

Progress on Conservation Efforts

By Jill Handwerk and the CNHP Botany Vegetation Ecology Team

This symposium began like any other with an announcement to the group about items of interest, this year honoring a long time Colorado botanist, Steve Olson. Steve has been a botanist for the US Forest Service for nearly 20 years covering the Pike San Isabel National Forest and Cimarron & Comanche National Grasslands—a very large area to cover! To facilitate his work there, Steve developed a database of over 2200 plants species from the region with information on life history, habitat, and locations on the PSICC. This database, 20 years in the making, is a wonderful resource that Steve leaves as a legacy to his successor. Steve was recently recognized by the USFS with a Forest Service career achievement award for contributions to his discipline. This was a noteworthy honor not often awarded and a wonderful way to end his career with USFS. Steve is retiring this fall and we will all miss his wit and wisdom as well as his significant botanical contributions to the Colorado flora.

Following brief announcements, the symposium continued with its first presentation of the day **“Five Years In: A Status Review of Conservation Actions from the Rare Plant Addendum to the Colorado State Wildlife Action Plan.”** Colorado Natural

Heritage Program botanist Jessica Smith gave a presentation on her review of the status of meeting conservation actions for 31 Plants of Greatest Conservation Need as listed in the Rare Plant Addendum of the Colorado State Wildlife Action Plan. The SWAP is a document which is the product of Colorado Parks & Wildlife but designed for all conservation stakeholders in the state. It outlines the vulnerabilities of species and habitat and provides recommended conservation actions.

The presentation discussed general threats facing rare plants, overarching conservation actions, and the status of meeting those actions. For 31 of the rarest plants in Colorado, including all federally-listed plants, actions for specific conservation recommendations were ranked. An overall score for each of the 31 plants was presented, as well as an average score for specific actions across species. Detailed results from six plants were presented as examples. The results indicate that actions to limit development and implement best management practices were represented reasonably well through resource management plans by federal and local agencies, city codes, special land designations and advocacy for plants in oil and gas mission change rulemaking mandated in SB19-181. Conservation actions related to climate change were typically lacking. Federally-listed species and rare plants on state lands tended to have more conservation actions in progress; however, many conservation actions fell into the unknown rank.

Check out the Rare Plant Addendum to the SWAP (<https://cpw.state.co.us/Documents/CNAP/Rare-Plant-SWAP-2015.pdf>) to review species of interest and contact Jessica Smith (jp.smith@colostate.edu) to provide information on ongoing or recent conservation actions for PGCN.

The second presentation of the day was **“The Floristic Quality Assessment Coefficients of Conservatism (C value) Update for Colorado”** and was presented by Pam Smith and Georgia Doyle. This presentation provided an overview of the methods used to update the FQA and C values for Colorado. Specifically, in 2019 and 2020, CNHP (as part of a wetland program grant from the US EPA) updated the plant list for the Floristic Quality Assessment. The FQA is an ecological assessment tool using botanical surveys to determine the degree of disturbance in a landscape. It is often used with other assessment tools to determine ►

Colorado Wildlife Action Plan

Appendix A: Rare Plants



By the Colorado Natural Heritage Program

For

Colorado Parks and Wildlife

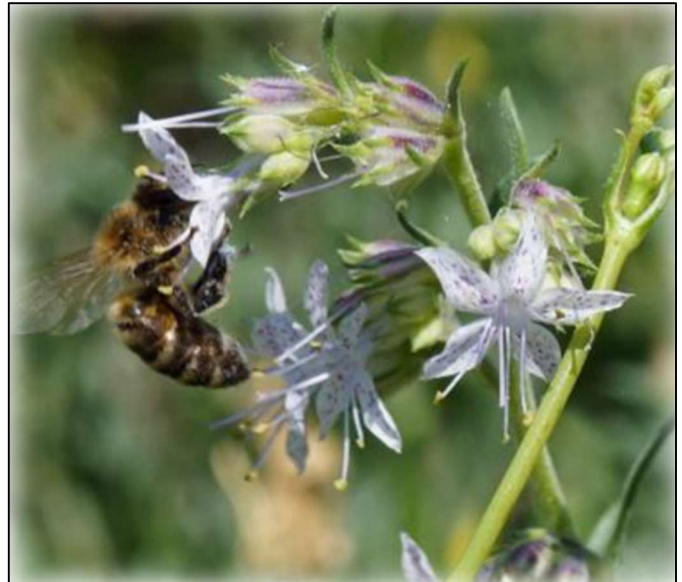
◀ habitat condition and has been hosted on the CNHP website. The update was accomplished by having a panel of 27 botanical experts assign a Coefficient of Conservatism (C value) to individual species focusing on species with no assigned value (~20% of the original species list). Based on two workshops, input from expert panel members and CNHP's wetland condition plot database, they were able to assign values to 600 additional species.

