Montana Natural History Center

Winter 2016-2017

MONTANA Naturalist

TO PROMOTE AND CULTIVATE THE APPRECIATION, UNDERSTANDING AND STEWARDSHIP OF NATURE THROUGH EDUCATION

Wildlife Crossings

Bats in Winter | Chasing Larches | Geological Explorations | Winter Solstice Poetry

MONTANA Naturalist Winter 2016-2017

inside

Features

Cover – Mountain bluebirds caught in a late spring snowstorm in Montana's Mission Valley. Photo by Mark Mesenko, www.mesenko.com.

Departments

tidings

PHOTO BY GREG PETERS

Observing alpine larches at Carlton Ridge in the Selway-Bitterroot Wilderness on a misty day.

This past fall, my husband and I adventured on longer hikes to more new places than is usual for us this busy time of year (page 20). And over and over again, I found myself gazing in awe at the landscapes and creatures we encountered. Sometimes Greg and I were the only people on the trail, and knowing we were the only humans observing a particular spot at a particular time had a powerful effect. It made me especially grateful that we decided to get outside even on rainy days.

But it also made our presence feel more weighted. It made me think about those days when no humans happen to visit these wild places, the days when the river otters swim and dive in Turquoise Lake or the snowshoe hares bound beneath the trees on the Crystal Lake trail unobserved by any but creatures who also call those places home. To observe something is to change it. It may not be a big change, but still: the hare we encountered beneath the trees chose a different path after seeing us.

It is important to remember the impact our presence has, whether as an individual exploring a wild landscape or, on a larger scale, as the human species living on this planet. Our collective lives have an enormous impact on the earth and all the other living things on it. Knowing this, we need to ask what kind of an impact we want to have. It doesn't necessarily have to be a negative one, though that seems, too often, to be our tendency.

But there's another side to having a presence, to being present, to observing. Yes, our observing a thing changes it—but it also changes *us*. Seeing that snowshoe hare made me pause; look closer; take in its half-brown, half-white fur; step quietly, trying not to startle it. Upon seeing it, I chose a different path, too.

Perhaps the real challenge is choosing to truly observe in the first place, knowing that it will change us. And that's where being a naturalist comes in: we are observers of the natural world, knowing fully that the more we learn, the more we find to love. Perhaps we revel in the swooping of bats at dusk and wonder about their winter survival strategies, like naturalist Stephanie Potts (page 4). Or perhaps we feel a thrill at finding unusual rocks and minerals, like the geology-lovers of the Hellgate Gem and Mineral Society (page 15). Or perhaps we look at all the roads crisscrossing our country and ponder what we can do to ensure that wildlife can travel through this landscape safely, like environmental consultant Kylie Paul (page 6).

This winter, a challenge: go outside. Observe. Let your observations change you. Then go out and do it again.

Allison De Jong
EDITOR
adejong@MontanaNaturalist.org

WINGED HIBERNATION

BY STEPHANIE LAPORTE POTTS

PHOTO: USFWS/ANN FROSCHAUER

Bats huddle together in hibernacula to conserve warmth.

PHOTO BY NATHAN SCHWAB

Moonbeams glisten off the tops of waves and mountains as I gaze out into nighttime at Kintla Lake. My legs warm from hiking and belly warm from campfire burritos, the day feels complete. It's time to sit for a moment, and breathe.

But as I gaze towards Canada and prepare to think of the Big Things in Life, small clicking noises grab my attention and root me firmly to my spot. Then, faint swishes rush past my ear. And—if I'm not deceiving myself in excitement—air currents, barely perceptible, fan my surroundings. The bats have started their day!

Swirling past me out of their day roosts in the forests and cliffs, bats skim the lake surface for a drink before heading off in search of their insect prey. I am overjoyed, marveling at their acrobatics as they swoop and dive on wings translucent in the moonlight.

I shiver as a cool breeze blows down from the mountains. Imagining a yellow glint starting to form on the larches silhouetted against the top of the ridge, my thoughts turn to questions about what my fluttering friends will do once winter descends. To me, bats are a hallmark of Montana's warm summer nights. But what will they do when summer ends?

Winter brings changes to the landscape that impact the ability of all wildlife to survive. Persevering through winter is all about using fewer calories to stay alive than you can find or have stored. Days are shorter and cooler, requiring animals to expend more energy to stay warm. Meanwhile, lakes and streams freeze, and plants, which form the base of food chains, become scarcer as leaves are shed or covered with snow. Animal prey can also be scarce as many species hibernate, hide, migrate, or die off in the winter.

As small, warm-blooded carnivores, Montana's 15 species of insectivorous bats face a particularly ardent challenge in winter. During the summer, it's not unusual for a bat to eat its body weight in flying insects every night to maintain its high metabolism. But in winter, insects are scarce and the water that bats drink while on the wing is mostly locked up in ice. Moreover, tiny creatures like bats have more surface area in ratio to their body mass, and as a result lose heat to the winter cold faster than larger animals.

Many small creatures address this challenge by burrowing into the ground or snow to protect themselves from the elements while they eat stored food caches and go about their lives. But the thin, flexible wings of bats, which bring such agility to summer hunts, become a burden in winter, preventing bats from burrowing while also increasing the surface area from which they can lose precious heat. Even if they could burrow, insect-eating bats could not subsist on caches of nuts and seeds like their distant relatives, the rodents. So instead, as they do in so many aspects of survival, bats have developed a number of unique adaptations that allow them to persist through the coldest and darkest part of the year.

Some of these are changes in behavior: bats hibernate, migrate, or both. Although some bats in the United States, such as the Mexican free-tailed bat, undergo epic hemisphere-spanning migrations, most of Montana's bats hibernate in Montana or surrounding states during the winter. But nearly all of our bats do undergo at least a short seasonal migration from their summer roots to their winter hibernacula. They are drawn together from their scattered summer hunting by the promise of acceptable shelter and a community of other bats with which to huddle against the cold.

Many of Montana's bats prefer to hibernate in caves or mines, where temperature and humidity tend to stay constant throughout the winter, but not all caves are created equal. Each species has particular requirements it looks for in a hibernation chamber, from temperature to humidity to airflow. Even when two or more different species share a cave, they segregate themselves into different areas and chambers that match their specific requirements. Many bats choose hibernacula with high humidity levels, perhaps to help avoid dehydration. When bats do wake during hibernation, it is often to drink water off the cave wall or a stalactite rather than to feed.

PHOTO BY CARL FROSLIE

PHOTO BY CARL FROSLIE

Many of Montana's bats prefer to hibernate in caves or mines, where temperature and humidity tend to stay constant throughout the winter…

Other adaptations that help bats survive winter are physical: during hibernation, bats enter a state of true torpor, in which their metabolism slows down drastically and their body temperature drops to nearly freezing. Their movements decrease to as little as one breath and heartbeat per minute. This adaptation significantly reduces their daily caloric expenditure and allows bats to survive through the winter without needing to devour insects.

