



Sego Lily

Newsletter of the Utah Native Plant Society

Spring 2022 Volume 45 Number 2



Visualizing Utah's Rare Plants	2	Help Fight Weeds	19
Utah Rare Plant Meeting.....	7	Slate Canyon Purge the Spurge	20
Rare Plant Meeting Abstracts.....	8	New UNPS Logo and Banner	20
Renée Van Buren	16	Bill King Book Review	21
UNPS Annual Report.....	17	UNPS Chapter Reports.....	22

Visualizing the Habitat Associations of Utah's Rare Plants

by Jacqueline Grant

Dr. Jackie Grant is associate professor of biology and director of the Garth and Jerri Frehner Museum of Natural History at Southern Utah University's Walter Maxwell Gibson College of Science and Engineering.

Deep within the pages of the Utah Native Plant Society's website is an extremely data rich link related to the rare plants of Utah. The link leads to the Utah Rare Plants Project (<https://www.utahrareplants.org/>), which, after a few more clicks, leads to a treasure trove of data about Utah's rare plants. The 2016-2021 Utah Rare Plant Master List contains over 1250 entries that include all the rare species, subspecies, and varieties that have been designated by the Utah Native Plant Society (UNPS) Rare Plant Committee. The list was last updated on January 26, 2022 and is organized by Family (Cronquist, APG/PPG, and *A Utah Flora*), taxon, ranking, geographic range, and more than twelve other categories, not to mention the state counties in which each taxon can be found. Altogether, this means that there are over 37,500 unique data fields in the 2016-2021 Utah Rare Plant Master List! In addition to the Master List, there are five additional spreadsheets in pdf format. The

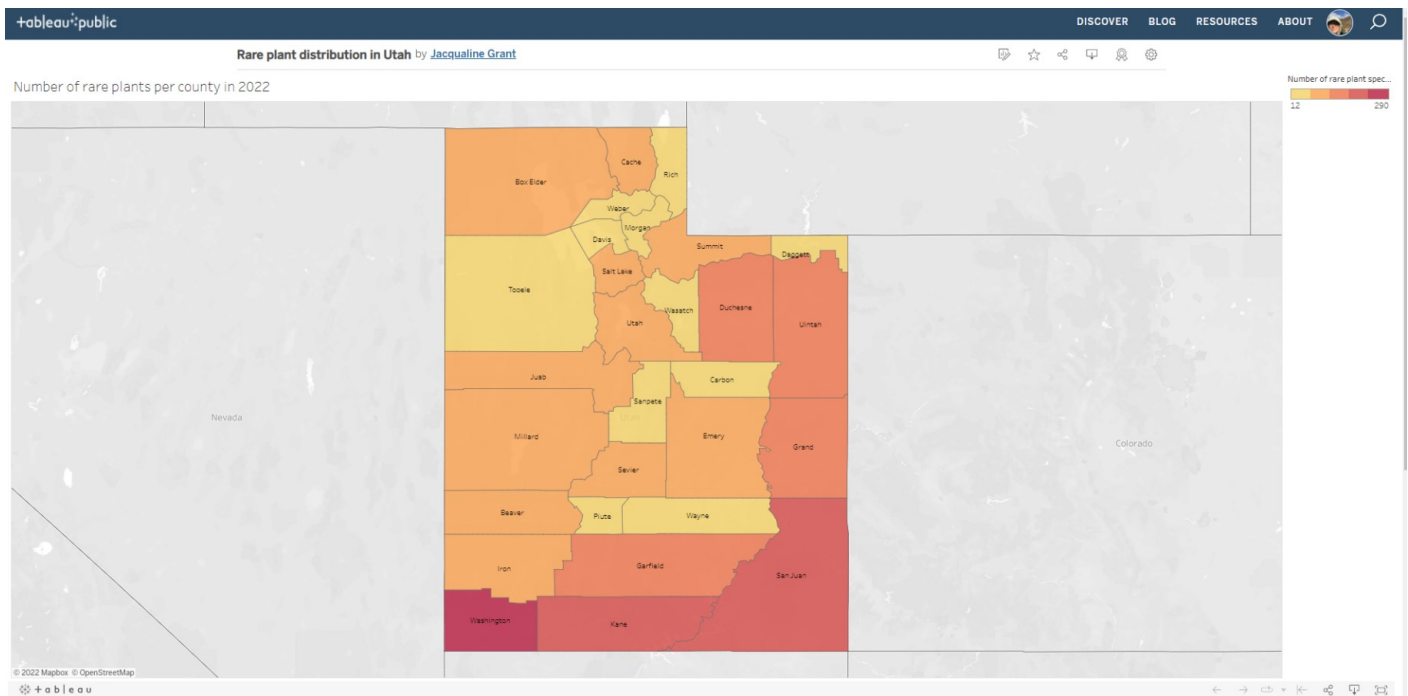


Figure 1. An interactive map that shows all of Utah's counties colored-coded to indicate how many rare plant taxa are found in each county. The darker red colors represent higher numbers of taxa, while the yellow colors represent lower numbers. The map is interactive at the Tableau Public website and will show the specific number of plants in each county when a cursor is hovered over the county. The map is found at the following url: https://public.tableau.com/views/RareplantdistributioninUtah/Numberofrareplantspercountyin2022?:language=en-US&:retry=yes&:display_count=n&:origin=viz_share_link

Cover photo: *Viola beckwithii* by Steve Hegji.

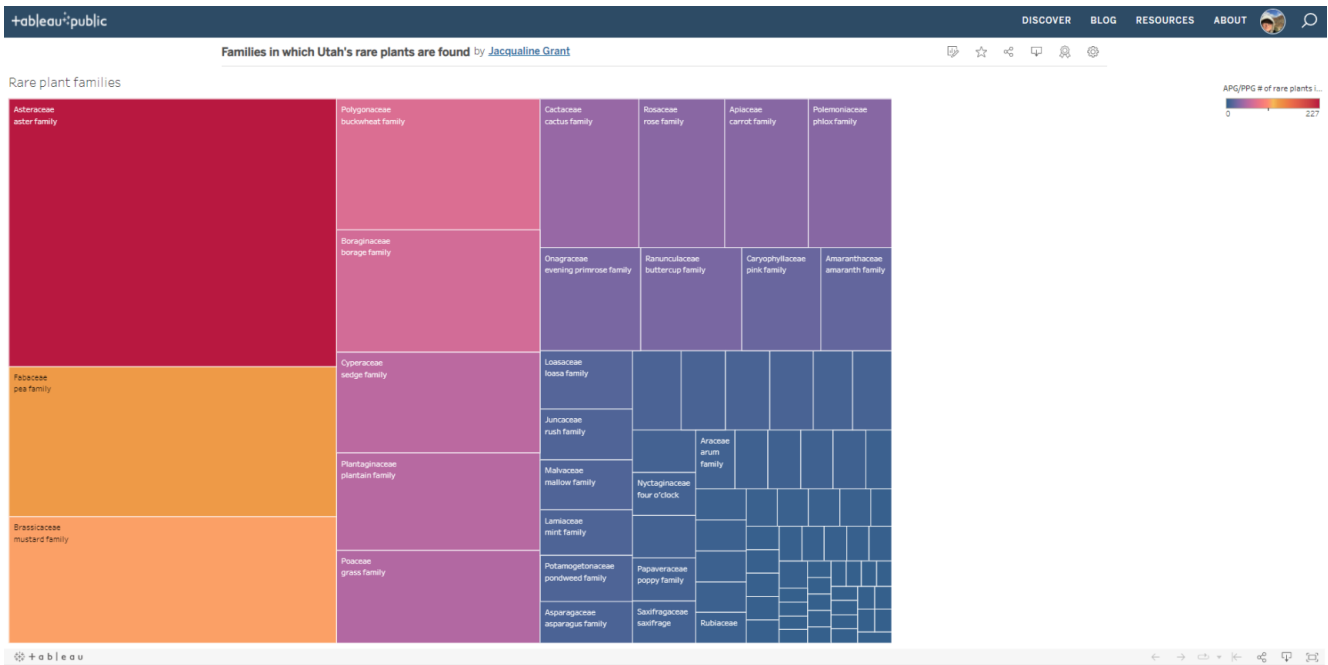


Figure 2. An interactive data visualization (“viz”) that shows the number of rare plant taxa in specific plant families. The size of each box is related to the number of rare taxa found in each family. The viz is interactive at the Tableau Public website and will show the specific number of plants in each family and the common and scientific names of the plant family when a cursor is hovered over the box. The viz is found at the following url: https://public.tableau.com/views/FamiliesinwhichUtahsrareplantsarefound/Rareplantfamilies?:language=en-US&:display_count=n&:origin=viz_share_link.

pdfs provide information about each species in relation to soil type, habitat, county, land manager, and its status under the Endangered Species Act (ESA), and at Global and State levels. The committee has done an incredible amount of work in putting this information together, but there is so much information that a casual user would be quickly overwhelmed.

