



Rocky Mountain Conservancy

QUARTERLY

Spring 2017

ALPINE DREAMS ON A WINTER DAY by Leanne Benton

It was one of those happy-to-be-alive days. As I climbed out of my car along Trail Ridge Road I was greeted by blue skies, a gentle wind, and enough of a cool bite in the air to remind me I was at nearly 12,000 feet. It was a perfect summer alpine morning, a day that beckoned exploration of the high country.

Clad in a warm jacket, knit hat and mittens, I shouldered my backpack and started up the trail. The view was dizzying. The windswept ridge I was traversing was profuse with tiny colorful wildflowers. To my right, the ridge sloped downward toward a stand of gnarled shrub-like trees and then slipped out of view into a deep canyon. Just beyond loomed the craggy peaks of the Continental Divide glittering in exquisite detail in the clarity of the alpine air. I paused to take it all in. This is a land of contrasts; tiny and huge are juxtaposed and it takes a moment to get one's bearings. The vastness of the view — mountains, rock, snow and sky in all directions — creates a powerful sense of standing on top of the world.

The miniature world around my feet was no less magnificent. Tiny flowering plants hugged the ground: pink moss campion, white-lavender alpine phlox, white alpine sandwort, rose-colored dwarf clover, yellow

alpine parsley and blue alpine forget-me-not, each plant less than an inch tall. I dropped to my belly and stuck my nose into a phlox, inhaling the sweet scent. There were at least a dozen different plants arrayed in front of me. Some looked like pincushions with tiny leaves packed tightly together, others were covered with fine white hairs, while others had fleshy succulent leaves edged in red. A small fly rested on alpine parsley while several ants marched around and over the cushion plants. Mine was a front row seat to the daily life of the alpine tundra.

Lying on that windswept ridge, I was reminded that winter is always lapping at the edges of an alpine summer. Snow can fall any month of the year and it is almost always windy. Deep snowdrifts persist late into summer and some don't melt away at all. Freezing temperatures prevail on the tundra most of the year, and the alpine growing season is only 6 to 12 weeks long.

In fact, the climate is too severe for trees. The word *tundra* is derived from Russian meaning *land of no trees*. Yet, more than 300 plants live in the Colorado alpine. To meet the challenges of this climate, plants have myriad solutions — small sizes, compact shapes, tiny hairs, waxy leaves, deep, extensive roots, and slow growth (some cushion plants

(Alpine Dreams continued on page 2)



(Alpine Dreams continued)
live more than 100 years) — that enable them to survive and thrive. These plants do something we cannot do — they live here year-round. I was humbled.

A marmot whistled nearby, and I rose to my feet to admire it, perched on a sunny rock. Lounging is serious business for a marmot. Its lifestyle consists of eating, sunbathing and sleeping, and this is what works here. Marmots double their body weight in fat by summer's end, providing enough stored energy for a 7-month-long hibernation.

The trail continued across a varied landscape of alpine meadows swathed in yellow alpine avens, with rocky areas sheltering deep blue sky pilots and the occasional swale containing dirt mounds left by tunneling pocket gophers. Here and there, bright yellow alpine sunflowers faced the morning sun.

My morning's destination was a procession of large rock outcrops.

Outcrops are particularly fascinating because one never knows what one will find — perhaps a family of weasels, a marmot or two, a camouflaged ptarmigan, or some beautiful alpine plants tucked in

the crannies. Near the first outcrop, I heard the distinctive squeak of a pika and scanned the area for this softball-sized rabbit relative. A flash of movement revealed its location as it darted under a rock. Sporting tiny ears and round fluffy bodies, pikas are built to conserve heat. They are particularly busy during the summer, collecting and storing vegetation and defending their winter food caches from other marauding pikas.

I reached the rock outcrop and



Photo: Julie Klett

climb up halfway. Marmot scat littered a ledge along with alpine alumroot and a lovely honey polemonium in full bloom. Exploring around the base I was rewarded to find some Colorado blue columbine growing in a sheltered niche.

Hearing a sound beyond the rocks, I quietly climbed up to peer around it. There was a herd of a dozen bull elk with magnificent antlers still in velvet. Several were lying on the slope just beyond the outcrop, eyes closed against the morning sun, while a few stood

grazing on tundra plants. Behind them spread the panorama of the Continental Divide. Quietly, I crouched down among the rocks and reveled in the magical moment.

It is now winter. Today, the Estes Valley

is covered in snow and the midday thermometer hovers at 20 degrees. The surrounding mountains are shrouded in clouds, and strong winds lift snow skyward from the summits. I am happy to stay inside in the comfort of my snug home. My thoughts travel upward to this summer alpine trek and to the plants and animals of the alpine tundra. What is life like for them today?

Like us, the elk and nearly all

bird species have migrated to lower and warmer locales. The marmots are curled up in the darkness of their underground burrows in deep hibernation, their body temperatures only a few degrees above freezing. The pikas are hidden in the crannies of talus slopes, relying on a blanket of insulating snow overhead and feeding on their stores of dried vegetation. Mice huddle together under snowdrifts while weasels, forever hungry, hunt for them in an effort to keep winter starvation at bay. Ptarmigan have molted to their pure winter

whites, since these white feathers actually are warmer than colored feathers because of the hollow air spaces within them. Additional feathers on their feet and eyelids lend extra protection. Some plants lie dormant under a blanket of snow, while the cushion plants are exposed, bearing the brunt of the icy wind. Once again, I am humbled by the resilience of alpine plants and animals.

In April, park snowplows begin the lengthy process of clearing Trail Ridge Road for the upcoming season. Sometime in May, there is a wondrous window when visitors can drive to the gates on Trail Ridge Road, at Rainbow Curve on the east side, and Milner Pass on the west, and hike the newly plowed road before it opens to vehicles and before winter releases its snowy grip on the alpine.

Each year I eagerly anticipate that first walk up Trail Ridge Road, to admire the towering snow cuts left by the plows, to look for hints of green on the plants in windswept areas, to spot a ptarmigan still in its white plumage, or catch sight of a marmot freshly dug out of its hibernation burrow, blinking its eyes in the too-brilliant sunlight. But what I look forward to most is the reminder that the cycle continues — after a long cold winter, another glorious alpine summer will always return.

