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The mission of the Boulder County Parks and Open Space Department is to

conserve natural, cultural and agricultural resources and provide public uses that reflect sound resource management and community values.

COVER PHOTO: Hall Ranch in winter.
Photo by Lucas Ainsworth.

PHOTOGRAPHS & ILLUSTRATIONS

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Walker Ranch Pascale Fried

NATURE DETECTIVES

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Progress Report on Five-Year Performance Measures

by Tina Nielsen

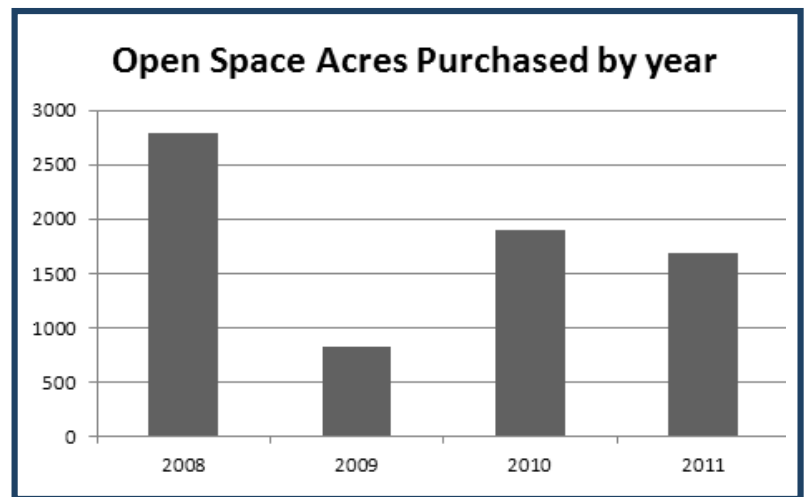
Boulder County's mission is, "As trusted stewards of Boulder County's future, we provide the best in public service." A lofty and worthy mission indeed, but how do we know if we're hitting the mark? The Parks and Open Space Department has its own mission statement and goals that we use to guide our planning and management activities. In order to ensure we are providing the "best in public service," the department developed a strategic set of performance measures targeted to a five-year period from 2008 through 2012 to help direct us and measure progress toward those goals. We're about to head into the final year of this five-year plan – so, how are we doing? Here are some highlights of the 475 performance measures and our accomplishments.

Boulder County Parks and Open Space Mission: To conserve natural, cultural and agricultural resources and provide public uses that reflect sound resource management and community values.

Goal One: To preserve rural lands and buffers.

Performance measure: preserve an additional 5,000 acres.

Performance results: We exceeded our goal, purchasing over 7,000 acres since 2008. Some notable examples: AHI, Loukonen Dairy, Hall Ranch II and the Tree Farm.



Goal Two: To preserve and restore natural resources for the benefit of the environment and the public.

Performance measure: Baseline inventory of all native vegetation.

Performance results: Substantially completed our goal using the gathered information to guide management decisions and work plans.

2008: Completed Natural Heritage Program's countywide survey for imperiled species and communities, focusing on targeted, high value areas.

2008: Completed vegetation mapping of 3,964 acres at Walker Ranch, Betasso Preserve and Suitts properties.

2009: Completed vegetation mapping of 3,785 acres at Heil Valley Ranch, Betasso, Walker Ranch, AHI, Lagerman, Imel, Bishop, J Family, Haystack Dairy, Hygiene Dairy and Walden Ponds Wildlife Habitat.

2010: Completed baseline inventory of 448 acres at the Two Creeks properties and 1,900 acres on the Platt Rogers Memorial Park and Reynolds Ranch and associated properties. Completed baseline assessment on 222 acres at Sugarloaf Mountain.

2011: Completed vegetation mapping of 284 acres at the Steamboat property, 150 acres at the Forsberg/Wyn property, 577 acres at the new Hall properties, 291 acres at Kenosha, 272 acres at Parish II, and 73 acres at Loukenen II.

2012 Planned: Map Bald Mountain Scenic Area, Caribou Ranch, Prescott, Mud Lake, and Sugarloaf Mountain.

Goal Three: To provide public outreach, partnerships and volunteer opportunities to increase awareness and appreciation of Boulder County's open space.

Performance measure: Develop a partnership program with businesses and organizations that fosters increased stewardship of our natural and cultural heritage.

Performance result: We have established a successful and thriving partnership program.

2008: Hired program coordinator.

2009: Established work plan and priorities; recruitment started.

2010: 27 partners completed projects with over 3,000 volunteer hours contributed.

2011: 33 partners completed projects.

2012 Planned: Continue to build capacity by increasing number of staff and volunteers trained as crew leaders to 30 people.

Goal Four: To protect, restore and interpret cultural resources for the education and enjoyment of current and future generations.

Performance measure: Restore and open facilities related to metal mining and agricultural history.

Performance results: On track to complete goal; watch for the virtual mining tour next year!

2008: Renovated Blue Jay flourospar mine near Jamestown.

2009: Renovated Walker Ranch house for interpretive use and residency for Walker Ranch ranger.

2010: Inventoried historic structures; determined maintenance and repair schedule.

2011: Completed engineering plans for structural repairs at the historical Tumbleson House at Hall Ranch.

2012 Planned: Cardinal Mill Phase IV, to complete restoration of Cardinal Mill; create a virtual hard rock mining tour.

Goal Five: To provide quality recreational experiences while protecting open space resources.

Performance measure: Add 17 miles of new trail, bringing our total to 115 trail miles.

Performance results: A bit short of goal; we will have built approximately 14 miles of new trails.

2008: Constructed the 5.2 mile Picture Rock Trail.

2009: Constructed 0.9 miles at the Ruth Roberts property.

2010: Constructed the 1.5 mile extension of the Mayhoffer/Singletree Trail.

2011: Constructed the 3.6 mile Benjamin Loop Trail at Betasso Preserve, 2 miles of the Niwot/Dry Creek Trail, and 3 miles of the new Longmont-to-Boulder (LOBO) Trail.

2012: Planned: 0.8 mile connection between Fourmile Road and Betasso Preserve, 0.5 mile trail from Lagerman Reservoir to 75th Street, and 0.5 mile trail in the Hesse area.

Goal Six: To promote and provide for sustainable agriculture in Boulder County for the natural, cultural and economic values it provides.

Performance goal: Convert 10% of cropland to organic production.

Performance results: Making progress but short of goal; organic production will occupy 6% of cropland in 2012.

2008: Changed lease criteria to give preference to organic producers.

2009: Awarded bid for organic market farm at James Construction property.

2010: Awarded bid for organic farm to Red Wagon Farm.

2011: Awarded five leases to organic operators for 539 acres of organic crop production (AHI, Darby, J Family, Bishop, Piazza).

2012 Planned: Continue to sponsor new farmer programs in cooperation with CSU Extension.

The Next Five Years

In 2012, the department will develop performance goals and measures for the next five year period, 2012 through 2017. Staff members will start the ball rolling with internal staff discussions, and we'll solicit input from our Parks and Open Space Advisory Committee (POSAC) stakeholder groups and the public. What are your ideas and desires? Stay tuned for more information or feel free to drop me a line at tnielsen@bouldercounty.org.

Research on Boulder County's Open Space Lands

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 2010 study conducted by Scott B. Franklin, Assistant Professor in the School of Biological Sciences at the University of Northern Colorado. His project focused on the Effects of Mechanical Thinning, Fire, and Mastication on the Spatial Structure of the Forest Floor.

Abstract: Mastication has become a common and cost-effective means for fuel reduction and restoration of open ponderosa pine forest, but mastication effects on the understory are still unknown. This study examined the spatial structure of fuels, soil and vegetation at Heil Valley Ranch in areas masticated and compared it to a control area and two other management techniques: thinning and fire (prescribed burn).

The objectives were to determine to what extent mastication alters forest floor fuels, soil structure, and vegetation composition and diversity. Further, the spatial structure of these understory components were examined to help understand the impacts of mastication and influences on understory heterogeneity. Data were collected from a stratified random placement of 1m² plots in each treatment type. Vegetation cover was collected from each plot. Soil cores were extracted within the top 20 cm of the soil surface from 15 plots in each site, and fuel data were collected from five locations within each site.

