Aquilegia

Newsletter of the Colorado Native Plant Society

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PHOTO CONTEST WINNERS

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Native Plant
1st Place - - Vicky Ramakka
Frasera speciosa

Native Plant
2nd Place - Linda Smith
Populus deltoides ssp *monilifera*

Native Plant
3rd Place - Steve Olson
Buffalo grass stigmas

Native Plant Landscape
2nd Place - Stanley Heginbotham
View of Alpine

Native Plant Landscape
3rd Place - Dave Elin
Sagebrush Country

Native Plant Landscape
1st Place - Steve Olson
Shale Hills

Artistic - 2nd Place
2nd Place - Vicky Ramakka
Geranium richardsonii flower close-up

Artistic
3rd Place - Carol McGowan
Hairy Clematis

Artistic
1st Place - Linda Smith
Cottonwood Tree Bark

Native Plant & Wildlife
1st Place - Audrey Boag
Hummingbird feeding on *Scrophularia lanceolata*

Native Plant & Wildlife
2nd Place - Stanley Heginbotham
Spider on Wildflower

Native Plant & Wildlife
3rd Place - Dave Elin
Chrysalis of Monarch Butterfly

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

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Artwork © Carolyn Crawford

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AQUILEGIA: Newsletter of the Colorado Native Plant Society
Aquilegia Vol. 40 No. 4 Fall 2016
ISSN 2161-7317 (Online) - ISSN 2162-0865 (Print)

Aquilegia is the newsletter of the Colorado Native Plant Society. Members receive four regular issues per year (Spring, Summer, Fall, Winter).
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 the author and attributed to *Aquilegia*.
Announcements, news, articles, book reviews, poems, botanical illustrations, photographs, and other contributions should be sent to the editor.
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Front Cover Photos: Linda Smith (cottonwood bark), Audrey Boag (hummingbird & *S. lanceolata*), Vicky Rammaka (*Frasera speciosa*) - 1st place winners, **Back Cover Photo:** Steve Olson - Shale Hills (1st Place NP Landscape winner)

Happenings at CoNPS

We want to thank the members of CoNPS for making our 3 years as co-presidents of the Colorado Native Plant Society so enjoyable. We met so many wonderful people throughout the state and made a lot of new friends. Native plant lovers are a special group of people. They are smart, friendly, and down to earth - literally down on the ground viewing plants! We will continue to see you at CoNPS events.

Since the election, many of us are especially concerned about the future of public lands. It is important that we work together to protect public lands, native plants, native pollinators and other wildlife. Shortly after the election, the Colorado Wilderness Gathering took place in Buena Vista. The focus of the gathering was on public lands and wilderness area designation. There is a brief news item about the event on page 11 and there will be a "Conservation Corner" article about it in a future issue of *Aquilegia*. We encourage everyone to take part in efforts to protect public lands. This is an important time to translate your beliefs into actions.

CoNPS partners with a number of other organizations to bring awareness of native plants to the public. CoNPS and Audubon Rockies are collaborating through the Wildscaping Ambassadors program to educate the public about the importance of incorporating native plants in the yard to expand wildlife habitat. You can be trained as a Wildscaping Ambassador (see page 9) and present the program to libraries, garden centers, clubs, and HOAs so the public will understand the importance of native plant habitat to wildlife including birds and native pollinators and to create greater biodiversity. The presentation is based on the work of entomology professor, Douglas Tallamy, author of *Bringing Nature Home*. If you haven't read Tallamy's book yet, we would encourage you to do so. The book can be checked out from your public library or purchased at a discount from the CoNPS Bookstore.

Speaking of Doug Tallamy, the movie "Hometown Habitat" has been released. Your chapter could view the movie. Another possibility is scheduling a larger showing for the public in your area. In either case, a licensing agreement is required, and we can help you with that. The movie is based on the work of Tallamy and shows how people can work together to make a difference. More information about the movie is on page 12.

The Colorado Native Plant Society is now one of the organizations participating in ColoradoGives. Please support CoNPS' programs by donating to CoNPS through Colorado Gives. https://www.coloradogives.org/ColoradoNativePlantSociety/overview.

Charlie and Jan Turner

December 6, 2017

2016 Photo Contest Winners

Congratulations to this year's photo contest winners. The first, second, and third place winners are listed below according to category, and their photos are displayed on the front and back covers and on the inside of the front cover (page 2) of this issue. Print copies of the photos were displayed at the Annual Conference at the University of Colorado in Boulder on September 24 and attendees voted for their favorite photos. There is no entry fee for the contest and the first place winners receive an award of $50 each.
The photos of the winners are featured in the *Colorado Native Plant Society 2017 Calendar,* for sale through the CoNPS Bookstore ($12). https://conps.org/conps-store/. The calendar is a spiral bound, 8.5" x 11" wall calendar on sturdy card stock.

Native Plant Category
1st Place - Vicky Ramakka – *Frasera speciosa* (front cover)
2nd Place - Linda Smith – *Populus deltoides* ssp. *monilifera*
3rd Place - Steve Olson – Buffalo grass stigmas

Native Plant Landscape Category
1st Place -Steve Olson – Shale Hills (back cover)
2nd Place - Stanley Heginbotham – View of Alpine
3rd Place - Dave Elin – Sagebrush Country

Artistic Category
1st Place - Linda Smith – Cottonwood Tree Bark (front cover)
2nd Place - Vicky Ramakka – Close up of flower of *Geranium richardsonii*
3rd Place - Carol McGowan – Hairy Clematis

Native Plant and Wildlife Category
1st Place -Audrey Boag – Hummingbird feeding on *Scrophularia lanceolata* (front cover)
2nd Place -Stanley Heginbotham – Spider on Wildflower
3rd Place -Dave Elin – Chrysalis of Monarch Butterfly

I have also taken the liberty of selecting an "Editor's Choice" photo that I thought deserved recognition:

Macheranthera coloradensis by Steve O'Kane

Chapter Programs

Chapter meetings and other events are listed on the CoNPS Event Calendar at https://conps.org/mfm-event-calendar/#!calendar

Boulder Chapter

Boulder Chapter meetings are held the SECOND TUESDAY of the month , October through April
Time: 7 p.m. to 8:30 p.m.
Where: Boulder Rural Fire Station, 6230 Lookout Road in Gunbarrel

If you have questions, please contact Erica Cooper, CoNPS Boulder Chapter President, at boulderconps@gmail.com

Colorado Blooms - A Journey: 2015, 16 & Beyond...
Tuesday, December 13, 2016, 7 p.m. - 8:30 pm
Presenter: Bob Lagier

Take a break from winter with your fellow plant enthusiasts and a colorful slide show of summer blooms.

Myriad Colorado blooms surround us, from tiny alpine and subalpine blossoms down to foothills flowers and the wind-swept wildflowers of our Eastern plains. Not to mention Western Colorado! Share and enjoy some Colorado blooms seen on our journey through the special place we call home and beyond into the future.

Bob Lagier joined CoNPS after solo-searching for Colorado blooms in 2015. Plateauing with what he could find and identify he came to CoNPS seeking out new wildflower horizons through the eyes, wisdom and experience of CoNPS members. He also bought a proper camera to improve his wildflower pics! Some ninety 2016 outings and nine-thousand photos later, he's sharing some small part of what he's seen and will talk about how we might better see and share our Colorado Blooms together in the future. A former software developer, he's now working to create a novel wildflower photo-and-description-sharing-platform called Colorado Blooms specifically tailored to this task.

Future Boulder Chapter Meetings will be held on the following dates. Please check the Event Calendar for details.

Tuesday, January 10, 2017, 7 pm
Tuesday, February 14, 2017, 7pm
Tuesday, March 14, 2017, 7 p.m.
Tuesday, April 11, 2017, 7pm

Metro-Denver Chapter

The Metro-Denver Chapter has not been meeting because of a transition to a new chapter president. Meetings will usually take place on WEDNESDAYS. The Plant Society Building is a modular building and is the last building you will come to as you walk west from the conservatory. For information, email metrodenverCoNPS@gmail.com or conpsoffice@gmail.com.

Metro-Denver Chapter Meeting Schedule 2017
These will be held in the Plant Society Building, Denver Botanic Gardens, 1007 York St. from 7-9 p.m.The Plant Society Buiding is a modular unit that is the farthest west from the Conservatory.

Wed., January 4, 2017 (7-9pm)
The Benefits of Native Plant Gardening
The benefits of gardening with natives, from pollinators to birds to reduce water and other inputs
Speaker: Irene Shonle, CSU Extension

Wed., February 1, 2017
Research and Conservation at the Denver Botanic Gardens
Speaker: Dr. Jennifer Ramp-Neale, DBG

Future Meetings (tentative):
1 March 2017 (7-9pm) TBD
5 April 2017 (7-9pm) TBD
3 May 2017 (7-9pm) TBD

Northern Chapter

Northern Chapter meetings are held the FIRST THURSDAY of the month.
Time: 7 p.m. to 8:30 p.m.
Where: Gardens at Spring Creek, 2145 Centre Ave, Fort Collins

If you have questions, please contact Renee Galeano-Popp, Northern Chapter President at mtnpoppies@aol.com.

Bees - Diverse Pollinators
Thursday, January 5, 2017, 7pm
Gardens on Spring Creek in Fort Collins
Presenter: David Julie, CoNPS Education & Outreach Committee Chair

The interdependence of flowering plants and their most prolific pollinators, bees, plays a foundational role in most ecosystems. This presentation explores three types of bees and their life cycles: solitary leafcutter bees, bumblebees and honeybees.

Chapter Programs

Northern Chapter (Cont.)

