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# IMAGES

The mission of the Boulder County Parks & Open Space Department is to conserve natural, cultural, and agricultural resources and provide public uses that reflect sound resource management and community values.

## PHOTOGRAPHS & ILLUSTRATIONS

**Agricultural Heritage Center:** Mike Lohr  
**Monarch Butterfly,** Jeff Walker, *Colorado Parks and Wildlife*

**Dainty Sulphur,** John Barr

**Bald Eagle,** Howard Witkin

**Golden Eagle,** Dick Fogg

*\*Uncredited photos from BCPOS Collection*

## NATURE DETECTIVES

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Volume 43, number 4

# 2021 Land Conservation Awards

On Oct. 6, the Boulder County Parks & Open Space Department held the annual Land Conservation Awards ceremony to celebrate 2020 and 2021 award winners. (Last year's ceremony was canceled because of pandemic guidelines for group gatherings.) Here are highlights from the special gathering about the 2021 recipients.

**Land Conservation Award** honors individuals, families and organizations whose contributions demonstrate notable achievements in preserving Boulder County's agricultural lands. Margaret Geick and Jean Moore, of the M.A. Tucker Investment Company, formed in the late 1800s, preserved their 324 acres of land by selling the property to Boulder County. This sale removed nine development rights in the Indian Peaks Environmental Conservation Area, just west of Nederland. The property contains the North Beaver Creek B3 high biodiversity area, critical wildlife habitat, riparian and wetland areas, and significant natural communities surrounded by 755 acres of protected and preserved lands, resulting in a continuous area of more than 1,000 acres.

**Environmental Stewardship Award** recognizes individuals, families, or organizations that make significant contributions in land protection and/or management. Jan Chu was nominated for her long-time commitment to increasing awareness of butterflies and in turn, influencing peoples' appreciation of nature overall. For more than two decades, Chu has been instrumental in increasing knowledge about and appreciation for butterflies and their role in ecosystem function. She created a network of naturalists throughout Boulder County and the northern Front Range who are engaged in studying butterflies and protecting their habitats.

**Heritage Award** honors individuals or organizations whose contributions demonstrate achievements in preserving Boulder County's heritage through substantial privately funded historic preservation projects. Under the guidance and leadership of Wesley Black Elk and Marty Chase Alone, the Indian Mountain Native American Veterans reestablished the Inipi Ceremony (purification sweat lodge) on the Southdown Indian Mountain property. The ceremonies performed by Black Elk and Chase Alone have provided important community gathering and spiritual healing for veterans and other people suffering from the effects of combat, military service, and other life-altering events. The ceremonies have also created a significant connection to land-based experiences for Native Americans in the Boulder and Denver areas.

**Outstanding Volunteer Award** honors individuals whose leadership and support of the Parks & Open Space volunteer programs have enhanced our community partnerships and improved public service. This year, there were two recipients.

Elizabeth Kellogg has been volunteering with Parks & Open Space, as well as other land management organizations located in, and outside of, Boulder County, since 2005, and her passion continues to blossom with every growing season. Kellogg has contributed nearly 1,600 hours to the department as a seed collection scout, crew leader, willow and milkweed monitor, and Peck Native Seed Garden steward.



"This was one of the most meaningful awards ceremonies I have experienced at Parks & Open Space. We were welcomed and centered with a Native American Flute player, Joseph Lam, calling us together, and he closed the ceremony with a traditional drum and song. The awardees were all so deserving of recognition for their passion and commitment to helping make Boulder County a better place."

- Parks & Open Space Director, Therese Glowacki

Anne Cure is a long-time supporter of the Boulder County CSU Extension agriculture program. She is a leader among market farmers in Colorado and is sought out for engagement in national slow-food events. Ann has served as a board member for the Colorado Organic Producers Association and the Boulder County Farmers Markets. She owns Cure Organic Farm in Boulder and provided access to her farm for nine years to allow CSU Extension to collect data on irrigation water use for a long-term research project.

Therese Glowacki, Wesley Black Elk, Marty Chase Alone, Margaret Geick, Jean Moore, Gedeon Lafarge, Rob Alexander, Elizabeth Kellogg, Matt Jones (Commissioner), Jan Chu, Lowell Dodge, Diane Dodge, Marta Loachamin (Commissioner)



# RESEARCH ON OPEN SPACE

*The Boulder County Parks and Open Space Department offers grants for research on county open space lands each year. All proposals are reviewed by a team of resource specialists, and awarded research projects are monitored during their activities on open space. The following is a summary of a 2020 study conducted by David M. Theobald, PhD. His project focused on permeable landscapes for climate change adaptation in and around Boulder and Jefferson counties.*

## Introduction:

The goal of this proposed research is to inform decision making on open space lands in and adjacent to Boulder County by mapping the landscape permeability and resilience of species, communities, and ecological processes to adapt to climate change impacts. Because a primary strategy to adapt to climate and land use change is to maintain and restore ecological connectivity, then understanding where the critical locations that maintain and restore landscape permeability are located is fundamentally important. This information will inform decision making around resource management, protection priorities, and collaboration with land management partners within and surrounding Boulder County, including Boulder County Parks & Open Space (BCPOS), the City of Boulder Open Space & Mountain Parks (OSMP), and Jefferson County Open Space (JCOS). We will take a coarse-filter conservation approach, in recognition of the relatively high uncertainty about how future ecosystems will evolve with climate change in the next 10-50 years, particularly at detailed scales, and because life history data for specific species is typically limited.