Results show an increased level of available fuels in the mastication site when compared to thinning, but not when compared to the fire site, especially class 3 and class 4 woody biomass. Mastication also had greater levels of duff present at the site (>600g m²) while not significantly changing the soil composition, which could be due to the lack of time needed for proper decay and return of the nutrients to the soil. The fire site on the other hand had much greater levels of K, Ca, Mg. The mastication site did have slightly more spatial heterogeneity than the fire site and the control site, but less than the thinning site; however, the diversity within the fire site was much greater than that within the mastication site. Overall cover was also lower in the mastication site when compared to fire (>100% - due to abundance of species and overlap in shade cover), but slightly more compared to the thinning and control sites (<50% total cover). The data do not suggest major differences on fuel loads, soil chemistry, or spatial heterogeneity among the thinning treatments, but do elucidate an increase in cover and richness; thus, mastication may be just as effective of a technique for maintaining ponderosa pine ecosystems. The data further suggest that fire should not be excluded from management consideration.

Discussion: While mastication is an efficient method to reduce fuels and restore ponderosa pine forest, its effects on understory communities is only partially understood. We compared

vegetation on a mastication site, thinning site, prescribed fire site, and control site to determine effects of mastication in relation to other management techniques. Our basic findings were that mastication sites had substantially more fuels, especially Class 3 and duff, noticeably different composition and slightly greater diversity, but were otherwise similar to thinning and control sites. In addition, mastication sites were not different from thinning and control sites in regard to soil temperature or soil moisture.

Our first hypothesis, that mastication would increase fuels and soil organic matter more than thinning or fire, is only partly supported. The mastication site and the fire site both had high levels of dead and down woody fuels, with the fire site having slightly more total fuels than the mastication site. Fuel loads from this study were substantially higher for thinning and fire treatments than other studies have shown, but comparable for the mastication treatment to studies in the east (approximately 160 Mg/ha; Glitzenstein et al. 2006) and the west (20-60 Mg/ha; Vaillant et al. (Final Report). Control site fuel loads were greater by a magnitude of ten from those reported by Robertson and Hall (1999), but we don't have an explanation for the difference. It is possible that the density of the control site was greater in our study.

Glitzenstein et al. (2006) and Busse et al. (2009) found similar results in that mastication significantly increased woody biomass in the understory, but the amounts vary with location and class sizes. Both previous studies, however, found that fire actually decreased the relative amounts of woody biomass in the understory, especially in regards to rotten fuels. The differences could be that the trees at Heil Valley Ranch were not entirely burned in the fire and thus remained in the environment (became dead and down), whereas the smaller size classes that were present in the understory prior to the burn, as in previous studies, were reduced with the fire. Both the thinning and control sites had much lower fuel loads, especially for class 3 and class 4 fuels, which were mostly removed during the thinning and cleaning stage of the thinning site. Wolk and Rocco (2008) also found much lower fuels and duff in thinning and control sites compared to mastication treatments.

Soil organic matter was greater in all three treatment sites (thinning, mastication, and fire) compared to the control but not different among treatments. However, the duff layer was much greater on mastication sites and that may lead to increased soil organic matter after a year or two of decomposition. Soil nutrients showed no negative impact of mastication and were essentially the same as control and thinning sites. Contrarily, Miesel et al. (2009) found that thinning treatments impacted soil nutrients - increased soil N and pH - differently and suggested such changes would affect forest growth rates. Fire, acting as a fast decomposer, resulted in substantially higher available nutrient concentrations as has been shown by numerous other studies (Kutiel and Naveh 1987), although fire can also reduce volatile nutrients (Covington and Sackett 1984). Supporting our thin-

ning site and mastication site data but contrary to our fire site data, Kaye et al. (1999) found no differences in the effects of ponderosa pine restoration strategies on soil nutrient losses.

Our second hypothesis, that mastication would increase vegetation cover and diversity compared to the control site but less than the other treatment types was also only partly supported. Total cover was approximately twice as high in the mastication site as the control site, but only about a third of cover in the fire site. Studies have confounding results regarding the increase or decrease of cover following thinning and fire (Busse et al. 2000). Increases in cover were related to increases in diversity as well. The data clearly showed differences in understory community composition, as was also found by Wolk and Rocca (2008) who compared thinning and thinning & chipping treatments along the Front Range of Colorado. Indeed, Wolk and Rocca (2008) also had *Phacelia* as an indicator of mastication treatment sites. Also as with Wolk and Rocca (2008), much of the diversity in treatment sites was due to exotic species. However, it appeared that the cover of exotics and natives was similarly higher in the mastication and thinning treatments compared to the control; in other words, the disturbance did not give a greater advantage to exotics as has been found in some studies (Dodson et al. 2007). In fact, the fire site had much greater cover of native species than exotic species compared to control sites, suggesting fire gives an advantage to natives.

Richness was greatest in the fire site, followed by mastication, then thinning, and finally control. Shannon and Simpson diversity indices followed the same trend, but evenness was similar among the control, mastication, and thinning sites; the fire site had greater evenness. Therefore, mastication did impact vegetation cover and diversity, but was certainly more similar to the thinning and control sites than the fire site. This is consistent with Abella et al. (2004) in that increasing intensity of disturbance (fire in our case) increased overall understory diversity, especially native diversity, while lower levels of disturbance (mastication and thinning in our case) had limited impacts on vegetation diversity with respect to undisturbed sites. Abella et al. (2004) also found an increase in exotic species diversity in medium intensity disturbances, which was similar to our results in that the mastication site had a significantly higher amount of *Verbascum thapsus* L. (an exotic disturbance-loving species) than any of the other three sites. One reason for higher levels of vegetation cover within the fire site could be due to the lower levels of duff found within the site. Fire removed most of the duff layer and that removal promoted more favorable conditions for germination and growth. The seed bank and colonizers were able to flourish, especially with greater available soil nutrient pools. Lack of disturbance generally leads to ponderosa pine understory herbaceous communities being replaced by needles (Wienk et al. 2004).

Our third hypothesis was that mastication would decrease understory heterogeneity compared to all other treatments. This hypothesis was not supported, as all diversity metrics and the vegetation composition had strong spatial structure and small patch sizes (<3.5 m). The evidence suggests even

smaller spatial structure in the understory of thinning treatments (in fact, smaller than our study design could examine), suggesting neither thinning treatment had a negative effect on small-scale heterogeneity. Indeed, fire has been found previously to increase small-scale spatial structure (Franklin et al. 1993, Bonnet et al. 2005). Because spatial heterogeneity is tied to several ecological theories, including succession, maintenance of 15 species diversity, competition, and multi-trophic interactions (Takeshita et al. 2009), it is important to understand the effects of management on spatial structure (North et al. 2007).

Overall, it appears that mastication increases fuel loads and vegetation cover, as well as spatial heterogeneity, and results in higher diversity than unmanaged sites. While duff and Class 3 fuels were higher in mastication sites, neither appeared to have a negative impact on abiotic conditions or biota. Based on the data presented above, there seems no reason not to include mastication in stewardship decisions regarding ponderosa pine ecosystems. That being said, fire may be an additional component to increase native species and overall diversity on sites that have been thinned.

If you want to read the full report, or other funded research, visit the department's website at www.bouldercounty.org/live/environment/land/pages/posresearch.aspx

Call for 2012 Studies

The department is currently accepting proposals for 2012 funding. Two categories will be awarded—grants up to \$5,000 and grants up to \$10,000. The deadline for proposals is noon on Thursday, January 26, 2012.

Department staff have identified priority needs for research including these topics:

1. Spatial reconstruction and fire return intervals at Hall Ranch and Heil Valley Ranch open space properties.
2. Post-Fourmile Canyon Fire rehabilitation effectiveness.
3. Assess northern leopard frog habitat use, including terrestrial dispersal and foraging habitat.
4. Preferences of older adults for recreational amenities on open space lands.
5. Quantify carbon sequestration under land management practices including agriculture, restored grasslands, and forests on Boulder County Parks and Open Space lands.