Climate, Fire and Bugs: Lodgepole Pine Trees Tell Their Stories through Tree Rings
Date: Thursday, February 2, 2017, 7pm
Presenter: Laurie Huckaby, US Forest Service

Novel Approaches to Erosion Control and Native Plant Reestablishment
Date: Thursday, March 2, 2017, 7pm
Presenter: Nate Boschmann, Wildlands Restoration Volunteers

Displaced Plant Communities: Challenges and Strategies of Prairie Restoration in Northern Colorado
Thursday, April 6, 2017, 7pm
Presenter: Casey Cisneros, Larimer County Open Lands

The Role of Monitoring Vegetation in the City of Fort Collins Natural Areas
Thursday, May 4, 2017, 7pm
Presenter: Crystal Strouse

Workshops

Up-to-date and complete information about the workshops are listed on the CoNPS Event Calendar at https://conps.org/mfm-event-calendar/#!calendar.
If you have questions, please contact Ronda Koski, Workshop Coordinator, at ronda.koski@colostate.edu.

Overview of the Brassicaceae
Date: January 21, 2017 9am-3pm
CSU Herbarium, Anatomy/Zoology Building, Room E114
Instructor: Jennifer Ackerfield
Do those mustards give you botanical nightmares? This workshop will teach you about characteristics that will enable you to identify many of the Front Range species.

Identifying and Keying Out Colorado's Wetland Plants
Date: Sat. Jan.28 OR Sun., Jan.29, 2017, 9am-3pm
Location: CNHP at CSU in Fort Collins (sign up for one day)
Instructor: Denise Culver, Colorado Natural Areas Program
Does the prospect of keying out a sedge or rush keep you up at night?! Or does the idea of identifying aquatic plants send you running for the uplands?! Please join Denise Culver for a day learning and keying out wetland plants!

This workshop will cover each major plant family and species group highlighted *in Field Guide to Colorado's Wetland Plants* (Denise R. Culver and Joanna M. Lemly, 2013) as well as additional species of interest ,e.g. noxious weeds. Materials for the plant identification course will include numerous resources for distinguishing between common species and difficult species groups like grasses, sedges, and willows. *Field Guide to Colorado's Wetland Plants* can be downloaded as a PDF at: http://www.cnhp.colostate.edu/cwic/documents/wetlandplantsofcolorado_p1.pdf (326 pages) OR can be purchased from the CoNPS Bookstore (https://conps.org/volunteer/bookstore-committee)

Gymnosperms, Pinophyta, and Pinus
Date: February 25, 2017 9am-3pm
Fort Collins Senior Center
Instructor: Renee Galeano-Popp
Conifers of Colorado are easy to identify, don't require microscopes and are truly interesting to learn about. This workshop begins with an overview of the Gymnosperms and then focuses on the Pinophyta (conifers) worldwide and in Colorado. It will culminate with an in depth look at the taxonomy, morphology and ecology of the genus *Pinus.* Although this workshop is mainly lecture based, it will be interactive with some lab time and a field trip to the Gardens on Spring Creek. Renee (aka The Pine Cone Lady) is an entertaining speaker and will bring her extensive collection of pine cones from around the world along with other displays. You can bring your copy of Ackerfield's *Flora of Colorado* or use the keys provided at the workshop. A hand lens might be helpful.

Influence of Soil Properties on Where Native Plants Grow
Saturday, March 25, 2017, 9am to 3pm
Instructors: Jean Reeder (9:00 am – Noon);
Jim Self (1:00 – 3:00 pm)
9:00 am – 12:00 pm - CSU Horticulture Center, 1707 Centre Avenue, Fort Collins
1:00 pm – 3:00 pm - CSU Soil, Water and Plant Testing Laboratory, Natural and Environmental Sciences Bldg. Room A-320

During the morning portion of this workshop, Dr. Reeder will provide information about the different types of soils found in Colorado. Which native plants are adapted to the different soil types? The influence of weather (temperature and precipitation) conditions on soil development and plant adaptability. Issues to consider when trying to grow native plants in our urban soil back yards.

In the afternoon, Jim Self, Manager and Extension Soil Testing Specialist will give a tour of the Soil, Water and Plant Testing Laboratory to workshop attendees.

Using Colorado Native Plants on Greenroofs
April 1, 2016, 9am-3pm
Douglas County Ext. Bldg. - Garden Level Conf Room
Instructor: Jen Bousselot

Great Plains Ethnobotany and Folklore
Saturday, April 8, 9am-3pm
Poudre Learning Center, 8313 W F Street, Greeley
Instructor: Don Hazlett

Latin American Ethnobotany and Folklore
Sunday, April 9, 9am-3pm
Poudre Learning Center, 8313 W F Street, Greeley
Instructor: Don Hazlett

Thistles
Saturday, April 29 OR Sunday, April 30, 9am-3pm
Contact Station, Rocky Mountain Arsenal, 6550 Gateway Road, Bldg. 121 Commerce City, CO
Instructor: Carla DeMasters

NEWS & ANNOUNCEMENTS

Rich Rhoades: New President of the Southeast Chapter

We are pleased to announce that Rich Rhoades is the new president of the Southeast Chapter. Rich will be running the chapter with Doris Drisgill.


Rich Rhoades. Photo courtesy RR.

Rich Rhoades graduated from Colorado State University with a B.S. degree in Range/Forest Management in 1976.

Rich recently retired from NRCS/SCS (Natural Resources Conservation Service/Soil Conservation Service) after 40 years of service in the Sterling, Eads and Pueblo Field Offices. He was in charge of the Pueblo Field Office for 32 years and managed various Farm Bill programs authorized by Congress. He has developed numerous reclamation plans for gravel mines, clay mines, urban sites, construction sites and critical areas. He has extensive experience with determining proper stocking rates for various grazing animals.

As a member of the Colorado Native Plant Society, he has taught classes and led tours on grass identification at several locales in Colorado.

Rich is a member of the Soil and Water Conservation Society and served as Secretary-Treasurer and President for the Colorado Chapter. He received the Society's Commendation Award and is a Fellow of SWCS which was awarded in 1998. He served as the Chair for the 1996 International meeting in Keystone, CO and assisted with the 2006 International meeting also in Keystone, CO.

Rich enjoys golf, hiking and sings in a barbershop quartet. One of his retirement goals is to see all of the Colorado State Parks. He is still adjusting to retirement but gives it "two thumbs up" so far!

Doris Drisgill runs the chapter with Rich. She was responsible for the incredibly successful John Fielder event in Colorado Springs (see news item on page 9).

Our thanks to Jeff Jones who stepped in briefly as the Southeast Chapter President despite his heavy work schedule and move to a new house. Although he was with the Board briefly, Jeff made an important contribution to CoNPS offering his computer design expertise to tweak the design of the website to bring it from excellent to outstanding. His work schedule continued to be so demanding that he thought it was best to step down from the Board.

New Chair of Education & Outreach Committee, David Julie

David's life-long zeal for gardening led to a passion for insects that, in turn, fostered a deep appreciation for native plants. He avidly reads works by Gilbert Waldbauer, Edward O. Wilson, Howard Ensign Evans, Dave Goulson, Robert Hazen, and other scientists.
David learned about CoNPS thanks to a trailhead flier co-sponsored by CoNPS that recounted the ecosystem value of native cottonwoods rather than exotic Russian Olives.

David and his partner, Kate Goes In Center, love to teach children and adults about native plants and their interdependence with animal pollinators. They hope that the native plant seeds, material and figurative, that they provide will grow and blossom, sustain wildlife, and excite learning and enjoyment.
David and Kate are active in bringing pollinator education to children and adults. (See article in the Spring issue of *Aquiegia*).

Happy 98th Birthday, Dr. Bill Weber!

Dr. William A. Weber turned 98 on November 16 and celebrated his birthday with friends at the Tandoori Grill in Boulder, one of his favorite restaurants.

He conversed about a variety of topics including the discovery by Toby Spribille that lichens are composed of three organisms rather than two, his admiration for the European system that includes some national parks set aside to remain undisturbed, and continental drift and the location of mosses.

He encouraged everyone to read the book, *Why Darwin Matters* and entertained the group with songs and poems, and was able to recite a long passage from Shakespeare.
Such an amazing 98 year old!

From left to right: Ron Wittmann, Bill Weber, Loraine Yeatts, Jan Wingate, Dina Clark, Vera Evenson, and Heather Weber Harris. Photo by Jan Turner.

Research Grants Committee

Stephen Stern is new Chair of the Research Grants Committee. Stephen is the President of the Plateau Chapter of CoNPS and is a faculty member at Colorado Mesa University.

Cath Kleier stepped down because of her busy schedule. Cath is Chair of the Biology Department at Regis University. She just taped a series of lectures for Great Courses. CoNPS is grateful to Cath for her many contributions to the organization.

See the Request for CoNPS grant proposals on p. 13.

Sara Copp Franz: Restoration Committee

Former Chair of the Education & Outreach Committee, Sara Copp Franz, is the Chair of the newly formed Restoration Committee. The Horticulture & Restoration Committee voted to split into two committees.

Eric Lane is New Director of Boulder County Parks & Open Space

Eric Lane, the former director of the Colorado Department of Agriculture's Conservation Services Division, has been named Boulder County's new Parks and Open Space director. Eric was a member of the CoNPS Board of Directors and served as the Chair of the Membership Committee for many years.

Mountain Goats in Utah's LaSal Mountains Are Damaging Rare Native Plants

Mountain goat wallowing at Mt. Evans. Photo by Mo Ewing

As on Colorado's Mount Evans, rare alpine plants in Utah's LaSal Mountains are experiencing damage from mountain goats. In 2013, twenty mountain goats (non-natives) were introduced by the Utah Division of Wildlife Resources (DWR) in the USFS's Mount Peale Research Natural Area (RNA), located in the LaSals. RNAs are areas with largely undisturbed ecosystems, set aside for climate change research and education. Digging and wallowing by the mountain goats damage the rare plants and ecosystem in the RNA.

In January 2016, the Grand Canyon Trust and the Utah Native Plant Society brought a lawsuit in the US District Court in Utah, asking that the non-native mountain goats be removed from the Mount Pearle Natural Resource Area and future introduction of mountain goats be prohibited.