Luckily, the world of data visualization is no longer limited to computer scientists. Online tools such as Tableau Public (<https://public.tableau.com/s/>) have become reasonably user friendly to nonspecialists. As a biology professor at Southern Utah University, I want to stay ahead of the curve and learn how to use data visualization tools so I could incorporate them into my classes. I decided to teach myself how to use Tableau in March of 2022, and I needed a publicly available source of data to make the experience meaningful. The UNPS Rare Plant Guide was a perfect project. My first venture into Tableau was to create an interactive map of Utah that would show the number of rare taxa by county (Figure 1). The map shows each county color-coded by the number of rare plant taxa, and it is interactive in that one can hover one’s cursor over each county to reveal the specific number of taxa reported from that county. The map may be accessed freely at the following url: https://public.tableau.com/views/RareplantdistributioninUtah/Numberofrareplantspercountyin2022?:language=en-US&:retry=yes&:display_count=n&:origin=viz_share_link.

Given the success of the map, I was further interested to know how many rare taxa could be found in each taxonomic plant family. I went back to the well and created a second data visualization, also known as a “viz.” The second viz is titled, “Families in which Utah’s rare plants are found,” and it shows each family as a box sized according to how many rare taxa are found in the family (Figure 2). Unsurprisingly, the highest number of rare taxa are found in Asteraceae (227 taxa), and many families only have one rare plant taxon. This viz is interactive in that one can hover one’s cursor over each box to reveal the specific number of taxa reported from that family along with the common name of the family. The viz may be accessed freely at the following url: https://public.tableau.com/views/FamiliesinwhichUtahsrareplantsarefound/Rareplantfamilies?:language=en-US&:display_count=n&:origin=viz_share_link.

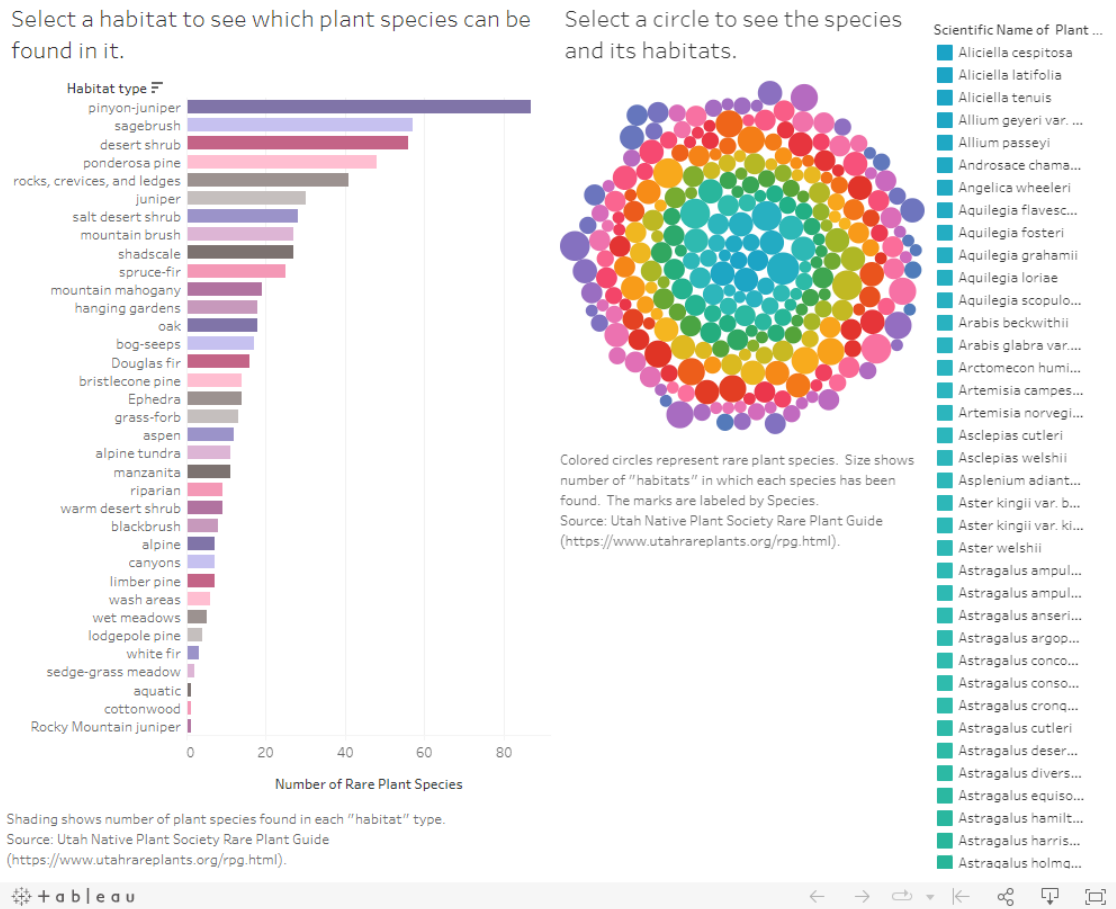


Figure 3. An interactive data visualization (“viz”) that shows the number of rare plant taxa in specific habitats (left) and the number of habitats in which individual taxa can be found (right). The viz is found at the following url: https://public.tableau.com/views/HabitatAssociationsofUtahsRarePlantSpecies/Dashboard1?:language=en-US&:display_count=n&:origin=viz_share_link.

These first two viz projects were helpful, but they were not quite as interactive as I would have liked them to be. Therefore, I took a new approach and learned to link two datasets and perform an analysis within the Tableau program. The two datasets were the list of rare plant taxa and the specific habitats in which they were found. In this viz (Habitat Associations of Utah’s Rare Plants Species), one can quickly find all the taxa found in a specific habitat, or find all the habitats for a single taxon with a click of the mouse (Figure 3). The viz is found at the following url: https://public.tableau.com/views/HabitatAssociationsofUtahsRarePlantSpecies/Dashboard1?:language=en-US&:display_count=n&:origin=viz_share_link.

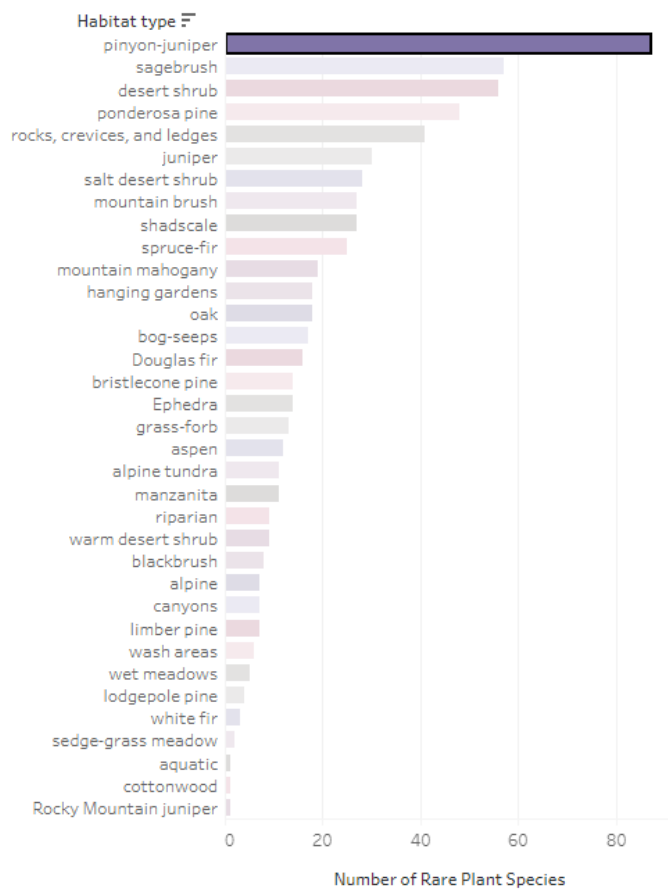
For example, if you were interested in knowing how many rare taxa are associated with pinyon-juniper habitats, you could hover over the bar in the habitat panel to see that the number is 87. If you were further interested in knowing which specific taxa were associated with pinyon-juniper habitats then all you would need to do is click on the pinyon-juniper habitat bar in the graph (Figure 4). Upon clicking on the pinyon-juniper bar on the left panel, the panel on the right changes to reveal a select group of taxa - those associated with pinyon-juniper habitat (Figure 4).

