




# Sego Lily

Newsletter of the Utah Native Plant Society

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**NatureServe Global Ranking Session  
at March 2019 UNPS Meeting**



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211873

BRIGHAM YOUNG UNIVERSITY  
 HERBARIUM  
 PROVO, UTAH

Uintah, Co., Utah, USA 211873  
 Cryptantha grahamii Johnst.  
*Leptotype*  
 2 to 20% slope, Thelypodopsis-Hilaria-<sup>3</sup>  
 Enceliopsis  
 Mouth of Sand Wash, above flood plane,  
 on W side of Green River  
 Shadscale comm, sloping terrace  
 gravels, shale talus slopes and cobbles  
 E Neese, S White 15 May 1980  
 8656  
 HERBARIUM OF BRIGHAM YOUNG UNIVERSITY  
 PROVO, UTAH

NatureServe Global Ranking .... 2	Cliffrose Reminder ..... 19
Utah Rare Plant Meeting 2019. 4	Dorde Woodruff ..... 20
Fritillaria pudica ..... 12	Joel Tuhy Meeting ..... 21
Eriogonum Society Meeting .... 15	Lifetime Members ..... 21
Alma Winward ..... 16	Penstemon Society Meeting .... 22
Bill Gray's App Reviews ..... 19	Dave Wallace Weed Pull ..... 22



## NatureServe Global Ranking Session at March 2019 UNPS Meeting

by Anne Frances ([anne\\_frances@natureserve.org](mailto:anne_frances@natureserve.org)) and Leah Oliver ([leah\\_oliver@natureserve.org](mailto:leah_oliver@natureserve.org))

### Abstract

On March 4, 2019 the Utah Native Plant Society and NatureServe co-coordinated a Global Ranking session to review the conservation status of high priority plant species. Global Ranks refer to NatureServe's Conservation Status Assessments, the most widely used platform for assessing conservation status of species in the United States and Canada. The meeting was hosted by Red Butte Botanic Gardens in Salt Lake City. The session was attended by representatives from the Bureau of Land Management, U.S. Forest Service, Utah State University, Grand Canyon Trust, Idaho Museum of Natural History, the Utah Natural Heritage Program, consultants, and private citizens. NatureServe botanists Anne Frances and Leah Oliver provided an overview of the NatureServe Ranking methodology before the larger group thoroughly reviewed each species. The group considered new information on each species' threats, land use, population trends, habitat condition, taxonomy, and other factors. We then entered available data into NatureServe's Rank Calculator and discussed the resulting Global Ranks. Much of the discussion focused on challenging species where the weight of evidence fell between two ranks.

### About NatureServe ([www.natureserve.org](http://www.natureserve.org))

The NatureServe Network is a public-private partnership that includes more than 80 independent member programs, commonly known as Natural Heritage Programs or Conservation Data Centres. NatureServe works collaboratively with the Natural Heritage Network to provide conservation information on rare plants, animals, and ecosystems. This partnership allows NatureServe to work cooperatively and efficiently with all jurisdictions in North America. Using a shared data structure, NatureServe network member programs collect and manage information on the location and conservation status of taxa in their jurisdictions. NatureServe's Botany Department compiles and maintains extensive data on the taxonomy, distribution, threats facing plants and selected fungi, lichens, and algae of the United States and Canada, with a focus on species that are most imperiled.

### About Conservation Status Assessments, or Ranks

Conservation status assessments are used to prioritize plant conservation efforts by evaluating a species' risk of extinction (Master, 1991). Because of the recognized importance of status assessments to conservation, several international policy initiatives and strategies include status assessments as part of their strategic goals. For example, Target 2 of the Convention on Biological Diversity's Global Strategy for Plant Conservation calls for "an assessment of the conservation status of all known plant species...to guide conservation action" by 2020 (CBD, 2012). Similarly, the North American Botanic Garden Strategy for Plant Conservation calls on botanic gardens to review and contribute to conservation status assessments of plants using criteria and standards developed by NatureServe and the IUCN (BGCI, 2016).



Anne Frances. Photo by Jonathan Barth.

Scientific Name	Common Name	Previous Rank	Current Rank	Year of Last Review*
<i>Ericameria lignumviridis</i>	Greenwood's Heath-goldenrod	G1	G1	1995
<i>Cryptantha grahamii</i>	Graham's Cat's-eye	G3	G2	1990
<i>Terraria haydenii</i>	Frisco Mountains mustard	G1	G1	2017
<i>Euphorbia nephradenia</i>	Paria Spurge	G2	G2	1999
<i>Ivesia shockleyi</i> var. <i>ostleri</i>	Ostler's Ivesia	G3G4T1	G3G4T1	1991
<i>Potentilla cottamii</i>	Cottam's Potentilla	G1	G1	1987

Table 1: Species and Global Ranks reviewed at the March Ranking Session  
 \*All Global Ranks currently indicate 2019 as the year of last review.

NatureServe’s system of conservation status assessments, also called Ranks, evaluate the potential extinction or extirpation risk of a species by systematically analyzing factors grouped into three factor groups: rarity, threats and trends (Faber-Langendoen et al., 2012; Master et al., 2012). Species and infraspecific taxa (varieties and subspecies) are ranked from most endangered to least endangered on a scale of 1 to 5 (Figure X). Ranks are completed at three nested, geographic scales: Global (G), National (N), or Subnational (S) (Figure X—ranking graphic). By

indicating species imperilment at multiple scales, governments are better able to allocate resources for the most imperiled species in their respective jurisdictions while considering a species overall risk of extinction (Faber-Langendoen et al. 2012). For example, comparing the Subnational (state or provincial rank), or Sranks, to the Global, or Granks, provides information on jurisdictions within a species range that may be more vulnerable than others. NatureServe ranks also include GX (Presumed Extinct) and GH (Possibly Extinct), as well as variant ranks and rank qualifiers. Conservation



Attendees at March 2019 NatureServe Global Ranking Session held at Red Butte Garden.

	Global	National	Subnational
Critically Imperiled	G1	N1	S1
Imperiled	G2	N2	S2
Vulnerable	G3	N3	S3
Apparently Secure	G4	N4	S4
Secure	G5	N5	S5

NatureServe Ranks

information from the Natural Heritage Network is freely available online via NatureServe Explorer ([explorer.natureserve.org](http://explorer.natureserve.org)). However, there may be a lag time between updates made in NatureServe's central database, called Biotics, and corresponding information on NatureServe Explorer.

### Details About the Ranking Session

It is no surprise that Utah is known for high floristic diversity and endemism. NatureServe was interested in reviewing Global Ranks in Utah for this reason and because of the many plant species of conservation concern. For example, some of Utah's rare plants occur on specific geologic substrates, many of which are threatened by mining. Introduced mountain goats also threaten by trampling and digging wallows. The species evaluated in the Global Ranking Session were prioritized for review with input from several stakeholders based on 1) species with high levels of threat and 2) reviewers' ability to fill data gaps (Table 1). In most cases the Global Rank remained the same and we filled in relevant information on distribution, threats, and trends. This information, along with the updated Rank Review Date, provide current, scientific information to federal agencies and other partners.

### Acknowledgments

We thank the Bureau of Land Management Washington Office for supporting Leah and Anne's attendance at the Ranking Session. We are grateful to the Utah Native Plant Society for organizing and hosting the meeting, and to Red Butte Botanic Garden for providing space and technical support.

### References

**Botanic Gardens Conservation International [BGCI], comp. 2016.** North American Botanic Garden strategy for plant conservation, 2016-2020. Glencoe, IL: Botanic Gardens Conservation International. 40p.

**Convention on Biological Diversity [CBD] 2012.** Global strategy for plant conservation, 2011-2020. Richmond, UK: Botanic Gardens Conservation International.

**Faber-Langendoen, D.; Nichols, J.; Master, L.; Snow, K.; Tomaino, A. [et al.]. 2012.** NatureServe conservation status assessments: methodology for assigning ranks. Arlington, VA: NatureServe.

**Master, L. 1991.** Assessing threats and setting priorities for conservation. *Conservation Biology*, 5(4), 559-563.

**Master, L.; Faber-Langendoen, D.; Bittman, R.; Hammerson, G.A.; Heidel, B. [et al.]. 2012.** NatureServe conservation status assessments: factors for evaluating species and ecosystem risk. Arlington, VA: NatureServe.

### Hyperlinks to species on NatureServe Explorer

#### *Ericameria lignumviridis*

[http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT\\_GLOBAL.2.156862](http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.156862)

#### *Cryptantha grahamii*

[http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT\\_GLOBAL.2.128275](http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.128275)

#### *Terraria haydenii*

[http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT\\_GLOBAL.2.1012874](http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.1012874)

#### *Euphorbia nephradenia*

[http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT\\_GLOBAL.2.152922](http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.152922)

#### *Ivesia shockleyi* var. *ostleri*

[http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT\\_GLOBAL.2.142451](http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.142451)

#### *Potentilla cottamii*

[http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT\\_GLOBAL.2.159639](http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.159639)



*Terraria haydenii*. Photo from UNHP.