Despite the ability to use long-term torpor, bats must still enter the hibernation period with sufficient fat supplies to get them through winter. Leading up to winter, a few bad nights of hunting could spell disaster for an animal whose normal metabolic rate requires it to eat its weight in food daily. But bats have another adaptation that allows them to prevent such a difficulty: unlike many other animals that use seasonal torpor, bats are also able to enter torpor for much shorter periods. The ability to cut their metabolism for even part of the day in poor conditions allows bats to maintain healthy body weight going into winter, despite their usually high calorie needs.

To further reduce their metabolism during winter, female bats also have the ability to delay their pregnancy. Bats mate once a year, in the fall, as they gather at and swarm around their hibernation spots, but female bats store sperm during hibernation and do not release an egg for fertilization until spring. This allows them to perfectly time the development and feeding of newborn pups with the seasonal increase in food supply.

A beautiful, delicate balance of behavioral and physical adaptations allows bats to persist despite cold and lack of food in the depths of winter. Sadly, the creeping threat of white-nose syndrome (WNS) jeopardizes this equilibrium. A fungal disease, *Pseudogymnosacus destrutans* causes bats to wake out of torpor unnecessarily, burning up precious stored calories and eventually causing death by starvation. Although there are no confirmed cases of WNS in Montana, a number of our native bat species have contracted the disease elsewhere in the country. As bats migrate and mingle at different hibernacula, there is a chance of transmission. This risk is greatly increased by cavers and other explorers who do not follow posted cave closures and decontamination procedures. Those planning to explore caves or mines in Montana can do their part to help stop the spread of WNS by educating themselves about recommended closures, regulations, and protocols; www.whitenosesyndrome.org is a good place to start.

Lost in thoughts about bats, I didn't see the clouds blowing in. The moon is hidden now, and darkness is truly falling. Though I can no longer see their silhouetted bodies, the clicks of my chiropteran companions continue out over the lake. It's time for me to leave them to their work and return to the fire. We're leaving in the morning, but I'll be back next year. And, thanks to their amazing winter adaptations, so will the bats.

BOTTOM LEFT: The hoary bat is one of Montana's migratory bat species, spending only summer months in our state.

BOTTOM RIGHT: Many bats choose caves at or near 100 percent humidity when hibernating, and are sometimes found surrounded by water droplets.

—Stephanie Laporte Potts is the Youth Programs Coordinator at the Montana Natural History Center. She holds an MS in environmental studies from UM, and is passionate about exploring, learning, and getting others excited about Montana's diverse landscapes and species.

BY KYLIE PAUL

Wild Inte

Thanks to the collaboration of many agencies and groups, we've had success building wildlife crossing structures in western Montana–success that can serve as a model for projects both elsewhere in the state and beyond.

While on your way to to your favorite hiking (or skiing) spot in the Bitterroot or Mission valleys, have you noticed any of Montana's new wildlife crossing structures? Seen a fence leading to a tunnel under a road? Have you wondered if and to what extent they help wildlife and people? We're all sadly familiar with the smear marks and mushed body parts of dead wildlife along highways, the result of our movement in conflict with the movement of wild animals—the dangerous intersection between daily natural wanderings and modern transportation. But as you may have seen while driving our Montana highways, there are things we can do to lessen animal-vehicle collisions and provide safe wildlife movement.

The miles of roads and total number of vehicles worldwide are drastically increasing. There are an estimated 750 million vehicles on 63 million miles of paved and unpaved roads in the world. North America has more than 4.5 million miles of roads and more than 250 million vehicles on those roads. Globally, road travel is predicted to double in the next 40 years, creating an additional 15.5 million miles of new roads worldwide, mostly in the world's fastest urbanizing regions, including those with exceptional biodiversity and ecosystems, such as Latin America, China, and India.

So what do all these roads and vehicles mean for wildlife and wildlands? Research has shown that transportation infrastructure like roads and railroads are a major cause of habitat loss, fragmentation, and degradation. Roads penetrating into wilderness or frontier lands are major drivers of wildfires, over-hunting, poaching, and land speculation, often with irreversible impacts on ecosystems. And of course, there's the mortality. Millions of animals die each year, ranging from mammals of all sizes, reptiles, and birds, to insects and other invertebrates. Along with this tragic loss of wildlife, collisions cause significant human injury and property damage. In North America alone, one to two million annual wildlife collisions cause several hundred human fatalities, tens of thousands of human injuries, and more than eight billion U.S. dollars in damage.

We rely on our transportation infrastructure to move resources and keep us connected. So roads are here to stay, but that doesn't mean we are helpless against the challenge of wildlife collisions and habitat fragmentation. We can counteract the negative impacts of our transportation infrastructure with a comprehensive and interdisciplinary approach to research, conservation, planning, and education. *Road ecology* is a relatively new applied discipline that focuses on understanding the interactions between road systems and the natural environment. It develops diverse strategies for avoiding, minimizing, and mitigating negative environmental impacts of transportation.

When considering large terrestrial wildlife species (think deer!), road ecology research has shown that the most successful tool to reduce roadkill and increase connectivity across a highway is to add wildlife underpasses or overpasses, coupled with wildlife fencing that funnels animals to these crossing structures. These structures make drivers and animals safer by reducing wildlife-vehicle collisions. They also help keep habitats and populations connected by providing opportunities for wildlife to cross under or over the highway safely.

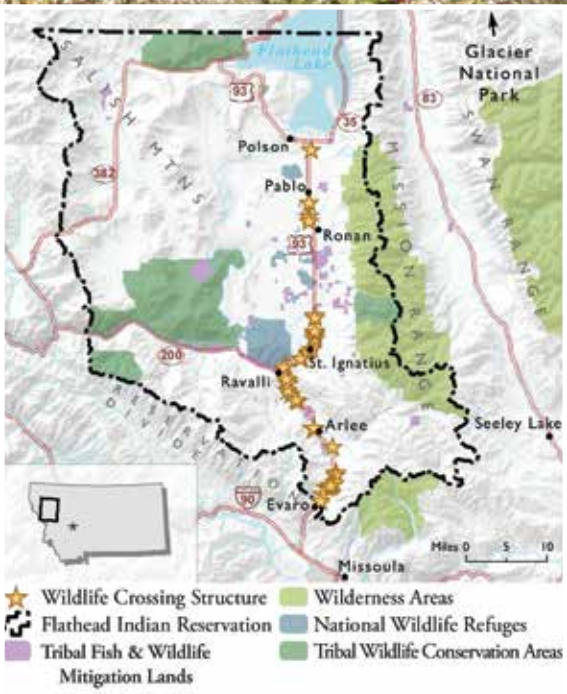
Many of us live in Montana because of the fantastic access to public lands, the wealth of wildlife, and the low number of people—and the resulting relatively low number of major roads