Dr. William Weber, Professor Emeritus, University of Colorado, Boulder, has been outspoken about the damage caused by mountain goats on Mount Evans. The mountain goats were

(Cont. on page 9, lower left)

Thank You Marjorie Joy

When CoNPS Merit Award winner, Jill Handwerk, was asked her favorite plant, she said "*Oxybaphus rotundifolius*." Normally, the award winner receives a photo of their favorite plant or of a photo contest winner printed on canvas. It just so happened that one of our Southeast Chapter members, Marjorie Joy, is a talented botanical artist whose watercolor of *Oxybaphus rotundifolius* was used in the *Colorado Rare Plant Guide*. We phoned Marjorie, asking for permission to use a copy of her signed print as a present, and Marjorie generously agreed. Not only did she do that at no charge but she also offered to mat and frame it for free!

Marjorie Joy

Marjorie Joy is a botanical artist living in Pueblo West, Colorado. She has been painting detailed, intricate portraits of native Colorado and Rocky Mountain plants in watercolor and other color mediums since 1991. Current projects include a series of illustrations of rare and endangered Colorado plants, an exploration of mixed media for botanical art, and gardening with native Colorado plants.

Marjorie studied botanical illustration at the Denver Botanic Gardens' Certificate Program in Botanical Art and Illustration and completed that program in 2009. She holds a Bachelor of Fine Arts from the University of Colorado and an Associates Degree in Advertising Design from the Colorado Institute of Art. She is a member of the American Society of Botanical Artists, Rocky Mountain Society of Botanical Artists, and the Colorado Native Plant Society.

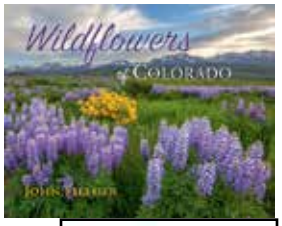
Marjorie's botanical drawings and paintings have been shown in many locations, including the Denver Botanic Gardens, Missouri Botanical Gardens (Art in Science 1999), the New York State Museum (Focus on Nature 2000), and the Loveland, CO Museum & Gallery (American Society of Botanical Artists' First North American Western Regional Exhibit 2003). Locally, she has shown her botanical art at the Sangre de Cristo Arts Center in Pueblo, Pueblo Convention Center, The Gallery in La Veta, and Points West Gallery in Fort Garland.

ARTIST'S STATEMENT

Artists have been painting plants for centuries, for reasons both decorative and scientific. I paint plants out of fascination for the details and relationships that are found in the natural world, especially in the plants native to the Rocky Mountain region. This is my way of saying, "Look what I found! Come see this!"

Contact information: mar1joy@juno.com 719-251-8916

John Fielder's Program for CoNPS SE Chapter and Sierra Club



On November 12, over 200 people filled the seats and crowded the halls of a free John Fielder program. "100 Years of Celebrating Colorado's National Parks & Monuments: Rivers, Ruins, & Mountains". Doris Drisgill of the Southeast Chapter of CoNPS and Jane Ard-Smith and Jim Lockhart of the Pikes Peak Group of Sierra Club organized the event, which was held in Colorado Springs.

Fielder sold many of his books at the event and generously donated part of the profits from the sale of his books to CoNPS and the Sierra Club.

If you would like John Fielder's presentation to come to your area, contact the president of your chapter. You and others can volunteer to help make the event take place.

Intermountain Region Herbarium Network

Complete List of Native Plants from Ackerfield's Database Available on SEINet!

Link to It from CoNPS Homepage (conps.org)

Using a database compiled by Jennifer Ackerfield for her *Flora of Colorado,* Melissa Islam of the Denver Botanic Gardens with the assistance of Julia Clark has added the list to SEINet. A link to this resource and the CoNPS definition of "Native Plant" is on the CoNPS website home page, https://CoNPS.org.

Our thanks to Jen Ackerfield, Melissa Islam, Julia Clark, and the staff of the Colorado Natural Heritage Program for this extremely useful resource.

Mountain Goats (cont. from page 8)

brought to Mount Evans many years ago for the enjoyment of hunters but they have done much damage to the delicate and rare plants of the alpine on Mount Evans.

For more information about the mountain goat problem:

Donoughue, Amy Joi. 1/27/2016. Groups Want Mount Goats Removed from the LaSal Mountains. *Deseret News.* http://www.deseretnews.com/article/865646318/Groups-want-mountain-goats-removed-from-La-Sal-Mountains.html?pg=all

Padgett, Wayne. 8/29/2015. Op-Ed: LaSal Mountains are the Wrong Place to Transplant Mountain Goats. *Salt Lake Tribune.* http://www.sltrib.com/opinion/2883999-155/op-ed-lasal-mountains-are-the-wrong

Weber, Bill. Summer 2010. Goats and Mount Evans. *Aquilegia. 34* (2): 1-3.

Become a Wildscape Ambassador!

Spread the Word About Natives with CoNPS Audubon Rockies

Gaillardia aristata
Photo by Dave Elin

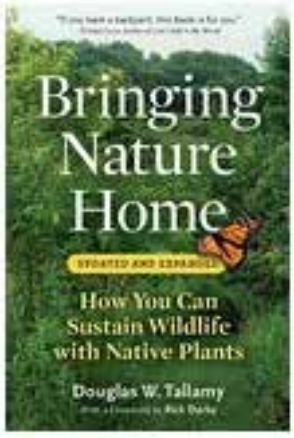
Do you find it discouraging that so many people fail to understand the importance of native plants and the many threats of shrinking habitat including loss of biodiversity? Here's a chance to make a difference! The Colorado Native Plant Society's Education & Outreach Committee and Audubon Rockies are collaborating to get education to the public through PowerPoint presentations at libraries, gardening centers, clubs, HOAs, and other organizations. Audubon developed a program called Wildscaping (using native plants to bring habitat to your backyard for wildlife) and Jamie Weiss, of Audubon Rockies Habitat Heroes program, has been giving a PowerPoint presentation on wildscaping to Audubon chapters in Colorado and Wyoming (Audubon Rockies is the regional branch of Audubon).

CoNPS is now partnering with Audubon Rockies to reach out to the public with the program rather than only preaching to the choir.

You can become a Wildscaping Ambassador and present this program and other programs to the public.

Attend our "train-the-trainer' workshop. We will engage and train volunteers on spreading the word about actively restoring a natural habitat for birds, butterflies, and other pollinators by implementing water-wise and native gardens on our landscapes. Come enjoy meeting other fellow gardeners and learning the tools of the trade to deliver a presentation to your local garden center/nursery, garden clubs, community centers, HOA's, and more on the importance of creating native plant gardens that not only create a welcome place for birds, but benefit the environment and our community, too.

Two sessions have already been held, one in Fort Collins and one in Loveland. New sessions and locations,in the Front Range and throughout the state, will be announced through CoNPS ENews, on the CoNPS website, and in *Aquilegia.*



Become a Wildscaping Ambassador! You Can Spread the Word! Grow Native!

Harlequin's Gardens and the Boulder County Land Use Dept.

David Wheeler, (Bee Safe) with Mikl Brawner at the hearing. Photo by Jan Turner.

Harlequin's Gardens in Boulder, operated by Mikl Brawner and Eve Reshetnik Brawner, has been a fixture in Boulder for many years. Mikl is a member of the Boulder Chapter of CoNPS and is an ardent supporter of native plants and the health of the environment. In order to be able to provide a better supply of pesticide-free native plants and vegetables for their customers and local pollinators, the Brawner's purchased the one acre property next to theirs in 2015. Their intention was to build a sustainable green house and grow pesticide-free native plants and vegetable plants. As is typical in the nursery and agriculture business, they intended to build a dwelling for their propagator (an expert in native plant propagation) on the property next to the greenhouse as a benefit (as partial payment of his salary) and so he could be near the greenhouse to care for the plants.

Next came a bureacratic nightmare. They applied for a building permit and were denied it by Boulder County Land Use Department, that designated the property as "unbuildable". Unknown to the Brawners, their title company, and the Land Use Department (until the Brawner's applied for the permit), the land had been illegally divided 48 years ago in 1968. There was nothing in the public record about this.

On Tuesday, November 29, at a re-zoning hearing before the Boulder County Commissioners, Mikl gave an eloquent statement about their philosophy, his research on the history and size of the property (a surveyor measured it to be over an acre), and how the expansion would fit in with Boulder County's commitment to local agriculture and sustainability. Many supporters came to the hearing, speaking on Mikl and Eve's behalf, including Jane Shellenberger, editor of *The Colorado Gardener* newsmagazine. The Commissioners have not yet come to a decision.

Harlequin's Gardens has been know as one of the finest nurseries in Colorado and is dedicated to natural and sustainable gardening. They carry a great selection of native plants and their selection will be even better if the planned expansion takes place. Please let the Brawners know you support their efforts. 303-939-9403.

Correction: Cover Photo by Jane Hendrix

The cover of the Spring/Summer 2016 issue is by Jane Hendrix. Prior to the last issue of *Aquilegia*, Jan Turner experienced an irreparable corruption of her *Aquilegia* InDesign file template, which required starting from scratch in creating the basic template for *Aquilegia* and she forgot to add a place to give credit for the cover photo. Apologies to Jane Hendrix for leaving out the credit for her beautiful cover photo of *Calochortus nuttallii* in the Spring/Summer 2016 issue of *Aquilegia*. Jane, a botanist, writer, and gardener, lives in Breckenridge and is a member of the Gore Range Chapter and a leader of many field trips. Her garden in Breckenridge will be one of those featured in the CoNPS native plant gardening guide for the mountains.

More Native Plant Gardening Guides from CoNPS and Partners!

Soon there will be two native plant gardening guides! The draft version of the *Low-Water Native Plants for Colorado Gardens: Mountains 7,500' and Above* will be available on the website shortly. The committee will probably make additional modifications to it before it is printed. The draft version of the guide for the *Front Range and Foothills* has been replaced by the final version on the website. On the main page of the CoNPS website (https://conps.org) is a link to the guide that is located on the CoNPS Gardening with Native Plants page.

Three more booklets in the series, geared to other regions of the state, are planned for publication in 2017: The Prairies and Plains, Southeastern Colorado, and Low Elevation Western Slope.

