



Rocky
Mountain
Conservancy

QUARTERLY

Autumn 2018

HISTORY OF PLACE: A HIKE OF REMEMBRANCE by Suzanne Silverthorn

My heart sank when I heard the news. Jim Detterline, who left his mark on the world with his passion for RMNP and his record ascents of Longs Peak, was gone. His life had been cut short and I couldn't stop thinking about his kindness — helping me, a complete stranger, with my research questions. I had looked forward to meeting him in person to thank him for his help, and that opportunity had now vanished. I had read accounts of Jim's work as a climbing ranger and the dangerous rescues and recoveries associated with the job, and of his love of organizing the Longs Peak reunions that brought together climbers from all generations to celebrate their passion for the towering peak. I was in awe of Jim's accomplishment of holding the record for the most ascents. He quietly surpassing the legendary Shep Husted, the guide who once worked for naturalist and hotelier Enos Mills, leading guests on the trek from the Longs Peak Inn, which served as the outpost for adventure during the park's early years.

That's when I got the idea: Would it be possible to summit Longs Peak, the most celebrated mountain in the park, just once as my own personal tribute, to say thank you to Jim? I'm not a climber, and while I'd enjoyed exploring the park's many trails throughout my life, I'd never thought

about attempting such a thing. But it got me thinking about the historical research I'd been doing. It brought me back to the first recorded ascent led by Major John Wesley Powell in 1868, Isabella Bird's colorful account of her 1873 summit, and the daring climbs of East Face adventurers, including Ranger Jack Moomaw, whose Longs Peak legacy was bestowed to Jim. I envisioned what it must have been like to climb in the elements without the benefit of comfortable hiking shoes, windproof clothing, energy snacks and other modern conveniences. Or to have climbed as a guest of the Longs Peak Inn, while listening to stories about Mills' years-long crusade to create the park.

I shared my idea with a co-worker, an experienced mountaineer, and without hesitation he offered to join me. To prepare for the hike and to familiarize myself with the trail, I took a practice hike one Sunday with the intention of making it to the Boulder Field at 12,700 feet — a sight I'd only seen in photographs. I was three hours in when I arrived at my planned destination, thankful for my inaugural 14er hike up Mt. Sherman a few weeks earlier. Looking up some 500 feet beyond was the Keyhole formation with its ragged edges resembling its namesake. I sat down to take it all in, then advanced to the tent sites, each encircled by rock walls, which served as the only available protection from the elements.

(Tribute, continued on page 12)



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Dear Friends,

As winter settles into the Rockies, I hope this letter finds you well and warm, wherever you are. With Thanksgiving just around the corner, I find myself especially thankful for the public lands I'm lucky enough to call my backyard. This summer, I was fortunate, with a little bit of luck and a lot of careful planning, to retreat into Rocky Mountain National Park on many different weekends for quick backpacking trips with my daughter and husband. We were often joined by other families with small children, too. On one of our trips, we arrived at our campsite after dark, two miles from the nearest trailhead, with a 2-year old, a 5-year old and a 7-year old in tow, each of them with faces and hands covered in chocolate, only to find a note from the last camper letting us know of bear activity at the site the night before. We scrubbed little faces, tightened up our bear-proof canisters, and restlessly fell asleep with fingers crossed. Fortunately, we didn't see a bear that night, nor on any of our other trips, in part because each of the little Junior Rangers on our adventures knew how to help protect wildlife, enjoy the wilderness appropriately, and experience the park safely. I'm always honored to watch a child take the Junior Ranger pledge: *"As a Junior Ranger, I promise to help protect Rocky Mountain National Park, my neighborhood parks, and all other natural areas, by being a responsible steward of the environment."*

As members and supporters of the Conservancy, you are helping us to reach these children, and thousands more each year, through education programs in the park, schools and communities. But so many children have not had the same opportunities. I am also thankful that my child is healthy and able-bodied, while so many children and members of our community don't have that same fortune, nor the opportunities to connect with and learn about the natural and cultural wonders of Rocky. We owe these valued members of our community more.

For many park visitors, visiting Rocky begins in a park visitor center, and so I'm especially excited that we are partnering with the park this coming year to design new exhibits for the Kawuneechee Visitor Center in Grand Lake. These exhibits will be designed to be accessible for people with disabilities, whether visual, auditory, or physical, so that a child who might not be able to pick up and read a Junior Ranger booklet can still experience and benefit from the educational content of the exhibits, regardless of their abilities. I frequent a quiet little trail near my house, and recently found myself grumbling about what I thought was an illegal mountain bike tire mark on the trail, until one evening when a neighbor in a wheelchair rolled past me on his way to his own adventure further into the park. I waved, and reminded myself that, of course, these are his trails, too, and his wheelchair treads belong on that trail as much as my boot treads do. We can do a better job of making sure that all of our community has access to our majestic public lands, either on the trail, on a field trip, or on a ramp into a building.

As we look toward the New Year in the not-too-distant future, I am thankful each day that I get to serve in a leadership role in this wonderful organization, alongside you, our board and staff, and our partners, to continue to be inspired by Rocky, and to strive to serve the park and its visitors in new and important ways. Happy Thanksgiving to you and yours, whether you're eating a turkey from the store, or watching a wild turkey strut around Cascade Cottages, I hope you'll mention Rocky Mountain National Park as something you're thankful for, too!

Estee Rivera Murdock

Executive Director



Photo: Jim Ward

Happy Holidays from the Rocky Mountain Conservancy!

Let us help you make it special with products that support Rocky Mountain National Park!



2019 Erik Stensland 12-month Scenic Calendar
Enjoy a year-long journey through the heart of Rocky Mountain National Park through rarely seen views of the park. Item #5983 \$14.95
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12 stunning photographs of Rocky Mountain National Park with descriptive text for every month. Includes large grids for daily notes. Item #3713 \$14.95
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RMNP Dream Lake Short-sleeved T-shirt

This deep heather green T-shirt sports a design of Dream Lake on the front including the circular type "Rocky Mountain National Park Est. 1915" and "Take me to the Mountains". 52% cotton, 48% polyester. Unisex sizes: S, M, L, XL and XXL. \$24.95
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A wonderful story of a young girl's bravery and strength that captures the thrill of climbing Longs Peak a long time ago, which isn't so very different today. Item #3900

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RMNP Vintage Cap

A great cap for a day in the Rockies! 100% cotton and fully adjustable, this comfy cap boasts an embroidered snow-capped Rocky Mountain scene stitched with "Rocky Mountain National Park Est. 1915." Item #9769 \$16.95
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This Volkswagen van magnet features an open door revealing a view of Trail Ridge Road and two elk beside the road. Measures 3-7/8" x 2-1/2". Item #4010 \$6.95

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Cover photo credits

(Upper) "Red Fox Hiding" by Conservancy member Jim Ward, Estes Park, CO; (Lower) "Night Sky, Alberta Falls Area" by Conservancy members Kent and Carolyn Carlson, Estes Park, CO

Please send high-resolution images to nancy.wilson@RMConservancy.org by December 31 for publication in the 2019 Winter 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.