The individual taxa are color-coded according to the legend at the far right of the screen, and the taxonomic names are shown when the cursor is hovered over each circle. The viz can be used in the reverse direction by

selecting a taxon of interest, which then reveals all of its habitat associations in the left panel (Figure 5). When habitats that support fewer taxa are selected, the circles on the right become big enough to automatically show the taxonomic names of all plants associated with the habitat (Figure 6).

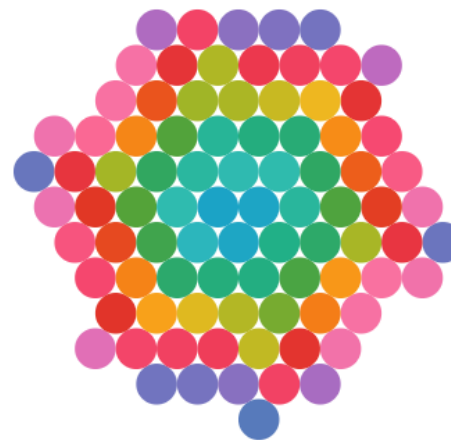
My initial foray into data visualization of Utah's rare plants is still in its infancy, but I see a great potential for this software to make inquiries into the database easier than searching through spreadsheets. Each viz is shareable from the Tableau Public page, and can be embedded into a website if desired. I am looking forward to making these visualizations more data rich, for example, by adding photos that pop up when a taxon is selected. I'd also like to add other features such as radio buttons that would toggle each taxon in the legend list on or off as desired by the user. I'm open to your suggestions (jacquelinegrant@suu.edu), but I'm also planning on getting away from the computer and out into the field to look at plants for most of the summer!

Select a habitat to see which plant species can be found in it.



Shading shows number of plant species found in each "habitat" type.
 Source: Utah Native Plant Society Rare Plant Guide
 (<https://www.utahrareplants.org/rpg.html>).

Select a circle to see the species and its habitats.



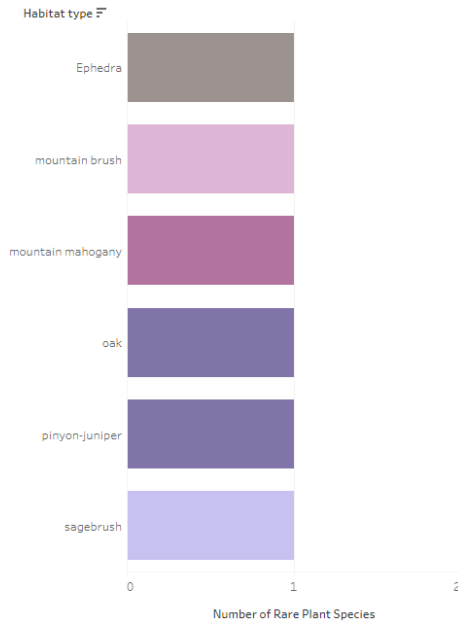
Colored circles represent rare plant species. Size shows number of "habitats" in which each species has been found. The marks are labeled by Species.
 Source: Utah Native Plant Society Rare Plant Guide
 (<https://www.utahrareplants.org/rpg.html>).

- Scientific Name of Plant ...
- Aliciella cespitosa
 - Aliciella tenuis
 - Allium geyeri var. ...
 - Asclepias cutleri
 - Astragalus argop...
 - Astragalus conco...
 - Astragalus conso...
 - Astragalus hamilt...
 - Astragalus harris...
 - Astragalus iselyi
 - Astragalus loanus
 - Astragalus monu...
 - Astragalus musin...
 - Astragalus oopho...
 - Astragalus puben...
 - Astragalus striati...
 - Astragalus subcin...
 - Astragalus welshii
 - Astragalus zionis ...
 - Boecheera vivarien...
 - Calochortus cisco...
 - Camissonia bairdii
 - Camissonia exilis
 - Camissonia gouldii
 - Ceanothus greggi...
 - Cryptantha graha...
 - Cryptantha johns...
 - Cryptantha jonesi...
 - Cryptantha ochro...
 - Cryptantha oster...
 - Cryptantha semig...
 - Cymopterus beckii
 - Cymopterus purp...
 - Draba kassii
 - Epilobium nevade...
 - Erigeron unterma...
 - Eriogonum corym...

Figure 4. When one habitat is selected, in this case pinyon-juniper, the species group on the right is reduced from the full set to just those that are associated with pinyon-juniper habitat. Each circle is color-coded according to the legend on the far right, which is scrollable on the Tableau Public website. Hovering over a circle reveals the taxonomic name of the plant.

Utah Native Plant Society

Select a habitat to see which plant species can be found in it.



Shading shows number of plant species found in each "habitat" type.
Source: Utah Native Plant Society Rare Plant Guide
(<https://www.utahrareplants.org/rpg.html>).

Select a circle to see the species and its habitats.

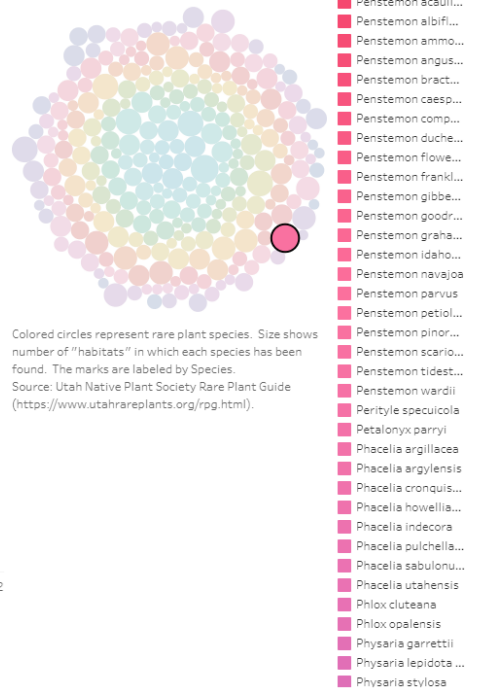
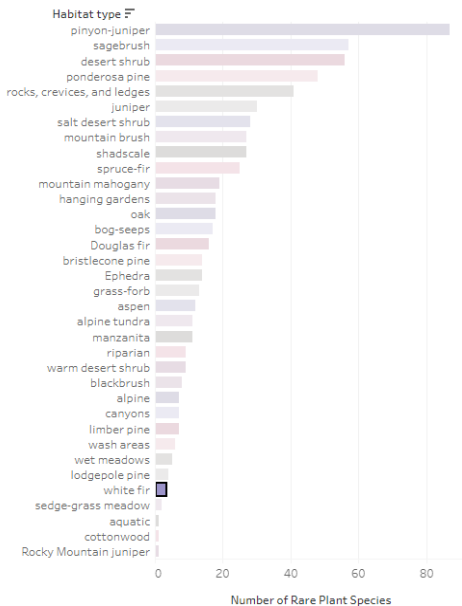


Figure 5. When one circle is selected, in this case *Penstemon pinorum*, the habitat group on the left is reduced from the full set to just those that are associated with this species.

Select a habitat to see which plant species can be found in it.



Shading shows number of plant species found in each "habitat" type.
Source: Utah Native Plant Society Rare Plant Guide
(<https://www.utahrareplants.org/rpg.html>).

Select a circle to see the species and its habitats.



Figure 6. When a habitat that supports few taxa is selected, in this case white fir habitat, the circles that represent each taxon on the right panel become large enough for individual names to be revealed.

Utah Rare Plant Meeting Report


On March 1, 2022, the Utah Native Plant Society hosted the Utah Rare Plant Meeting on Zoom with thirteen presenters on a wide variety of subjects. Traditionally held in person at the Natural History Museum of Utah, this is the second year the meeting has been held virtually because of the Covid pandemic but there is a good chance it will return to the NHMU next year on **March 7, 2023**, with possibly a combination of both in person and virtual. **Mark your calendar.**

The presentations ranged from updates on agency activities to research results on genetic studies to field studies using drones and population monitoring of

endangered populations and also included a report on the Provo River Delta Restoration project.

The highlight of the meeting was the presentation of the UNPS Lifetime Achievement Award by Susan Meyer to Dr. Renee Van Buren for her many contributions to Utah botany and education (see article in this issue).

The Rare Plant Agenda and Abstracts printed below give a more detailed view of the program and recordings of the presentations can also be viewed on the [UNPS YouTube channel](#).