Leanne Benton is a retired NPS ranger naturalist who worked in Rocky Mountain



Photo: Nancy Wilson



A Salute to Charley Money

by Rich Fedorchak,
RMNP Chief of Interpretation

The first time I met Charley was at a partnership conference. He was teaching a class before me so I thought I'd sit in and see what this guy knew. Turns out, he knew a lot! Little did I know that years later we'd meet again and I'd have the fortune and honor of working with Charley at Rocky. Lucky me!

There are many things that Charley taught me during our time together at Rocky. First, he sees the extraordinary within the ordinary. Author Antoine de Saint-Exupéry said *"A rock pile ceases to be a rock pile the moment a single person contemplates it, bearing within him the image of a cathedral."* That's Charley. Charley rarely saw just a rock pile because he was looking at cathedrals. And to see cathedrals, you have to look for them. And to look for them, you have to have your eyes open. And not just with your eyes, but also with your heart. Anyone who knows Charley also knows that he believes that within every rock pile there is a cathedral. Or, at least, the possibility of one.

Saint-Exupéry also said "If you want to build a ship, don't drum up the men to gather wood, divide the work, and give orders. Instead, teach them to yearn for the vast and endless sea." As the consummate leader, Charley allowed all of us, Conservancy and National Park Service staff alike, to envision a new future, that vast and endless sea. Charley's leadership as Conservancy executive director these past 5 years has been nothing short of amazing. I speak a lot about creating transformative change, but Charley has shown us how it's done:

- The Conservancy's financial position has never been stronger
- Centennial celebrations for both Rocky and the National Park Service were seen as national partnership models
- Cascade Cottages and the Wild Basin property have been preserved as part of the park forever
- We've doubled our internship participants through the NGF Fund
- We've increased the number of students served by our outreach education program by 1500
- The park greenhouse even has a new fence!

If you ask Charley, he'll say "Oh it wasn't me, it was my staff and board, and the park staff..." and he is correct, but it was Charley who helped lead the way. He has been a transformative leader at this critical time by helping us identify the needed change, helping us create a vision to guide us, and inspiring us along the way, providing the courage to act upon this vision.

Thanks again, Charley, for creating a solid foundation of trust between the park and the Conservancy, and for ushering in a new era of collaboration and cooperation that supports our mutual missions.

"A hero is someone who has given his or her life to something bigger than oneself." ~ Joseph Campbell

Cover photo credits

(Upper) "Dream Lake Vision" by Crystal Brindle, Estes Park, CO; (Lower) "Hangin' Out" by Jeremiah Ramirez, Denver, CO

Please send high-resolution images to nancy.wilson@RMConservancy.org by June 1 for publication in the 2017 Summer Quarterly.

Photos are always appreciated! Scenery, wildlife and wildflowers greatly enhance this publication, so get out there and take a hike! **Thank You!**

Ask Nancy

Quarterly Editor Nancy Wilson attempts to unearth answers to any questions asked by Conservancy members and park visitors. If you are curious about something in or about the park, email nancy.wilson@RMConservancy.org or write: Nancy Wilson, Rocky Mountain Conservancy, PO Box 3100, Estes Park, CO 80517.

How do weasels and rodents see and travel under the snow? Once snow levels reach 6 or more inches, small animals, such as mice and voles, retreat under the snow to spend the rest of the winter in the sugar-like snow layer next to the ground called *depth hoar*. As snow continues to pile up, it provides an insulating blanket against the harshest winter conditions, and enables these animals to continue their daily lives tunneling and seeking plants in their secret subnivean (under the snow) world. However, increasing snow depth means diminishing light — a foot of overlying snow allows only a faint glow of light to penetrate. Mice and voles use their keen sense of smell to find plant food and to avoid predators, and use long sensitive whiskers to navigate through their complex system of snow tunnels. Weasels, on the hunt above the snow, check every hole, nook and cranny for food. They locate prey primarily by scent, but also can hear rodents beneath the snow. With their long skinny bodies, weasels easily access rodent tunnels and follow the scent to their food reward. — *Retired RMNP Interpretive Ranger Leanne Benton*

How do some of the more urban wildlife, like coyotes and fox, even mountain lions stay hidden so well in these less "natural" environments? With the expansion of human developments into their 3-dimensional living space, species we may think of as secretive wildland dwellers have adapted and habituated to living in urban and suburban settings. In fact, they have adjusted to exploit that 4th dimension — time. That is, they conduct much of their "business" when humans don't — from about 11 p.m. until just before dawn — to hunt for food, look for new territories, search for mates, and locate a "hideout" for the coming day's burst of human activity. I recall a red fox pair that scratched out a natal den between the roots of an old cottonwood in Fort Collins, successfully rearing their young year after year despite being nearly surrounded by busy streets, parking lots and sidewalks, all within 20 yards of the den. Studies of radio-collared mountain lions find that they frequent subdivisions in Front Range communities during the dead of night, moving at first light to nearby cover with an excellent view of the neighborhood they share with unsuspecting humans. Where parks, trails and open space are common, these animals are even more able and willing to access areas of high human activity. Since the 1990s in Colorado, a number of counties and/or municipalities have dedicated a portion of sales tax revenue (typically a fraction of a percent) to parks, trails and open space. The state's Great Outdoors Colorado (GOCO) program, funded by lottery proceeds, also has provided much open space in urban/suburban areas. As long as we humans behave in neighborly fashion — e.g., keeping pet food and trash (until pickup morning) inside, keeping pets leashed on trails and NEVER leaving them out at night — we can expect to continue to share even our urban and suburban human habitats with wild creatures. — *Retired RMNP Wildlife Biologist Gary Miller*

What is the life cycle of wood ticks that allows them to be ready for action as early as February? Rocky Mountain wood ticks actually have three opportunities to get a blood meal, but only one usually concerns humans. During their developmental and feeding stages as a larva, nymph and adult, they must feed on three different animals. This is because the tick simply drops off the host after a meal. Females lay their eggs on the ground, and the newly hatched larvae seek a small mammal, such as a rodent, as the first host. After feeding, the larvae drop to the ground and molt to the nymph stage. The nymph then seeks its own small mammal host. After feeding this second time, the nymph drops from the animal and molts to the adult stage. Adult Rocky Mountain wood ticks then feed on a large mammal host, such as a dog, a deer or a passing human. After this feeding, the adults drop off the host, and then mate, following which the females lay eggs. So, by the time they are positioned on the end of their branch, waiting for you to pass, they are already quite grown up. All this to say, they are ready at ALL stages of the development process, which means as soon as it's warm enough for humans to be out and about, so they, too, will be out!! — *RMNP Interpretive Ranger Kathy Brazelton*

Impact of Climate Change on Alpine Animals in Rocky

I believe climate change is fundamentally the greatest threat to the integrity of our national parks that we have ever experienced. Rocky Mountain National Park has been actively studying the effects that climate change is having on the park, and addressing climate change through mitigation, adaptive management and education. — Jon Jarvis, former Director of the National Park Service, from the 2010 NPS Climate Change Response Strategy



Photo: Jim Ward

by Carissa Turner

“What does the park know about how climate change is affecting different wildlife species in the park?” While we don’t have all the answers, ongoing park research is helping us understand what the future holds for Rocky’s wildlife, and how we can best move forward to protect it.

