiners. I, at least, made a multi-grain cheese, veggie and avocado sandwich. Needless to say, the California girl jokes kept coming ad nauseam.

Duane’s campfire stories were the best! He would reminisce about his overseas travels, the hunting and collecting trips and many adventures in the West. My jaw dropped when he told me about the time his truck broke down in the San Rafael Swell and he ran the 20+ miles all night into town to find replacement parts he needed. I mean, WHO DOES THAT?! DUANE ATWOOD does. My lame story was about how when I worked out of BLM’s Price office in 1979 I would often find myself having a serene lunch at the Wedge overlook and wondering what that little blooming cactus barely out of the ground was. Duane laughed at my not recognizing the rare San Rafael cactus, *Pediocactus despainii*, right under my butt! I shot back that the only reference I had to go on at the time was a slender orange book called *Utah Plants: Tracheophyta* and not the tome we now call *A Utah Flora*. The banter was delightful and I miss it so much.

I once asked him if any of his kids had taken after him and were interested in Botany. With a twinkle in his eye he said, “not really” but “I tricked them into



Duane fulfilling his passion for collecting, cataloging and preserving Utah’s flora at the BYU Herbarium. Photo by Teresa Prendusi.

believing that the drive to Phoenix would take at least two weeks so I could make many collecting stops along the way.”

In 1999, Duane, his wife Judy and I got tickets to the Salt Lake City Antiques Roadshow taping. Duane brought a Civil war era short sword he had found in his travels, Judy brought family heirlooms and I a nice oil painting from New Mexico purchased at a thrift store for \$1.50. After receiving a \$10,000-\$15,000 appraisal for my painting Duane quickly offered to double my investment (yes, that’s right...an offer of \$3.00!). Such a card.

We’ve all known Duane Atwood as the extraordinary and legendary botanist that he was and that will never be taken away from him. His encyclopedic knowledge of the Utah (and indeed, the entire Intermountain flora) will likely not be seen again. But the generous, warm human being behind the scientist is the afterglow that remains. I recall his words at a small café after a particularly hard field day where several of us were winding down over a pitcher of beer while Duane chugged his tall glass of cold milk. Someone asked if he was at all worried about his place in eternity by hanging around with the likes of us. Duane said: “My place in eternity is secured....though I don’t much know about you guys.”

Duane Atwood’s colleague and close friend, BYU professor emeritus Blaine Furniss gave the following eulogy at his funeral:

Duane Atwood was, among other things, a professional plant taxonomist. He was passionate about finding and collecting plants. He was an authority on the genus *Phacelia*. He found a number of previously unknown species of that genus within the Intermountain Region and elsewhere and named them in professional publications. A likeness of one of them has been carved into the top of his casket. It commemorates the passion he had for his career and the significant contributions he made to plant taxonomy. He named one of those new species after his major professor. He called it *Phacelia welshii* in honor of Dr. Stanley L. Welsh, who is now 93 years old. Stan was unable to be here today but he has written the following tribute for one of his favorite students.

Stanley L. Welsh tribute:

On a pleasant day in summer in the mid-1960s a fine-looking young man came to the rather infant herbarium at Brigham Young University, then in the east end of what



had been the reading room of the Grant Building library. He had been employed by one of the federal agencies and needed verification on some plants encountered in the field. His name was Duane Atwood.

I [Blaine Furness] pause here to mention, this was the pivotal encounter that launched Duane on his career path. Dr. Welsh showed Duane how to identify plants and Duane was hooked. “I can do that,” he said.

Duane had recently graduated from Weber State with a Bachelor’s degree, having been supported there in some part by an athletic scholarship. Now, he was interested in plants and soon was enrolled at BYU where his attention was drawn into botany. He was then or soon would be married to Judy Vaughan; whose grandfather had shared the Sugarhouse Prison with James Welsh for the same infraction (Unlawful Cohabitation).

*Duane excelled in coursework leading to a master’s degree. His thesis was *The Flora of the National Reactor Testing Site at Arco, Idaho*. He immediately began research leading to a doctoral degree, supported financially by a National Defense Education fellowship. He selected the Genus *Phacelia* in the waterleaf family (*Hydrophyllaceae*) for his dissertation subject.*

Following completion of coursework and literature review, he went into the real world to collect and become hands-on familiar with the species of that amazing genus. He was awarded the Ph.D. degree upon completion of the coursework and dissertation in 1975 and was granted a position essentially directing the Navajo/Kaiparowits environmental studies astride the Utah/Arizona line near Page and Glen Canyon City (now called Big Water) in Kane County. In that position he was in his element. Studies involved collection, not only of plants, but of animals to serve as vouchers.

