

Aquilegia

Magazine of the Colorado Native Plant Society

Volume 47 No. 3 Fall 2023





This issue of *Aquilegia* honors the CoNPS Annual Conference with photos of plants native to the San Luis Valley and a featured story about the flora of the Upper Rio Grande watershed (page 4).

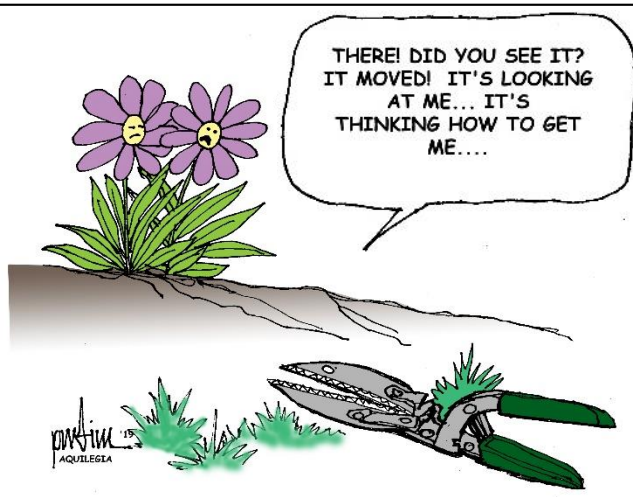
Photo credits

Front cover: *Astragalus ceramicus* (painted milkvetch). © Carol English

This page: Left, butterfly on *Astragalus ripleyi* (Ripley’s milkvetch) from La Botica, which was and is a sacred plant-gathering area for the Ute People and the Hispanic peoples. Right, *Aphyllon ludovicianum* (sand-dune broomrape). © Carol English

Back cover: Looking east across the San Luis Valley at Blanca Peak. © Carol English

Botanicum absurdum by Rob Pudim



Scientific Plant Names Updated with the New Edition of *Flora of Colorado*

Aquilegia adheres to the botanical Latin plant names used in *Flora of Colorado* by Jennifer Ackerfield. The new edition of *Flora of Colorado* (2022) provides the most current Angiosperm Phylogeny Group system standards, (APG IV). Note changes that have been made to genera names and to families.

See the Angiosperm Phylogeny Website for more details on current nomenclature, as well as general discussions on botanical systematics.

<http://www.mobot.org/MOBOT/research/APweb/>

Aquilegia: Magazine of the Colorado Native Plant Society

Dedicated to furthering the knowledge, appreciation, and conservation of native plants and habitats of Colorado through education, stewardship, and advocacy

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Featured Story

Colorado's Rio Grande Watershed: A Multi-field Inventory

By Richard Haswell

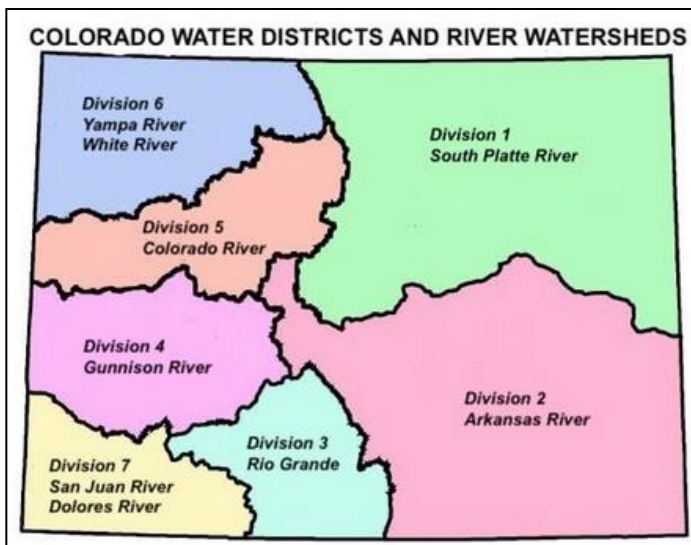
Of the seven Colorado Division of Water Resources districts, Division 3, the Rio Grande watershed, claims the least acreage. But the watershed has much to offer floristic studies, with a wide variety of ecosystems and microhabitats (1-3), ranging from sand dunes and alkaline playas up to subalpine rock fellfields and tundra snow melts. Within Colorado, the Rio Grande drops more than 5,000' in elevation, from 12,480' at Stony Pass to 7,395' at the border with New Mexico. Blanca Peak, just east of the town of Alamosa, rises to 14,326', yet lies less than 30 miles from some of the most intensely farmed land in the state. With such habitat variety in mind, a project called the Flora of the Rio Grande Watershed in Colorado (FRGWC) was begun in 2020. <https://floraupperriogrande.com/>

Ecological diversity was not the only reason why a river drainage was chosen for the confines of FRGWC. It is telling that environmentalists sometimes call a watershed a "hydrologic unit." A watershed unites and integrates the elements that interact within it—climatic, geologic, biologic, anthropogenic. For instance, the natural boundaries of a watershed function as a route for plant migration (4). This is obvious with aquatic and riparian species, but also true for dispersing agents—such as wind, wildlife, and humans—that also follow river systems. Moreover, plants in the Colorado Rio Grande watershed have migrated under a series of major evolutionary disruptions, both nonhuman and human.

Within the relatively small upper Rio Grande watershed, the botanic landscape has been altered through two major uplifts (which formed the San Juan Mountains and, later, the Sangre de Cristo Mountains); volcanic activity that included one of the largest eruptions in North American history (the La Garita Caldera); formation of Lake Alamosa that covered the valley for some three million years; and extensive glaciation that drained the lake and formed the Great Sand Dunes. Subsequently, humans added their own disruptions, both large and small: converting about half of the prehistoric basin grasslands into shrublands and monocrops; redistributing water through irrigation canals and center-pivot sprinklers; annually drenching over 300,000 acres with chemicals; and pasturing sheep and cattle in the uplands. Understanding of the impact of these disruptions, past and present, will benefit from an ongoing and systematic tally of flora in the region.

The inventory

Four features of FRGWC's design add to previous floras that cover the watershed (2,5). First, the venue is online, so that amendments and amplifications—flowers and flower addicts are always on the move—can be added within hours. Second, records are vetted to include only those whose location falls strictly inside the Rio Grande drainage. Third, the database includes not only herbarium vouchers but ►



Major Colorado watersheds. Re-drawn from Kurath (1).



San Luis Valley looking east, Sangre de Cristo Mountains and the Great Sand Dunes in the background April 1, 2019. © Richard Haswell

Species

Family

Common Name

Presence Rio Grande Watershed: Yes or Maybe

Status

adventive commercial escaped exotic native noxious

EarliestDate

LatestDate

Ecosystem

aquatic basin foothill montane ruderal sanddunes shrubland subalpine tundra urban

Geobotanical

Culebras Garitas UBasin NCristos SSanjuaus SSawatch UBasin

Counties

Alamosa Archuleta Conejos Costilla Hinsdale Mineral Rio Grande Saguache San Juan

Passes

Bonito Carnero Cochetopa Cumbres Elwood Grayback Gunsight Hayden Indian Creek La Manga La Veta

Los Pinos Medano Moon Mosca Music North Poncha South Spring Creek Stony Stunner Venable

Whiskey Wolf Creek

Wildlife Preserves

Alamosa Baca Blanca Wetlands Brown Lakes Coler Dry Creek Great Sand Dunes Hot Creek La Jara Monte Vista

Rio Grande Russell Lakes San Luis Lakes Sego Springs Wheeler

Other Localities

La Botica

PhotoRecords: Type yes to locate

Comments

Annotated Page: Type yes to locate

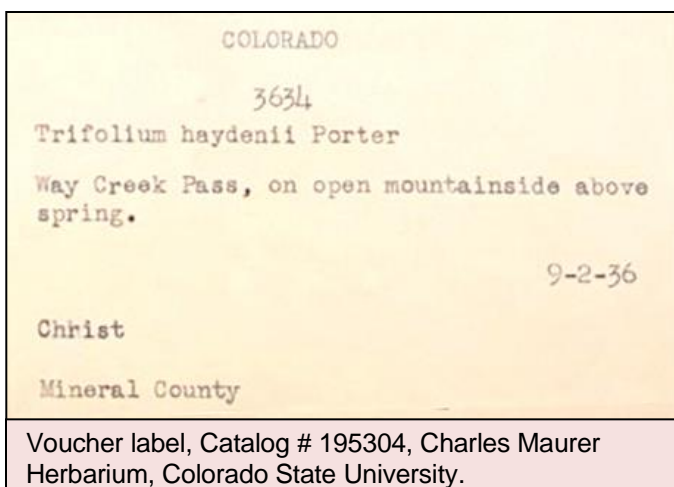
Search fields for FRGWC.