What is the bright orange lichen I've seen on rocks along the trails in the park? The park's most common orange lichen is *Xanthoria elegans*, or sunburst lichen. There are many other orange lichens, but as this is our most abundant and widespread, chances are good it is this one. If you see this lichen, look around closely on the neighboring rocks — it is often found near animal scat and urine deposits. — *Kathy Brazelton, RMNP Ranger, Interpretation*

What's the story on the "native" greenback cutthroat trout in the park — is there some question as to their provenance? In a 2007 study, Metcalf et al. used molecular markers from the mitochondrial and nuclear genomes to analyze individuals from greenback and Colorado River cutthroat trout (*O.c. pleuriticus*) populations from the major river basins in Colorado. Results from that study identified five populations with what the authors believed were Colorado River cutthroat trout genetic markers on the east side of the Continental Divide, and one population with what they believed were greenback cutthroat trout genetic markers occurring on the west slope of Colorado, which has historically been considered Colorado River cutthroat habitat. Additional genetic research led by researchers from the University of Colorado (Metcalf et al. 2012) then compared mitochondrial DNA of extant cutthroat trout populations from Colorado with DNA extracted from cutthroat trout museum specimens collected in the late 1800s, thereby providing an understanding of the native ranges of cutthroat trout in the southern Rocky Mountains prior to major fish-stocking efforts. Several significant conclusions resulted from this study, with the most significant finding being that that only a single extant population of greenback cutthroat trout remained, which was occupying Bear Creek, near Pikes Peak in El Paso County, Colorado, in the Arkansas River basin. A concurrent meristic study (**Ask Nancy: Trout continued on page 15**)

I've noticed a marked increase in overhead commercial flights during recent visits to RMNP. In fact, during the morning and afternoon, I was hearing overhead flights about every 20–30 minutes. This is concerning — has something changed?

The FAA developed new aircraft arrival and departure procedures for the major Denver Metro Area airports in 2010 – 2012. Prior to that time, aircraft approaching the Denver Metro Area from the northwest were being vectored over the park to an arrival gate located east of Estes Park. This included numerous flight paths over the park resulting in a broad swath of noise impacts. RMNP was very engaged in the planning process and was successful in persuading the FAA to identify a single commercial airline arrival flight path over the park that roughly follows Trail Ridge Road. The procedures called for aircraft to be sequenced from multiple flight paths west of the park to a single flight path over the park. The logic was that with a single flight path over Trail Ridge Road, the remainder of the park (which is 95 percent designated wilderness) would be quieter. In 2016, the FAA launched the Metroplex Project to further refine Denver Metro Area aircraft departure and arrival procedures. Data presented at a January 2016 Metroplex meeting revealed that commercial airlines were not following the procedures developed in 2010 – 2012, but were in fact sequencing directly over the park rather than west of the park. RMNP engaged with the FAA Project Manager and staff on the issue, and assurances were given that the new procedures would address the situation. The Denver Metroplex project was on hold and is starting to move forward again. — *RMNP Public Affairs Officer Kyle Patterson*



Limber pine monitoring and conservation activities could not be done without the help of dedicated volunteers. Data is recorded on a variety of factors including tree health status, percent canopy kill, percent of branches with fresh cones, other notable damages to the trunk and branches, and signs and symptoms of WPBR.

Photo: NPS

It doesn't seem like much to begin with — a slight orange tinge to the bark, a bit of swelling on a branch, brown pine needles. Inconspicuous features that could easily go unnoticed. But features like these can be a sign of an insidious problem, and in the case of white pine blister rust, the Forestry Program at Rocky Mountain National Park is fighting back.

Last October, during routine limber pine surveys, Dr. Anna Schoettle noticed several limber pine trees (*Pinus flexilis*) showing possible indicators of white pine blister rust (WPBR) infection in the Beaver Ponds area of Rocky Mountain National Park (RMNP). Dr. Schoettle, a Research Plant Ecophysiologicalist with the USFS's Rocky Mountain Research Station, has been conducting research on limber pines in the park for several decades. USFS Forest Pathologist Kelly Sullivan Burns was called in to take a closer look. Further observations, removal of a canker, and lab analyses by Dr. Jane Stewart of Colorado State University, confirmed WPBR as the culprit. RMNP Forest Ecologist Brian Verhulst and the Forestry Crew removed the infected tree and incinerated it before the year's end. This summer, Rocky Mountain National Park's Forestry program has been busy removing WPBR infections in the Beaver Ponds area.

This isn't the first time that WPBR has been found in RMNP. Symptomatic trees were observed near Many Parks Curve in 2009, but at the time the fungus, *Cronar-*

tium ribicola, could not be confirmed. Follow-up visits during the summer of 2010 showed no signs of spores or spore formation, a sure sign of WPBR infection. However, further survey work at the Beaver Ponds found an infected mature tree with spores, confirming

the presence of WPBR in the park.¹

WPBR is tricky to identify and requires a trained inspector. Symptoms include branch swelling, orange blisters, diamond-shaped cankers, and dead branches adjacent to cankers and blisters. Chew marks from rodents feeding on the cankers may also indicate WPBR infection. Signs of infection can take years to appear. The tree found in 2010 was likely infected 4–6 years earlier. Models suggest, using canker size as a proxy for age, that the tree identified with WPBR in 2017 was infected in 2001.² Confirming WPBR is also challenging, as observed signs and symptoms are not



RMNP Forestry Crew Supervisor Dale Loper practices collecting seed cones as part of a training activity. Cones are collected from both trees that contain the gene resilient to WPBR and those that don't, to support natural, genetically diverse populations.

Photo: NPS

Research Behind the Scenes:

Ongoing Limber Pine Conservation Strategies in Rocky

by Carissa Turner & Saba Asefa

conclusive on their own. Spore presence (in spring) or DNA analysis is necessary to make a final confirmation.

Limber pine is recognized as a Species of Management Concern at RMNP. This high-elevation keystone tree species maintains ecosystem structure, function and biodiversity. It supports an array of plants and animals — the root systems stabilize soil; the branches and needles shade young plants and help retain snow; and the large seeded cones provide high-calorie nutrition for the Clark's nutcracker, squirrels and other wildlife. Limber pines have historically significant uses by Native Americans for nutritional, medicinal and ceremonial purposes.³ These trees' ecological and cultural importance, and intrinsic value to Rocky has prompted a proactive and adaptive approach to their management.

WPBR isn't the only issue affecting limber pine in RMNP. Recent severe drought conditions, along with the bark beetles such as the mountain pine beetle (MPB), have also affected pine species in the park. Warmer winters and drier summers have supported higher overwinter survival of MPB which in turn led to 19% mortality of RMNP's limber pine between 1996 and 2014.³ Limber pine is a preferred host for MPB.⁴ In addition, WPBR infection likely increases limber pine susceptibility to bark beetle infestation.