Other research proposals will be accepted. For a full listing of research topics and proposal guidelines, visit the department's website at www.bouldercounty.org/live/environment/land/pages/posresearch.aspx.

Night Skies

by Geoff Goss

The heavens are your city; constellations your neighborhoods; stars your favorite art galleries; nebulae the most beloved, colorful, inspiring paintings.

The sun, in all its radiant glory, provides us with warmth, growth, the seasons, and life as we know it. It ties us to this earth. Animals migrate hundreds of thousands of miles in a lifetime to bask in its rays. Everything we are literally revolves around it. But its brightness is often blinding. As we rush to accomplish as much as we can before the sun sinks in the west, cheery blue skies shield us from one inescapable truth: we are but one. One planet in trillions throughout the universe. One tiny, twinkling mass in the vast expanse of space. On winter nights, while our solar life-support is farthest away, we are humbled.

On cold, dark Colorado nights, the best celestial viewing is possible. Generally, humidity is lower in winter than in summer, permitting greater atmospheric clarity. The atmosphere is also thinner at higher elevations, allowing superior views. But anywhere with low light pollution and clear skies will give a stellar reward.

To reap the rewards of the night sky, one must not be intimidated by its immensity. When becoming familiar with a new city, one first learns general neighborhoods, then streets and buildings. Before long, favorite places emerge on your mental map. What was once foreign and vacant is now an old friend. The same can be said for the night sky. The heavens are your city; constellations your neighborhoods; stars your favorite art galleries; nebulae the most beloved, colorful, inspiring paintings.

Finding Orion

Some of the most easily-viewed celestial bodies are among the most inspiring. The constellation Orion is one of the most well-known, as it is visible from every inhabited part of Earth. This may explain why so many ancient cultures tell stories about it. Although they all vary, the Greek myth is most famous in western culture, where Orion is known as the hunter. He wields a raised club in his right hand and the pelt of a slain lion in his left. With his two hunting dogs, the nearby constellations Canis Major and Canis Minor, Orion faces the charge of Taurus the bull.

Best found in the northern hemisphere's winter months, this perpetual standoff can be seen about halfway up the sky, facing south. First, look for a skewed rectangle with the red-tinted star Betelgeuse in one corner and the blue-tinted Rigel

in the other. This forms Orion's body. In the center of his body, three stars in a row form his belt. Following the line of those three stars down and to the left, the brightest star in the sky, Sirius, is seen. Also known as the Dog Star, Sirius is the nose of Orion's hunting dog Canis Major. Just below Orion's belt, a smaller line forms Orion's sword. To the naked eye, the sword appears to be made of small stars. With even a small telescope, however, more is revealed.

The middle "star" in Orion's sword is in fact a nebula, a cloud of gas and dust in which new stars form. The Orion Nebula is well worth finding, with its luminous wisps of gas surrounding the brilliant Trapezium at its core. When you find the multi-star Trapezium, remember that Italian astronomer Galileo Galilei discovered those same stars in the winter of 1617.

The Lights are On

One beautiful phenomenon caused by our closest star is the aurora borealis, or the northern lights. The name aurora borealis comes from the Roman goddess of dawn, Aurora, and the Greek name for the north wind, Boreas. The serpentine movement of colors in the northern sky is caused by particles charged from solar winds colliding with atoms in the high atmosphere. If red or blue, the particles are reacting predominantly with oxygen atoms. If green, the solar winds are reacting with nitrogen. Although more often seen farther north, the aurora borealis occasionally sweeps its great curtain across Colorado skies.

Many places throughout Colorado promise great views of the night sky. The mountains of Boulder County near Ward, Jamestown, and Nederland are far enough away from the lights of Boulder and Denver for some spectacular stargazing. But the skies above the plains near Longmont can be just as awe-inspiring.

Awe is knowing that millions before us have looked up and become intimately familiar with the map of the sky. Seas were crossed relying on stars. Constellations played starring roles in the tales of ancestral origin. It is all still above us. After the sun relinquishes its hold, the cosmos wait patiently for us to find ourselves.

Boulder County Businesses and Organizations Love and Care for Parks and Open Space Land

by Karen Imbierowicz

The Boulder County Parks and Open Space Department's Partnership Program is in its third year and going strong with 27 Alpine and Foothills partners!

The following organizations and businesses celebrate their third year or more helping us care for our county open space and trails: Amgen, Backpacker Magazine, Boulder Area Trails Coalition, Boulder County Horse Association, Boulder Mountainbike Alliance, Boulder Trail Runners, Boy Scouts, CU MBA Program, Eldorado K-8 School, Geocachers, Global Leadership Academy, Heritage Middle School, Level 3, New Vista High School, Niwot Community Association, Platts, Redstone Cyclery, Roche Colorado, Smartwool, Stratus Consulting, and Wildland Restoration Volunteers.

Best Buy and Singletrack Mountain Bike Adventures are finishing up their second year of being a partner and we welcome the Boulder Climbing Community, Merck Pharmaceutical and White Wave Foods into our partner family.

These groups make the effort to recruit 10 or more hard-working individuals to come out and give four to five hours of needed attention to our public land. Perhaps surprisingly, our trails and open space need a lot of attention to thrive and our partners appreciate getting out of their offices and classrooms to enjoy a fresh air experience.

Beyond the Call of Duty

This year, the department's volunteer work project coordinators identified a new type of group project: ditch cleaning. If you are skeptical about the worth and appeal of such a volunteer project, you are not alone. When I first heard that our coordinators were planning to bring our valued partners out to clean ditches, I was dubious.

Why ditches? Because of the extremely dry spring in Boulder County there was a high fire danger. The farmers who lease our agricultural land were not able to burn the weeds and debris in the ditches on their property and if the ditches are not cleaned out, water flow problems arise including flooding and critter infestation. The solution was to ask for help.

Our partner Amgen, a Longmont pharmaceutical manufacturer, was one of the first groups to participate in a ditch cleaning project. Ten Amgen employees pulled on their water proof boots and met our volunteer work project coordinator, Craig Sommers, at one of our local leased farms. Armed with rakes, loppers and shovels, the group arrived at

the property to discover not all was as expected. The first volunteers stepped into the ditch and found that it was filled with foul muck. While the volunteers were ready for some dirty, hard work, Sommers felt asking volunteers to stand in muck-filled ditches was going above and beyond what we expect of volunteers. He offered each Amgen volunteer the opportunity to move to a different, dryer part of the ditch. According to Sommers, every volunteer insisted on staying and getting the work done for the local farmer and did so throughout the day.

As other local farmers drove past this group of white collared people working in the ditch, they stopped and scratched their heads, wondering what on earth was going on. Rob Alexander, the department's Senior Agricultural Resource Specialist, happened upon the scene and offered his thanks to the Amgen employees on behalf of the department, the farmer and the workers.

Volunteer Hours Add Up

At the time of this writing, our Trail Stewardship teams have contributed almost 600 hours of volunteer work. Their accomplishments include maintaining and restoring almost 5,000 feet of existing trail as well as constructing new trail.

Thus far, Property Stewardship teams have performed 340 hours of work this year. Their work has involved clearing 800 feet of ditches, planting 800 perennials and trees, collecting trash, weeding an acre of land, closing 900 feet of social trail and maintaining 200 feet of trail.

Our Foothills partners who are committed to at least one annual project have cleaned 700 feet of ditches, removed 2,000 feet of fence, planted over 100 trees, built 20 slash piles and collected over seven tons of trash! All of this was accomplished in a little over 700 hours.

Finally, a big congratulations to Smartwool for being recognized at our Land Conservation awards as our Partner of the Year! We are extremely grateful to all of our esteemed partners for the example they set in being devoted stewards of the land.

Our partners' willingness to go out and get their hands dirty and engage in manual labor demonstrates their devotion to our public lands and shows our farmers who lease our agricultural properties, our park employees and everyone who cares so deeply for this land that they are appreciated and supported!