The climate is changing. Research shows that the average annual temperatures in and around Rocky Mountain National Park (RMNP) increased by 3.4 degrees F during the 20th century. Snowmelt now begins two to three weeks earlier than it did 40 years ago. Additionally, the number of very cold days (below -20 degrees F) has declined significantly over the last 70 years. These changes can lead to other changes, such as decreased seasonal water flow in dry summer months, and changes in soil moisture, which in turn can impact plant communities and the wildlife that rely on them.

Wildlife species in Rocky each have



Pika are considered a climate-change indicator species.

Photo: Dick Orleans

their unique set of habitat and resource needs. The current and future change in climate in this park will fundamentally lead to changes in habitat and resource availability. While some species will likely struggle to persist in the park under warming conditions, others may thrive, at least for the short term. The following is a closer look at a few of Rocky Mountain National Park’s most notable examples.

American Pika

Weighing in at a mere 6 ounces, the charming American pika (*Ochonta princeps*) can be seen and heard around Rocky’s high-elevation talus slopes and rock outcroppings. Pika require relatively cool summer conditions and cannot survive above 75 degrees F for extended periods of time. The rocky areas they inhabit are cool refuges during hot summer days. Even more critical for Rocky’s pika is adequate snowpack in winter months for insulation from extreme cold. However, average summer temperatures are increasing and winter snowpack is decreasing. The future for the American pika in this park is uncertain.

As temperatures warm, RMNP’s pika are expected to move up to higher elevations to get out of the heat. While this may provide a short-term solution, long-term warming trends are expected to lead to smaller and smaller patches of suitable habitat here. This, combined with

reduced snowpack in colder high elevation areas, puts pika at even greater risk. In fact, recent models suggest that loss of insulating snowpack will be the main factor in the decline of pika, and scientific models predict local extinction of Rocky’s pika by 2100¹.

Although the outlook is concerning, there is still hope for these delightful lagomorphs. High genetic diversity in the park’s pika populations may help the species adapt to change over time. Rocky Mountain National Park is actively working with academic partners to study and monitor pika throughout the park.

Mountain Pine Beetle

One species that is doing very well in the warming climate is the mountain pine beetle. Native to North America, mountain pine beetle populations have historically provided an important ecological service within forests —

that of maintaining forest health by killing older and diseased trees, which then allows younger trees access to light and nutrients. But this most recent outbreak (which has spread throughout Western North America during the last decade), has affected nearly 90% of Rocky’s forests. Warmer winters have improved overwinter survival of beetle larvae, and longer summers have led to increased reproductive success. Drier conditions have also stressed younger, healthier trees, making

Habitat fragmentation, air and water pollution, human encroachment and the introduction of non-native species and disease are just a few examples of threats that can intensify the struggle to survive.

them more susceptible to the outbreak.

Evidence of this outbreak, as well as the more recent spruce bark beetle outbreak, can be seen everywhere in the park. One of the goals of the park and the National Park Service is to allow for these natural processes. But, high tree mortality and warmer and drier conditions have increased the potential severity of wildfires. As a result, RMNP's forestry and fire management staff are working to implement an adaptive, proactive bark beetle management program that focuses on mitigating hazard trees, providing for visitor and employee safety and protecting property.

Colorado River Cutthroat Trout

Fishing in RMNP's scenic lakes and streams is a popular pastime for many visitors to the park. Rainbow, brook and cutthroat trout are all found in the park; however, only cutthroat trout are native to the Southern Rocky Mountains. One subspecies, the Colorado River cutthroat trout (CRCT; *Oncorhynchus clarkii pleuriticus*), only occupies a fraction of its former range, due, in large part, to the historic introduction of non-native trout species. Today, CRCT are found exclusively in high-elevation headwater streams in the Upper Colorado River Basin.

CRCT, like other fish, have specific temperature ranges needed for survival and reproduction. Changes in water temperature and water flow could threaten the long-term survival of fish species. Fortunately for cold-water species such as CRCT, water temperature changes in high-elevation headwater streams are not expected to be as severe as those at lower elevations². Other factors may play a larger role in this species persistence over time. Models developed by researchers at Colorado State University, U.S. Fish and Wildlife Service and U.S. Geological Survey, predict that less than 40% of CRCT populations are likely to be around by 2080³. Populations at lower elevations and those in short streams are most at risk. In this case, fragmentation is the strongest factor against long-term survival. Restoring streams to connect suitable habitat can improve the outlook for the CRCT.

Pika, pine beetle and Colorado cutthroat trout are being affected by climate change in different ways. Changes are being seen in other species as well: White-tailed ptarmigan (*Lagopus leucura*) begin breeding nearly two weeks earlier than they did in the late 1960s⁴. Non-native

cheatgrass can be found at higher elevations, competing against native plants and increasing fire risk. And extended summer seasons and changes in precipitation will likely have an impact on boreal toad (*Anaxyrus boreas boreas*) breeding habitat, a species already greatly affected by fungal disease.