To assign values, they also found that it was necessary to update the list of species for Colorado, incorporating taxonomic updates that have occurred between 2007 and 2020. The FQA species list now includes 3,375 taxa. For 154 species (5% of the total flora) there was not enough habitat data available or expertise to assign a C value (many species are known from only one collection site). For the taxonomic update, CNHP completed a crosswalk between Ackerfield's *Flora of Colorado* (2015) and the original FQA list which was based on Weber's and Wittmann's *Colorado Flora* (2001) and USDA Plants (2005). In addition to updating the species list and assigning C values for 600 additional species, information on wetland status, nativity, and CNHP tracking status was updated for all species on the list of plants for Colorado. The new list, a detailed report and an FQA calculator will be available on the CNHP website in January 2021.

Following the first two informative presentations, summaries of ongoing conservation work by partner agencies was provided

Emily Griffoul with Betty Ford Alpine Gardens began the session. The BFAG are expanding their conservation program by active participation and implementation of the: North American Botanic Garden Strategy for Alpine Conservation. This strategy included four key components: understanding and documenting alpine plant diversity, in-situ and ex-situ conservation, education and outreach and capacity building. This year they were able to collect seed from 19 plant species for ex-situ conservation and surveyed several alpine Important Plant Areas. For more information contact emily@bettyfordalpinegardens.org.

Raquel Wertsbaugh, the Colorado Natural Areas Program coordinator provided an overview of the program, with an introduction to its staff and volunteers, the natural areas being monitored by their volunteer stewards, and rare plant monitoring projects. The Natural Areas Program has on-going monitoring on state lands for Tier 1 SWAP species such as *Ipomopsis polyantha* and *Physaria pulvinata*. Looking to the future CNAP is hoping to increase the representation of state natural areas on the Eastern Plains. For more information go to <https://cpw.state.co.us/aboutus/Pages/CNAP.aspx>



Pagosa skyrocket, *Ipomopsis polyantha*. © CNHP

Jennifer Neale, director of research and conservation at the Denver Botanic Gardens regaled us with beautiful photos of the new Freyer-Newman Center, which includes space for research facilities, herbaria, art galleries, classrooms, the School of Botanical Art & Illustration, the Helen Fowler Library, and more. The new research facilities provide spacious accommodations to support DBG's ongoing population biology, botanical surveys, conservation genetics, ex-situ conservation, restoration, and urban ecology work. Jennifer encourages everyone to visit the new state-of-the-art facilities and explore the gardens. To learn more, go to: <https://www.botanicgardens.org/science-research/biodiversity-research>.

Mindy Gottsegen, conservation services manager for the State Land Board provided an overview of the establishment and mission of the SLB. Established in 1875, state land was set aside to support public schools. The program has provided \$1.7 billion to schools since 2008 by supporting capital construction and supporting the Colorado Department of Education's operation budget. To continue to ensure that the state lands remain intact to support its mission, a Fen Stewardship Action Plan has been developed with three goals in mind: 1) resource conservation; 2) development and how to lease lands in a sustainable manner; and 3) outreach. To learn more about this exciting plan contact Mindy Gottsegen at mindy.gottsegen@state.co.us.