When that project closed Duane and Judy and their, by then, substantial family moved from their home to other employment. He never lost contact with the herbarium,



Photo, photographer unknown, from Duane Atwood's keynote address presentation at the March 2008 Utah Native Plant Society - UNPS - rare plant meeting. Almost sitting right behind the sign is long-time UNPS board member Dave Wallace. Duane Atwood is standing at left. This was one of many attempts to help protect the habitat of the endangered dwarf bearclaw poppy* (*Arctomecon humilis*).

Dr. Atwood was a fierce advocate for this species. He was in general an indefatigable protector of rare plant species in Utah, regardless of where they occurred (he was working for the Forest Service at this time but these are BLM lands).

*Also known as low bearclaw poppy, low bear-poppy, and dwarf bear poppy. As I have noted elsewhere, low bear-poppy is technically the most accurate Latin translation of its name since *Arctomecon* translates to "bear poppy" and *humilis* means "low" and not dwarf. There is no "claw" in its scientific name; its leaves though do resemble bear paws/claws. Comments by Tony Frates.

and in 1995, upon retirement from the Forest Service, accepted the position as Assistant Curator at the Stanley L. Welsh Herbarium. He did more than merely fill that position; he continued to collect and broaden the scope of the herbarium. His total number of collections exceeded 30,000, and with an average of about 3.5 duplicates per collection, the specimen total came to more than 100,000, about one sixth of the total in the collection. Duane was not only a collector of grand enthusiasm, he was also a family man, whose wife Judy assisted him in whatever

activity. He has been sorely missed and will continue to do so. Signed this day in October by Stan Welsh, former Major Professor for both of Duane's masters and doctoral degrees. He was amazing to say the least. And his collections and publications are indeed "Footprints in the sands of time."

And then Stan added this:

We hunted together for bear in Alaska, elk and deer in the Uinta Basin, caribou in Quebec, Canada, water buffalo in Australia, Red Stag in New Zealand, and miscellaneous game in South Africa. Specimens from each of those endeavors are housed in the Monte L. Bean Life Science Museum. In whatever endeavor, collecting of plants or on hunting trips Duane contributed much more than his mere presence. He was also more than a mere enjoyable companion. He truly made the trips into adventures. Have and will continue to miss him. Stan

Duane pondered the genus *Phacelia* so intently that he nearly named one of his girls *Phacelia*. Some of the annual species have really pretty flowers but most of the perennials have a profusion of tiny unattractive flowers and a pronounced unlovely odor. In other words, they stink. They are variously referred to as phacelias, or sometimes as scorpionweeds after the curvature of their inflorescences, but Dr. Welsh affectionately referred to them as "Atweeds."

I first became aware of Duane Atwood in the fall of 1966. He wouldn't have known me at that time, but I knew him. I was an undergraduate in the Department of Botany at Brigham Young University. Duane was a graduate student. I knew about him because he had already acquired a deferential reputation that I admired. Dr. Welsh would often tell stories about Duane's plant collecting trips. I'll share a couple of them.

Duane couldn't afford new tires for his truck so he went down to the tire shop and got about twenty worn out tires for free. He would patch the tubes then off he would go on a collecting trip. He remained in the field searching for and collecting plants until he had flattened most of the tires before heading back to Provo, his presses overflowing with specimens.

On another excursion, he was in the hinterlands about 25 miles south of Wellington when his truck broke down. The transmission had gone out as I recall. So, he hiked up the creek all night and got to town shortly after daylight. He located an auto junkyard, found the parts he needed, got someone to haul him back to his disabled truck and overhauled it in the field.

Who in their right mind would ever have the temerity to even think of doing the things Duane did? No one, of course. So, it was stories like this that built his



Phacelia argillacea. Crop of picture taken in 1972 (photographer unknown). At left is N. Duane Atwood who rediscovered the locality and named it as a new species. Picture was included in a 2008 Utah rare plant conference keynote speech by Atwood held in Salt Lake City, Utah.

reputation. He was held in very high regard by Dr. Welsh and the rest of the department faculty and, of course, impressionable undergrads like me. I was astonished at the things he accomplished.

The stories always described him with superlative adjectives that made him appear just short of superhuman. Whatever he wanted to do, or had to do, he could always figure out a way to do it. His smarts, stamina and determination were legendary.