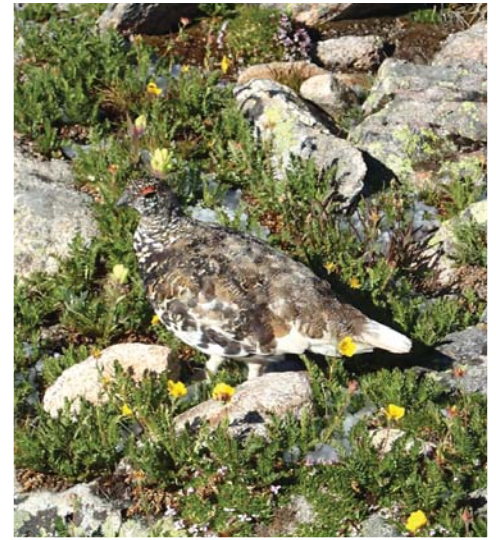
The warmer/drier conditions brought on by climate change are often only one of several threats to a species' survival. Habitat fragmentation, air and water pollution, human encroachment and the introduction of non-native species and disease are just a few examples of threats that can intensify the struggle to survive. Mitigating these other threats may be the best way to support wildlife that are responding to a changing climate. As such, ecosystem restoration and removal of invasive species are ongoing strategies used by the park to build resiliency within critical wildlife habitat.

Carissa Turner is the science communication coordinator at the Continental Divide Research Learning Center in Rocky Mountain National Park.

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Ptarmigan are exhibiting earlier breeding behavior than what was observed in the '60s.

Photo: Marlene Borneman

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⁴ Wann G.T., C.L. Aldridge, and C.E. Braun. 2016. Effects of Seasonal Weather on Breeding Phenology and Reproductive Success of Alpine Ptarmigan in Colorado. *PLoS ONE*, 11(7). doi:10.1371/journal.pone.0158913

SAVE THE DATE!

Rocky Mountain Conservancy Picnic in the Park!



When: August 5, 2017

Time: 11:00 AM to 2:00 PM

Where: Hidden Valley in RMNP!

Members \$15.00; Guests \$20.00

Kids 6-12 \$5; Kids 5 and under, free!

11:00-12:15 Activities & mingling

12:15-1:00 BBQ picnic lunch

1:00-2:00 Program

*Join us for this year's
celebration of food and frivolity!*

Conservancy High School Leadership Program Connects with Local Youth

June 5–16, 2017, marks the Rocky Mountain Conservancy’s new pilot program to engage high school students (ages 14–17) in service learning, experiential education, and youth development programming in Rocky Mountain National Park. Born out of an effort to better serve local audiences through the Conservancy’s programming, the new High School Leadership Corps offers high school students a two-week immersive experience in the park, including a stipend and complimentary outdoor gear.

While the existing Conservation Corps has endeavored to engage local college-aged audiences, recruitment efforts were challenged by a psychological barrier among young people related to their limited experience in Rocky Mountain National Park, due, in part, to a lack of shorter term immersive experiences. The High School Leadership Corps will now serve as an important gateway experience for youth, allowing them to move from day trips in public lands toward a more in-depth, stewardship-oriented experience.

The High School Leadership Corps youth will be based in



The High School Leadership Corps will now serve as an important gateway experience for youth.

[www.rmconservancy.org/
learn-us/high-school-leadership-corps/](http://www.rmconservancy.org/learn-us/high-school-leadership-corps/)



Working alongside park staff, crew members will learn about park resources firsthand.

Moraine Park Campground for the two-week duration. They will be led and mentored by experienced crew leaders who will guide them through various volunteer educational activities, including assisting with trail work, resource stewardship, fuels management, and many other divisions within the park. They also will be introduced to Leave No Trace concepts, camp etiquette, backcountry preparedness, and the natural and cultural resources of RMNP. Reflection activities, résumé-building workshops, and career exploration exercises will wrap up the experiences.

Conservancy program efforts are geared to promote a broader awareness of Rocky, gain an understanding of career opportunities in NPS, and embrace a stewardship ethic. Through past successes in the Conservation Corps program, the Conservancy anticipates that this High School Leadership Corps will expand the organization’s impact on young people and boost the park’s connection with local youth.

For more information about this program, visit our website at **RM-Conservancy.org** — and stay tuned for future updates!



More than once I have had to write or talk about my connection to Estes Park and RMNP. I would have thought by now that I would be able to respond in an instant, but it’s still a hard thing to describe and I find myself rethinking it all the time.

An Olson Family Fellow Profile Dominic Rickicki

What I do know is, I find myself repeating that Rocky has given a lot to me and every time I see the opportunity to give back I try and take it.

I spent my first summer in Estes Park in 2014, working for the YMCA of the Rockies as a groundskeeper. My best friend from childhood got an internship there, called me, and said to apply for something. I filled out the lengthy application as fast as I could. Nearing the end of that spring semester, I got the email saying I had the job. I immediately dropped out of a pretty decent position in the Adirondack Mountains which I had al-

ready agreed to, just so I could move out west. Growing up near Buffalo, New York, I had never been west of Kentucky, and as a rock climber, Estes Park was a dream come true.

Rocky gave me so much that summer. I made some of the best friends of my life, I had my breath taken away hiking to Dream Lake, I met my girlfriend, I watched the sunset from atop Storm Peak, I ran away from lightning storms with a full rack of climbing gear more than once, and I spent every weekend camped out with friends. I got scared in the mountains but I also found joy, fulfillment and a place to which I could always return.

It was on a climbing trip in Estes Park

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that summer that the possibility of returning to Estes for another season occurred. I went out to Lily Lake with my buddies that were meeting up with a college friend. This friend brought several people with her and it turned out that most of them worked for the Rocky Mountain Conservancy – Conservation Corps on the Estes crew. They had spent a little time describing the job to me and I quickly knew that I would be applying. One year later I found myself, Pulaski in hand, fixing up trails with Conservancy's Conservation Corps on the Red Feather crew.

It was during the Conservation Corps experience that I became aware of feeling a sense of stewardship for Rocky. The place had given me so much that first summer and I was ready to give back to it.

I spent two summers with the corps, my second as a crew leader for the Kawuneeche crew. In that time, I fixed trails, restored old buildings, replaced some roofs, and most importantly was able to share this place with others. One of the most rewarding experiences of being a crew leader was to educate and lead a crew as they spent their first season in this place. As a leader, I was watching from the outside as others went through the same things that I went through when I first came to Rocky. I saw friendships and memories being made, as well as a growing respect for the area.

My mom always said that I would be the one of her three sons to end up as a teacher like she was, or as a writer, or something of that nature. In my youth I denied it — I wanted to be a fly fishing guide or professional skateboarder, a ski

bum, or something along those lines, but here I am doing pretty much what she predicted. As I finished my bachelor's degree, I found that I truly loved to teach others and share experiences, and I feel so fortunate to now be on my third season with the Conservancy, this time as the Olson Family Fellow. I feel so much satisfaction each time one of my after-school students figures out a question I asked, or when a participant on a snowshoe hike is still smiling and eager to learn at the end of the day.