Team Amgen at their volunteer project.

Let it Snow, Let it Snow, Let it Snow

by Diane Schwemm

"How full of the creative genius is the air in which these are generated! I should hardly admire more if real stars fell and lodged on my coat." Henry David Thoreau, 1856

When it comes to snow, there often seems to be too much or too little. One thing is certain: snow matters in Colorado. Mountain snowpack is critical to our water supply and tourism industry; it shapes our landscapes and lifestyles. But before we strap on our snowshoes and head out to the trails, let's pause for a moment, like Robert Frost's solitary rider in the winter woods, and take a closer look at snow.

What is Snow?

Snow forms in the middle and upper atmosphere, when temperatures are at or below freezing. Water vapor condenses and freezes around tiny particles (such as dust) to form individual ice crystals. The complex journey of the crystals on their way down to earth is the reason for their infinite variety. As the ice crystals bounce around inside clouds of super-cooled water droplets, the principle of equilibrium asserts itself, demanding that the droplets throw off molecules which then are "grabbed" by the crystals. Starting as simple hexagonal prisms, the crystals branch, then branch some more. The changes, to what are now officially snowflakes, continue as they move through layers of clouds. Different shapes form depending on temperature, humidity, and elevation: columns, plates, feathery dendrites, stars, needles. Flakes grow more slowly and have simpler shapes in dryer air while more moisture contributes to faster growth and bigger flakes like the one that probably landed on Thoreau's lapel.



From Champagne Powder to Pukak

Understanding snow's formation and behavior requires a scientific vocabulary, but as Thoreau proclaimed, there is poetry to the experience as well. A snow day can have many personalities, ranging from the whispery tranquility of fluffy snowflake "aggregates" (clumps) falling in calm weather to blizzards, with their winds of 35 mph or more, visibility below a quarter mile, and duration of at least three hours.

The word "snow" can mean many things. In northern cultures, communication evolved to express this multiplicity. Take the Kobuk Eskimos of northeastern Alaska, subjects of *The Secret Language of Snow* by Terry Tempest Williams and Ted Major.

A few Kobuk terms for snow include **annui**: falling snow; **api**: snow on the ground; **sioq**: swirling snow blown upwards like a smoke plume from the crests of mountains; **kimoagruk**: snow drift and **mapsuk**: overhanging drifts carved away at the base by wind.

In the first October snowstorm, we witnessed the damage that can be caused by "qali," snow accumulated on tree boughs.

Snow is More Than Meets the Eye

The monolithic whiteness of a snowfield masks the diversity of conditions underneath. Layer piles upon layer; snow melts and refreezes. When the lowest layer is warmer than those above, water vapor rises, creating "pukak" (another Kobuk term), a layer of loose, granular snow full of insulating air pockets. This type of snow is easier for small animals to tunnel in and for elk,

moose, and deer to paw through for forage. In fact, under blankets of insulating snow, an entire "sub-nivean" environment of flora and fauna flourishes. Come spring and summer, patterns of plant growth reveal where there was winter snow cover as opposed to more exposed ground. According to Ruth Carol Cushman and Stephen R. Jones, authors of *Boulder County Nature Almanac*, protected from extreme temperature fluctuations under snow in winter, some plants like kinnikinnick continue to carry out photosynthesis; seeds germinate and perennials bloom. In the mountains, deep snows built up on top of pukak

can lead to avalanches — another reason to study and understand the layering behavior of snow.

Lucky for Us Here in the Rockies...

...mountains make snow. When winds carrying ocean moisture meet the peaks and are forced upwards, the air cools rapidly and snow forms and drops. The Western Slope and Summit County typically see more than we do here on the Front Range, one reason Boulder's own Chautauqua Mesa ski area lasted only a few seasons back in the late 1940s and early 1950s. That being said, the heaviest 24-hour snowfall ever recorded was 76 inches at Silver Lake near Ward in April, 1921.

The biggest individual snowflake ever observed was in 1887 in Keogh, Montana. At 15-inches across, it was the size of a frisbee. If you're not getting enough snow here, you might consider a move to upstate New York with its legendary "lake effect" snows, or Tamarack, California, officially the snowiest place in the U.S. (it once received 884 inches of snow in a single season). But we'll see what La Nina brings us this year!

NATURE DETECTIVES

Winter 2011



Tails Talk

A tail twitching, wagging, slapping, rattling or flipping is tail “talk.” Any animal’s moving tail can say a lot to another animal -- if the other animal understands the same tail language.

House cats and mountain lions both twitch their tails when they are ready to pounce on prey. We humans aren’t quite sure what a twitching tail says. A straight-up cat tail seems to say, “I’m walking along happily.”

People certainly know what dogs are saying when they wag their tails back and forth in eager greeting. A dog’s tail tucked under its body says, “You are bigger, please don’t hurt me.” Dogs say much more with their tails, but only another dog can completely understand the whole conversation. Wild dogs such as wolves and coyotes have similar tail talk.

Watch Out!

Some tail talk is clearly meant to be a warning for others. The rattlesnake’s rapid buzz sends an unmistakable signal to back off...or else.

A beaver will slap her flat tail on the water to warn her family to dive deep because she has seen something scary. Maybe she saw a coyote or a bear.



White-tailed deer get their name from the color of the underside of their tails. They flip up their tails to show the white side when they are alarmed. The deer around them see this white “flag” as a sign to take off. It might also be a signal to the predator that says, “I see you -- so don’t bother trying a surprise attack.”

Body Language

People don’t have tails, but we certainly have body language. Nod yes and you have just given an example of body language. So is waving hello or good-bye. If humans had tails, think of the things we could say.

Tails as Tools for Balance and Steering

Just as your arm can do much more than wave, tails can help animals do lots of different things. One thing tails do is help animals balance. Do you notice how sometimes you throw your arms wide to catch your balance? Animals do the same thing, only they use their tails. Mountain lions, foxes and coyotes swing their tails to the side to counter-balance their bodies as they tear around a sharp turn. The swinging tail helps them steer without falling over as they change direction. Mice use their tails like a tightrope walker uses a balance pole.



Squirrels swing their tails around to help steer them to a landing spot as they jump from limb to limb. Eagles and other birds use their tail feathers to help them turn and brake. River otters and beavers use their tails to steer underwater.

More Tail Tools

Squirrels also use their tails almost like a parachute as they jump from high places. In the rain, a squirrel holds its tail overhead as an umbrella.

Similar to how we use our hands, opossums can hold on to things with their tails. Baby opossums hold onto their mother's fur with their tails as she carries them along on her back.

Beavers are propped up on their wide tails as they stand on their hind legs to chew through a tree trunk. Woodpeckers prop their tail feathers the same way to give them extra support as they cling to the side of a tree and hammer away with their beaks.



Hang on harvest mouse.

Squirrels, foxes and some other animals sleep with their fluffy tails curled up over their noses like a warm winter blanket. Mice can pump extra blood into their waving, furless tails to help cool off on hot days. Pocket gophers use their tails to feel their way as they scamper backwards inside their dark underground tunnels.

Tails as Weapons

The porcupine may be the best example of an animal with a tail that can hurt. Underneath the porky's long hairs are thousands of quills. Many a curious or hungry animal has gotten a face full of quills from the porky's quick, swinging tail action.

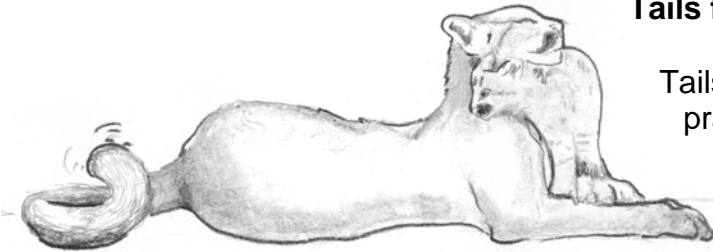
Tails for Defense

During the winter, weasels turn white for better hiding in snowy landscapes. The tips of their tails stay black. Wildlife biologists think the end is black to fool the weasels' predators. If a great-horned owl sees and grabs for the tail tip, the camouflaged weasel just may escape unharmed.