## Dr. Anne Frances – Lead Botanist



Dr. Anne Frances, Lead Botanist for NatureServe, sets priorities for and guides the activities of NatureServe's botany department. This includes overseeing Global Rank Reviews and Climate Change Vulnerability Index Assessments for all plant species. She currently serves as the North American Plant Red List Authority and has collaborated on Red List projects such as the Global Cactus Assessment and updated the conservation status of rare orchids in the United States. She has worked as field botanist for Fairchild Tropical Botanic Garden and the Institute for Regional Conservation, as well as conducted independent field research in Costa Rica and Florida. Her diverse interests and over 20 years of experience in native plant conservation, ethnobotany, and restoration ecology help her in coordinating NatureServe's efforts to protect rare plants and their ecosystems. Dr. Frances has a BA in Biology from the University of North Carolina Chapel Hill, a MS from Florida International University, and a PhD from the University of Florida. She serves as Affiliate Faculty at The Smithsonian Mason School of Conservation.

# Utah Rare Plant Meeting 2019

by Cathy King

From UAV drone fly-over plant census technology to molecular DNA data sampling, the 2019 Utah Rare Plant Meeting held on March 5th in the Swaner Forum at the Natural History Museum of Utah once again gave individual scientists and representatives from numerous universities and government agencies the opportunity to present their most recent scientific findings relating to Utah native plants.

The Utah Rare Plant Meeting, organized by the Utah Native Plant Society and now in its 37th year, is co-sponsored by the Garrett Herbarium and generously hosted by the Natural History Museum of Utah. It is a full day meeting of short, overview scientific presentations (see agenda and abstracts below), with breaks and lunch allowing plenty of time for discussion and networking.

Special guests this year were Anne Frances and Leah Oliver from the Virginia based office of NatureServe, who in addition to giving a presentation on the "Conservation Status of Rare Plants in Utah: The NatureServe Network Perspective," also led a plant ranking workshop the day before at Red Butte Garden. This was the first time that representatives from NatureServe have attended a meeting in Utah.

Also at the meeting this year, the Utah Native Plant Society presented the "Lifetime Achievement Award for Uinta Basin and Utah Botany" to Sherel Goodrich,

recognized as the foremost authority on Uinta Basin endemics and flora. Sherel was a contributing editor to *A Utah Flora*, (Stanley Welsh, et. al.), the co-author (with Elizabeth Neese) of *Uinta Basin Flora* in 1986, and the *Uinta Flora* (with Allen Huber) in 2014.

This meeting is open to anyone with an interest in the study and conservation of native plants. The date has already been set for next year: Tuesday, March 3, 2020 and will once again be held in the Swaner Forum of the Natural History Museum of Utah. Get it on your calendar and plan to attend.



Sherel Goodrich receives the "Lifetime Achievement Award for Uinta Basin and Utah Botany" from UNPS Board Chair Bill King.



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**Annual Utah Rare Plant Meeting Agenda March 5, 2019 Natural History Museum of Utah**

<b>8:00 9:00</b>	<b>Registration</b>
9:00	<b>Announcements</b>
9:10	<b><i>A UAV-based Methodology for Census of an Endangered Plant Species in a Fragile Habitat</i></b> -- Kody Rominger, Susan Meyer
9:30	<b><i>Investigating the Seed Dispersal Mode of Holmgren's Milkvetch, Astragalus holmgreniorum, by Wind and Water in the Laboratory and Field</i></b> -- Sydney Houghton, Michael T. Stevens, Susan Meyer
9:50	<b><i>Effects of Cattle Grazing on Population Densities and Reproductive Effort of Sclerocactus wrightiae</i></b> - Thomas H. Bates, Val J. Anderson, Robert L. Johnson, Steven L. Petersen, Loreen Allphin, Dustin Rooks
10:10	<b><i>The Efficacy of Small Versus Large Fences on Protecting the Clay Phacelia (Phacelia argillacea) from Free-ranging Ungulates</i></b> -- Michele M. Skopec, Jennifer M. Schmalz, Jill Dinsdale, Heather Gardner

<b>10:30</b>	<b>20 minute break</b>
10:50	<b><i>Plants in the Conservation Movement</i></b> -- Robert Fitts
11:10	<b><i>Conservation Status of Rare Plants in Utah: The NatureServe Network Perspective</i></b> -- Anne Frances, Leah Oliver
11:30	<b><i>Updates on the State Rare Plant Program</i></b> -- Mindy Wheeler
11:50	<b><i>USFWS Utah Field Office Updates</i></b> -- Jennifer Lewinsohn
12:10	<b>Community Announcements</b>

<b>12:20</b>	<b>Lunch (with pre--registration) -- 1 hour 20 minutes</b>
1:40	<b><i>Uinta Endemic Plants and Geologic Formations</i></b> -- Sherel Goodrich
2:00	<b><i>The Role of Protected Areas in Maintaining Biodiversity at a Variety of Scales</i></b> -- Wayne Padgett
2:20	<b><i>Protecting the Native Vegetation of the Left Fork Huntington Creek Reference Area, in the Wasatch Plateau</i></b> -- Marc Coles-Ritchie

<b>2:40</b>	<b>20 minute break</b>
3:00	<b><i>Resolving Relationships in Aliciella subsection Subnuda: New Insights into Evolutionary Processes</i></b> – Theresa Saunders, J. Mark Porter, Leigh A. Johnson
3:20	<b><i>The Relationship Between Penstemon x jonesii, P. eatonii, and P. laevis</i></b> – W. Wesley Crump, Jason M. Stettler, Robert L. Johnson, Chris D. Anderson, Sarah Harrison, and Mikel R. Stevens
3:40	<b><i>Purshia (Rosaceae) at a Crossroads in Northern Utah</i></b> – William R. Gray

<b>Posters</b>
<b>Great Basin bristlecone pine (<i>Pinus longaeva</i>) historic fire regimes and future fire risk: a multi-scale assessment</b> – Stanley G. Kitchen, Steven L. Petersen, Gregory W. Taylor, Douglas H. Page, Christopher S. Balzotti, Craig Coleman
<b>Cliffrose (<i>Purshia stansburyana</i>) at the Limit: Pioneer or Refuge?</b> – William R. Gray

**Meeting Abstracts – UNPS Rare Plant Meeting  
March 5<sup>th</sup>, 2019 Natural History Museum of Utah**

**1. A UAV-based Methodology for Census of an Endangered Plant Species in a Fragile Habitat**

*Kody Rominger & Susan Meyer*

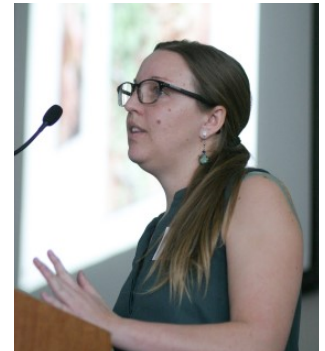
Understanding population extent is essential for the management of endangered plant species. Yet complete on-the-ground census are often difficult to achieve. Resource limitations, as well as accessibility, especially for species in fragile habitats, is an added constraint. We examined the feasibility of using UAV-based imagery for census of an endangered plant species, *Arctomecon humilis* (dwarf bear-poppy), an endemic gypsophile of the Mojave Desert. We used a DJI Phantom 3 Advanced drone at two occurrences, White Dome (315 ha) and Red Bluffs (166 ha) to capture imagery at 50-m altitude. This imagery was processed into orthomosaics that were then visually scanned. Putative poppy plants were marked according to predefined criteria. We also acquired imagery from 15-m altitude at each area as validation data sets to check identification accuracy. Visual evaluation of the 50-m imagery resulted in errors of both commission and omission, but these compensated for each other, enabling reasonably accurate population estimates. Higher-resolution imagery taken at 30-m altitude greatly reduced errors of commission and should also facilitate automated counting of individuals. Habitat classification demonstrated that poppy density variation was closely tied to soil surface color. This study showed that drone captured imagery can be used to census rare plant species with distinctive morphology in open habitats and to aide in understanding their spatial distribution.



