

Newsletter of the Colorado Native Plant Society

Aquilegia

**Over 45 Field Trips!
See inside!**

FIELD TRIP ISSUE

**Advocacy! Conservation Corner Reports Survey Results
Taking Native Plants to School
Meet the North American Native Plant Society**

Volume 38, No. 1 Spring 2014

Aquilegia: Newsletter 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

Volume 38 Number 1 Spring 2014 ISSN 2161-7317 (Online) - ISSN 2162-0865 (Print)

Message from the President

Please welcome our first advertiser, Harlequin's Gardens. Their color ad can be found on the back cover of *Aquilegia*.

Located in Boulder, Harlequin's Gardens is a name that is sure to come up when someone asks where to find a good selection of native plants. It is a family business owned by Mikl Brawner and Eve Reshetnik. Mikl is a long time CoNPS and Boulder Chapter member who has promoted conservation and been successful in propagating *Physaria bellii*.



<http://www.harlequinsgardens.com/>

Recently, Mikl's wife, Eve Reshetnik, was run over by a car and badly injured. After spending 10 days in intensive care, 6 surgeries and 6 weeks in hospital and rehabilitation, Eve was allowed to come home to recover and is using a walker and cane. Our hopes for a quick and complete recovery go to Eve.

People have been asking how they can help Eve with her recovery and a Paypal account has been set up. You can access it from their home page at HarlequinsGardens.com. Alternatively, you can send a check to Eve Reshetnik, 1600 Spruce Ave., Longmont, CO. 80501 Please mark the donations: Gift. Harlequin's Gardens can be reached at 303-939-9403 and is located at 4795 North 26th St, Boulder, CO 80301.

Aquilegia readers, let's try an experiment!

Are 32 pages too much to print off? Then just print off the Field Trips and activities that are on pages 3-13. You can print off just the field trip pages if you would like or, if you prefer, you can print off just the CoNPS calendar, which contains all the events and field trips, on page 29. Print off a copy of the calendar and post it on your refrigerator so you don't miss out on the fun.

Inside this issue

Field Trips.....	3-12
Chapters & Committees News.....	13-14
News & Announcements.....	15-17
Articles.....	17-24
Increased Advocacy Efforts Favored.....	18
The North American Native Plant Society.....	22
Taking Native Plants to School.....	23
Phylogenetics Simplified.....	26
Calendar.....	29
CoNPS & the Board of Directors.....	30
Membership Application.....	31

Enter the CoNPS Annual Photo Contest!

The deadline for the 2014 Colorado Native Plant Society Photo Contest is August 15, 2014. There are two categories: Colorado Native Plants. and Colorado Native Plant Landscapes/Habitats. The first place prize for each category is \$50. Please submit entries to: conpsphotocontest@gmail.com. Entry forms and rules can be found on the CoNPS website (conps.org).



Left: 2013 Native Plant Category Winner, *Castilleja rhexifolia* by Benjamin Blonder.

Right: 2013 Native Plant Landscapes Winner, Monkey flower Landscape by Marlene Borneman



Conservation Corner: Members Support Stronger Advocacy Efforts

by Mo Ewing

Article with survey results on page 18!

2014 Field Trips & Workshops



Stephen Stern, President of the Plateau Chapter, will be leading a field trip at Gateway on May 4th. Please RSVP to Stephen Stern at stern.r.stephen@gmail.com if you plan on attending or have additional questions.

Cover photo (also on left): *Aliciella haydeni* at Gateway © Loraine Yeatts

Check the CoNPS website under Chapters for the most up-to-date information on field trips. New field trips are often added and some may be cancelled as the season progresses. conps.org/chapters

BOULDER CHAPTER

For more information and to register: Megan Bowes, bowesm@bouldercolorado.gov or call 303-561-4883.

The Drunken Botanists—Hike and Dinner

**June 12, Thurs., OSMP Boulder Valley Ranch, 5:30 pm -dusk
Megan Bowes**

In her recently published book *The Drunken Botanist*, Amy Stewart explores the dizzying array of herbs, flowers, trees, fruits, and fungi that humans have, through ingenuity, inspiration, and sheer desperation, contrived to transform into alcohol. Megan Bowes will take us on a hike to find the botanical relatives of these fermented favorites. Afterwards, we'll convene at a nearby eatery—and one lucky attendee will win a copy of the book.

Meet: OSMP Boulder Valley Ranch Trailhead—3900 Longhorn Rd., ~ 1 mile east of US 36/Hwy 7/North Foothills Highway. Bring snacks, water, and your favorite key or field guide.;

Time: 5:30 pm to dusk followed by dinner at a nearby eating establishment

Megan Bowes is a member and volunteer of the Colorado Native Plant Society. She is a plant ecologist with Boulder's Open Space and Mountain Parks department and loves nearly all things plant.

**Caribou Ranch—Conifers and Colorful Wildflowers Galore
July 10, Thurs. 5:30 p.m. - Twilight**

Linda Boley

Join Linda Boley for an evening posey mosey to see amazing wildflower and conifer diversity and possibly a moose at one of Boulder County Parks and Open Space's montane parcels. Bring snacks, water, and your favorite key or field guide.

Meet: Caribou Ranch Open Space, located 1.5 miles north of the Town of Nederland off of the Peak to Peak Highway. Carpool will leave the SW corner of Justice Center parking lot (6th and Canyon) at 5 pm sharp.

Linda is a Volunteer Naturalist with Boulder County Parks and Open Space and has led a number of public hikes at Caribou Ranch.

**Butterflies, Wildflowers and Host Plants
South Mesa Trailhead, Boulder OSMP
Sunday, July 20, 10 am – 12 noon
Amy Yarger**

Butterfly Pavilion has joined other states, regions, and organizations from around the country in using citizen science to monitor the trends and fluctuations of butterfly populations in parks and open spaces. Join Amy Yarger and members of the Colorado Butterfly Monitoring Network on one of their established census routes along the Homestead Trail to learn more about the project while observing butterflies in a variety of native habitats.

Meet: Boulder OSMP's South Mesa Trailhead, 1.7 miles west of Highway 93 on Eldorado Springs Drive (Highway 170). Note: this is one of Boulder's busiest trailheads; please plan on carpooling.

For more information and to register/arrange your carpool: Megan Bowes, bowesm@bouldercolorado.gov or call 303-561-4883. Amy Yarger is the Horticulture Director of the Butterfly Pavilion. She recently initiated the Colorado Butterfly Monitoring Network.

Lichens, (Date, Time, Location: to be determined)

Erin Tripp

Erin will take us on hike to explore the world of lichens.

Dr. Erin Tripp serves as Curator of Botany (COLO Herbarium) of the CU Museum of Natural History as well as Assistant Professor of Ecology & Evolutionary Biology (EBIO). Erin is a biodiversity scientist whose research focuses on the diversity and evolution of flowering plants as well as lichens.

GORE RANGE CHAPTER

June 18, Wed. , 10:30 a.m. Betty Ford Alpine Gardens Tour

Tour the Betty Ford Alpine Gardens located at 8250 feet. It is the highest public botanic garden in North America. Located in the shadow of the Gore Range the gardens contain a stunning range of plants, both native and from around the world. The high elevation along with creative use of berms and plant placement provides environments for plants from the alpine to Zone 5. There are taxonomic, habitat, and geographic collections. Come explore this living museum with garden docents on June 18 at 10:30 a.m.

The Gardens are located at 530 South Frontage Road in Ford Park in Vail, Colorado. The closest parking to the gardens is adjacent to the softball fields next to Ford Park. If you plan to park in the Vail Village Parking structure, it is about a 10 minute walk to the gardens from the eastern end of the parking structure and by taking the Gore Creek Streamwalk you are guaranteed a lovely walk. The intown bus to Gold Peak is also available from anywhere in the village.

Driving Directions: From east or west on I-70, take the main Vail exit (#176). After exiting I-70 you will navigate through

two roundabouts. Follow the first roundabout until it takes you under I-70. Enter another roundabout, make a left, and continue driving east on to the South Frontage Road. Along the South Frontage Road you will come to a stop sign (note: traffic from the right does not stop). Shortly after the stop sign on your right you'll see the softball fields and tennis courts at Ford Park. Park in the parking lot next to the softball fields or tennis courts and follow the asphalt path to the gardens. The Gardens are located at 530 South Frontage Road in Ford Park in Vail, Colorado. A donation of \$10 to benefit the Betty Ford Gardens is suggested.

Digital Photography Workshop, Fairplay, CO

Sat. July 12 – 2:30-5:30 p.m.

Sun., July 13 – 8:00 a.m.-12:30 p.m.

Bernie Nagy

Get out with your camera in the good afternoon and morning light and expand your knowledge of your camera and learn the art of photographic composition from close-up to landscape shots.

Local author and award winning landscape photographer Bernie Nagy will present the photo workshops. Locations in the nearby mountain meadows near Fairplay and Alma will provide great opportunities for unique flower and scenic landscape photography.

Skill level: beginner, intermediate and advanced

Will learn: Simple steps on how to use your camera with accessories and your eyes to compose more interesting photo images of wildflower close-ups, ancient trees, and stunning landscapes with foregrounds.

Each workshop will be at a different location and will be limited to 8 participants *Cost: \$30; \$50 for both days*

Wildflower Walks

Saturday, July 12 – 2:30-5:30 p.m.

Sunday, July 13 – 8:00 a.m.-12:30 p.m.

Linda Nagy

Half day wildflower walks with local wildflower guide author Linda Nagy in the sub-alpine and alpine meadows near Fairplay and Alma. Emphasis will be on common, scientific, and family names of wildflowers and the characteristics that distinguish each species. Each walk will be at different locations and will be limited to 10 participants. *Cost: \$10 for each walk*

Participants may choose to participate in both the photo and wildflower hikes on different days. More detailed information will be sent to participants.

Please contact Nanette Kuich, Gore Range Chapter President, for more information and to sign up at kix@vail.net

Pass Lake Wildflower Hike July 23rd, Wed.,

Nicola Ripley

Join us on Wednesday, July 23rd for a hike around Pass Lake, a high alpine lake, located at 11,600 feet just below the summit of Loveland Pass. Nicola Ripley, Executive Director of the Betty Ford Alpine Gardens, will lead us on an exploration of the many alpine plants that thrive in this harsh environment. We may also walk part of the Loveland West trail if time and weather permit.

Once we have a list of attendees a meeting place for carpooling up to the pass will be sent as parking at the lake is limited. A donation of \$10 to benefit the Betty Ford Gardens is suggested.

METRO DENVER CHAPTER

April 25

William Frederick Hayden Park on Green Mountain

Judy King

4:30 pm to 5:30 pm easy walking

5:30 pm to 7 pm moderate hiking

Flowers bloom early here with the warm eastern exposure. See Easter Daisy (*Townsendia hookeri*), Cutleaf Daisy (*Erigeron compositus*) and others. Meet at the Alameda and Florida parking lot. From 4:30 pm to 5:30 pm we'll stick close to the parking lot for an easy walk to see what's in bloom.

From 5:30 pm to 7:00 pm we'll hike up the mountain on a 3.2 mile loop to find more spring flowers and enjoy a fantastic sunset, deer, and a view of the city lights. Come for one or both times. Bring warm clothes and a flashlight. Judy King is a Native Plant Master and leads flower walks for the Colorado Mountain Club. Additional information is available by contacting Judy King, 303-984-2987

Register online with Eventbrite in case trip is cancelled or rescheduled

<https://www.eventbrite.com/e/william-frederick-hayden-park-on-green-mountain-with-judy-king-tickets-10582020107>

Willow Identification Course

April 27, Sun. 9 a.m.- 3 p.m.

Randy Mandel

Various locations, the field course will concentrate on the field identification through winter twigs. Randy Mandel has 30 years of experience as a restoration ecologist and applied plant scientist. Mr. Mandel's graduate studies were at Colorado State University

where he worked on two Masters-level projects: examination of the effect of environmental parameters upon site quality versus age analysis for Pinyon-Juniper stands throughout Colorado, New Mexico, and Arizona; and examination of natural clones of Quaking Aspen to note the effect of water relations and site conditions in comparison to genotype on fall leaf coloration. Mr. Mandel received his Bachelor of Science Degree from Colorado State University in Forest Biology, Concentration Physiology and Genetics. His expertise includes wetland, riparian, rangeland, desert, and forest ecology; plant taxonomy and synonymy; restoration/ reclamation project design, layout, and implementation; site assessment and monitoring; site-specific seed collection and increase; native plant propagation and cultivation; wetland delineation; threatened and endangered species survey; and the integration of native



Townsendia hookeri at Green Mountain.
Photo © Loraine Yeatts

species into traditional and modern landscape design. Prior to joining Golder, Mr. Mandel's past positions included: (1) Co-Founder/Senior Scientist, Rocky Mountain Native Plants



Salix exigua from: USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols. Charles Scribner's Sons, New York. Vol. 1: 594.

Company; (2) Co-Founder/Senior Scientist, Warm Springs Wetland Mitigation Bank; (3) USDA-NRCS Regional Native Plant Specialist; and (4) Director of the USDA-NRCS Upper Colorado Environmental Plant Center.
Meeting Location(s): 11 am, the rest area at the top of Vail Pass, I-70.

Carpool from Morrison: 9 am from the Woolly Mammoth Parking Lot., center of the lot in the southern most lane.

Bring: snowshoes, rain/ weather gear, warm clothes, water, and Dorn's *Willow Guide to the Rocky Mountains*

Register online to ensure you receive updates in case hike is rescheduled or cancelled due to weather at Eventbrite: <https://www.eventbrite.com/e/willow-identification-course-with-randy-mandel-tickets-10582076275>

**South Valley Jeffco Open Space
May 3rd, Saturday, 9am to noon
Lenore Mitchell**

Come and enjoy spring blooms from *Leucocrinum montanum* (sand lily) to *Claytonia rubra* (spring beauty) along with newly blooming shrubs on gentle trails amidst red rock formations. Leader Bio: This is Lenore's ninth year teaching CSU Extension NPM classes at various locations, and she loves that there's always more to learn.

Bring: snacks, water, sunscreen and jacket. Optional botanical keys, camera. Weather variable this time of year! Raptors often seen soaring above the red rocks, deer and coyote frequent the area.



Miner's Lettuce
Photo by Lenore Mitchell

Directions: Park is located west of the Dakota Hogback. Follow C470 and exit onto Ken Caryl (from either north or south). Follow Ken Caryl west and then south (left) past a stop-light and take another left turn at a stop sign (still heading south) follow to a left hand turn into the main parking lot (restrooms available). No pass or fee required.

Register online to ensure you receive updates in case hike is rescheduled or cancelled at Eventbrite: <https://www.eventbrite.com/e/Aquilegia Volume 38, No. 1 Spring 2014>

south-valley-jeffco-open-space-lenore-mitchell-tickets-10596521481

**Regis University Arboretum
May 27, Tuesday
Patrick Schlanger
5:00 pm to 6:00 pm**

Champion Trees at Regis University's Lowell Campus. We'll walk 1/2 mile, there are some small hills and slopes. The leader is Patrick Schlanger, Director of Operations, Physical Plant, has 22 years of experience as a Regis University employee. What to Bring: water, rain gear, Arboretum brochures will be provided - limit 20 participants.