◀ also in-situ photographs, so long as they are diagnostic and reliably documented. Fourth, the search capabilities are multi-field. Each taxon is catalogued by 12 features—for example, *ecosystem* (e.g., basin, scrubland, montane), *geobotanic region* (e.g., Upper Basin, Northern Cristos, Sawatch Range), and *date recorded* (earliest and latest). With a click, a user can generate, for instance, a list of species recorded from old Cochetopa Pass (108 currently), or a list of species of *Astragalus* from the Lower Basin (eight currently).

FRGWC is free of charge and free of pop-ups, and users may take away from it what they wish. Worth noting, however, are a few examples of the way the search fields offer baseline data with some avenues of inquiry. Note that although currently FRGWC treats only gymnosperms and angiosperms, it treats them exhaustively.

Vouchers

FRGWC first relies on herbarium vouchers in SEINet (6). But SEINet's point distributions are not reliable since some vouchers lack geo-coordinates and some vouchers doubtless are misidentified. So for FRGWC, candidate vouchers are scrutinized label by label. That in itself can be problematic. For instance, what is to be made of this voucher? On double-take, "Christ" can be



assigned to John Henry ("Heinie") Christ IV, who sent vouchers to herbaria from 1896 to 1972. Since there is no "Way Creek Pass" in Mineral County, Christ probably meant Wolf Creek Pass. But *Trifolium haydenii* (Hayden's clover) has not been collected from Colorado before or since. The closest recorded location is the Absaroka Range of northwest Wyoming. Considering this, FRGWC omits *T. haydenii* from its inventory.

Taxa that FRGWC does include are classified in three ways. Marked "Yes" are species that have reliable evidence for their presence in the watershed, even if there is only one observation—for example, *Ageratina herbacea* (snakeroot) and *Euphorbia cyparissias* (cypress spurge) (1,153 species, 87.0%). Marked "Maybe" are species with vouchers judged in need of confirmation (125 species, 9.4%). Marked "Undocumented" are those with authoritative testimony to their presence but with no attainable documentation (47 species, 3.5%).

The calculations reported below are based on only the 1,153 "Yes" species, excluding the insufficiently documented ones (the "Maybe" and "Undocumented" species).

Geobotanical

FRGWC locates 73 species found in the eastern ranges of the watershed and not found in the western ranges—e.g., *Astragalus parryi* (Parry's milkvetch), *Monarda pectinata* (plains beebalm), *Rubus deliciosus* (Boulder raspberry), *Valeriana arizonica* (Arizona valerian); and 433 species found in the western ranges and not in the eastern, which include *Arnica latifolia* (broadleaf arnica), *Oreocarya weberi* (Weber's cryptantha), *Turritis glabra* (tower mustard), and *Verbascum thapsus* (common mullein).

The number of unshared species seems remarkable, given that the foothills of the two ranges, the San Juans and the Cristos, lie only about 60 miles apart at their farthest. The two ranges, of course, are quite different. The present San Juans are largely eroded remnants of volcanic activity and some 180 million years older than the Cristos, which are characterized by anticlinal fold-thrusts and thus steeper, much less eroded slopes. Southwestern winds across the San Juans create a rain shadow that affects the eastern slopes of the watershed much more than the western slopes. Some, maybe much, of the unshared taxa reported by FRGWC, however, may be due to collecting patterns, since the Cristos are much less accessible for botanical survey.

Collecting patterns may also have generated other salient geobotanical differences in recorded species. On the west side of the watershed, the southeastern San Juans, mostly BLM and National Forest land, ►

◀ have generated 925 species. On the east side, the Culebras, in large part privately owned, have been much less collected, recording only 279 species. There are at least 90 species not recorded from the Culebras but found in the Cristos to the north in Colorado and to the south in New Mexico. Examples include *Primula pauciflora* (darkthroat shooting star), *Penstemon virgatus* var. *asa-grayi* (oneside penstemon), and *Rhus trilobata* (three-leaf sumac).

In another geobotanical split, the Upper and Lower Basins share 184 species, but the Upper has 186 the Lower lacks, and the Lower has 67 the Upper lacks. Here differences in habitat may play the largest role. Geologically, the Upper Basin is “closed.” Water flowing into it, such as from the Saguache, Rock, Medano, and Mosca creeks, soon goes underground, or forms playas and lakes with their characteristic alkaline and lacustrine flora. The Lower Basin is “open.” The river and creek systems draining into it, such as the Culebra, the Conejos, and the Alamosa, remain above ground and empty into the Rio Grande via valleys with their characteristic riparian flora (7). The San Luis Hills Horst, evidence of the volcanic activity that also distinguishes the Lower Basin from the Upper, adds its own species unique to the Basin—for example *Fallugia paradoxa* (Apache plume), *Neoparrya lithophila* (Bill’s parsley), *Paronychia pulvinata* (Rocky Mountain nailwort), and *Pectis angustifolia* (lemonscent).

Native and exotic

Both Basins are extensively ranched and farmed, and compared to surrounding uplands show a clear difference in terms of non-native species.

Geobotanical region	Percent of species that are non-native
Upper Basin	21.0
Lower Basin	20.3
South San Juans	10.0
North Sangre de Cristos	6.5
La Garitas Mountains	6.4
South Sawatch Mountains	5.1
Culebras Mountains	4.8

There is little doubt that ruderal conditions created by the human disruption of the Basin has encouraged the spread of exotic species there. In the uplands it is usually only along roads and trails where collectors have found non-native species such as *Hyoscyamus niger* (black henbane) and *Matricaria discoidea* (pineapple weed). It is no surprise that within incorporated towns non-native species account for 51.0 percent of all recorded species.

Passes and protected areas

Passes are sometimes heavily collected and offer a look at species biodiversity. Wolf Creek Pass, an area of roughly one-half square mile and with a road over it since 1916, has rewarded collectors with 199 different species. Stony Pass, with a wagon road since 1872 and still accessible by passenger car from the west side, records 192. Some of the protected areas of the watershed have also been extensively collected. The historic site of La Botica, around 40 acres or .06 of a square mile, has been systematically surveyed by Carol English, Loraine Yeatts, Kristy Duran, and others, and the species count now totals 143 (8).

Persistence, eradication, and new arrivals

FRGWC has some evidence that protected wildlife areas may actually be protecting wildflowers. Rare watershed species such as *Aliciella micromeria* (dainty gilia), *Astragalus bodinii* (Bodin’s milkvetch), and *Nama dichotoma* (wishbone fiddleleaf) have been observed in the Baca National Wildlife Refuge; *Atriplex wolfii* (Wolf’s saltbrush) in Russell Lakes State Wildlife Area; and *Erigeron consimilis* (cushion fleabane), *Mentzelia thompsonii* (Thompson’s stickleaf), and *Lomatium grayi* (Gray’s biscuitroot) in other protected sites. Unfortunately, stronger evidence from FRGWC suggests that some species in the Basin and its over-grazed meadows may have been eradicated. There are 15 native taxa from the Basin not collected for the last 50 years, including *Bidens vulgata* (tall beggarticks), *Suaeda nigra* (bush seepweed), *Atriplex truncata* (wedge saltbrush), *Aliciella leptomeria* (sand gilia), *Sisyrinchium idahoense* (Idaho blue-eyed grass), *Gratiola neglecta* (clammy hedgehyssop), *Trifolium mucronatum* (cusp clover), and *Euthamia graminifolia* (flat-top goldentop).