The Native Plant Gardening Guide Committee is chaired by Irene Shonle (CSU Extension). Members include Deryn Davidson (CSU Extension), Nick Daniel (Denver Botanic Gardens), Amy Yarger (Butterfly Pavilion), Jim Tolstrup (Hign Plains Environmental Center), and Jan Turner (CoNPS). Susan Crick Smith was a former member of the committee.

Colorado Wilderness Gathering

On November 12-13. a number of organizations concerned with the protection of public lands met for the Colorado Wilderness Gathering in Buena Vista. Over 80 people attended the conference, including CoNPS members Lorraine Niemela, Linda Smith, and Charlie and Jan Turner. The speakers and the networking opportunities were excellent at this 1-1/2 day conference. The first day of the conference lasted from 8:30 a.m. until 8 p.m., ending with a presentation by John Fielder (100 Years of National Parks and Monuments) that he had given earlier in the day for the Southeast Chapter of CoNPS in Colorado Springs.

Charlie Turner and LInda Smith of CoNPS in the front row at lectures during the Colorado Wilderness Gathering. Photo by Jan Turner.

Topics included Colorado Wilderness and the Southern Rockies, Celebrating Success (featuring relevant tools such as organizing, communication, NEPA, field inventory, social media, diverse constituencies), Wildlands Protection Opportunities via Legislation, Wildlands Protection Opportunities via Administrative Plans, The New Political Landscape – What to Expect from Congress and the New Administration, Working with Congress, and Stewardship of Existing Wilderness and Wildlands.

Speakers included Bob Pearson, Julie Mach (Colorado Mountain Club), Jimbo Buickerood (San Juan Citizen's Alliance), Vera Smith (Wilderness Society), Josh Kuhn and Scott Braden (both of Conservation Colorado), to name a few.

John Stansfield as Enos Mills.
Photo by Jan Turner.

As a special treat at lunchtime, Enos Mills (photo on left) appeared at the conference (played by John Stansfield) and told us the fascinating story of his life.

There will be an article with more details about the conference in an upcoming "Conservation Corner" by Linda Smith.

Southern Rockies Seed Network Annual Conference, December 7, 2016

Join the partners, stakeholders, industry reps, and the technical advisory committee of the Southern Rockies Seed Network to explore key issues in the development of ecotypic plant materials. Hear from regional and national experts on policy, practice, and science. Help grow the ecotypic plant materials industry for the Southern Rockies.

Where: The Ranch Events Complex, Loveland, CO
When: December 7, 8 am - 5 pm
More information: www.synergy3.org
Register: https://srsn2016.eventbrite.com

Peggy Olwell will speak on "National Seed Strategy: The Power of Partnering." Other speakers include Nancy Shaw, Research Botanist, USDA Forest Service, Stanford Young, Research Professor, USU, and a number of national and local experts.

HAR-CERSER 2017 Conference

March 7-9, 2017

High Altitude Restoration Science & Practice Conference, CSU Fort Collins

The High Altitude Revegetation Committee and the Central Rockies Chapter of the Society for Ecological Restoration will host a joint conference with the broad theme of "High Altitude Restoration Science & Practice" on March 7-9, 2017, at Colorado State University in Fort Collins, Colorado. The aim of the conference is to connect practitioners, scientists, land managers, students and policymakers to enhance our understanding of restoration theory and practice in diverse ecosystems using a variety of methods. This event will be the 22nd biennial High Altitude Revegetation conference and workshop. The Central Rockies Chapter of the Society for Ecological Restoration has been active in promoting ecological restoration in Colorado and Wyoming since 1996. The collaboration grew from the shared mission to promote awareness, understanding, procedures, and projects among restoration researchers and practitioners. http://chapter.ser.org/centralrockies/events/har-cerser-2017-conference-home/

Conservation on the Western Slope

Black Canyon Regional Land Trust is working to conserve private lands on the western slope. They currently hold and service 340 conservation easements in five counties, protecting natural ecosystems, agricultural lands, scenic open space and wildlife habitat. You can help by donating on Colorado Gives Day. Go to BCRLT.org and click on donate now.

Graham's Penstemon and White River Penstemon Should Have Protection Says Federal Court in Denver

White River Beardstongue Photo of US Fish & Wildlife Service

On Tuesday, October 25, in Denver, U.S. District Court Judge William J. Martinex ruled that the U.S. Fish and Wildlife Service (FWS) must reinstate a 2013 proposal to protect Graham's Penstemon (*Penstemon grahamii)* and White River Penstemon (Penstemon *scariosus* var. *albifluvus*), which grow almost exclusively on oil shale formations in Colorado and Utah.

In 2013, the FWS had proposed to protect federal land in Utah and Colorado as critical habitat for the penstemons but, in 2014, they filed a withdrawal notice for the protection because the energy industry wanted to begin oil and gas development in the Uinta Basin, habitat of the penstemons.

Earthjustice represented the plaintiffs including the Center for Biological Diversity, Grand Canyon Trust, Rocky Mountain Wild, Southern Utah Wilderness Alliance, Utah Native Plant Society, Western Resource Advocates, and Western Watersheds Project, that brought the lawsuit against the U.S. Fish and Wildlife Service.

The judge has ordered the Plaintiffs to meet with the FWS by February 21 to modify the Conservation Agreement to adequately protect the penstemons.

Information in this article from the *Denver Post* http://www.denverpost.com/2016/10/26/federal-court-rules-wildflowers-in-colorado-and-utah-must-be-protected/ and the Earthjustice website http://earthjustice.org/news/press/2016/court-declares-fish-and-wildlife-service-failed-to-protect-rare-colorado-utah-wildflowers-threatened-by-oil

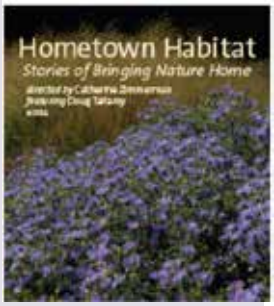
Help CoNPS Through Amazon Smile

Give to CoNPS through Amazon Smile (smile.amazon.com) Every time you purchase something from Amazon.com, if you go through Amazon smile, Amazon will donate 5% of the purchase price to CoNPS. First, select CoNPS as your charity. Then sign in through http://smile.amazon.com to make your purchase. Thank you from CoNPS.

The Bundys and Other Occupiers of Malheur Wildlife Refuge Found Not Guilty

At a trial held in Portland, Oregon, Ryan and Ammon Bundy, Shawna Cox, David Fry, Ken Medenbach, Jeff Banta, and Neil Wampler were found not guilty of conspiracy to prevent federal employees at the Malheur National Wildlife Reserve of doing their jobs by intimidation, threat or force. Defendants were also found not guilty of having firearms at a federal facility. For the full story, see *High Country News* http://www.hcn.org/articles/in-shocking-verdict-jury-finds-malheur-occupiers-not-guilty.

Hometown Habitat Documentary



Hometown Habitat, Stories of Bringing Nature Home, is an environmental, education documentary focused on showing how and why native plants are critical to the survival and vitality of local ecosystems. Featuring renowned entomologist Dr. Douglas Tallamy, author of *Bringing Nature Home*, inspiring stories of community commitment to conservation landscaping illustrate Tallamy's vision by showing how humans and nature can co-exist with mutual benefits. Disk one plays the full 90-minute film. Disk two plays the film in chapters as a tool for targeted audiences such as congregations, homeowner associations, landscape designers, nurseries, city councils, parks and recreation divisions, and land developers. The chapters can also be incorporated into school lesson plans as prompts for environmental sustainability discussion and action. 90 minutes. (Description from website, https://themeadowproject.com/product/hometown-habitat-autographed-dvd-set/). Licensing fees will apply if the movie is shown to a group. Information about licensing fees is on the website.

The DVDs are available from CoNPS Bookstore for $24 plus shipping.

SAVE THE DATE! February 11, 2017

Landscaping with Colorado Native Plants Conference

The Landscaping with Colorado Native Plants Conference promotes the inclusion of native plants in our landscaping to benefit pollinators and songbirds, save water, and restore the beauty and health of nature in the places we live, work and play.

While we recommend the use of straight species and local ecotypes wherever possible, we support the use of varieties and cultivars of native species as long as their breeding doesn't interfere with their ability to function in nature and maintain key relationships with pollinators and other lives.

More information including a full line up of speakers and breakout sessions coming soon.

Location: McKee Bldg., The Ranch Events Complex, Loveland

Jobs and Grant Opportunities

Request for CoNPS Research Grant Proposals: The John W. Marr and Myrna P. Steinkamp Funds

The Colorado Native Plant Society supports research projects in plant biology from the John W. Marr and Myrna P. Steinkamp funds. These separate funds honor the late Dr. John Marr, Professor at the University of Colorado and the first President of CoNPS, and Myrna Steinkamp, a founding member of CoNPS who worked on behalf of the Society for many years in a variety of capacities. Both funds were established to support research on the biology and natural history of Colorado native plants by means of small grants. The Steinkamp Fund targets rare species and those of conservation concern. Both field and laboratory studies are eligible for funding.

Thanks to the generous contributions of many members and supporters, a total of nearly $4,000 is available, although individual awards will not exceed $1,000. Recipients of the awards must agree to summarize their studies for publication in *Aquilegia* and on the CoNPS website.

The Board of Directors is now soliciting proposals for a February 15, 2017, deadline. Information on guidelines and requirements for proposals may be obtained on our web site at http://conps.org/volunteer/research-grants/. If additional information is needed, contact Board member Stephen Stern at stephen.r.stern@gmail.com.

Small Grants Program - Boulder County Parks and Open Space Department

Boulder County Parks and Open Space is offering small grants for research and biological inventories on open space lands. These research projects and inventories provide valuable data to monitor management practices and improve resources and park visitor experiences.

Grants awarded up to $10,000. The deadline for proposals is Friday, January 13, 2017. For details see CoNPS home page. https://conps.org.

Jefferson County Open Space Small Grants

Jefferson County Open Space (Jeffco Open Space) is excited to once again offer small research grants to individuals or groups to perform research and/or inventories on Jeffco Open Space lands. To apply for a research grant, individuals must contact the Program Sponsor by December 9, 2016, and submit a written proposal by Friday, January 13, 2017. For details see CoNPS homepage, https://conps.org.