Dr. Schoettle has been at the forefront of limber pine research and conservation, and a key partner at RMNP. Her research has focused on developing a proactive approach to support the long-term conservation of limber pine in the western United States. At RMNP, she has supported a long-term monitoring effort, started in 2008; identified genetic resistance to WPBR in limber pine trees in RMNP; led the development of the Limber Pine Conservation Strategy; and contributed to the Limber Pine and White Pine Blister Rust Monitoring and Assessment Guide



C. ribicola, the non-native fungus that causes WPBR, has a two-host life cycle. (Photo (left): fungal spermatia known as aecia, with spores not yet erumped. Photo (right): Sporulating aecia showing the rusty-colored spores. While fatal to limber pines and other 5-needle white pines (pines with needles in bundles of five), the second host, most commonly currant or gooseberry shrubs (*Ribes* spp.), is not greatly affected by the fungus. Limber pine is the only 5-needle white pine found in RMNP.

Photos: NPS/Anna Schoettle

for Rocky Mountain National Park. RMNP's forestry program has enthusiastically incorporated Dr. Schoettle's recommendations into their limber pine monitoring and conservation work.

The Limber Pine Conservation Strategy, initiated in 2008, employs on-site and off-site approaches to management to promote conservation. The goal is to increase the limber pine population, sustain genetic diversity in limber pine stands, identify WPBR-resistant trees, and monitor limber pine communities for rust. To proactively assess WPBR, there currently are 17 monitoring plots where tree stands consist of 20% or more limber pine, and six wetland early detection-monitoring plots where early detection is most likely because they provide the high humidity and cool temperatures necessary for spore release and germination. Each monitoring station is evaluated for tree sizes, elevation, slope and presence of WPBR. Seeds are collected from trees within the park that will be out-planted in new areas that have a good environment for limber pine, optimizing the genetic diversity of the species. Additionally, seedlings from seed collected from 80 trees within the park have been screened for genetic resistance to WPBR, as resistance conferred by a single gene has been confirmed in the park's limber pine populations.^{5,6} These individual trees are periodically monitored.⁷ Some seeds also are stored in a freezer to save for later use if needed, and for ongoing genetic research.

To combat bark beetle infestations, protection of limber pines with Verben-

one packets is underway.⁸ Verbenone is a chemical compound that mimics the pheromone pine beetles exude to ward off other pine beetles when they have paired with a mate, thus dissuading bark beetles from attempting to infest a tree. Over 275 individual limber pines have been treated with Verbenone at 17 limber pine sites in the park since 2008.⁹ Verbenone packets are placed annually on 15 trees per limber pine site. Additionally, infected parts of trees are immediately pruned to reduce the spread of blister rust.

At least for now, Rocky's forestry crew has been successful in keeping the threat of WPBR at bay. A 2013 study by the NPS Inventory and Monitoring program found 0.3% of limber pine trees surveyed were infected by WPBR, compared to over 24% at Glacier National Park and 7% at Great Sand Dunes National Monument.¹⁰ Much of the monitoring and data collection is ongoing, but there is a positive outlook on the future health of RMNP's limber pine population. The park's Limber Pine Conservation Strategy was recently expanded into northern Colorado and southern Wyoming, highlighting RMNP's leadership role in conserving biodiversity across the greater landscape.¹¹

There is no doubt that this work takes an army of dedicated staff, partners and volunteers. Each year since the monitoring program began in 2008, up to 40 volunteer citizen scientists work nearly 1,000 hours in support of the Limber Pine Conservation Strategy program. Limber Pine Citizen Scientists have worked alongside Forestry staff in all aspects of monitor-

ing and restoration activities. They have photo-documented, tagged and mapped trees; collected seed cones; applied Verbenone pheromone packets; inspected trees for WPBR infections; propagated limber pines in the greenhouse; and planted limber pine seedlings at restoration sites. Early detection and action against WPBR will help ensure the long-term presence of limber pine, and the plant and wildlife communities they support, in Rocky Mountain National Park.

Interested in getting involved in the limber pine monitoring and restoration? Each year, the Forestry program recruits volunteers to support limber pine conservation efforts. Contact the park volunteer office in early spring.

1 Schoettle, A., B. Goodrich, and J. Klutsch. 2010. "White Pine Blister Rust Confirmed on Limber Pine in Rocky Mountain National Park." Rocky Mountain Research Station, Fort Collins, CO.

2 Burns, Kelly Sullivan. 2018. White Pine Blister Rust Infections Confirmed on Limber Pine in Rocky Mountain National Park in 2017. Lakewood, CO: US Forest Service.

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4 Cerezke, H.F. 1995. "Egg gallery, brood production, and adult characteristics of mountain pine beetle, *Dendroctonus ponderosae* Hopkins (Coleoptera:Scolytidae) in three pine hosts." *The Canadian Entomologist* 127 (06): 955-965.

5 Schoettle, A. W., R. A. Sniezko, A. Kegley, and K.S. Burns. 2014. "White pine blister rust resistance in limber pine: Evidence for a major gene." *Phytopathology* 104: 163-173.

6 Schoettle, A.W., B.A. Goodrich, J.G. Klutsch, K.S. Burns, S. Costello, R.A. Sniezko, and J. Connor. 2011. "The Proactive Strategy for Sustaining Five-Needle Pine Populations: An Example of its Implementation in the Southern Rocky Mountains." Edited by D.F. Tomback, M.P. Murray, C.M. Smith R.E. Keane. *The Future of High-Elevation Five-Needle White Pines in Western North America: Proceedings of the Hight Five Symposium*. Missoula, MT: USDA Forest Service Proc. RMRS-P-63. 323-334.

7 Cleaver, C., K. Burns, and A. Schoettle. 2017. "Limber Pine and White Pine Blister Rust Monitoring and Assessment Guide for Rocky Mountain National Park." Report prepared for RMNP.

8 Schoettle, A.W., K.S. Burns, C.M. Cleaver, and J.J. Connor. 2018. Proactive limber pine conservation strategy for the Greater Rocky Mountain National Park Area. General Technical Report RMRS-GTR-379, Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station, 81.

9 Connor, J., A. Schoettle, K. Burns, and E. Borgman. 2012. "Limber pine conservation in Rocky Mountain National Park." *Nutcracker Notes* 23: 13-15.

10 Borgman, E. 2017. Forest Health of High-Elevation, Five-Needle Pines at Glacier National Park, Rocky Mountain National Park, and Great Sand Dunes National Park and Preserve: 2013 Data Report. Natural Resource Data Series NPS/ROMN/NRDS-2017/1112, Fort Collins, CO: National Park Service.

11 Schoettle, A., K. Burns, T. Douville, and C. Holtz. 2018. Update on Status of the Southern Rockies Rust Resistance Trial (SRRRT). USDA.



Research Science in Action

Researching Antibiotic-Resistant Bacteria in Rocky

Laura Scott,
Bailey – RMNP Research Fellow

A research project is like a long hike. There's an initial gust of excitement at the start, upon undertaking this huge endeavor, followed by hours of hard work and effort. A lot of planning goes into every little detail. Despite this, somewhere along the way something unexpected is going to slow you down: It might storm, you may stumble and trip, and sometimes things just take longer than anticipated. In certain moments your destination seems distant, and you wonder if you'll ever reach it or why you were crazy enough to attempt it in the first place. When you finally reach your goal, you're on top of the world. And while I haven't achieved all my research goals yet, the summit is definitely in sight.