As a boy growing up in Vernal, he once bet a classmate his lunch money that he could outrun the school bus. Whereas the bus had to make frequent stops, Duane just kept on running. So, he outran the school bus and collected on the bet. I can't imagine that he did that more than a few times. Once kids find out that you can outrun the school bus, they stop playing the game.

Duane went to Weber High School in Ogden, where he competed in wrestling and track. At that time, there was a five-mile cross country race called The Little Brown Jug. Duane won that race in a record time that was never broken. After he had been awarded the trophy, some of his competitors and a gang of their henchmen took umbrage over a newcomer from the Uinta Basin deposing them, so they decided to teach him a lesson and take his trophy. They waylaid him in the parking lot. They managed to get his trophy, but only after it disintegrated against one of their heads. There were just too many of them and he was overpowered. That was the fracas where Duane lost his front teeth. He finally managed to slip between one guy's legs and scoot under a school bus and get away. That gave him time to gather

up a handful of rocks, whereupon he scattered his pursuers and that ended the fight.

When Duane threw a rock, it traveled between 80 to 100 mph. He had the arm of a major league pitcher. I've watched him throw rocks on field trips. Nobody could throw a rock farther than Duane. He would throw, then he would say, "I'm not going to throw again until somebody matches that one." And if they ever did, he would throw one really hard that they couldn't match. He just couldn't be beaten. So, when he went to Weber State College, he did so, in part, on a scholarship in baseball and track. He played center field. If somebody hit the ball in his area and tried to make second base, he threw them out. If somebody on first tried to score, he could throw them out at home base. His arm was that good!

Here is another story about his athletic ability. Back at BYU, Dr. Welsh believed that students needed to spend time in the field, so they went on lots of field trips. Sometimes back at camp, while waiting for their evening meal to cook in the Dutch oven, students would wrap some duct tape around a roll of toilet paper and play football. Arthur Cronquist was on one of Stan's field trips watching the students play. Cronquist was a famous botanist of international stature. He was to the botanical world like Moses would have been to an Israelite. Anyway, he was watching the students play, and observed to Stan, "It looks like the team that always wins is the team that has Duane on it." So, these were the stories I was hearing.

During the spring semester of my senior year, we went on a week-long ecological field trip. It was my first chance to see Duane in action. What I observed confirmed everything I had ever heard. But there was more. It was on this trip that I observed something the stories had never mentioned. Duane could teleport. If I am using that term correctly it occurs when a magician enters a box on the stage, the curtain closes and a moment later the spotlight picks him up entering the rear of the auditorium. You are left wondering, "How in the world did he do that?"

We were somewhere in Canyonlands; Duane was driving the first van and I was in the third. We had no more than stopped and I had gotten out of my van when I noticed someone on top of some cliffs to my right. It was Duane. I heard afterward that he was searching for an unusual geologic feature, so he went up there for a reason. I wondered to myself, "How did he get up there, and how did he do it so fast?" But we didn't go that way, we immediately went diagonally in the opposite direction around the large hill. As the valley beyond opened up, I noticed a figure about a quarter of a mile away coming

toward us. As it got closer, I recognized that it was Duane. Unbelievable. How did he do that? We left him back there on the cliffs and now he is over here, what? Teleporting seems to be the only logical answer. Duane could teleport. Eventually you just got used to it.

Lest you think I am imagining things, let me remind you of the "uncertainty principle." In 1927 the German physicist Werner Heisenberg published his discovery of the Uncertainty Principle which states that *you cannot measure both the momentum and position of a quantum particle with absolute precision*. Apparently, things happen in the quantum world that defy ordinary logic. Duane bore a lot of resemblance to the quantum world in that respect. He defied ordinary logic. His speed changed from a walk to a run unpredictably. His direction of travel changed unpredictably. You could never predict where he would end up. *So, Duane behaved pretty much like a quantum particle, you could never determine his velocity or his position with any degree of precision*. You just knew that in a single day he could cover a lot of ground. He was like the Energizer bunny; he could just go and go and go.

Over the years, I have tried to figure out his secret. What propels him? It wasn't until I learned about the kangaroo that I think I finally figured it out. When a kangaroo jumps, he stretches some sinews in his legs as he lands and he uses that elasticity to help launch his next jump, sort of like a kid jumping on a trampoline. So, after the kangaroo gets going, he practically travels for free. The fact is, Duane's entire body was made out of that kind of sinew.