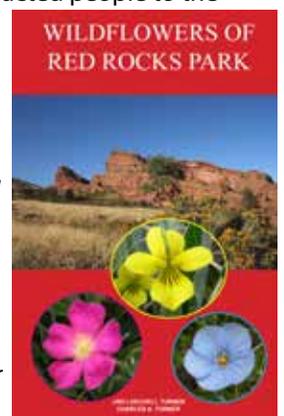
Oak Tree image courtesy the Florida Center

Directions: head north on Federal Blvd. from I-70 Exit, travel approximately 1/4 mile to 50th avenue aka Regis Blvd.. head west on 50th for approximately 1/2 mile then take right on Lowell (north) for 1/4 mile, enter campus at entrance # 4 (designated by green entrance sign) and gather at arboretum kiosk 100 feet west of entrance #4 near parking.
Regis University 3333 Regis Blvd Denver CO 80221

Register online to ensure you receive updates in case the event is rescheduled or cancelled at Eventbrite: <https://www.eventbrite.com/e/regis-university-arboretum-patrick-schlanger-tickets-10596607739>

**Wildflowers of Red Rocks Park
June 1st, Sunday , 8:30 a.m. to noon
Jan & Charlie Turner**

The 1.4 mile Trading Post Trail loop at Red Rocks Park is a great place to hike and view native plants while also enjoying the beautiful rock formations that first attracted people to the area. At Red Rocks Park, the plains meet the foothills and an interesting variety of plants can be found along the trails. Plants we may encounter include *Lomatium orientale*, *Mertensia lanceolata*, *Delphinium geyeri*, *Physaria vitulifera*, *Physocarpus monogynus*, and *Asclepias viridifloras*. We will try to avoid unpleasant encounters with *Tragia ramosa*, a nasty little Euphorb that can turn your skin red and make it sting. Red Rocks Park is located near Morrison and is part of the Denver Mountain Park system and the site of numerous concerts.



Bring: snacks, water, sunscreen, sun hat, and jacket.

Directions: Red Rocks Park is located near Morrison, Colorado. From I-70, take exit 259, and take CO Hwy 26 to Morrison/Red Rocks Park. From Hwy 26, take entrance #2 (Red Rocks Park Road) and turn right on Trading Post Road. Meet at the Trading Post Parking Lot at 8:30 am.

Jan Loechell Turner is the editor of *Aquilegia: Newsletter of the Colorado Native Plant Society* and a member of the CoNPS Board. She is professor emerita at Regis University and a former Native Plant Master Trainer. Charlie Turner is the President of CoNPS and is an advisory scientist involved in environmental cleanup. Charlie has a PhD in chemistry from University of Colorado. Jan and Charlie are the authors/photographers of *Wildflowers of Red Rocks Park*. Copies of *Wildflowers of Red Rocks Park* may be purchased ahead of time from the CoNPS bookstore for \$12.

Register online with Eventbrite: <https://www.eventbrite.com/e/red-rocks-park-hike-with-jan-charlie-turner-tickets-10608322779>

Kendrick Lake Gardens

June 17 (subject to change), Tuesday , 3-5 pm

Greg Foreman

We will tour the fabulous gardens featuring xeric and native plants at the Kendrick Lake park; Greg Foreman is the Lakewood Urban Parks Supervisor and is well-versed in native plants, most of which are grown in the Lakewood greenhouses and then planted in specially formulated soil mixes, most often in berms and grown with minimal supplemental moisture.

Bring: camera and notebook; optional picnic after the tour (bring your own food and drink - there are picnic tables nearby)

Directions: meet at Kendrick Lake Park, corner of West Jewell Ave and Garrison, gardens are at this corner near the parking lot.

Register online with Eventbrite to receive updates on day and time of the tour: <https://www.eventbrite.com/e/kendrick-lake-gardens-tour-with-greg-foreman-tickets-10636733757>

Staunton State Park

June 28, Saturday, 9 am to noon

Lenore Mitchell

This new state park averages 8000 ft elevation and has displays of many montane plants, from shrubs such as Mountain Mahogany to herbaceous columbine and many others. The hike consists of gentle trails with mild elevation gains, varying microclimates from meadows with small streams to rock outcroppings and beautiful vistas. Lenore Mitchell lived very near Staunton for many years. This is her ninth year teaching CSU Extension NPM classes at various locations.

Bring lunch, snacks, water, and sunscreen. Optional: botanical keys, hand lens, camera.

Directions: The park is located approximately 5 miles west of Conifer. Follow US285 west of Denver, past Conifer to Schaffer's Crossing. Take right ramp off highway; right turn onto Elk Creek Rd and follow approximately 1.5 miles to the State Park entrance. Daily or annual pass required. Meet at main parking lot just beyond entrance trailer. Lenore will be in silver Volvo station wagon.

Register online with Eventbrite: <https://www.eventbrite.com/e/staunton-state-park-flower-hike-with-lenore-mitchell-tickets-10608392989>

Peak 7 Hike followed by Tour of Mountain View Experimental Gardens

July 2, Wednesday , 7am to 5pm

Jane Hendricks

The hike begins from the gardens at 10,000 feet and trails through at least 8 ecosystems (open meadow, aspen grove, lodge pole pine forest, sunny wetland, shaded riparian, dry hillside, spruce-fir forest and sunny, disturbed areas) on a circular route. Our focus will be the species of the Upper Montane and Subalpine Zones. Easy to moderate. Bring rain gear, a windbreaker, warm clothing, lunch and water. Wear sturdy hiking boots. Total round trip distance: 2 to 6 miles; total elevation gain: 300 to 1,000 feet. (Wide variation in distance and elevation gain will depend on the desires of the group and the weather.) Return to the gardens by 4 p.m. A new website devoted only to Montane Zone plants of the lower Peak 7 Area is at <http://www.picturetrail.com/snowtrekker7>.

Jane Hendrix has produced a wildflower guide for the entire Peak 7 Area which will be available for purchase at \$4.00 each. This is totally optional. The benefit of having one of these guides on the hike is that Jane included only species that we will find in this area.

Note: Safety Rules: The group must function as a unit. We will travel at the pace that is comfortable for the slowest person. No splitting of the group will be allowed. If one person wants to go back, the whole group must return. This is primarily for safety because the Peak 7 Area trails do not appear on any map and have many intersections that can cause confusion for a person unfamiliar with that area.

Directions to Mountain View Experimental Gardens:

Take I-70 west to Exit 203 (Breckenridge/Frisco). Go south on Colorado Highway 9 about 8 miles (passing Lake Dillon and Summit High School) to Coyne Valley Road (CR3). There is a traffic light here. Turn right onto Coyne Valley Road. Drive over the Blue River to the 3-way stop sign. Turn left. Drive 1/4-mile to first road on your right (Barton Road/CR3). There is a large beaver pond on the southwest corner of this intersection. Turn right. Drive 1/2-mile up Barton Road. Bear left onto Blue Ridge Road/CR911. Follow paved Blue Ridge Road/CR911 up the mountain, around two hairpin turns, until it stops at a "T" intersection (CR906/American Way). Turn right. Stay on CR906 as it passes 3 roads on your right (Shadows, Adams and Protector). At the fourth and last road (Lone Hand Way), turn right. Follow Lone Hand Way around the curve to the two-story "round" house (honey-brown w/green trim) on your right Park in the driveway or along the road.

Meet at 9 am in Breckenridge at the Mountain View Experimental Gardens, 133 Lone Hand Way, Phone: 970-453-4174.

Carpool from Morrison at 7am, meet at the Woolly Mammoth Parking Lot; heading west on I-70, take Morrison Exit to the right, parking lot is on west (Left) side of road. Carpool to Breckenridge for arrival at 9am. Plan return to carpool parking lot approximately 5 p.m.

Register online on Eventbrite: <https://www.eventbrite.com/e/peak-7-hike-tour-of-mountain-view-experimental-gardens-with-jane->

Butler Gulch

July 9, Wednesday, 8:00 am to 3 pm

Cheryl Ames

Trip Description: Bulter Gulch is famous for it's wildflowers. It is a 5 mile round trip, elevation gain of about 1500 to a big open meadow below the continental divide with wonderful views. This area collects a lot of snow in the winter and produces an amazing amount of wildflowers. Cheryl is an avid hiker who can find the wild flowers(!)

Carpool from Morrison, meet at the Woolly Mammoth parking lot next to the Conoco Station on the north frontage road off I70 and exit 259 near U.S. 40.

Difficulty Level: 5 miles and 1500 elevation gain, depending on the group.

Bring: Lunch, water, rain/wind gear, botanical keys.

Register online with Eventbrite: <https://www.eventbrite.com/e/butler-gulch-flower-hike-with-cheryl-ames-tickets-10608858381>

Flora of Horseshoe Cirque

July 12 (date is subject to change) Sat., 7:30 am-2:00 pm

Steve Yarbrough

Join us for a drive and hike up Horseshoe Mountain. Horseshoe Mountain is a 13,898-foot peak located in the Mosquito Range of Park County, Colorado. We will drive close to the Horseshoe Cirque at an approximate elevation of 11,700, and then proceed on foot into the cirque itself. Our exploration will seek out some of the "aristocrats" listed in Weber and Wittmanns' description of the Horseshoe Cirque:

Ascellia nana (Dwarf hawksbeard) Asteraceae, G5/S2
Eriophorum altaicum (Altai cottongrass) Cyperaceae, G4/S3
Salix calcicola (Lime-loving willow) Salicaceae, G4-G5/S1
Saussurea weberi (Weber saussurea) Asteraceae, G2-G3/S2
Trichophorum pumilum (Little bulrush) Cyperaceae, G5/S2

We will also be on the lookout for *Carex scirpoidea* ssp. *scirpoidea*, *Eutrema edwardsii*, *Oxytropis podocarpa*, *Oxytropis viscida*, *Ipomopsis globularis*, and any other interesting species or geology that we may encounter.

Steve Yarbrough is a long-time Colorado Native Plant Society member and was on the Board of Directors for two terms. He has worked in environmental consulting for 30 years with an emphasis on wetland science, botany and ecology. His Master's Degree in Biology was earned at the University of Colorado at Denver, doing field work and laboratory analysis to study the effects of dioecy on the population genetic structure in *Carex scirpoidea* ssp. *scirpoidea*.

Meeting Location: Prather's Market, 301 Us Hwy 285, Fairplay, CO 80440, (719) 836-1618, on the west side of U.S. Highway 285, at the intersection with Colorado Highway 9.

Difficulty Level: Moderate. This trip will be at high altitude (11,700 – 12,200 ft.). Afternoon thunderstorms are a real threat. Sunburn and altitude sickness are problematic. We will be walking up a short section of 4-wheel drive road, then cross-country through the floor of the Cirque.

Aquilegia Volume 38, No. 1 Spring 2014

What To Bring: Lunch, raingear, sunscreen, good hat and warm enough clothes to survive comfortably above tree line. The references *Colorado Flora/Eastern Slope* (Weber and Wittmann) and *Alpine Flower Finder* (Wingate and Yeatts) would be useful, along with a good hand

Register by contacting Steve Yarbrough, 303.250.5542(cell), 303.233.6345(home), steveandkenna@msn.com

Golden Gate State Park

July 19, Saturday, 8 am to noon

Judy King



Horseshoe Cirque Photo © Mo Ewing

Explore the far west portion of the park trails for interesting flowers and stream plants. We'll see Strawberry Blite, Parry's Golden Weed, Twin Flower, Cowbane and more. The hike is an easy one mile uphill hike.

Meet at the North Golden Parking Garage at 8 am to carpool and share park entrance fee. Judy King is a Native Plant Master and leads flower walks for the Colorado Mountain Club. Additional information is available by contacting Judy King, 303-984-2987

Register on Eventbrite in case trip is cancelled or rescheduled: <https://www.eventbrite.com/e/golden-gate-state-park-flower-hike-with-judy-king-tickets-10608958681>

Hoosier Ridge - West

July 24, Thursday 7am to 5pm

Jane Hendricks

The hike begins at the parking area in a subalpine forest of spruce and fir. It follows a wide road around the ridge of the Continental Divide to the sunny, open south side with spectacular views of rugged mountains. At 1-1/3 miles, we will arrive at an unnamed alpine pass along the ridge of North Star Mountain (elevation 12,090 fee). This will be the highest point of the hike. From there, we will descend 1/2-mile along a narrow, rocky jeep trail and have lunch at little Crystal Lake. We will then return on a 1-1/4-mile-long jeep road, paralleling Hoosier Ridge on the north side of the Continental Divide.

The total round trip distance is about 3 miles with a total elevation gain of about 600 feet. Bring rain gear, a windbreaker, warm clothing, lunch and water. Wear sturdy hiking boots. Return to the parking area by 4 p.m. Many of the species we will encounter are on display at Klaus & Jane Hendrix's main website: <http://www.picturetrail.com/hendrix> Jane Hendrix

has produced a wildflower guide for Hoosier Ridge which will be available for purchase at \$3.00 each. This is totally optional. The benefit of having one of these guides on the hike is that Jane included only species that we will find in this area.

Safety Rules: The group must function as a unit. We will travel at the pace that is comfortable for the slowest person. Anyone who would like to tour Klaus & Jane's Mountain View Experimental Gardens after the hike are most welcome. Jane's phone number: 970-453-4174.

Directions: Take I-70 West to Exit 203 (Breckenridge/Frisco). Go south on Colo. Hwy. 9, through Breckenridge, to Hoosier Pass. Park in the large parking area on the west (right) side of the road. To avoid the possibility of a thunderstorm while we're above timberline, we will meet at 9 a.m. There is no restroom facility at Hoosier Pass. There is a public restroom at City Market (from Colo. Hwy. 9, turn right onto Park Avenue) and at Breckenridge Station, 150 Watson Avenue, Breckenridge (about 1 block south of City Market, near the gondola).

Carpool from Morrison, meet 7am at the Woolly Mammoth parking lot: heading west on I70, take Morrison Exit to the right, parking lot is on west (Left) side of road.

Carpool to Hoosier Pass for arrival at 9am. Plan return to carpool parking lot approximately at 5pm.

Register online using Eventbrite in case hike is cancelled or rescheduled: <http://www.eventbrite.com/e/west-hoosier-ridge-flower-hike-with-jane-hendrix-tickets-10609064999?aff=eorg>

Shelf Lake Area and Optional Camping

July 25 – 27, Friday to Sunday

Jeanne Willson

This trip is designed to let participants attend either or both day trips in the Geneva Basin and camp if they wish. Study the Geneva Fen off the Guanella Pass Road on Saturday on this trip led by fen expert Dave Bathke. See a plant assemblage that's rare on this planet. Or, hike the beautiful Shelf Lake hike on Sunday up into a rich and wet alpine valley with great biodiversity including gorgeous, healthy bristlecone pines, several species of gentians, and thousands upon thousands of the flower-of-the-week; could be larkspurs, could be bistort, could be paintbrush. This will be my 5th trip to Shelf Lake in as many years; we will continue to expand the plant list.

Or, explore (but do not enter) the old mining structures or just wander in the Geneva Basin, taking your own time to look things up in Weber. But wait! Two great day trip options on one weekend, plus time to hang out ... what to do? Let's go camping!

I have reserved 3 sites (to be shared as needed) in the Burning Bear campground. I will reserve more as the requests roll in, space permitting. Tent or small campers are appropriate. I will go up to Geneva Basin Friday morning. Given interest, we can go on a short hike such as Silver Dollar Lake on Friday. For Saturday/Sunday, people can choose to carpool to the fen (Saturday) or Shelf Lake (Sunday) as day trips, or come up and spend the weekend. Everyone should plan to be on their own for all meals or plan on your own to cook jointly. Campers are invited to bring either a dessert or appetizer to share. Would-be campers who need encouragement or who need to borrow a tent, a camp chair, or a camp stove, etc. are welcome, and are

encouraged to ask camping questions before the trip. Note that the camping is at about 9800' and it can be wet and cold. I will bring 2 rain shelters, more as needed.

Carpooling will be arranged from the Mammoth parking lot at I-70 for those who want day trips.

The Shelf Lake portion will be run through Colorado Mountain Club for members, and guests will sign a CMC waiver. Other participants will sign a CoNPS waiver. Hikers should follow CMC guidelines for hiking preparedness. Shelf Lake is considered a "B-difficult" hike under CMC rules, which means it has substantial distance and/or elevation gain and requires reasonable fitness, good hiking boots, rain gear and warm clothes, food and water, personal 1st aid kit, map and GPS, etc. The elevation gain is roughly 2,000 feet depending on our route. Please call the trip leader if you have questions about hike preparedness.