I am honored to have been this summer's Bailey – RMNP Research Fellow offered through the Rocky Mountain Conservancy. This fellowship is geared toward young scientists conducting graduate work in Rocky Mountain National Park. In particular, it is designed to offer insight about public education and service when conducting scientific research in public lands. The fellowship also affords an aspiring scientist opportunity for scientific independence, including the associated benefits and trials that come along with it.

The planning for this project started in the winter of 2017. Coordinated efforts were made to make sure that both the park's interests and my research interests were covered. I designed a project with the lofty goals of elucidating the mysteries behind antibiotic-resistant bacteria found in the far reaches of the natural environment, and determining whether they might be a threat to human health. This was going to be my breakthrough opportunity to make my mark as an up-and-coming scientist in my field. As every detail was checked, supplies were ordered, and final arrangements were made, my excitement and anticipation were irrepressible.

I arrived in Rocky Mountain National Park rip-roaring to begin. My first hurdle was a delay in arrival of supplies. Sampling and processing of bacterial samples requires delicate and precise timelines, especially when public health outcomes are at stake. I could not start my fieldwork. I practiced patience while familiarizing myself with the park and triple-checking my research plans. I was certain I had

prepared so extensively that nothing could surprise me or go wrong. Despite the delay, the work eventually started, and the journey began.

During the first two months of sampling I hiked more than 200 miles, collected over 200 soil and water samples, and processed thousands of bacterial plates. I got caught in thunderstorms, pushed my muscles to their limits, and made laboratory mistakes that continually set me back. When my time in the park was halfway spent, I was less than halfway through retrieving and processing my samples. Getting all of the work finished seemed like an insurmountable task. However, the true objective was always in

sight: There's a potential public health threat, and I was determined to get the data I needed to do something about it.

In general, work taking longer than intended was frustrating and stressful. However, interacting with park visitors, while a delay, was never bothersome. These people were genuinely intrigued by the idea that antibiotic-resistant bacteria might be

I designed a project with the lofty goals of elucidating the mysteries behind antibiotic-resistant bacteria found in the far reaches of the natural environment, and determining whether they might be a threat to human health.

lurking in soil and water in the park at all, much less in the far reaches of the park's backcountry. I had many opportunities to educate hikers about the dangers of drinking untreated environmental water. I also always made a point to inform guests about microbial stewardship, and humankind's propensity for contaminating the environment with our microbes. To my pleasure, visitors were always quick with kindness and encouragement, wishing me luck, and with one saying they hoped to read about my findings in the journal *Nature*. In an extreme case, I met a young man in the parking lot before my hike to sample on Mt. Ida. He took a particular interest in my research and ultimately flew back out to the park several weeks later to help with sampling for a weekend. Not only did my project benefit from his assistance, but my morale was boosted as he impressed on me that I was capable of achieving my goals. The generosity and kindness of strangers was an unexpected benefit of this experience, and it served as a reminder for whom this work is done and why it is so important.

My home institution, Tulane University, is more than a thousand miles away, and I did not bring a field/lab team with me. Besides the obvious implication that the workload is mine to bear, the arousal of scientific hurdles has also weighed heavily. Progress-halting problems reared their heads, both in the lab and the field, threatening the whole research

project. Termination of the project or loss of data were not options. I had to engineer solutions or give up. To this extent, I have matured as a scientist. No longer do I fear approaching unforeseen detriments, but face them head-on with the knowledge that I am fully capable of alleviating them. Without the experience of this fellowship, I would not have this newfound skill or confidence in my scientific abilities.

When one thinks about research in a national park, one might think of climate change, wildlife monitoring, ecological webs, and other common "nature" themes. Infectious disease threats are for hospitals and dense urban centers. In reality, a national park makes for an ideal locale to study the microbiological effects of humans on the natural environment. How do our pathogens get into the environment? Do they evolve within the environment or do we induce the change? Are we changing the microbiome of pristine environments by visiting them? Do these changes represent a threat to human health? A park like Rocky offers countless examples of a human-impact gradient along which we can study and attempt to answer these questions.

My research hypothesis posits that human impact affects the presence of antibiotic-resistant bacteria and their associated genes within the natural environment. This venture has enabled me to observe the potential of these estimated mechanisms take place. To many visitors' (and researchers') lament, parking lots near trailheads are frequently full, to the very last legal inch, in the summer. But when you find a place to park and walk a little way down the

trail, you'll slowly discover peace and isolation. I have hiked an entire day without seeing any other people in several nooks and crannies of the park. The idyllic, age-old idea that wandering "into the wilderness" will result in greater solitude the farther you go, appears to still hold true, even in a park as busy as Rocky.

As this fellowship experience concludes, there is still much work to do. There are samples to be collected and processed, presentations to give, and questions left to answer. A small army of volunteers is helping me reach the finish line, for which I am extremely grateful. Once back at Tulane, there

will be bacterial identification tests, antibiotic-resistance gene testing, cell counting, risk modeling, and data analysis to complete. However, the limited results from the current

processing are intriguing. Thus far, the antibiotic-resistant bacteria tend to be found nearer to trailheads, compared to backcountry sites. This suggests that the presence of antibiotic-resistant bacteria might be related to the presence of humans. Ultimately, I am hopeful that the completed data will be illuminating and serve to inform us about human health risks and natural resource management policy.

This fellowship has been the experience of a lifetime, and I am thankful to the Rocky Mountain Conservancy and Rocky Mountain National Park for this opportunity. I have solidified my passions for environmental microbiology, specifically regarding antibiotic resistance, tested and extended my limits as a scientist, and appreciated the value of serving the public in a research career. I plan to move forward with my passion and my skills, solving important public health problems, and pursuing a career in public service.

Laura Scott has been the Bailey-RMNP Research Fellow during 2018.

In reality, a national park makes for an ideal locale to study the microbiological effects of humans on the natural environment.



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today using the handy
envelope attached.

Dear Friends,

Thank you for your support and passion in 2018 as we worked together to support Rocky Mountain National Park (RMNP). While the number of people visiting Rocky, as well as the park's needs, continue to grow each passing year, I'm pleased to report that your generosity has made this another exciting year full of successes. Here are a few highlights

- With your help, we supported the park's ongoing flood-recovery efforts after the 2013 Colorado floods to reroute and reestablish the Aspen Brook Trail using sustainable trail-building techniques.
- Your contributions helped to improve campground services and accessibility by constructing and installing a solar shower station and pathway at Glacier Basin Campground, and building accessible trails to restrooms in Moraine Park Campground.
- Your donations supported the development of innovative backcountry toilet systems in the Longs Peak area, improving the resource conditions and visitor experience in Rocky's wilderness.
- Thanks to you, we doubled the High School Leadership Corps from one crew in 2017 to two crews in 2018, reaching even more youth from ten Front Range communities, and tackling more park stewardship projects in the process.
- You enabled us to increase participation in children's and family programming in Field Institute classes by eliminating the fees for enrollment in most classes, thus removing cost as a barrier for local kids to spend time learning in their national park.