To achieve the goal of this research, the following research objectives will be pursued: (1) identify the study area, specifically the “core” analysis area and surrounding lands; (2) compile spatial data on important habitat locations, protected areas, and intact natural lands; (3) model landscape permeability/connectivity; (4) evaluate the gaps, vulnerabilities, and opportunities for each ecosystem and the full landscape; and (5) provide key results and recommendations for follow-on activities. This work includes all lands within the core study area as well as surrounding lands because understanding connectivity needs to include cross-boundary wildlife movement and ecological flows to and through the complex of parks and open space lands.

This project will contribute to the missions of BCPOS, OSMP, and JCOS because it will inform decision making and evaluate broad conservation strategies and provide a tool (dataset) to evaluate future opportunities and management actions to address potential changes (e.g., increased development, transportation development, increased visitation, potential invasive/disease expansion or outbreaks). This work strongly addresses the priority research topic to advance the ability to adapt to and mitigate effects of climate change on natural systems—specifically to wildlife migration and connectivity issues. The proposed work is well supported by the conservation science literature.

Moreover, this work likely can make important contributions to bridging science and practice as a prototype/case-study of recognizing very large extent with management relevant scale information.

Briefly, key supportive findings from pertinent literature include the following. In conservation planning, maintaining connectivity has been recommended as a primary strategy to adapt to climate change (Heller and Zavaleta 2009). Maps of landscape permeability inform connectivity conservation initiatives at broad scales by identifying locations and their relative importance for maintaining landscape connectivity, protecting the movement of species, retaining landscape-scale ecological processes, and facilitating adaptation to climate change (Theobald et al. 2012). Permeable landscapes are needed to maintain ecological processes, genetic diversity, potential for communities and populations of species to adapt as the climate and land use change (Anderson et al. 2016). Riparian areas are expected to provide critical movement corridors and are among the most threatened habitats in many regions (Krosby et al. 2018). Keeley et al. (2018) found that evaluating structural connectivity for climate change adaptation provides a practical approach as a proxy for movement patterns of a wide range of species and has relatively low uncertainty.

*To read the full report, or other funded research, visit [www.BoulderCountyOpenSpace.org/research](http://www.BoulderCountyOpenSpace.org/research).*

**Note: See the following page for information about 2022 grant proposals.**



# What Happens to Butterflies When It Snows?

by Jan Chu



Monarch butterfly and Dainty sulphur butterfly

Butterflies, which are summer visitors to Boulder County, may hibernate in the cold, never to awaken. These butterflies come from as far away as the Rio Grande and Mexico. However, if a butterfly can hide and keep its scales dry, it will awaken and continue to live, even though it has endured freezing temperatures. Its blood is not water-based, but hemolymph, made of 'antifreeze' glycerol, amino acids, and lipids.

Our famous Monarch butterflies migrate in September from Colorado to Mexico. Some may have begun their great journey from Canada in late August. They stop in trees for overnight rests

or in blossoms for nectar-energy during their final long flight. Monarchs may catch a blast from the northwesterly wind to assist on their journey before the snow.

Mourning cloaks find hiding places. Cloaks have a pheromone that communicates this 'grouping instinct' in late autumn. These cloaks have been seen coming from under loose bark of aging cottonwoods a dozen at a time during the end of winter when warm sunlight hits the tree trunk. They will emerge for a day only to be seen by kestrel hawks waiting on nearby branches to snap up early morsels.

Some immigrant butterflies come from far-away southern deserts, prairies, and grasslands. These butterflies will live out their lives in Boulder and end up as nourishment for birds and spiders.

The thumbnail-sized dainty sulphur has greenish-colored wings, apparent to our eyes, but formed from black scales over the yellow wing background. It arrives in late summer along with the Reakirt's blue.

Survival is the important factor in the lives of insects. Migration is one answer, and the other is maintaining the next generation by laying eggs in their home communities.

## ACCEPTING SMALL GRANT PROPOSALS FOR 2022

Each year, the Boulder County Parks & Open Space Department awards small grants (up to \$10,000 each) for research and biological inventories on Boulder County open space lands. These research projects and inventories provide valuable data to monitor management practices and improve resources and park visitor experiences. The department has identified 16 priority needs; the following are four of them.

- Analyze the effects of riparian cattle enclosures on groundwater depth, hydric soils, and carbon sequestration along a Front Range stream.
- Assess *Sceloporus undulatus* delimitations at open space sites, with additional emphasis on throat patch coloration expression within populations.

- Review existing models that predict fire behavior and effect to further refine modeled outputs for future treatments and expectations on open space areas.
- Research in further depth the 11 paleontological site localities recently located and recorded on a cluster of open space properties in the southeast grasslands.

The deadline for proposals is Monday, Jan. 10, 2022. Research proposal requirements, priority research topics, and past research project reports can be found on the department's webpage at [www.BoulderCountyOpenSpace.org/research](http://www.BoulderCountyOpenSpace.org/research).

# Six-Sided Wonders

by Andrea Van Sambeek

Creating paper snowflakes is a favorite wintertime craft. There is no right or wrong way—just grab some paper, fold it into sixths, and cut away. Each flake will be unique and lovely.

Paper snowflake creation is so simple, but how do real snowflakes form? What gives them their unique shapes? How many different types are there?