We hope that the weekend format encourages people from Boulder, Longmont, the Springs, Pueblo and anywhere else to come together for some serious botany or serious hanging out. Both day trips will have trip limits of 15 participants each, so please sign up soon on the Eventbrite website.

Your trip leaders: Dave Bathke is an expert on fens. Jeanne Willson, PhD, leads many natural history hikes and loves botany, paleontology, canoeing, and playing guitar, ukulele, and fiddle.

Meeting Time: Campers should plan on meeting to share appetizers at 6 pm on Friday, July 25th. Saturday. The Sunday meeting time will be at 8:00 am at the campground entrance on Geneva Creek Road; Anyone wanting to carpool should meet with other hikers at 6:45am at the Mammoth lot.

Approximate Ending Time: 5:00 pm Sunday plus the drive home.

Please express your interest or commitment soon! Call/write Jeanne Willson, riversong@centurylink.net, 720-581-2052, Denver-- Colorado Native Plant Society.

Register for the Sunday Shelf Lake Hike on Eventbrite: <https://www.eventbrite.com/e/shelf-lake-flower-hike-with-jeanne-willson-tickets-10609227485>

Geneva Basin Iron Fens, a Colorado Natural Area

July 26, Saturday, 7:30 am to 5 pm

Dave Bathke assisted by Fran Enright

This is a designated Colorado Natural Area, due to its unusual habitat and vegetation. It is a site for *Sphagnum balticus*, a boreal sphagnum. The vegetational species in an iron fen are limited to 8 plant species, due to the high dissolved iron content. Where there are underground fresh water sources, there are numerous other common wetland plants. The terrain is mostly level to slightly sloping. However, most terrain is wet, with a few small streams, so a good waterproof boot is recommended. Several



Eritrichum aretioides at Hoosier Ridge
Photo © Loraine Yeatts

sites will be visited with the longest hike being one-half mile. Elevation is 11,000 feet, so plan for typical mountain weather.

Dave Bathke is a volunteer steward for Colorado Natural Areas (Administered by Colorado Parks and Wildlife) and for Clear Creek County Open Space. He is a retired National Park Service Ranger, Planner and Resource Compliance Specialist.

Meeting Location: We will meet at the Woolly Mammoth Lot of the Dinosaur Parking Lot. It is about one mile west of the C-470 and I-70 interchange, on the north side of I-70, and reached by exiting I-70 at the Hogback road and going north to the next traffic light, and at the light go west on the Mt. Vernon Canyon Road. Continue to the west end of this large parking lot, and meet in the lot opposite the Conoco station. From the Dinosaur Lot, we drive one mile east on I-70, then four miles south on C-470, then west on U.S. 285 about 50 miles to Grant, then north on Guanella Pass Road, then west on Geneva Creek road. Geneva Creek becomes a 4-wheel drive road, and in 5 miles we reach Geneva Basin Iron Fens. One mile from the iron fens is a locked gate. We will visit 3 or 4 individual iron fens and learn about the unusual soil and vegetation.

Bring lunch, water, coat, raingear, waterproof footgear (packs are best for water 8" deep), sunscreen, mosquito repellent, camera, botanical keys.

Special Note on Vehicles: If you have a 4-wheel drive vehicle, please bring it on this trip. The last five miles are on 4-wheel drive road. We hope to have one 4-wheel drive vehicle for each four participants.

Registration: Register for this trip on Eventbrite to receive updates in case trip is cancelled or rescheduled. <https://www.eventbrite.com/e/geneva-basin-iron-fens-hike-with-dave-bathke-tickets-10609307725>

Ranson Edwards Open Space
September 6, Saturday , 8:30 am to noon
Judy King

Ranson Edwards is an old ranch site. It is a closed open space park. Some unusual flowers grow here including: Stiff Goldenrod, Stiff Sunflower and Pleated Gentian, among other fall plants. Hiking is easy here. Bring ski poles or hiking sticks, this is rattlesnake country.

Meet at the North Golden Parking Garage to carpool. Judy King is a Native Plant Master and leads flower walks for the Colorado Mountain Club. Additional information is available by contacting Judy King, 303-984-2987

Register on Eventbrite to receive updates in case trip is cancelled or rescheduled: <https://www.eventbrite.com/e/ranson-edwards-open-space-flower-hike-with-judy-king-tickets-10609410031>

Castlewood Canyon State Park
October 18, Saturday , Time TBA
Jeanne Willson, PhD

Four to five hour hike, 30 minutes from the Arapahoe Park and Ride.

This charming state park southeast of Parker is a geological gem full of human history, with plants normally living from the prairie to the high foothills crowded on top of each other. Our 7 mile loop hike will take us through two intimate canyons, past a 100 year old homestead and a spectacular FAIL of a dam. We'll

Aquilegia Volume 38, No. 1 Spring 2014

also hike on top of a riverbed and past fossils of prehistoric forests.

Jeanne Willson, holds a PhD in Botany from Cornell. She currently is Co-President of the Metro Denver Chapter of CoNPS and volunteers teaching natural history including geology, paleontology, and evolution with the Colorado Mountain Club and the Denver Museum of Nature and Science.

Please be prepared to walk 7 miles over a good but rocky trail with about 700 feet of elevation gain; wear good walking shoes or hiking boots with long pants and bring water, lunch, raingear, sharp eyes, and field guides. Binoculars and camera optional. The park has rattlesnakes and poison ivy, hence the long pants and sharp eyes recommendation.

Registration online using Eventbrite to receive updates in case hike is cancelled or rescheduled: <https://www.eventbrite.com/e/castlewood-canyon-state-park-tickets-10609556469>

NORTHERN CHAPTER



Velma Richards and Rick Brune on a Pawnee Buttes field trip in 1999. Photo by Jan Wingate.

Red Mountain Open Space -May 4 – Sunday
Hugh Mackay and Ronda Koski

This large (15,000 acres), rugged and remote open space is a real jewel of northern Colorado, one of the first places of human habitation in North America. For more information on Red Mountain go to: http://www.larimer.org/naturalresources/red_mountain.cfm

Since the entrance is 21 miles north of Ft. Collins and is a 45+ minute drive, we will meet to car pool at the northwest corner of the King Soopers parking lot 1842 North College Ave (intersection of N. College and Willox Lane) in Fort Collins. at 8:30 AM. This hike will be lead by Hugh Mackay and Ronda Koski. For additional information contact Hugh Mackay at hughmackay@gmail.com or at 970-221-1843 (home) or 970-310-4330 (cell). Bring water, lunch, warm clothing and raingear.

Cathy Fromme Prairie
Wednesday, May 14, 5:30 p.m.
Hugh Mackay and Ronda Koski

This is a short, early evening hike in a short grass prairie natural area on the south side of Ft. Collins. The prairie is usually filled with wildflowers at this time of the year. For more information go to: <http://www.fcgov.com/naturalareas/finder/cathyfromme>

The entrance we will use is on the west side of S. Shields street about ¼ mile south of the intersection of S. Shields and Harmony Road. Since the parking lot is very small and often full, we will meet in the South West corner of the Front Range Community College parking lot off S. Shields just south of Harmony at 5:50 p.m. to car pool. This hike will be lead by Hugh Mackay and Ronda Koski. For additional information contact Hugh Mackay at hughmmackay@gmail.com or at 970-221-1843 (home) or 970-310-4330 (cell).

Well Gulch Trail, Lory State Park
May 25 – Sat., 9 am
Hugh Mackay and Ronda Koski

This is a short hike of just under a mile and a half, but we always have to stop a lot in Lorry because there are so many spring wildflowers in bloom! For more information go to: <http://cpw.state.co.us/placestogo/Parks/lory>

We will meet at in the parking lot in back of the Visitor Center at 9:00 AM. There is a \$7 fee per car. Directions: drive north on N. CO Road 23 (this is the road along the east side of Horsetooth Reservoir) past the north dam to N CO. Road 25G. Go west on N. CO 25 to the park (about a mile). If you want to car pool to share the entrance fee, meet at the Reservoir Ridge Natural Area parking lot on N. CO 23 just north of the north dam at 8:45 AM. This hike will be lead by Hugh Mackay and Ronda Koski. For additional information contact Hugh Mackay at hughmmackay@gmail.com or at 970-221-1843 (home) or 970-310-4330 (cell). Bring water, lunch, warm clothing and raingear.

Details on these hikes will be available soon:

Pawnee Buttes - June 1 - Sunday

Natural Area @ Big Thompson Elementary School - June 11 Wednesday

Brackenbury Cabin Trail (Pingree Park area) - June 28 - Saturday

Lady Moon Trail (near Redfeather Lakes) July 6 - Sunday

Bobcat Ridge Natural Area - July 9 – Wednesday

Blue Lake Trail (Poudre Canyon) - July 26 - Saturday -

Ouzel Falls @ Rocky Mountain National Park -August 3

Maxwell Natural Area -August 13 – Wednesday

Lower Dadd Gulch Trail (Poudre Canyon) - August 23

Pawnee Buttes - September 7 - Sunday

Ramsay-Shockey Open Space - September 10 – Wednesday

Soapstone Prairie - September 27 – Saturday

PLATEAU CHAPTER

Gateway Spring Flowers -May 4th - Sun.

We will take a repeat trip to the low elevations around Gateway to see some of the early spring wildflowers. This trip has been a favorite of many Plateau Chapter members in the past. Come enjoy the warm weather and wonderful flowers!

Please RSVP to Stephen Stern at stern.r.stephen@gmail.com if you plan on attending or have additional questions.



Lupinus argenteus at Gateway
Photo © Loraine Yeatts

Badger Wash
May 10th - Saturday -

Larry Allison and Stephen Stern will lead this field trip to the Badger Wash area west of Grand Junction to enjoy the desert spring flora.

Please RSVP to Stephen Stern at stern.r.stephen@gmail.com if you plan on attending or have additional questions.

San Juan Mountains - July 12th - Saturday

CONPS will team up with the Black Canyon Regional Land Trust (BCRLT) for an outing in the San Juan Mountains of southwest Colorado. Exact location of the trip is TBD but any day in the San Juan's is guaranteed to be gorgeous! You can learn more about the BCRLT at their website <http://www.bcrlt.org/> and find out about some of their events.

Please RSVP to Stephen Stern at stern.r.stephen@gmail.com if you plan on attending or have additional questions.

Grand Mesa - August TBD

I hope to plan a field trip onto the Grand Mesa for August. Any input as to date and location would be appreciated! (send to stern.r.stephen@gmail.com)

SOUTHEAST CHAPTER

Register with leader to check whether space is available and for any changes in dates, etc. Registration is required a minimum of 2 days prior to trip..

Bent Canyon Bluffs on the Comanche -May 10, Sat.
Leader: Steve Olson, Botanist USFS leadersteve01@gmail.com

This area is juniper woodland on the edge of the shortgrass prairie of the Comanche National Grassland. The limestone, sandstone and shale of the area help to create some of the local diversity. There will be grasses, composites, legumes,

borages and “scrophs”, with a bit of luck (and some rain). We should be able to cover most of the diversity in about two to three miles of hiking. We can make it last as long as people would want to, but since it’s close to two hours driving to get there, expect 3-4 hours on the ground. We will leave from the Forest Service office in Pueblo (behind the Ford dealership on the south side of US-50, about 2 miles west of I-25) at 7:30 am, with a secondary meeting place (to be determined) in Rocky Ford an hour later.

Elk Park Knoll on Pikes Peak - June 14, Sat.

Leader: Doris Drisgill leaderdoris@gmail.com

We’ll meet at 8 am at the Pikes Peak toll gate to carpool up to timberline. The toll will be \$7 per person (cash please). Be prepared for moderate exercise at high altitude, and chilly weather. This is Doris’ perennial trip to the high country on Pike’s Peak. Many alpine species are typically in abundance including Dwarf Columbine, Bluebells, Mountain Dryad and many others. The TH is at 12,000 ft. elevation, but the hike is short – usually less than 2 miles. This trip is rated “moderate”

San Carlos Trail on the San Isabel in the Wet Mountains June 28, Sat.

Leader: Steve Olson, Botanist USFS Registration at: leadersteve01@gmail.com

This trail in the Wet Mountains, about 4 miles south of Beulah, goes from the ridge down into a canyon cut by the St. Charles River. The ridge is dry with some prairie influences, and the canyon bottom is cool and moist. Along the way we may find birdfoot violet (*Viola pedatifida*) and Hall’s alumroot (*Heuchera hallii*). At the bottom of the canyon is an interesting variety of shrubs along the river. It’s about a mile and a half from the trailhead to the river, so the total length is about 3 miles. We will leave from the Forest Service office in Pueblo (behind the Ford dealership on the south side of US-50, about 2 miles west of I-25) at 7:30 am.

N. Cheyenne Canyon, Buffalo Creek - July 12. Sat.

Leader: Doris Drisgill leaderdoris@gmail.com

We’ll meet at 8:30 am at Starsmore Discovery Center in N. Cheyenne Canyon and carpool up the canyon to the trailhead above Helen Hunt Falls. The hike will be moderate, 4-5 mi. round trip at 6500- 7500 ft. We’ll look for wood lilies, monkshood and other riparian species along the creek below St. Mary’s Falls.

The Craggs - July 19, Sat.

Leader: Jeff Jones leaderjeff01@gmail.com

The Craggs are a high elevation riparian willow carr as you hike in along the valley floor at 10,200’ elevation and ascend gradually over a mile to 10,400’. In the willow carr you will find many species of Gentianaceae (*G. acuta*, *P. parryi*, and *S. perennis* among others), *Clemensia rhodantha* (Rose Crown), various Scrophulariaceae (including *Penstemon whippleanus*) and along the rock outcroppings near the end will be the highlight *Telesonix jamesii* (very rare plant found only in 3-4 counties in Colorado, and no place else) and *Heuchera hallii*. Along the way we will identify the willows and any other flowering species to be found. Free parking is available about 0.5 miles from the trailhead; or paid parking at the trailhead or free with an RMRC pass. The trip is rated moderate.

Putney Gulch, south of the Craggs - Aug 16, Sat.

Leader: Doris Drisgill leaderdoris@gmail.com

We’ll meet at 8 am at the Safeway on W. Colorado Ave. to carpool up to the trailhead (past the Craggs campground). The hike will be moderately strenuous, 4-6 mi. of ups and downs at 9500-10,500 ft. We’ll look for montane/ subalpine species among conifers, aspen groves, and riparian meadows on the west flank of Pikes Peak. This can be a great place for mushrooms too.

Rampart Range old-growth on the Pike - August 23, Sat.

Leader: Steve Olson, Botanist USFS leadersteve01@gmail.com

When did you last see some 300+ year old lodgepole pines? Or western wheatgrass under a ponderosa pine – Douglas-fir woodland? There’s not a lot of these in the Rampart Range, but they are there (and not as hard to find as you might think). Remember that old trees are not necessarily big trees, especially on these dry ridges north of Woodland Park. Expect short walks into the woods forests at a handful of locations on and near the Rampart Range Road. We will leave from the Forest Service office in Pueblo (behind the Ford dealership on the south side of US-50, about 2 miles west of I-25) at 7:30 am, with a secondary meeting point (to be determined) in Woodland Park.

San Juan/Four Corners Native Plant Society

Tentative Schedule: Details will be posted in the future on our web page (<http://www.swcoloradowildflowers.com/San%20Juan%20Four%20Corners%20Native%20Plant%20Society.htm>).

Most trips begin early and finish by about 4 p.m.

Behind the Rocks Wilderness Study Area, Moab. April 23-24. John Bregar and Al Schneider. Come for one or two days. Overnight in Moab or Monticello.

Wildflowers galore in Cross Canyon on the first day and in lower Butler Wash the second day. May 5-6

Kay Shumway and Al Schneider . Come for one or two days. Overnight in Bluff.

Dolores Plateau, Western San Juan National Forest near Lone Mesa State Park. May 11. Bob Powell and Al Schneider Wander through fields of Glacier Lilies, and more.