**2. Investigating the Seed Dispersal Mode of Holmgren’s Milkvetch, *Astragalus holmgreniorum*, by Wind and Water in the Laboratory and Field**

*Sydney Houghton, Michael T. Stevens* - Department of Biology, Utah Valley University, *Susan Meyer* - USFS Rocky Mountain Research Station Shrub Science Laboratory

*Astragalus holmgreniorum* is a perennial herb endemic to the northern Mojave Desert near St. George, UT. Federally listed as endangered since 2001, this species faces threats of urban development, off-road vehicle use, and invasive species competition. Understanding the dispersal system is a key aspect of efforts to conserve *A. holmgreniorum*. The



leguminous fruits start out as fully bilocular and trigonously-compressed legumes with the ventral side of the fruit wall folded inward to form a double-walled partition between the valves. Once ripe, the pod becomes dry and the ventral-side suture separates, exposing the inner partition and allowing the ends of the pod to curve dorsally. Each end partially dehisces allowing space for seeds to fall out. The morphological characteristics of the pods at this stage exhibit minor aerodynamic qualities. Additionally, we have observed the pods to be hygroscopically active and have the capacity to change shape dramatically in response to water uptake. We first studied the effects of wind and water in a laboratory setting and subsequently conducted a field study to compare our results of the laboratory studies. Laboratory wind trials were performed using a runway of varying wind velocity, slope, and surface roughness. Seed loss was measured by change in pod mass after trials. Pod dimensions were analyzed as well to identify any correlation to distance traveled. Results showed pods were readily moved by wind. A significant three-way interaction between wind velocity, slope, and surface roughness was found ( $X^2 < 0.001$ ). The greatest mass loss was seen on the medium surface, upslope, with high wind velocity ( $p=0.0126$ ). Pod dimension analysis showed a significant positive correlation of pod width and pod

curve on the distance travelled ( $p < 0.0001$ ). To determine the effect that water has on pod opening, an apparatus was designed to mimic natural precipitation in the Mojave Desert. This design permitted us to apply known amounts of water as rain-like droplets over a ten-minute period to simulate low intensity storms of 1, 3, and 5 mm of rainfall. Results showed that the simulated small storms were extremely effective in inducing pod opening. Furthermore, control of pod opening seemed to be controlled by the mechanics of folding and unfolding of the ventral side suture associated with wetting and drying. The field study was installed in *A. holmgreniorum* habitat with marked pods. Two evaluations were performed on pod travel. During the study wind velocities comparable to those in the laboratory wind trials were recorded and precipitation-producing storms occurred. At the final evaluation, we were able to locate 73% of study pods. Pod distances from original position ranged from 15- 600 cm with some outliers at >1500 cm. The great majority (85%) of located pods no longer contained seeds. This was true regardless of whether the pods moved appreciably. This indicates that seed deposition occurs in conjunction with precipitation events. This analysis fills knowledge gaps in dispersal processes and provides valuable information for conservation efforts of this federally-listed endangered species.

### 3. Effects of Cattle Grazing on Population Densities and Reproductive Effort of *Sclerocactus wrightiae*

Thomas H. Bates, Val J. Anderson, Robert L. Johnson, Steven L. Petersen, Loreen Allphin, Dustin Rooks - Department of Plant & Wildlife Sciences, Brigham Young University



In 1979, the U.S. Fish and Wildlife Service (USFWS) declared *Sclerocactus wrightiae* (SCWR) endangered due to its limited range and population size, as well as its popularity for field collection by amateur and professional cactus fanciers (USFWS, 1979). Since its listing, the impacts associated with cattle grazing have also been identified as a primary threat to the species (Spector, 2013; USFWS, 2005, 1985). During the field seasons of 2011-2012, the BLM established 30 macro-plots to monitor the impacts of grazing intensity on SCWR population trends. Macro-plot locations were placed in multiple grazing allotments and located in areas representing different levels of cattle disturbance. Disturbance was divided into three categories: high disturbance (>50% of individuals with a cow track

within 15 cm), medium disturbance (20-50%), and low disturbance (<20%). Each disturbance category was replicated ten times (BLM, 2015). Our objective was to evaluate the effects of cattle grazing on both the number of reproductive individuals (%) and population densities (individuals ) of SCWR across seven years (2011-2017). Our mixed model analysis suggests that greater cacti densities are significantly associated with high grazing disturbance ( $p = 0.02$ ).

### 4 The Efficacy of Small Versus Large Fences on Protecting the Clay Phacelia (*Phacelia argillacea*) from Free-ranging Ungulates

Michele M. Skopec, Jennifer M. Schmalz, Jill Dinsdale - Department of Zoology, Weber State University, Heather Gardner - Department of Botany, Weber State University



Climate change models predict an increase in disease abundance, severity and range. Introduced diseases can cause major losses to plants that are not adapted to resist them. This is particularly true when the affected plants are rare. The loss of populations or large numbers of individuals in populations can lead to a loss of genetic diversity. A significant loss of genetic diversity can leave a plant species maladapted to future threats and increase risk of inbreeding depression. Land managers must be prepared to handle the increased risk of disease and genetic factors crucial to population recovery. This presentation addresses some of the genetic threats to rare plants caused by disease and other factors affecting populations loss and offers advice on how to approach recovery.

### 5. Plants in the Conservation Movement

Robert Fitts

The conservation movement in the United States moved from animals, landscapes and plants, and from state, private and federal programs. Science backed many of the policies of land management, such as hunting, establishment of preserves, national parks and forests. Floods, catastrophic wildfires and loss of common plants and animals fueled action and to





create conservation policies and land management practices.

### 6. Conservation Status of Rare Plants in Utah: The NatureServe Network Perspective

Anne Frances & Leah Oliver – NatureServe

The conservation of native plants, especially those experiencing threats and population declines, is dependent on accurate information about each species' location, population health, and protection needs. In cooperation with Natural Heritage Programs in each U.S. state, Canadian Conservation Data Centres, and other collaborators, the NatureServe Network uses a long-standing, standardized, and vetted methodology to assess each plant species' risk of imperilment at subnational (state), national, and global scales. This presentation will provide an overview of NatureServe's methodology and data-flow within the network, using Utah rare plants as case studies. These case studies will highlight the unique challenges of rare plants in Utah. We will review how NatureServe's assessments, or Ranks, facilitate setting conservation priorities that support the protection and management of the most vulnerable plant species. Finally, we will discuss how NatureServe's data inform broader plant conservation challenges, including national and international policies and initiatives.



Anne Frances

### 7. Updates on the State Rare Plant Program

Mindy Wheeler

The state botany team has been busy in coordinating and implementing rare plant conservation throughout Utah. Updates will be given on the status of these activities, which include the new database and associated photo library (up and running!), data collection methods, and future goals for the database. Further, information will be shared on the work our team has been doing on Heliotrope milkvetch (*Astragalus montii*), Goose Creek milkvetch (*Astragalus anserinus*), Frisco



buckwheat (*Eriogonum soredium*), Ostler's peppergrass (*Lepidium ostleri*), and Frisco buckwheat (*Trifolium friscanum*) as well as the efforts our office is involved in for work being completed on White River Penstemon (*Penstemon albifluvis*), Holmgren's milkvetch (*Astragalus holmgreniorum*), bear claw poppy (*Arctomecon humilis*), and others.

In addition, the Species Recovery Office has agreed to do what we can for monarch butterfly and other pollinator work in Utah and the botany team has gotten involved. The Western Association of Fish and Wildlife Agencies (WAFWA) just completed a Western Monarch Conservation Strategy and the State of Utah is a signatory to the plan. Activities for this program will also be shared.

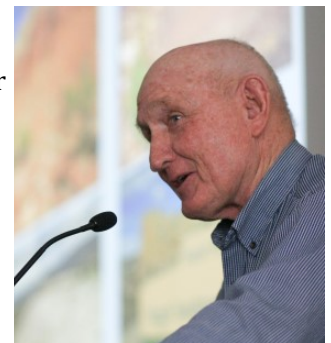
### 8. USFWS Utah Field Office Updates - Jennifer Lewinsohn



### 9. Uinta Endemic Plants and Geologic Formations

Sherel Goodrich

Many endemic plants of the Uinta Basin and Uinta Mountains are found on one or a few geologic formations. Examples of Uinta endemics with affinity for geologic formations are displayed in a power point presentation. Included are 27 taxa for the Green River Formation, 15 for the Duchesne River Formation, 7 for the Uinta Formation, 6 for Morrison Formation, 5 for Weber Sandstone, 3 for pediments of the Green River and Duchesne River, and a few for 9 other formations. The genus *Penstemon* is well represented in the area with 14 endemic taxa that range from desert shrub communities to the alpine. The genus *Astragalus* with 8 endemic species is also well represented.



Some endemics are listed more than once as they occur on more than 1 formation. Many of the plants listed are

limited to the Uinta area. Some extend over the Tavaputs Plateau to the south, and others into Wyoming on the north. Many of these endemics are most abundant on semibarrens where geologic strata are exposed and where competition from other plants is limited.

**10. The Role of Protected Areas in Maintaining Biodiversity at a Variety of Scales**

Wayne Padgett – Vegetation Ecologist, Retired

Research Natural Areas, Areas of Critical Environmental Concerns, and Wilderness Areas all provide at least some level of protection of biodiversity from genetic to the ecosystem scale. While limited in their abilities based on the distribution of rare plants across the landscape, these areas do provide at least some havens for species and their habitats. In Utah there has been an attempt to protect a variety of areas representing ecosystems at all elevations and, thereby protecting biodiversity from low deserts to alpine areas.



**11. Protecting the Native Vegetation of the Left Fork Huntington Creek Reference Area, in the Wasatch Plateau**

Marc Coles-Ritchie – Grand Canyon Trust

Native vegetation thrives in the Left Fork Huntington Creek reference area, a 297-acre ungrazed site in the north zone of the Manti-La Sal National Forest.