## SNOWFLAKES START HERE

Snowflake-making starts up in the cold world of a cloud. A tiny particle of dust, dirt, pollen, or bacteria provides the initial building block for a snow crystal. When this tiny speck gets cold enough, water vapor will stick to it, transforming directly from vapor into ice. This miniature ball of ice grows as more water vapor sticks to it. Because of its atomic makeup, water molecules join together to form rings of six, creating the six-part symmetry of snowflakes. Water vapor continues to stick to the crystal as it forms, and the formation is faster at the corners. This faster growth causes six spokes, or branches, to form. The branches continue to grow as the flake gets heavier and descends through the cloud, adding more water along the way. The temperatures and humidity the snow crystal encounters along the path through the cloud dictate the final shape of the snowflake.

Snowflakes come in many different shapes. The six-pointed star-shaped flakes are called dendrites (tree-like) thanks to their beautiful branches. These flakes form in clouds that have plenty of moisture and a temperature of around 5 degrees. If the cloud doesn't have as much moisture or if the temperatures are either a bit warmer or cooler than 5 degrees, plate crystals will form. These plate crystals are still six-sided; they just lack the branches of dendrites. At very

cold temperatures high in the clouds, column-shaped crystals form. They are very tiny (half-a-millimeter long) and may be solid, hollow, or even hollow with caps made of plate crystals.

## IMPERFECT FLAKES

Although snowflakes do show symmetry, that symmetry is rarely perfect. Arms of the crystal may grow at different rates or encounter different obstacles on the way down. Twelve-point snowflakes form when two crystals grow from the same starting speck or when two six-pointed dendrites collide on the way to earth. Snowflakes may also encounter small drops of water as they fall. These drops freeze to the crystal forming little bumps called rime. Blobs of rime fall as graupel, or soft hail.

While perfect snowflakes are rare in nature, scientists can make designer snowflakes in the lab! By carefully controlling temperature and humidity as snow crystals form, scientists can dictate the shapes they form.

Many of what people call snowflakes are actually a combination of several snow crystals. On the way to the ground, the snow crystal may encounter other falling crystals, combining to form what we call snowflakes.

You can catch and examine snowflakes to see their crystal structure for yourself! You just need a piece of black cardboard or foam board and a snowy day. Make sure to place your board outside for a while first so that it's not too warm to catch the falling snow without melting the crystals. A magnifying glass or the magnifying feature of your smart phone will reveal the unique structures to you. Have fun studying snowflakes this winter!

# NATURE DETECTIVES

Winter 2021



## Meadow Vole Finds a Home

Meadow Vole left the burrow where she was born in early spring. Six inches long and only five weeks old, she was a fully-grown adult. She set off to explore her world, searching through thick grasses until she found a good spot for digging.

She dug a shallow burrow under a protective rock near a creek. Starting from the entrance hole, she began nibbling plants to make a runway. Her almost two-inch-wide runway was a trail along the ground, trampled by her quick footsteps and sprinkled with chewed off bits of grass and other plants. Her runway grew longer with many side trails as she gnawed her way through lush meadow vegetation. Her paths meandered around trees and shrubs. Tall plants draped over the runways, partially hiding Meadow Vole as she scurried along to her next meal.

## Lots of Baby Voles!

Nearby male voles soon caught her scent and became her mates. During the warm months, Meadow Vole had a new litter of babies every few weeks. The males lived in their own burrows and didn't help raise the babies. By the time winter came, lots of little voles had departed to find homes of their own.

## Hide Below the Snow, Meadow Vole

Winter weather shriveled the plants beside Meadow Vole's runways. Long grasses no longer hid her from her enemies—the fox, coyote, bobcat, hawk, and owl. A dusting of snow made her even more visible to their hungry eyes.



What a wonderful change when the snow grew deep!

At the bottom of the snowpack, warmth from the ground kept the air much less chilly than the cold winds above the snow. Tunneling through sugar-like snow crystals nearest the ground was simple.

Meadow vole added exits and air vents beside trees and under shrubs. Living under the snow made it harder for her enemies to find her. She would only abandon her cozy world when melt water flooded her snow tunnels.



## Voles Are Rodents

Rodents outnumber all other mammal groups. Mice, rats, beavers, squirrels, chipmunks, prairie dogs, porcupines, marmots, pocket gophers, along with voles are rodents living in Boulder County. All rodents chew, chew, chew, and chew!



Gnawing on plants wears down rodent teeth, but that isn't a problem for voles or any other rodent. Their teeth never stop growing from the base, and are always being sharpened at the tip as they eat. The front of each tooth is harder than the back of the tooth. As top teeth scrape against bottom teeth, the softer back surface of their teeth is slowly rasped away, keeping a sharp edge on each tooth.

## The Voles of Boulder County

Six different species of voles are found in various habitats here. Voles have stubby snouts and plump bodies. They are covered with soft fur except for their tails. Their tails have a sparse amount of hair. Unlike mice with their Mickey Mouse ears, vole ears are small and hard to see tucked in their dense fur. Vole necks are hidden in thick fur between their head and body.

The color of the six kinds of Boulder County voles varies, but they all sport grizzled dark gray/brown or reddish brown fur. The species are slightly different in size, but all are around six inches long, with somewhat varying tail lengths.

## Habitats for Voles

Voles usually live fairly close to water. Some species have names that hint at where they can be found. **Mountain voles** inhabit the county's high mountains. **Red-backed voles** and **Heather voles** are mountain dwellers too. **Montane voles** are found in the high mountains and also in lower mountain habitats. **Prairie voles** are prairie and foothills residents. **Meadow voles** can survive in drier places and are the most widespread in the county. They can be found from the prairies to the mountains.

## A Vole's Diet Is Green (Mostly)

Voles graze on green grasses and tender plants all through the spring, summer, and fall. They nibble berries and seeds when they find them.