The strongest evidence involves new arrivals. FRGWC records 49 species collected from only the last 10 years, 2013 or later. Perhaps surprisingly, only 14 of these are exotic—for example *Berteroa incana* (hoary alyssum), *Potamogeton crispus* (curly pondweed), *Onobrychis viciifolia* (sainfoin), *Axyris amaranthoides* (Russian pigweed), *Clematis orientalis* (orangepeel clematis), and *Rumex acetosella* (sheep’s sorrel). The majority, 35 of them, are native, including *Atriplex subspicata* (thickleaf orach), *Tragia ramosa* (noseburn), *Bidens tripartita* (strawstem beggarticks), *Astragalus nuttallianus* (Nuttall’s milkvetch), *Purshia tridentata* (bitterbrush), and *Myosurus minimus* (Arizona mousetail). Note that Mary E. McDonald found the last three in the Conejos River drainage. If recent warming of the watershed (9) may account for some of these new arrivals, then one migratory pathway might be from the southwest (the Continental Divide at the New Mexico border in Archuleta County is only about 9,100’). ▶



Myosurus minimus (Arizona mousetail). Conejos County, Colorado July 7, 2019. © Mary E. McDonald

◀ All in all, FRGWC shows that for flowers the Rio Grande watershed in Colorado has been more 'open borders' than 'closed enclave'. So far FRGWC finds evidence for only three endemic or near endemic taxa: *Astragalus cerussatus* (powdery milkvetch), *Descurainia kenheillii* (Heil's tansymustard), and *Neoparrya lithophila* (Bill's parsley). Poncha Pass in the north, La Veta Pass to the east, and the low passes to the south in Archuleta and Conejos counties, all less than 9,400', have not served effectively as barriers to entry of species from the Central Rockies, the Great Plains, and the Southwest. Fully open, of course, is the great corridor of the Rio Grande itself. There are less than 10 species found in the watershed that are not found in the Rio Grande drainage farther south. These include *Smelowskia*



Neoparrya lithophila (Bill's parsley). Rio Grande County, Colorado Lookout Mountain just south of Del Norte May 20, 2016. © Richard Haswell

americana (American false candytuft) and *Potentilla ovina* (sheep cinquefoil).

Currently FRGWC charts floral distributions on a very rough scale. To map a more accurate floristic presence in the watershed will require a point distribution of species. And that will require a multitude of new observations, including targeted-area surveys of the kind already done for the Conejos River drainage by Patricia Douglas—1986-1988 (10); for the Baca National Wildlife Preserve by Pam Regensberg, Melissa Islam, and Janet Wingate—2006-2012 (11); for the Wilderness area of the southeastern San Juans by Mat Sharples—2013-2016 (12); and for La Botica by English, Yeatts, and Duran—2013-2017 (8). But who will pick the next sites and organize the surveys? A meaningful point distribution is a logical next step for FRGWC, but it will involve many thorny issues and require many willing hands.

In 2005 Richard Haswell retired from more than 40 years of college teaching. He specialized in evaluation of writing, on which he conducted studies, many of them empirical. Living in Del Norte of the San Luis Valley, he then took up wildflowers to keep out of trouble, off the streets and on the trails. Flora of the Rio Grande Watershed in Colorado could not have even been contemplated without the support of his wife, Jan, and his long-time colleague and computer guru, Glenn Blalock, who designed and maintains the site.

Haswell's home page is at

<https://sites.google.com/view/rhaswellhomepage>, and he can be contacted at haswellcomp@comcast.net.

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"Rio Grande Flora..." continued on page 9 ▶

Featured Story

Need for Seed: Be Part of the Solution

By Denise C. Wilson



Collected native plant seeds. © Denise C. Wilson

While it is well known among horticulturalists and other professionals that there is a critical shortage of native seed, two national events recently confirmed this for a larger audience. First, the National Academies of Sciences, Engineering and Medicine's publication of its final report on a three-year study, *An Assessment of Native Seed Needs and the Capacity for Their Supply: Conclusions and Recommendations* (1), which found that "almost all buyers of seed wanted native, yet 89 percent could not obtain it, regardless of time or price." And second, the recent National Native Seed Conference, *Cultivating the Restoration Supply Chain* (2), whose 200 presenters of workshops, talks, posters, and exhibits overwhelmingly restated the need for more native seed—and for paid workers and volunteers to collect the seed necessary to develop wild habitats and restore our precious public lands.

The results of the National Academies' native seed assessment pointed to seeds as the foundation, and a key limiting resource, for restoration efforts. The challenges are of time and space, since the process takes two to three years, from collection, evaluation, field establishment, growing, and storage, to the final step of restoration with native plants.

The report focused on the western United States, and included a survey conducted by interviews with growers, suppliers, and state-level users. The suppliers' main problems, according to the report, were the unpredictability of demand, the difficulty of

obtaining native stock seed, and the challenges of growing the seeds.

Recommendations include: structural organizational changes on a national level; better information sharing and partner communication; government support to suppliers; more research and development; and more widely distributed seed storage warehouses across the country.

The National Native Seed Conference provided valuable information about the collection, research, production, and use of native plant materials, and highlighted workshops in seed design mix and seed transfer zones.

The conference's most memorable presentation was by Elizabeth Leger, Foundation Professor of Biology and Director of the Museum of Natural History at the University of Nevada, Reno, who showcased her recent research. Her group found some surprising results in the high desert of the Great Basin. As Leger explained, we often assume that bigger and hardier plants are the ones that make it through drought; however, her group's recent research shows that both smaller plants, and *smaller seeds*, are more competitive under limiting conditions. Plus, they come up early and grab water, which suppresses cheat grass.

Although native seed collection can be physically demanding, it's also Zen-like, restful, and fun. Crews in National Parks have enjoyed some unexpected perks, too, like walking through petrified forests, and encounters with bison and wild horses. We have collected in areas not open to the public and watched ►



Denise with bags of collected native plant seeds.
© Denise C. Wilson



Seed collectors taking a break at Teddy Roosevelt National Monument. © Denise C. Wilson

◀ sunsets over beautiful pristine vistas. We have shared delicious community dinners and sat around (regulation) campfires. And we once enjoyed a posh ranch with kitchen stools made of saddles, and two snowy days bingeing on movies!


We need your help! We will be collecting at Carlsbad Caverns National Park October 12-16. Housing provided at this collection site. In addition, we will be collecting seeds at the Sand Creek Massacre National Historic Site and at Black Canyon of the Gunnison National Park in 2024.

Each of these projects need crew members, volunteers, and possibly a crew leader. Please call Denise Wilson at 303-588-6442, or email deniseclairewilson@gmail.com for more information.

A veteran of 12 years collecting for three seed banks through Chicago Botanic Garden, Denise C Wilson has more than 700 accessions to her credit. She also served

two years as Seed Collection Coordinator with Wildlands Restoration Volunteers, a non-profit which performs 16+ seed collection projects per year using volunteer labor. She has managed a dozen large-scale seed collections in seven western national parks, collecting from 50-400 lbs. bulk weight per project. She earned her MS from University of Colorado in Integrated Science with an emphasis in Botany, and is the Principal Plant Ecologist at Wilson Associates Inc.

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Proud seed collectors with their "haul." © Denise C. Wilson


◀ "Rio Grande Flora ..." continued from page 7

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Research and Reports

Colorado Field Botany Course

By Jacob Watts

Editor's note: Aquilegia uses Flora of Colorado, Second Edition by Ackerfield as its standard for botanical nomenclature. However, the field class reported in this article used Colorado Flora by Weber and Wittmann. Therefore, the names reported in this article reflect those in Colorado Flora. Go to <https://conps.org/wp-content/uploads/2023/10/Watts-Class-plant-list-1.pdf> to see the updated nomenclature, as well as complete lists of all species identified by the class.

During May 2023, undergraduate and graduate students at University of Colorado-Boulder's Ecology and Evolutionary Biology and Museum and Field Studies programs had the opportunity to traverse the state during a camping-style field biology course. This course, Colorado Field Botany, emphasizes the biodiversity, ecology, and evolution of the flora of Colorado. It was taught by CU botanist, lichenologist, professor, and curator Dr. Erin Manzitto-Tripp and her outstanding graduate student teaching assistant, Adele Preusser, and consisted of three one-week sections. Weeks One and Three were camping trips across Colorado's Eastern Slope and Western Slope, respectively, while Week Two consisted of local botanizing and independent study. The course's only textbooks were Weber and Wittmann's *Colorado Flora: Eastern Slope* and *Colorado Flora: Western Slope*.

On May 15, the class caravanned to its first destination: the Comanche National Grassland in the southeastern plains of Colorado. Once there and without delay, with the help of these field guides and knowledgeable and patient teachers, we began to "key" plants as a group, learning myriad botanical terms and concepts along with important concepts in plant ecology.

When using dichotomous keys, our group of amateur botanists was presented with a series of forks in the proverbial road to lead us to the identity of the plant confronting us. With 3,100 seed plant species in Colorado

to choose between, and students with little or no prior experience in the botanical sciences (Dr. Tripp believes in botany without borders—no prerequisites required!), one can imagine that this was at first a daunting task. However, students learned exceptionally quickly in the field, which is perhaps unsurprising given the overall efficacy of outdoor and experiential learning.

Dichotomous keys use defining characteristics of a given species to whittle down the list of possible identities in the form of contrasting couplets. For example, a key might describe plants as having parallel vs. netted leaf veins. This single characteristic guides the reader to select either monocots or dicots, greatly reducing the pool of possible identities. The key then proceeds with increasingly nuanced features that ultimately reveal its identity. Some difficulties arose when terms became highly technical or when the mystery plant seemed intermediate between the two options presented in a given couplet. It was at these moments that Erin and Adele stepped in and provided direction. Many a spirited debate arose between students about the density of trichomes on the abaxial surface of the leaves, or what Weber and Wittmann meant by "chaffy pappus"!