While 2018 was as another incredible year at Rocky, there is still more work to be done. The upcoming year presents exciting new challenges and opportunities for land protection, stewardship of our beloved park trails, and preserving valued park resources so they may be enjoyed for years to come.

We are counting on your support to make our work possible!

Will you make a gift to support the park?

Please return your gift in the enclosed envelope today.

Again, thank you for being a valued member of the Rocky Mountain Conservancy. Your generous gift today is vital to our ability protect, preserve and enhance Rocky Mountain National Park — for everyone.

With gratitude,

Esther Rivera Murdock
Executive Director

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Your Opportunities to Give in 2019:



✓ **Best Use**

Help the park where funding is needed most. This option gives the Conservancy the flexibility to respond to the park's priority needs. Your gift may be used for trails, education, exhibits, land protection, historic preservation, and more. Plans for 2019 include new exhibit designs for the Kawuneeche Visitor Center; and urgently needed repairs at the Holzwarth Historic site.



✓ **Next Generation Fund**

Your gift provides support for park internships, school programs, Junior Ranger programs, internships, publications, educational materials, and engagement with Native American tribes. It will also provide tuition-free programs for local youth.



✓ **Trail Improvement Fund**

As more people visit the park each year, the need for trail maintenance has never been greater. Your gifts will be used to help rehabilitate and improve the trail from Dream Lake to Lake Haiyaha, to restore the Adams Falls Trail, and more. Help us keep your favorite trails safe and available to all.



✓ **Conservation Corps**

This past summer, the Corps improved trails, restored historic cabins and more in Rocky and the Arapaho-Roosevelt National Forests. Next year with your gift, crews will work in Rocky and in the Indian Peaks Wilderness to improve access and repair trails. Help inspire the public-lands stewards of tomorrow!

Your contributions at work

Conservation Corps Spotlight



"Becoming a member of the Conservation Corps this past summer was nothing short of a life-changing experience. I was challenged to navigate solutions in ways I had not previously done before, and it is because of these challenges that I have seen my growth and am more equipped to handle the rigors of life. I came into the Corps with an idea of what conservation was. Leaving the Corps, I have a passion for it. I hope to use my knowledge and experience from this summer as a springboard for my career, and engage in stewardship for the rest of my life."

— Daniel Vasquez
Texas



Conservancy board members gather at one of the bunkhouse projects for the ribbon-cutting ceremony.

by Kyle Patterson,
RMNP Public Affairs Officer

On October 24, U.S. Department of Interior and National Park Service officials celebrated the construction of new housing units at Rocky Mountain National Park.

“These projects have addressed a significant maintenance backlog at the park and will reduce operation and maintenance costs in the future; two critical

Conservancy Contributes to New Park Housing Facilities for Rocky

issues for the Secretary,” said Rick May, Senior National Advisor for Recreation at Interior. “We are appreciative of the partners who are providing assistance to Rocky Mountain National Park to improve housing conditions for park staff who provide important services to park visitors.”

Two “Park Model” RV units were donated to the park by the Forest River Park Model Division of Elkhart, Indiana, and two were donated by the RV Industry Association. Each structure provides approximately 400 square feet gross floor area.

Also highlighted was the construction of two new bunkhouses. This project replaced two dilapidated and obsolete houses with two new four-bedroom, eight-bed housing units, each encompassing 1,880 square feet. The new quarters will be fully accessible.

A contractor constructed the shells, and the finish work will be completed by the Larimer County Conservation Corps (LCCC) of Fort Collins, Colorado. The LCCC will be directly hired and funded through a donation from the the Rocky Mountain Conservancy. The LCCC will work under the supervision of park staff.

“We are grateful for the generous donations from Forest River Park Model Division, the RV Industry Association, and the Rocky Mountain Conservancy,” said Rocky Mountain National Park Superintendent Darla Sidles. “These organizations have contributed greatly to provide much-needed new housing units for park staff to rent. Additional housing is one of the park’s highest priorities, to help us better attract and retain the staff that are so critical to serving our visitors and protecting Rocky’s amazing resources.”

Summer Discovery Days at RMNP: Families Exploring Rocky Mountain National Park Together

by Katie Phillips, Education Program Manager, Kathryn Ferguson, Distance Learning Specialist, and Collette Wilfong, Geologist in Parks Intern

If you’ve ever visited the Moraine Park Discovery Center during the summer, chances are you may have seen Discovery Days in action. Discovery Days is a family-oriented public program at Rocky Mountain National Park that runs for eight weekends each summer. The program was piloted by the education team at Rocky in 2009, and has expanded every summer since. The program is designed to complement other child-centered programming being offered, such as Rocky’s Junior Ranger Program.

Thanks to the generosity of the Rocky Mountain Conservancy, Rocky’s Discovery Days program provides an array of hands-on activities each week during the summer. From studying lichens up-close under a microscope in “Our Park Rocks” to exploring the invertebrates that live in Rocky’s rivers in “Water, Water Everywhere,” there’s



*Families enjoy relaxing in the reading nook and getting creative at the arts and crafts station of Discovery Days.
Photo: NPS*

no shortage of excitement!

Whether families have all day or just an hour, Discovery Days fosters a fun, family-friendly, interactive space to explore the unique resources of Rocky, up-close and personal. Often, local and Front Range families attend multiple weeks of activities, since each week has a different theme. We had one family this past summer that participated in all of the Discovery Days! Now in its ninth summer of programming, Discovery Days continues to grow and expand ev-

ery season with additional visitors and new activities. In 2018, a total of 3,400 visitors participated — averaging 400 visitors attending per week.

Discovery Days fun doesn’t stop when summer ends. Activities from these weekly themes are woven into school outreach programs and field trips during the school year. Kindergarten- through college-age students interact with Education Rangers to experience some of these same concepts through classroom- and field-based adventures. The Conservancy provides critical financial support to purchase supplies and materials to maintain high quality year-round programming.

Summer may have just ended, but you can be certain that the education team and the Rocky Mountain Conservancy are already planning new activities for next summer. Updated 2019 information will be on the park’s website, and in the park newspaper. Drop in any time at the Moraine Park Discovery Center next summer and see what’s happening in Rocky Mountain National Park!



SUPPORT THE CONSERVANCY AND RMNP ON COLORADO GIVES DAY, DECEMBER 4

Colorado's largest one-day online giving movement, presented by Community First Foundation and FirstBank, is coming up and we need your support.

On Tuesday, December 4, 2018, thousands of donors will come together to support Colorado nonprofits like ours. Last year we raised more than \$47,000. This year, our goal is to raise \$52,000, which we hope to exceed! Your gift will provide critical support to Rocky Mountain National Park.

About Colorado Gives Day

Colorado Gives Day is powered by ColoradoGives.org, a year-round website featuring more than 1,900 nonprofits. ColoradoGives.org encourages charitable giving by providing comprehensive, objective and up-to-date information about Colorado nonprofits and an easy way to support them online.

\$1 Million Incentive Fund

Thanks to Community First Foundation and FirstBank, Colorado Gives Day features a \$1 Million Incentive Fund, one of the

largest gives-day incentive funds in the country. Every nonprofit receiving a donation on Colorado Gives Day receives a portion of the Incentive Fund, which increases the value of every dollar donated.