When freezing winter weather causes meadow plants to become brown and brittle, food is scarce. There is little left to eat except tough bark and roots. Some voles have stored food in their burrow or other protected places.

Voles living under deep snow can often find green shoots growing under the blanket of snow.





## Babies, Babies, and More Babies

Several teeny vole babies are born in each litter in a ball-shaped nest the female vole constructs from grass stems. The babies are born furless, toothless, and with closed eyes. They drink their mom's milk, and within a week they have hair and teeth. In two weeks their eyes open, and they start eating plants. In three weeks, they are able to survive on their own. Soon a new group of babies is born in the nest. Meanwhile, female youngsters from the first litter can already be having babies of their own.

Unlike the other vole species, Prairie voles have just one mate for life, and the male and female live together. Both build the nest and take care of their young.



## Look Out Voles! Danger lurks!

With so many little voles born each year, the land would be overrun with voles except for their numerous predators, parasites, diseases, and hazards such as flooding and starvation. Foxes, coyotes, bobcats, weasels, and martens have voles on their dinner menus. Owls look for them at night, and hawks and falcons spot them during the day. Snakes prey on baby voles in their nest or burrow. Ticks, lice, and other parasites weaken voles. Diseases take their toll. Nibbling, chewing voles sometimes cause serious problems for orchards, farms, and gardens, and people kill the voles to save their harvest.

Deep snow does not stop sharp-eared foxes and coyotes from hearing rodents scurrying below the snowpack. Foxes pounce at the sound, trapping voles in their tunnel beneath the snow. Great horned owls also punch through deep snow to catch the voles they hear below. Slim-bodied weasels slip down vole tunnels following the scent of their prey under the snow. With all these dangers, voles typically do not live beyond a year, and most have much shorter lives.

## By the Way, Voles Are Not Moles

The similar names can be confusing, but voles and moles are very different critters.



Voles have a furry rounded nose, narrow clawed toes, and shiny black beady eyes.

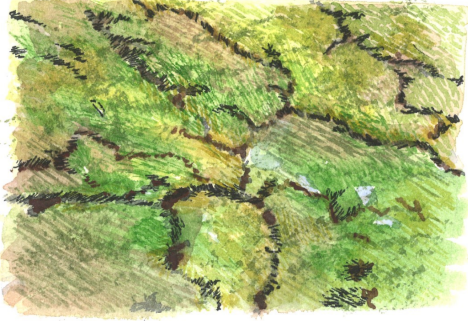
They spend a lot of time above ground, scampering along their runways through grassy meadows, day or night.

Moles have naked, pointy snouts, wide webbed feet, and no visible eyes or ears.

They spend almost zero time above ground. Moles are not in the rodent family, and they do not live anywhere in Boulder County.



## Evidence of a Winter World Below the Snow



Melting snow can uncover signs of a hidden world beneath the snowpack, and it is fun to observe areas newly made bare by warm sunshine. Look for a network of trails where voles chewed grasses and roots. You might find a scattering of grass clippings or a ball of dry grasses that was a vole nest. The disturbed ground may be bare in some places. Look for openings to burrows around rocks and logs. Check around the main trunks of shrubs and trees.

You may find tube-shaped trails that look like meandering, covered tunnels. These are not made by voles. These trails are made by rodents called pocket gophers. The pocket gophers make squiggly ridges of mounded dirt as they kick soil into tunnels in the snow while burrowing into the ground under the snowpack.

## Checking Temperatures Above and Below the Snow

Wait for a cold day when deep snow covers the ground to try this activity. You'll need: two simple outdoor thermometers (small, slim thermometers would work best), a long stick, and some tape. Securely tape one thermometer flat against the bottom of the stick. Tape another thermometer several feet above the first.

Push your stick into the snow until the thermometer end reaches the ground. Keep your stick there for at least five minutes. Then check the temperature on both thermometers. Is there a difference in the temperature under the snow and the temperature in the air above the snow?

### If There's No Snow on the Ground

Look for an animal hole in the ground. Make sure the animal isn't right inside or nearby so you don't disturb each other. Poke your thermometer stick as far into the hole as it will go. Wait at least five minutes and compare the temperature on both thermometers.

### If There's No Snow and No Holes

Look for a big pile of leaves or a pile of brush and leaves on the ground. Push your thermometer stick into the leaves as far as you can. Wait the five minutes again, and check both thermometers.

**Brrrrr! Where would you hide on a cold day if you were a vole?**



Text by Katherine Young and Deborah Price  
Illustrations by Carol Tuttle



# Hibernation: A Long Winter's Nap

by Lucy Haggard

As weather cools down and days get shorter and nights get longer, animals have a choice to make—scavenge for hard-to-find food and shelter during snowstorms and frigid winds, or hunker down to wait it out until spring.

For many, the latter option is far more appealing, especially for small mammals like ground squirrels and mice. This winter rest is called hibernation, and for the animals that do it, it's integral to their life cycle.

To prepare for months of hibernation, animals spend late summer and autumn frantically stocking up with fuel. If you've ever heard of "Fat Bear Week"—a week of competition among some of the chunkiest brown bears in Katmai National Park—then you've watched hibernation prep in action! Bears, bats and many rodents will race to pack on the pounds, as during hibernation, their body uses that stored-up fat as fuel to stay alive.

## CHANGES OF HIBERNATION

As an animal hibernates, its body temperature drops significantly. Its heart beats slower, and it takes fewer breaths than normal. Occasionally, an animal will wake up from this deep slumber-like state but will quickly return to rest. Many animals, including bears, can recycle their urine so that they don't even need to get up to use the bathroom. Don't be confused, though; hibernation is not sleep but is rather a deeper state of rest.