Through this process, repeated 20, 30, or even 40 times a day, we simultaneously learned plant names, technical botanical lingo, and emergent biological concepts (e.g., reproductive isolation, breeding system evolution, determinants of range size) at a blistering pace. We even began to skip parts of the key, as we could recognize the cross-shaped flowers of the mustard family (Brassicaceae) or the bilaterally symmetrical flowers characteristic of the pea family (Fabaceae), despite most students not having any prior experience.

We spent our days hiking and driving to search for new and interesting plants, whereas our mornings and evenings were spent around camp, preparing meals while discussing characteristics of the local habitats. We intimately engaged with the outdoors. We became students of the flora and the surrounding ecosystems and spent hours with craned, sunburned necks and single eyes closed, peering through hand lenses at tiny floral parts. It was not uncommon to drive hours out of the way to explore different and interesting habitats where we found new communities of flowering plants. Our "where to go" choices, although seemingly limitless in this vast state, were governed by the edaphic and/or climatic differences ►



Amateur botanists and teachers pose together on the northwest rim of Withers Canyon in the Picketwire Canyonlands of the Comanche National Grassland. We are overlooking dinosaur tracks, the Purgatoire River, and Dolores Mission, all features of this very special valley. © Jacob Watts



The Great Sand Dunes National Park on a magical day in the San Luis Valley. © Jacob Watts

◀ between sites along with camping accessibility. Immediately and without prompting, once we reached camp, we would excitedly set out to explore and learn new plants on our own or in small groups. We talked about plants around the fire, in the form of “Fireside Chat” assignments given to us as part of the syllabus and learning goals. Plants were the butt of all jokes. It was as if we had formed a band of plant-crazed botanists living our best lives together in the Colorado wilderness. We all felt the field course was a much-needed break from society and an entrance into nature and all it can teach.

And boy, did nature teach! All we needed to do was look closely. During Week One, we visited Withers Canyon in the Comanche National Grassland, Great Sand Dunes National Park in the heart of the San Luis Valley, and a stunning Bureau of Land Management (BLM) campsite just north of Cañon City. Between each campsite, we made stops at points of botanical interest. Bushwhacking and traversing 12 trailless miles through Withers Canyon with little to no shade on the first day proved challenging yet fruitful. We saw (or accidentally kicked!) nearly every cactus species in Colorado on one hike, learned close to 10 new plant families, stood where dinosaurs once stood on the banks of the Purgatoire River (a tributary of the Arkansas River), and took a much-needed cold soak in the river. We welcomed the sunset after that long and grueling day—spirits rose as the temperatures plummeted.

One day later, after a hint of car trouble and a dash of gas station snacks, we found ourselves in the mysterious San Luis Valley, the largest high altitude desert valley in the world. It was in a pinyon-juniper (PJ) forest on the western slope of the Sangre de Cristo Mountains that we learned the first member of the Asteraceae family and all the botanical jargon that accompanies it, not a mile from a desolate sand dune habitat nearly devoid of plant life.

Our Week One trip came to a close after a few soggy nights at a climbers’ paradise—a BLM campsite along Shelf Road north of Cañon City. There we learned some incredible geology along with the tropical remnants of the Colorado flora, including constituents of the citrus family Rutaceae (*Ptelea trifoliata*, common hoptree), coffee family Rubiaceae (*Galium* spp., bedstraw), and mango/pistachio family Anacardiaceae (*Rhus trilobata*, three-leaf sumac). Limestone bluffs checkered with cushion plants of all kinds towered over the surrounding red, sandy washes. A member of the most diverse genus in the world, *Astragalus* (milkvetch, Fabaceae family), stumped even our professor and teaching assistant. Craving more, we even took late-night botany hikes as the rain momentarily let up. As new students of nature, our eyes were opened to the diversity and ecology of plants around us, and we were sent home to discover Boulder, our hometown, in a brand new, shining light.

At dawn the following Sunday, the summer band of student botanists set out once again, this time for western Colorado, armed with our Western Slope floras, our hyped-up enthusiasm, and our new appreciation for (and knowledge of) plant biodiversity. Little did we know the day that awaited us, for our campsite was in an unknown, faraway land. The original, intended target was Rifle, CO; however, hordes of Memorial Day campers and public roads turned private prevented the caravan from setting up camp in the area. In an impromptu yet democratic decision made at a ripe 6:30 PM, we set our sights on the Book Cliffs north of Grand Junction, a mere two-hour drive from where we had botanized all day. A few moments prior to sunset, we settled on a secluded, idyllic campsite on BLM lands abutting a rare and remarkable desert stream—a desert oasis long sought after. The class was: HAPPY! ▶



The Black Canyon of the Gunnison National Park from the Pinyon Draw Trail. © Jacob Watts

◀ The following day, we hiked from camp into a remarkably steep-walled and narrow desert canyon, keying and learning: *Calochortus nuttallii* (sego lily), *Ipomopsis aggregata* (scarlet gilia), *Fraxinus anomala* (singleleaf ash), and others. Late lunch was back at our desert campsite, and to escape the heat, we drove to the Colorado River for riparian botany and a much-needed dip into the Colorado River, flowing fast and high owing to the state's high snowmelt. Back at camp, sunset brought an exquisite view of the serpentine canyons of the Colorado National Monument while students presented "Fireside Chats" hiding in the long shadow of a student's truck. More botany the next day, and two nights later, we headed south for a botanical pit stop in Dominguez-Escalante National Conservation Area. We hiked all afternoon after a 20-mile drive down a terrible dirt road, finding a series of canyon springs and identifying nothing short of 14 species including *Yucca harrimaniae* (Spanish bayonet) and *Townsendia annua* (annual Townsend's daisy). We retreated after a late lunch, making our way to Black Canyon of the Gunnison National Park where we set up camp for the remainder of the course.

The upper valley was in full, glorious flower: as floriferous as any had ever seen it, reminiscent of the bountiful botany of the Cerrado biome in Brazil. We identified many species that afternoon, including *Amelanchier utahensis* (Utah serviceberry) and *Balsamorhiza sagittata* (arrowleaf balsamroot). These plants were so common that they painted the landscape a surreal white and yellow. The next morning, we set out for the biology hike of our lifetimes: descending the Pinyon Draw Trail, which traverses over 2,000 feet vertical gain in less than a mile (so steep that it is also sometimes called a route rather than a trail). We botanized all the way down, climbing through at least three distinct altitudinal zones of plant communities, until reaching the roaring, screaming Gunnison River. People took their time swimming and bathing in the bottom prior to the long, steep, scrambling, on hands and knees trek back uphill to camp. Deep within the canyon, we found *Oenothera caespitosa* (tufted evening-primrose),

Thelypodopsis juniperorum (juniper tumble-mustard), *Physaria rollinsii* (Rollin's twinpod), *Mahonia repens* (creeping Oregon grape-holly), *Echinocereus coccineus* (claretcup cactus), *Opuntia fragilis* (brittle pricklypear), and maybe even some new meaning to life.

After traversing much of Colorado with the sole purpose of learning new plants and building our knowledge and appreciation of the surrounding native landscapes, our field practical (given to us in the beautiful, floriferous Black Canyon!), asked us to describe leaf margins, pubescence, shape, floral morphology, and ID plants on our own. The written



Thelypodopsis juniperorum (juniper tumble-mustard) encountered in the Black Canyon of the Gunnison National Park. © Jacob Watts

portion of the exam asked us what inspired us, what were the primary plant communities we visited, and why did we value learning something new about plant biodiversity. Through those minutes, hours, and days, each of us had become independent botanists, a beautiful end to the course of a lifetime. When all was said and done, through the course we encountered and identified 138 species together! After its conclusion and our return to Boulder, the class stuck together, joining up for dinnertime events and more botanical fun. We were already plotting a reunion. We are thankful to our department and to the university for supporting our journey, which left us with many new life skills, perspectives, and memories to last a lifetime.