FUNDING FOR PRAIRIE RESEARCH

Prairie Biotic Research (PBR) is an all-volunter scientific public charity established in 2000 to foster basic biotic research in prairies and savannas. One way it does this is through a competitive Small Grants Program that funds grants up to $1000 to individuals for the study of any grassland taxon anywhere in the USA, supporting both natural history and experimental science. PRB is especially eager to support independent researchers (those lacking institutional support), but anyone having a U.S. Social Security number may apply.
To Apply for a Grant: Your proposal must be received via email by December 20, 2016. See the CoNPS website for information at https://conps.org.

JOBS

See the CoNPS website for more information (https://conps.org:

Western Lands Director, Western Resource Advocates

Curator & Howell Chair of Western Botany for California Academy of Sciences

Watershed Coordinator for Little Thompson Watershed Coalition

Executive Director for Great Outdoors Colorado

Landscape Architect for Boulder County

Human Dimensions Specialist for Colorado Parks and Wildlife

Natural Resources Supervisor for Jefferson County

Dina Clark, Tim Hogan, Erin Tripp of the University of Colorado Herbarium in front of mini-forest (with lichens) created by CoNPS Treasurer, Denise Wilson. Photo courtesy of Erin Tripp.

Conservation Corner:
Conifers at the Crossroads
by Renee Galeano-Popp

It's a long story. Some say it all started with the colonists and the Pine Tree Riot of 1772 in New England. But first let's talk about white pines. White pines are in the *Strobus* subgenus of *Pinus* and are characteristically 5-needled. White pines include Bristlecone (*P. aristata*), Limber (*P. flexilis)*, Southwestern White (P. strobiformis) and Whitebark *(P. albicaulis*) in the Rockies.

Eastern White Pine (*P. strobus)* is reported to be the tallest tree in eastern North America with pre-colonial estimates at around 230 ft. (Cox, 2003). Diameters have been reported as great as 5 ft. It was highly valued by the colonists who used it heavily for constructing their towns, villages and even exporting it to faraway countries. They sent boatloads (50 trees at a time) back to England where the King had them used for masts on ships of the Royal Navy.

The King prized them so much that he had laws passed in the colonies reserving all eastern white pines over 12 inches diameter to be marked for use solely by the king. The colonists responded with defiance, arrests and widespread protest cuttings of pines. It was the Pine Tree Riots and skirmishes like it that eventually led to the Revolutionary War. In fact, the first flag flown by the colonists against the British was the Pine Tree Flag (Murrow, 2013). When all over, eastern white pine forests paid a high price.

Enter the fungus White Pine Blister Rust (*Cronartium ribicola*) (WPBR). As a rust, it has a complex life cycle involving an obligate alternate host. The alternate host for WPBR is *Ribes* (gooseberries, currants) and just about any *Ribes* species will do. Recent studies have also found that paintbrushes (*Castilleja* spp.) and louseworts (*Pedicularis* spp.) may also serve as alternate hosts (USFS, Undated). WPBR is believed to be native to Asia and was first detected and described from western Russia in 1856 (Hummer, 2000). Once a North American white pine is infected, it may take some time but most will die of the disease. Outbreaks were noted in England on seedlings that had been brought from North America for cultivation and also in nurseries in Germany.


Cronartium ribicola on Ribes - US Forest Service

By the mid-1800s, the demand for eastern white pine lumber and the improvement of logging equipment had accelerated the regional depletion of the forests. A premium was placed on nursery stock. Tariffs were removed and because there was no visible sign of disease, large numbers of white pine seedlings were imported to the U.S. for reforestation (Hummer, 2000). By the mid-1890's and early 1900's signs of infection became visible. The newly formed U.S. Forest Service recorded that several million infected seedlings from Germany had been shipped to more than 226 locations here in the U.S (Hummer 2000).

At around the same time (1910) a shipment of eastern white pines from Europe was received in Vancouver, Canada (Hummer, 2000). The rust was identified there in 1921 and over the next 20 years it had spread through much of the western U.S.

The earliest strategy to combat this deadly disease was to eradicate *Ribes*, develop a public awareness campaign and to place quarantines in high value areas where *Ribes* plantings were then prohibited. Enter the Civilian Conservation Corps. The first blister rust camp was established in Idaho in 1924. Men were commissioned to dig out or spray herbicide on *Ribes* plants. Fungicides were added in 1957 but the program ended in 1967 and left management of the situation to "natural factors". Certain areas, such as the northeast, reportedly now have few wild *Ribes* as a result.

Scientists refer to the direct and indirect effects of WPBR as having a cascading effect because they affect so many trophic levels in the ecosystem.

Cumulative impacts are also at play in this scenario. Here we look at the one-two punch. Mountain Pine Beetles (MPB) kill mature trees and they do it very quickly. WPBR will kill mature trees slowly but can decimate seedlings very quickly. Not only does this result in reduced seed production, MPB can kill the few rust resistant trees that might be present in an area and the WPBR can kill off any seedlings left in the aftermath of a MPB epidemic. Even though MPBs are native, there are a host of conditions causing them to become more virulent and in combination with WPBR our high elevation pine ecosystems are at great risk.

Although whitebark pine does not occur in Colorado, it is in Wyoming just north of us. Moreover, it is the flagship for all North American white pines at the "conifer crossroads." According to the US Fish and Wildlife Service (Undated) cumulative threats to the whitebark pine include habitat loss and mortality from white pine blister rust, mountain pine beetle, catastrophic fire and fire suppression, environmental effects resulting from climate change, and

the inadequacy of existing regulatory mechanisms. While individual trees may persist, given current trends the Service anticipates whitebark pine forests will likely become extirpated and their ecosystem functions will be lost in the foreseeable future. On a landscape scale, the species appears to be in danger of extinction, potentially within as few as two to three generations."

So, the question becomes: will researchers and foresters be able to slow the mortality and mitigate the threat WPBR poses to Colorado's high elevation pines before it's too late? In addition to natural selection, there is a multi-state, multi-agency effort to find natural resistance in our white pines. Scientists at the USFS Rocky Mountain Research Station in Fort Collins look for possible resistance in bristlecone and limber pines, collect seed and germinate them in the lab. They inoculate the seedlings with WPBR and wait to see if their hunches are right. If so, seeds from resistant trees are preserved and ultimately used to breed resistant strains for propagation.

That means there is hope.

But before we end this story, we might note that other species of blister rust are native to our local ecosystems. For example Comandra blister rust (*Cronartium comandrae*) is an endemic disease of "hard pines" (as opposed to the soft white pines) in North America (Johnson, 1986). The alternate host in Colorado is bastard toadflax (*Comandra umbellata*). In our area, it especially hits Ponderosa and Lodgepole pine. However, unlike a non-native disease, our pines are adapted to Comandra blister rust meaning that it does not have the same mortality or infection rate that WPBR does. That, too, is good news.

Comandra Rust on Lodgepole Pine
William Jacobi, Colo. State. Univ.
Bugwood.org

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Volunteer Voices

by Lenore Mitchell

Let's begin this new column with a shout out to the many members whose time and efforts make CoNPS a great organization. From Chapter Presidents and Board members to Committees, from those who help with the annual convention, lead field trips, give speeches, conduct workshops, or step up to help in many ways - you're all superheroes!

We celebrate you and encourage even more volunteers to join in. So this column will serve as both an ongoing thank you and an ongoing solicitation. For those who haven't yet joined in, sure, you've heard it all before. We want you! We need you! Please help! Ya-da, ya-da.... We know you're busy and don't have much spare time. You probably belong to other organizations too, maybe already volunteer in other ways. We get that.
But we still need you, even for a small amount of time. Some of our volunteer tasks can be done at home in your fuzzy slippers. How great is that! According to research, here are just a few benefits that volunteers enjoy:

- Ability to make a difference (by conserving nature, gardening with natives, etc.
- Opportunity to learn (and there's always more to know about plants!)
- Connect with others (and make new friends)
- Increase health (both mental and physical)

Lenore Mitchell
Courtesy of LM

We'll explore these and other benefits in future columns as well as present bios of current volunteers in an effort to reveal interesting (and maybe juicy!) tidbits about your fellow members, and we'll also present ways for more members to participate in making CoNPS ever better and more effective in protecting and preserving our wonderful native plants.

Ideas and comments welcome! Send to Lenore Mitchell (zap979sar@icloud.com).

Lenore Mitchell is an accomplished photographer and CoNPS Photo Contest winner, CSU Ext. Native Plant Master Trainer, an Instructor at DU's Osher Lifelong Learning Institute (OLLI), and a volunteer for a number of other organizations. Lenore is modest about all she does, but she definitely qualifies as a volunteer superhero! - Jan Turner

John W. Marr Research Grant Report: High Country Violets – a Study of the *Viola adunca* Complex in the San Juan Mountains

Ross McCauley

When I moved to Colorado in the summer of 2008 to begin a position as botanist at Fort Lewis College I admittedly was not well-versed in the flora of the state. Most of my botanical training had been in the eastern US, principally the Appalachian Region with occasional forays to tropical and subtropical areas. Mountain floras and their high-elevation species were something new and exciting to explore. To help with my personal floristic education I went to look at plants whenever I could – where didn't matter much, it was all new. One of the first outings I took into the alpine was to the La Plata Mts. near Mt. Hesperus, west of Durango. As one of the first times getting into the alpine region of Colorado I was enjoying the splashes of mid-summer floral color: the reds and yellows of the paintbrushes, bright yellow of the Old-man-of-the Mountain. One thing that caught my eye though was a small plant tucked in among the gravel and tufted alpine grasses. It was a small blue violet, probably no more than two to three centimeters in height. I was somewhat knowledgeable on violets from having worked a little with the group in graduate school, but I was no expert. So out came my then clean and unruffled copy of the *Colorado Flora* which told me it was *Viola labradorica*. While it was great to put a name on it, it didn't feel right. I knew *V. labradorica* as a species of the Great Lakes Region and the plant habit and alpine habitat didn't match.

Figure 1. *Viola "bellidifolia"* in the alpine of the San Juan Mountains.