Each time a season ends, I tell myself I might try and move around for my next job, maybe I'll try this town or that state, but I always find myself back here in Estes — and I can't complain. This isn't where I grew up, but it feels like home, and I'm happy to continually learn from this place and to keep sharing it with others.

Park Puzzler

by Conservancy Member Joel Kaplow

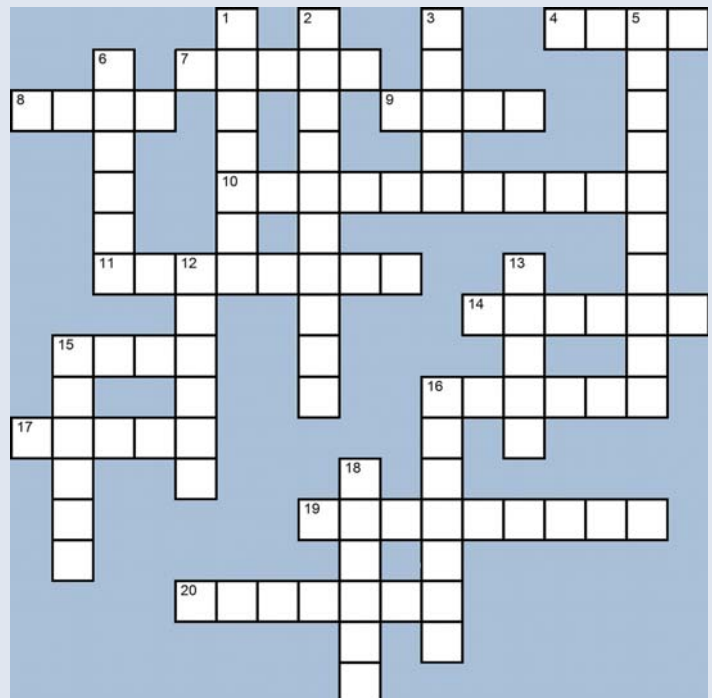
Across

- In size, RMNP ranks somewhere in the middle of all the national parks. Compare it to Hot Springs NP in Arkansas, the pipsqueak of the bunch, which weighs in at under ___ square miles. Remember, we're talking about national *parks*, and not *monuments* here.
- Keeping with a theme of sorts, Cow ___ flows below Sheep Mountain, on the north side of Lumpy Ridge.
- Surprisingly, Rocky is home to two species of cacti. Unsurprisingly, they are found in the lower montane zone. *Pediocactus simpsonii*, aka ___ cactus, blooms from May to early June.
- If you were to hike every mile of Rocky's trail system, that would be tantamount to traversing the 13th-largest state, north to south. What state will you have "conquered"?
- The other cactus that calls the park home is *Opuntia polyacantha*, aka ___, which blooms in late June. (2 wds)
- What triggers the elk to start shedding their fur in March? Somehow, an internal mechanism senses the increasing length of ___ during the day. And then they know it's time to set their clocks ahead one hour ...
- You may spot a black-and-white bird hitching a ride on the back of an RMNP elk. It's not really finding an alternative to short rail, but most likely snacking on sumptuous ticks. This benefits both the elk and the dinner guest known as the black-billed ___.
- When the elk appear to be having bad fur days, they are shedding not one, but two layers of winter fur; the longer guard hairs and the shorter undercoat, for that unattractive just-got-out-of-bed scruffy look. This process is known as the spring ___.
- Robert "Squeaky Bob" Wheeler, the proprietor of the Wheeler Camp Resort, named this drainage in the eastern flank of the Never Summer Range to the west of his establishment "Hells Hip ___."
- We recently welcomed Darla Sidles as the newest superintendent of RMNP. She replaced Vaughn ___ after he served in Rocky for a good 13 years.
- Established in 1892, and one of the very few that are still active inside a national park, ___ Cemetery is found on the west side of Rocky, south of Harbison Meadow. Many graves were relocated here when Shadow Mountain Lake and Lake Granby were created in 1943–45, which flooded the original grave sites. (2 wds)
- Darla Sidles is no stranger to the National Park System. Her résumé includes work in Denali, Zion, Big Bend and Arches national parks. After serving seven years as superintendent, she left ___ National Park to make Rocky her new home.

Down

- The RMC Field Institute has a new program for the youngsters titled "Cloudy with a Chance of ... ___?" The blank being the term for the kind of "soft hail" that any seasoned high-country hiker has experienced.
- The park has a lake on the west side named for J.N. ___, a Grand County judge who moved to Hot Sulphur Springs in 1880. The tallest peak in Grand County (3.5 miles north of the Eisenhower Tunnel) is named for him as well.
- "Squeaky Bob" Wheeler did most of the cooking at his resort. One noted guest was none other than President Roosevelt, whom he once served by taking care of Teddy's Rough Riders' horses. Ever the character, he whimsically referred to his inn as the "___ de Hardscrabble."

- Back in the day, a lady could not earn the title of "Ranger." Even though Margaret Fuller Boos had a Ph.D. in geology, led dozens of interpretive hikes, taught evening programs and created a geological guide for RMNP, Roger Toll hired her in 1928 with the title of "Ranger-___."
- Nestled in the Never Summers under peaks named Mts. Cumulus, Stratus, Cirrus and Nimbus, it wasn't too much of a stretch for someone to come up with the name for Lake of the ___.
- Under Rocky's second superintendent, L. Claude Way, sisters Esther and Elizabeth Burnell were hired as the nation's first female national park ___ guides in 1917. Liz was also the first lady Longs Peak guide, and Esther impressed with her noted 30-mile winter snowshoe across the Divide.
- The publication on which you are now puzzling is constructed by a talented editor extraordinaire, one ___ Wilson.
- A new RMC Field Institute bus tour for this year is "From ___ to Tree Line," which travels from the montane to subalpine life zones.
- "Squeaky Bob" Wheeler sold his hotel to Lester Scott in 1926. Scott promptly changed the name to "___ Valley Ranch," inspired by a feeling of the willies and/or heebie-jeebies he had when he was coming down from Lulu City in the twilight, years earlier.
- The Grand Ditch ___ happened on May 30, 2003, sending tons of sand, gravel, rocks and other detritus down Lulu Creek and into the Colorado River, leaving a 1.5-mile trail of destruction.