Some animals even give birth to babies during hibernation season. Having to provide nutrients for offspring means it's all the more important to stock up before denning down. Sometimes, if an animal gets pregnant during mating season but has not bulked up with enough nutrient storage to sustain both the mother and children during hibernation, then her body will essentially reset the pregnancy. This way the mother can survive the winter and hopefully have another chance to reproduce the following season.

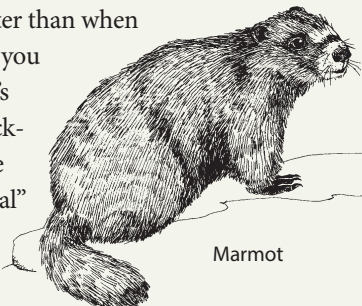
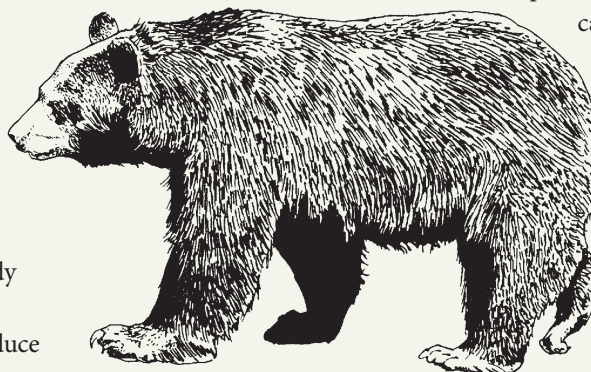
When hibernating animals emerge in the spring, bleary-eyed and very hungry, they are many pounds lighter than when they snuggled away. This awakening is when you start to hear of bears coming into the county's urban areas searching for nourishment to kick-start their metabolism back to life. It can take days for an animal's body to regain its "normal" patterns of operating. In the meantime, they may appear confused and groggy. You would also be confused if you spent months in a dark den with no food!

Besides hibernation, animals have other ways to survive a hard winter. Many birds go into torpor if the weather is nasty enough, with their bodily processes slowing down, much like hibernators experience. But torpor is often unplanned, compared with the anticipation of hibernation, and lasts only for short periods of time. As a result, animals that experience torpor do not have to store up as much of a nutrient reserve as hibernators do, since they return to "normal" functions much sooner. Some debate exists as to whether certain animals, like bears, skunks, and raccoons, go into full hibernation or if they actually experience torpor.

However, as climate change accelerates and temperatures warm, animals that do hibernate are waking up for longer intervals during their hibernation season as they sense an increase, albeit usually temporary, in the ambient temperature. This awake period means they burn more fuel during their hibernation season and they may be less capable of making it all the way until spring.

Bears aren't the only animals that hibernate—amphibians like frogs and salamanders, and some reptiles like turtles also hibernate. Even snakes do a modified hibernation called brumation.

And humans have our own version of hibernation with a couple of exceptions—we can enjoy hot cocoa and a warm fire through the cold weather!



Marmot

Bears aren't the only animals that hibernate—amphibians like frogs and salamanders, and some reptiles like turtles also hibernate. Even snakes do a modified hibernation called brumation, and birds will go into torpor if weather is cold enough.

# Carbon Sequestration in Action

by Ellen Harris

In an age of climate change, the term “carbon sequestration” often gets thrown around, but you may find yourself wondering what it actually means, how it can be used to address climate change, and what carbon sequestration looks like in your community.

Carbon sequestration is simply the process of removing carbon dioxide, the primary greenhouse gas, from the atmosphere and locking it up so that it can't affect the climate. Plants do this all the time; in the process of photosynthesis, they take in carbon dioxide, water, and light and use it to make sugars, which they join together as the building blocks of their cells. The carbon is locked up in the plant cells where it can't affect the climate, and some of the oxygen it was attached to when it was floating around in the atmosphere goes free. Carbon dioxide can also be sequestered in soil by adding compost and encouraging soil organisms to grow, which similarly use carbon to build their cells. By sequestering carbon in plants and soil, we use the natural processes of the earth to reduce the amount of carbon dioxide in the atmosphere, helping reduce the effects of climate change.

## AVENUES TO CARBON SEQUESTRATION

Boulder County Parks & Open Space (BCPOS) is working on carbon sequestration on several fronts. Most visible to many county residents are the parks in the foothills and mountainous parts of the county, where open space protects the trees that sequester carbon in their trunks and branches, as well as the soils where additional carbon is sequestered by soil organisms.

In total, a study found that at the end of 2013, non-agricultural land in BCPOS held 3.8 million metric tons of carbon dioxide equivalent (carbon dioxide equivalent simply accounts for all greenhouse gases trapped in plants and soils, rather than only carbon). In addition, since the 2013 flood, the county has been working on extensive riparian area restoration projects. In the 152.6 acres the county has restored, it's estimated that over a 50-year span, approximately 1,000 metric tons

of carbon dioxide equivalent will be sequestered per year in the soil and plants. That's the equivalent of around 209 cars being taken off the road for one year!

Along with its wild spaces, BCPOS also preserves agricultural lands, where experimental farm plots are used to study which carbon sequestration practices

work best for our area and how we can make it easier for farmers to adopt those practices. These plots are using a variety of carbon-sequestering practices, including applying compost, reducing tillage, and planting cover crops. Each of these strategies seeks to add carbon to the soil and disturb the soil as little as possible so that soil organisms will have an easier time sequestering more carbon. Farmers who submit a bid to lease an open space agricultural property also have an incentive to use these practices because the department takes sustainability practices into consideration when selecting a lessee.