He is the only person I know that regularly ran uphill when he didn't have to run. We would be on a collecting trip and I would look over and there he would be, running uphill. Collecting plants for him was like a six-year old on Christmas morning, combined with an Easter egg hunt. Imagine Christmas packages concealed all over the hillside, just waiting to be found. "Duane, you don't need to run. Plants aren't like a bird. They are not going to run or fly away when they see you coming. Slow down!" But he couldn't slow down. He didn't even have that gear. That is another Atwood fact: there was no first gear!

Duane also had a quick eye for finding things, and it wasn't just plants. It didn't matter if it was an unusual flower or an arrowhead, he always found more of them than anyone else. He could walk behind me and see more than I did. He would pick up an arrowhead that I had walked past and say, "Oh, so you didn't want this one?"

He was remarkably resourceful. One time we were coming back from Pine Mountain, Wyoming with a trailer load of logs and I noticed smoke pouring out of

the right wheel well of the trailer. "Duane, we've got a problem," I said. We stopped. I looked at the broken springs and started thinking, "We ain't getting home tonight." Without a moment's hesitation Duane got out his trusty handyman jack, jacked up the trailer, put a 4 X 4 under it to keep the trailer from rubbing on the tire and twenty minutes later, were back on the road. Part of the reason he could figure things out so quickly is because he had already had every kind of breakdown you could ever imagine: broken springs, busted axles, flat tires, dead batteries, leaky radiators, whatever, you name it, so he already knew how to fix things and get us out of a jam. If he didn't already know what to do, he just took stock of his assets and figured out what to do.

Late one night, we were headed back to Vernal with another load of logs. He was making lumber for his den at that time. Why buy lumber when you can make it. That's the way Duane thinks. That afternoon, there had been a tremendous rainstorm and now the bridge ahead was washed out. I start thinking, "We ain't getting home tonight!" By now, it is way after dark. We backed up to where we could unhitch the trailer and started searching for an alternative road. A few miles later, in the middle of the night, Duane suddenly recognizes where he is. Years ago, he had collected plants in this area, and he remembered everything. "There is going to be a gate up ahead," he says, and sure enough, there is a gate. "At the next road we take a left, then left again and we will get to where we need to be." Sure enough, he was right. Once Duane had been in an area, he carried a map in his head that he never lost. I learned never to question his instincts.

I've been on roads with Duane that didn't even look like roads and maybe never had been roads. We've gone down places so steep we could never have gone back up them without chains on all four wheels. We have driven across places I would never have dared to cross. He had a sixth sense about what he could do and get away with. The Ford Motor Company could have really used Duane to advertise their trucks. It was a revelation to me what he made that truck do. We got stopped a time or two, but not for long. We had that Handyman jack, a set of tire chains, his toolbox, a shovel, and a chainsaw.

He drove a lot of miles. Except for the turn signals, that old truck of his is pretty well worn out. He never used them, so the turn signals are still pretty much like brand new. As he got older, stop signs became more like a suggestion than an actual command, so the brakes have hardly been used. They should be in good shape too.

I often thought that Duane might have been born in the wrong century. He could easily have been a Mountain Man. In many respects, he was a Mountain Man. He loved

hunting and trapping and exploring. John Coulter left St. Louis in the spring of 1804 with Lewis and Clark and didn't return to civilization for another six years. On the way back, as they approached the Mandan villages on the Upper Missouri River, he received permission to leave the expedition and return to the Rocky Mountains to trap beaver and explore. Had Duane Atwood lived at that time, he could have been the one to discover Yellowstone or escape in a footrace from the Blackfeet. It may sound tediously redundant to hear me keep implying this, but Duane was a uniquely amazing human being. And that is so true. All the people that knew him in his prime will corroborate that fact.

He had a career mostly with federal agencies, eventually becoming the regional botanist with the Forest Service in Ogden. When Stan invited him to come back and run the herbarium, he couldn't resist. Plant collecting was, after all, his passion. When Duane first arrived at B.Y.U. as a student in the mid '60s, I would guess that the herbarium contained around 35,000 plants. Today it contains over 650,000 plants. This phenomenal growth is due to Dr. Welsh and his students, Duane Atwood being the most prolific collector. If I recall correctly, his field notebooks logged somewhere close to 33,000 numbers. Stan has mentioned the duplicates which more than doubles that number. At a reasonable \$35-40 apiece his contribution to the collection would be valued at over two and a half million dollars.