Further investigation showed that other botanists over the years weren't quite sure of how to recognize this either. It became clear that this alpine resident is closely allied to the widespread *Viola adunca*, occurring across much of North America from the north-central US to California and Alaska. *Viola adunca* shows a tremendous range of phenotypic variation in variable habitats and in fact 56 different once-segregated and named forms are now viewed as synonyms of *V. adunca*. The small alpine form I encountered in the La Platas corresponded to one of these once-segregated forms. It was first collected from a mossy bog just west of Mt. Hesperus in the summer of 1898 during a two-month botanical exploration of the mountains west of Durango by Charles Baker, Franklin Earle, and Samuel Tracy and described as *V. bellidifolia* by Edward Greene in 1901. Milo Baker, the predominant expert on the violets of Western North America who published multiple monographic works on the genus from 1940-1957 also considered it distinct and reported the species ranging across the alpine regions of the Rockies north to British Columbia and even into the northern Sierra Nevada's. In 1954 Harold Harrington in his *Manual of the Plants of Colorado* reduced this species to a variety of *V. adunca* and since that time most authors have either recognized it at the varietal level under *V. adunca* or not at all simply including it within the variable *V. adunca*.

Figure 2. *Viola adunca* in forested understory of the San Juan Mountains.

And what of that name *V. labradorica*? An overly broad interpretation of *V. adunca* combining glabrous-leaved alpine and boreal forms with *V. labradorica* made by the prolific eastern North American botanist Merritt Lyndon Fernald in 1949 and published one year later in the widely used 8th edition of *Gray's Manual of Botany* synonymized these taxa under the name *V. adunca* var. *minor.* This misinterpretation of the type material was accepted by many later botanists thus suggesting that *V. laboradorica* had a range much further west in North America than it actually did.

While this exploration of the history of the name was interesting I still wasn't sure what to call this thing. As I saw it I might have simply a high elevation dwarf form of *V. adunca* or a separate taxon. In initial field and herbarium observations across the western San Juan Mountains I saw that morphologically the high elevation form (we can call that *V. "bellidifolia"*) differs from the low elevation *V. adunca* principally in size with *V. "bellidifolia"* being very small and diminutive (Figures 1 & 2). This size character is generally consistent and tends to parallel the alpine habitat of *V. "bellidifolia"* and woodland habitat of *V. adunca*. This clear pattern of habitat and morphological differentiation is slightly muddied however when examining specimens collected at tree line and from

montane meadows supporting alpine elements. In these areas the two forms can be difficult to differentiate and appear to intergrade. Flowering phenology which would be important for segregating species by controlling cross-pollination by bees, which are the principal pollinators of violets, was seen to be mostly different. Lower elevation plants tend to flower before higher elevation plants, however there is some overlap in flowering time at middle elevations and earlier snowmelt seems to lead to high elevation plants blooming earlier thus leading to overlap with those at lower elevation.

These preliminary observations still didn't settle it for me – I'm hard to please. Violets are notoriously plastic in their traits and I felt that investigating this at the molecular level would give deeper insight into the system. So I began a population genetic study of the group in the western San Juans with students from Fort Lewis College. For this study we examined eight distinct populations, four representing *V. "bellidifolia"* and four representing V. adunca (Figure 3). To genetically compare these populations we used microsatellites, highly variable DNA markers useful for differentiating closely related groups or species.

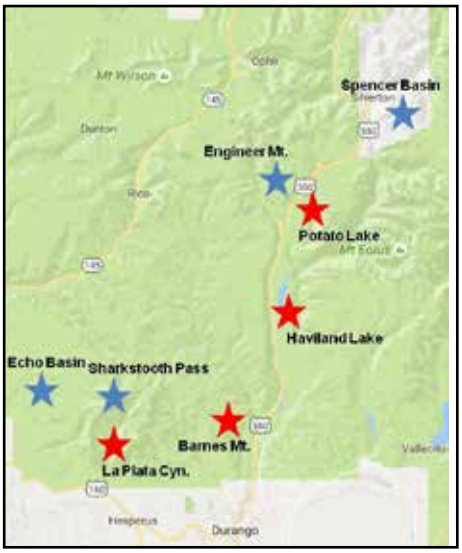

Figure 3. Sampling locations for genetic analysis of. Alpine *V. "bellidifolia"* represented by blue stars, Montane *V. adunca* by red stars.

Unlike my previous observations, the molecular data showed some clear patterns. The first analysis we performed was to identify discrete genetic clusters in the multi-locus genotype data. This identified two strongly differentiated groups corresponding to *V. "bellidifolia"* and *V. adunca* (Figure 4). One population, the one from an intermediate elevation, Potato Lake, exhibited a combination of the two genotype groups despite being morphologically within *V. adunca* and ecologically growing in the understory of dense forest. Secondly, analyzing the same data for genetic distance among the populations showed a similar pattern with separate groupings of high elevation populations and low elevation populations (Figure 5). Again however Potato Lake, while grouping closer to the high elevation group, was somewhat intermediate.

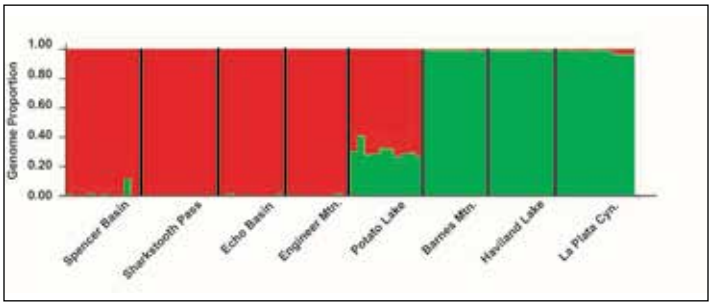

Figure 4. Identification of genetic clusters among populations of *Viola adunca* from the western San Juan Mountains. See Figure 3 for locations and taxon affinity of populations.

As could be seen in morphology the two forms remain generally very distinct genetically from each other. Gene flow via pollination does not appear to occur among most sites and this would suggest recognizing these as two separate taxa. But what about the genetic pattern of intermediate elevation populations such as the one at Potato Lake? The genetic pattern here points to gene exchange, perhaps via hybridization between low and high elevation forms. Close examination of the genetic data actually points to an even more fundamental change. The nature of microsatellite data allows one to infer the ploidy or number of sets of chromosomes within the plant cells. Typically organisms are diploid meaning they contain two sets of each chromosome but polyploidy, a condition in which an organism exhibits multiple sets of chromosomes is common in many plants including violets. The population at Potato Lake was unique in this study in that it showed four sets of chromosomes while all the other populations showed two. This tetraploid condition showed that these plants contained both the high elevation and low elevation genotypes. But how did they get there? That was likely through hybridization and incomplete combination of two different parental genotypes, a condition known as allopolyploidy.

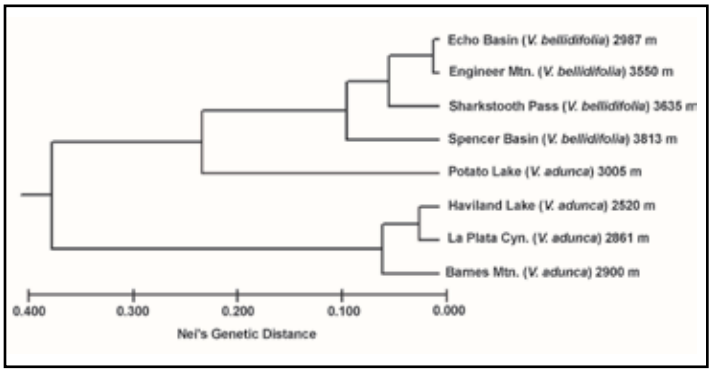

Figure 5. Relatedness of *V. adunca* populations at varying elevations across the western San Juan Mountains based on genetic distance. See Figure 3 for location of populations.

So can we relate this back to the original question regarding the differentiation of *V. "bellidifolia"* from *V. adunca*? Absolutely, and what we see are two principally differentiated forms isolated by habitat. But are they separate species? That's a hard one to answer and lies at the base of a long-debate in botany about how to define species. Due to the presence of apparent gene exchange giving rise to fertile, although tetraploid, offspring the differentiation may not be great enough to call these separate species. Additionally there appear to be no distinct morphological differences outside of size to differentiate these groups, thus they likely share a relatively recent common ancestor and the differentiation is only due to environment and pollinator behavior. The differentiation however is clear and I would recommend recognizing these as two separate taxa. Barring further insights and the fact that differing chromosomal races can occur in other species of *Viola,* I feel that Harrington's recognition of the high elevation

form as *V. adunca* var. *bellidifolia* is probably the best way of recognizing this consistent variation. I am currently looking more into this instance of allopolyploidy to determine the number of chromosomes in each of the separate groups, the extent of this pattern across the range, and the identification of morphological characters that could be used to recognize individuals of different ploidy.

What this study says is something I like to stress to my Plant Taxonomy students. While the recognition of a taxon at the level of variety may seem minor, it is important. The names we ascribe to organisms should represent the patterns we see in nature. As species are not fixed entities, ever-changing due to evolution, the name we give them is actually a hypothesis of historical relationship. In this case we can see how *Viola adunca* has adapted and differentiated in the complex mountain environment, responding to both physical and biological factors over long periods of time. It's a view that reminds us that those beautiful displays of summer flowers we enjoy are the result of many complex interactions with each species having a unique story to tell.

Fort Lewis College student Ethan Hainey collecting *Viola* at Sharkstooth Pass, La Plata Mountains.

Acknowledgements:
I would like to thank the John W. Marr Fund of the Colorado Native Plant Society, the Mountain Studies Institute, and Fort Lewis College for providing funding toward this research. I would also like to thank the following Fort Lewis students who assisted in this project: Kyle Corbett, Benjamin Downing, Ethan Hainey, Samuel Kaup, and Zachary Turner.

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Photos in this article by Ross McCauley.

Geobotany (cont. from page 20)

of this shale is that it is plastic, that is, when it's moist it can flow. It breaks down into clayey soils which tend to hold water. Even as it allows the soils to turn over, the clay holds moisture for forbs and grasses to take root. Look up at the hillsides and you'll notice that the slopes aren't broad flat gradients, but are hummocky. That's the topographic expression of all this slow activity.