Lizards, especially skinks, are famous for having tails that simply break off when a predator attacks the tail. Even better, nerves in the broken-off tail piece keep it wiggling to get the attacker's attention long enough for the lizard to make its escape. In time, the lizard will grow a new tail.



Tails for Training Toys or Beauty Charms



Tails are even used for playtime hunting practice. Mountain lion kittens get a lesson on pouncing as they earnestly attack their mom's flicking tail.

Tails can be useful to show off to potential mates. Think of the tom turkeys that spread their beautiful tail feathers in hopes of attracting a hen turkey's attention.



The Reason for Tails

Tails come in all shapes and sizes. Some are furry and fluffy, others are scaly and flat, some are smooth and skinny, and there are many other styles, too. Animals use their tails in various ways, but all tails somehow aid survival for the animal species that have them. Otherwise, no critters would have tails.

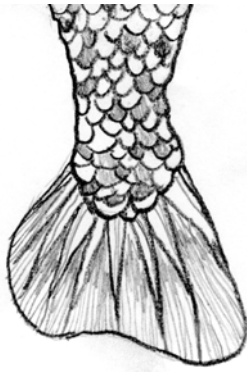
What About Short Tails or No Tails?

Some animals have really short tails. Think of bobcats. Some animals, such as pika, have no tails at all. Biologists know that different kinds of tails are quite useful for survival to a variety of animal species, but the bobcat and pika have survived well with a just a stubby tail or none. So here is something for you to ponder: what could be the benefit of NOT having a long tail for tail-less or short-tailed animals?



Little pika live high in the mountains. Why do you suppose pika have no tails?





Riddle Rhyme -- Who am I?

My tail is very helpful upon a summer day. It swishes and swooshes all around to keep the flies away. _____

My tail gives you warning. When you see me raise it tall, walk away really fast, before I spray you all. Pee-yew! _____

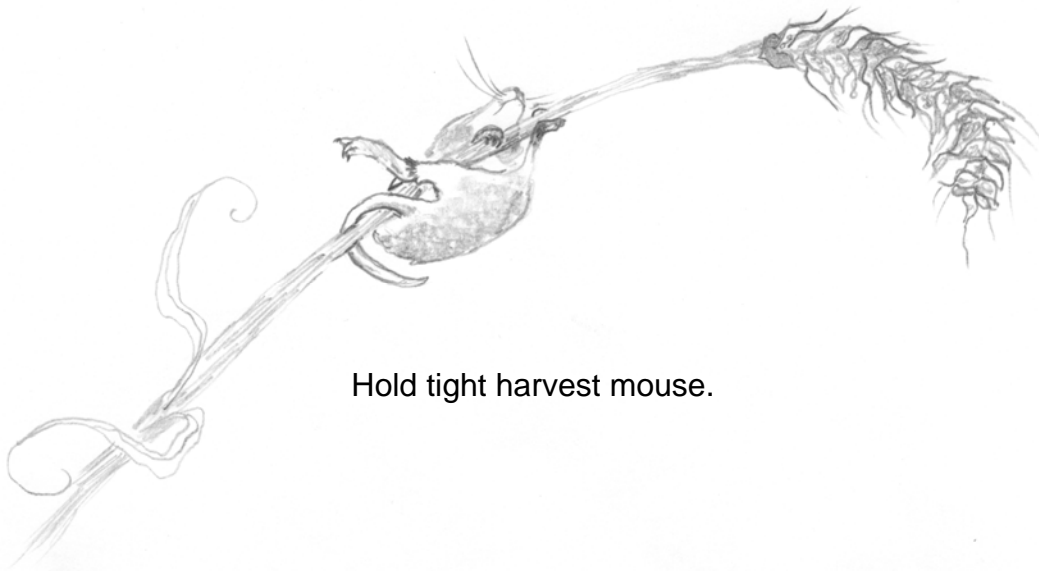
My tail feathers spread wide when a female I do spy. I hope she notices that I am a really good-looking guy. _____

My tail can rattle when I am full of fear. I'll strike, if you ignore my warning, and you will not like that, my dear. _____

Always under water, my tail waves from side to side. Whether rapidly or lazily, I can either zip away or slowly glide. _____

Tails on Trails

If you are hiking a trail or just out enjoying nature, whenever you chance to see wildlife, watch the tail. Most animals have them. See if you can tell how the tail benefits that animal. Was it using its tail to communicate or to move somehow? Was the tail being used as a weapon or as defense for the animal? Write your observations in a journal with the day's date if you like.



Hold tight harvest mouse.



Beaver tail

Answers to Riddle Rhyme:
(Other answers may also be correct.)

Horse or cow, skunk, turkey (male), rattlesnake, trout or other fish

There's Gold, Silver and Tungsten in Them Thar Hills

by Sharon Bokan

When most people drive or bike into the Boulder County foothills today, they are looking at the trees, scenery, wildflowers and wildlife. One hundred and fifty years ago, men went into the foothills looking for something far different—gold!

Today's visitors may not realize that early in Boulder County history, the area had a very active hard rock mining industry. The county is located at the top of a crescent containing precious metals that stretches from Boulder County through Central City and Black Hawk, Cripple Creek and Victor to the San Juans. Overall, Boulder County ranked 9th among all the gold producing counties in the state.

Streams of Gold

As with most gold rushes, the first Boulder County gold discovery was a placer find. Placer finds are gold or other precious metals or stones that have been eroded away from the vein. As the metals are eroded away they follow gravity or water downhill. The eroded material and gold end up in streams that may flow continually or be intermittent. Miners would work their way up a stream panning as they went. When the gold stopped, they would then start searching the hillside for the main gold containing vein. Miners would initially pan the streambed to recover the gold, as this was less expensive than hard rock mining. In order to process more material, miners would switch to sluice and rocker boxes. Streambeds were processed as long as they were producing and economical.

Experienced miners would search hillsides looking for specific minerals that they knew carried gold or whatever precious metal they were seeking. Once veins were located, exploration took place to determine how to best develop the hard rock mine. Many experienced hard rock miners who came to the United States were from the British Isles, mainly Cornwall and Ireland. The Cornish had significant hard rock mining experience.

Precious Metals

As with other mining districts in the state, gold may have been the big attraction, but silver often became the main dollar and ounce producer. Caribou is known more for its silver production than gold. Quite often, due to the geology of vein formation, silver and gold are found together but the silver was not always easily recognized in its ore form. Other metals produced in Boulder County besides silver and gold are lead, zinc, copper, tungsten and fluorspar, which is used in steel making flux.

Boulder County had several precious metals mining districts. They were Gold Hill–Sugarloaf, Jamestown, Magnolia, Ward and Grand Island–Caribou.

The first county placer find was in Four Mile Creek at what would be named Gold Run in January of 1859. The following summer, the vein was found and hard rock mining began. The Gold Hill area was the largest producing district followed by Sugarloaf. Initially miners mined the free gold,

but as it played out, they discovered a rich gold telluride ore in 1872 in Gold Hill. This ore kept the Gold Hill mines active until about 1904. The mines have been active off and on ever since. Most mines became active again pre World War II in the 1930s and 1940s. The towns kept active in this district were Rowena, Salina, Sunshine and Crisman. The Logan mine in Crisman had a vein discovered in the 1870s that produced gold pure enough that it was sent directly to the Denver mint.

The Magnolia area had a small amount of gold telluride ore that kept it active for about 30 years from 1875 to 1905.

The Ward District which consisted of Ward, Sunset and Copper Rock was active from 1861 when gold was discovered until the 1890s and then again from 1936 to 1942.

Jamestown produced gold until 1912 and then again in the 1930s and 1940s, closing down after World War II. Jamestown also produced gold pure enough to send directly to the Denver Mint.

If the first tunnel in a mine is vertical, it is known as a shaft; a horizontal tunnel into the mountain is an adit. Horizontal tunnels off the main shaft or adit are known as drifts.