Livestock grazing has been minimal or non-existent at this site since 2002, in part thanks to a Memorandum of Understanding signed in 2010 between the Manti-La Sal National Forest and Grand Canyon Trust to manage it as a reference area. Native plant communities abound at this site and there is relatively low cover of introduced plant species; no cheatgrass has been observed! The area includes rushing mountain streams, beaver ponds and associated riparian vegetation, and the surrounding uplands include shrublands, multi-layer aspen forest, conifer forest, and grassland. A plant list by Grand Canyon Trust and volunteers so far includes 162 species, including



108 native forbs (and 13 introduced forbs); 12 native grasses (and three introduced grasses); 21 native shrub species, including five willow species (no introduced shrubs); and five native tree species (no introduced trees). This area should be kept free of livestock to retain it as one of the few reference areas in the Wasatch Plateau. We are seeking special “Geographic Area” designation by the Manti-La Sal National Forest for this site, which includes a portion of the non-motorized *Left Fork of Huntington Creek National Recreation Trail*. A rare plant survey is needed to determine if there are any rare plants in this area.

**12. Resolving Relationships in *Aliciella* subsection *Subnuda*: New Insights into Evolutionary Processes**

Theresa Saunders, J. Mark Porter, Leigh A. Johnson – Brigham Young University

*Aliciella* subsection *Subnuda* contains seven species of perennial flowering plants: *A. tenuis*, *A. caespitosa*, *A. subnuda*, *A. haydenii*, *A. formosa*, *A. cliffordii*, and *Gilia karenae*, three of which are rare and others with fragmented, highly restricted distributions. Previous molecular analyses of one nuclear and three chloroplast regions revealed an unexpected history of repeated hybridization and introgression within the subsection, including multiple cases of chloroplast capture by *A. tenuis*. To strengthen our understanding of species boundaries and evolutionary histories in these species, both the inter and intra-species sampling strategies were expanded over this past year. Additionally, we increased our molecular data sampling via a next generation-sequencing technique: restriction site associated DNA sequencing (rad-seq). While the rad-seq data analyses are still in progress, we report here our experience with generating next-generation sequencing data useful for informing conservation efforts from leaf tissues of different qualities. These include herbarium material, leaf tissue collected in silica gel specifically for DNA analyses up to 15 years ago, and tissue newly collected in 2018, albeit in some cases from drought-stricken plants. New insights into evolutionary processes across the entire subsection will be discussed.



**13. The Relationship Between *Penstemon x jonesii*, *P. eatonii*, and *P. laevis***

W. Wesley Crump, Jason M. Stettler, Robert L. Johnson,

Chris D. Anderson, Sarah Harrison, and Mikel R. Stevens – Brigham Young University

First collected in 1894 by Marcus E. Jones (1852–1934) and labelled as *Penstemon glaber* Pursh., *Penstemon jonesii* Pennell was not described until 1920 by Francis W. Pennell (1882–1952) who used the 1894 M. E. Jones specimen as the holotype. In 1967, Frank S. Crosswhite (1940–2008) hypothesized that “it is indisputably the hybrid *P. laevis* x *P. eatonii*.” It is now widely accepted as the putative natural hybrid of those two species and described as having “Tyrian rose”, “amaranth purple”, or red-purple to maroon colored blooms. To date, it has only been identified in concentrated areas in Southwestern Utah. Elizabeth Neese (1934–2008), in A Utah Flora, stated that this taxon has long been recognized as a candidate for horticultural selections due to its beautiful habit and color. Research beyond its original description and hypothesized hybrid origins has been minimal. Gaining a better understanding of its origins will help clarify lingering taxonomic questions surrounding *P. x jonesii*. We have made reciprocal first generation hybrid plants from the two parental species (*P. eatonii* and *P. laevis*); as well as second and third generation hybrids through backcrossing to both parental species. Using nine *Penstemon* microsatellite markers we have examined the allelic variations between *P. x jonesii*, *P. eatonii*, and *P. laevis*. These SSR data, in conjunction with our controlled crosses suggest that *P. x jonesii* indeed descends from hybridization events between *P. eatonii* and *P. laevis*. However, the standing definition of *P. x jonesii* is both myopic and misleading. The first generation hybrid (F<sub>1</sub>) of these putative parents do not resemble *P. x jonesii*. The blossom color is a strong pink with its morphology slightly more in alignment with the characteristics of *P. laevis*. In our Zion National Park and Grand Staircase Escalante fieldwork, we have yet to identify, unambiguously, a true F<sub>1</sub> of these putative parents. However, when we backcrossed our F<sub>1</sub> to either of the two parents (*P. eatonii*, *P. laevis*) we do find blossom colors and morphology described in all presently published descriptions along with additional undescribed colors also occurring in wild populations in Zion and Grand Staircase Escalante. Both the controlled crosses and wild population blossom color range include purples, pinks, peach, and light oranges with



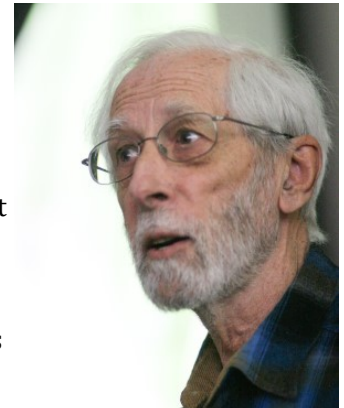
Wesley Crump

hints of yellow. The morphology of these blossoms generally more closely aligned with that of *P. eatonii*. Here, we propose a new, broader and more encompassing definition of *P. x jonesii*, reflecting what is seen in the wild and our controlled hybrid cross experiments. It is unclear to us as to why, in the wild populations, we generally found that the predominant floral colors of *P. x jonesii* fall in “Tyrian rose”, “amaranth purple”, or red-purple to maroon colored blooms. These predominate colors in the wild plants suggest some selective preference, perhaps a pollinator preference and/or increased fitness of plants with that color type.

#### 14. *Purshia* (Rosaceae) at a Crossroads in Northern Utah

William R. Gray

*Purshia tridentata* (Bitterbrush) and *P. stansburyana* (Cliffrose) are common native shrubs in Utah, the first found at all latitudes, while the second has its strict northern limit at a line stretching west from Salt Lake City to the Pilot Range. They are known to hybridize where their ranges overlap: this is widely considered a probable origin for *P. glandulosa* (= *P. tridentata* var. *glandulosa*, Desert Bitterbrush) which occurs to the south and west, barely reaching Utah in the Beavertdam area.



Stutz & Thomas found glandular plants of *P. tridentata* far to the north, suggesting that *P. stansburyana* was once there or that hybridization has spread in a stepwise fashion northwards. This raises a question as to whether the sharp northern limit for *P. stansburyana* represents a refugium from an earlier interglacial period, or the leading edge of a northward expansion.

An isolated individual of “*P. glandulosa*” was found in Salt Lake City, in a situation suggesting it was likely a de novo hybrid. Re-examining historical collections of *P. stansburyana* in the area I have located strong candidate populations for all collections in Salt Lake County made from 1869 to 1984. All are restricted to a narrow band on steep slopes around the northern benches – likely the reason they have survived rampant development. More southerly records made in the past 30 years represent plantings along highway verges and similar sites. Unless other natural plants are found in the county the nearest Cliffrose are 25 miles to the south in Utah Co.

A second isolated *P. glandulosa* lookalike has been found in City Creek Canyon. Otherwise almost no glandular character was found in many plants of *P. tridentata* examined from northern Salt Lake County. Observations will be extended through flowering and seed set, with the aim of understanding the interactions of these iconic plants.

Stutz, H.C. and L. K. Thomas. 1964. Hybridization and Introgression in *Cowania* and *Purshia*. *Evolution* 18: 183-195.

Photos of speakers by Jonathan Barth.

### How to Save Trees and Money

The Segó Lily is available in two different editions. It is available in an on-line electronic edition which is in full color and is available as soon as it is published and in a hard print edition which is printed in black and white and sent by US snail-mail. It costs the Society nearly two dollars to print and mail each hard copy. If you are getting a hard copy and would like to save the society this money which could better be used for programs and scholarships and would like to make the switch to an electronic copy please contact Susan Sims at: shsims@mac.com. If you are happy with the way you receive the Segó Lily now, no action on your part is needed.

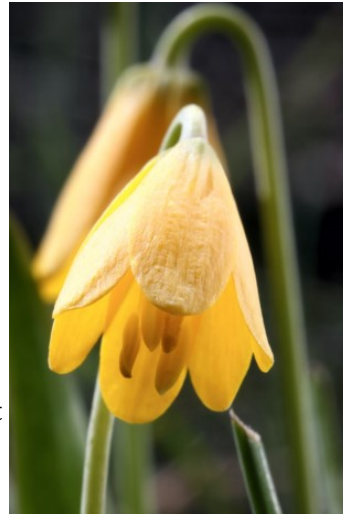
# Spring Time in the Sagebrush with *Fritillaria pudica*, Yellow Bells

by Marv Poulson



#1 Fresh *Fritillaria pudica* in bloom this spring 2019.

As one of those who loves tiny plants and crawling around photographing our native flora, I seek out one of our earliest and smallest bulbs, *Fritillaria pudica*, which has particular fascination for me. I have enjoyed seeing and photographing this highly variable species at many locations throughout the intermountain region, most commonly in our Sagebrush, Oak, Pinyon-Juniper zones.



#3 Close up into the nodding Yellow Bell.



*Fritillaria pudica* - Synonym *Lilium pudicum*

#2 Historic drawing of *Fritillaria pudica* circa 1825, with modern dimension and caption.