The laccoliths—those igneous intrusions in the shale—form steep valley walls where they are exposed, most notably on Gothic Mountain and Crested Butte itself. Few areas in Colorado have this arrangement with hard igneous rock overlying soft shale valleys.

Sometimes the pull of gravity has sudden and spectacular results. The most catastrophic of slope failures are avalanches. Winter snow avalanches often follow established paths on steep slopes. As they crash down the mountain they take out trees and shrubs and can tear up the soil. Aspens will grow back quickly in these avalanche zones because their roots are often left intact as the trunk is knocked away. Until they do, open meadows allow wildflowers to prosper.

Even on shallower shaley slopes, large masses of the shale can fail. A section of bedrock, sometimes as long as 100 m. can break away as a single block and as it does it exposes fresh bedrock and leaves a mass of rubble at the base. This movement is called a slump. All this movement keeps the hillsides (especially south-facing) relatively free of trees and provides a great environment for grasses and forbs.

Of course, many other factors contribute to the formation of micro-ecosystems. Changes in cementation of the rocks provides a unique substrate. The removal of spruces from a hillside exposes an acidic soil to sun. Hot springs, alpine ridges—these are the features that create unique environments that excite the native plant enthusiast, and the Crested Butte area provides lots of these opportunities.

The Crested Butte Wildflower Festival advocates for the preservation and appreciation of wildflower by providing a venue for exploration and education. In addition to the many guided hikes of the Festival, we print wildflower guides for self-guided hikes. Numerous walkable trails with a wide variety of wildflowers are available near town, but it's only a short distance to more challenging alpine hikes. We also offer many related topics including garden tours, geology, edibles, arts, photography and even botany! With over 200 events during the festival we try to appeal to all and welcome the opportunity to share the beauty of our valley!

Tom Zeiner is a retired geologist, CoNPS Conservation Committee and Education & Outreach Committee member, and teaches Geobotany at the Crested Butte Wildflower Festival in July. He is on the Crested Butte Wildflower Festival Board.

Geobotany and the Wildflower Capitol

by Tom Zeiner

Crested Butte was named the Wildflower Capital of Colorado by the state legislature in 1990, three years after the first Crested Butte Wildflower Festival. While on its face this might appear to be another insignificant tip of the hat to a small town, there's some science behind why the name is appropriate.

Why is Crested Butte a great place for a wildflower festival? It's not the only place for great blooms, but it's the way the place is put together—the geobotany--that provides a unique venue for introducing botanical wonders to the wider public.

The variety of ecosystems throughout the state contributes to the diversity of plants to be found. Geology, topography, and elevation help determine that mix. We'll focus in this article on this one special area because the geology is so interesting and contributes decidedly to the spectacular displays of wildflowers we find.

What I describe as geobotany can include a whole range of factors which are related to, but not necessarily exclusively due to the bedrock and soils in an area. As a starting point, let's look at some of the geologic history of our fair state.

Most of the mountain ranges in the state are oriented roughly NNW-SSE. This alignment comes from the tectonic processes that formed the original mountains, the Ancestral Rockies, during the Pennsylvanian and Permian time periods (starting about 325 million years ago or MYA). As Africa and North America collided during that time, the sedimentary rocks on the east coast were deformed into folds much the way a rug crumples on a wood floor as a dog skids into it. That's why the Appalachian Mountains consist of long ridges and valleys—the folds in the sedimentary rocks extend for hundreds of miles along the collision course.

As the tectonic impact continued, Africa rotated clockwise until it folded the Ouachita Mountains in a nearly east-west orientation. The force of this continental collision was felt across the central part of the North America, forming a huge fault that lifted the Amarillo-Wichita Mountains in Oklahoma before turning to the north and exerting pressure on Colorado.

The result locally was that two big mountain ranges were pushed up out of the ocean to form islands known as Frontrangia and Uncompahgria. The names are simply geologists' way to keep straight where the islands were—Frontrangia stretched from the present day Sangre de Cristos north into Wyoming. Uncompahgria was parallel and to the west. The two islands were separated by a deep seaway. The eastern margin of Uncompahgria was along the present south edge of the Elk Mountains, where Crested Butte lies. Its northern edge drained into the Eagle Basin around Gypsum.

The two ranges were eroded into the adjoining basins, with their granitic detritus accumulating in rivers and beaches of red-brown sands. The resulting rock is one of the hallmarks of Colorado. Called the Fountain Formation on the Eastern Slope,

Crested Butte Wildflower Festival - Tom Zeiner and Aspen Sunflower, *Helianthella quinquinervis*, West Maroon Trail Photo courtesy Tom Zeiner

it forms several landmarks of the Front Range—the Flatirons, Red Rocks, Roxborough and Garden of the Gods. On the Western Slope, the sediments are called the Maroon Formation, made famous in the Maroon Bells. To the south in the Sangre de Cristos, the sediment lacks the maroon color found elsewhere. Here it accumulated as the Crestone Conglomerate and forms the high peaks of the Crestone group. In time, these mountains were all eroded away, and the landscape was flattened.

The Mesozoic Era in Colorado started as a quiet time geologically. In the Jurassic Period (160 MYA) the Atlantic Ocean formed, separating Africa and Europe from North America. Colorado subsided as a broad seaway formed from western Utah out into Kansas, and from the Gulf of Mexico to the Arctic.

This Cretaceous Period seaway was filled with life, from vertebrate "sea monsters" like plesiosaurs to tiny invertebrates like copepods which died and became organic matter on the seafloor. After being buried, this material was heated to form hydrocarbons of the Niobrara Formation, source for most of the oil and natural gas found in the DJ and Piceance Basins.

But even as life seemed calm in Colorado, big things were happening to the west. Africa wasn't bothering us any longer, but the continent had been growing on its west side as pieces of ocean crust were pushed into North America.

One small tectonic plate slid its way under the continent causing mountains to be uplifted in western Utah. The erosion of these mountains began to fill the seaway from west to east. As it did, swamps formed behind the sandy shorelines. The trees and other plants buried in these swamps became coals. These coals became the life-blood for Crested Butte with active mines in the valley until the 1950's.

As the Cretaceous Period ended, tectonic forces squeezed the old faults that had formed the Ancestral Rockies and once again mountains popped up. This mountain-building epoch is known as the Laramide Orogeny and began about 65 MYA.

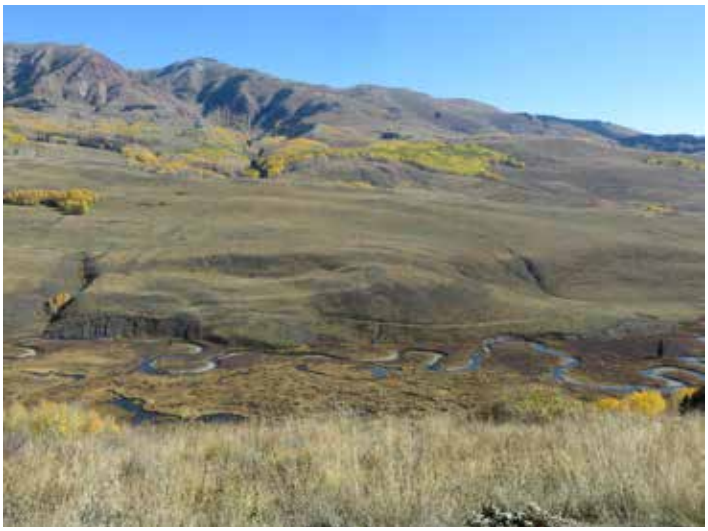
The igneous intrusion of Gothic Mountain rises steeply above the East River valley. Shale slopes below the igneous rock are very unstable. Photo by Tom Zeiner.

Several ranges were uplifted, including the Front Range, Sawatch and Medicine Bows. Between these ranges were basins which filled with sediments to form North, Middle and South Parks. Sometime during this activity the Pennsylvanian sedimentary rocks on top of the Sawatch Range slid or were pushed to the west, forming the Elk Mountains between Crested Butte and Aspen. As a result, the Elks are the only range in Colorado without an igneous or metamorphic core.

This wasn't the end of the geologic action for Colorado, because igneous activity then took over. On the west margin of the Elk Mountains a series of igneous rock masses was implanted, forming Gothic Mountain, Mt. Crested Butte, Snodgrass and Round Mountains. These intrusions are unusual because, as they were injected into the soft Cretaceous shales, they sometimes spread out along a bedding plane before expanding upward to form a flat-bottomed, round-topped mass of hard rock. These intrusions are called laccoliths. They're unusual because they are relatively small igneous masses and are encased in sedimentary rocks. The mountain building came to an end as volcanoes erupted in the San Juans as well as in the West Elks and Front Range.

The final geologic event in our story shaped the mountains into the features we see today. About 120,000 years ago glaciers started forming in the high mountains. As the snow accumulated thicker and thicker, it was compressed and turned to ice. When it became thick and heavy enough, it began to slide down the valleys, scraping rock from underneath and off the valley walls. As long as the ice moved faster than it could melt, it pushed farther down-valley. When it finally reached warmer temperatures, it melted, dropping all the rock and dirt it had accumulated. This formed hilly areas known as end moraines.

At the end of this glacial epoch, the end moraines blocked the valley just downstream from Crested Butte and created a dam. A lake filled the valley until the East River finally breached the dam, but it left behind a flat valley floor with lots of wetlands. After all the ice melted away, we were left with the breath-taking sight of glacial cirques, the headwalls formed by the glaciers.



Along the front of the Elk Mountains, hummocky slopes border a flat valley with the meandering East River. Photo by Tom Zeiner.

Barren shale is exposed where rock has slumped away form the hillside. The uneven slopes on the hillside above result from soil movement. Photo by Tom Zeiner.

The valleys are steep-sided where the glaciers scoured but the bottoms are filled with glacial debris, making a U-shaped valley, typical of glacial areas. The till and outwash, as the sediments are known, filled the valley and left a flat valley floor. So how does all this geology relate to native plants? And why does it make Crested Butte a good place for a Wildflower Festival?