 Utah Native Plant Society		Agenda Utah Rare Plant Meeting March 1, 2022 Online via Zoom	
8:45	>	Log-in	
9:00	>	Welcome & Announcements	
9:10		UNPS Accomplishments, grantees, grant opportunities, board, etc.	
9:30		USFWS Updates. Rita Reisor	
9:50		Beardtongue Listing Decision or USFWS updates. Jennifer Lewinsohn	
10:10		Update on the Utah Rare Plant Program/ Heritage Program. Mindy Wheeler	
20 minute break			
10:30		Pronounced genetic separation among varieties of the <i>Primula cusickiana</i> species complex, a Great Basin endemic. Austin Koontz	
10:50		The Taxonomy of the Penstemon scariosus complex. Mikel R Stevens	
11:10		Native Species Revegetation Methods and Relocating Ute Ladies'-Tresses Sod on Created Peat Mounds at the Provo River Delta Restoration Project. Darren S Olsen	
11:30		Lifetime Achievement Award	
Lunch break			
1:00		Update on monitoring of <i>Castilleja parvula</i> v. <i>parvula</i> herbivory from native and nonnative herbivores in the Tushar Mountains, Fishlake National Forest, Utah. Madison Huie	
1:20		<i>Astragalus anserinus</i> relationships between disjunct populations.	
1:40		Characterizing the ecological niche of <i>Pediomelum pariense</i> . Ashley N. Egan	
2:00		Using Drones and A.I. to Census Dwarf Bear-poppy Populations. Kody Rominger	
20 minute break			
2:40		Population Viability Analysis for Holmgren's Milkvetch: A Methods Roadmap for Desert Species with Persistent Seed Banks. Susan E Meyer	
3:00		Population Monitoring and Conservation of the Frisco Clover, <i>Trifolium friscanum</i> , on the Desert Experimental Range in Western Utah. Loreen Allphin	
3:20		Conservation of Tiehm's buckwheat (<i>Eriogonum tiehmii</i>). Alli Melton	
3:40	>	Concluding remarks	
4:00	>	Optional discussion rooms by session, with speakers from that session	

Abstracts

Utah Rare Plant Meeting

hosted by the Utah Native Plant Society

March 1, 2022

Online Meeting via Zoom

(In order of presentations on agenda)

1. USFWS Office Updates

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

Jennifer Lewinsohn (U.S. Fish & Wildlife Service, West Valley City, UT,
jennifer_lewinsohn@fws.gov)

Lark Willey (U.S. Fish & Wildlife Service, West Valley City, UT, lark_willey@fws.gov)

Updates on listing decisions, recovery planning and implementation. The Uinta Basin Hookless Cactus and Pariette Cactus draft recovery plan and biological report will be made available for public comments this spring and will be posted here: <https://www.fws.gov/endangered/species/recovery-plans.html> under the Draft Recovery Plan section. Species Status Assessments (SSAs) are currently under review and revision for Ute ladies'-tresses (*Spiranthes diluvialis*) and Cisco, Stage station, and Isley's milkvetches (*Astragalus sabulosus*, *A. vehiculus*, and *A. isleyi*) in response to delisting and listing petitions, respectively. We will provide additional updates in our presentation. The withdrawal decision for Graham's and White river penstemon (*Penstemon grahamii* and *P. albifluvis*) was published in the Federal Register on January 13, 2022, and can be found here: <https://ecos.fws.gov/ecp/species/4267> under the Federal Register section.

The Ute ladies'-tresses Species Status Assessment is currently undergoing peer and partner review with comments due by March 7, 2022. A five-year review for this species will be complete by the end of this fiscal year.

A species status assessment for Heliotrope milkvetch (*Astragalus montii*) will be initiated this fiscal year with a five year review due to be completed next fiscal year.

2. Beardtongue Listing Decision

Jennifer Lewinsohn (U.S. Fish & Wildlife Service, West Valley City, UT, jennifer.lewinsohn@fsw.gov)

Jena will discuss in more detail the analyses, results, and the USFWS withdrawal of the 2013 proposed rules to list the Graham's and White River beardtongues (*Penstemon grahamii* and *P. scariosus* var. *albifluvis*) as threatened and to designate critical habitat under the Endangered Species Act (ESA).

The proposed listings under the ESA were initially created to protect the Graham's and White River beardtongues from what were believed to be threats from energy exploration and development and the cumulative impacts of livestock grazing, invasive weeds, small population size and climate change. Subsequent research and analysis have shown that the threats are not as significant as believed at the

time of the proposed rules. This is in part due to work to establish conservation actions on federal and non-federal lands that provided protections to many Graham's and White River beardtongue populations. Both beardtongues are distributed across many populations and have sufficient levels of redundancy and representation to withstand catastrophic events and adapt to changes. While some stressors have impacted plants in localized areas, none are currently having population-level impacts. The USFWS also projected the impacts to both species under various future energy development scenarios. As a result of this analysis, the USFWS finds that Graham's and White River beardtongue do not meet the definition of threatened or endangered under the ESA.

3. Update on the Utah Rare Plant Program/Heritage Program.

Mindy Wheeler (Utah State Rare Plant Program, Salt Lake, UT,
mindywheeler@utah.gov)

Update on the Utah Rare Plant Team/ Heritage Program

The Utah Rare Plant Team has been busy in their new home of UDWR Habitat Section. We will share updates on new policy that increase the visibility of rare plants by the state as well as updates on our many projects. The inclusion of plants and insects in the State Wildlife Action Plan has increased communication between DWR and the USU rare plant team as rare plants and insects can potentially increase scores for WRI (Watershed Restoration Initiative) projects. We will also share updates on our many projects that involve surveys, monitoring, reporting, conservation rankings, field guide, database work, seed collection and pollinator work!

4. Pronounced genetic separation among varieties of the *Primula cusickiana* species complex, a Great Basin endemic.

Austin Koontz (Hoban Lab, Morton Arboretum, akoontz11.github.io/)
William D. Pearse
Paul G. Wolf

Primula cusickiana var. *maguirei*, or Maguire's primrose, is a rare plant endemic to Logan Canyon, in Cache County of northern Utah. After being listed as threatened in 1985, research using different genetic markers has consistently revealed strong genetic differentiation between *P. cusickiana* var. *maguirei*'s upper and lower canyon populations (separated by only about 10 km). Variety *maguirei* is one of four varieties included within the *P. cusickiana* species complex, with the other three varieties made up of disjunct populations scattered across the Great Basin largely in anomalously wet, high elevation habitats. Genetic relationships between the *P. cusickiana* species complex varieties, which were each originally classified as unique species, have remained unclear. This study aimed to analyze these relationships and provide greater context for the genetic structure observed in variety *maguirei*.

We used a reduced representation sequencing approach (RADseq) to clarify the boundaries

separating the geographically distinct but morphologically similar varieties of the *P. cusickiana* species complex. Our genetic analyses demonstrate pronounced separation between isolated populations, indicating that the current varietal classifications are inaccurate and emphasizing their conservation importance. We discuss how these results correspond to recent biogeographical models used to describe the distribution of other sky island taxa in western North America. We also consider how edaphic specialization and heterostylous breeding systems may be contributing to frequent diversification via allopatric speciation in this species complex. Finally, we highlight the need to conserve the rare species with narrow niches considered in this study, such as *P. cusickiana* varieties *maguirei*, *nevadensis*, *domensis*, and *Primula capillaris*.

5. The Taxonomy of the *Penstemon scariosus* complex.

Mikel R. Stevens (Brigham Young University, emeritus, mikel.r.stevens@gmail.com)

We examine the four recognized varieties of *Penstemon scariosus* which comprise a complex of related taxa that share overlapping morphological characters: namely varieties *albifluvis*, *cyanomontanus*, *garrettii* and *scariosus*. Modern taxonomic descriptions and associated keys are not in complete agreement as to how to clearly delineate these varieties. It is particularly important to understand the taxonomic circumscription of variety *albifluvis*, since it is being considered for listing under the Endangered Species Act. To address the taxonomic position of taxa in this species complex we examine the genetic structure of 66 accessions of *P. scariosus* representing the four known varieties across its entire known geographic range using ten SSR (microsatellite) markers. We also examine plant morphology of these taxa from 264 herbarium specimens.

The results of our molecular and morphological studies give rise to four conclusions. First, due to the genetic distinctiveness of *P. scariosus* var. *albifluvis* and its geographical isolation, we consider conserving its original status at the species level. Second, our molecular study suggests that the geographic area for var. *cyanomontanus* is much larger than previously understood, consisting of plants and populations with or without the characteristic glandular hairs that have been used to identify that taxon. Third, both our molecular and morphometric data suggest that varieties *garrettii* and *scariosus* are not reliably separable and should be considered the same taxon. Finally, our molecular data reveal a distinct genotype from the Tabby Mountain, UT area that has not previously been given taxonomic recognition. We describe this new taxon and provide a taxonomic key to separate this new variety from the other members of the species complex.