The Grand Island–Caribou District started with a discovery in 1860 and most of the mines were closed by the late 1800s. In this district, the silver ore was not recognized until 1869. One fun fact about this district is that they banished the red light district forcing the shady ladies to nearby Cardinal.

Take time to explore more of Boulder County's fascinating hard rock mining history.



The Rake-off Mine near Gold Hill, circa 1900. Photo from the Carnegie Branch Library for Local History, Boulder Historical Society Collection

Artist in Residency Program Creates Connections Through Art

The Boulder County Parks and Open Space Department is accepting applications for the new Artist-in-Residency Program at Caribou Ranch Open Space!

The program provides an opportunity for artists to pursue their work in the inspiring landscape and history of Caribou Ranch.

Caribou Ranch offers a variety of landscapes to explore including streams, waterfalls, forests, and beautiful vistas. Moose, elk, black bears, beavers, bats and nearly 90 species of birds live within or pass through the area.

The Artist-in-Residency Program is open to musicians, painters, illustrators, photographers, visual/film artists, sculptors, performers, poets, writers, composers and crafts/artisans.

Artists should be in good health and comfortable in a backcountry setting with rustic accommodations. The residence is in the center of the property with no nearby neighbors. One additional adult may accompany an artist.

Selected artists stay in a recently restored historic barn for up to seven days from July through September (no stipend is provided). In return, artists are required to donate to Boulder County a piece of work representative of their stay at Caribou Ranch Open Space.

The application deadline is February 15, 2012. Additional information and the application form is available on the department's webpage at BoulderCountyOpenSpace.org or by calling 303-678-6201.



*Painting by Bill Daniels during his stay at Caribou Ranch Open Space.
(This painting is in color—changed to black and white for publication)*

Poster Contest

by Debra Rice



October was Wildfire Awareness Month. Activities throughout the month educated residents about wildfires and encouraged them to take action to protect their homes and their community.

In addition to public programs, Boulder County sponsored a poster contest for students to communicate their views of wildfire. Themes and topics included: Firefighters, Preparing for Wildfires, Wildfire Prevention, Healthy Forests, Safe Homes, and Wildfire Mitigation.

Here are a couple of the winning posters for the 7 to 10 year-old group.

*On left, 1st Place, Ella Bartsch, age 7
Title of Poster: Practice Wildfire Prevention*

*2nd Place, Justin Bartsch, age 10
Title of Poster: Drown Fires*

Discover Boulder County

A CALENDAR OF NATURAL AND CULTURAL HISTORY EVENTS

Winter Birds of Prey Programs

Birds of Prey Slide Shows

Wednesday, December 14; 7:00pm to 8:30pm
Longmont Public Library, 4th Avenue and Emery
Street, Longmont, Meeting Room A & B
--and--

Wednesday, January 11; 7:00pm to 8:30pm
Louisville Public Library, 951 Spruce Street, Louisville
--and--

Tuesday, February 7; 7:00pm to 8:30pm
George Reynolds Branch, Boulder Public Library, 3595
Table Mesa Drive, Boulder (overflow parking available
in King Soopers parking lot across the street)

Learn how to recognize birds of prey, or raptors - hawks, eagles, falcons, and owls - in the winter skies above Boulder County. During this slide presentation, you'll observe and learn how to distinguish between different raptors 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, December 17; 10:00am to 1:00pm
Saturday, January 14; 10:00am to 1:00pm
Saturday, January 28; 9:30am to 2:30pm (extended
tour)

Saturday, February 11; 10:00am to 1:00pm
Saturday, February 25; 9:30am to 2:30pm (extended
tour)

Meeting location will be provided to registered
participants.

Join Boulder County volunteer naturalists for a driving tour of some of Boulder County's best areas to view birds of prey, or raptors. We will carpool from our meeting place, searching for raptors, learning about habitat and behavior, and working on our observation and identification skills. Bring water, lunch or a snack, binoculars, spotting scopes, and a bird field guide if you have them. Older children are welcome. Register by calling 303-678-6214, no later than the Thursday before each scheduled Saturday tour.

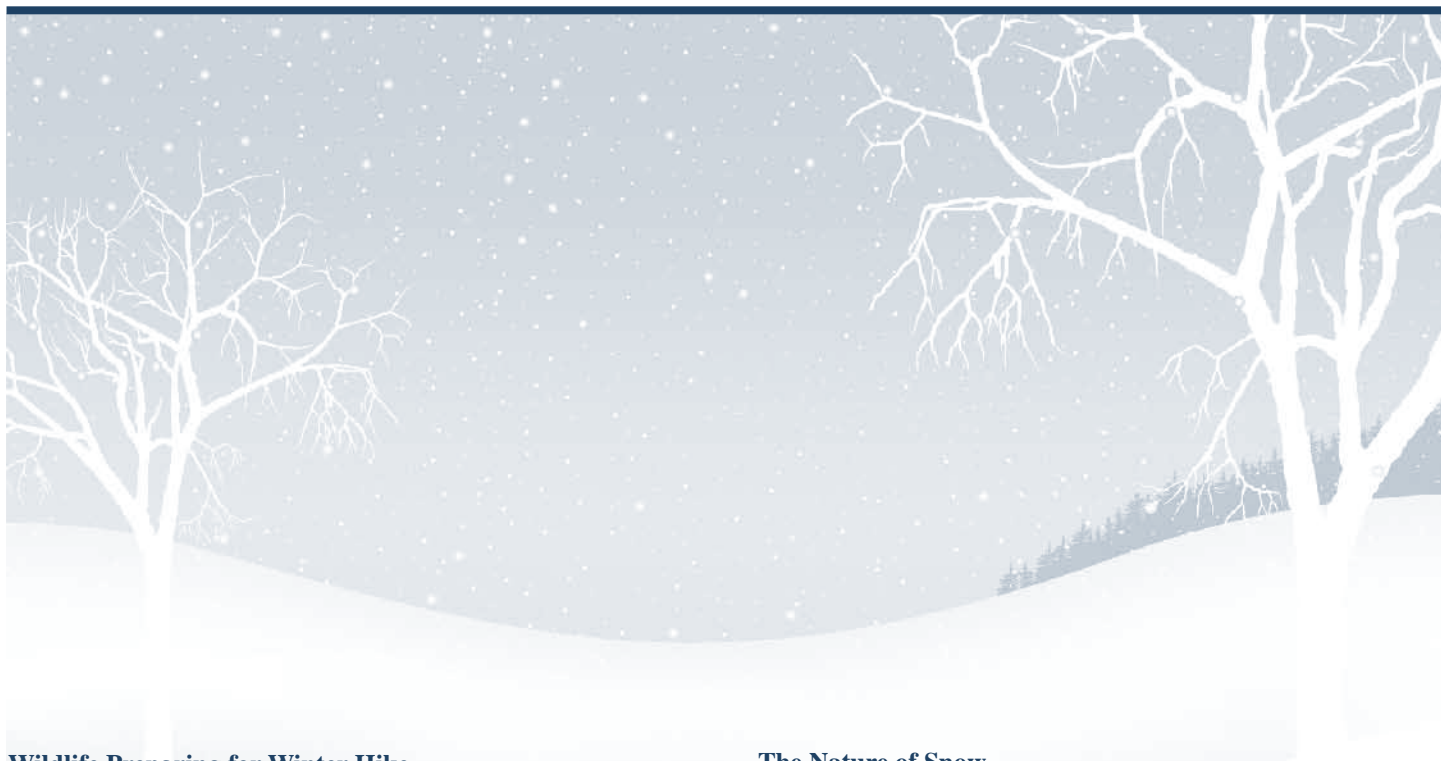


All Programs

All ages are welcome unless otherwise noted. NO PETS PLEASE! Be prepared for winter temperatures. Bring drinking water and dress in layers. See the back cover for park locations. For information about these programs, or to arrange a volunteer-led program for your group, please call Larry Colbenson at 303-678-6214.