Jacob Watts is a broadly-interested ecologist, botanist, and lichenologist. His interest in nature started at a young age and has steadily grown since. He studied tropical fern reproductive ecology as an undergraduate student, root functional traits as a master's student, and now lichen ecology and ecophysiology as a PhD student in Erin Manzitto-Tripp's lab, Department of Ecology and Evolutionary Biology. Though his interests are broad, the underlying questions that guide his research often have to do with how plants and lichens interact with and adapt to varied environments. Outside of research, he is an avid nature-enjoyer, whether that be on skis, in a kayak, or on foot. Field trip participants: Professor – Erin Manzitto-Tripp; Graduate Teaching Assistant – Adele Preusser; Students – Maya Bliss, Giorgio Casini, Julia Dessart, Tate Ellis, Lucy Figueroa, Skylar Graves, Brendan Norman, Seth Raynor, Elton Springman, Jacob Watts, Gio Wilson. ☺

Research and Reports

The 2023 Gunnison Water Wise Pollinator Workshop

By Aleshia Rummel

CoNPS annually funds grants to support field and laboratory research and as part of its John W. Marr, Myrna P. Steinkamp, and Mission grant programs. Reporting on projects is a requirement of all grant recipients. We are pleased to feature the following report from one of our Mission grant recipients (<https://conps.org/mission-grant/>).

The Gunnison Conservation District (GCD) worked with its partners, Bird Conservancy of the Rockies and Bureau of Land Management (BLM), to host a Water Wise Pollinator Gardening Workshop on June 9, 2023, at the newly constructed BLM building in Gunnison. Twenty-six people attended the workshop, whose agenda and topic selection were primarily in response to feedback from a similar workshop held in 2022.

First, Steve Armstead of the Xerces Society provided an overview of pollinators and their associations with native plants, as well as best management practices for supporting pollinator habitat.

Next, Melissa Schreiner, entomology specialist at CSU Extension, discussed gardening for beneficial insects and common pollinators of Colorado's Western Slope. She brought specimens including butterflies, bees, flies, and more for workshop attendees to view. Next, Gay Austin, retired botanist from the Gunnison BLM and US Forest Service, explained how to propagate common native plants of the Gunnison Basin. She showed how and where she incorporated them into her own crevice garden at her house in town, and discussed why certain species did better in different locations. Following Gay's talk, Rachel Miller of the BLM reminded workshop attendees of the agency's seed collection regulations.



Workshop participants plant native plant species in the newly constructed BLM building's garden. © Marcella Tarantino, Bird Conservancy of the Rockies

The final talk, from Aleshia Rummel of the Gunnison Conservation District, illustrated several principles of designing visually appealing landscaping and gardens, including layout and color, then provided resources for finding or creating garden layouts.

After the speakers concluded their talks, the participants moved outside for a service-learning component, where the BLM ecologist discussed why certain plant species were going to be planted in different parts of their native plant garden based on conditions, naturally available moisture, soils, and more. Volunteers then planted these native plants using that layout and mulched the bed to conserve water and prevent noxious weed infestations. This garden will later receive interpretive signs labeling each native plant, including their traditional uses to the Ute Mountain Ute tribe.

To further their knowledge, participants received a goody bag of educational materials and supplies, all of which was funded by the Bird Conservancy of the Rockies, the Colorado Native Plant Society Mission Grant, and the Colorado Department of Agriculture and US Forest Service Disaster Mitigation Funds. Each bag included a pair of gardening gloves, a trowel, a low-moisture, pollinator-friendly seed mix specific to the Gunnison Basin, an Audubon Society sticker encouraging the use of native plants, and a handful of guides and pamphlets including:

- CoNPS's *Low-Water Native Plants for Colorado Gardens: Mountains 7,500' and Above*;
- CoNPS's *Low-Water Native Plants for Colorado Gardens: Western Slope - Below 7,500'*;
- Gunnison Conservation District's *How to Successfully Seed Wildflowers in Gunnison*; ►



Steve Armstead of the Xerces Society provides an overview on pollinators and gardening, and best management practices to support them. © Marcella Tarantino, Bird Conservancy of the Rockies



Workshop participants mulch the newly planted native species. © Marcella Tarantino



Some of the reference guides and supplies in each workshop participant's goody bag. © Marcella Tarantino

- ◀ GCD's *Xeriscaping for Water Wise Gardens*;
- CSU-Extension's *A Beginner's Field Guide to Identifying Bees*;
- The Butterfly Pavilion/Colorado Native Plant Society's *10 Steps to a Pollinator Garden*;
- USDA's *Bee a Friend to Pollinators*;
- Point Blue Conservation Science's *Pocket Guide to Sagebrush*;
- USDA Forest Service's *Attracting Pollinators to Your Garden Using Native Plants*; and
- CoNPS's *Low-Water Native Plants for Pollinators*.

The GCD thanks the Colorado Native Plant Society for

the Mission Grant, which was used to pay speakers and their travel fees, and to provide some of the materials for the goody bags.

Aleshia Rummel works for the GCD, a grassroots organization and local government unit that addresses conservation concerns of landowners within our district by encouraging the protection and enhancement of natural resources. Aleshia Rummel has worked for the GCD for five years, often working on the planning and implementation of Farm Bill programs throughout the Gunnison Basin, in addition to other projects addressing natural resources management through workshops, cost-shares, and incentives opportunities. The GCD has hosted several workshops often in coordination with the local Bird Conservancy of the Rockies private lands wildlife biologist, Marcella Tarantino. For more information on the workshop or other programs with the GCD, please visit www.gunnisonconservationdistrict.info, or contact Aleshia Rummel at aleshia.rummel@co.nacdnet.net 🌱

The Dove of Evening

By Arthur Clifford

Who can name such innocence?
 Hear its budding cry
Oenothera cespitosa: The Dove of Evening
 Before the dawn to die
 Yet we have walked... Oh Lover Mine!
 Can any other paint possibility?
 Scent Heaven's face sublime?
 Together we sing in mountain halls
 Mertensia chime o'er waterfalls
 We've blossomed together Beloved One
 Just one day...
 One morning sun



Oenothera cespitosa (tufted evening-primrose), Rocky Mountain Arsenal Wildlife Refuge. © Kelly Ambler

The Conflict between Rare Plant Conservation and Extractive Industries

By Josh Carrell

As discussed in the Conservation Corner of the Fall 2022 issue of *Aquilegia*, rare plants of Colorado are under threat from the oil and gas industry (1). Threats manifest in a variety of forms and levels of severity. Unpaved road usage, common at oil and gas sites, contributes to habitat fragmentation, dispersal barriers, and increasing dust loads, which can diminish plant growth and reproductive potential (2). In turn, noise, dust, and turbulence influence the distribution and density of pollinators, which indirectly impact plant health (3,4).

Lastly, oil and gas infrastructure development destroys oil shale, a sensitive habitat for the plants that occupy it.

These developments threaten rare plants far beyond the Centennial State. Our borders overlap with an ecoregion of intensifying conservation conflict: the Colorado Plateau, a biodiverse and energy-rich ecoregion located in the Intermountain West (Figure 1A). The Colorado Plateau boasts profuse oil and gas resources. Due to underlying geological and edaphic (soil) conditions, plant biodiversity hotspots occur but are severely limited in their distribution to small, discrete ranges (Figure 1B). As a result, many plant species are placed under federal and state management plans due to their rarity. In addition to limited range size, plant-species endemism and oil and gas development potential significantly overlap in geographic distribution (5).

Recently, I partnered with researchers in the Quinney College of Natural Resources at Utah State University, examining the conflicts between rare flowering plant conservation and the oil and gas industry of the Colorado Plateau. This resulted in the publication of a manuscript, *Balancing Rare Species Conservation with Extractive Industries*, from which excerpts of this article are drawn. We found that societal interests regarding biodiversity conservation and natural resource extraction are diverse and often conflicting. We all rely on oil and gas products as a society, the development of which isn't inherently "evil," though we often feel that way when it conflicts with other interests such as plant conservation. In fact, the prospect of maximizing oil and gas development and extraction while simultaneously conserving the total landscape of rare species may be desirable to the general population. However, that outcome is simply not possible. Regardless of wants or desires, there are two truths regarding the oil and gas industry of the Colorado Plateau—energy development and extraction will continue to grow; and rare plants will continue to be at risk. With the understanding that we cannot choose only one or the other, we questioned: "With the high number of flowering plant species qualifying for listed status under the Endangered Species Act or being considered of concern by Non-Governmental Organizations (NGOs) like NatureServe, and the increasing global demand ►

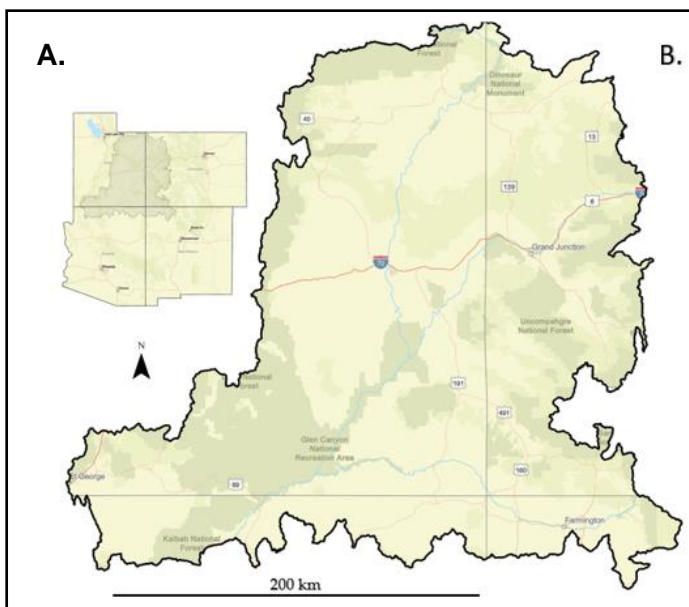


Figure 1. A. The Colorado Plateau. B. Graham's beardtongue (*Penstemon grahamii*) situated among loose oil shale. © Robert Fitts, UNHP

◀ for oil and gas resources, how can conflicting conservation and energy demand objectives be mutually satisfied?”