6. Native Species Revegetation Methods and Relocating Ute Ladies'-Tresses Sod on Created Peat Mounds at the Provo River Delta Restoration Project.

Darren S. Olsen (Principal Senior Hydrologist, Bio-West, Inc., Logan, UT, dolsen@biowest.com)

The Provo River Delta Restoration Project is needed to re-establish a naturally functioning delta marsh ecosystem to recover June sucker at the river-lake interface. Aquatic plant species diversity is currently

lacking on the eastern shoreline of Utah Lake compared to shoreline vegetation conditions before carp were introduced and floodplain farming became popular. Multi-year construction and revegetation plans are being implemented for the 260-acre delta restoration project area for the purpose of re-establishing a diversity of native submerged aquatic vegetation (SAV), emergent, wet meadow, and riparian vegetation communities at the mouth of Provo River to provide rearing habitats needed for successful June sucker recruitment at the river-lake interface.

This project will hopefully act as an emergent and aquatic vegetation seed source for the lake to help re-establish a diversity of native aquatic species now that carp populations have been reduced and phragmite controls stepped-up. Additionally, there are several locations where Ute ladies'-tresses are known to occur within the project area. Total avoidance of all occupied habitats was not possible to construct delta channels and ponds, and occupied habitat sod relocation plans were implemented fall 2021. The sod and top foot of soil from occupied areas was peeled back by an excavator, placed in a dump truck, dumped on created peat mounds roots down, and spread on created peat mounds at suitable elevations for when site hydrology is restored in 2023.

Revegetation methods for this large-scale restoration project and Ute ladies'-tresses sod relocation efforts will be presented along with observations of associated plants and specific soil moisture conditions of occupied habitats around Utah Lake.

7. Update on monitoring of *Castilleja parvula* v. *parvula* herbivory from native and non-native herbivores in the Tushar Mountains, Fishlake National Forest, Utah.

Madison Huie (Brigham Young University, Provo, Ut)

Steven Flinders (Beaver Ranger District, Fishlake National Forest, USFS, Beaver, UT)

Loreen Allphin (Brigham Young University, Provo, UT, loreen_woolstenhulme@byu.edu)

The Tushar Mountains provide critical alpine habitat for a variety of flora and fauna, including 28 endemic plant species. The Tushar Indian-paintbrush (*Castilleja parvula* var. *parvula*) is one of five taxa listed as high-priority for conservation and most likely to be impacted by herbivory due to its palatability. Native and nonnative ungulates have been shown to utilize this species, including mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), mountain goats (*Oreamnos americanus*), and domestic cattle (*Bos taurus*). Small mammal herbivores have also been observed foraging in these communities, including marmots, pika, and white-tailed jackrabbits.

To determine the extent and effects of herbivory on plant communities with *C. parvula* var. *parvula* in the Tushar Mountains, we established herbivore exclosures near four known populations of the taxon in spring 2020. These herbivory exclosures were established in pairs (one exclosure to exclude ungulates only and the other exclosure to exclude all mammal herbivores, including marmots and pika) to distinguish between the effects of ungulate herbivores and small mammals in these communities. Camera traps were set near the exclosures to identify the herbivore species utilizing these communities. The paired exclosure plots were read at the end of growing season in both 2020 and 2021.

We assessed plant cover by species, plant biomass by species, overall vegetation height, the number of *C. parvula* individuals in plots and the reproductive success (in flowers and fruits produced) of *C. parvula* under exclosures and outside of the exclosures at each location. Our data showed less herbivory and more *C. parvula* plants under exclosure plots. Moreover, the *C. parvula* plants had higher reproductive success under exclosures. We found significantly higher cover and less utilization under the exclosure plots that excluded all herbivores, illustrating the role of small mammals in these alpine communities.

8. *Astragalus anserinus*: disjunct populations, phylogeny, and species limits.

Leigh A. Johnson (Brigham Young University, Provo, UT, leigh@byu.edu)

Brenden M. Thomson

Martin Batalla

Steven D. Leavitt

Astragalus anserinus, the Goose Creek Milkvetch, is known primarily from a narrow, diagonal strip of land that straddles the borders of Utah, Idaho, and Nevada. Some 125 miles to the west in the YP desert, a collection was made in 1999 from a small population that appears conspecific with *A. anserinus*.

NatureServe states that this latter material represents “a misidentified specimen of *Astragalus purshii*”, but without documentation for this claim. All three specimens from the 1999 collection are currently annotated as *A. anserinus*, and examination of the fruits make it clear why this material was determined as *A. anserinus* and not *A. purshii*. To explore this disjunction and the species limits of *A. anserinus* more carefully, we sequenced entire chloroplasts from multiple individuals of both population systems, as well as sympatric individuals of *A. purshii*. From these data, PCR primers were designed from several variable regions of the chloroplast for comparative sequencing across a larger pool of *Astragalus* species.

Focusing on the several varieties of *A. purshii* and related species from *Astragalus* section *Argophyllii* subsection *Eriocarpis*, and representatives of other subsections of section *Argophyllii*, we have surveyed the most probable near relatives of *A. anserinus*. Our survey shows the disjunct populations of *A. anserinus* are best considered as distinct species, with interesting patterns of relationship with *A. purshii* and related species. This survey provides a framework for more rigorous assessments of species limits using data from the nuclear genome and defines the population systems of conservation concern for *A. anserinus*.

9. Examining the ecological niche of the rare plant *Pediomelum pariense* (Fabaceae) from the perspective of topographical indices and digital elevation modeling.

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

Dr. Justin White (Air Force Academy, Colorado Springs, CO)

Abstract: The Paria river breadroot, *Pediomelum pariense* (Fabaceae), is endemic to and known from only 13-14 populations in Kane and Garfield counties, Utah, USA. This plant has only been found living on the limestone soils of the Claron and Carmel formations in the Grand Staircase Escalante National Monument

and adjacent areas. *Pediomelum pariense's* rarity and narrow distribution create an increased extinction risk in the face of rising threats from habitat degradation, destruction, and climate change, yet not much is known concerning its ecological niche or why it is so narrowly distributed. Here, we take a unique approach to characterizing ecological niche by investigating various topographic position variables. Using geospatial analysis and geographic information systems, we transformed a 1-meter DEM into surficial indices that include: landform category, heat load index, topographic position, slope position, elevation, aspect, Beer's Aspect (weighted for optimal growing orientations), slope, water flow accumulation, topographic convergence, daily intensity of and total solar illumination across 2-hour intervals, and total annual solar radiation. Taken together, these indices help to characterize the influence of topography on sunlight and water availability, critical elements of ecological niche. This work presents a novel approach to niche characterization and highlights a number of unique features that may influence the endemic nature of this species.

10. Using drones and A.I. to census dwarf bear-poppy populations.

Kody Rominger (Utah Valley University, Orem, UT, krominger@uvu.edu)

Census of endangered plant populations is critical to determining their size, spatial distribution, and geographical extent. Traditional, on-the-ground methods for collecting census data are labor-intensive, time-consuming, and expensive. Use of drone imagery coupled with application of rapidly advancing deep learning technology could greatly reduce the effort and cost of collecting and analyzing population-level data across relatively large areas. We used a customization of the YOLOv5 object detection model to identify and count individual dwarf bear poppy (*Arctomecon humilis*) plants in drone imagery obtained at 40-m altitude. We compared human-based and model-based detection at 40 m on n=11 test plots for two areas that differed in imagery quality.

The model out-performed human visual poppy detection for precision and recall and was 1200x faster at inference/evaluation on the test plots. Across all validation plots, model inference precision was 0.83, and recall was 0.74, while human evaluation resulted in precision of 0.61, and 0.71 for recall. Both model and human performance were better in the area with higher-quality imagery, suggesting that imagery quality is a primary factor limiting model performance. Evaluation of drone-based 40-m census imagery from the 245-ha Webb Hill population with our customized YOLOv5 model was completed in <3 hours and provided a reasonable estimate of population size (7,414 poppies) with minimal investment of on-the-ground resources.

11. Population viability analysis (PVA) for Holmgren's milkvetch: a modeling protocol for desert perennials with persistent seed banks.