Annual trip to Sand Canyon. May 22 .Al Schneider Cliff Rose in full bloom. Many other species.

Sanborn Park Road, Southwest corner of Uncompahgre National Forest near Norwood. May 31. Connie Colter Numerous stops for many species. Leader:

Navajo Lake New Mexico/Colorado border. June 7. Ken Heil and Wayne Mietty Exploratory trip in high desert.

Big Al Trail at Transfer Camp Ground above Mancos. June 14. Bob Powell. Numerous low montane wildflowers along the handicap accessible trail.

Prater Ridge Trail, Mesa Verde National Park. June 21. Al Schneider. 4-6 mile loop.

Ophir Pass Road From the East. July 2. Bob Powell and Al Schneider. Exploratory. A number of stops from Highway 550 montane to alpine pass.

Upper Echo Basin Mine Road. July 12. Bob Powell and Al Schneider. Leisurely walk uphill on old mining road.

Annual Pass Creek Trail. July 16. Travis Ward.

An alpine area above Silverton. July 22. John Bregar

La Plata Canyon, Columbus Basin. July 25. John Bregar, Bob Powell, and Al Schneider. High montane & sub-alpine.

Annual Telluride trip. July 30. Connie Colter and Al Schneider Superb flowers and scenery.

Bolam Lake Meadows via Hermosa Creek Pass Road. August 2. Bob Powell High montane wetland and forest wildflowers. Come for one day or camp for several days.

Mushroom trip near Lizard Head Pass. August 23. John Sir Jesse. Pick um in the woods and eat um at John's home.

Tamarisk Coalition 2014 Riparian Restoration Workshop Series

Tamarisk Coalition is proud to be working with a host of partners throughout Colorado to bring you the 2014 Riparian Restoration Workshop Series! Several workshops are still in the planning stage, but those that have already been scheduled are listed below. Partners on the workshops below include Bureau of Land Management, Colorado Native Plant Society, Uncompahgre Partnership, Dolores River Restoration Partnership, Desert Rivers Collaborative, Colorado Natural Heritage Program, and Colorado Canyons Association. To register for a workshop go to : *To register for a workshop go to: <http://tamariskcoalition.wildapricot.org> and click on 'Events' link*

Sagebrush of Colorado: A Focus on Western Colorado's Riparian and Upland Sagebrush Communities Saturday May 3, 9 am-3pm, Grand Junction, CO

The subspecies of big sagebrush (*Artemisia tridentata* group) respond very differently to fire, cutting and other management techniques and they are often misidentified or not recognized at the subspecies or varietal level. This workshop will focus on the identification of sagebrush (*Artemisia*) in Colorado with a focus on species common on the West Slope and provide specific tools and tricks to distinguish the subspecies of the big woody sagebrushes We will provide you with plant keys and other guides that you can take with you. Suggested optional items to bring: hand lens (10x-20x), black light, small rulers (15 cm/6 inches). Taught by Pam Smith, Field Botanist/Ecologist, Colorado Natural Heritage Program; Delia Malone, Ecologist, Colorado Natural Heritage Program. *Workshop charge \$10; pre-registration required.*

Plant Identification on the Dolores River: Plants of the Riparian Corridor Friday May 30, Bedrock, CO

The riparian corridor of the West and Southwest consists not only of the green strip directly adjacent to the river where classic riparian species reside, but often includes an 'upper

bench' component consisting of plant species adapted to much drier conditions. We will be conducting a guided plant identification tour of the most common native and exotic riparian and 'upper bench' plant species of the Dolores River near Bedrock, CO

We will provide you with a plant identification book developed through previous plant identification workshops that you can take with you at the end of the day. Taught by Amanda Clements of the Uncompahgre Bureau of Land Management Field Office. *Workshop is free but pre-registration is required.*

Identification of Riparian & Wetland Plants of Colorado's West Slope Friday, July 18, Grand Junction, CO

There are some specific useful clues that can help you identify some of the tricky species (including grasses and sedges) that are found in the riparian and wetland areas of the West Slope. Common native and non-native species are important to identify accurately. Once identified properly, plants can tell us much about the health of the wetland system. We will incorporate some ecology so that you can come to know how these plants add to the riparian and wetland communities

Suggested items to bring: hand lens (10x – 20x), *Colorado Flora: Western Slope*, Weber & Wittmann (2012), and *Field Guide to Colorado's Wetland Plants*, Culver and Lemly (2013- will be available for sale should you want to purchase a copy (\$39.95 +tax).

Taught by Denise Culver, Ecologist Colorado Natural Heritage Program; Pam Smith, Field Botanist/Ecologist Colorado Natural Heritage Program. *Workshop charge of \$10; pre-registration required.*

Dryland Revegetation Techniques: Restoring Sites in the Face of Drought or Limited Access to Water - A Friday in September, to be held on a site along Dolores River, CO

Site restoration in the face of drought or limited access to water can be a challenge. While there is no silver bullet, there are a variety of techniques that can be implemented to improve your chances of success. Several experts from across the West will be sharing techniques they have used to enhance success on these kinds of sites as it relates to soil manipulation, amendments, planting, and seeding efforts. Attendees will be provided with several relevant handouts.

Sponsors of this series include the Gates Family Foundation, Xcel Energy, and the Walton Family Foundation.

Wetland Plant Identification Course (Eastern Slope focus)

is being offered by the Colorado Natural Heritage Program (CNHP). The class is geared to national, state, county, and local land managers, private consultants, non-profit organizations, and private land owners who need to know how to identify wetland plants. The class is free. **Only sign up for one date:**

July 29-30, 2014 9 a.m.– 5 p.m. each day, Boulder

August 19-20, 2014 9 a.m.– 5 p.m. each day, Colo. Springs

RSVP by June 1 Class sizes are limited

Denise Culver 970-491-2998 or Denise.Culver@ColoradoState.edu

Field Studies: Join a Bioblitz -- or Two!

Cimarron Nat. Grassland (KS) Bioblitz, May 16-18

Cimarron National Grassland, which is in the southwestern corner of Kansas, may present some interesting challenges. There have been several years of dry conditions and we can't be sure if that may improve or not. Hopefully, there will be enough spring rains and/or left-over winter moisture to get plants growing and critters moving. The Cimarron covers more than 100,000 acres, so we will focus on the western third of the Grassland, from Kansas State Highway 27 west to the Colorado border. North of the Cimarron River is shortgrass prairie. South of the River is sand prairie. And then there's the River with its cottonwood groves. This is likely to be another camping experience. Elkhart, KS, is about 9 miles from where we would probably meet. We will gather at the Cimarron River Picnic Area, just off KS-27. Camping is available at the Cimarron Recreation Area about five miles to the east. There are amenities in town (food, lodging).

The blitz period will be from the first afternoon (Friday May 16), a full day, and a last morning (Sunday May 18), to give us two full days over a three-day period.

Please let me know if you're interested and willing to see the Cimarron. With a bit of luck with some precipitation, we can get a good turn-out and find out a bit more about the Cimarron, and visit with folks you don't always get to talk to. Please send this along to other folks who may be interested

For more information, contact Steve Olson, Forest Service Botanist, solson01@fs.fed.us, or CMC's Karl Ford, 800-633-4417. Please join us!

Bioblitz: Rampart Range Wildlands, June 21-22

A BioBlitz endeavors to identify as many species in a natural area in one-two days. This BioBlitz opportunity is planned for the Rampart Range East roadless area in the vicinity of Palmer Lake. The BioBlitz is being sponsored by the Colorado Mountain Club. We are still working on the logistics, but we are looking for botanists to help ensure we get a good understanding and reliable documentation of the biological resources there. A report will be compiled and used for future protection of the area. We hope/expect to find several rare plants/communities and document Mexican spotted owl, Preble's jumping mouse, Pawnee montane skipper. Who knows what else we may find!?

We anticipate a number of day-long hiking groups of varying difficulty to be led by a scientist and CMC leader (to be sure we don't get anyone lost). We hope to engage students and local interested citizens in the BioBlitz and show them the wonders of the natural world and get out and have fun.

Even if you can only attend one day, please come. Some scientist categories we might be short on are invertebrates (terrestrial and aquatic), fungi, mosses and lichens, fishes, and herps. Please circulate this notice to your colleagues who might be interested. More information later.

Please RSVP Karl Ford at earthford@aol.com if interested.

Aquilegia Volume 38, No. 1 Spring 2014

Chapter Programs and News

Boulder Chapter

Chapter President Danielle Cassidy Levine is stepping down because of time constraints. Our thanks go to Danielle and her team for their hard work including putting on the 2013 Annual Meeting despite massive flooding in Boulder and Danielle's impending child birth.

The Boulder Chapter is in need of volunteers to help run the chapter and to lead field trips. If you are willing to lead a field trip on the second Thursday of the month (evening) or during the weekend (daytime) please contact Megan Bowes at bowesm@bouldercolorado.gov or call 303-561-4883.

As in years past, the Boulder chapter, along with Boulder County Nature Association (BCNA) and others, co-sponsored the Ecosystem Symposium on April 12 at CU Boulder.

Purge the Spurge with CoNPS and WRV! Saturday, April 19

It's an annual tradition, and there's no weed more satisfying to pull than the spurge! Join CoNPS members, Wildlands Restoration Volunteers and other community members and help us purge the spurge from numerous locations in the Boulder foothills. Myrtle spurge (*Tithymalus myrsinites* syn. *Euphorbia myrsinites*) is a "List A" noxious weed that has escaped ornamental gardens and is now designated for statewide eradication by the Colorado Department of Agriculture.

Sign up here and register CoNPS as your group: <https://www.wlrv.net/index.php?section=events&action=list&type=trainings%20#event1345>

Gore Range Chapter

The Gore Range Chapter is a small, loosely knit group living in unique native plant environments. We like to offer field trips and workshops to share our natives, and depend on our members with local expertise to help in this effort. You don't have to be a botanist – just take us to your favorite places!



Metro Denver Chapter

The Metro Denver Chapter had an active year with numerous chapter meetings/presentations and now a bumper crop of field trips are being offered and one includes an overnight camp out!

CHAPTER MEETING

Results from 2013 Green Gentian (*Frasera coloradensis*) Survey, Tuesday, April 29,, 7 p.m. New Location: Daniels Center, 101 Monroe St., Denver, CO

Presenter: Dan Fosha

Dan Fosha will discuss his CoNPS funded research on the Colorado Green Gentian, *Frasera coloradensis*, a rare plant, endemic to southeast Colorado.

Northern Chapter

Many thanks to the Northern Chapter for generously agreeing to host the 2014 CoNPS Annual Meeting. It will take place October 3 - 5 at the North Aztlan Community Center in Fort Collins. Stay tuned for details!

Meeting

Forensic Botany - Can plants help to solve a crime?

Thursday, May 1, 7:00 PM

Speaker: Pam Smith

The Gardens on Spring Creek, 2145 Centre Ave, Ft. Collins, CO

Plants can tell tales if you know what and how to look for clues. Forensic botanical information can provide insight to people working on a crime in a variety of ways using plant identification, plant physiology, genetics, pollen, seeds, plant ecology and more. A few high profile cases have been solved using botanical data. We will discuss some of these cases and the various ways in which plants can be used to solve crimes and find buried bodies.

Pam Smith is a field botanist and ecologist with the Colorado Natural Heritage Program at Colorado State University and has been part of NecroSearch International for three years and became an official member in 2013. NecroSearch International is a non-profit volunteer organization of experts that provide assistance to police departments and agencies all over the world.

Plateau Chapter

Following last summer's successful joint field trip we are planning another with the Black Canyon Regional Land Trust to the San Juan Mountains. Last year's trip let members of each organization know about the other and I hope to do more of these next year to increase awareness about CONPS. We have a variety of field trips from the deserts to the alpine and various lab/herbarium activities.

Southeast Chapter

The Southeast Chapter has been actively working to protect the habitats and rare plants in the Pueblo State Park. See Mo Ewing's Conservation Corner article on pages 18-20.

Committee Reports

Conservation Committee - Mo Ewing

1. Several CoNPS members have volunteered to review government documents. We are planning to review the Environmental Impact Studies on oil and gas development for the Pawnee National Grasslands as well as the EIS for the amended oil and gas development plan for the Roan Plateau. We may also comment on the land swap for the Wolf Pass development.

2. Several volunteers and I have met with both board and staff of the Wildlands Restoration Volunteers to discuss the possibility of CoNPS volunteers getting involved in follow-up monitoring of WRV restoration projects. We are in the process of collecting research protocols which were developed by WRV some time ago but never implemented. Megan Bowes has volunteered to run a botany course for WRV volunteers who may be interested in working on this monitoring project. We,

with Board approval, will begin developing a training program for volunteers interested in monitoring completed WRV projects. If things go as planned we may tackle two restoration monitoring projects, one at Summit Lake on Mount Evans where WRV has done restoration for the last three years, and another at the Hyde Park Burn Area.

3. Christina McCloud has volunteered to help write future articles for *Conservation Corner* in *Aquilegia*. Her help is welcomed! It would be great if I could find more volunteers to help with that as well as develop interesting content for the Conservation Committee page on our web site.

Education & Outreach Committee - Jim Tolstrup

The Committee has been offering native plant presentations to a number of organizations. The High Plains Environmental Center is partnering with CoNPS to offer native plant seed packets as gifts to new and renewing CoNPS members.

Field Studies Committee - Steve Popovich

There are two field studies opportunities this summer. One bioblitz will be on the Cimarron National Grassland just inside Kansas in mid-May, while the other bioblitz is in the Rampart Range East roadless area in the vicinity of Palmer Lake in late June. These field studies are sponsored by the U.S. Forest Service and the Colorado Mountain Club (CMC). See p. 13.

Finance Committee - Mo Ewing

The profit and loss statement for the year shows that income came in very close to budget, with some categories a bit higher and some a bit lower than budgeted. There was a \$3,000 single contribution to the Steinkamp fund.

Horticulture & Restoration - Megan Bowes

The Horticulture & Restoration Committee has been involved in a number of activities including working with the Front Range Chapter of Wild Ones to hold the First Annual Native Plant Seed Swap (see news story, page 16).

Media Committee - Jan Loechell Turner

Bob Henry stepped down after three years as editor of *Aquilegia*. The idea to make the position paid through advertisements was unfeasible because of workload. Jan Loechell Turner is the new editor. Rob Pudim joined the staff as cartoonist and Sally White and John Vickery joined Linda Smith as proofreaders. The publication schedule is being adjusted to accommodate the timing of field trips and workshops. Aaron Davenport and Crystal Strouse stepped in as webmasters while Yongli Zhou was on maternity leave. Aaron has stayed on and Yongli has returned to help out. Carol English, CoNPS Facebook editor, posts reminders about workshops and field trips and items of interest. The CoNPS Facebook page has 192 members.

Membership Committee - Linda Smith

Memberships are holding steady at 760 memberships. Many native plant societies count family memberships as two people and if counted this way, we have well over 800 members.

Research Grants Committee - Catherine Kleier

The Research Grants Committee awarded approximately \$4,000 in research grants through the John Marr and Myrna Steinkamp funds

Workshop Committee - Linda Hellow

The large variety of workshops continue to be quite popular. Linda Hellow, Workshop Coordinator, decided it was time to move to a full-time job so she resigned as of late April. Ronda Koski has been hired for the job.

News & Announcements

2014 CONPS ANNUAL MEETING OCTOBER 3-5, Fort Collins Theme: Reaching Out

The 2014 Annual Meeting will be October 3-5 at the North Aztlan Community Center in Ft. Collins. This is just north of Old Town and an easy walk to all kinds of restaurants. The theme is "Reaching Out" and will explore how CoNPS interfaces with other organizations, various professions, and reaches the general public. Put the date on your calendar! There will be interesting speakers and great field trips!

2014 CoNPS Marr and Steinkamp Research Grants Award Recipients

The CoNPS Research Grants Committee has selected the following recipients for the 2014 research grants.