This part of the Upper Gunnison Valley is dominated by three smaller valleys, controlled by geology, carved by glaciers, and modified by streams and rock movement. The East River meanders on the north side, at the foot of the Elk Mountains. The Slate River flows down from Paradise Divide through Crested Butte before joining the East. Between them, Washington Gulch is a higher, shallower valley on the south side of Gothic and Snodgrass Mountains.

The valley bedrock is composed of Cretaceous-aged marine shale with a few sandstone layers. One of the characteristics

(Continued on page 18)

The UP Native Plant Program on the Western Slope

by Kathy See

The Uncompahgre Project (UP) Native Plant Program is part of a western slope collaborative organization that was formed in 1998 as a result of a study of declining mule deer habitat on the Uncompahgre Plateau. The problem brought multiple agencies and private organizations together to discuss how to improve ecosystem conditions across state, federal, and private boundaries.

In 2002, the UP put together a native plant subcommittee to work on the need for locally adapted, but unavailable, plant materials for use in revegetation on public and private lands. This group worked to draw up lists of desired species, to test the various collections, to grow the foundation seed and to provide this seed to commercial seed growers for production on a large scale. These efforts were both time-consuming and expensive. The costs involved were underwritten by native plant programs from the collaborative partners, BLM and USFS, and the then CO Division of Wildlife.

The UP native plant program began by selecting 50 key species of grasses, forbs, and shrubs to collect, study, and advance with the goal of developing an adequate supply of species native to the Uncompahgre Plateau. Agencies were particularly interested in species that would benefit sage grouse. Forbs, which are non-grass species, were chosen for their palatability and/or ability to attract insects for sage grouse chicks to consume. Grasses were chosen to provide cover.

Over the next decade, over 250 separate wildland seed collections were made for more than 50 species on or around the Uncompahgre Plateau. Extensive field studies at universities and plant materials centers were done to determine which of the collections would be most successful under agricultural production conditions. Studies were done on flowering timing and patterns, seed harvesting techniques, optimal plant spacing and irrigation.

After years of research, the most successful collections were determined. Seed increase plots were then planted to grow enough of the foundation seed and make it available to commercial growers. Over 20 species of grasses and forbs were made available to commercial growers. Because shrubs take so long to produce a seed crop, they were soon eliminated from production trials.

In spite of the original small plot research, not all of the species turned out to be adaptable to the realities of larger-scale production. At this point, there are 10 of the UP species in commercial production.

To keep the cost of seed down, production must be somewhat streamlined. Wildland species have adapted to have variable germination and variable seed maturity. This complicates seed production where the cost of seed increases with the hand labor involved. Some of the species proved to be just too variable.

Species that lend themselves to mechanical planting and uniform harvesting are often the species that make it to the revegetation seed market. Grasses have proven to be fairly adaptable to production and the price of most native grass seed is generally affordable.

Heliomeris multiflora in 1st year production. Photo by Kathy See.

Wildflowers/forbs need more hand labor. As a result, the seed of many species is relatively expensive, especially when land managers need bulk seed mixes to cover hundreds of acres and often have tight budgets.

In recent years, the need for a local climate-controlled storage facility became more pronounced. Producers could produce quantities of UP seed that could not be used immediately. Seed mixes were stored wherever there was space, like metal buildings and enclosed trailers. Without any type of temperature control, stored seed loses viability and becomes worthless.

In 2012, Colorado Parks and Wildlife (CPW) opened their seed warehouse in Delta, CO. The warehouse provides storage for 300,000 lbs. of seed with 5080 sq. ft. of open storage, plus 920 sq. ft. of refrigerated storage. This facility has become an important resource for land managers on the western slope.

Recently, agency funding priorities have shifted, due to reduced budgets. Luckily, the Western Slope Landscape Collaborative as it is now called, still has the goal of partnering with others in the rehabilitation of native plant communities, though now on the wider geographic Colorado Plateau, which extends into Utah.

So, in response to the funding changes, the UP Native Plant Program has shifted from its widespread research and development program to more focused work. A new funding source has become available from the Utah BLM Seeds of Success (SOS) program. Seeds of Success is the nation-wide native seed collection program and its mission is "to collect wildland native seed for research, development, long-term germplasm conservation, and ecosystem restoration".

Agency personnel and contractors collect native seed under strict protocols. The seed is catalogued and most is put into frozen storage for germplasm preservation. Any extra seed can be returned to the collecting agency for their project research and possible development.

As an SOS collector, I travel around the Uncompahgre Plateau observing the varied ecosystems and collecting for SOS seed

(Continued on page 22)

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UP Plant Program (cont. from page 21)

preservation. In conjunction with funding from local collaborative partners, part of my job as the UP Native Plant Coordinator is to analyze a range of species that have possible commercial production potential. I bring suggestions to the collaborative plant subcommittee to determine which might be a successful addition to the local ecotypes currently under production.

Federal agencies now have increased requirements to use wildflowers to improve pollinator species habitat. In response, we are trying a faster track to make local species available for on-the-ground use. Rather than the years-long comparative research that had been done previously, likely species are collected and put into increase plots for actual use in regional seed mixes. In the last couple of years, the UP has put two local forb species into these plots. Both have been successful, thanks in part to the expertise of the grower.

Polanisia dodecandra
Photo by Kathy See.

The first species was red-whisker clammyweed, *Polanisia dodecandra*, an annual related to the much-used forb species *Cleome*. *Polanisia* grows in harsh, well-drained exposures in the salt deserts that are common on local BLM lands.

The other species was showy goldeneye, *Heliomeris multiflora* (see photo page 21). This year with the well-timed and 'generous' precipitation, native *Heliomeris* appeared in ecosystems from lower elevation dry-and-hot to the top of Grand Mesa, above 10,000 feet. Its wide ecological range and preference for open and/or disturbed places make it a valuable addition.

Another important part of my job is to help maintain market stability of the UP species now under cultivation. Commercial growers need their land to be productive. If the seed they are growing is not selling, they will naturally plow it under and put in a different crop. I help design seed mixes for local projects and make sure appropriate UP species are included, thus maintaining a market for the local ecotypes.

More and more research is focused on seed genetics these days, increasing the relevance of using local seed sources. This makes the local UP ecotypes used in rehabilitation and landscape management even more significant.

Seed warehouse and field.
Photos by Kathy See.

Kathy See is a plant ecologist who works as the UP Native Plant Coordinator for the Western Colorado Landscape Collaborative. The CONPS announcement (courtesy of Jane Hendrix) about the spring flora display at Rabbit Valley CNA near the Utah border introduced her to a unique area and a wonderful germplasm collecting opportunity.

Calendar

Dec. 6, Tues. ColoradoGives Day! (online) https://www.coloradogives.org

Dec. 7, Wed., 8am-5pm Southern Rockies Seed Network Annual Meeting, Loveland

Dec. 13, Tues. 7 p.m. Colorado Blooms - A Journey: 2015, 16 & Beyond... (B)

Jan. 4, Wed. 7-9 p.m. Benefits of Native Plant Gardening (MD)

Jan. 5, Thurs. 7pm Bees - Diverse Pollinators (N)

Jan. 10, Tues. 7p.m. Boulder Chapter Meeting (B)

Jan. 21, Sat. 9 am-3pm CoNPS Workshop: Overview of the Brassicaceae. CSU, Fort Collins

Jan. 28, Sat. CoNPS Workshop: Identifying and Keying Out Colorado's Wetland Plants, CSU, Fort Collins

Feb. 1, Wed. 7-9 p.m Research & Conservation at Denver Botanic Gardens, DGB (MD)

Feb. 2, Thurs. 7pm Climate, Fire and Bugs N)

Feb. 7-9. Tamarisk Coalition Conference 2017, Fort Collins

Feb. 7-10. ProGreen EXPO. Colorado Convention Center, Denver

Feb. 11, Sat. 9 am-3pm. Landscaping with Colorado Native Plants Conference,Larimer County Fairgrounds, Loveland

February 13-16, 2017 National Native Seed Conference, Washington DC

Feb. 14, Tues. 7pm, CoNPS Boulder Chapter Meeting (B)

Feb. 25, Sat., 9 am-3pm CoNPS Workshop: Gymnosperms, Pinophyta, and Pinus, Fort Collins

March 1, 7-9 pm CoNPS Metro-Denver Chapter Meeting (MD)

March 2, Thurs. 7pm Novel approaches to erosion control and native plant reestablishment (N)

March 7-9 HAR-CERSER 2017 Conference, CSU, Fort Collins

March14, Tues. 7pm CoNPS Boulder Chapter Meeting (B)

March 25, Sat, 9am-3pm CoNPS Workshop: The Influence of Soil Properties on Where Native Plants Grow, CSU Fort Collins

April 1, Sat. 9 am-3pm CoNPS Workshop: Using Colorado Native Plants on Greenroofs, Douglas County Fairgrounds, Castle Rock,

April 5, Wed. 7-9 pm. CoNPS Metro-Denver Chapter Meeting (MD)

April 6, 2017, Thurs., 7pm Displaced Plant Communities (MD)

April 8, Sat.., 9 am-3pm CoNPS Workshop: Ethnobotany: The fascinating study of the relationships between peoples and plants: Great Plains Ethnobotany and Folklore

April 9, Sun., 9 am-3pm CoNPS Workshop: Ethnobotany: The fascinating study of the relationships between peoples and plants: Tropical & Latin American Ethnobotany

April 11, Tues., 7pm CoNPS Boulder Chapter Meeting (B)

May 3, 7-9 pm CoNPS Metro-Denver Chapter Meeting (MD)

May 4, Thurs. 7pm The Role of Monitoring Vegetation in the City of Fort Collins Natural Areas (N)

KEY

B	Boulder Chapter
GR	Gore Range Chapter
MD	Metro-Denver Chapter
N	Northern Chapter
P	Plateau Chapter
SE	Southeast Chapter
SW	Southwest Chapter

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4.Share a testimonial on what CoNPS means to you for use on the CoNPS ColoradoGives profile.

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