As with so many western American plants, especially those found in the northern parts of our range, we have Meriwether Lewis to thank as he collected specimens so prolifically on the remarkable Lewis and Clark 1804-1806 expedition. He collected a single tiny plant we now know as *Fritillaria pudica* as the expedition passed through Idaho "at the headwaters of the Missouri" in May 1806. His specimen eventually made its way to the hands of a Frederick Traugott Pursh, an American-German botanist in Philadelphia who in 1814 published the name *Lilium pudicum*, updated and correctly

reassigned to *Fritillaria* as *Fritillaria pudica* in 1825 by the German botanist Kurt Sprengel. It is said that the name *Fritillaria* derives from the Latin term for a dice-box (*fritillus*), and probably refers to the shape of the seed capsule, or perhaps the checkered pattern on the flowers of many species.

Like many of our wildflowers with unique personalities, *Fritillaria pudica* seems to have earned more than its share of both Latin and Common names. Latin synonyms include: *Lilium pudicum* (basonym), *Amblirion pudicum*, *Fritillaria dichroa*, *Fritillaria leucella*, *Fritillaria oregonensis*, *Fritillaria oreodoxa*, *Fritillaria utahensis*, *Fritillaria washingtonensis*, *Ochrocodon pudicus*, *Theresia pudica*, *Tulipa pudica*. I won't get into the entomology of all these derivations, suffice it to say that people have assigned names so prolifically assuming they had found something not previously known.

While it is unusual for a plant to have so many synonymous Latin names, common names are generally bequeathed more liberally and with *Fritillaria pudica* I think appropriately: Yellow Bells, Yellow Fritillary,



#4 The flowers rich yellow color quickly age to a brick red after 3-4 days as the flower ages.

Yellow Missionbells, Modest Lily, Golden Bells.

By whatever name, these lovely little plants certainly catch the eye at a time of year with little early color. Emerging soon after snowmelt, followed soon, blooming with deep yellow, single flowers on nodding stems. *Fritillaria pudica*, Yellow Bells, favor open sunny slopes and flats with well drained, moist springtime soil that dries after their growing season. The flower stems are usually stout in my experience, ranging in height from 4 to 8 inches, and are usually between 1/2 and 3/4 inch long and have richly colored yellow to orange tepals that quickly age to a brick red after 3-4 days as the flower ages and "deflates."

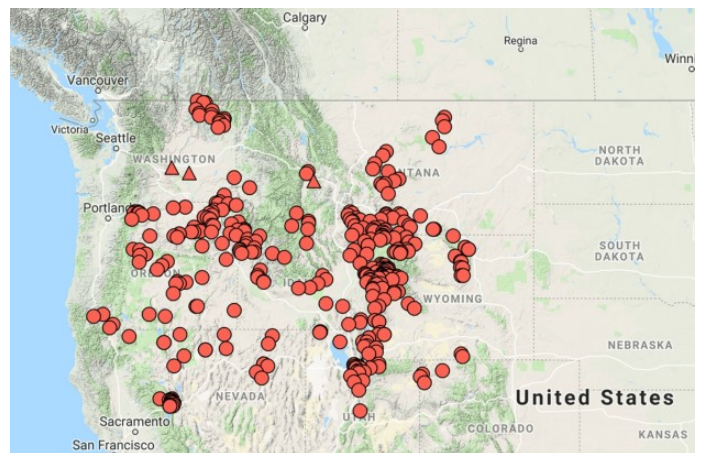
In my experience and in the literature, Yellow Bells are described to generally emerge in mid-March to June depending on elevation, blooming with their delightful, nodding flowers rising from basal fleshy leaves that are 3-4 or so inches long and folded half way inward. The flowers are unmistakable among the grasses and

sagebrush typical of their preferred habitat that is fairly cold and rather dry in winter, and very hot and dry in summer, usually on slopes where there is plenty of spring moisture.

*Fritillaria* is a genus of Eurasian, North African, and North American plants in the Lily family. There are about 100 to 130 species of bulbous plants, native to temperate regions of the Northern Hemisphere, especially the Mediterranean, southwest Asia, and western North America. *Fritillaria pudica* is certainly among the most petite in the genus as well as among the earliest to bloom each spring.



#5 Group of 6 *Fritillaria pudica* on my Fritillaria Hill this spring.



#6 Distribution map of *Fritillaria pudica* collections from intermountain herbaria.

*Fritillaria pudica* is said to be highly variable and has one of the widest distributions of all the North American *Fritillaria*. In my experience, the plants have appeared remarkably consistent in morphology. Being closely tied to our Sagebrush step, Yellow Bells may be found from the southern portions of the western Canadian provinces, British Columbia and Alberta, through Washington and Oregon to northern California eastward across northern Nevada and Utah, to Colorado and south into northern New Mexico, and north through Wyoming

large parts of Montana and east into western North Dakota. In Utah collections only as far south as southern Utah County, though a couple of herbarium collections extend the range to Kane County in "Navajo sandstone crevices. Pocket sagebrush, ponderosa pinyon-juniper."

The first time I found and photographed Yellow Bells

I have found *Fritillaria pudica* in a few other easily accessible locations near the populated Wasatch Front, include openings in the oak above the formal gardens of Red Butte Gardens and Arboretum. Another location is in open sagebrush areas beyond Little Mountain Summit, beyond Emigration Canyon, I've come to call Yellow Bell Hill. In favorable years as we have this



#7 Large grouping of *Fritillaria pudica* this spring among thousands of others within view in the Little Dell Drainage of Parleys Canyon.



#9 *Fritillaria pudica* growing in the path on the north end of Antelope Island.



#8 *Fritillaria pudica* flowering with *Erythronium grandiflorum* at the top of Emigration Canyon.

spring, it was possible to find areas with thousands of Yellow Bells blooming together in a space of a few acres. Yellow Bells in these foothill locations bloom rather more dependably than those on Antelope Island's north slopes and about three weeks later.

Occasionally, as on open mountain slopes in the oak zone like Yellow Bell Hill, *Erythronium grandiflorum* (Glacier Lilies) may grow in close association with the *Fritillaria pudica*, which usually follow with their bloom by a few days, though because of the wet and cool spring this year I found them blooming simultaneously in a place about a mile beyond Little Mountain Summit. There are still openings with sagebrush habitat among the scrub oak along the developed Wasatch foothills, including Olympus Cove on the east bench of Salt Lake Valley, away from developed areas where Yellow Bells still grow along with the Glacier Lilies.

was in early June 40 years ago while roaming the Sagebrush slopes of East Canyon in Morgan Country, UT. Since then I have been surprised to find them in what I considered unlikely places like the middle of the rocky trail around the north end of Antelope Island west of Bridger Bay Campground in Great Salt Lake. My first encounter with them in flowers there was in late March years ago. It was surprising to see they hadn't been trampled or eaten. Deer and other browsers will usually nibble them halfway to the ground if they find them. Wanting to take better pictures, I went back the next day and found the deer or the buffalo had done their job.

I've also found Yellow Bells in several similar habitats in our region, including the slope at the mouth of Neffs Canyon above Olympus Cove; near the mouth of South Willow Canyon, a popular canyon on the east side of the Stansbury Mountains; a south facing slope near Lamoille

Canyon on the foothills of the Ruby Mountains east of Elko, NV; as well as near the North Slope Road turn off and the East Fork of the Bear River near Hwy 150 east of the Utah state line.

While I have seen many Yellow Bells in flower during early June among the sagebrush on the hills east and above East Canyon Reservoir, my favorite location has become what I have come to call Yellow Bell Hill just beyond Little Mountain at the top of Emigration Canyon. Actually, these early blooming bulbs grow commonly among the sagebrush and in the openings between stands of *Quercus gambelii*, Scrub Oak, all around the back side of the mountains that don't see a lot of feet trampling. I've had reliable success finding these tiny *Fritillaria* in this area every year, so long as I time my search according to the snowbell and average temperature of the season.

Native tribes traditionally used *Fritillaria pudica* for food as were many of our other native bulb plants. Yellow Bells produce a small bulb, which can be dug up and eaten fresh, boiled or roasted for food as in times past by many tribes, including Ute, Spokane, Thompson, Blackfoot, Flathead, Montana, Gosiute, Okanagan-Colville, Paiute and Shuswap Peoples. In the Sahaptin language of some of the tribes in Washington, Oregon and Idaho, the plant is called "skni." The Okanagan-

Colville tribe (WA) used the appearance of Yellow Bells flowers as a sign of spring, and the Shuswap tribe (BC) used them in bouquets.

For several years I was able to maintain a couple of *Fritillaria pudica* in my garden in carefully prepared, well drained sandy, silty soil. That was until a catastrophic summer watering that did them in. I had obtained the bulbs 25 years ago when Siskiyou Rare Plant Nursery was at its peak as a source for a wide variety of rock garden plants from around the country and the world. I may give growing these wonderful little bulbs a try again, but from seed this time. The source for seed is a Colorado seed company I list at the end.