WILDLIFE IMAGES COURTESY OF CSKT, MDT, AND WTI-MSU; OVERPASS PHOTO BY KYLIE PAUL

rsections

in the state. With this gift of wildlife and wildlands, it is perhaps not surprising that we have the nation's second-highest rate of deer, elk, or moose collisions. According to a report by State Farm insurance company, a Montana driver has 1 in 58 odds of colliding with one of the large ungulates and filing an insurance claim for damage. A recent study by the Center for Large Landscape Conservation compiling Montana Department of Transportation (MDT) roadkill data found that between 2010 and 2015, a total of 36,940 animal carcasses were recorded along the state's highways by MDT. Of these, more than 24,750 were white-tailed deer. The majority were found along Interstate 90, followed by Highway 2 across the northern tier of the state and Highway 93 near Missoula. The top high-risk zones (in the fall, the peak collision season) in the state are US 93 south of Hamilton, US 191 near Four Corners, and US 212 by Red Lodge. This is only the minimum number of large animals killed on Montana's highways. This does not, for instance, include any animals deemed unnecessary for pickup by MDT (i.e., smaller species) or those that wander off the highway to die after a collision, or those carcasses picked up by the public. Since 2013, people are allowed to pick up roadkill for meat consumption; the roadkill law requires a permit, though it's unknown the rate at which people obtain them.

A 56-mile stretch that cuts across the Flathead Indian Reservation between Evaro and Polson represents the most extensive wildlife-sensitive highway design effort in the United States to date.



MAP: DEFENDERS OF WILDLIFE (DATA SOURCES: PAD-US, USGS, USCB, BIA, CSKT, NATURAL EARTH, ESRI)

Montana Examples

As befits a state with so many wildlife-vehicle collision problems, Montana has developed some exciting and successful examples of road ecology solutions at work.

U.S. Highway 93 North: A 56-mile stretch that cuts across the Flathead Indian Reservation between Evaro and Polson represents the most extensive wildlife-sensitive highway design effort in the United States to date. There are now 41 fish and wildlife crossing structures, 16 miles of wildlife fencing, 58 jump outs that allow wildlife to escape if they get trapped inside the fences, and many wildlife crossing guards that make it difficult for animals to get on the highway from access roads. Since the start of reconstruction in 2006 this project has helped large numbers of wildlife move safely across the highway. There has been ongoing research studying the efficacy of the structures, with a final report now available at www.mdt.mt.gov/research/projects/env/wildlife_crossing.shtml. Over 70,850 wildlife movements through the structures were documented with motion-activated cameras between 2010 and 2013 (though not all structures were assessed for research). Most movements are made by white-tailed deer, mule deer,

Ways to Get Involved

Interested in helping make our roadways safer for both people and wildlife? As citizens, we can identify our local DOT environmental scientists and engineers and simply ask that they keep wildlife mitigations in mind when considering projects. Bridge restoration and replacement projects are a great place to start. New designs can fairly easily incorporate wildlife needs, and retrofitting existing structures is less expensive than building new ones. Bridges can be extended to span the stream to allow for some dry ground or an artificial ledge beneath the bridge on one or both sides. Soil and vegetation can be added to large rocks to create an erosion-resistant surface that allows animals to move easily under the bridge, thereby increasing the road safety of bridge approaches. Adding fencing to funnel wildlife under existing bridges and culverts is cost-effective and increases their use by wildlife.

These and other recommendations can be made with a phone call, email, or visit to your local DOT office. Sharing your concern and local knowledge of specific wildlife movement areas with the DOT and other public officials can help encourage inclusion of wildlife mitigations in those areas. It is important to share your concern prior to a transportation project's initiation, however, because the planning process for a DOT project takes years prior to actual construction efforts. Sharing your concerns early and often is important.

Several groups work with wildlife and road issues in the West. In particular, Montanans for Safe Wildlife Passage advocates for innovative solutions to maintain habitat connectivity and provide safe passage for Montana's people, fish, and wildlife. You can get involved as a local citizen—contact them and read more at www.montanans4wildlife.org.

Useful recommendations for citizen engagement can be found through: Getting Up to Speed: A Conservationist's Guide To Wildlife and Highways, available at: www.defenders.org/publications/getting_up_to_speed.pdf

Wildlife of all kinds has been documented using the underpasses and overpasses along Highway 93. Such structures help keep wildlife habitats connected, and have been effective in minimizing the number of animal-vehicle collisions.

and domestic dogs and cats, but over 30 animal species have been documented using the structures, including grizzly and black bear, mountain lion, elk, moose, river otter, bobcat, birds, skunk, red fox, coyote, raccoon, rabbits, weasels, badger, porcupine, marmot, and a variety of small rodent species. And since the reconstruction, the number of wildlife-vehicle collisions has decreased in these mitigated areas.

U.S. Highway 93 South: Between Florence and Hamilton, the MDT installed 19 large wildlife crossing structures with wildlife fencing from 2004 to 2012. Research has focused on use by white-tailed deer and changes in animal-vehicle collisions. During post-construction monitoring (October 2008 through December 2014), cameras recorded individual white-tailed deer moving through wildlife crossing structures on 24,323 occasions. Further information is available in the final report on the MDT website.