To assess options, we used a combination of methods in Species Distribution Modeling (SDM) and Spatial Conservation Prioritization (SCP). SDM is the process of using species occurrence records and environmental predictors (e.g., climate, soil type, slope, etc.) to generate spatially explicit maps of habitat suitability of a given species across a given geographic boundary. SCP is the process of systematically selecting potential locations for conservation action at an optimal financial cost, while simultaneously considering external risks or restrictions. To make these calculations, we used Marxan conservation-planning software.

To begin, we developed habitat suitability models for 29 rare flowering plant species (Figure 2). Then we examined the distribution of current oil and gas infrastructure, oil and gas development potential, and land ownership associated with predicted plant habitat suitability. We

also included the financial cost tied to both wellhead restoration and land ownership as a function of optimization. We developed various scenarios to identify the optimal locations for conservation action. Our approach optimized conservation of 29 flowering plant species by selecting the minimum number of planning units required to cover 30 percent (a common conservation objective) of each species’ distribution and habitat at the lowest financial cost (6-8). By minimizing the number of units selected for conservation action, we not only minimize financial cost but also reduce areas of high energy development and potential from conservation efforts. These results provide not only options for land managers in areas with extractive industries but identify specific spatial zones for conservation action.

To inform our modeling process, we used spatial data linked to oil and gas development and potential, oil and gas well pad location, and land ownership. There is considerable oil and gas development potential within the northern sections of the Colorado Plateau (9), primarily in Utah and Colorado (Figure 3A). Stunningly, there are approximately 63,000 active and

26,000 abandoned oil and gas well pads in the Colorado Plateau (Figure 3.B), distributed across public and private lands (Figure 3.D).

Our study concluded that there is no feasible solution that allows for conserving 100 percent of the rare plants and continuing with oil and gas development at current standards. However, we did achieve a spatially optimized solution by selecting specific locations that may conserve 30 percent of suitable habitat on public lands for the 29 plant species examined, while accounting for oil and gas development risk. This is a success given the complex nature of the land use of the Colorado Plateau. However, financial costs associated with the solution are at a staggering \$14.72 million, far beyond the

financial capabilities of most organizations hoping to conserve rare flowering plants.

Additionally, we found there are a variety of barriers to rare plant species conservation when examining the roles of extractive industry, land ownership, and social tendencies. Regarding the oil and gas industry, we found it was

impossible to use well pad royalty costs to inform our study and provide a more accurate assessment, as they are proprietary information. Our study, which used estimated restoration costs tied to well pad reclamation, found that it costs approximately \$24,500 to restore a single well pad (10). This cost is known among oil and gas infrastructure owners, who often abandon sites and declare bankruptcy once a well is depleted. Though arguably irresponsible, this is a common practice.

Regarding land ownership, we argue that public lands are more suitable than private land for the conservation of rare plants. There are options that provide incentives for private and tribal landowners to cooperate with species conservation policy; for example, conservation easements or conservation banking (11,12); however, these too often result in inefficient species conservation (13). Additionally, the Endangered Species Act of 1973 Section 7, requires federal agencies to consult with the US Fish and Wildlife Service (FWS) or National Oceanic and Atmospheric Administration (NOAA) to ensure that any proposed activity on public lands will not ▶

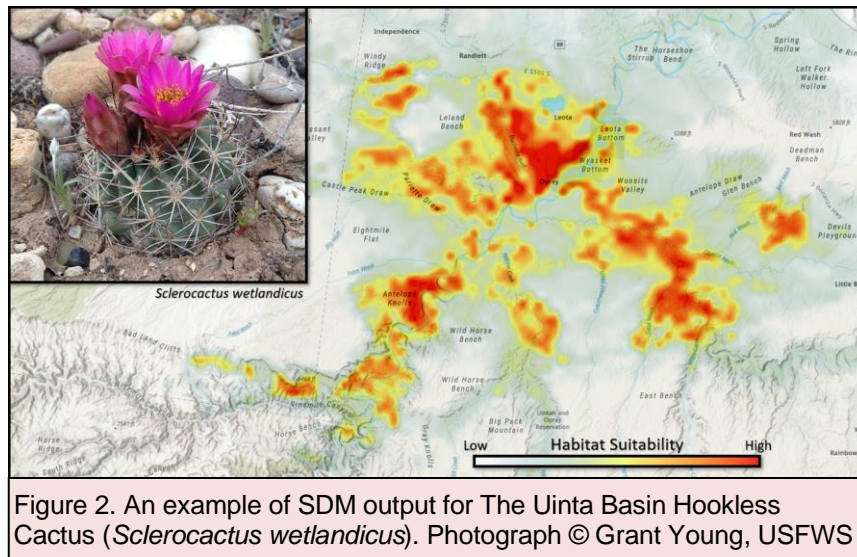


Figure 2. An example of SDM output for The Uinta Basin Hookless Cactus (*Sclerocactus wetlandicus*). Photograph © Grant Young, USFWS

◀ adversely modify or destroy critical habitat of a listed species (14). Private lands, however, may compromise habitat through incidental take permits that allow for land modification under a personal habitat-conservation plan submitted by the property landowner, even while under the same obligations of the ESA (15).

Additionally, plant species conservation, which may be best assessed at large ecoregional scales, is subject to geopolitical boundaries, which overlap natural processes with societal and political beliefs. The 29 species observed in our study represent approximately 63 percent of the rare flowering plant species found in the Colorado Plateau, many of which are found in Colorado (Figure 3D). However, political governance often inhibits conservation efficacy in transboundary regions (16,17). This can be due to restrictions on data availability and public data sharing designated by state, regional, or federal organizations, which impacted outcomes found in this research. Lastly, and most shockingly, surveys suggest ecologists limit data sharing ranges from insufficient data management, concerns for data misinterpretation, and jealousy (18).

The issues addressed regarding rare flowering plant species in the Colorado Plateau mirror those found

throughout any locale undergoing energy development and extraction. There are options that may lead to the long-term conservation of species, but due to resource demand, geopolitical boundaries and agendas, and social inclinations, we are unable to meet them. Protecting rare plants in landscapes of energy extraction will require mutual coordination among diverse stakeholders, unlike any we have ever seen before. Although observations suggest otherwise, we can hope!