Discover Boulder County

A CALENDAR OF NATURAL AND CULTURAL HISTORY EVENTS



Wildlife Preparing for Winter Hike

Saturday, December 10; 1:00pm to 3:00pm

Heil Valley Ranch Open Space North of Boulder off Lefthand Canyon Drive; meet at group picnic shelter

Join volunteer naturalists for a late fall hike to observe seasonal changes and to discover how the wildlife of Heil Valley Ranch prepares for winter. You'll learn about behavioral and physiological adaptations to the shortening days and cooling temperatures, and also look for signs of wildlife that are active year-round. Participants should be prepared for a slow-paced hike of just over a mile, and dress for the weather, wear hiking shoes or boots, and bring drinking water.

Nature Hike for Seniors

Thursday, December 29; Walden Ponds Wildlife Habitat Area; 75th Street between Valmont Road and Jay Road; meet at group picnic shelter near Cottonwood Marsh

Boulder County Parks and Open Space hosts a nature hike for seniors every month. Programs include information about an area's history, wildlife and current resource management projects. Please call 303-678-6214 in advance if you plan to bring a group so we have enough naturalists at the program. See page 14 for a listing of all the 2012 senior hikes.

The Nature of Snow

Saturday, January 21; 10:00am to noon

Mud Lake Open Space; 2 miles north of Nederland on County Road 126; meet at parking lot kiosk

Snow is an amazing substance! It changes form, it's sculpted by the wind into beautiful shapes, it insulates, it fractures into deadly avalanches, and also makes winter survival possible for many plants and animals. Join naturalist Larry Colbenson on a winter hike to explore the many properties of snow, and to examine the snowpack and learn how some plants and animals have adapted to life in the cold. Bring drinking water and clothing and boots suitable for cold and windy weather. Ski or hiking poles are also recommended due to icy trail conditions. Everybody should be prepared to hike about two miles in snow, above 8,000 feet in elevation.

A Kid's View of Raptors

Tuesday, January 24; 4:30pm to 5:30pm

Lafayette Public Library, 775 west Baseline Road, Lafayette

Learn how to recognize birds of prey, or raptors - hawks, eagles, falcons, and owls - in the winter skies above Boulder County. During the slide presentation you'll see some of these awesome birds up close and learn about where they live and what they eat. You will also get to see how your "wingspan" measures up against a hawk or eagle. This program is for families with elementary-age children.

Discover Boulder County

A CALENDAR OF NATURAL AND CULTURAL HISTORY EVENTS

Prairie Winter Hike

Saturday, February 4; 1:00pm to 3:00pm

Carolyn Holmberg Preserve at Rock Creek Farm; Stearns Lake Trailhead, South 104th Street, ½ mile south of Dillon Road, Louisville

Learn how grassland and wetland wildlife respond and adapt to winter on the prairie along the Colorado Front Range. Volunteer naturalists will lead this easy walk to explore and learn about the different winter strategies employed by wildlife that migrate through or are resident to the prairie ecosystems of Boulder County.

Signs of Life – Wildlife in Winter Hike

Sunday, February 12; 10:00am to 1:00pm

Caribou Ranch Open Space; 2 miles north of Nederland on County Road 126; meet at parking lot kiosk

Join volunteer naturalists for a hike in the high country to learn about the many ways that wildlife survives winter in the Rocky Mountains. We'll talk about hibernation, dormancy, migration, and various strategies for animals that are active all winter long. We will also look for signs of wildlife activity, including tracks, scat, and browse marks on trees. Bring drinking water, and clothing and boots suitable for a moderate 2-mile hike in snowy, cold and windy weather. Ski or hiking poles are also recommended due to icy trail conditions.

Trickster Tales

Saturday, February 18; 1:00pm to 3:00pm

Rabbit Mountain Open Space; NE of Lyons on north 55th Street; meet at group picnic shelter

Coyotes live throughout most of North America and coyote tales are found in many native cultures. Sometimes coyote has the power of creation, other times he battles supernatural enemies, and sometimes he's a trickster, outsmarting people and animals alike. Join Ranger Lynette Anderson for a moderate 2-mile hike at Rabbit Mountain Open Space to learn more about this clever, adaptable character. Dress for the weather, wear hiking boots or shoes, and bring drinking water and your sense of humor.



Where the Wild Things Live!

Monday, February 27; 4:30pm to 5:30pm

Longmont Public Library, 4th Avenue and Emery Street, Longmont, Meeting Room A

Where do wild animals live? Everywhere! Come join volunteer naturalists and hike across a HUGE map of Boulder County, from the grassy plains to the highest peaks, looking for signs of wildlife. Everyone will be a nature detective and help discover where different animals find the food, water, shelter, and space they need to survive. This program is geared for preschoolers and early elementary-age children accompanied by an adult.

Winter Heritage Day at the Walker Ranch Homestead

Sunday, January 29; 1:00pm to 3:00pm

Walker Ranch Homestead; 7701 Flagstaff Mountain Road, approximately 7 miles west of Boulder on Flagstaff Road

How did early settlers prepare for and survive the harsh winters of Colorado? Explore the Walker Ranch homestead in winter. In addition to a tour of the ranch, there will also be a working demonstration in the blacksmith shop, and the log house will be filled with wonderful smells of food being prepared on the woodstove. All ages are welcome; be prepared for cold, windy weather, and to walk in snow. For more information, contact Sheryl Kippen at 303-776-8848 or skippen@bouldercounty.org.



2012

Nature Hikes for Seniors

The last Thursday of every month (except where noted by an asterisk) the Boulder County Parks and Open Space Department hosts a nature hike for seniors at a county park.

Join us for an enjoyable, informal, and slow-paced hike through your open space!

- Programs begin at 10:00am and end by noon.
- Hikes include information about an area's history, wildlife and resource management projects.
- Meet at the park entrance kiosk, unless another location is indicated below.
- For more information and directions, call 303-678-6214. Please call in advance if you plan to bring a group so we can provide enough staffing.

January 26	Pella Crossing Open Space
February 23	Carolyn Holmberg Preserve at Rock Creek Farm (meet at Stearns Lake parking lot on South 104th Street)
March 29	Agricultural Heritage Center at Lohr/McIntosh Farm
April 26	Heil Valley Ranch Open Space (Meet at group picnic shelter near Lichen Loop Trailhead)
May 31	Betasso Preserve
June 28	Mud Lake Open Space
July 26	Bald Mountain Scenic Area
August 30	Caribou Ranch Open Space
September 27	Walker Ranch Open Space (Meet at Meyers Homestead Trailhead)
October 25	Heil Valley Ranch Open Space (Meet at group picnic shelter near Lichen Loop Trailhead)
November 29	Rabbit Mountain Open Space
December 27	Walden Ponds Wildlife Habitat Area

150th Anniversary Limited Edition Watercolor Print For Sale

Now available to the public is a limited edition print of the award winning watercolor titled "Lilacs at Walker Ranch" by Anne Gifford.

In August of 2011 a Plein Air Art Exhibit featuring Boulder County Parks and Open Space was held to celebrate the beautiful place we call home and Boulder County's 150th Anniversary.

Anne Gifford's bright watercolor was the recipient of Boulder County's 150th Anniversary prize chosen by the Board of County Commissioners. The public has the opportunity to buy one of these limited edition prints. All profits benefit the Boulder County Parks and Open Space Foundation.

Prints can be purchased through the end of the year (350 will be sold). These make great holiday gifts!