Mit McGlaughlin, a professor and director of the School of Biological Sciences at the University of Northern Colorado, provided an educational look at the ongoing conservation genetics being conducted in his lab at UNC. In 2020, work was completed on *Eriogonum brandegeei*, indicating that there is no gene flow between the two population centers of the species—important information for conservation of ▶

◀ the species as a whole. Updates on *Sclerocactus glaucus* genetic work revealed that the northern population of the species is distinct from the remainder of the population to the south and will be named as a new species, *Sclerocactus dawsonii*. Mit's lab is also working on several other rare plant species and has initiated new projects for several federally-listed species including *Astragalus osterhoutii*, *Eutrema penlandii* and *Eriogonum pelinophilum*. For more information contact: mitchell.mcgloughlin@unco.edu

Aimee Crittendon, a biologist with the US Fish and Wildlife Service, ecological services in Grand Junction, discussed the ongoing Species Status Assessments that are being completed for all the federally-listed and candidate species in Colorado. The SSAs for *Penstemon debilis* and *Ipomopsis polyantha* are in the final stages of review; *Eriogonum pelinophilum*, *Phacelia formosula*, *P. submutica* and *Sclerocactus glaucus* SSAs are in progress. Recovery plans were recently published for *Physaria obcordata* and *P. congesta* and are in progress for *Penstemon debilis* and *Ipomopsis polyantha*. *Astragalus schmolliae* has been proposed for listing as threatened and the 60-day comment period is ongoing. For more information visit the USFWS website <https://www.fws.gov/mountain-prairie/>.

Following a lunch break, the symposium continued with a presentation from Western State University Master's student Bronwyn Taylor. Bronwyn shared preliminary data from her master's thesis project "The Reproductive Ecology of *Astragalus microcymbus*." Her first-year results yielded amazing images of pollinators and insect visitors of *A. microcymbus*, but evidence of seed set in her study was complicated by browsing of flowering stems. The innovative use of

wildlife cameras on her study plots found the culprits to be predominately rabbits. Her exhaustive reproductive study will continue next year and we very much look forward to her final results. Bronwyn can be reached at bronwyn.taylor@western.edu.

The final session of the day "Rank and Status Review for Select Colorado Front Range and Plains Plants of Concern" was presented by CNHP botanist Susan Panjabi, who led the review of the 14 plants listed below. Summary information was presented on each taxon including a distribution map, photos of the plant and habitat, last observation date, population size estimates, management concerns, and land ownership patterns associated with the known distribution.

Additional data and photos are needed for all of these taxa, and we welcome efforts from the CoNPS members and others to help expand our knowledge of these plants through targeted field surveys and observations. Contact Susan at susan.panjabi@colostate.edu if you would like to contribute information on these species.

The day ended with a virtual happy hour that was well attended and provided a wonderful way to catch up with fellow botanists. All of the presentations from this meeting as well as previous symposia are available online at the Colorado State University, Colorado Natural Heritage Program (CNHP) website: www.cnhp.colostate.edu.

Jill is the botany and vegetation ecology team leader at the Colorado Natural Heritage Program, where she has worked for more than twenty years. She and her team work closely with many partners throughout the state to develop and maintain a statewide database that serves as the central repository for information on over 500 rare plant, lichen, and moss species and plant community associations. ☯

Scientific name	Common name	G Rank	S Rank
<i>Aletes humilis</i>	Larimer aletes	G2G3	S2S3
<i>Asclepias uncialis</i> ssp. <i>uncialis</i>	Dwarf milkweed	G3G4T2T3	S2
<i>Astragalus sparsiflorus</i>	Front Range milkvetch	G2	S2
<i>Bolophyta alpina</i> (<i>Parthenium alpinum</i>)	Wyoming feverfew	G3	S2
<i>Dalea cylindriceps</i>	Andean prairie-clover	G3G4	S2S3
<i>Erigeron radicans</i>	Taproot fleabane	G3G4	S1
<i>Grindelia hirsutula</i> var. <i>acutifolia</i>	Raton gumweed	G5T1	S1
<i>Grindelia hirsutula</i> var. <i>revoluta</i>	Rolled gumweed	G5T2	S2
<i>Oenothera coloradensis</i> (<i>Gaura neomexicana</i> ssp. <i>coloradensis</i>)	Colorado butterfly plant	G3T2	S1
<i>Oenopsis foliosa</i> var. <i>monocephala</i>	Rayless goldenweed	G3G4T2	S2
<i>Penstemon versicolor</i>	Variable-color beardtongue	G3?	S3
<i>Physaria bellii</i>	Bell's twinpod	G2G3	S2S3
<i>Solidago capulinensis</i>	Capulin goldenrod	G2	S1
<i>Spiranthes diluvialis</i>	Ute ladies' tresses	G2G3	S2tabl