*Josh Carrell is a PhD student of Forest Sciences at Colorado State University. He currently studies high elevation forests and climate variability in the Colorado Front Range. He's the lucky husband of April, a dessert connoisseur, and owner of two rowdy pups. He can be contacted at jcarrell@colostate.edu To view the full article, Carrell et. al, *Balancing Rare Species Conservation with Extractive Industries*. Land. 2022. visit: https://www.researchgate.net/publication/365298563_Balancing_Rare_Species_Conservation_with_Extractive_Industries*

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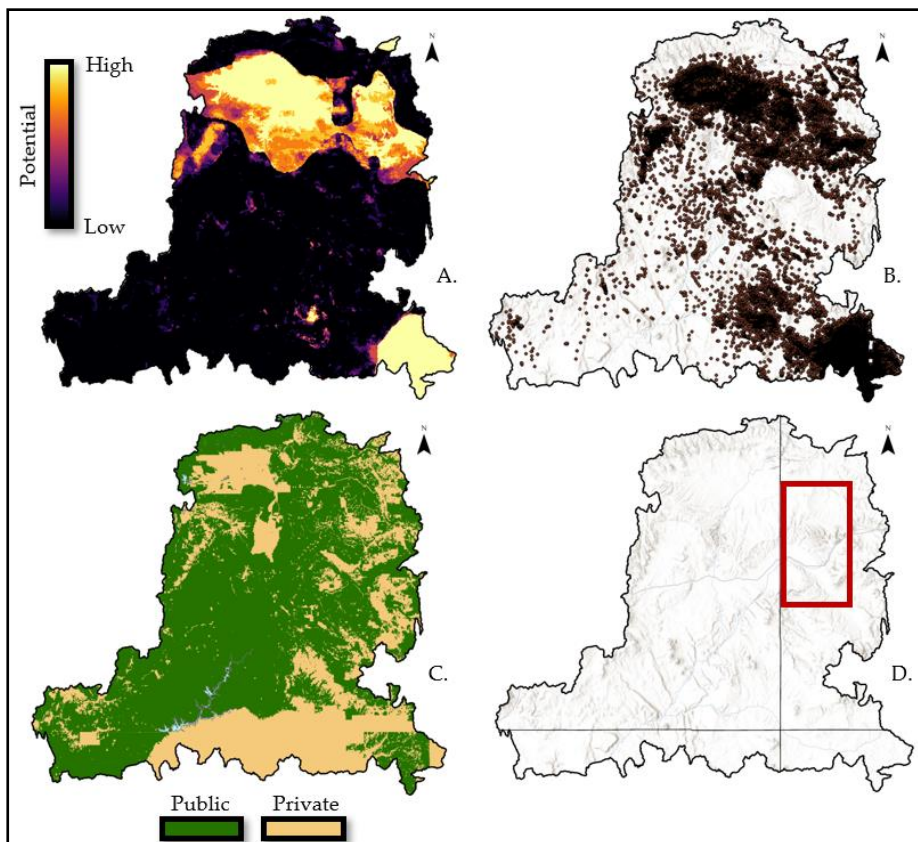


Figure 3. Spatial data examined during study optimization. A. Oil and gas development potential model from (19). B. Oil and gas well pad locations. C. Public and private land tenures. D. Generalized location of rare flowering plants at risk within Colorado, outlined in a red rectangle.

“Rare Plants...” continued on page 19 ▶

Garden Natives

Gumbo Lily (*Oenothera cespitosa*)

By Jim Borland

Gumbo lily, what a great name! Half of the name evokes memories of large white, yellow, orange, or reddish trumpets heralding the summer from tall, stately stems. The other half fills the mind with thoughts of sticky, clinging clay that fouls the garden spade as tightly as it does the tires of a four-wheel drive SUV on holiday in a rainstorm.

Who makes up these names? Was there one person charged with dreaming up common names for uncommon plants as settlers moved their lives and their gardens ever westward? If so, they changed the names depending upon where they stopped to make a living and raise their families. Gumbo lily is also known as butte primrose, tufted evening primrose, and white stemless primrose. It is, however, neither a lily nor a primrose and, for several subspecies, not stemless.

Gumbo lily belongs to the very large evening primrose family that is comprised of 21 genera and between 600 and 700 species of annuals, biennials, perennials, trees, and shrubs. The *Oenothera* genus, to which gumbo lily belongs, is made up almost entirely of day- or night-blooming annuals, biennials, and perennials, including several aquatic representatives. There are three types or subspecies of the perennial gumbo lily that one may encounter along the Front Range, either in the wild or in the garden center: *O. cespitosa* var. *cespitosa*, *O. c.* var. *marginata*, and *O. c.* var. *macroglottis*. All three subspecies are relatively short, no more than a few inches tall when in full bloom from mid-spring through summer. The rest of the year, the plant is a rosette of green to blue-green leaves. All are essentially stemless and may be found with rather smooth, long leaves with serrated edges.

Subspecies *marginata* is often covered with silvery hairs that add an extra attraction. This subspecies is more adaptable to various soil types than the others,

thriving in everything from tight clays to loose shales, a feature that probably explains its wide distribution throughout the plains and mountains of the upper west. Depending upon the race or ecotype of the seed from which it was grown, it may spread via root sprouts in the garden, eventually creating a colony of night-blooming, hummingbird-moth-attracting, large, pure white flowers.

Each four-petaled flower lasts but a single night, opening in the evening and turning pink as the sun rises each morning, but lasting longer on cloudy or cooler days. Not to worry, however, following buds swell quickly and open the next evening displaying more sweet-smelling blossoms up to four inches wide.



Oenothera cespitosa (tufted evening primrose), North Park, Colorado. © Kelly Ambler

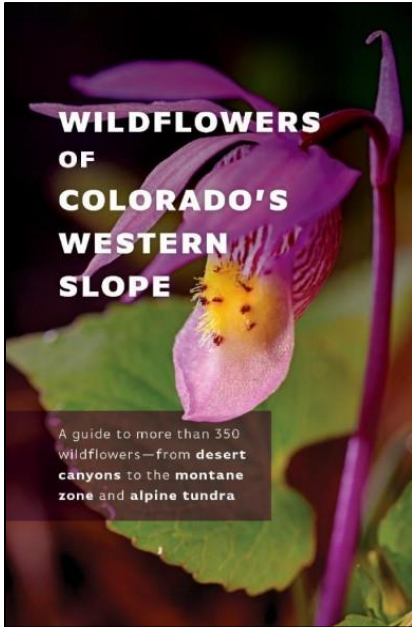
Gumbo lily is easy to grow from seed (started indoors or outdoors) in spring, with expectations of full-size, long-lasting blooming plants the following spring. If the seeds from which you start your own plants are from a similar latitude and elevation as your garden, then do not water your plants once they are established in full sun. Having evolved in a low precipitation climate, gumbo lily does not appreciate amended soil and extra moisture; such tender-loving care is likely to be rewarded with a dead plant.

In the wild, there is a subspecies or ecotype of gumbo lily for any garden soil in any western cold-hardiness zone from 3,000 to 11,000 feet. Can you beat that?

Jim Borland has been fooling around with native plants for more than 40 years in private, commercial, and public venues. His home garden contains thousands of native plants, most grown from seed at home and not supplementally watered for 20 years. Jim has written hundreds of articles, given talks too numerous to count, and continues to grow and plant the two or three native plants not yet in his garden.

Ed. note: previous spellings of the species name include "caespitosa". ☺

Book Review



Wildflowers of Colorado's Western Slope

By Mary Menz and Jim Pisarowicz

Review by Cathi Schramm

Mary Menz and Jim Pisarowicz are stalwart members of the CoNPS family. Jim's stunning photos grace our publications and social media, and Mary's editorial acumen was critical in building *Aquilegia* into the fabulous magazine it is today. Both Jim and Mary

Each of the more than 350 flower entries, grouped by color, sports at least one, and often two, gorgeous color photos providing excellent detail to help in identifying the plant. When a flower has a common color variation, an interesting seed head or fruit, or when the plant's overall form is important to an accurate ID, the book provides that key information. The entries include both common and scientific names, pollinators that the plant serves as a host for, uses by Native Americans, tidbits of Colorado history from a botanical perspective, and more. The introductory pages offer guidance on how to observe flowers, have a greater impact on the future of native plants (citizen science!), and have less of a negative impact on the ecosystems the flowers call home.

offer frequent wildflower hikes and talks across the Western Slope and have contributed immensely to the public's knowledge of Colorado native plants. Knowing this, one would expect their guidebook, *Wildflowers of Colorado's Western Slope*, to be filled with beautiful images and informative text for newcomers and native plant masters alike. This book does not disappoint!

I'm happy to spend time leafing through this lovely book to find the flower I'm looking for! It's a fun read and full of eye candy. It would make a great companion on your next Western Slope wildflower expedition! You can find this book in the CoNPS bookstore (<https://conps.org/home-2/conps-store/#!form/StorePlantBooks>).



◀ "Rare Plants..." continued from page 17

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News, Events, and Announcements

Please check the **Calendar of Events** online at <https://conps.org/event-calendar-2/#!calendar> for up-to-date information on webinars, chapter meetings, garden tours, field trips, and other events.

CoNPS may offer some chapter meetings, workshops, and lectures as webinars or other online meetings. Others might be postponed or canceled. Information will be posted online and will be promoted via the CoNPS E-News.