To donate to us on Colorado Gives Day, go to **coloradogives.org** and search for the Rocky Mountain Conservancy.

Park Puzzler

by RM Conservancy Member Joel Kaplow

Across

- 7** Only about 3% of all the critter species in RMNP (not to mention the world) have a backbone, but they get all the attention. What are the other largely ignored 97% called?
- 8** None of Rocky's hummingbirds overwinter in the park. They all migrate south, some for thousands of miles. In the spring, some not only return to the same area, but to the exact same ___!
- 9** RMNP is trying to reestablish its boreal toad population by having dedicated park staff and volunteers place newborns in selected ponds. What are these tiny tailed toad tots called?
- 10** Some eager visitors tend to venture too close to the park's elk, especially during the popular rutting season. Volunteers, known as the ___ Corps, are there to admonish and educate these folks.
- 11** A lepidopterist is someone who studies butterflies and ____. Thanks largely to citizen scientist Richard Bray, after 15 years of chasing butterflies with 50 of his helpers, the number of known species in RMNP grew from 97 to 141.
- 12** The chain of five lakes in Rocky east of Grand Lake are known as the Shoe-string Lakes to old-timers. The largest one is Lake ___.
- 14** One pretty blue tundra flower is known as both sky ___ and skunkweed, the latter due to its pungent aroma produced to keep unwanted visitors, like ants, away.
- 16** The ___-tailed hummingbird is the most common variety of this miniature marvel seen flitting about the park.
- 18** It's normal for a hummingbird's heart to beat ___ times a second.
- 19** Well-meaning visitors can be tempted to feed Rocky's wild denizens. Not a good thing. Park volunteers who keep a watch on this are known as the ___ Busters.

Down

- 1** Both the Big Thompson and Fall rivers arise inside RMNP. The confluence of these two streams is found next to the appropriately named ___ Drive in Estes Park.
- 2** One of the earliest tundra flowers to bloom is the primrose. Its name is derived from the Latin "primus," which means what?
- 3** The flooding of September 2013 was so damaging, for a while the only intact motorway in or out of Estes Park was ___ Ridge Road.
- 4** Every year, about ___ thousand hikers attempt to summit Longs Peak. Only about half make it, and there is an average of two unfortunate fatalities.
- 5** The sharp pinnacles on the west end of Lumpy Ridge are known as The ___.

- 6** The main culprit for the park's boreal toad population decline is chytridiomycosis, due to amphibian chytrid ____. It causes a thickening of the skin, blocking important electrolytes from being absorbed.
- 11** Just north of the Kawuneeche Visitor Center is Harbison ___ and picnic area, named for a homesteading family famous for their fried chicken.
- 13** RMNP boasts ___ peaks that top out at over 12,000 feet above sea level.
- 15** Estes Park was founded in 1859, and officially became an incorporated ___ in April 1917.
- 16** Rocky's ___ Canyon and namesake creek are found just south of equally gloomy-sounding Dark Mountain.
- 17** Another early tundra bloomer is the alpine forget-me-not. It likes to grow in windswept areas, so with no ___ to block the sun, it gets a head start on other flowers.
- 18** When a male ruby-throated hummingbird is doing his aerial diving act to wow the ladies, his wings can beat an unbelievable ___ hundred times a second!

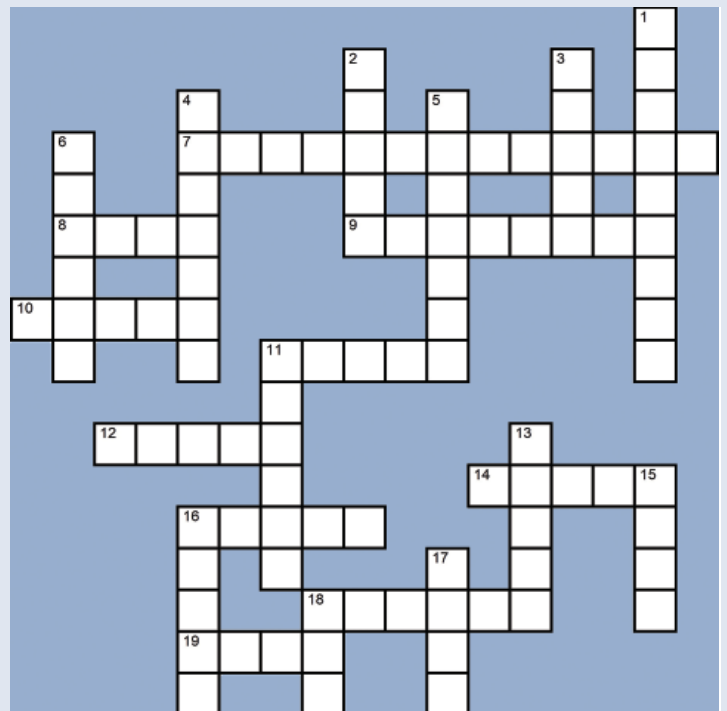




Photo: Lisa Thompson

(Tribute continued from p. 1)

That's when it all came back to me. This is where the Boulder Field Shelter Cabin and stables had once been located, and up ahead I spotted the beehive-shaped memorial shelter nestled in the rocks. I was familiar with these structures from my research, but experiencing these sites firsthand was something special.

The inspiration for construction of these shelters followed one of the worst tragedies in Longs' climbing history. It happened on January 12, 1925, when 34-year-old Agnes Vaille froze to death while waiting for rescuers to reach her. She had just boldly completed the first winter ascent of the East Face, and had taken a fall during her descent. Too weak to continue, her climbing partner, Walter Kiener, went to get help, but it was too late. Rescuers also lost one of their own as an unforgiving snowstorm pounded the mountain.

For Park Superintendent Roger Toll, the tragedy was personal — Vaille, a Denver socialite and a member of the Colorado Mountain Club, was a relative of his. The fallen rescuer, Herbert Sortland, had been a caretaker at the Longs Peak Inn. Those circumstances and the probability of more disasters in the future caused the park to implement a series of man-made safety provisions to help reduce the danger. This included trail improvements, construction of the two shelters, and installation of steel cables on the hardest sections of the North Face for use as hand lines. This was the route Vaille and Kiener had

been using on their descent when tragedy struck; it was Kiener who suggested the cables.

While improving safety was the overall goal, a byproduct of these efforts was the creation of a high-elevation resort, albeit primitive. The masonry shelter cabin was completed in 1927 and was operated by a concessionaire. It was only 14 by 18 feet, yet



Jim Detterline in his element

Photo courtesy of Rebecca Detterline

it could accommodate up to 14 guests. It was equipped with a stove, a small seating area, sleeping quarters and other basic necessities. In those days, you could reach the shelter cabin by horseback, spend the night in relative luxury, and climb to the summit the next morning utilizing the benefits of the Cables Route. A return from the Keyhole Route, with its newly added markings of red-and-yellow bull's-eyes, completed the experience. Souvenir postcards were available that included a daily postmark from the Boulder Field Shelter.