Annette Patton getting ready to hike to the head of the Bighorn debris flow. Photo: David Dust

It's usually the scenic beauty of Rocky Mountain National Park (RMNP) that draws tourists from across the country to gaze at the seemingly changeless landscape. Annette Patton, a Master's student working with Dr. Sara Rathburn at Colorado State University, was instead lured to the Colorado Front Range in order to research catastrophic change to this mountain landscape.

Debris flows are gravitationally-induced mass movements of poorly sorted sediment and water mixtures that surge down slopes. On average, mass movements, such as tsunamis, hurricanes and forest fires are the most costly natural hazard and can cause extensive damage to property and loss of life. In the semiarid Rocky Mountains, large naturally occurring debris flows are primarily associated with wildfire, extreme rainfall or rapid snowmelt that saturates unstable hillslopes. Such was the case in September, 2013, when more than 12 inches of precipitation fell in a four-day period resulting in more than 1,100 debris flows within a 1,160-square-mile-area of the Colorado Front Range. Numerous large debris flows were triggered within Rocky Mountain National Park during this storm. The debris flows in the park damaged roads, bridges and hiking trails, and threatened the historic Bighorn Ranger Station. This event motivated Annette's research to understand the controls on debris flow occurrence.

Annette's main research hypoth-

Studying Debris Flows From the 2013 Flood Storm in Rocky

by Sara Rathburn and Annette Patton



Annette Patton sampling a boulder within a berm of an older debris flow at the Bighorn site to determine the age of the deposit. Photo: Clare Lukens

eses are 1) Slope geometry, subsurface bedrock topography and substrate characteristics are dominant site-specific controls on debris flow initiation; and 2) Fire history outweighs slope characteristics in initiating debris flows. Her field and laboratory methods are directed at testing these hypotheses. Annette is also conducting additional studies to date older debris deposits which may have occurred since the last ice age. This research has valuable implications for management of infrastructure and buildings in the national park, and will increase awareness of geologic hazards in order to improve public safety.

Field and Laboratory Methods

In order to better understand the controls on debris flow occurrence in this region, Annette hiked to the initiation points of 11 debris flows in RMNP and 31 control sites to compare slope characteristics during the summer of 2015. Her fieldwork is both academically interesting and physically demanding; several of her sites are higher than 10,000 feet in elevation, and all are steep, rocky climbs.

At each site, Annette measured several variables, including soil depth, soil texture, vegetation cover, and topographic

characteristics in order to identify the primary site-specific controls on debris flow initiation in the region. At the Bighorn debris flow site, she mapped the distribution of boulders within debris flow levees and a trench was dug at the toe of the debris flow fan to expose buried debris deposits. Samples of buried vegetation within the trench, tree limbs wedged in debris flow deposits, and boulders within debris flow levees were collected for laboratory analysis to date the various events.

Preliminary Results

Most of the debris flows that Annette studied originate in areas where drainages come together or bowl-like depressions on the slopes where sediment accumulates. The soil texture is generally sand-sized or larger with some finer material that provides cohesion. Debris flows that followed existing channels are more common than those on hillslopes without channels. The Bighorn site has evidence of 5 to 6 different debris flows, with one buried layer dating to 580 BP (before present), and three episodes of debris flows were exposed in the trench stratig-



Sara Rathburn and Annette Patton (CSU), and Eric Bilderback (NPS) describing debris flow deposits exposed in a trench in the Big Horn debris fan.

Photo: NPS/Paul McLaughlin

raphy. re history does not appear to have an influence on the occurrence of debris flows initiated during the September 2013 storms. More results will be forthcoming from Annette's master's thesis.

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is a collaborator on this research and assisted numerous times in the field, and Paul McLaughlin of RMNP has been instrumental in assisting with research logistics.

Author contacts: Dr. Sara Rathburn and Annette Patton, Dept. of Geosciences, Colorado State University, Ft. Collins, CO 80523-1482



Eric Bilderback (NPS) looking down the Twin Sisters debris flow path.
Photo: Sara Rathburn



"Mister" crossing the Continental Divide

Photo: NPS

by Tara Vessella,
RMNP backcountry coordinator

Pack animals have been helping humans for thousands of years, carrying heavy loads wherever they might be needed. Chances are, if you've hiked or camped beyond the roads and trailheads in Rocky Mountain National Park, you may have encountered a park employee or two with llamas in tow. Rocky has been using llamas as pack animals for more than 15 years to support a variety of wilderness packing needs.

Llamas are native to the high plains of the Andes Mountains of South America and are well-suited to altitudes of 9,000 – 14,000 feet. As such, they are naturally adapted to the mountainous terrain found in Rocky, and, as a bonus, have remarkably minimal environmental impact on the land. In a national park that spans 265,000 acres and includes 124 named peaks, you can imagine the challenge of traveling and hauling work materials in the variety of alpine conditions this area presents: think dirt, snow, rock and water. And because of these extreme and variable conditions, the park can't use horses and mules at certain times of the year and in certain areas.

When it comes to navigating high mountain terrain, however, llamas, with some unique physical attributes, allow travel in sensitive and remote areas with

minimal impact to trails and vegetation. Llamas are very strong, and able to carry up to one-hundred pounds each. And it's their large spreading feet which help distribute this weight of the animal and the weight they can carry, significantly dispersing focused impact. Additionally, their unique split toes grip the uneven terrain like native bighorn sheep and their soft, dog-like foot pads make any impact negligible.

Llamas are cold tolerant and hardy animals which makes them a great fit for use in the ever-changing environment of Rocky's high country. They carry no endemic diseases that can be communicated to native animal species, they are compatible with wildlife common to alpine environments and they have low susceptibility to predation. Llamas also have low water requirements, and their feces are pelleted with a low nitrogen content, a high-value feature that helps reduce the harmful effects of stock waste on park vegetation.

The list of their attributes goes on. As an alternative and supplemental option to using horses, mules and helicopters, llamas also are key in the park's efforts to increase the safety of packing operations in remote areas. Visitors and park employees save have both been significant drivers for the continued use of llamas in the park. Their relaxed disposition makes them safe and easy to handle, and their intelligence and individual personalities enable them to blend into the social structure of any trip. Their gait is evenly matched to that of the average human hiker and their generally calm and quiet

demeanor is an asset, both on the trail and in camp.