Growing *Fritillaria pudica*



**Seeds Trust**

<https://www.seedstrust.com/>

999 Vallejo St, Studio 5C  
Denver, CO, 80204

Check out their Web Site for details.  
Search their site for: YELLOW BELL

#10 *Fritillaria pudica* under late snow in my garden years ago.

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## 2019 ERIOGONUM SOCIETY 2019 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. Attendees, please make lodging arrangements directly with the resort if you choose to stay there. Their reservations can be made at <http://www.eaglepointresort.com/lodging/reservations>

We hope to see some narrowly endemic species in the region.

#### Tentative Schedule

Thursday - Participants arrive. 3 - 5pm Registration and 3pm Board meeting 3pm. 5pm reception (schmoozing)

Friday - Morning and afternoon half day Eriogonum identification sessions by Dr. Grady. Possible half day field trips for the remainder of the day. Dinner (paid with your registration) followed by the speaker with overview of field trips. Introduction of the field trip leaders

Saturday - Field trip. Dinner (paid by your registration) at the resort. Board of Directors report to the membership followed by our speaker, Terri Hildebrand, 'Plant Survey of the Great Basin West Desert.

Sunday - Field trip. Official end of meeting. Those not staying for Monday depart.

Monday - Field trip to the House Range, Dr. Ben Grady, leader. Participants leave whenever they wish to leave.

[http://www.eriogonum.org/index.php?option=com\\_content&view=article&id=106&Itemid=127](http://www.eriogonum.org/index.php?option=com_content&view=article&id=106&Itemid=127)

# Alma H. Winward 1937-2018

by Wayne Padgett & Teresa Prendusi

In 1937, Alma H Winward (AKA Al, Dr. Al, Artemisia Al, and occasionally as Dr. Winward), was born and raised in the northern portion of Cache Valley at the base of the Bannock Mountains in Clifton, Idaho. Surrounded by members of this loving family, the world lost one of its finest men and a tremendous plant ecologist and taxonomists on November 16, 2018. Al passed away at his home surrounded by many of his loving family members including his wife, Bonnie, and his children, Robert, Gayle, Chad, Byron and Nicole.

Born in Clifton to Bertie and Elizabeth Winward, Alma was raised on a dairy farm with his 11 brothers and sisters. He grew up in a small town with a fishing pole in one hand, and who knows what in his other. We're pretty sure, however, that he was having a grand time and probably doing his best (or maybe not) to stay out



Dr. Alma H. Winward

of trouble; good-hearted trouble for sure, but trouble nonetheless! The streams, rivers, and landscapes of southern Idaho flowed through his bloodstream throughout his life.

He married young and, with his first four children in tow, earned his bachelor's degree in Range Science at Utah State University in 1966 at the age of 28. Four years later he earned his doctorate degree in Forest Science from the University of Idaho. His love of the land was clear, as was his desire to see healthy landscapes, from the desert to alpine and everything in between.

Following graduation from U of I, Alma became a faculty member in the Rangeland Resources Department at Oregon State University (OSU), where he was very soon making a name for himself. Still a bit of a good-hearted trouble maker, he was so very much respected and admired by his students! When he taught, students listened. His compassion for the students and other faculty members was unmatched. And in 1975 after only 5 years on staff, he earned the well-deserved Teacher of the Year Award in the School of Agriculture. During his almost ten years at OSU, Dr. Al established life-long relationships and influenced many other scientists and numerous students who went on to careers in public land management; individuals that carried his love for the land with them. It was in 1978, during his last few years at OSU, that Alma and one of his master's degree students (*that's me... Wayne P.*) began their work and research on the ecology and management of riparian ecosystems. And when Dr. Al accepted an appointment as regional ecologist for the Intermountain Region of the US Forest Service in Ogden, Utah, he brought that new found knowledge with him.

Alma was one of the foremost authorities on the taxonomy and ecology of sagebrush. He could easily identify varieties of sagebrush on the landscape while driving along the roadways and highways, sometimes at speeds of 50 mph (or faster)! In fact, he would often challenge coworkers (and his students in the day) to test their skills! Was it Mountain Big Sagebrush (*Artemisia tridentata* ssp. *vaseyana*) or Wyoming Big Sagebrush (*A. t.* ssp. *wyomingensis*)? Or (trick question), was it one of the new varieties of sagebrush that he had discovered?? Dr. Al worked closely with other botanists and ecologists in the Intermountain West on recognizing the differences among various sagebrush taxa. Drs. Leila Shultz, Sherel Goodrich, Roger Rosentreter, and Durant McArthur are but a few of those he collaborated with and who still occupy a much-needed niche of scientists for our better understanding of these ecosystems.



It was with Dr. Durant McArthur (Rocky Mountain Research Station) that he worked in naming Lahontan Sagebrush (*Artemisia arbuscula* Nutt. ssp. *longicaulis* Winward & McArthur). And, before it was changed to *Artemisia tridentata* ssp. *vaseyana* (Rydb.) Beetle, Alma had worked with Sherel Goodrich to describe *Artemisia tridentata* Nutt. var. *pauciflora* Winward & Goodrich. More recently, Alma discovered a new taxon of sagebrush that he informally called “Bonneville” or “Goshiute” Big Sagebrush. The name “Bonneville” came from the fact that it occurred with Pinyon and Juniper on the old Bonneville Lake shoreline. A hybrid between Wyoming Big Sagebrush and Basin Big Sagebrush (*Artemisia tridentata* ssp. *tridentata*), Bonneville Big Sagebrush (*Artemisia tridentata* x *xericensis* Winward ex R. Rosentreter & R. Kelsey) shows its genetic connections to both parent species, as well as the intermediate habitats that it occupies. Leila Shultz has continued to work on this species and provides more insight into its taxonomy and ecology. During his career, Alma Winward authored nearly 100 scientific and technical articles on topics such as sagebrush taxonomy and identification, genetics, ecological relationships, inventory and monitoring. Alma Winward not only was an ecologist, he was a taxonomist.

But Dr. Al didn't just know sagebrush! He knew his willows, sedges, and other riparian species. In fact, he developed some of the very first assessment, inventory, and monitoring methods ever to be used to evaluate the conditions of riparian landscapes in the West. Many of these protocols are still in use today, both nationally and internationally. He also had a special place in his heart for those subalpine wildflower ecosystems known as Tall Forb Communities. He understood that most of Utah's tall forb systems had been lost to heavy grazing at the turn of the 20<sup>th</sup> Century when livestock numbers were completely uncontrolled in the West. Dr. Al shined a light on the protection, restoration, and research needs of these unique ecosystems to those whose job it was to manage them. His love and reverence for these subalpine wildflower meadows ran deep, and those around him couldn't help but gain an appreciation for their beauty and function, as well as a sadness for their loss.

He was a strong supporter of the Botany Program for the Intermountain Region of the Forest Service. He was extremely respected and regularly sought out by field botanists throughout Utah, Nevada, Idaho, Wyoming, and Colorado for his expertise and guidance. When Dr. Duane Atwood retired as the Regional Botanist in the 1990s, Al was instrumental in ensuring that refilling that position stayed on the front burner until another one of us (Teresa Prendusi) arrived one year later.



Bonnie and Alma H. Winward

But wait... there's more! In addition to all the above, Alma was responsible for the establishment of over 100 Research Natural Areas (RNAs) in the Intermountain Region during his time as Regional Ecologist. Because of his tremendous efforts, the region today has these invaluable examples of ecosystems that are as close to pristine as we can possibly find. There are no better landscapes available to help us understand how ecosystems might appear today if they had not been affected by human activities in their past. Many RNAs contained rare or unique plant species and assemblages, and if those areas did not meet the strict criteria for RNA establishment, Al recommended that they receive protection as Special Interest Botanical Areas in individual Forest Plans.

His legacy as a giant in the understanding of Great Basin ecosystems is well established among scientists, ecologists and botanists, wildlife and range management resource managers throughout the Interior West. Are conditions today what he desired? In too many cases, no. In some cases, we've seen improvements and protections where none existed in over a century. He would be the first to drive by a dry landscape covered

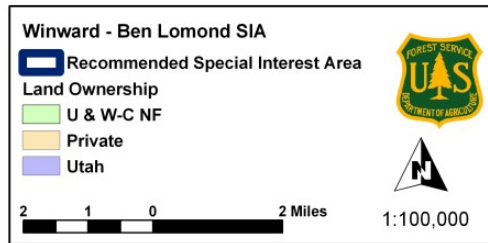
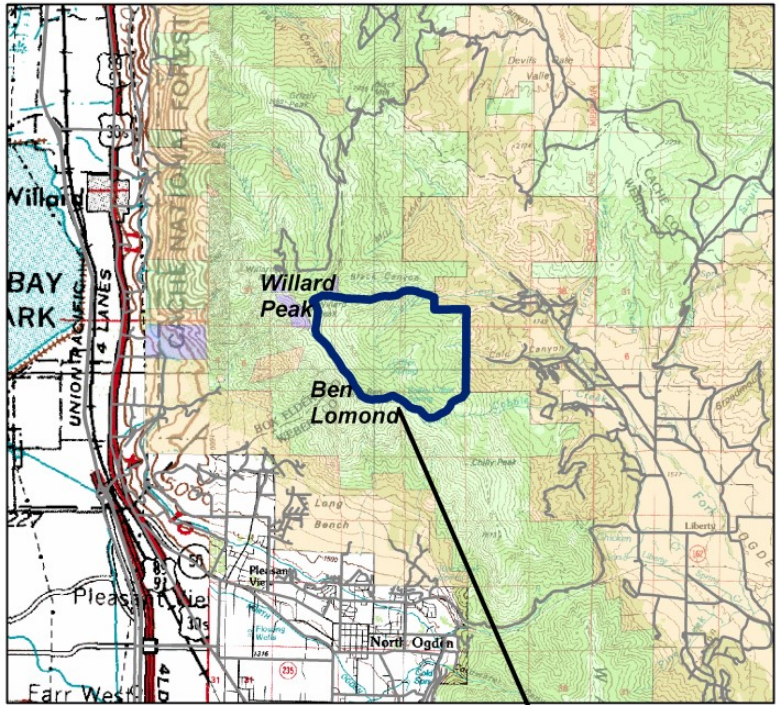
with nothing but invasive species or worse, bare soil, and mourn the loss of what those areas once provided for the wildlife and people that occupied the territory before westward expansion took its toll. But Dr. Winward was an optimist as well. He fought for funding that would result in improved conditions and more research that would help us better understand how to improve conditions where possible.