Marr Awards

Amy Goodrich, "Evaluating the Reestablishment of Vegetation on Disturbed High Mountain Lakeshore Areas Re-Exposed by Dam Removal in Rocky Mountain National Park, Colorado." \$500

Andrea Stuemky, "Continuation of trail restoration monitoring and plug succession rates on Mount Yale, Collegiate Peaks Wilderness, CO." \$750

Stephanie Zorio, "Using historical data to document 65 years of vegetation change in high-elevation communities of the upper East River Basin, Colorado, USA." \$1000

Steinkamp Awards

Robby McMinn, "Demographic and Genetic Variability Throughout the Range of Two Thistle Species (*Cirsium canescens* Nutt. and *Cirsium ownbeyi* S.L. Welsh)" \$945

Gwen Kittel, "Survey and update Colorado population of *Salix arizonica* and conduct systematic survey for additional populations in 2014 field season" \$550

Thanks to the generous contributions of many members and supporters, a total of nearly \$3,000 is available, although individual awards don't typically exceed \$1,000. Recipients of the awards must agree to summarize their studies for publication in *Aquilegia* and on the Society web site and are encouraged to present the results of their research at the CoNPS annual meeting and/or a chapter meeting. If you are interested in contributing to the research grant funds, please contact CoNPS treasurer, Mo Ewing at bayardewing@gmail.com

Welcome Back to the Board, Bob Powell!

Bob keeps an eye on environmental issues, especially those affecting the southwestern area of the state. We are fortunate to have Bob as a returning Board member.

Spring Awaits in Native Plant Master Offerings

Spring wildflowers are just starting to emerge, so now is a great time to view what the Native Plant Master® Program – Metro to Mountain Group – has to offer. For a complete list of this year's 27 different courses and classes on Colorado flora, see npm.eventbrite.com. Register soon as offerings can fill quickly.

New this year, those completing three NPM curriculum courses are awarded a Colorado Flora Certificate with no volunteer requirement. For those interested in educating others by becoming a certified Native Plant Master volunteer, contact npmassistant@jeffco.us.

For more information, including Native Plant Master offerings in other locations in Colorado, see nativeplantmaster.org. Also see the Colorado Plant Database at coloradoplants.jeffco.us for research-based information on more than 1,000 Colorado plants and plant lists for many of the courses.

Adopt a Rare-Plant Training for 2014 on May 13

Have you wanted to volunteer your time helping to document and protect some of Colorado's rarest plants? Have you wanted to learn more about how botanical professionals are tracking rare plants in Colorado? If so, please join us for the full-day course 'In the Field - Plant Conservation and Monitoring' on Tuesday May 13 in Gunnison. The course is taught through Denver Botanic Gardens in collaboration with the Colorado Natural Heritage Program and the Colorado Natural Areas Program. Upon completion of the course, you may sign up to become a volunteer steward in one of our programs. Details about the course may be found here: <http://www.botanicgardens.org/programs/classes/field-plant-conservation-and-monitoring>. For additional information or inquiries please contact instructor Michelle DePrenger-Levin at deprengm@botanicgardens.org.

New Workshop Coordinator Ronda Koski

Ever since she can remember, Ronda Koski has been attracted to plants! received a BS in Horticulture from Purdue University, and an MS in Plant Pathology from Ohio State University.

For the past 16 years Ronda has been a Research Associate for the College of Agricultural Sciences at Colorado State University. Since 2008, Ronda has been assisting with evaluations of plant species and selection for the Plant Select® program, and conducting herbicide safety studies for the USDA's IR-4 Project.



Photo courtesy
Ronda Koski

Ronda is a member of the Colorado Native Plant Society, the American Penstemon Society, the Northern Colorado and Colorado State Beekeepers Associations, the American Society of Horticultural Science, the Poudre Wilderness Volunteers, and is a Larimer County Native Plant Master. Reach her at conpsworkshops@gmail.com

Congratulations to Steve Popovich

Steve Popovich, chair of the CoNPS Field Studies Committee and Acting Regional Botanist for the U.S. Forest Service, Rocky Mountain Region will be serving as the Acting Regional Botanist for the Intermountain Region, based in Ogden, Utah, for four months beginning in April.

Native Plant Sale May 17 in Loveland

The High Plains Environmental Center in Loveland will be having a native plant sale on May 17.

Colorado Butterfly Monitoring Network Volunteers needed!

Do you get excited when you see a butterfly? Do you care about the health of ecosystems? Then volunteering for the Colorado Butterfly Monitoring Network is the perfect job for you! We are currently seeking energetic volunteers to assist in a new project monitoring Colorado butterfly populations in parks and open spaces throughout the state. Volunteers will observe and record butterflies along a set census route at least six times between May 15 and September 30 2014.

Volunteers are required to attend a full day training on either April 27th (9 am – 3 pm) or May 7th (10 am – 4 pm) at Butterfly Pavilion. After training, volunteers will be expected to identify 25 regionally common butterfly species and understand how to observe them in the field. For more information please contact Sarah Garrett (sgarrett@butterflies.org) or Amy Yarger (ayarger@butterflies.org) at Butterfly Pavilion.

Tallamy in Texas

Award-winning author Dr. Doug Tallamy will deliver the keynote address at the Spring Symposium on April 26. The event is sponsored by the Native Plant Society of Texas and held at the Lady Bird Johnson Wildflower Center in Austin.

Citizen Science Project Needs Volunteers

PlantShift is a research project that engages citizen scientists in the science behind plant population and conservation biology while collecting real data, and we want your help. We focus on understanding how climate change affects the performance of individual plants and how these responses scale up to alter the growth rate and extinction risk of plant populations. Our research focuses on the native herb valerian (also known as tobacco root and *Valeriana edulis*) as a model system in part because the broad range of climates in which it grows – from hot, dry sagebrush scrub to cool, wet alpine ridges – offers a preview of the warmer, drier climate expected in Colorado's future. The results of this work will provide a clearer picture of how montane plants are likely respond to climate change and concrete management tools to mitigate these impacts. Volunteers ages 16+ and of any experience level are invited to collect data with us in the Crested Butte area on any of our volunteer days (beginning in mid June through August). We also encourage citizen scientists to contribute sightings of valerian in Gunnison County to our website. To learn more, view the regularly updated volunteer day calendar, or sign-up to help, please visit <http://plantshift.weebly.com/> or contact Will Petry at wpetry@uci.edu.

First Annual Native Plant Seed Swap

CoNPS, in partnership with the Front Range Chapter of Wild Ones, held its First Annual Seed Swap on February 8, 2014 at Timberline Gardens in Arvada. Kelly Grummons of Timberline Gardens gave participants a tour of his greenhouse where he propagates native plants. Susan Crick Smith, Linda Hellow, and Megan Bowes organized the seed exchange.



Susan Smith and Linda Hellow
Photo by Jan L Turner

Wild Ones: Native Plants, Natural Landscapes "promotes environmentally sound environmental practices to preserve biodiversity through the preservation, restoration, and establishment of native plant communities. Wild Ones is a not-for-profit environmental education organization founded in 1979." (<http://frontrangewildones.wordpress.com/>). The Front Range Chapter is the first chapter in Colorado and serves the area from Colorado Springs to Fort Collins. For more information contact Susan or Linda at FrontRangeWildOnes@gmail.com.



Thank you for all you have done, Linda Hellow!

Our thanks go to Linda Hellow for the excellent job she has done as Workshop Coordinator. Linda is stepping down as the coordinator in April. She remains active in the promotion of native plants in the garden and is pictured in the article above with Susan Smith at the Native Plant Seed Exchange.

The 2014 Eriogonum Society Meeting

The meeting will be centered in Twin Falls, Idaho. The meeting is scheduled for Friday, June 20 through Sunday, June 22, with an optional post-meeting tour of Craters of the Moon National Monument and Fish Creek Canyon on Monday, June 23.

Native Plant Society of New Mexico

The 2014 NPSNM Annual Meeting will be held July 31 – August 2 in El Paso TX.

Enter the CoNPS 2014 Photo Contest!

The deadline for the 2014 Colorado Native Plant Society Photo Contest is **August 15, 2014**. There are two categories: Colorado Native Plant Landscapes/Habitats and Colorado Native Plants. First place prize for each category is \$50. Please submit entries to: conpsphotocontest@gmail.com. Entry forms and rules can be found on the CoNPS website (www.conps.org).

Outgoing Board Members

Two outstanding members are retiring from the Board this year, Steve Yarbrough and Brian Kurzel. We are grateful to them for all they have done for CoNPS.

Steve Yarbrough served on the Board for many years and also served as the chair of the Workshop Committee. Steve is famous for his field trips in the fens and will continue serving as a CoNPS field trip leader. Steve works for Tetra Tech.



Photo courtesy Steve Yarbrough

Brian Kurzel has been very active on the Board, spearheading advocacy issues, and helping to organize and plan a Denver Annual Meeting. Brian is Policy and Planning Supervisor at Colorado Parks and Wildlife and he will continue serving as a member of the Conservation Committee that is chaired by Mo Ewing.



Brian Kurzel
Photo courtesy of CNAP

CoNPS is fortunate that Steve and Brian will continue their active participation in the Society.

American Penstemon Society Annual Meeting

The Annual Meeting will be held in Zion National Park and Southwestern Utah! May 16-19, 2014.

2250 Colorado Wildflowers Android App.



Flora ID Northwest has recently published a new Android app for Colorado Wildflowers on the Google Play Store. They are pleased to make this available in a "field friendly format" that is the culmination of nearly 20 years producing interactive plant keys. The app is titled "2250 Colorado Wildflowers." It is much more comprehensive than the usual wildflower book or app, with many more species, over 6,900 photos, and sophisticated interactive keys with all the functionality of the keys in our PC programs (see CONPS Bookstore). The app includes 92% of all the native and naturalized, non-grasslike flowering species in Colorado. Species can be sorted by either common or scientific names, with synonyms listed in descriptions.

For more details, see their web site, www.flora-id-northwest.com or the web page on Google Play Store (<https://play.google.com/store/apps/details?id=com.floraidnorthwest.colorado>).

Botanicum absurdum by Rob Pudim

©Rob Pudim





Oenopsis puebloensis

by Susan Spackman Punjabi

Conservation Corner: Members Support Stronger Advocacy Efforts

by Mo Ewing

Last fall, at the urging of some members of CoNPS, the Board implemented a survey of our members to determine if they supported increasing the Society's advocacy efforts for native plants. Our mission states:

"The Colorado Native Plant Society is dedicated to furthering the knowledge, appreciation and conservation of native plants and habitats of Colorado through education, stewardship and advocacy"

In our discussions, the Board was confident that we as a society have always fulfilled our education mission through our workshops and field trips. However, when it came to advocacy, our record has been a bit spotty. As we said in the introduction to the survey:

1. The pressure on Colorado's public lands has never been greater and is expected to grow over the next several decades. This puts our habitats for native plants and the other biota that depend on them at ever increasing risk.
2. There is an urgent need for an honest and objective evaluator of the impact of these development projects on the health and, in some instances, on the survival of Colorado's native plant communities.

We defined advocacy as: "Influencing public policy through existing procedures." This involves collaborative, civic engagement with our public land managers working within existing processes (i.e., this will not involve chaining ourselves to any bulldozers!).

Over the last several months, 243 members responded to the survey, representing 35% of our members. The complete results of the survey can be found on the Conservation Committee page on our website at <http://www.conps.org/Committees/conservation.shtml>. In a nutshell, most of our members supported our becoming a stronger advocate for rare plants.

We defined *advocacy* as: "Influencing public policy through existing procedures." This involves collaborative, civic engagement with our public land managers working within existing processes (i.e., this will not involve chaining ourselves to any bulldozers!).

- 95% either strongly agreed, or agreed with some reservations, that we should become a stronger advocate for native plants
- 65% of members were not concerned that increasing advocacy would negatively impact other parts of our mission
- On the other hand 39% were greatly or somewhat concerned that greater advocacy might negatively affect the neutrality of our organization and affect relationships with our current partners
- But most importantly, a significant number of our members indicated that they would be willing to become more involved with the organization both in terms of volunteer time and financial support
- 19% would definitely be willing to make a one-time donation to an "advocacy fund" (38% might donate, 25% were not sure)
- 37% were definitely willing to visit a public land association to access the status of native plants (27% would "probably" be willing)
- 26.5% were definitely willing to review a federal management plan (23% "probably")
- 20.8% were definitely willing to attend a public meeting to voice our opinion (27% "probably")
- 180 of 243 respondents were willing to pay an average of \$27 more toward their membership to support advocacy
- 85.4% were willing to pay more for their membership if CoNPS' advocacy had an impact on oil and gas development in Colorado



Asclepias uncialis Photo © Loraine Yeatts

What Can We Do?

Based on this response, the Board has asked Brian Kurzel, who has spearheaded this effort, to put together a proposal to enhance our advocacy efforts. Keeping on top of the management plans of multiple public agencies is a huge task and is very difficult to do with only volunteers. What our Society needs is a person who is totally focused on this project, and one who can organize and lead CoNPS volunteers to visit public lands, read and comment on management plans and attend public meetings to voice our opinions.

One option is to hire a part-time person, on a contract basis, to manage this project. This has been a successful strategy for Linda Smith, who is our administrative assistant, and Linda Hellow, who is our workshop coordinator.



Oenothera harringtonii
Photo@ Krissa Skogen

Both report to Board committees. There may be other options that Brian proposes and we will be looking forward to his suggestions.

Having been the Chairman of the Conservation Committee for the last couple of years, I think it is important to make the following point. Even if we were to hire John Muir to run this program, he would not be successful unless CoNPS members are willing to pitch in to help with the work. There is simply no way that we will be able to make knowledgeable, objective and useful comments to public agencies without our members' input. Early on, I found that public agencies

pay little attention to platitudes about plant conservation, but require focused, specific and objective comments regarding their proposed activities. There is no way that one person sitting in an office somewhere in Colorado, will be able to accomplish that without detailed input from people who are familiar with what is happening on the ground locally.

Lake Pueblo State Park

Is this possible? I have a little story to tell to show why it is. John Vickery, who is on our government documents subcommittee, sent us a request for comments on Colorado Parks and Wildlife Statewide Comprehensive Outdoor Recreation Plan (SCORP). Initially, it was unclear whether we had anything to say about recreation until the southeast chapter president, Ed Roland, told us about serious recreation issues occurring in Lake Pueblo State Park.

It seems that the park staff has allowed a local mountain biking group, the Southern Colorado Trail Builders, to build, expand and maintain bike trails in the park with very little supervision. The result is that they have built a large number of trails all over the park. The park staff has mapped these trails as "social trails (unauthorized)" on their official maps, but has allowed the Trail Builders to erect signs at the trailheads, advertise them on their web site and distribute maps of the trails in the visitor's center. In addition the Pueblo Area Council of Governments has produced a map called the "Pueblo Bicycle and Trails Map" which promotes the use of these unauthorized social trails.

In many cases this might not be such a big problem except for the fact that the park contains unique chalk barrens that are rated by the Colorado Natural Heritage Program as having "B-1 Outstanding Biodiversity Significance" because of the presence of globally rare plant species. The list includes *Oenothera harringtonii* global ranking G2 (Arkansas Valley Evening Primrose), *Nuttallia chrysantha* G1G2 (Golden Blazing Star), *Asclepias uncialis* G3 (Dwarf Milkweed), *Oonopsis puebloensis* G2 (Pueblo Goldenweed), and *Oxybaphus rotundifolius* G2 (Round-leaf Four O'clock).