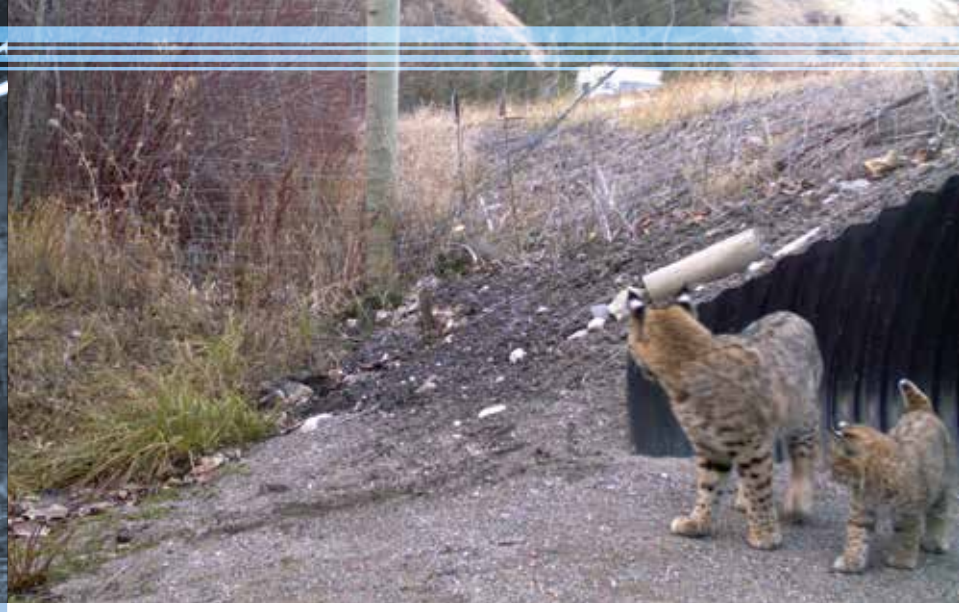
Challenges and Successes

Despite the growing evidence that wildlife-crossing infrastructure is effective, and despite some successful examples like those described above, the innovations developed to reduce wildlife-vehicle collisions and provide for wildlife connectivity across roads have been slow to materialize on the ground. It's a complicated problem. Road ecology has to balance potentially conflicting goals between engineering and ecology while also addressing human behaviors, economic considerations, and diverse wildlife populations. Transportation networks cross many jurisdictional and management boundaries. Governing agencies tasked with managing different resources have different priorities and mandates as well as differing cultures and attitudes. Success requires significant collaboration, but there is no mandate that infrastructure agencies conserve regional ecosystems. Indeed, one of the greatest challenges is a lack of policy or governing framework. There is a policy gap (especially in the U.S.) that does not require or oversee wildlife mitigations, and there are no federal or regional planning protocols. Legislative support and leadership at all levels of government is critical in order for wildlife crossings to be constructed on a large scale.

Not surprisingly, education is the answer—for the public, policy makers, and agencies—to ensure the research and implementation results are shared, more legislative action taken, and eventually more wildlife mitigations are constructed. Regular communication between the public and transportation agencies is essential.

The success of Montana wildlife crossing projects can serve as a model for more work in Montana and, in fact, the rest of the nation. Our U.S. 93 North reconstruction has proven to be highly effective in mitigating highway impacts to wildlife. This did not occur overnight; it came after ten years of disagreement and discussion. The MDT proposed widening U.S. Highway 93 through the Flathead Indian Reservation, which is inhabited and governed by the Confederated Salish and Kootenai Tribes (CKST), in the 1990s. Tribal members were concerned about the impact the expansion could

WILDLIFE IMAGES COURTESY OF CSKT, MDT, AND WTI-MSU



have on their landscape, culture, and natural resources. They insisted that the new design take the well-being of wildlife into account. CSKT and MDT were unable to reach an agreement for several years. Finally, in 2000, the Federal Highways Administration (FHWA) met with both parties and they all agreed to share an approach that recognized the "Spirit of Place"—the landscape, water, plants, animals, and native people. The CSKT, MDT, and FHWA signed a memorandum of agreement that included measures to mitigate the road's impacts to wildlife and other natural processes and to improve human safety through a reduction in wildlife-vehicle collisions.

Moving Forward

Next time you drive by a wildlife overpass or tunnel, ponder how many animals (including humans!) those structures are helping, and consider the hard work that has gone into developing them. The science of road ecology has helped us better understand the impacts of transportation infrastructure on wild species and ecosystems so that we can develop effective strategies to avoid, minimize, and mitigate many negative effects. The challenge we still face is to prioritize and implement this effort. We need to identify and retrofit the worst parts of the existing transportation network and build and manage a network for tomorrow that benefits both biodiversity and people. This starts with you and me, engaging and sharing our informed views with our local decision-makers.

—A wildlife biologist, conservationist, and enthusiast for decades, Kylie Paul enjoys documenting and sharing the wonders of the natural world. She currently works as owner of Kylie Paul Environmental Consulting.

Fictions & Facts: Some misconceptions must be regularly tackled by researchers and advocates, with a constant need for education of the public and decision-makers:

- ***Wildlife crossing structures like underpasses and overpasses aren't used by wildlife.*** No way. Research and monitoring throughout the world has documented rare species and common ones using these structures by the hundreds of thousands. Animals also learn about the location of the structures and that they are safe to use, and will use them more frequently when they have been in place for a few years.
- ***Wildlife crossing structures are too expensive—they aren't worth the money.*** Between vehicle repair costs, medical bills, towing fees, hunting value of road-killed game species, and more, the total costs for the average collision with a large ungulate in the United States and Canada have been estimated by researchers at over $6,000 per deer or bighorn sheep, $17,000 per elk, and $30,000 per moose (in 2007 US$). Despite their upfront costs, wildlife mitigation measures have been shown to pay for themselves over time through collision cost savings when installed at collision hotspots.
- ***Any kind of crossing structure will definitely work.*** Some wildlife species have specific habitat or behavioral requirements that need some specialized structure modifications. For instance, small prey mammals need sufficient cover such as piles of wood branches to move through comfortably. And while elk, moose, and grizzly bear will use large underpasses, they use overpasses in much higher numbers.
- ***Animals will always use a crossing structure if given the option.*** Research shows wildlife is much more likely to use a structure if it has fencing that funnels animals to the structure.
- ***Fencing a highway to keep animals off is all we need to do.*** Increasing the barrier effect of a highway for wildlife through installing wildlife fencing without also providing for safe and effective crossing opportunities for wildlife is bad practice because it fragments populations and may simply lead to new conflict areas.
- ***We can build any road, anywhere, and that will be okay so long as we have wildlife crossing structures and fences.*** Sadly, these mitigation tools can't solve everything, and fragmenting wildlife habitat in the first place should be avoided when possible. There is only a small window of time to influence a road's location and design, and the most cost-effective time is before a road is being built or upgraded.
- ***Avoiding deer-vehicle collisions is the only issue of importance.*** Nope. Mortality from roadways is a major threat to the survival of 21 species listed under the U.S. Endangered Species Act, and people have died swerving to miss more than just deer.

As To The Mission: A Hero Story

The Montana Natural History Center exists to foster a connection between people and nature. This work entails helping people of all ages not only to understand, but to love the natural world. This winter, rather than share specifics about our programs, I think the best way to tell you about our work is to tell you about Sofia and Drew.

Sofia is a fifth grader from a small town in western Montana.

Drew is one of our teaching naturalists—she visits Sofia's school, and many other schools, on a regular basis to teach kids about science and biology, take them outside to explore, and to be a mentor.

Last month, Sofia entered a community essay contest about personal super heroes.

Sofia's subject was Drew.

Sofia Lewanski (bottom) and her hero, naturalist Drew Lefebvre (top).

PHOTO COURTESY DREW LEFEBVRE

PHOTO COURTESY SOFIA LEWANSKI

You see, Sofia has a burgeoning love for nature, especially birds and wildflowers. But Sofia never found anyone her age to appreciate that part of her life. She wrote about how she felt alone in this interest. But in Drew she found not only someone to share her love of nature, but a mentor as well.

Sofia wonderfully described how Drew inspired her to be more confident, writing that she now realizes that she doesn't have to wait until she grows up to help people experience the wonders of nature. She can be like Drew right now: inquisitive, exploring outdoors, and sharing what she learns with others!

No matter where you live, there are opportunities to connect with the natural world. It is passion like Sofia's for birds, wildflowers and trees, mammals, reptiles, and fish that has the potential to preserve nature—but this interest needs to be nurtured.