CoNPS-Sponsored Events

Ethnobotany Workshop – Traditional Uses for Local Plants

October 21, 10:00 AM – 12:00 PM

Hosted by the Southwest Chapter

Many familiar local plants have traditional uses among Native Americans and early Hispanic and Anglo settlers, such as food, beverages, dyes, and materials for household items such as baskets. Donna Thatcher, retired coordinator of Riverside Nature Center in Farmington, has years of experience in ethnobotany. She will demonstrate some of these uses, and we will make samples of things to taste and dyes to take home. A helpful handout will list botanical names and uses. (*Event is full.*)

CoNPS Board Meeting

October 22, 4:00 – 5:00 PM, virtual

Hosted by CoNPS Board of Directors

All CoNPS members are welcome to attend board meetings. Attend to meet our new President, Alex Smith, and Vice-president, Alex Crochet. Are you interested in getting more involved in CoNPS? We are recruiting new members for the Board of Directors.

CoNPS Committee Efforts

Each committee meets monthly in order to coordinate efforts. All are welcome to attend; please register through the CoNPS calendar to receive a link to the virtual meetings.

Conservation Committee

Meets as necessary

The Conservation Committee focuses on commenting upon legislation and other actions concerning the welfare of native plants.

Education and Outreach Committee

Third Wednesdays, 6:30 – 8:00 PM, virtual

Led by Kathy Okon

The CoNPS Education Outreach Committee serves to educate the general public about native plants. The Committee has three focus areas: Adult Programs,

School/Youth Programs, and Community Outreach Activities. Committee members will be presenting educational programs, as well as staffing booths at community events and completing a variety of other community activities. If you would like to help with community events, etc., please contact Kathy at conpsworkshops@outlook.com

Field Studies Committee

Meets on second Wednesdays of the month

12:00 – 1:00 PM, virtual

Led by Gwen Kittel

The Field Studies Committee is working to revive the Adopt-a-Rare Plant program in partnership with Colorado Natural Heritage Program. We are also working on the Todd Gulch Fen Phenology project.

Grants and Scholarships Committees

Meets on third Thursdays of the month

8:00 – 9:00 AM, virtual

Led by Anne Beard

Horticulture Committee

Meets on third Mondays of the month

12:00 - 1:00 PM, virtual

Led by Ann Grant

The Horticulture Committee manages BudBurst, a citizen science project (<https://budburst.org/about-us/our-partners/colorado-native-plant-society>), and coordinates garden-centric events.

Media Committee

Meets on third Tuesdays of the month

8:00 – 9:00 AM, virtual

Led by Kelly Ambler

The Media Committee has been exploring ways to inform the general public about the importance of native plants. As such, we plan on distributing print copies of *Aquilegia* to libraries and other entities.

And are you attending any CoNPS-sponsored events? How about submitting a summary and/or photos of your activity to *Aquilegia* or posting on social media? We would love to hear from you! ►

◀ Restoration Committee Meeting

Meets on third Fridays of the month

12:00 – 1:00 PM, virtual

Led by Maggie Gaddis

Please join us as we work to define our restoration-oriented work. This year, we are focusing on our USFS-CNHP partnership to develop the USFS Region 2 Rocky Mountain Plant Materials Program. We are collecting seeds all over the state as our primary engagement. We have already been an integral part of the species selection process and pilot season efforts.

CoNPS Events

CoNPS Booth at CSU Extension's Tri-River Annual Plant Sale in Grand Junction

October 14, 9:00 AM – 1:00 PM

SE Chapter Native Seed Collection

October 16, 3:30 – 5:30 PM

SE Chapter Virtual Meeting – Member Favorite Photos Slideshow

October 17, 6:00 – 8:00 PM

NOCO Seed Cleaning

October 19, 4:00 – 6:30 PM

Volunteer with Us at University Hills Farmers Market

October 21, 8:30 AM – 1:30 PM

SE Chapter Native Seed Collection

October 23, 3:30 – 5:30 PM

SE Chapter Native Seed Cleaning

October 30, 3:30 pm - 5:30 PM pm

Up in the alpine: the history and future of research at the Mountain Research Station

Speaker: Scott Taylor, Mountain Research Station

Hosted by: Boulder Chapter

November 1, 7:00 – 8:30 PM

Metro-Denver Seed Swap

November 4, 10:00 AM – 1:00 PM

Pikes Peak Region Native Seed Share

Hosted by: CoNPS, WildOnes, Manitou Pollinators, and Manitou Seed Library

November 5, 3:00 – 5:00 PM

NOCO Seed Swap

November 12, 10:00 AM – 1:00 PM

2023 CoNPS Annual Conference Talks Revisited

Virtual

15TH of every month, 7:00 – 8:00 PM

Cross-Pollination Events

October 8-15

National Wildlife Refuge Week

<https://www.fws.gov/story/national-wildlife-refuge-week>

October 17-19

NA Pollinator Protection Campaign meeting

<https://www.pollinator.org/nappc/conference>

October 18

CO Section Society Range Management

<https://www.cssrm.org/events.html>

October 24

International Day of Climate Action

October 24-31

Bat Week

<https://batweek.org/>

October 30-31

Upper Colorado River Basin

<https://collaborativeconservation.org/events/12th-annual-upper-colorado-river-2023-water-forum/>

November 2

Natural Areas Conference

<https://www.naturalareas.org>

November 4

National Bison Day

November 5

Rocky Mountain NARGS annual banquet

<https://rmc-nargs.org/events/>

November 6

Pollinator Summit

<https://tickets.butterflies.org/Selection.aspx?sch=85445>

November 16-18

SER Southwest Chapter

<https://www.ser.org/events/EventDetails.aspx?id=1766587&group=>

November 29-30

Western Weed Coordination Committee meeting

<https://westernweed.org/events/2023-meeting/>

December 5

World Soil Day

<https://www.fao.org/world-soil-day/en/>

December 6-7

Colorado Weed Management Association Winter Training

<https://cwma.org/>

December 11

International Mountain Day 🌄

Become a CoNPS Member

Name _____
 Address _____
 City _____ State _____ Zip _____
 Phone _____
 E-mail _____
 Chapter (if known) _____

- New
- Renewal
- Student \$17
- Senior (65+) \$17
- Individual \$25
- Family \$35
- Plant Lover \$50
- Supporting \$100
- Patron \$250
- Benefactor \$500
- Life Member \$800

Printed Color Copy of the magazine, *Aquilegia*, \$20

CHAPTERS: Boulder, Metro-Denver, Northern (Ft. Collins-Greeley), Plateau (Grand Junction and West Slope), San Luis Chapter (Crestone, Alamosa, Salida), Southeast (Colorado Springs-Pueblo), Southwest (Durango), or Unaffiliated

If this is a change in address, please write your old address here.

Address _____
 City _____ State _____ Zip _____

Check box to receive information on volunteer opportunities

DUES include the electronic version of the *Aquilegia* magazine, published quarterly.

The full color electronic publication arrives by PDF in member email boxes in February, May, August, and December. For those members without email addresses, please apply for a scholarship to receive print copies.

Membership dues cover a 12-month period.

You may also join online at <https://conps.org/join-donate/>

CONTRIBUTIONS to CoNPS are tax deductible:

John Marr fund for research on the biology and natural history of Colorado native plants \$ _____

Myrna P. Steinkamp Memorial fund for research and other activities to benefit the rare plants of Colorado \$ _____

Alice Eastwood Scholarship fund to help support undergraduates pursuing bachelor's degrees that ultimately advance the mission of the Society \$ _____

Mission Grant to support the mission of the Society \$ _____
 Total included: \$ _____

Please make check payable to:
Colorado Native Plant Society

Send completed form and full remittance to:
 CoNPS Office
 1536 Wynkoop Street, Suite 911
 Denver, CO 80202



2022 CoNPS Annual Conference Sponsors



Can You Identify These San Luis Valley Native Plants?



Answers (clockwise from upper left): *Asclepias hallii* (Hall's milkweed, Apocynaceae), *Dieteria bigelovii* (Bigelow's tansyaster, Asteraceae), *Tripterocalyx micranthus* (smallflower sand verbena, Nyctaginaceae), *Ipomopsis longiflora* (long-flowered gilia, Polemoniaceae), *Mirabilis linearis* (narrowleaf four o'clock, Nyctaginaceae), and *Ericameria nauseosa* (rubber rabbitbrush, Asteraceae). © Carol English



Colorado Native Plant Society

a non-profit organization dedicated to furthering the knowledge, appreciation, and conservation of native plants and habitats of Colorado through education, stewardship, and advocacy

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904 E. Boulder St.
Colorado Springs, CO 80903

December 5



Show your appreciation and support of local nonprofit organizations by making a donation. Early giving starts November 1.
<https://www.coloradogives.org/organization/ColoradoNativePlantSociety>

47TH Annual CoNPS Conference, September 23-24 ***Flora of the San Luis Valley: History, Culture, and Science***



Look for stories from the annual CoNPS conference in the next issue of *Aquilegia*