The Global rankings mean:

- G1: considered critically imperiled; at very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
- G2: considered imperiled; at high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
- G3: considered vulnerable; at moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

Fortunately for our SCORP comments, we had a CoNPS member, Marjorie Joy, who was very familiar with Lake Pueblo State Park. She is a native plant monitor for the Colorado Natural Areas Program and a raptor monitor for the Colorado Parks and Wildlife Resource Stewardship Program. Marjorie was able to point us to publicly-available maps that, when put together, showed that the Trail Builders were placing trails right through the middle of rare plant populations. She told us that in certain areas,



Oxybaphus rotundifolius
Top photo: courtesy CNHP
Lower photo © Rick Brune

the rare plants grew right along side of the unauthorized trails, and that the Southern Colorado Trail Builders were promoting the use of these unauthorized trails by handing out maps right in the Park's visitor's center.

The state's proposed recreation plan (SCORP) states in Goal 5, "increase the capacity of land managers to effectively maintain and manage natural resources and recreation infrastructure...," and Objective 4 "continue efforts to prepare for and mitigate impacts on Colorado's natural resources from natural and anthropogenic causes." Because of the information that Marjorie gave us, from her experience on the ground, we were able to make a strong statement to Parks and Wildlife about the need to protect rare plants and sensitive plant communities, and demonstrate that they were not effectively doing so at the present time. (See "SCORP Comments" on the CoNPS website, on the Conservation Committee page.)

We were able to write an effective letter commenting on the Lake Pueblo State Park Management Plan, which supported a local issue important to the Southeast Chapter. (Those comments can also be found on the Conservation Committee page of our website.)

This is the way our plant advocacy program needs to be run. CoNPS members with feet on the ground, supporting CoNPS staff to advocate for our Colorado native plants. Some members may believe that they have to be a botanist to advocate for native plants, but that is not true. Anyone can identify the destruction of plant communities caused, for example, by mountain biking, or oil and gas development.

The important thing to do is to get out on CoNPS and other organizations' on-the-ground conservation projects, and pitch in. There will be several on-the-ground projects listed on the Conservation Committee web site this spring. Do you want to help? Please contact Mo Ewing at bayardewing@gmail.com.

Advocacy Success Story

Wacker Ranch and the Buckwheat Fund: The Colorado Natural Areas Program Partnership with CoNPS and Others to Protect Endangered Wildflower in Montrose by Brian Kurzel

Hollywood couldn't have scripted it any better: an endangered wildflower that only occurs in Colorado; a parcel of private land that is threatened by real estate development and off-highway vehicles; an enthusiastic coalition of government and non-governmental groups. The Wacker Ranch, home to one of the best populations of the federally endangered clay-loving wild buckwheat (*Eriogonum pelinophilum*), is now protected for future generations.



A Critical Property



The 43-acre Wacker Ranch is located just outside of Montrose, Colorado, in the Adobe Hills ecosystem which supports rare plants, unique soil crusts and imperiled lichens. The Ranch is adjacent to Bureau of Land Management property, and together these parcels house one of the largest and most viable populations of clay-loving wild buckwheat in the world! CNAP, The Nature Conservancy (TNC) and the Colorado Natural Heritage Program (CNHP) had been working with the landowners for over 20 years to protect the plants; but early last year, the Ranch was put on the real estate market. In an area that is growing as rapidly as Montrose, the loss of this important habitat was imminent. Decisive action was necessary to avoid the loss of

this critical property. This story is one for the conservation history books.

Decisive Action

The wheels of conservation snapped into motion across the state when people learned of the potential loss of the Wacker Ranch. Because of the long standing relationship with CNAP, the Wackers contacted CNAP staff first when they considered selling the property in fall of 2006; CNAP contact TNC and CNHP because they had also been involved with the property over the last 20 years; CNHP botanists confirmed the importance of this population; The Colorado Parks Board voted to allow the use of \$13,000 in Colorado Lottery funds to buy an option on the property to take it off the real estate market for a year; CNAP and TNC jointly prepared a Recovery Land Acquisition Grant from the U.S. Fish & Wildlife Service, which was awarded in the amount of ~\$160,000. TNC had some key funding for the project and CNAP was eligible for the Fish and Wildlife federal assistance to the state; The Nature Conservancy contributed match funding to secure the federal grant; The Friends of Colorado Natural Areas, TNC, Center for Native Ecosystems, and the Colorado Native Plant Society raised over \$17,000, using snappy slogans such as "Buckwheat: it's not just for pancakes anymore!"; The Natural Areas Program received the Fish and Wildlife grant and then closed on the property

The Colorado Native Plant Society raised over \$17,000, using snappy slogans such as "Buckwheat: it's not just for pancakes anymore!";

in March of 2007. TNC agreed to a 25 year management agreement of the site while the Friends of Natural Areas and partners will

continue to do fundraising to build funds and relationships for long-term management. With such wholesale support from the conservation community and the general public, the protection of the Wacker Ranch has become a reality.

Conservation Success

As of March, 2007, CNAP and State Parks became the owner of the 43-acre ranch, and TNC will manage the property for the protection of the clay-loving wild buckwheat. The land, as well as the buckwheat, will be monitored closely and access will be restricted to researchers and guided tours. CNAP will seek designation for the Wacker Ranch Natural Area with the Natural Areas Council and the Montrose County Commissioners and will work closely with the BLM and TNC to secure the population that spans the property boundaries.

This story has been a notable model of how those who care about biodiversity and habitat conservation can rally around and protect Colorado's imperiled plants. Congratulations to all who worked so hard on this success story. Stay tuned, we hope this is just the first episode in a conservation mini-series that is about to unfold.

Photos courtesy CNAP

Meet with your chapter or talk to other members on field trips about pressing conservation issues in your area.

Contact Mo Ewing (bayardewing@gmail.com) to join the Conservation Committee. With a strong committee, we can work to protect the plants of Colorado and their habitats.

As can be seen from the saga of Pueblo Lake State Park and the Wacker Ranch, collaboration and cooperation with other organizations that share our goals are key to successful advocacy.

This year's annual meeting, hosted by the Northern Chapter in Fort Collins will have the theme, "Reaching Out," exploring how CoNPS interfaces with other organizations, various professions, and reaches the public.

New Board of Directors member, Lenore Mitchell, will attend Colorado Natural Areas Program (CNAP) meetings and report back to the Board on issues of concern and coordination of rare plant monitoring. This responsibility is a good fit for Lenore, who is participating as a volunteer steward with CNAP for Wacker Ranch near Montrose that has one of only 16 known world-wide populations of clay-loving buckwheat, *Eriogonum pelinophilum*, and also the relatively rare *Pensetmon retrorsus*. She's also joining the rare plant monitoring program through Denver Botanic Gardens and CNAP.



Photo courtesy Lenore Mitchell

North American Native Plant Society (NANPS) and Advocacy

On the next page in the *Cross Pollination* column, Peter Kelly, Executive Director of the North American Native Plant Society (NANPS) writes about the history and purpose of NANPS. When asked if NANPS engages in advocacy, Pete answered:

At our roots, just like CoNPS, we are largely an organization focused on education but we do engage in advocacy work when needed and we would like to expand our advocacy work in the future. Here are two prominent examples:

1. In the past, NANPS has fought municipal bylaws and city officials in Toronto who argued that natural gardens attracted rats, fueled fires or were homes for breeding mosquitos. In total, four past directors of NANPS have received official complaints about the choice of plant materials or the design of their native plant gardens. They have also fought city officials who perceive native plant gardens as a sign of neglect.
2. Recently, NANPS has been lobbying the City of Toronto to include native plant gardens and native trees as part of a new park going in a former parking lot location near the waterfront at Ontario Place and have had representatives at every consultation session that has taken place to date to argue for native plantings. We have been using Facebook and Twitter to rally support for the idea as well.

The North American Native Plant Society

by Peter Kelly, Executive Director



NORTH AMERICAN
NATIVE PLANT SOCIETY

In 1984, Jim French an avid Canadian native plant gardener wrote a letter to Marilyn Dawson; gardening columnist for Toronto's *Globe & Mail* newspaper, requesting information on where to purchase native plants and seeds. A few weeks later, a large bundle of letters arrived at Jim's home from Marilyn; all from similarly frustrated gardeners who had written her with the exact same request. Where do we get native plants and seeds for our gardens?

Jim was intrigued that so many others had similar questions. So he reached out to them with one singular thought: why not form a national native plant society? The following year, the Canadian Wildflower Society was born followed shortly by the first issue of the society's magazine; simply known as *Wildflower*. A few years later, the Society launched its first annual plant sale.

The organization continued to grow and in 1998, the society opted to change its name to the North American Native Plant Society (NANPS), recognizing that native flora and the issues surrounding their conservation cannot be confined by political boundaries. NANPS was the first native plant society to have a continent-wide focus.

Today, NANPS continues to advocate for the study, conservation, cultivation and restoration of native plants. *Wildflower* has given way to the *Blazing Star*, our quarterly native plant publication. *The Local Scoop* is an entertaining yet informative monthly e-newsletter that features society news, articles and event postings for the native plant enthusiast.

The NANPS Spring Annual Native Plant sale is now the largest in Canada with over 350 species of native plants for sale to the general public. It is held at the Civic Centre in Markham, Ontario. For members that are also native plant growers, NANPS facilitates an annual Seed Exchange every winter. Seed savers send us selections of their native seeds, we post the list on our web-site and members then contact us with their native plant seed requests. These two events nicely fulfill the original mandate of our founding members.

We also organize the Dr. Barbara Fallis Memorial Lecture Series on native plant topics each spring, run a number of field excursions each year, make appearances at a variety of public events and arrange for plant rescues and restorations as the need arises. NANPS is also the fortunate owner of two properties in Ontario; a 50-acre Carolinian forest remnant known as Shining Tree Woods and Zinkan Island Cove on the Bruce Peninsula. Zinkan Island Cove includes an alvar and 1,200 feet of Lake Huron shoreline amongst its numerous attributes.

While NANPS has a continent-wide focus, we are based in Toronto and while we do have members across Canada and the United States, our membership is still largely based in Ontario. NANPS is still trying to strategize how we can take the role as a continent-wide advocate for native plants. Given that our volunteer base is anchored in southern Canada, it would be impractical for us to host a native plant sale in Colorado or organize a lecture series in Florida. However, given our geographical restrictions, we have managed some successful continent-wide native plant outreach and education. This includes our Twitter account (@tnanps) and the *Blazing Star* which has recently featured articles on native plants in areas as diverse as Kansas, New Brunswick, New York and California. I encourage you to check out our web-site (www.nanps.org) and contact me with your ideas on the future role of the North American Native Plant Society (pkelly@nanps.org).



Stanleya pinnata Photo © Audrey Boag

Taking Native Plants to School

by Jim Tolstrup

Since Richard Louv's *Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder* was published in 2005, there has been an ever-increasing focus on getting students of all ages connected with their natural surroundings. There is a tremendous opportunity in this discussion for CoNPS and other advocates to play a role in promoting the utilization and conservation of native plants.

High Plains Environmental Center (HPEC) in Loveland has been working closely with local schools in the Thompson School District over the last six years to promote nature-based learning. The movement toward building outdoor classrooms and nature playscapes has been a grassroots effort, almost always originating with a small and inspired group of parents and teachers. On a muddy day in January, I set out to interview some of the individuals whose passion has breathed life into these projects.

Big Thompson Elementary

At Big Thompson Elementary School, I spoke with Christa Ahrens and Kerri Rollins, both parents of children who attend the school. In 2009, Big T staff decided to pursue a nature and science designation for the school. Many of the teachers had already pursued additional training in environmental education and they had incorporated the information into the classroom. The staff was inspired to make additional curriculum changes necessary to meet this new vision. Great things were happening inside of the school including the conversion of an unused classroom into an interactive science lab.

Next, they wanted to turn their attention to the outdoor space around the school and began with a contest: "Design Your Dream Playground." Students and their families presented some very creative ideas. The school received more than 40 proposals and spent over a year sorting through them to come up with a design that integrated the best concepts. The resulting design for the nature playscape at Big T has a hydrological flume that demonstrates erosion and sedimentation, a climbing wall that depicts ecosystems at different altitudes and animal adaptation for various life zones, an embankment slide where students can learn about gravity and balance, and a bio-swale where native plants will purify water that runs off of the playground before it returns to the river. There are many sustainably built features of the playground including a recycled rubber tire surface for the play yard and an artificial turf ball field.



Pollinator gardens help to teach about real-world applications of science and provide students with a sense of place.



Outdoor classroom at Big Thompson Elementary

The flume construction was funded by a grant from Pulliam Charitable Trust. The school also received grants from Great Outdoors Colorado and New Belgium Brewing to complete the half-million dollar playground renovation. Plants for the bio-swale are being donated by High Plains Environmental Center and include native grasses such as Big Bluestem (*Andropogon gerardii*), Switch Grass (*Panicum virgatum*), Yellow Indian Grass (*Sorghastrum nutans*), and Little Blue Stem (*Schizachyrium scoparium*). In addition, there will be flowering plants that attract pollinators including Blue Vervain (*Verbena hastata*), Swamp Milkweed (*Asclepias incarnata*), and Nuttall's Sunflower (*Helianthus nuttallii*).

The use of native plants can run into some unforeseen restrictions in gardens at elementary schools. The school district avoids toxic plants for obvious reasons. HPEC has created a list cross-referencing the CoNPS list of native plants (<http://www.conps.org/Committees/horticulture.shtml>) with information on toxicity. At Big T, plants with



What would a child's world look like if she were to design it herself?

edible fruit were excluded because of the abundance of bears where the school is located.

In addition to the nature playscape, there is a 4-acre outdoor classroom adjacent to the school. Teachers at Big T invite students and teachers from other schools to attend field trips on-site and Big T students conduct the tours, giving presentations on soils, geology, plants and pollination.

Lisa Coalwell, a Big T teacher, says the school's STEM curriculum (science, technology engineering and math) is taught in the outdoor classroom. Working cooperatively, students measure and categorize natural processes as fast or slow. Recent natural events in the area - floods and fires - have provided vivid examples of fast processes. Weathering and erosion of the adjacent foothills demonstrate slower processes. The outdoor classroom is also a place where students follow compass coordinates during treasure hunts to find native plants, identify them, and read about the ways that Native Americans use them for food and medicine.

Jim Cooper, another teacher at Big T, spoke with great eloquence and passion about the outdoor classroom as the place where students spend solo time working on descriptive writing and journaling. "They produce really beautiful things over there that they wouldn't in the classroom" he said.

A number of groups in the community have utilized the outdoor classroom for various programs including poetry, writing, and art. Rocky Mountain National Park has offered community outreach programs there. The Northern Chapter of CoNPS will offer a tour of this remarkably diverse site this summer with the intention of organizing a plant inventory for the school

Namaqua Elementary

Michele Mandeville's passion for the wild began in early childhood when she played outdoors and learned about birds and nature. Her connection to nature and the outdoors was rekindled as an adult when, after a personal tragedy, it was the place that she turned to for solace and healing. She wanted her own children to have access to the restorative and sustaining quality of nature and started an outdoors learning program, Namaqua Outdoors, at her daughter's school, Namaqua Elementary.

Michele organized and led trips to nearby natural areas, such as Bobcat Ridge, and enjoyed seeing the spark of curiosity that it ignited in the children. She commented about how simple it is to get children connected with nature "just by going outside and noticing small things, such as bird calls or the color of a flower, and letting them lose themselves in the environment a little bit." The Namaqua Outdoors program led to the plan to build an outdoor classroom at the school. The funding for the garden is coming primarily from within the school community. The school principal, Donald Beuke, teachers, and parents are all very supportive and are committing funds from an annual race to the project.

The outdoor classroom will have native shrubs, grasses and flowers encircling a seating area beneath a large old cottonwood that will provide dappled shade. Ironically, the spot where the outdoor classroom is being built was covered by rabbitbrush and native plants until a decade or so ago when parents raised money to turn it into a "nice" irrigated turf area. Fortunately, the trend is now going in the opposite direction and we have an opportunity to restore Colorado's unique native biodiversity on school grounds.

In the outdoor classroom, students will adopt a shrub or tree for a year and track its seasonal changes. When the native garden is completed, children will be able to measure the influx of birds and butterflies that visit, track them, learn about them, and write about them.