Another option was to stay at the Timberline Cabin, a way station operated by the Longs Peak Inn, which was located about three miles from the trailhead at 11,000 feet near the present location of Jim's Grove Junction. This tiny structure housed sleeping quarters on one end and a combination kitchen-dining area on the other. It was equipped with a telephone line

with sketchy reliability. These outposts sheltered climbers for a number of years before the buildings became uninhabitable. The cables were removed from the North Face in the 1970s.

As I hiked toward the Keyhole, I stopped at the shelter memorial and peeked inside. It was cold, dark and filled with snow, a reminder of winter's harsh conditions. A plaque honoring Vaille and Sortland is fastened to the outside.

I took one last view through my history lens and then transitioned to the purpose of my trip — it was a practice hike to test

my stamina, after all. Five weeks later, I returned to the trail with my hiking companion and was lucky enough to summit from the Keyhole Route on my first attempt. When I got to the top, I thanked Jim for serving as my inspiration, and for his contributions in adding another chapter to the annals of Longs Peak history.

Suzanne Silverthorn is a frequent contributor to the Quarterly. When she's not writing or visiting the park, she serves as Director of Communications for the town of Vail, Colorado.



Rocky Mountain Conservancy

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 Douglas County Community Foundation, Lawrence, KS
 Teachers Insurance and Annuity Association TIAA, Charlotte, NC
 YourCause/Jane Stout, Plano, TX
 American Endowment Foundation, Hudson, OH
 Fidelity Charitable/Jennifer Wood, Cincinnati, OH
 YourCause/Katie Caldwell, Plano, TX
 Morgan Stanley Smith Barney, Dallas, TX
 YourCause/Laura Weiss, Plano, TX

Network for Good/Lisa Brenskelle, Washington, DC
 Network for Good/Marcus Weimer, Washington, DC:
In honor of Hope Shishilla, Washington, DC

Disney EARS to You, Lake Buena Vista, FL
 YourCause, Plano, TX
 Austin Community Foundation, Austin, TX
 Panorama Global Impact Fund, Reston, VA
 Colorado Gives: Community First Foundation, Arvada, CO
 Vanguard Charitable, Warwick, RI
 Network for Good, Washington, DC
 Network for Good, Washington, DC
 McMaster-Carr Supply Co., Elmhurst, IL
 Cheley Colorado Camps, Inc., Estes Park, CO
 AmazonSmile Foundation, Seattle, WA
 Cream City Market, LLC, Littleton, CO
 Romantic Riversong, Estes Park, CO

All in memory of Gaye Franklin

Ronda Curtis, Boulder, CO
 Shirley Guenther, Williamsburg, VA
 Linda and Stanley Burech, Scottsdale, AZ

All in memory of Jean Parshall Dormer

Sara Goldstein, Delray Beach, FL
 Marlene Kitchell, Sarasota, FL
 Murray Hill Neighborhood, Bluffton, SC
 Elise McCaffery, Bluffton, SC

All in memory of Mary Jean Peketz

D. Beverly, Broomfield, CO
 Wayne Beverly, Loveland, CO
 Marvin Eakes, Westminster, CO
 Donna Grass, Broomfield, CO
 Colin and Jean Johnson, Broomfield, CO
 Kenneth and Karen Kanemoto, Longmont, CO

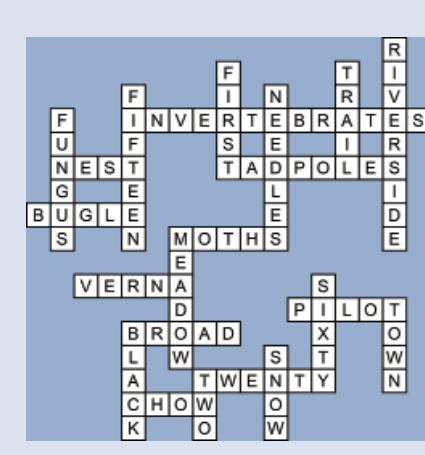
All in memory of Geraldine "Gerri" Stutheit

Lisa Kassel, Broomfield, CO
 Samuel and Elizabeth Novak, Broomfield, CO
 David Peketz, Westminster, CO
 Melissa Ronacher, Lafayette, CO
 Jack and Joyce Williams, Longmont, CO
 Bywater Family Trust, Lakewood, CO
 Tim Ratterman, Centennial, CO
 Michael Yousif, Loveland, CO

All in memory of Douglas and Linda Agee

Douglas and Linda Agee, Fort Collins, CO
 Dale Agger, Fort Collins, CO
 Janet Baynton, Loveland, CO
 Jean Anne Bullock, Red Lodge, MT

PARK PUZZLER SOLUTION



Wilbur Flachman, Westminster, CO
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 Ron Graver, Fort Collins, CO
 Beverly Haddwn, Fort Collis, CO
 H.E. and Carol Halac, Fort Collins, CO
 Mark and Rebecca Johnson,
 Berthoud, CO
 Mark and Janet Knoll,
 Fort Collins, CO
 Marsha Leavitt, Fort Collins, CO
 Mr. and Mrs. Ernest Lira,
 Fort Collins, CO
 Robert Loner, Fort Collins, CO
 Randy and Nancy Morgan,
 Fort Collins, CO
 Corinne Peck, Fort Collins, CO
 Hugh Price, Fort Collins, CO
 Diane Sherry, Fort Collins, CO
 Joyce and Douglas Sjogren,
 Fort Collins, CO

David and Sharon Smith,
 Fort Collins, CO
 Brian Stutheit, Littleton, CO
 Lynn Stutheit, Fort Collins, CO
 Wilbur and Geraldine Stutheit,
 Fort Collins, CO
 David and Susan Stalsworth,
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 Margaret and Fontaine Reeves,
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America By Rail, Inc.,
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(Ask Nancy, Trout, continued from p.3)

(the counting of quantitative features of fish, such as the number of fins or scales) of cutthroat trout in Colorado (Bestgen et al. 2013) supported and complemented the 2012 genetic study. The meristic study was conducted in collaboration with researchers at the Larval Fish Laboratory at Colorado State University and Pisces Molecular, LLC (Boulder, Colorado), and included cutthroat trout specimens collected from all major drainages in Colorado, Wyoming, Utah and New Mexico that are occupied by putative Colorado River cutthroat trout, Rio Grande cutthroat trout or GBCT. The Fish and Wildlife Service are examining this emerging information, and eventually will determine whether the greenback listing will change. In the meantime, all pure cutthroat populations east of the Continental Divide in RMNP are still considered “greenback,” and they have all of the associated protections for a federally listed species under the Endangered Species Act.— *RMNP Conservation Biologist Mary Kay Watry*



American pika are a highlight of the high country, and they are now entering winter, prepared to endure freezing temperatures and high winds for the duration.

Photo: Kent and Carolyn Carlson

Quick-Fix Science

Subalpine Forest Fires and Climatic Variation



The Question: How does fire occurrence relate to climate variability?