## HOW YOU CAN HELP

If you want to be part of the process of sequestering carbon, you can plant native and/or drought-tolerant plant species. Since much of Boulder County's residential areas were originally prairies, consider planting native grasses with extensive root systems, which sequester more carbon than more shallow-rooted turf grass. In addition, reducing the amount of land covered in turf grass, applying less synthetic fertilizer, and using more compost will help reduce greenhouse gas emissions on your own property. If you don't have your own property, consider encouraging your city, housing complex, or HOA to adopt some of these practices.

While carbon sequestration can't solve all our climate woes, it's one powerful tool to mitigate climate change.

Carbon sequestration is the process of removing carbon dioxide, the primary greenhouse gas, from the atmosphere and locking it up so that it can't affect the climate.



DeLonde Barn at Caribou Ranch Open Space



# Protecting the Eagles of Boulder County

by Patrick Morgan



Bald eagle  
with fledgling;  
golden eagle

Boulder County is home to a diverse array of natural resources. An example of these resources are two species of eagles that call this area their home. The golden eagle and bald eagle have enjoyed relative success nesting on Boulder County open space lands. Some of these birds, however, are not too fond of close human contact, especially around their nests. To help mitigate disturbances, Boulder County enacts seasonal nesting closures to ensure that these majestic creatures have a home for years to come.

The origins of protections for these birds dates to the early 20th century. As not only eagles, but bird populations began to decline, conservationists helped pass the Migratory Bird Treaty Act of 1918, along with the Bald and Golden Eagle Protection Act (passed in 1940) which prohibit activities that harm migratory birds and eagles, such as hunting or disturbing nests. In accordance with these statutes, Boulder County enacts seasonal nest closures and buffer zones to protect critical nesting habitat and the continued success of these raptors and their nests.

## PROTECTING THE EAGLES

The golden eagle deserves special attention due to its habitat requirements and relationship with humans. Wildlife biologist Michelle Durant, along with seasonal staff and volunteers, monitors these birds to understand what they need. Golden eagles require a large amount of open space, such as grasslands, and a sustainable food source, which in Boulder County is primarily prairie dogs. Durant says golden eagles do not tolerate human presence and will often fly away from their nests if too many people are frequenting the area. This can have disastrous effects for their offspring, potentially causing the chicks to die from exposure. To meet their needs,

Boulder County observes a half-mile buffer zone between the nest sites and areas of human activity during their nesting period, which is Dec. 15 to July 15. The buffer zone and closure provide the eagles with time and space to conduct courtship rituals, build a nest, and provide for their offspring free from human disturbance.

Bald eagles have a different set of habitat requirements, but also need freedom from human disturbance. Bald eagles prefer nesting near open water where they can feed their offspring with a steady supply of fish, though Durant points out that bald eagles in Boulder County also take a significant amount of prairie dogs. The presence of this prey at Carolyn Holmberg Preserve has aided in the success of a bald eagle nest on the property. However, this nest site has its challenges being located only 100 meters off the trails, well within Colorado Parks and Wildlife's recommended buffer zone of a half-mile. To accommodate the eagles and still provide opportunities for human recreation, one of the trails is closed from Oct. 15 to July 31 when eagles are undergoing courtship rituals, building nests, and raising their young. The department has "no stopping" zones along the open section of trail and provides a viewing area for park visitors. Limiting human interaction as much as possible is essential to the continued success of the nest for future generations.

Eagles are some of the most iconic animals to be found in Boulder County. Their role as top predators and the enjoyment they provide to visitors make them an invaluable resource. Yet, they will not succeed in years to come without our cooperation and respect. Boulder County's wildlife biologists are continuing their efforts to understand them and adapt to their needs. The eagles need the public's help as well, and respecting the nesting closures is just one way we can help ensure their presence in Boulder County.

## Calendar of Events

### MONTANE WINTER HIKE

Saturday, Dec. 11, 1-3 p.m.

Near Nederland. Space is limited. Location provided when registering.

Volunteer naturalists will lead this hike to explore the winter strategies employed by wildlife that live year-round in montane ecosystems. Ski or hiking poles recommended in case trails are icy.

Register at [www.BoulderCountyOpenSpace.org/register](http://www.BoulderCountyOpenSpace.org/register)

### VIRTUAL LEARNING: MINING HISTORY OF BOULDER COUNTY

Thursday, Dec. 14, 6:30-7:30 p.m. on Zoom

Learn what geologic features made this area rich in minerals and which ones were mined here. Register at [www.BoulderCountyOpenSpace.org/register](http://www.BoulderCountyOpenSpace.org/register) by Dec. 12 to get the Zoom link.

### NATURE DETECTIVES: VOLES DIG IN

Saturday, Jan. 15, 1:30-2:30 p.m.

Near Boulder. Location provided when registering.

Discover the secret world where voles and other critters hide beneath the snowpack in this interactive program and enjoy getting outside in the winter. For ages 5-10 with an accompanying adult. Registration required at [www.BoulderCountyOpenSpace.org/register](http://www.BoulderCountyOpenSpace.org/register)

great  
for kids!

### VIRTUAL LEARNING: PIKE'S PEAK GOLD RUSH

Tuesday, Jan. 25, 6:30-8 p.m.

Gold was discovered in 1858 near what would become downtown Denver. At that time, American Indians lived in what would become Colorado. Let's explore this fascinating story. Register at [www.BoulderCountyOpenSpace.org/register](http://www.BoulderCountyOpenSpace.org/register) by Jan. 23 so you get the Zoom link.