Susan Meyer, Senior Research Ecologist (USDA Forest Service Rocky Mountain Research Station Shrub Sciences Laboratory, Provo, UT, semeyer@xmission.com)

Renee Van Buren (Retired, Utah Valley University, Orem UT)

Federally endangered Holmgren's milkvetch (*Astragalus holmgreniorum*) is restricted to the northeastern Mojave Desert. Dr. Renee Van Buren and I worked to place her 22-year demographic study (1991-2013) for this species into a matrix modeling framework. In addition to average precipitation that is far below optimum, weather patterns in deserts are extremely variable from year to year. For Holmgren's milkvetch, the good years are years of high recruitment success and high seed production for adult plants. In bad years, this perennial species can be completely absent as actively growing plants but survives via a persistent seed bank. Seed dormancy loss rates are insensitive to weather variation, whereas seed production is highly episodic and increases non-linearly in response to year quality.

The net effect is that weather stochasticity is essential to survival. If every year were average, the species could not persist. Holmgren's milkvetch is a spring ephemeral with superficial dormant meristems, making it susceptible to summer mortality. It must survive at least one summer and return as an adult in order to produce seeds, but survival beyond the first seed production year has little effect on population growth. It has evolved to become more like a desert annual, with an emphasis on seed production and seed bank persistence rather than longevity.

Another interesting feature of PVA in a highly stochastic environment is that even when the mean stochastic growth rate predicts a high probability of persistence, the variation around this mean is so large that extinction risk can remain high. This risk varies as a function of population size, creating a moving window of extinction risk through time. This makes it impossible to predict extinction risk with any certainty. PVA is more useful as a heuristic tool for understanding factors that change extinction risk rather than for predicting absolute extinction probability.

12. Population Monitoring and Conservation of the Frisco Clover, *Trifolium friscanum*, on the Desert Experimental Range in Western Utah.

Loreen Allphin (Brigham Young University, Provo, UT, loreen_woolstenhulme@byu.edu)

Stanley Kitchen (USDA Forest Service Rocky Mountain Research Station Shrub Sciences Laboratory, Provo, UT, skitchen@fs.fed.us)

The Frisco clover, *Trifolium friscanum* (Welsh) S.L. Welsh (Fabaceae), is a rare endemic from the Great Basin in Utah. In 2011, the Fish and Wildlife Service (FWS) determined that the species was warranted for listing as endangered or threatened under the Endangered Species Act; however, listing of the clover was precluded by higher priority actions. In 2020, we established a three-year study on *T. friscanum*, in conjunction with the US Forest Service at the Desert Experimental Range (DER).

We had three main study objectives: 1) determine the extent and distribution of populations of *T. friscanum* within the DER, 2) demographically monitor *Trifolium friscanum* populations to better determine population trends, and 3) monitor any additional natural or anthropogenic factors affecting the conservation of the species. From extensive surveys, we found *T. friscanum* to occur at eight locations in the Tunnel Spring Mountains of the DER. Most of the locations were small subpopulations with less than 50 individuals. At these locales, flowering was rare (< 20 % plants with inflorescences at these sites). When

flowering did occur, we found few inflorescences per plant (mean 3.3). At the long-term demographic monitoring site, we found no recruitment and much die back on mats (20.8 %). Herbivory was observed at all sites (~ 45 % of plants utilized at long term site). Fecal DNA samples indicate that herbivory is due to *Sylvilagus nuttallii* (mountain cottontail). Because of its palatability and low reproductive success, we do not recommend the reintroduction of desert bighorn sheep into the DER. We also suggest that this species be made a high priority for conservation.

13. Conservation of Tiehm's buckwheat (*Eriogonum tiehmi*).

Allison Melton (Senior Attorney, Public Lands Program, Center for Biological Diversity, Crested Butte, CO, amelton@biologicaldiversity.org)

Tiehm's buckwheat (*Eriogonum tiehmi*) is a single-site endemic, restricted to 10 acres of habitat in the Rhyolite Ridge area of the Silver Peak Range in far western Nevada. Since its discovery in 1984 by Jerry Tiehm, no other populations of this wildflower have been discovered.

Tiehm's buckwheat is a dense mounded herb that spreads low across the landscape and has white or gray leaves. Although it looks like grayish clumps for most of the year, in May and June it can explode with tight-balled blooms ranging from cream to light yellow, and which can turn orange or red as they age.

As a hint to the controversy surrounding this little plant, it is restricted to highly mineralized soils with high boron content and is also associated with lithium. Located in an extremely arid environment, this wildflower has found its niche in this preferred soil type. In a landscape with few native plant species, Tiehm's buckwheat substantially contributes to supporting the high abundance and diversity of arthropods and pollinators found in the Rhyolite Ridge area.

In early 2019, a Bureau of Land Management whistleblower contacted the Center for Biological Diversity (the Center), alerting us to proposed lithium exploration activities and a proposed mine near and within the Tiehm's buckwheat population. As we do, the Center launched into action, commencing our multi-year effort to save this rare species from harm and extinction. Because of our efforts, the U.S. Fish and Wildlife Service proposed listing the species as endangered last fall, and recently released its plans for proposed critical habitat designation.

This presentation will cover the whirlwind of activism and legal action that has compelled Endangered Species Act compliance as well as the seemingly endless new threats that crop up threatening this species with the unacceptable fate of extinction.

Lifetime Achievement Award Presentation to Dr. Renée Van Buren

by Dr. Susan Meyer

It is my pleasure to present the Utah Native Plant Society Lifetime Achievement Award to Dr. Renée Van Buren. Renée's career in Utah botany spans more than four decades. She received her B.S and M.S. in botany under the tutelage of Dan Fairbanks and Kimball Harper at Brigham Young University. She earned her Ph.D. in botany at Arizona State University in 1994 with a dissertation on the genetics of the endangered autumn buttercup.

After a post-doc studying rare plants with Dr. Harper, she joined the botany faculty at Utah Valley University in 1997. She spent over 20 years helping to build a strong undergraduate botany program there. She was the first faculty mentor of the Botany Club, started the native plant garden, was director of the Kimball T. Harper botany scholarship endowment, and was instrumental in the establishment of the Capitol Reef Field Station, where she was director for the first several years. Renee is first author on *Woody Plants of Utah*, a field guide and smartphone app that is widely used. She has also made several notable contributions to the scholarly literature on Utah rare plants.

Renee instilled a love of native plants in both botany majors and non-science students through her warmth and enthusiasm for the subject, teaching many field botany and plant conservation courses and involving students directly in hands-on field research projects. Several of her undergraduate research students have gone on to successful careers in botany.

Three of Renee's field research projects involved the generation of extremely valuable demographic data sets on endangered species of Washington County, Utah. Each of these studies involved yearly data collection over periods of twenty years or more. We are still learning from these data sets. Such long-term demographic studies are rare, and may hold the key to successful management for recovery. Renee also published several papers on the genetics, life history, and ecology of these three species-Holmgren's milkvetch, Shivwits milkvetch, and dwarf bear poppy

-and worked actively for their conservation.

I would like to thank Renee on behalf of all of us for acting as a major force keeping botany alive in Utah in the 21st century. No one is more deserving of a UNPS Lifetime Achievement Award than Dr. Renee Van Buren. Congratulations!



UNPS Annual Report 2021: Accomplishments and Activities

UNPS is a 501(c)(3) non-profit organization dedicated to the appreciation, preservation, conservation and responsible use of the native plant and plant communities found in the state of Utah and the Intermountain West.

- Board of Directors comprised of 14 volunteer members
- Membership of approximately 375 that includes 78 lifetime members and four chapters

Meetings

- Utah Rare Plant Meeting 2021 had 14 presenters and over 100 attendees; recordings are on UNPS YouTube Channel have about 50 views per presentation, and a high of 410 views for the Tiehm's buckwheat presentation
- There were five Salt Lake virtual chapter meetings (so actually statewide meetings) all available on the [UNPS YouTube channel](#):
 - April, Walt Fertig -- Plants of Cedar Breaks
 - June, Steven Andrew Kannenberg -- Juniper Die-off in Utah
 - October, UNPS annual meeting with Paul Cox – Plants, People, and Culture: Ethnobotany and the Discovery of New Alzheimer's Drugs
 - November, Walt Fertig–Grand Staircase Botanizing
 - December, Anne Lawlor – Plant Fiber and Prehistoric Foraging Tools in the Eastern Great Basin
- 22 total recordings on [UNPS YouTube channel](#), 62 subscribers, 2,100 total views

Grants Awarded

- Three research grants were paid out in 2021 for almost \$5,000, a record amount. The grants included research on biocrusts, microbiomes, *Pedionelum pariense* and represented researchers from the University of Colorado Boulder, Utah State University, and Utah Valley University
- Grant applications are due on April 15th of each year, details are on the [unps.org](#) website. Please consider donating to increase the grant fund. Donate at [unps.org](#)

Fundraising

- UNPS poster sales—about 500 in 2021
- Online donations
- Membership dues
- UNPS web store

Horticulture/Gardening with native plants

- Kipp Lee presentation “Creating Urban Wildlife Habitats with Native Plants” to the Great Salt Lake Audubon ‘Birds ‘n Bites’ meeting.
- Updated list of native plant resources on [unps.org](#) website
- Answered many native plant questions

Invasive Weed Control

The continuing severe drought has led to the incursion of more invasive weeds which has made this a high priority. In 2021, a number of organized efforts have been made.