There is an African proverb that says, "If you want to go fast, go alone. If you want to go far, go together."

We are asking you to join us and help us go far—to educate the next generation, to encourage their love for nature, and to help them feel empowered to impart that love for generations to come.

Thurston Elfstrom,
Executive Director

Thank You, Ron Clausen & Friends!

Ron Clausen has been a tireless champion of Montana's outdoor places for many years, and is especially dedicated to making sure children have the opportunity and resources they need to get outside and experience the wonder and beauty of the natural world. To this end he organizes both the Montana Extravaganza, where he hosts groups of his friends at his home for multiple days of fishing and outdoor activities as well learning about the work of various Montana non-profit organizations who work in outdoor education, conservation, or wildlife management; and the Montana Matters Concert, which features an evening of music, barbeque, and a live auction in Napa, California.

We are incredibly grateful to Ron for his generous support over the past several years. Since 2015 Ron has helped us purchase much-needed buses for our programs that take children and adults into the outdoors. He has also helped fund our newest teaching naturalist position, which has made it possible for us to teach 1,700 kids in 68 4th- and 5th-grade classrooms in Missoula and beyond—from Pablo to Hamilton, and from Alberton to Seeley Lake. We so appreciate Ron and his many friends who have helped MNHC as we grow and expand to carry out our mission of connecting people with nature. We are very much looking forward to our continued partnership. ***Thank you, Ron!***

Ron Clausen (second from right) and friends posing with one of the buses they helped MNHC purchase.

PHOTO COURTESY RON CLAUSEN

Who's Been Walking Here?

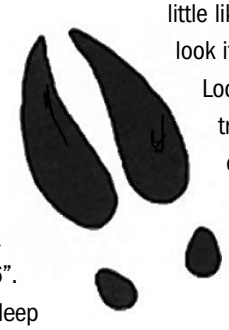
Winter is a great time to practice your tracking skills. How well do you know your Montana wildlife? Brush up on your knowledge here, and then take an amble in the snow for a real-life test!

Coyote - *Canis latrans*
Tracks have four toes, with inside toes a little larger. Claw marks usually show. Bottom pad is roughly triangular. You can draw a rough "X" through the center of canid tracks, between the two outer toes on each side to between the pad and outer toe on the opposite side. ~2.5-3" long by ~2-2.5" wide. (Wolf tracks are larger - 5" by 4", and fox tracks smaller - 2" by 1.8".)

Mountain lion - *Puma concolor*
Four toes, usually no claws showing. Bottom pad is wide and trapezoidal, with three lobes on bottom and two on top, and makes up nearly half the print. Tracks are as wide or wider as they are long, about the diameter of a baseball (3.5" by 3.6").

White-tailed or mule deer - *Odocoileus spp.*
Tracks are heart-shaped, and look a little like an open mussel shell, with their curved edges and slender, pointed tips. Dewclaws may show (about an inch behind the main print) in deep snow. ~3" long by ~2" wide.

Moose - *Alces alces*
Tracks similar to deer, but much larger, ~6" long by ~3.5" wide. Stride (distance between prints of the same hoof) is much longer than that of deer—70" to a deer's 30-36". Moose may drag their feet in deep snow, leaving long, parallel troughs.



Snowshoe hare - *Lepus americanus*
Hind feet are long and wide to help hares "float" on the snow. Front prints are small and circular, about half the size of hind prints. Hind prints are parallel, and land ahead of the diagonal front prints. ~2" long by 1.5" wide (front); 4-5" long by 3.5-4.5" wide (hind).

Red squirrel - *Tamiasciurus hudsonicus*
Front prints are the size of a quarter, with four toes; hind prints are longer and five-toed. Short claws. The hind feet land ahead of the front feet in a squarish shape, with front feet a little closer together. 1" by 1" (front), ~2" long by ~1" wide (hind).

River otter - *Lutra canadensis*
Each foot has five clawed toes; hind prints are wide and about twice the size of front prints. ~3.5" long by ~2.5" wide (front), 4-5" long by 3.5" wide (hind). All feet have webbed toes, and hind prints look a little like our hands might look if they were webbed. Look for tail drag tracks as well—and, even more fun, the 9"-wide troughs otters make when sliding down a snowy hill into the water!

Shrew - *Soricidae family*
Tiny! Five little clawed toes on each foot, with a grouping of small pads below. Track pattern is similar to squirrel, with the larger hind feet landing ahead of front feet; can look U-shaped in deep snow. Hind prints are parallel, front prints often slightly diagonal. .25" x .2" (front), .4" x .4" (hind).

Grouse - *Dendragapus spp.*
Four toes, three pointing forward and one pointing back. Back toe is shorter and may not show, making track look a little like an anchor or an arrow. Toes are fairly wide, and feet may point slightly inward. ~2.5" long by ~2" wide.

RECOMMENDED READING

(all available for checkout at the Montana Natural History Center library):

Scat and Tracks of the Rocky Mountains by James C. Halfpenny

Field Guide to Tracking Animals in Snow by Louise R. Forrest

Tracking and the Art of Seeing: How to Read Animal Tracks and Sign by Paul Rezendes

Mammals of Montana by Kerry Foresman

Tracks from an otter sliding downhill.

PHOTO COURTESY USFWS

get outside calendar

MNHC Hours:
Tuesday-Friday, 9 a.m. - 5 p.m.
Saturday, noon - 4 p.m.

Admission Fees: $3/adults (18+), **$1**/children (4-18), **$7**/family rate
Free/children under 4 and MNHC members

Programs for Kids

December 22, 29 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Free with admission.

January 5, 12, 19, 26 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Free with admission.

January 14 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Hibernation Celebration.** Free with admission.

February 2, 9, 16, 23 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Free with admission.

February 11 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Nature Art with Artist in Residence Peggy Christian.** Free with admission.

March 2, 9, 16, 23, 30 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Free with admission.

March 11 **Saturday Kids Activity.** 2:00-3:00 p.m. **Rockhounding!** Free with admission.

March 21-24 **Spring Break Camp!** 10:00-11:00 a.m. daily. **Nature Activities for Kids & Their Families.** Tuesday, **Outrageous Owls.** Wednesday, **Backyard Birding.** Thursday, **Exciting Explorers.** Friday, **Fabulous Fossils.** Free with cost of admission.

April 6, 13, 20, 27 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Free with admission.

April 15 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Wild Raptors.** Free with admission.

January 6, February 3, March 3, and April 7: **Homeschool Naturalists,** 10:00-11:00 a.m. Natural history education program for homeschool students ages 6-12. Registration required; see page 19 for more information.

Adult Programs

December Gallery, all month. **Gail Trenfield and Mary Kelley: Water and Sky: Ninepipes Landscapes.**

January Gallery, all month. **2016-2017 Audubon Photo Awards Traveling Exhibit.**

January 6 **First Friday Gallery Opening,** 4:30-6:30 p.m.