### THE WONDER OF WINTER SLIDESHOW PROGRAM

Saturday, Jan. 29, 2-3:30 p.m.

Louisville Public Library, 951 Spruce Street, Louisville. Space is limited.

Learn about the many wonders of winter and how plants and animals adapt to snow and cold. Register at <https://www.eventbrite.com/e/wonder-of-wildlife-slide-program-tickets-201021720377>

## Winter Heritage Day

Sunday, January 30, 1-3 p.m. Walker Ranch Homestead, 7701 Flagstaff Rd., approx. 7 miles west of Boulder on Flagstaff Road

Learn about typical winter chores and indoor games when you explore the Walker Ranch Homestead. You'll see a working demonstration in the blacksmith shop and smell food being prepared on the woodburning stove. Be prepared for cold, windy weather and to walk in snow.

Please note: Dogs are not permitted at the site. Contact Sheryl Kippen at [skippen@bouldercounty.org](mailto:skippen@bouldercounty.org) or 303-776-8848 for more information.

### PRAIRIE WINTER HIKE

Sunday, Feb. 13, 1-3 p.m.

Near Lafayette. Space is limited. Location provided when registering.

Volunteer naturalists will lead this easy walk to explore winter strategies employed by wildlife that migrate through or live year-round in prairie ecosystems. Register at [www.BoulderCountyOpenSpace.org/register](http://www.BoulderCountyOpenSpace.org/register)

### THE MORE YOU 'SNOW'—KIDS HIKE

Saturday, Feb. 19, 1-3 p.m.

Near Longmont. Location provided when registering.

Snow is cold and wet and crucial to the people, animals and plants on the Front Range. Join us as we learn about snow and all of its properties and benefits. For ages 6-10 with an accompanying adult.

Register at [www.BoulderCountyOpenSpace.org/register](http://www.BoulderCountyOpenSpace.org/register)

great  
for kids!

### SIGNS OF LIFE—WILDLIFE IN WINTER HIKE

Saturday, Feb. 26, 1-3 p.m.

Near Boulder. Space is limited. Location provided when registering.

Join volunteer naturalists for a hike to look for signs of wildlife activity, including tracks, scat, feathers, fur, and browse marks on trees. We will also learn about the many ways that wildlife survives winter. Ski or hiking poles recommended in case trails are icy.

Register at [www.BoulderCountyOpenSpace.org/register](http://www.BoulderCountyOpenSpace.org/register)

## Birds of Prey Programs

### BIRDS OF PREY SLIDE SHOWS

Wednesday, Dec. 15, 6-7:00 p.m.

Parks & Open Space Building, 5201 St. Vrain Road, Longmont

Wednesday, Jan. 19, 6-7 p.m.

Lafayette Public Library, 775 West Baseline Rd., Lafayette

Learn to recognize birds of prey in the winter skies by identifying common field marks. You will also learn about the habitat requirements, behavior, and ecology of these magnificent birds.

### BIRDS OF PREY DRIVING TOURS

Saturday, Dec. 18, 9 a.m.-noon

Saturday, Jan. 22, 9 a.m.-noon

Saturday, Feb. 12, 9 a.m.-noon

Near Longmont. Location provided when registering.

Join us for a driving tour to view birds of prey. Follow the tour map to stations where a volunteer naturalist can help you search the skies for raptors, learn about their habitat, and work on your observation and identification skills.

For ages 10 and older with an accompanying adult. Register at [www.BoulderCountyOpenSpace.org/register](http://www.BoulderCountyOpenSpace.org/register)

**ALL PROGRAMS:** Be prepared for cold temperatures. Bring water and dress in layers.

For information about these programs or to arrange a private program, please call 303-678-6214. NO PETS, PLEASE!



## Hikes for Seniors

Join volunteer naturalists for an easy hike to explore what Boulder County Parks & Open Space properties have to offer. Learn about the history, geology, and flora and fauna of these incredible spaces.

Please call in advance if you plan to bring a group so we can provide enough naturalists to lead the hike. For more information call 303-678-6214.

Registration required at [www.bouldercountyopenspace.org/register](http://www.bouldercountyopenspace.org/register).

### Winter Solstice Hike

Tuesday, Dec. 21, 10 a.m.-noon

Near Boulder. Location provided when registering.

### Foothills Geology Hike

Wednesday, Jan. 26, 10 a.m.-noon

Near Lyons. Location provided when registering.

### Wildlife Signs Hike

Thursday, Feb. 24, 10 a.m.-noon

Near Longmont. Location provided when registering.



## VOLUNTEER RANGER CORPS NOW RECRUITING

Members of the Volunteer Ranger Corps hike, bike, or ride a horse at Boulder County's most scenic open spaces while providing park visitors with information about cultural and natural history, recreational opportunities, facilities, and regulations. With additional training and approval, volunteers can hike the trails with their dog to help share information with other dog owners on the trail.

Volunteers must be at least 18 or older. Volunteer training will be two days on the weekend and take place in April. **The application deadline is March 4, 2021.**

For more information and an application, go to [www.boco.org/volunteer](http://www.boco.org/volunteer).



Members of the volunteer ranger corps.

## HISTORY ANYTIME AND ALMOST ANYWHERE

The pandemic provided an opportunity for us to participate in new ways of sharing history. The Cultural History Corner video series features tidbits about local history.

### 36 Videos -Many Topics

Our YouTube playlist features 36 videos. Viewers can learn about several topics, including the buildings and museums of Parks & Open Space, tractors, and seed sorters. Some videos feature living history demonstrations.