- UNPS, led by Dave Wallace, participated in the 3rd Annual Weed Day in Logan Canyon on May 22nd, removing “an impressive pile” of dyer’s woad, Scotch thistle, myrtle spurge and other weeds of concern
- Dave Wallace, chairman of the Invasive Species Committee, has made it a personal mission to remove weeds from trails in the Logan Ranger District, working in conjunction with the Uinta-Wasatch-Cache National Forest since 2019
- The UNPS Utah Valley Chapter, in conjunction with the Slate Canyon Naturalists and other Utah County organizations, participated in a “Purge the Spurge” event in Slate Canyon on May 22, 2021

Field Trips

Normally, there are 3 to 5 field trips sponsored by the Salt Lake Chapter every year, but Covid has been a mitigating factor.

- Field trip to Bald Mountain in the Uintas led by Bill Gray in 2021 (some 80-year olds climbed to the top!)
- The Canyonlands Chapter led a couple of field trips in 2021

Advocating for native plant protection–conservation

- Submitted comments to the Ashley National Forest Plan
- Comments submitted Mill Creek Canyon, Uinta Basin Railway, Conserve Utah Coalition
- Signed onto 15 conservation letters authored by other non-profit organizations
- Utah Rare Plant Guide
- Keeping the utahrareplants.org updated

Social Media

- UNPS Facebook page has 2,400 followers
- Meetup postings periodically by Jonathan Barth
- Membership list communicates with members about activities, job or volunteer opportunities, chapter news, conservation news and press releases
- Board of directors list

Newsletter, Segó Lily

- The Segó Lily has been in publication since the Utah Native Plant Society was organized in 1978
- We now print the Segó Lily on a quarterly basis, Spring, Summer, Fall & Winter. In 2021 26 authors contributed articles to the newsletter covering subjects from native plants and trees to conservation of rare plants, control of invasive weeds, horticulture, special awards, new plants species, book reviews, the monarch butterfly, nature journaling, native plant portraits, rare oak hybrids, the flora of the Grand Staircase and Escalante National Monuments and more. These articles were submitted by a wide variety of authors as well, mostly from our membership–conservationists, geologists, botanists, artists, a teacher and an accountant, a former professor and a retired physician and a business professional, just to name a few. The newsletter is now published only in a full color digital format online and available to everyone on our website at unps.org

HELP FIGHT WEEDS ON OUR PUBLIC LANDS

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

What: 4th Annual Weed Day

When: Saturday, May 21, 2022,
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,
lisa.thompson3@usda.gov 801-625-5850

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

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

Volunteers providing service on national forests will follow Federal health guidelines including social distancing while on projects and wearing masks when social distancing is difficult to maintain.

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, hila-ry.shughart@gmail.com.



2nd Annual Purge The Spurge

At Slate Canyon in Provo May 7th

In conjunction with Earth Day 2022, the second annual Slate Canyon Purge the Spurge event will be on Saturday, May 7th 9:30 am to noon, sponsored by Conserve Utah Valley. Educational activities start at 9 am and the UNPS Utah Chapter will staff a booth to answer questions about native plants and invasive weeds.

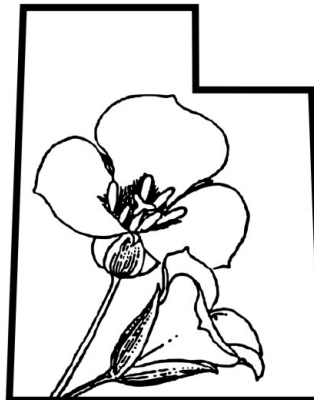
Volunteers can sign up under the "Events" tab at conserveutahvalley.org. Select the "Register" button to scroll through the list of activities. The "Purge the Spurge" event is under the "Clean Up Projects" selection.



SLATE CANYON SATURDAY

EARTH DAY - SLATE CANYON PARK
SATURDAY, MAY 7TH, 2022
9:00 AM - 12:00 PM

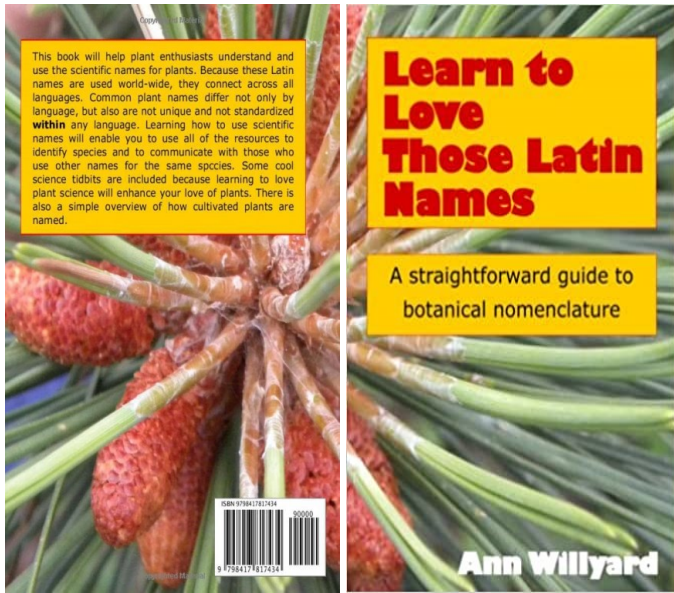
EDUCATIONAL ACTIVITIES	
9:00 AM	"Hope of Nature" Book Club with George Handley
	First People's History with the Timpanogos Nation
	Nature Excursions: Insects, Lichen, Plants, Birds, & Geology
11:00 AM	Bike Skills Lesson
CLEAN-UP PROJECTS	
9:30 AM	Clear debris, purge Myrtle Spurge, remove graffiti, and more!



Utah Native Plant Society



There are occasions when the Utah Native Plant Society holds a special outdoor event or sets up a booth at a community gathering and has a need for a banner to identify itself. In fact, sometimes this happens in multiple locations at the same time. Because of this, we recently had a need to produce another banner. Pictured is the new banner using the newly updated logo designed by newsletter editor John Stireman and the banner design he created using two wildflower photos by UNPS member Andrey Zharkikh. It was produced by the sign company A & H Signs of South Salt Lake and donated to UNPS by its owner, Joel Howes. Many thanks to all!



Book Review: Learn to Love Those Latin Names

by Bill King

Learn to Love Those Latin Names: A straightforward guide to botanical nomenclature by Ann Willyard

Self published 2022

Ann Willyard, Las Vegas, NV

\$12.95 on Amazon 63 pages

Ann Willyard is a retired professor of botany and plant systematics at Hendrix College, Arkansas and has a PhD in botany and plant biology from Oregon State University. She is an associate editor of the *American Journal of Botany*.

The book is organized into twenty short chapters of 1-5 pages each. It also has a chapter with additional resources and one page of literature citations as well as a glossary of botanical terms and acronyms. No footnotes or endnotes are included but there are some internal references.

When I was an officer in the North American Rock Garden Society I received a letter from an MD complaining about the use of Latin scientific names in the Rock Garden Quarterly publication. I thought, if an MD was struggling with this terminology, there must be a lot of lay people dealing with the same problem. The purpose of Ann Willyard's book addresses this issue in a simple and straightforward manner, attempting to

overcome this reluctance that many people feel to use botanical Latin to identify plants. Most people are much more comfortable with common names of plants, such as lamb's ears or forget-me-nots, but common names cause confusion because there are so many plants that could be called lamb's ears or forget-me-nots.

The book contains short but succinct explanations of the organization of plant names, the history of the binomial name system created by Carl Linnaeus in 1753, the use of the genus and specific epithet for a plant. These are clear and easily understood descriptions. There is even a chapter on the ever-changing scientific names and why that happens. This is written to make the learning process as easy and painless as possible.

Pronunciation of botanical Latin is also a subject of contention and the author maintains there is no correct way to pronounce the words but then proceeds to offer "some conventions that botanists use." This was confusing and contradictory and she should have stayed with the initial claim there is no correct way to pronounce Latin names. Also, her suggestion to write the name down in order to communicate it correctly is a good idea.