January 7 **Saturday Discovery Day,** 10:00 a.m.–4:00 p.m. **Staff-led Snowshoe Hike.** Members only. Free.

January 10, 17, 24, 31 **Evening Program Series,** 7:00-8:30 p.m. **Geology Rocks!** with Bruce Baty. Join us for a four-class series with geologist and retired Hellgate High School earth sciences teacher Bruce Baty, and learn all about why geology rocks! $35; $30 MNHC members. Registration required.

January 11 **Evening Program,** 7:00 p.m. **Naturalist Trivia Night.** $4 suggested donation; MNHC members free.

January 18 **Glacial Lake Missoula Chapter Meeting,** 4:00 p.m. Free & open to the public.

January 18 **Evening Program,** 7:00 p.m. **Sip & Sketch with Nancy Seiler: Birds.** $25.

SUN MON TUE WED THU FRI SAT

December

December Gallery, all month. **Gail Trenfield and Mary Kelley: Water and Sky: Ninepipes Landscapes.** 18

Closed for the Holidays December 24-26 and December 31-January 1. 19 20

Winter solstice 21

miniNaturalist Pre-K Program, 10-11 a.m. 22

Deer, elk, and bighorns forage along river bottoms 30 31

TERRY SPIVEY PHOTOGRAPHY, BUGWOOD.ORG

Moose forage for willow twigs 25

miniNaturalist Pre-K Program, 10-11 a.m. 29

CALEB SLEMMONS, NATIONAL ECOLOGICAL OBSERVATORY NETWORK, BUGWOOD.ORG

January

January Gallery, all month. **2016-2017 Audubon Photo Awards Traveling Exhibit.** 1 2

miniNaturalist Pre-K Program, 10-11 a.m. 5

Homeschool Naturalists, 10-11 a.m.

First Friday Gallery Opening, 2016-2017 Audubon Photo Awards Traveling Exhibit. 4:30-6:30 p.m. 6

Saturday Discovery Day, 10 a.m.–4 p.m. **Staff-led Snowshoe Hike for members.** 7

Evening Program Series, 7-8:30 p.m. **Geology Rocks!** 3 10

Evening Program, 7 p.m. **Naturalist Trivia Night.** 4 11

miniNaturalist Pre-K Program, 10-11 a.m. 12

Saturday Kids' Activity, 2-3 p.m. **Hibernation Celebration.** 14

Grouse grow stiff feathers on their feet, which function like snowshoes 8 9 15 16

Evening Program Series, 7-8:30 p.m. **Geology Rocks!** 17

Glacial Lake Missoula Chapter Meeting, 4 p.m. 18

Sip and Sketch with Nancy Seiler: Birds, 7 p.m.

miniNaturalist Pre-K Program, 10-11 a.m. 19

13 20 21

Evening Program Series, 7-8:30 p.m. **Geology Rocks!** 24

Biers for Benefits at Bayern Brewing, 4:00-8:00 p.m. 25

miniNaturalist Pre-K Program, 10-11 a.m. 26

Bear cubs born 22 23 27 28

Lynx pursue snowshoe hares

Evening Program Series, 7-8:30 p.m. **Geology Rocks!** 31

February

February Gallery, all month. **Tom Curry: Montana Wildlife Photography.** 1

miniNaturalist Pre-K Program, 10-11 a.m. 2

Homeschool Naturalists, 10-11 a.m.

First Friday Gallery Opening, Tom Curry: Montana Wildlife Photography. 4:30-6:30 p.m. 3 4

Glacial Lake Missoula Chapter Meeting, 4 p.m. 7 8

miniNaturalist Pre-K Program, 10-11 a.m. 9

Saturday Kids' Activity, 2-3 p.m. **Nature Art with Artist in Residence Peggy Christian.** 10 11

Glacial Lake Missoula Chapter Meeting, 4 p.m. 12 13 14

miniNaturalist Pre-K Program, 10-11 a.m. 15 16

General Volunteer Orientation, 5:30-6:30 p.m.

Evening Program, 7 p.m. **Naturalist Trivia Night.** 17 18

MICHAEL ZAHRA, FLICKR.COM

Programs and events held at MNHC - 120 Hickory Street - unless otherwise noted.

SUN	MON	TUE	WED	THU	FRI	SAT
19	20	21	22 Evening Program, 7 p.m. Sip & Sketch with Peggy Christian.	23 miniNaturalist Pre-K Program, 10-11 a.m.	24	25 *Bluebirds, robins, and red-winged blackbirds return*
28		Non-profit Tuesday at Caffe Dolce. 5-9 p.m.	**March** 1 March Gallery, all month. Peggy Christian, Artist in Residence: Specimen Study in Photography.	2 miniNaturalist Pre-K Program, 10-11 a.m.	3 Homeschool Naturalists, 10-11 a.m. First Friday Gallery Opening, Peggy Christian, Artist in Residence. 4:30-6:30 p.m.	4
7	8	9 miniNaturalist Pre-K Program, 10-11 a.m.			10	11 Saturday Kids' Activity, 2-3 p.m. Rockhounding!
12 *Great blue herons return to nests in rookeries*	13 Moscow Monday at Montgomery Distillery, 12 a.m.-8 p.m.	14	15 Glacial Lake Missoula Chapter Meeting, 4 p.m. Evening Program, 7 p.m. Naturalist Trivia Night.	16 miniNaturalist Pre-K Program, 10-11 a.m.	17	18 Saturday Discovery Day, 9 a.m.–2 p.m. Staff-led Nature Walk for members.
19	20	21 Spring Break Camp! 10-11 a.m., Outrageous Owls.	22 Spring Break Camp! 10-11 a.m., Backyard Birding.	23 miniNaturalist Pre-K Program, 10-11 a.m. Spring Break Camp! 10-11 a.m., Exciting Explorers.	24 Spring Break Camp! 10-11 a.m., Fabulous Fossils.	25
29	30 *Western screech owls begin breeding*		31 Evening Program, 7 p.m. Navigating a Changing World: A Geological Perspective with Kallie Moore.	miniNaturalist Pre-K Program, 10-11 a.m.		**April** 1 April Gallery, all month. TBA.
5	6	7	8	9 miniNaturalist Pre-K Program, 10-11 a.m.	10 Homeschool Naturalists, 10:00-11:00 a.m. First Friday Gallery Opening, 4:30-6:30. TBA.	11
12	13	14	15 Evening Program, 7 p.m. Naturalist Trivia Night.	16 miniNaturalist Pre-K Program, 10-11 a.m.	17	18 Saturday Kids' Activity, 2-3 p.m. Wild Raptors.
19 *Columbian ground squirrels wake up*	20	21	22 Glacial Lake Missoula Chapter Meeting, 4 p.m. Volunteer Naturalist Training, 4:30-6:00 p.m.	23 miniNaturalist Pre-K Program, 10-11 a.m.	24	25

JOY VIOLA, NORTHEASTERN UNIVERSITY, BUGWOOD.ORG

U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION, CENTRAL CALIFORNIA AREA OFFICE

January 25 Biers for Benefits at Bayern Brewing, 4:00-8:00 p.m. 50¢ from every beer goes to MNHC! Come out to Bayern, enjoy a tasty brew, and know you're helping us connect people with nature!