When asked what she hopes student will gain from the outdoor classroom Michele said "a sense of place, connection to where they grew up, where they went to school, and to the native plants that sustain life."

Centennial Elementary

Loveland-based architect Stacey Kersley was disgusted by the way the stormwater pond looked at her daughter's school, Centennial Elementary. It was a mud-pit and the neighbors were concerned about the standing water in the pond. Stacey worked with Jim Birdsall, a landscape architect, to develop a concept that was presented at a PTA meeting. The group was

convinced by their presentation and dedicated fundraising proceeds to the project.

A detailed landscape plan was donated by landscape architect Cara Scohy of CS Design, Inc. As the concept evolved, the custodial staff was consulted to make sure that they had the time and resources to maintain the new garden. The new school principal, Kim Tymkowych, is determined to see the project through to completion. The vision for the project is much more than beautification. It will be a literal outdoor classroom with stones for seating and a focus on local ecology, including water conservation, watershed protection, and native plants and their relationships with pollinating insects and birds.

In the past, the school has focused their funding primarily on technology and the students' only exposure to the outdoors was a short recess break so this project will dramatically change the experience of the students to incorporate nature.

A partnership is being pursued with the Loveland Garden Club to build support for the garden. A Mother's Day plant sale will provide funding and in the future people will be able to donate specific plants to the project. A private donor neighbor who lived in the neighborhood and frequently walked by school heard about the project and also made a substantial donation.

Stacee talked about the special quality of engaging community volunteers for projects like this "it has to be mutually beneficial" she said. Planting by volunteers is a personal investment in the project. She recalled how, on one wet June day, the former superintendent of the school district was out wearing fancy dress shoes and planting trees in the mud along with a group of bedraggled students and their families. Twenty years down the road those students will be able to come back with their kids and see how it has grown.

Jim Tolstrup is the State Outreach Chair for CoNPS and the Executive Director of the High Plains Environmental Center, a unique model for preserving native bio-diversity in the midst of development, in Loveland CO. Photos in the article by Jim Tolstrup.

In November of 2013 Connie Gray, who is the president of the Northern Chapter of Colorado Native Plant Society, as well as the Education and Outreach Manager at HPEC, led HPEC staff and nearly 400 students at Cottonwood Plains Elementary School in a pollinator game.

Bees are the active participants in the game. They wear goggles, antennae and felt vests which they use to carry pollen from the stamens of one flower to the pistils of another. In a more elaborate version of the game, the bees sip juice from the flowers through a straw but things get messy and complicated quickly in a large group of kids

Pollen is provided in the form of small balls covered in Velcro that easily stick and unstick to the other game pieces.

Petals for a red flower and a blue flower are made of heavy construction board and are held up by the students to form a flower.

Stamens are created by students pulling socks over their hands and holding their hands up with pollen sticking to them.

Pistils sit in the center of the petals wearing a wool caps. The bees detach the pollen from their felt vest and stick it on the pistils when they come to get the nectar.

The HPEC staff members were amused that the biggest boys shot their hands up when we said "who wants to be the pistils?" Presumably they thought some type of sidearm was involved. Little did they know that they were signing up to represent the essence of the feminine. The game is amusing and chaotic. It demonstrates pollination in way that is fun and easy to understand. Discussions about conserving native bio-diversity flow easily after participating in this exercise.



Phylogenetics Simplified

by Melissa Islam

Molecular biology techniques are commonly used to address questions impacting plant conservation. Two related and overlapping fields of research that use molecular techniques to inform conservation include phylogenetics and population genetics. Phylogenetics focuses on the evolutionary history of organisms (Fig 1) while population genetics focuses on genetic diversity and gene flow among populations of a single species. Researchers apply these methods to answer questions about Colorado's imperiled plant species. Both areas of research, phylogenetics and population genetics, are robust theoretically but still full of healthy debate. I focus here on phylogenetics. Over the last few years, you may have noticed evolutionary trees popping up in the pages of *Aquilegia*. For those of you that have wondered, "Why DNA? What's wrong with morphology?" or "What is a phylogram, and do I need one?" I hope to answer those questions by explaining how phylogenies are built, how to read a phylogeny, why DNA is useful, and why phylogenetics is important. Admittedly, I gloss over details and debates, hopefully, to provide a simplified explanation and in case this peaks your interest, I've included a few books and websites for further reading. There is also a glossary of terms at the end of the article.

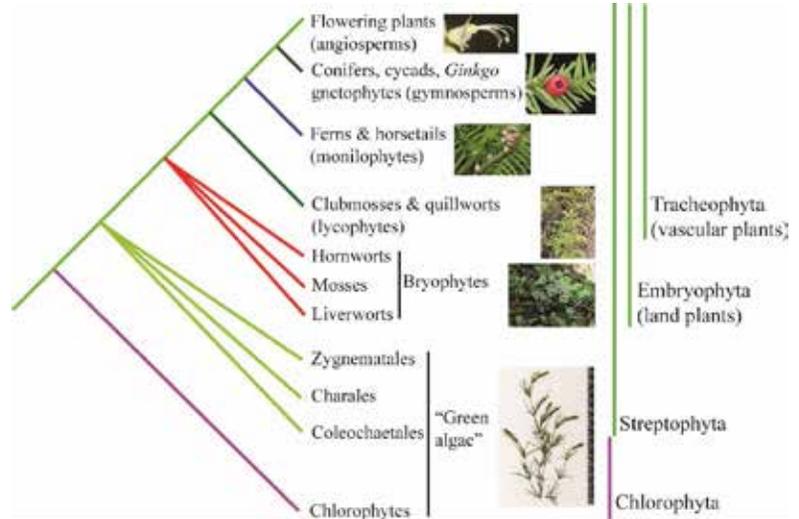


Figure 1: Phylogenetic tree summarizing relationships among major lineages of green plants (Viridiplantae) by Doug Soltis and Bryan Drew, used with permission (Soltis.Drew.phylogeny.png)

How phylogenies are built

A phylogeny illustrates hypothesized evolutionary relationships among organisms in a tree-like structure (Fig. 1, 3). You may have come across other terms, often used interchangeably, such as evolutionary tree (which I use here), cladogram, dendrogram or phylogram. In essence, all these terms refer to tree diagrams illustrating the evolutionary relationships among organisms. An organism's genetics (DNA) and phenotype (morphology) are the result of a tangle of recent and ancient evolutionary events. We can use DNA and/or morphology to build phylogenies. First, one needs to record the expressions (character states) of a heritable informative trait (character). Informative characters have states that are shared by two or more species. A morphological character could be 'flower color', and the states for a particular genus could be 'purple, yellow or white'. In molecular data, the character would be a particular nucleotide in a region of DNA, and the states are 'adenine (A), guanine (G), cytosine (C), or thymine (T)'. Typically, DNA provides

hundreds of informative characters, which when added to tens of informative morphological characters enables the construction of a robust phylogeny. Morphological characters are generally easy to define but the states are sometimes more difficult to put into discrete categories. If you have ever worked through a key, and had to choose whether the flower is pink or purple and scratched your head thinking, "both," "depends on which flower", or "is magenta pink or purple?," then you have run into this conundrum. In contrast, for molecular data the character states

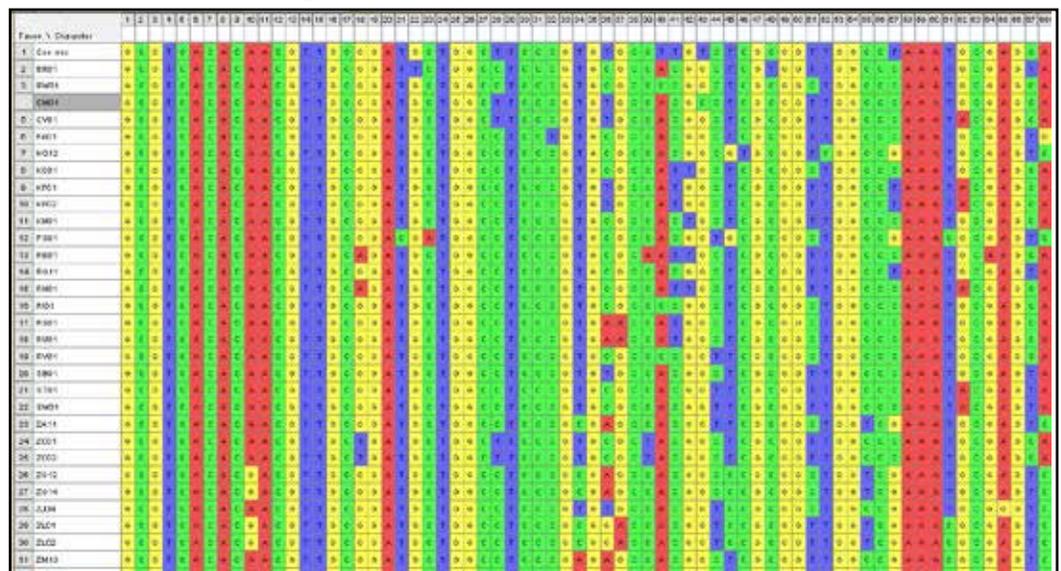


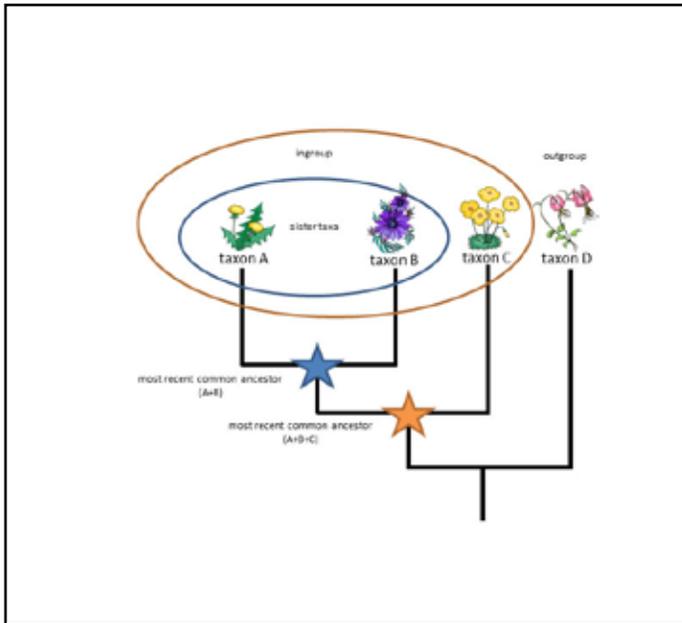
Figure 2: DNA matrix of aligned sequences (example.alignment.png)

are discrete, but the characters are more difficult to discern. For molecular sequence data, characters are defined based on how sampled sequences are aligned to one another (Fig 2).

Sometimes alignment is straightforward with little ambiguity, but often sequences may be aligned in multiple ways so different algorithms are applied to choose the optimal alignment.

A matrix of characters and character states is compiled for species sampled. Species are then grouped together by their shared, derived character states to create fewer and fewer inclusive groups (Fig. 3) akin to a Venn diagram. Shared, derived characters are those that are shared between or among species and their most recent common ancestor. Why shared, derived and not just shared states? Species may share character states for reasons that either do not reflect their shared evolutionary history (convergence - similar states that evolved independently) or do reflect a past shared evolutionary history but does not help group species (shared, ancestral state). For example, in figure 3, all four cartoon species are green plants. Presence of chlorophyll is a shared, ancestral character state. Presence of chlorophyll doesn't help us know if taxon A should be grouped with taxon B or C. To use only shared, derived character states a species hypothesized to be distantly related to the investigated species, an outgroup (Fig. 3), is added to the analysis. Conflict may exist with characters supporting different relationships, and these are resolved by implementing different methods (see further readings).

How to read a phylogeny



Phylogenies are constructed from the traits of organisms. Within the context of a phylogeny, we refer to organisms sampled as taxa or if singular taxon, and these are placed on the tips of the tree. In figure 3, taxon A and B are more closely related to each other (sister groups) than to taxon C. Taxon A and B are said to form a clade, which includes their most recent common ancestor (blue star). A phylogeny may have more than one clade. Taxa A, B and C also form a clade with their most recent common ancestor (orange star). A group of organisms that includes a common ancestor and all of its decedents is called monophyletic. In figure 3, taxa A, B and blue star form a monophyletic group and A, B, C and orange star also form a monophyletic group. Most scientists formally recognize groups that are monophyletic when naming genera, families, orders and on up the hierarchy. They do not formally recognize groups of organisms that are polyphyletic or paraphyletic (see Figure 3). Using the principle of monophyly, we could name a genus that includes A, B, and C. Or three genera, one for A, one for B, and one for C. We would not however based on figure 3 include A and C in a genus and B in a different genus, because figure 3 doesn't support A and C as a monophyletic group without also including B. In this example, Taxon D is the outgroup. Neither blue star nor orange star are recent common ancestors of Taxon D.

Figure 3: Cartoon of phylogenetic tree. Taxon A and B form a clade. Taxon A, B, and C form a clade. Stars at the two nodes represent the most recent common ancestor for their respective clade (cartoon.phylogeny.png).

As you may expect, scientists have a lot of flexibility even following the principle of monophyly on how to formally group organisms together. Taxonomists tend towards conserving names. Typically, if a large genus is supported as monophyletic, that genus would be retained instead of splitting into many small monophyletic genera (see Stevens 2001 section 'On Classifications...').

Relationships supported in a phylogeny may change if additional species and/or characters are added to the analysis. When reading research about or using phylogenies, the species and characters sampled (or those not sampled) are important for interpreting the strength of the hypothesized relationships.

Why DNA?

All types of heritable characters are important and inform evolutionary history. Evolutionary trees can be built using morphology only, but often morphology alone doesn't yield enough data or would require time intense studies compared to molecular studies. Colorado alone has about 3500 plant species. This number changes not only with additional surveys but also because the classification or nomenclature of many species is debated. To best manage for plant conservation, land managers need answers now so time is an important factor in deciding what to sample. Unlike morphology, DNA typically provides researchers with more characters to compare. As an example, a well-studied morphologically diverse genus may yield 30 to 40 informative morphological characters, but a well-studied morphologically uniform genus may provide only 10 informative characters. Yet, sequencing the DNA of these species regardless of their morphological diversity has the potential of providing hundreds (if not thousands) of informative molecular characters. To create robust phylogenies, we want to use as many characters as we can.

Luckily, plants have quite a bit of DNA. A single plant cell has three genomes, one located in the nucleus, one in the mitochondrion, and one in the chloroplast. Each of these genomes may carry a different evolutionary history. Usually, all three

genomes are extracted from the leaves at the same time. Portions of the DNA are then amplified, which just means thousands of copies are made. For plants, most studies focus on the nuclear and chloroplast genomes. A region of DNA is sequenced resulting in an ordered string of nucleotides (Fig 2, 4). In Figures 2 and 4, sequences are from the same region of DNA and are aligned with each other. Aligned sequences and morphological characters may be analyzed together to build a phylogeny. Scientists building evolutionary trees do not discount morphology outright or think of it as unimportant. Morphology is treated as another set of informative characters that are often part of building trees and certainly important and helpful when using phylogenies to inform classification, but DNA, simply, provides more data to build more robust hypotheses of the evolutionary relationships among species.