Rocky Mountain National Park began using llamas in the early 2000s as a more environmentally friendly alternative to the standard horse and mule pack animals used to service the high alpine solar composting toilets located throughout the park. Today, llamas are used for a wider variety of tasks throughout the park, including packing out human waste from drying toilets in the backcountry, transporting tools and supplies for Wilderness and Trail crews to complete multi-day field projects, hauling gear and supplies for multi-day search-and-rescue operations, occasionally assisting with special project needs, and carrying needed equipment for research teams studying in the field.

When we're working with llamas, it is almost guaranteed that we will have some unique experiences, or end our week with a great story. I once had an opportunity to pack a llama for the FBI to help them complete an investigation in a remote area of the park. Years before, I had one llama work his rope loose at the end of the pack string, and the next thing I knew he was in the river for a swim. Who knew llamas could swim? I found out firsthand on that hot day in Grand Lake.

Each year the park leases more than a dozen pack llamas to promote stewardship and the protection of this special place, and in almost every operation or project in the park, these animals have proven to be incredible assets and a complete joy to work beside.

Check Out One of Rocky's Greatest Wilderness Assets — Llamas



Rocky Mountain Conservancy Welcomes Esther Rivera Murdock as New Executive Director

The Rocky Mountain Conservancy's Board of Directors is pleased to announce the appointment of Esther "Estee" Rivera Murdock as its new Executive Director. She replaces Charles "Charley" Money who has retired.

Estee Rivera Murdock hails from Washington, D.C., where she worked for the National Park Service (NPS) for more than eight years, most recently as a program manager for "Every Kid in a Park," a federal land and water management agencies outreach program. Simultaneously, she served for six months as the Acting NPS Program Manager where she co-developed the NPS Teacher Corps in partnership with the National Park Learning Alliance.

Ms. Murdock also has worked as a Partnerships Specialist in the NPS Centennial Office, developing new and existing partnerships with non-

governmental conservation and recreation organizations, assisting with the coordination of philanthropic and corporate sponsorships, implementing new diversity and youth engagement initiatives, and improving internal and external communications.

Ms. Murdock also served for more than six years as the Community Engagement Coordinator at Saguaro National Park in Arizona, where she developed new strategies to engage and connect the residents of gateway communities with public lands. She holds B.A. and M.A. degrees from the University of Arizona.

"We are excited to have Estee joining us," Board President Don Cheley stated. "Her experience aligns perfectly with the Conservancy's ongoing commitment to find new ways to engage the next generation of park visitors and develop them as support-

ers and stewards. At the same time, we owe Charley Money a tremendous debt of gratitude for his years of service to the Conservancy. Thanks to Charley and his staff — in its 86-year history, the Conservancy has never been stronger."

Save Time at Rocky's Entrance Stations

Purchase Entrance Passes on pay.gov

Visitors can now purchase a 1- or 7-day entrance pass online via the following link on Rocky's NPS webpage:

www.nps.gov/romo/planyourvisit/fees.htm

Alternately, you can go to www.pay.gov and, at the top of the page, type Rocky Mountain National Park in the search function. You then scroll down the list to select the type of pass you want. Most likely, it will be the RMNP Prepaid Passes option for the weekly and daily passes. Continue to follow the links to the form where payment can be made. Your email confirmation is your pass and you can either print this receipt out to show staff at the entrance station or simply show the email confirmation on your mobile device. *(Keep in mind that you may need to take a screen shot of the email since cell coverage is unreliable throughout the park.)*

Check it out!

www.nps.gov/romo/planyourvisit/fees.htm



More than 3,000 on the road.
Support the park. Get yours today.
RMConservancy.org

Cascade Cottages Property Transferred to RMNP

We are thrilled to report that the Cascade Cottages property now belongs to Rocky Mountain National Park! In mid-March, 2017, the Trust for Public Land, which had purchased and held this private, commercial inholding while the Rocky Mountain Conservancy and the National Park Service secured the needed funds, transferred ownership of the approximately 40-acre parcel to the park. With your help, the Conservancy raised the necessary money a year ahead of schedule. Thank you!

Wade Shelton, project manager for the Trust for Public Land, sent a note of thanks: "... I wanted to take this opportunity to thank all of you, your Board, and your donors for everything that the Conservancy has

done to make this project a reality. At the risk of being blunt, if you take away either one of our organizations, this transaction simply does not happen. This was a great team effort, and I have been honored to be a part of it with you all."

So, what's next? The property's buildings and infrastructure will be assessed for possible future use, and the park will oversee a public planning process to decide the future of the property. It will also be assessed to see if it qualifies for inclusion in the National Register of Historic Places. Approximately eight acres north of US 34 can administratively be added to designated wilderness. The assessment and planning phase



One of the 14 cabins currently situated on the Cascade Cottages property.

is expected to take a year or more. Ultimately, the National Park Service will decide if and how the property might be repurposed, or if it will be ultimately returned to a natural state. We will keep you posted as the planning process moves forward.

Thank you again for your part in ensuring that this vital parcel will be protected in perpetuity.

RMNP Fund Project Highlight: Lily Lake Restroom Facilities

Lily Lake is the site of multiple philanthropic projects that have been funded through the Rocky Mountain Conservancy (under the former name Rocky Mountain Nature Association). The list of Association projects in that area included a wheelchair-accessible trail around Lily Lake, the creation of a visitor center complete with exhibits, the removal of unsightly power lines, the acquisition of water rights on the lake, the acquisition of additional nearby land (the Roessler property), and the building of the backcountry trail to Storm Pass and Estes Cone.

Around the year 2004, after a decade of use, the trail around Lily Lake was seeing a huge increase in popularity. To serve

the public need, the NPS installed portable toilets trailside at the lake, similar to those found at rock concerts and construction sites. Needless to say, on warm summer days, the aroma was a wee bit pungent. Additionally, these toilets were not wheelchair accessible, which was at odds with the accessibility-oriented services at the Lily Lake site.

According to legend, one day the Nature Association's

board president walked past the smelly toilets and reported the offense. A few weeks later, when it was clear that the NPS could not provide a facility in a speedy fashion, the board of the Association decided to raise the funds to do so. After three months of fundraising and actual construction, a \$65,447 truly accessible restroom was completed and opened for public use in record time.