February Gallery, all month. **Tom Curry: Montana Wildlife Photography.**

February 3 First Friday Gallery Opening, 4:30-6:30 p.m.

February 7-May 9, February 9-May 11 Spring Master Naturalist Courses. FULL. Check www.MontanaNaturalist.org for information on our summer course.

February 15 Glacial Lake Missoula Chapter Meeting, 4:00 p.m. Free & open to the public.

February 15 Evening Program, 7:00 p.m. **Naturalist Trivia Night.** $4 suggested donation; MNHC members free.

February 22 Evening Program, 7:00 p.m. **Sip & Sketch with Peggy Christian.** $25.

February 28 Non-profit Tuesday at Caffe Dolce. 5:00-9:00 p.m. 15% of the evening's sales go to MNHC. Enjoy a delicious Italian dinner while supporting MNHC!

March Gallery, all month. **Peggy Christian, Artist in Residence: Specimen Study in Photography.**

March 3 First Friday Gallery Opening, 4:30-6:30 p.m.

March 13 Moscow Monday at Montgomery Distillery, 12:00-8:00 p.m. $1 from each cocktail goes to MNHC! Join us!

March 15 Glacial Lake Missoula Chapter Meeting, 4:00 p.m. Free & open to the public.

March 15 Evening Program, 7:00 p.m. **Naturalist Trivia Night.** $4 suggested donation; MNHC members free.

March 18 Saturday Discovery Day, 9:00 a.m.-2:00 p.m. **Staff-led Nature Walk.** Topic & location TBA. Members only. Free.

March 29 Evening Program, 7:00 p.m. **Navigating a Changing World: A Geological Perspective with Kallie Moore,** Collections Manager at the UM Paleontology Center. See our website for ticket info.

April Gallery, all month. TBA.

April 7 First Friday Gallery Opening, 4:30-6:30 p.m.

April 12 Evening Program, 7:00 p.m. **Naturalist Trivia Night.** $4 suggested donation; MNHC members free.

April 19 Glacial Lake Missoula Chapter Meeting, 4:00 p.m. Free & open to the public.

Volunteer Opportunities

February 15 General Volunteer Orientation, 5:30-6:30 p.m. Located on campus, this is a chance for UM students to learn about volunteer opportunities at MNHC. Exact location TBD. No prior experience necessary.

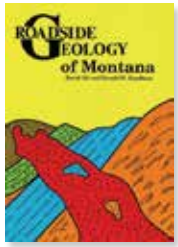
April 19 Volunteer Naturalist Training, 4:30-6:00 p.m. Learn how to teach kids about the flora and fauna of western Montana during the May VNS school field trips for 4th & 5th graders. Training will be held at the Native Plant Garden at Fort Missoula. No prior experience necessary.

Visit www.MontanaNaturalist.org for directions. To register or to learn more, call MNHC at 327.0405.

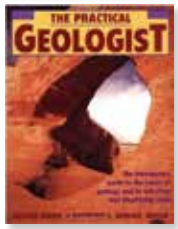
Interested in geology?

Want to learn more? Here are some great educational opportunities, events, and books to check out!

- **MNHC's Geology Rocks!** Evening Program Series with Bruce Baty. Tuesdays, January 10, 17, 24, & 31. Registration required. See the calendar or visit www.MontanaNaturalist.org for more info.
- **MNHC's Saturday Kids' Activity: Rockhounding!**, March 11, 2:00-3:00 pm.
- **The Glacial Lake Missoula Chapter of the Ice Age Floods Institute.** The chapter meets at 4:00 p.m. on the third Wednesday of every month at MNHC.
- **Hellgate Gem and Mineral Society Annual Show and Sale,** Missoula, March 18-19.
- **Northwest Federation of Mineralogical Societies 79th Annual Show** hosted by the Bitterroot Gem and Mineral Society, Hamilton, May 19-21. www.ravailligemandmineral.org
- ***Roadside Geology of Montana*** by David Alt and Donald W. Hyndman

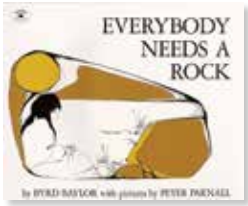


- ***The Practical Geologist: The Introductory Guide to the Basics of Geology and to Collecting and Identifying Rocks*** by Dougal Dixon



- ***Rockhounding Montana: A Guide to 100 of Montana's Best Rockhounding Sites*** by Montana Hodges and Robert Feldman

- ***Everybody Needs a Rock*** by Byrd Baylor (kids' book)



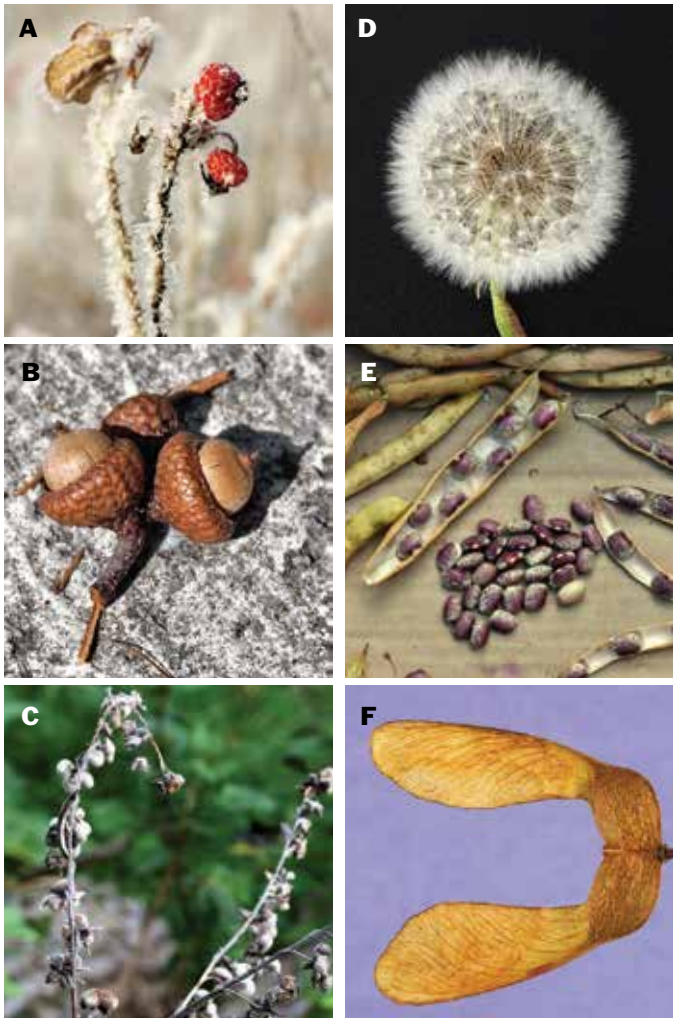
ANSWER TO QUIZ BELOW:
D. wind-dispersed fruits (fluffy)
F. wind-dispersed fruits (winged)
C. fruits that attach to fur or clothing
E. explosive fruits
A. tasty fruits (berries)
B. tasty fruits (nuts)