You'll also find videos that teach you how to make an old-fashioned calling card and how a windmill works!

Explore these videos at [boco.org/chc](http://boco.org/chc).



Photos from the carding wool and log house tour videos.

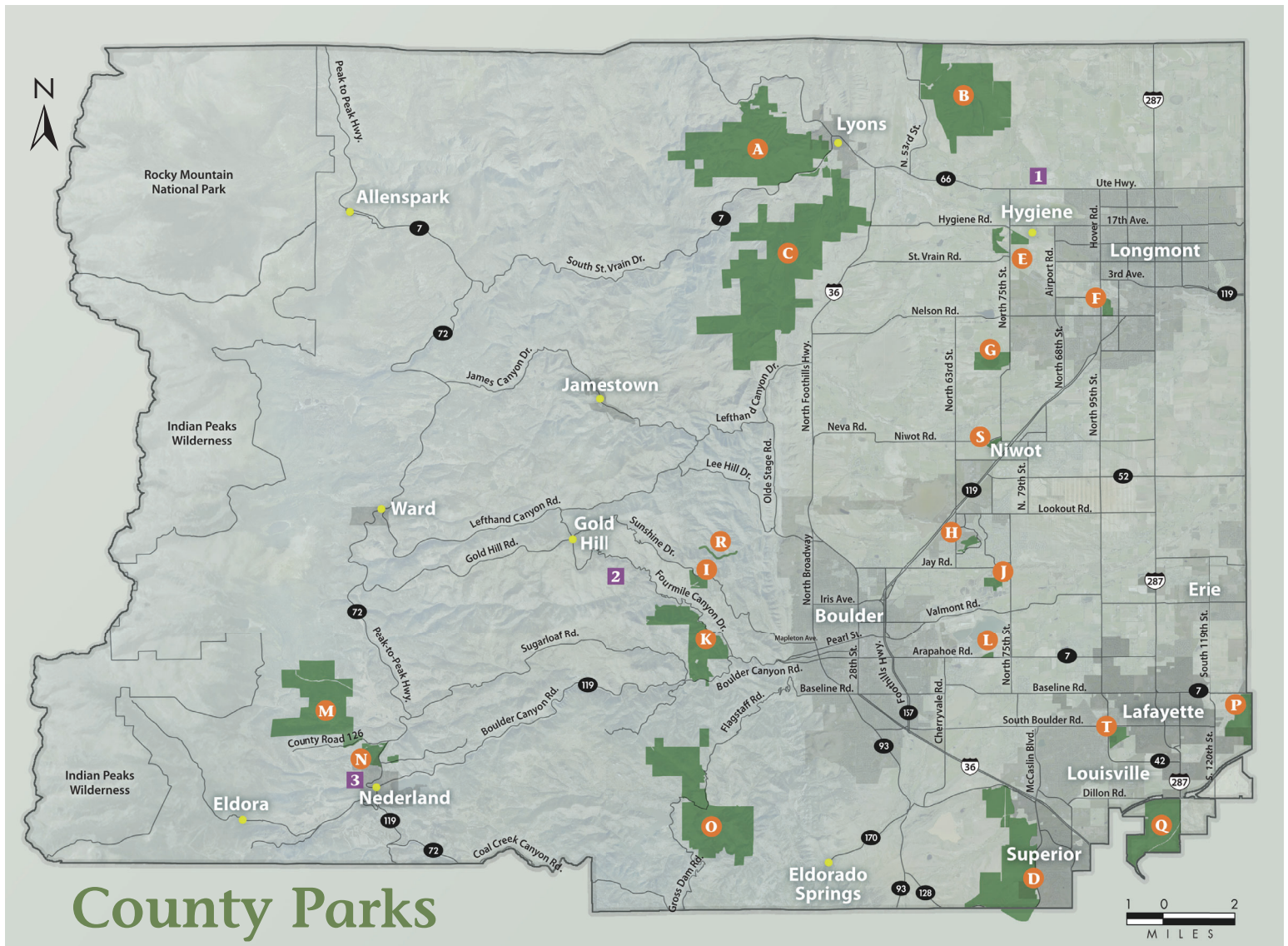




## Parks & Open Space

5201 St. Vrain Road, Longmont, CO 80503

[www.BoulderCountyOpenSpace.org](http://www.BoulderCountyOpenSpace.org)



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|---|--|--|--|
| <b>A</b> Hall Ranch   | <b>F</b> Boulder County Fairgrounds    | <b>L</b> Legion Park                                     | <b>R</b> Anne U. White                       |
| <b>B</b> Ron Stewart Preserve at Rabbit Mountain                      | <b>G</b> Lagerman Reservoir            | <b>M</b> Caribou Ranch                                   | <b>S</b> Dodd Lake                           |
| <b>C</b> Heil Valley Ranch<br>(Portions closed due to fire recovery.) | <b>H</b> Twin Lakes                    | <b>N</b> Mud Lake  | <b>T</b> Harney Lastoka                      |
| <b>D</b> Coalton Trailhead  | <b>I</b> Bald Mountain Scenic Area     | <b>O</b> Walker Ranch                                    | <b>1</b> Agricultural Heritage Center        |
| <b>E</b> Pella Crossing   | <b>J</b> Walden Ponds Wildlife Habitat | <b>P</b> Flagg Park                                      | <b>2</b> James F. Bailey Assay Office Museum |
|   | <b>K</b> Betasso Preserve              | <b>Q</b> Carolyn Holmberg Preserve<br>at Rock Creek Farm | <b>3</b> Nederland Mining Museum             |