Rocky Mountain Conservancy

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December 13, 2016 – March 1, 2017
950 gifts ~ total donations \$267,097

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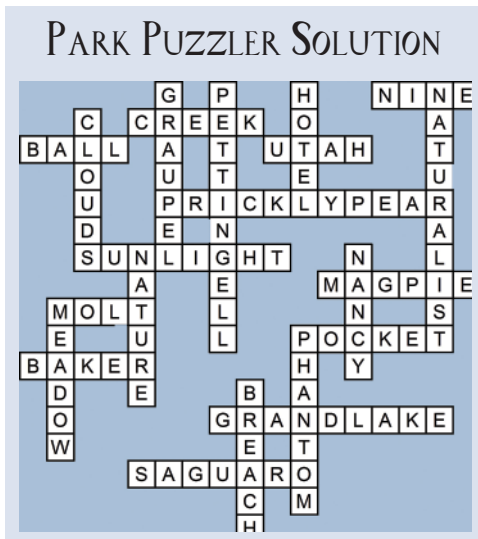
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 Arthur Turpin and Shirley Neely-Turpin,
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 Carole K. Tuttle, Fort Collins, CO:
In memory of Jim Detterline
 Floyd and Leslie Tyson, Eaton, CO
 Elizabeth Ugalde, Estes Park, CO
 Bill and Susan Urlick, Parker, CO
 Sandra Utz, Longmont, CO
 Constantine & Claire Valaoritis, New York, NY
 David and Debra Van Tassel, Estes Park, CO
 Michael Walker, Plano, TX:
In memory of Robert Meadows
 Joe and Jean Van Winkle, Estes Park, CO
 Patricia VanDevander, Denver, CO
 Robert Venohr, Aurora, CO
 Tania Ventura, Boulder, CO
 Marguerite VillaSanta, Baltimore, MD
 Tom Waddell, Golden, CO
 David and Jan Waddington, Golden, CO
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 Melissa Walker, Colorado Springs, CO
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 Timothy and Julie Walsh, Windsor, CO
 Sharon Ward, Fort Collins, CO
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In memory of Deane Dukes
 Marcy Wasman, Palmetto Bay, FL
 Joe and Barb Wasung, Greeley, CO
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In memory of Sherrie Lynn Weinstein
 Karen Weisbrich, Dallas, TX:
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 William and Marlene Wenk, Denver, CO
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Pygmy owl with a hankering for horned lark. Photo: Scott Rashid, founder of CARRI



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Nature Notes

Whoooooee! High winds have been wreaking havoc on the park's east side this winter. Major windstorms in early February brought in reports of 120 mph wind gusts in some locations in Estes Park. Trees were falling throughout the Estes Valley, but also in the park housing area and along popular hiking trails in the park. In fact, around that same time, a hiker literally was blown off the Twin Sisters Trail in Rocky Mountain National Park. His hiking partner reported that one minute his friend was up ahead of him taking a photo, and the next, he was gone. That gust was estimated to be more than 90 mph. Luckily, the hiker survived, with just a broken leg and some facial damage. A word to the wise when hiking in the park these days: trees that were weakened during the 2013 September storm have fallen or been further weakened by these recent winds, so do be cautious when hiking in the park. 🐾 Estes Park resident and Conservancy member **Marge Dunmire** lives right next to the park's east boundary. She's had some trouble with mice in her house while she's lived there and has set traps to try to reduce the population. One night in late October, she was sitting in her living room when she heard a scuffling noise in the corner. When she looked over she saw a weasel staring at her from across the room. In her house. The weasel was mostly brown, but with some white on it. It also had a mouse in its mouth, along with the trap hanging off the mouse. Marge watched it, following it up into the upper bedroom where it carried the mouse and disappeared. She didn't see it again. But then her son came to visit and stayed in the room in which the weasel had disappeared. During the night, he awoke to find the weasel sitting on him, quietly watching, just inches from his face. He observed it for a few brief moments before it scampered away. Marge hasn't seen this nocturnal visitor since, but she's happy to also not have seen any mice, either. 🐾 Conservation Corps Manager **Geoff Elliot** recently moved to a new place in Estes Park. In this new setting he has come to rely on the neighborhood turkeys' morning gobbling to wake him up. 🐾 RMNP Conservation Biologist **Mary Kay Watry** was driving with her kids near a playground in Estes Park in mid-February when her daughter exclaimed, "Look! That bird got a worm!" The "bird" was a red-tailed hawk and the "worm" was a garter snake that was dangling from its talons before the bird perched in one of the nearby ponderosa trees to feast. The snake must have been sunning itself during an early winter warm spell. So much for that. But this turned into a pretty cool wildlife sighting for her kids, as well as an educational opportunity

to talk about the diet of red-tailed hawks. 🐾 The Conservancy's Director of Donor Relations **Julie Klett** was working steadfastly at her third-floor desk when, out of the corner of her eye, she caught the flash of wings against a dreary winter sky. A magnificent northern goshawk had landed and sat perched in a humble aspen tree across the street. It was either waiting for prey or perhaps taking a breather. The bird hung out there long enough for Julie to slowly approach it and snap a blurry picture. 🐾 RMNP Wildlife Technician **Logan Reese** noted that moose and elk were starting to drop their antlers in mid-February. He added that a young moose was observed in Wild Basin on February 20 and the brilliant blue of a mountain bluebird was observed near Mary's Lake on February 21. 🐾 To Conservancy member **Howard Hansen** of Estes Park, it seemed a wee bit early to see a trio of bluebirds hanging around his yard scavenging the winter ground for bugs in early March. It's always worrisome to see them so early in the "spring" when freezing temperatures and winter bluster is yet to come! 🐾 While snowshoeing with a student group from St. Olaf College, instructor **Christie Wilkins** and her students noticed some strange snow formations on the trees. They hypothesized that the snow conditions were just right such that some of the snow stuck to the trunk of the tree while the rest of the snow compacted, leaving the ring of snow hanging. They found several trees off the trail from Bear Lake to Nymph Lake with these snow donuts on them, and by the end of the day, the students had started calling them "snownuts." 🐾 RMNP Education and Outreach Intern **Riley Cavanaugh** noticed a stream in January, in which, as the stream froze over after a thaw, the bubbles from a rivulet cascading over rocks and twigs kept the surface clear. As the temperature dropped, a cone of ice gradually enclosed the minute pool. Within a few nights it had grown above the ice sheet, the burbling bubbles only audible through the open tip. The next day the temperature rose, and by morning it was gone. 🐾 Spring is lurking — just turn over a rock and see what you find!



"Snownuts" Photo: Christie Wilkins