We lost a guiding star in our galaxy in November. But his legacy lives on in the many lives he touched in the world of natural resource management, and in his wife and family, who are all beautiful both inside and out!

### Unofficial Alma H. Winward Botanical Area

Located in the watershed between Ben Lomond and Willard Peaks on the east side of the Wasatch Mountains is a beautiful area dominated by Tall Forb plant communities. While efforts have been made to make this an official Botanical Area, the lack of funding has left it unsanctioned. Alma Winward was a big proponent of Tall Forb communities overall, but this area was very special to him. It was literally in his “backyard” east of the Winward home in North Ogden. Access to the area is a bit on the difficult side; one can either hike about 16 miles round trip on the Skyline Trail to Ben Lomond Peak from North Ogden Pass (8 miles each way), or drive the Willard Peak Road about 13 miles up from Mantua (4wd or ATVs are highly recommended), then hike a little more than a mile on the developed trail from the end of the road into the watershed. In 1994, five mountain goats (one billy and four nannies) were transplanted to the Willard Peak area, and in 2000 four additional mountain goats (undisclosed sex) were added to this population. Nearly 150 goats were counted in 2016. The presence of the goats makes it important that we do our best to visit the area while the beauty of the area still exists. While it may not be an official Botanical Area, it will always be the Alma H. Winward Botanical Area to many members of the Utah Native Plant Society.

## Unofficial Alma H. Winward Botanical Area



## Apps Reviews

**Colorado Rocky Mountain Wildflowers** by Al Schneider (\$9.99); **Wasatch Wildflowers** by Steve Hegji (\$7.99).  
Published by High Country Apps.

by William Gray

These little apps were originally created in 2012 using software developed by High Country Apps in Bozeman, Montana. Both were reviewed briefly by Walt Fertig at that time, and I maintain his very favorable view <https://www.unps.org/segolily/Sego2012JulAug.pdf>.

Over the years the company has updated the software regularly to keep it compatible with continuously evolving operating systems of mobile phones. My experience is with the iPhone version, last updated on March 15, 2019.

The apps run very intuitively, giving a variety of ways to search for plants including **vernacular names** (as most commonly used in Colorado), **scientific "Latin" names** based on Kertesz's *Floristic Synthesis of the North American Flora* and **visible characteristics** such as color, size, type of plant, flower shape, fruits, leaf shape, etc. This enables one to quickly narrow the list to a manageable size and then to browse photos for the best match. Each species is illustrated with a group of lovely photos and clear descriptions – with lots of 'tidbits' of general information. A detailed map of the plant's geographical distribution is also drawn from Kertesz.

Anybody familiar with Al's website <http://www.swcoloradowildflowers.com/> or Steve's book will expect that the botanical material should be thorough and of excellent quality. They will not be

disappointed as the photos, besides being of fine quality, are chosen to illustrate important aspects of the description. By choosing one specific source for plant names (APG III, family; Kertesz, scientific) there was a risk of creating confusion for those of us who grew up with older systems. This is well taken care of in the browsing where older names are included as synonyms. For instance, 'zig' will immediately narrow the list to two well-known plants that used to be *Zigadenus* but are no longer. Plants can be sorted by either common or scientific names.

What about the plants chosen for inclusion? Sometimes it's hard to remember that the Wasatch are part of the Rockies, so it's not surprising that the Colorado version contains more plants (530) than the Wasatch one (about 300). My estimate is that 80-90 percent of the species illustrated in the Colorado version also occur in the Wasatch Range and other high mountains of Utah. So this selection will do quite well locally and really benefit when traveling further East. There are often look-alike species even if there is not an exact fit, so one gets close.

Who will benefit most from purchasing? Beginners to intermediate users will find these much more user-friendly than the free iNaturalist app. One immediately gets involved with what the plant in question looks like and narrows down from there. All data for the species are there with you in the field, while iNaturalist relies on cell phone connection. On the other hand, if you're at home looking at your photos then the web version of iNaturalist adds full coverage of all the species. Then you can upload photos and have them reviewed by volunteer 'experts' – but there is no guarantee of a timely response if any. And some of the choices offered by the site's algorithms are way off. All in all, these are very well made apps that fit well on your mobile phones and give instant gratification in the field.

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## Looking for Cliffrose

Just a reminder that Bill Gray is interested in learning more about Cliffrose and Bitterbrush, particularly in the Central Wasatch counties. This is where Cliffrose reaches its northern limits, and there are some potentially very interesting things we might learn about its past distribution and hybridization. As of right now (April 25th) the Bitterbrush has just started putting out flower buds in a few places. Cliffrose is still waiting, having been really hammered by the late wet snowstorms. It has sustained heavy damage.

Are you willing to make notes on when these beautiful shrubs produce fresh leaves and flowers, and what types of seed they have, and to share them with Bill? If

so please contact him at [cyberflora80@gmail.com](mailto:cyberflora80@gmail.com). He will provide a short guide on how to distinguish the different plants, and give more detail about what information he would like you to gather and share.



# Dorde Woodruff

by Kipp Lee

Longtime UNPS member and cactus expert Dorothea “Dorde” Wright Woodruff passed away on July 17, 2018 at the age of 90. She was raised in Chicago, Illinois and educated at Carlton College and Northwestern University. At an early age, she fell in love with the landscapes of Utah and she moved with her first husband Robert Wright to Salt Lake City. Dorde had 4 daughters who she raised with the same appreciation for the wild as she had.

During the early 60’s Dorde rode a motorcycle all over the West and she wrote articles for a few motorcycle magazines regarding her travels. It was unprecedented to have a female journalist not only writing about an almost exclusively male pastime during that time but also a passionate participant. Not only did she write articles, she also began to study cacti in Utah, New Mexico, and Arizona. On one of her motorcycle excursions near Capitol Reef National Park in the spring of 1961, she discovered a previously undescribed *Sclerocactus* that would later be named *Sclerocactus wrightiae* after her. She supposedly pulled up to the U of U herbarium on her motorcycle to deliver her type specimen. She also documented through photograph, various *Sclerocactus* populations in Utah in such places as Cottonwood Wash in the Grand Staircase Escalante National Monument over a period of 50 years. Through this research she demonstrated the steep decline of *Sclerocacti* in Utah due to overgrazing, beetles, and land mismanagement.

Dorde had her hands in many interests including the Utah Rock Art Society to which she contributed articles and research. She also had a great knowledge of native plants and their uses. She was a member of the now defunct Utah Cactus club in which members would get permits to collect cacti, yucca, and Joshua trees in areas like the Beaver Dam Wash for their gardens. She enjoyed growing cacti and created a garden on her property on Knudsens Corner near the mouth of Big Cottonwood Canyon. When she attended the University of Utah and was working on her Masters Degree in Biology in the early 1970’s, she planted a cactus garden in the front of the south entrance to the Biology Building. The garden is still there today and contains Joshua trees over 10 feet tall, various opuntias, and cylindropuntias. Other species she planted have long since disappeared.

Previous to attending the University of Utah, she started working with the well-known cactus expert Dr. Lyman Benson in sorting out the genus *Sclerocactus*. Without consulting Dorde or realizing she had remarried, Benson named *Sclerocactus wrightiae* after her using her divorced name in 1966. This would always be a mild irritation to her. Dorde contributed significantly to the section on *Sclerocactus* in Dr. Benson’s monumental book *The Cacti of the United States and Canada* which was published in 1982. She was instrumental in raising *Sclerocactus spinosior* to the species level and she also contributed in restoring the name *Sclerocactus parviflorus* to the widespread fishhook cactus found all over the Colorado Plateau. There are pictures of various *Sclerocacti* growing in Dordes’ garden that were contributed to the book.