For such a small book there is quite a lot of information, even a chapter on naming horticultural hybrids and another on weeds and their definition, which is a growing concern as invasive weeds increase with climate change.

The title seems a little over the top but is understandable considering how much pushback one hears about Latin names and how hard it is to learn them. However, the cover of the book is the most outstanding I've seen in the past five years, a handsome close-up photo of the needles of *Pinus brachyptera* taken by the author's husband Gene Willyard in the Big Horn Mountains of Wyoming.

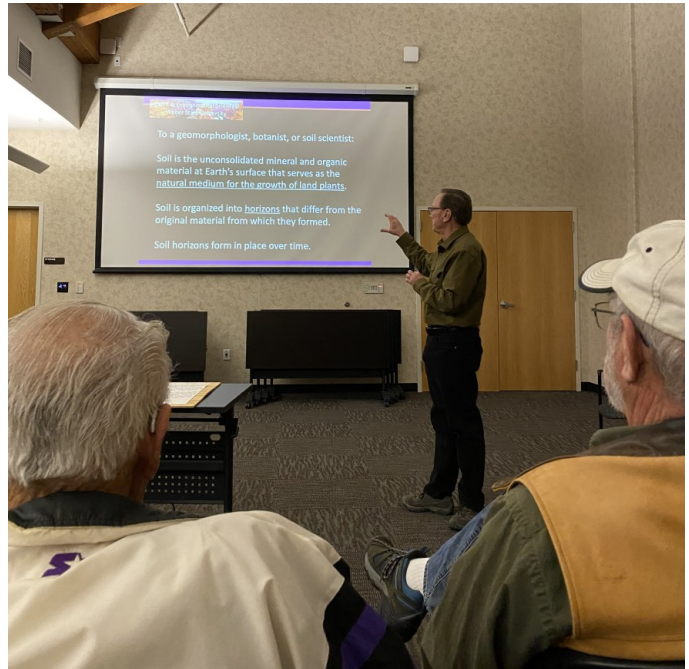
While I don't think I will ever love Latin names after reading this book, it is, nevertheless, a short and concise treatise on how botanical names work and as such, it is a highly useful reference tool for anyone who does botanical research or writing. It might be a useful project to send a copy to every BLM and Forest Service office across the country.

UNPS Chapter Reports

Mountain

President: Kati Hites

The newly revived Mountain Chapter of the Utah Native Plant Society held its first meeting on Friday, March 11th in the Kimball Junction Branch Auditorium of the Summit County Library (1885 West Ute Blvd, Park City). As stated in the invitation from the new chapter president, Kati Hites - "Our aim is twofold: to bring together a community that is interested in learning about our amazing native flora, the broader connections to local fauna, as well as the often overlooked relationship to fungi; and to foster a spirit of reciprocity toward the land we co-inhabit. We hope to make friendships as we learn about plants within the intricate network of life in the Wasatch Range."



Dr. Richard Ford at Park City Meeting

Dr. Richard Ford, professor emeritus of Earth & Environmental Studies at Weber State University, gave a presentation on the history of our local geology and its integral relationship with our substrate in the Wasatch Range - an essential backdrop for the native and endemic plants we find in our region.

Plans are currently being made for our next meeting to be held in June with a speaker about the wildflowers of the Wasatch. Details will be forthcoming!



Mountain Chapter President Kati Hites



Canyonlands

President: Diane Ackerman

Moab Earth Day Event, April 23:

We had a great day, refreshed by rain the day before, it was a calm/cool spring day of music and celebration! Canyonlands Chapter gave tours of the native plant garden and distributed free native plant seeds.

Upcoming Events:

Wednesday, May 25 & Saturday May 28: Red Towers Botanical Area in Manti La Sal Mountains.

We are working out the specifics for a refreshing look at the place we all know as Dinosaur Track Way on the road to Gateway, CO. We hope to be joined by botanical and ornithology experts and the Manti-La Sal USFS on Wednesday to learn more about this fascinating area. The Saturday hike will be a bit different as Canyonlands Chapter members Pam Hackley and Mimi Trudeau will cover the same ground more closely exploring the unique vegetation. Folks are welcome to join one or both days.

Come take a look at some of the oldest Ponderosa pines you may encounter in your life and learn how they may become protected. Easy/moderate hike with gentle incline totaling 2-2.5 miles round trip, more specific information forthcoming.

Please let field trip leader Pam Hackley know if you are interested so she can plan—pamhackley3@gmail.com.

Saturday, June 11: Propagation Workshop and visit to Mayberry Propagation Worksite

We are working on the specifics but are excited to welcome retired USU professor of horticulture Dr. Larry Rupp, who will instruct us at Moab. In the afternoon, we anticipate hearing from Kara Dohrenwend at Mayberry Propagation Site. She will be updating us on the current propagation work that is taking place on-site.

Salt Lake

President: Catherine King

Past Events:

February 2: Dr. Jennifer Ackerfield shared her current research on the thistles of Utah and untangled the taxonomy of this complex group. She shared the identification of a new species of Utah.

March 1: Utah Rare Plant Meeting (see article in this issue) took the place of the regular Salt Lake Chapter meeting this month.

April 6: Ellen Eiriksson from the Natural History Museum of Utah gave a presentation about how to use iNaturalist titled "Using Citizen Science to Support Records of Plant Diversity." This is the last meeting planned for the Salt Lake Chapter until next Fall.

All of these meetings have been recorded and are available on the [UNPS YouTube channel](#).

Upcoming Activities:

Field trips are in the works for this summer, details will be announced.



Utah Valley

President: Robert Fitts

The Utah Valley Chapter field trip was successful in the hunt for *Viola beckwithii* at the Moark Junction site at the mouth of Spanish Fork Canyon (see cover photo by Steve Hegji).

Upcoming activities:

Saturday, May 9: Purge the Spurge at Slate Canyon trailhead in Provo. Meet at 9 a.m. Please come and help remove weeds. Utah County will provide a dump truck. The Utah Valley Chapter has committed \$250 to help purchase plants to restore the area.

Saturday, June 4: Field trip to view cottonwoods and other trees and plants. Meet at

9 a.m. at Battle Creek Trailhead at the east end of 500 North in Pleasant Grove.

July activity: Hunt for *Eriogonum* species in desert areas. Please contact Robert Fitts for more details at 801-518-3550.

Utah Valley Chapter is going to have our own poster! Please send suggestions for your favorite Utah Valley Native Plants to Robert Fitts.

Your Membership

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

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

Summer is 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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Webmaster: unps@unps.org

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Conservation: Bill King, Tony Frates

Education and Outreach:

Allison Izaksonas, Morgan Abbott

Horticulture:

Amber Rasmussen, Tony Stireman, Morgan Abbott, and Cathy King

Invasive Species:

David Wallace, Tony Frates, Rachel Belote and Neal Dombrowski

Newsletters and Publications:

Cathy King, Amber Rasmussen

Rare Plant List/Rare Plants: Robert Fitts, Tony Frates

Small UNPS Grants:

Ron Bolander, Bill King, Marc Coles-Ritchie, and Bill Stockdale

Publicity, Communication, Website and Meetings:

Allison Izaksonas, Wayne Padgett, Marc Coles-Ritchie and Tony Frates

Membership Committee:

Diane Ackerman, Tony Stireman and Tony Frates

Annual Report Committee: Bill King

Chapters and Chapter Presidents

Canyonlands: Diane Ackerman

Mountain: Kati Hites

Salt Lake: Cathy King

Utah Valley: Robert Fitts

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

Webmaster inquiries at unps@unps.org

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

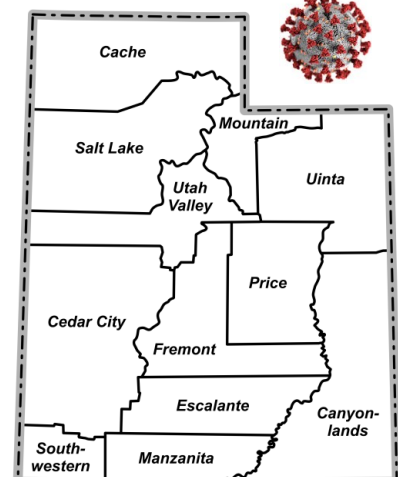
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Submit articles to Cathy King:
cathy.king@gmail.com

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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 plants.

UNPS Chapter Map





Utah Native Plant Society

PO Box 520041

Salt Lake City, UT 84152-0041

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