Climate can affect fires by creating fire-prone conditions like drought. Understanding the relationship between fire occurrence and climate variability can help predict how future climate change scenarios may impact wildfire patterns. The goal was to ascertain the relationships between wildfire occurrences in subalpine forests with (1) climate variability (specifically drought); (2) broad-scale climate patterns caused by sea surface temperatures (SST) in the tropical Pacific (El Niño Southern Oscillation or ENSO), north Pacific (Pacific Decadal Oscillation or PDO), and northern Atlantic oceans (Atlantic Multi-decadal Oscillation or AMO), which oscillate between relatively warm and cool phases; and (3) temporal variation of sea surface temperatures in the Pacific and Atlantic at short (one- to two-year) and long (100+ years) timescales.

The Project: Compare fire history to climate records.

Using dendroecology analyses (tree-cores and fire-scar cross sections) and vegetation mapping, Jason Sibold and Thomas Veblen of University of Colorado at Boulder reconstructed the fire history (the year and size of past fires) from 1650 to present for 74,000 acres of subalpine forest in the southern part of the park. They compared the fire history of the park with known tree-ring width data. These tree-ring indices correlate strongly with rainfall and temperature in the region; therefore, tree rings are a good indicator of drought,

	ENSO	AMO	PDO
Positive (warm SST)	Wet (El Niño)	Drought ⁺	Wet
Negative (cool SST)	Drought (La Niña)	Wet	Drought

The effects of sea surface temperatures on Rocky Mountain climate

A positive state reflects sea temperatures above normal (warm); a negative state below normal (cool).

*Positive AMO is the most important factor in large-scale fire occurrence.

and can be used as a proxy record of climate conditions. Researchers tested for relationships between years in which large fires occurred and (1) drought; (2) broad-scale climate patterns, including SSTs; and (3) different combinations of SSTs in the three ocean regions (eight combinations between the three oscillation patterns).

The Results: Large fire events are associated with extreme drought conditions, especially those caused by broad-scale climate patterns. This study suggests that regional changes in precipitation play a major role in large-scale fires in subalpine forests, which take place during extreme regional drought conditions. Large fires in the subalpine are not necessarily related to above-average moisture conditions preceding fires, which increase fine fuels like grasses and are essential for fire occurrence in some lower-elevation forest types. These results indicate that large fires in the park depend only on severe drought within the fire year. This is in sharp contrast to the lower-elevation ponderosa pine forests, which typically have fires that follow fuel-enhancing wet periods.

For more information on the park’s research program, visit www.nps.gov/romo.

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Rocky Mountain Conservancy

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Winter is coming.

Photo: Conservancy member Marlene Borneman

Nature Notes

Glowing golden aspen leaves peek through snow-laden pine boughs on this snowy, gray fall day in the high country, where elk and deer and wild turkeys roam, burrowing through the fluffy white stuff to find their food. A second significant snowfall in mid-October has got us wondering what the coming winter will be like 🐾 While hiking to Pettingell Lake in late July, Conservancy member **Walt Borneman** spotted a very active pine marten scurrying across a scree slope, but its wary nature kept it hidden in the willows 🐾 Late this summer, Trail Crew Leader **Cameron Stark**, who was working in the Boulderfield at the time, and Climbing Ranger **Max Barlerin**, who was in Chasm Meadows, observed a black bear as it came through the Keyhole from Glacier Gorge. They watched as it traversed the upper Boulder Field and headed towards Chasm View. It then traversed over to Camel Gully and descended to Chasm Lake, then went across Chasm Meadows onto the shoulder of Mount Meeker and continued on to the south. WOW! 🐾 Park visitor **Betsy Banks** reported a wildlife encounter in mid-August along the shores of Bierstadt Lake — the highlight of which was being checked out by several curious baby ducks. Oh! They also spotted three moose on the far side of the lake — a young one and two adults. They were so surprised to see moose there, as they'd never seen any there before — which highlights the reality that moose are now seen quite regularly on the east side of the park, and lakes and riparian zones are prime spotting areas 🐾 Estes Park High School freshman **Caleb Kilgore** arrived home late one night in late August to find a male hummingbird fluttering on his front doormat. Caleb could tell he needed help, and he didn't want him to get eaten during the night. Turns out it was a calliope hummingbird, the smallest North American bird, in fact. Caleb and his family set up a shoebox with linens and put him in a quiet dark room until morning. When they opened the lid the next morning it was clear that he hadn't moved all night, but breathing deeply, undaunted by the passing cars, their hands, or chirps from other birds. It was clear he was in a torpor sleep. They put a heat pack in his box, and within about ten minutes he was blinking his eyes and opening his beak. They attempted to pick him up to put him up to a nectar feeder outside, but he tightened right up and flew to a nearby tree. Yippee! 🐾 Park visitor **Dean Martinson** spotted a turkey vulture sitting in profile on the rocks around Marys Lake 🐾 Conservancy Director of Conservation **Geoff Elliot** relayed that during mid-summer one of his Conservation Corps crews chased a bear away from their campsite in the Moraine Park Campground, while another crew in the Never Summer Wilderness experienced the thrill of four bull moose walking through their lunch spot on a regular work day 🐾 Conservancy Director of Finance

Sarah Rhode observed four turkeys with a gaggle of 10 chicks wandering near the Conservancy office on two different occasions 🐾 On a recent survey of one of the park's nesting sites, RMNP Biological Science Technician **Nick Bartush**, and an intern, observed a peregrine falcon and a golden eagle dueling in the sky as they competed for the same territory. After a couple minutes of screaming, dive-bombing and talon-slashing they retreated to their respective cliff faces. Further surveys revealed the final outcome: The peregrines ultimately lost their nest to ravens, while the eagles managed to hatch a chick 🐾 RMNP VIP Trailmaster **Carol Nussbaumer** was working her summer morning shift at Bear Lake when she became aware of someone standing behind her, obviously waiting for her to finish talking with another volunteer. When she turned around, an elderly man said, "I was hoping you were planning a prize for a 91-year-old man who just walked around Bear Lake." She had to tell him that, sadly, they weren't, but to his delight, they did offer him a Junior Ranger badge as another achievement to augment his memories of Rocky 🐾 And Conservancy Development Associate **Sue Pinkham** watched two bears in a meadow near their house near the park's Beaver Meadows Entrance. One bear was lying on the ground, happily munching on something, while the other was standing above it at its head, trying to get what the other bear had. After a while, they both lumbered up and wandered down the meadow 🐾 While deeply engrossed in a thrilling detective novel on the edge of his patio in Estes Park one sunny afternoon this summer, Conservancy Everything Man **Brian Desmond** sensed something close by. A first he thought it was a dog, but, stunned, he watched as a full-size black bear slowly sauntered by, close enough to touch! Brian suspected that this adult female (determined by its size and lack of odor) was the same bear that wandered into the lobby of the Stanley Hotel three days later. Upon being informed of this close encounter, Brian's two daughters (one in VA one in TX) each asked via separate emails "What book were you reading?" And no, it was not *Goldilocks* 🐾 It's time to start thinking about your next trip to the park — Rocky will be waiting for you!



Two cow moose showed up a little late to catch the last Moraine Shuttle one summer evening.

Photo: Rocky Mountain Transit Staff