Prices:

7 1/2" x 9 3/4" Print, Unframed - \$32

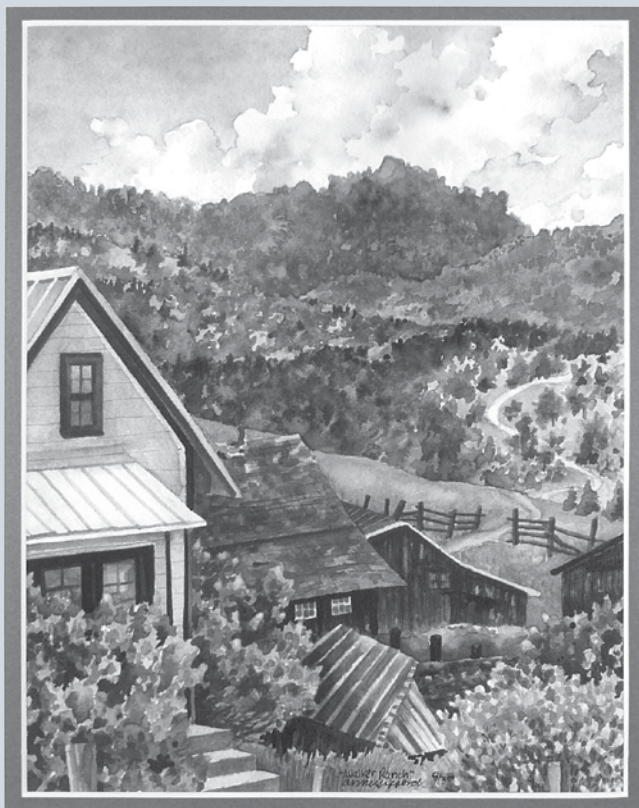
13" x 15" Framed and Matted Print - \$90

15" x 19 1/4" Print, Unframed - \$68

22" x 26 1/2" Framed and Matted Print - \$190

Set of 5 Notecards (blank inside) - \$6.00

If you are interested in learning more, please visit:
www.bouldercounty.org/pay/products/pages/150print.aspx.



2011 Land Conservation Awards

The Boulder County Parks and Open Space Department is now accepting nominations for the county's annual Land Conservation Awards. Nominations will be accepted until January 31, 2012.

Anyone may nominate individuals, families or organizations that have made outstanding contributions in Boulder County in **Environmental Stewardship** or **Historic Preservation**.

The Land Conservation Award has been awarded to Jan Burns for her 18 years serving Boulder County land conservation efforts as the Parks and Open Space Real Estate manager. Jan retired in September 2011. She will be honored at the April ceremony.

Nominating yourself or an organization of which one is an officer or director is not permitted. Federal, state, county, special district and municipal government agencies are also not eligible.

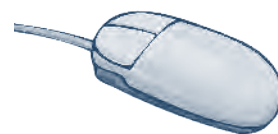
Special consideration will be given to land conservation or historic preservation activities that particularly affect unincorporated Boulder County and for activities that demonstrate ongoing effort. One-time efforts resulting in lasting benefit to the county's environmental landscape will also be favored for selection.

Other award selection criteria include conservation activities that are a model for others or that increase public awareness of land conservation. The Boulder County Commissioners will present the awards at a ceremony to be held in Longmont in April 2012.

For more information and nomination forms, call 303-678-6277 or visit www.BoulderCountyOpenSpace.org.

New Resource for Educators Parents and Kids

With just the click of a mouse, you can now access a library of over 80 Nature Detectives inserts that are part of every *Images* magazine. These publications are written at an elementary school level and feature original artwork. This is a great resource for teachers, people who home school, scout leaders, parents, kids, and of course anyone just curious about nature.



Want to learn about plants, weather, geology, local history or animals? You can find it here.

Teachers, these publications can be used to supplement your science curriculum for a number of standards. Sample topics include, "Don't Shrug off Shrubs," "Bee thankful," "Spring Brings Snowmelt," and "Moose not Meese!"

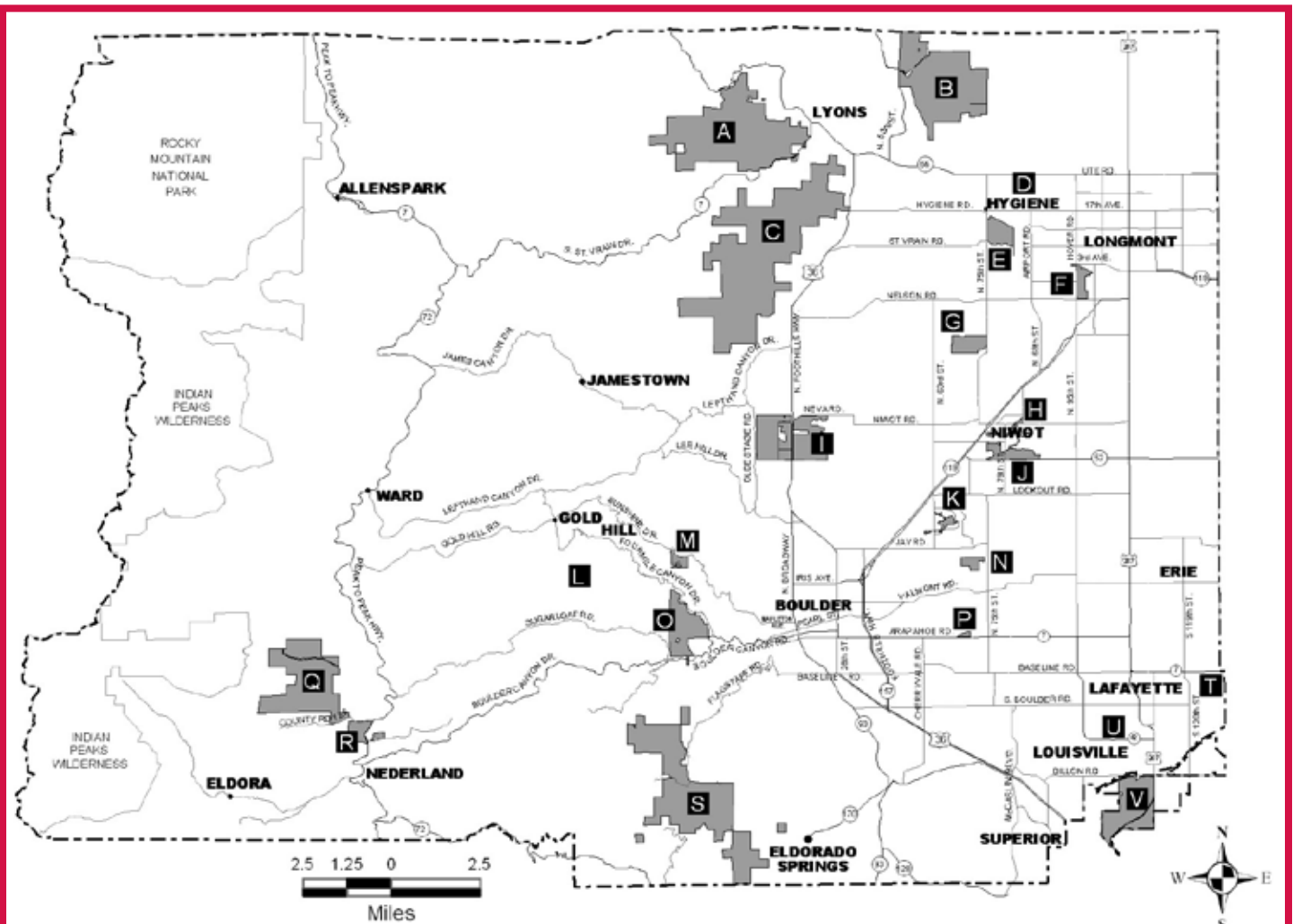
Explore this great resource at BoulderCountyOpenSpace.org.



PARKS & OPEN SPACE DEPARTMENT
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Longmont, CO 80503
303-678-6200

www.BoulderCountyOpenSpace.org

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| A. Hall Ranch | H. Lefthand Valley Grange | P. Legion Park |
| B. Rabbit Mountain | I. Beech Open Space | Q. Caribou Ranch |
| C. Heil Valley Ranch | J. Niwot Loop Trail | R. Mud Lake |
| D. Agricultural Heritage Center
at Lohr/Mcintosh Farm | K. Twin Lakes | S. Walker Ranch |
| E. Pella Crossing | L. James F. Bailey Assay Museum | T. Flagg Park |
| F. Boulder County Fairgrounds | M. Bald Mountain Scenic Area | U. Coal Creek Trail |
| G. Lagerman Reservoir | N. Walden Ponds Wildlife Habitat | V. Carolyn Holmberg Preserve
at Rock Creek Farm |
| | O. Betasso Preserve | |