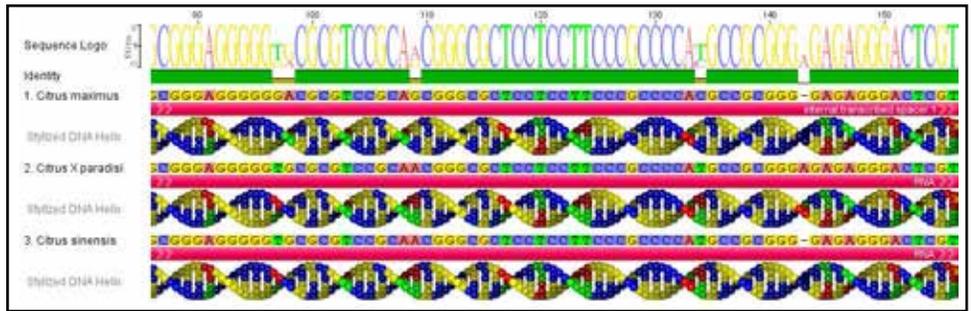


Figure 4: Section of aligned nucleotide sequences for two *Citrus* species and their hybrid (citrisDNA.png)

Why phylogenetics is important

Phylogenetics is a component of systematics, the study of biological diversity and its origin. Systematics also includes taxonomy, the classification and naming of organisms. Understanding the evolutionary history of organisms is the foundation of all comparative biology. Robust phylogenies underpin and advance crop science (breeding, biological controls), medicine (spread of contagious disease, evolution of viruses, discovery of new biological based chemicals for medicine), community ecology, evolutionary developmental biology, biogeography, and conservation just to name a few. Of course, robust phylogenies also help scientists name and classify organisms. While changes in naming and classification of plants based on phylogenies is sometimes viewed with skepticism, it represents our current understanding of the evolutionary history and is essentially just the natural progression of the science of systematics as techniques and theory are refined.

Further reading.

Felsenstein, J. 2004. *Inferring phylogenies*. Sunderland, Massachusetts: Sinauer Associates.
 Simpson, M. 2010. *Plant Systematics* 2nd Edition. San Diego, California: Elsevier.
 Stevens, P. F. (2001 onwards). *Angiosperm Phylogeny Website*. Version 13, September 2013. <http://www.mobot.org/MOBOT/research/APweb/>
Understanding Evolution. 2014. University of California Museum of Paleontology. 22 August 2008 <http://evolution.berkeley.edu/> or http://evolution.berkeley.edu/evolibrary/article/0_0_0/phylogenetics_02

Melissa Islam is the Associate Director of Research at Denver Botanic Gardens and Head Curator of the Herbaria.

GLOSSARY

Clade – a group that includes a common ancestor and all its decedents, living and extinct

Cladistics – a method of classification that groups organisms based on shared unique characters not present in distant ancestors (shared derived character states). For some biologists, cladistics is synonymous with phylogenetics referring to the general study of evolutionary relationships.

Genome – all the genetic information carried in an organism, which can be split in plants into all the genetic information carried in the nucleus, mitochondrion, or chloroplast.

Monophyletic – a group of organisms that includes a common ancestor and all of its decedents.

Paraphyletic – a group of organisms that includes a common ancestor and some of its decedents, living and extinct

Phylogenetics – the study of evolutionary relationships among organisms

Polyphyletic – a group of organisms derived from more than one ancestor

Outgroup – an organism or group of organisms related to but not belonging in the group of organisms under investigation

CONPS 2014 CALENDAR

APRIL 2014

Apr. 19 Purge the Spurge weed pull (B)
Apr. 23-24: Behind the Rocks Wilderness Study Area, Moab (SJ)
Apr. 25, Fri., Hayden Park on Green Mountain 4:30-5:30 p.m.;
5:30-7 p.m.(MD)
Apr. 26 - Sat., Gateway Spring Flowers (P)
Apr. 26 Tallamy in Texas, Austin (p. 16)
Apr. 27, Sun., Willow Identification Course 9 a.m.-3 p.m. (MD)
Apr 29 Program: Results from the 2013 Green Gentian (*Frasera speciosa*) Survey 7 p.m. (MD)

MAY 2014

May 1, Thurs. Forensic Botany Chapter Program, 7 p.m. (N)
May 3, Sat. South Valley Jeffco Open Space 9 a.m.-noon (MD)
May 3, Sat.. Sagebrush of Colorado Workshop (p. 12)
May 4, Sun. Red Mountain Open Space 8:30 a.m. (N)
May 4,
May 5-6 Wildflowers galore in Cross Canyon on the first day and
in lower Butler Wash the second day (SJ)
May 10th Sat. Badger Wash (P)
May 10, Sat.: Bent Canyon Bluffs on the Comanche (SE)
May 11 Dolores Plateau, Western San Juan National Forest near
Lone Mesa State Park (SJ)
May 13 Adopt-a-Rare Plant Program Training, Gunnison (p. 15)
May 14 – Wednesday - Cathy Fromme Prairie 5:50 p.m. (N)
May 16-18 Bioblitz at Cimarron Nat. Grassland (p. 13)
May 16-19 American Penstemon Soc. Meeting, Utah
May 17 High Plains Environmental Center Native Plant Sale
May 22 Annual trip to Sand Canyon (SJ)
May 25 Sat. Well Gulch Trail (in Lory State Park) 9 a.m.(N)
May 27th, Tues. Regis University Arboretum Tour 5-6 p.m. (MD)
May 30, Fri. Plant ID on the Dolores River Workshop (p. 12))
May 31 Sanborn Park Road, Southwest corner of Uncompahgre
National Forest near Norwood (SJ)

JUNE 2014

June 1, Sun., Red Rocks Park 8:30 a.m. - noon (MD)
June 1 - Sun., Pawnee Buttes (N)
June 7 Navajo Lake New Mexico/Colorado border (SJ)
June 11 Natural Area, Big Thompson Elementary School (N)
June 14, Sat.: Elk Park Knoll on Pikes Peak (SE)
June 14 Big Al Trail at Transfer Camp Ground above Mancos (SJ)
June 17(subject to change), Kendrick Lake Gardens 3-5 p.m.(MD)
June 18, Wed.,10:30 a.m. Betty Ford Alpine Gardens Tour (GR)
June 20-22 Eriogonum Society Meeting, Idaho
June 21 Prater Ridge Trail, Mesa Verde National Park (SJ)
June 21-22 Bioblitz: Rampart Range Wilderness (p. 13)
June 28 Sat., Brackenbury Cabin Trail (Pingree Park area) (N)
June 28, Sat., Staunton State Park 9 a.m.-noon (MD)
June 28: San Carlos Trail on the San Isabel in the Wet Mtns. (SE)

JULY 2014

July 2, Wed., Peak 7 hike followed by tour of Mountain View
Experimental Gardens 7 a.m.-5 p.m. (MD)
July 2 Ophir Pass road from the east (SJ)
July 6 Sun., Lady Moon Trail (near Redfeather Lakes) (N)

July 9, Wed., Butler Gulch 8 a.m.-3 p.m. (MD)
July 9 Wed., Bobcat Ridge Natural Area (N)
July 12 (date is subject to change) Sat. Flora of Horseshoe Cirque
7:30 a.m.-2 p.m. (MD)
July 12. Sat.: N. Cheyenne Canyon, Buffalo Creek (SE)
July 12th Sat., San Juan Mountains (P)
July 12 Upper Echo Basin Mine Road (SJ)
July 12 & 13, Sat. & Sun., Digital Photography & Wildflower
Workshop (GR)
July 16 Annual Pass Creek Trail (SJ)
July 18, Fri., ID of Riparian & Wetland Plants Workshop (p.12)
July 19, Sat., Golden Gate State Park 8 a.m. -noon (MD)
July 19, Sat.: The Craggs (SE)
July 20 Butterflies, Wildflowers, & Host Plants, S. Mesa Trail (B)
July 22 An alpine area above Silverton (SJ)
July 23, Wed., Pass Lake Wildflower Hike (GR)
July 24 Thurs. Hoosier Ridge - West 7 a.m.-5 p.m. (MD)
July 25 – 27, Fri. to Sun., Shelf Lake area and opt. camping (MD)
July 25 La Plata Canyon, Columbus Basin (SJ)
July 26 Sat., Geneva Basin Iron Fens (MD)
July 26 Sat., Blue Lake Trail (Poudre Canyon) (N)
July 29-30 Wetland Plants ID class, Boulder (p.12)
July 30 Annual Telluride trip (SJ)
July 31- Aug. 2 Native Plant Society of NM Meeting, El Paso

AUGUST 2014

Aug. 2 Bolam Lake Meadows via Hermosa Creek Pass (SJ)
Aug. 3 Sun., Ouzel Falls at Rocky Mountain Nat. Park (N)
Aug. 13 Wed. Maxwell Natural Area (N)
Aug. 15 Deadline for CoNPS Photo Contest Submissions
Aug 16, Sat.: Putney Gulch, south of the Craggs (SE)
Aug. 19-20 Wetland Plant ID Course, Colorado Springs (p. 12)
Aug. 23 Sat., Lower Dadd Gulch Trail (Poudre Canyon) (N)
Aug. 23, Sat.: Rampart Range old-growth on the Pike (SE)
Aug. 23 Mushroom trip near Lizard Head Pass (SJ)
Aug. TBD - Grand Mesa (P)

SEPTEMBER 2014

Sept. 6 Sat., Ranson Edwards Open Space 8:30 a.m.-noon (MD)
Sept. 7 - Sun., Pawnee Buttes (N)
Sept. 10 – Wed., Ramsay-Shockey Open Space (N)

OCTOBER 2014

Oct 3-5 The CoNPS Annual Meeting, Fort Collins
October 18th, Saturday Castlewood Canyon State Park (MD)

KEY

B	Boulder Chapter
GR	Gore Range Chapter
MD	Metro-Denver Chapter
N	Northern Chapter
P	Plateau Chapter
SE	Southeast Chapter
SJ	San Juan/Four Corners Native Plant Society



Colorado Native Plant Society

The Colorado Native Plant Society is dedicated to furthering the knowledge, appreciation and conservation of native plants and habitats of Colorado through education, stewardship and advocacy.

Membership is open to all with an interest in our native plants and is composed of plant enthusiasts, both professional and non-professional.

CoNPS Administrative Assistant
Linda Smith CoNPSoffice@aol.com

OFFICERS

President	Charlie Turner	conpscturner@gmail.com
Vice President	Bernadette Kuhn	bernadettekuhnCoNPS@gmail.com
Treasurer	Mo Ewing	moewing@q.com
Secretary	Denise Wilson	denise@denisecwilson.com

CHAPTER PRESIDENTS

Boulder	Danielle Cassidy Levine	boulderconps@gmail.com
Gore Range	Nanette Kuich	kix@vail.net
Northern	Connie Gray	cpowersgray@gmail.com
Metro-Denver	Jannette Wesley Jeanne Willson	metrodenverCoNPS@gmail.com riversong@centurylink.net
Plateau	Stephen Stern	stern.r.stephen@gmail.com
Southeast	Ed Roland	edwardrroland@gmail.com

BOARD OF DIRECTORS AT LARGE

Bob Powell (2014)	robertlpowell@durango.net
Jenny Neale (2014)	nealejr@gmail.com
Betsy Bultema (2014)	blharbert@gmail.com
Lenore Mitchell (2015)	mitchelllenore89@gmail.com
Steve Olson (2015)	sdolsonoslods@aol.com
Jessica Smith (2016)	jpsmith24@gmail.com
Erin Tripp (2016)	erin.tripp@colorado.edu
Jan L. Turner (2016)	JLTurner@regis.edu

STANDING COMMITTEES (Chairs)

Conservation/Finance	Mo Ewing	moewing@q.com
Education & Outreach	Jim Tolstrup	jim@suburbitat.org
Field Studies	Steve Popovich	stevepopovich@hotmail.com
Horticulture & Restoration	Megan Bowes	bowesm@bouldercolorado.gov
Media	Jan L. Turner	JLTurner@regis.edu
Membership	Linda Smith	conpsoffice@aol.com
Research Grants	Catherine Kleier	ckleier@regis.edu
Sales	Linda Smith	conpsoffice@aol.com
Workshops	Ronda Koski	conpsworkshops@gmail.com

WEBSITE & SOCIAL MEDIA

Webmaster	Aaron Davenport	davenport.aaron@gmail.com
Webmaster	Yongli Zhou	shallopcq@yahoo.com
Website Editor	Linda Smith	conpsoffice@aol.com
Facebook Editor	Carol English	grownative@msn.com

AQUILEGIA

Newsletter of the Colorado Native Plant Society

Aquilegia is the newsletter of the Colorado Native Plant Society and is available to members of the Society and to others with an interest in native plants. Four regular issues are published each year plus a special issue for the Society Annual Meeting held in the Fall.

Announcements, news, articles, book reviews, poems, botanical illustrations, photographs and other contributions should be sent to Jan Loechell Turner at JLTurner@regis.edu.

All contributions are subject to editing for brevity, grammar, and consistency, with final approval of substantive changes by the author. Articles from *Aquilegia* may be used by other native plant societies or non-profit groups, if fully cited to author and attributed to *Aquilegia*.

Deadlines: Submissions to *Aquilegia* are accepted throughout the year, although the usual deadlines for publication are:

February 15 (Spring issue, sent out mid to late March)

April 15 (Summer issue, sent out mid to late May)

June 15 (Annual Meeting issue, sent out mid to late July)

July 15 (Fall issue, sent out mid to late August)

November 15 (Winter issue, sent out mid December)

AQUILEGIA

Editor	Jan Loechell Turner	JLTurner@regis.edu
Columnist	Mo Ewing	bayardewing@gmail.com
Cartoonist	Rob Pudim	robpudim@yahoo.com
Proofreader	Sally White	sallyl.white11@gmail.com
Proofreader	Linda Smith	conpsoffice@aol.com
Proofreader	John Vickery	jvickery@mcg.net
Tech Support	Charlie Turner	conpscturner@gmail.com

"Friend" us on Facebook!

www.facebook.com

Want to find out the latest CoNPS news? Have news to share? Have a photo of a plant you need help identifying?

Want reminders about upcoming field trips or workshops?

Sign in to Facebook and type in Colorado Native Plant Society. You can "friend" us

Join the Colorado Native Plant Society



Membership in CoNPS entitles you to:

- Subscription to the CoNPS newsletter, *Aquilegia*
- Field Trips to see wildflowers
- Educational Workshops by expert botanists
- Annual Conference
- Conservation and Restoration Activities
- Camaraderie of Plant Lovers from Colorado
- Local Chapter Educational Programs & Email Updates

MEMBER APPLICATION FORM

Name(s).....

Address

City.....State.....Zip

Phone ____ - ____ - ____ E-mail

MEMBERSHIP CLASS

Dues cover a 12-month period.

- Individual (\$20)
- Family / dual (\$30)
- Senior (65+) (\$12)
- Student (\$12)
- Organization (\$30)
- Supporting (\$50)
- Lifetime (\$300)

CHAPTERS

You are free to affiliate with any chapter you choose and to attend the meetings of any chapter. Chapters do not have drawn map boundaries.

Boulder Gore Range Metro-Denver Northern Plateau Southeast Unaffiliated

Send information about **volunteer opportunities**

OPTIONAL PRINT DELIVERY OF AQUILEGIA NEWSLETTER

Most members prefer to receive the newsletter electronically via e-mail (pdf file), and this saves the Society considerable printing and postage expense. If you would like to receive a print copy of the newsletter instead, check this box. Please note that print copies usually arrive about a week later than the electronic version. Please deliver a printed copy of *Aquilegia* by mail.

DONATION

\$ _____ General Fund

Endowments in support of small grants-in-aid of research:

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

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

\$ _____ **TOTAL**

Mail to: CoNPS Office, P.O. Box 200, Fort Collins, CO 80522.

Please make checks payable to "Colorado Native Plant Society." Dues and contributions are tax-deductible.



Colorado Native Plant Society

P.O. Box 200

Fort Collins, Colorado 80522

<http://www.conps.org>

Over 45
Field Trips!
See inside!

AT HARLEQUIN'S GARDENS

One of our missions is

“To support and preserve our native plants by propagating them and distributing them into our communities.”

We've walked this talk for 21 years.

We offer both local and regional native forbs and shrubs.
Many can be seen in our demonstration gardens.

A growing collection of natives from Boulder Co. seed is available each year.

Also available: organic veggie starts and herb plants
Organic fertilizers; composts and mulches
Non-toxic pest-management supplies.

A family business with a country atmosphere

www.HarlequinsGardens.com 303-939-9403