Dr. Welsh wrote this book: *A Utah Flora*. It has over 1,000 pages, with print barely large enough to read. It weighs nearly five pounds. Duane Atwood is listed as one of the coauthors. This book contains all of the wild plants known to exist in the state and most of the cultivated ones, including the keys to their identity. That is more than 4,000 taxa. Despite the fact that it is an indispensable tool, Duane seldom used it. That's because he already had all those keys and all those plants in his head. We rarely found a plant on our collecting trips that he didn't already know, and that is another amazing fact!

Well, I'm sure you've been reviewing your experiences with Duane, even while listening to mine. The truth is, I have barely skimmed the surface. I haven't even mentioned his pet bobcat Rufous that lived to be 24 years old, ... and so on and so on...

I am going to skip forward. After he retired, he and Judy started spending their winters just outside Blythe, California, in the Mayflower campground alongside the Colorado River, surrounded by alfalfa fields, desert, and the Paloverde Nature Preserve. In 2011, he and Judy invited me and Kay to come down and camp with them. We spent the next nine winters together with them down there.

Duane's health was declining but he never complained.

"Duane, how are your knees doing today?" "They're getting better," he would say. Things were always getting better, but I could tell they weren't. Still and all, we hiked up the river almost every day, and did the things retired people do. He had stopped collecting plants, but that dominant gene for collecting was insatiable. Now he collected pecans, golf balls, and bamboo for walking canes. Whenever we went to the orange grove, he came back with his sacks overflowing and another quarter of a bushel inside his shirt. He couldn't throw rocks anymore, so he made a slingshot, and he made one for me too. We must have resembled a couple of ten-year-olds, hiking up the river with slingshots in our back pockets.

I have recounted again and again that nobody could keep up with Duane. But the day finally came that he couldn't keep up with me, and I had to start hiking alone. About two miles up the river, I discovered the whereabouts of a big 4 x 4 mule deer buck. I told Duane about it. He wanted to see it, so we managed to hike up there one evening. We found the buck just before dark, but in our eagerness, we hiked too far. Duane's phenomenal body, weakened by the march of time, had begun to fail him. The determination was still there, but the stamina was gone. His legs gave out and I had to help him get back to camp. I got a tear in my eye that night and it has been there ever since.

I have to tell you that Duane was the best friend I ever had. We've collected plants in Utah, Colorado, New Mexico, and Arizona, particularly the Arizona strip. We've been places where no white man or even an Indian ever left a footprint. I have been with him from sea level to over 12,000 feet, from Alaska to Mexico, and beyond. I've hunted with him, collected with him, toured with him, shared misery, flash floods, and good fortune. And so, have all of you. My stories are no more important than yours. There are so many of them, we will have no difficulty at all carrying his memory forward. He has immeasurably enriched our lives. There never was a better friend.

So, as we together remember Duane's life and honor him today, there is one more essential ingredient to his remarkable life that I acknowledge, and that is his wife, Judy. She kept the home-fires burning while he was gone. And he was gone a lot. Occasionally, he returned home to find that she had put forth a child in his absence. As Stan Welsh observed, "It isn't easy being married to a whirlwind."

Judy, we all love you. We share your loss. Thanks for all you have done. What Stan said is true, your husband indeed left some impressive footprints in the sands of time. But, when we reflect and take the time to examine them, we find your footprints alongside his all the way.

Blaine Furniss , November 20, 2021

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.

Spring is coming soon... 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 (**PDF is 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

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

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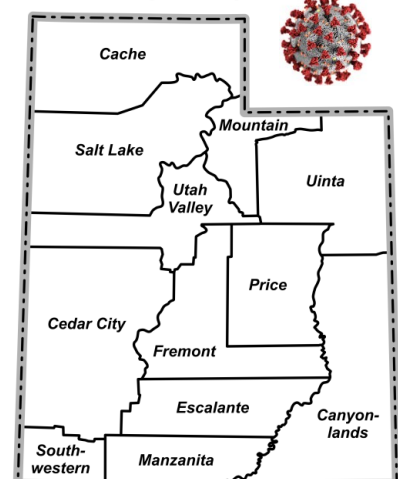
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jstireman@outlook.com
Cathy King cathy.king@gmail.com

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The *Sego Lily* is a quarterly publication of the Utah Native Plant Society, a 501(c)(3) not-for-profit organization dedicated to conserving and promoting stewardship of our native

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