Dorde spent much time collecting, documenting, and preparing herbarium specimens of cacti over a period of 40 years. She not only did much field work with the several sclerocacti species in Utah, she worked with *Echinocereus*, *Pediocactus*, *Opuntia*, and other native species. Dorde worked as a freelance botanist and did a lot of field work in the Uinta Basin and West Desert for the BLM. I was fortunate to have gone out on numerous research trips with Dorde in the last 15 years. During such trips, we discovered a mutant population of *Echinocereus mojavensis* with only pink and white flowers and we were able to map populations of cacti species throughout the state of Utah. While in the last few years of her life, Dorde insisted upon camping out in a tent or in the back of her truck in the desert. On one such occasion we camped on the Kaibab Plateau in a March blizzard! She was resilient and at home in the wilds of Utah. Dorde befriended and also worked closely with Dr. Dean Stock, Dr. Ty Harrison, Blake Wellard, and Tony Frates (a UNPS cactus research group) on cactus taxonomy and mapping. She also had a following of German and other European cactophiles who she would travel with all over Utah.

Dorde contributed numerous articles on cacti to the *Sego Lily* and well known cactus journals. She provided consultation for books and research papers involving cacti. She presented her research on *Sclerocactus brevispinus*, *wetlandicus*, *pubispinus*, *spinosior*, *blainii*, *wrightiae*, *parviflorus*, and others at many Rare Plant Meetings. She contributed greatly to our understanding of cacti in Utah and will be greatly missed.

# WHERE DO ALL THE *WILDFLOWERS* GO?

Presented By Joel Tuhy

Conservation Science Director: The Nature Conservancy, Moab

We see our local wildflowers at their height of bloom. We admire their colorfulness and profusion. But then they fade away, and likewise they fade from our attention ... until the next year, when we see and admire them again. What happens to the flowers in that interim time? It's that intervening span, between flowers fading in one year and seeing them again the next year, that will be our theme.



**Wednesday, June 5, 2019 – 7:00 p.m.**

**REI, 3300 South and 3300 East, SLC**

**Sponsored by *Utah Native Plant Society* and  
*The Nature Conservancy, Utah Chapter***

Many thanks to the following who have recently become **Lifetime Members** of the Utah Native Plant Society. Much appreciation for their confidence and support of UNPS and its core issues of native plant conservation and education.

Adrienne Pilmanis  
Michael Piep  
March Coles-Ritchie  
Raven Reitsstetter

Norman Anderson  
Kent Morby  
Jonathan Barth  
Celeste Kennard

Carol Nygren  
Genevieve Walden  
Janette Warner

## AMERICAN PENSTEMON SOCIETY ANNUAL MEETING

**Walden, Colorado May 31- June 2, 2019**

Please see the Fall 2018 newsletter for much more detail.

<http://penstemons.org/index.php/annual-meetings>



### *APS Full Schedule*

#### Friday night

- Noon-5:00 pm Registration Check-in
- 2:00-3:00 pm APS board meeting
- 6:00 pm Dinner or heavy appetizers
- 6:30 pm Opening talk by Bryan Fischer- History and plants of North Park
- 7:30 pm Mike Bone -Propagation of Penstemon

#### Saturday

- 7:30 am Field Trips (North Park, Rd #5 and 17, Fischer Ranch, Independence mountain)
- 6:30 pm Banquet and Annual meetings
- Michelle DePringer-Levin from DBG - research work with Colorado's rare and endangered Penstemon.

#### Sunday

- 7:30 am Field Trips (State Bridge and Middle Park)
- Dinner on own

#### Monday

- Optional day to visit Yampa River Botanic Gardens
- Possible visit to a private garden near Steamboat

# Logan Weed Pull

**What:** 2nd Annual Weed Day, Logan Ranger District, Bridgerland Audubon Society, Utah Native Plant Society and Logan City

**When:** Saturday, May 18, 2019, 9:00 a.m. – 1:00 p.m.

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

**Contact:** Lisa Thompson, Volunteer and Partnership Coordinator, [lisathompson@fs.fed.us](mailto:lisathompson@fs.fed.us) 801-625-5850

The Logan Ranger District of the Uinta-Wasatch-Cache National Forest, Bridgerland Audubon Society, Utah Native Plant Society and Logan City invite the public to join us for the 2nd Annual Weed Day. The public is invited to participate in the community wide event. The ongoing efforts offer fun, exercise, a chance to meet new people as well as give back to the local community.

The goal of this project is to help reduce and eradicate invasive weeds threatening the native plant community of the local area. Invasive weed species threaten the ecological integrity and biological diversity of plant communities within the project area and have caused adverse impacts to recreation, wildlife and other important social and resource values.

Target weeds include, dyers woad, burdock, houndstongue, Scotch thistle and other invasive weeds.

Control methods will include hand pulling, digging and possible bagging.

We will meet at the Canyon Entrance Park pavilion 9:00 a.m. for a safety meeting and weed orientation before heading out to the assigned areas. Parking is available.

Volunteers should wear protective clothing, including gloves, long pants, long sleeved shirts, sturdy footwear and lots of drinking water. Some tools will be provided but it is recommended to bring your own weeding tools and shovels.

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

For more information, contact:

Lisa Thompson, Volunteer and Partnership Coordinator, Logan Ranger District, (801) 625-5850

Dave Wallace, Utah Native Plant Society, (435) 750-5913, or

Hilary Shughart, [hilary.shughart@gmail.com](mailto:hilary.shughart@gmail.com)

### 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](mailto: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](mailto:shsims@mac.com)



## Utah Native Plant Society

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

To contact an officer or committee chair write to

**Webmaster:** [unps@unps.org](mailto:unps@unps.org)

### Officers

- President:** Kipp Lee (Salt Lake Co.)
- Vice President:** Robert Fitts (Utah Co.)
- Secretary:** Cathy King (Salt Lake Co.)
- Treasurer:** Bill Stockdale (Salt Lake Co.)
- Board Chair:** Bill King (Salt Lake Co.)

### UNPS Board:

- David Wallace (Cache Co.)
- Tony Frates (Salt Lake Co.)
- Susan Fitts (Utah Co.)
- Wayne Padgett (Salt Lake Co.)
- Raven Reitsstetter (Tooele Co.)
- Celeste Kennard (Utah Co.)
- Jonathan Barth (Salt Lake Co.)
- Adrienne Pilmanis (Salt Lake Co.)
- Susan Sims (Utah Co.)
- Marc Coles-Ritchie (Salt Lake Co.)

### Committees

**Conservation:** Tony Frates, Bill King & Susan Sims

**Education:** Celeste Kennard, Robert Fitts

**Horticulture:** Kipp Lee

**Invasive Species:** David Wallace & Jonathan Barth

**Publications:** Cathy King

**Website/Internet:** Tony Frates

**Rare Plant List/Rare Plants:** Robert Fitts

**Small UNPS Grants:** Raven Reitsstetter & Adrienne Pilmanis

**Communications and Publicity:** Cathy King

**Membership Committee:** Susan Sims

### Chapters and Chapter Presidents

**Cache:** Michael Piep

**Canyonlands:**

Diane Ackerman & Janet Mallory

**Cedar City:** Matt Ogburn

**Escalante:**

**Fremont:** Nancy Holve

**Manzanita:**

**Mountain:**

**Salt Lake:** Cathy King

**Southwestern/Bearclaw Poppy:**

**Utah Valley:** Susan Sims

**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](http://unps.org).

Webmaster inquiries at [unps@unps.org](mailto:unps@unps.org)

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

**Sego Lily Editors:** John Stireman

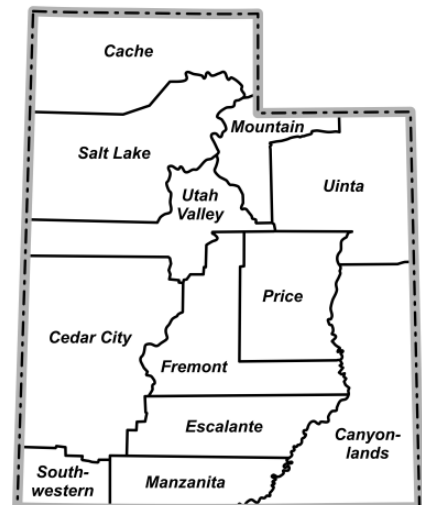
[jstireman@outlook.com](mailto:jstireman@outlook.com)

Cathy King: [cathy.king@gmail.com](mailto:cathy.king@gmail.com)

**Submit articles to Cathy King:**  
[cathy.king@gmail.com](mailto:cathy.king@gmail.com)

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UNPS Chapter Map



Utah Native Plant Society



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

**Return Service Requested**

## Utah Native Plant Society Membership

New Member \_\_\_\_\_  
 Renewal \_\_\_\_\_  
 Gift Membership \_\_\_\_\_  
 Membership Category Name \_\_\_\_\_  
 Student \$9.00 (free digital membership 2019) Street \_\_\_\_\_  
 Senior \$12.00 City \_\_\_\_\_ State \_\_\_\_\_  
 Individual \$15.00 Zip \_\_\_\_\_  
 Household \$25.00 Email \_\_\_\_\_  
 Sustaining \$40.00 Chapter \_\_\_\_\_  
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 US Mail (B&W Hardcopy newsletter)  
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Or easily pay membership with PayPal at  
<http://www.unps.org/index.html>