Scavenger Hunt: Fruits in Winter

Flowering plants have adapted to spread their seeds in a variety of ways. Some seeds are attached to structures that are easily blown about by the wind—light and fluffy ones, like dandelions and milkweed, or winged ones, like maple "helicopters." Other seeds are encased in structures with hooks or barbs that get caught in animal fur (or people's clothing), and hitch a ride far away, like houndstongue or cheatgrass. Still other seeds are spread by expulsion, where the seed casing dries and cracks and the seeds burst out, like lupine and beans. And of course there are seeds buried in fruits that are tasty to eat, like rose hips and huckleberries, which animals deposit far from the parent plant with a nice pile of nutrients!

You may think that there's not much to see once plants are dead or dormant in winter, but you'd be surprised at how many fruits you can find even when it's cold and snowy. Animals need to eat in winter, too! So the next time you take a walk, see how many different kinds of fruits you can find. And remember, when talking about flowering plants, the fruit is the part of the plant that contains seeds, whether it's a bur or a pod or a "helicopter," not just the ones we find tasty!

- ☐ wind-dispersed fruits (fluffy)
- ☐ wind-dispersed fruits (winged)
- ☐ fruits that attach to fur or clothing
- ☐ explosive fruits
- ☐ tasty fruits (berries)
- ☐ tasty fruits (nuts)



A: SATOSHI SAWADA; B: TIIA MONTO; C: FLICKR USER FREEUSEPHOTOS; D: JD PARKER; E: FLICKR USER GRAIBEARD; F: STEVE HURST, USDA

Treasures from the Earth:
Explore Geology with the Hellgate Gem and Mineral Society

BY CHRISTINE MORRIS

PHOTO BY CHRISTINE MORRIS

Genevieve Fix shows off pyrite cubes collected near Lincoln.

PHOTO COURTESY OF TOM CORRIGAN

Montana iris agate—a very special find, and more colorful than regular Montana agate.

Twelve years ago on a cool spring day, I was shown a secret crystal hunting spot. I collected clusters of red-tipped dog-tooth calcite crystals and curious pieces of knobby limestone. The calcite vein was right off the road but unmarked. Treasures from the earth were hiding there in plain sight. My interest in geology really began with finding these rocks and I now consider all elements of the field fascinating.

Eventually this interest led me to the Hellgate Gem and Mineral Society's Annual Show and from there to the club. At my first meeting I was welcomed by a group of convivial rockhounds. Hellgate Gem and Mineral Society members collect and work crystals, agates, gems, and colorful minerals. Many of the members shape the rocks into cabochons (stones that are polished but not faceted) and set them into jewelry. Others use rock saws to slice agate into translucent sheets or tumble jasper into beautifully polished stones. From the novice to seasoned collector, members of all ages especially enjoy searching for rocks together in beautiful country.

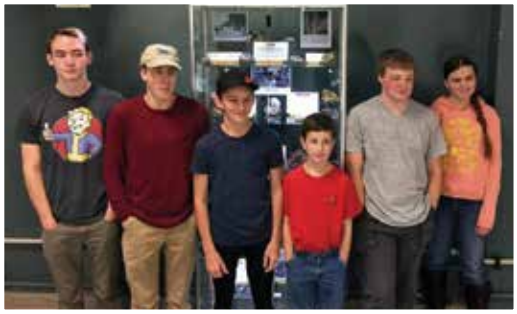
Summer is prime rockhounding time for the club. The group organizes field trips to sites in the hills, along rivers, and at long-abandoned mines. Several trips include camping and potlatches. The yearly trek to Agate Mountain near Dillon is a club favorite. During the day members scour bare hilltops and slopes for petrified wood, fossilized snails and algae, and chips of green common opal. Everyone struggles back to the rigs, dusty and hot, with armloads of geologic wonders. Happy rockhounds fill the evenings with stories as the sun sets late behind the Clark Canyon Reservoir.

In the winter the club focuses on bi-monthly meetings and the annual March show and sale. Meetings offer an opportunity for members to display stones that they have tumbled or worked as well as a chance to plan future adventures (I have seen more than one map drawn on a napkin). The remainder of the meeting is comprised of educational lectures and videos.

The annual show this year is March 18-19, and will feature display cases of specimens, wire wrapping and faceting demonstrations, and a popular kids' mineral dig. Vendors occupy the main room with equipment, jewelry, rocks, and fossils. The show is a wonderful introduction to the great variety of mineral forms found in Montana and around the world.

Once you start looking for rocks, you may not be able to stop. Your hikes may slow down and your pockets will grow heavy wherever you go. Beautiful in their own right, all rocks also have a fascinating story to tell.

PHOTOS BY THURSTON ELFSTROM



Hellgate Gem and Mineral Society member Parker Hall (second from right) created an exquisite display case of Montana minerals for his Eagle Scout badge. The Rose Houseman Memorial Exhibit is currently located at MNHC. Stop by and view the collection to learn more about Montana's mineral treasures!

Hellgate Gem and Mineral Society meetings are held on the second and fourth Thursdays of the month at 7:30 p.m. at the First Christian Church, 2701 S. Russell, Missoula (just across from the Fairgrounds). For more information, visit the Hellgate Gem and Mineral Society Facebook page (www.Facebook.com/HellgateMineralSociety).

The Annual Show and Sale is March 18-19 at the Hilton Garden Inn, 3720 N. Reserve St., Missoula.

A Fabulous 25th Anniversary Celebration...and Record-Breaking Year!


Thanks to everyone for helping us connect people with nature!

Once again, we'd like to convey our sincere thanks to everyone who attended MNHC's 25th Anniversary Annual Banquet & Auction at the University Center Ballroom on October 7th. More than 370 generous guests helped us raise nearly $140,000 (a new record!) in support of nature education for children and adults. We are especially grateful for your outstanding response to our Fund A Dream challenge, helping to strongly launch us into the next 25 years of connecting people of all ages with nature. And, of course, we couldn't have done it without the following businesses and individuals whose generosity and hard work made the whole event possible. (Please accept our apologies for any missed names.) Thank you!

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Jerome Walker
Gates and Annie Watson
Brant and Jessica Welborn
Beth Woody

A few of our founders, celebrating 25 great years! (l-r) Sue Reel, Dick Hutto, Pat Tucker, Erick & Anne Greene, Robin Tawney-Nichols, Ellen Knight.

At this year's Banquet & Auction we also had the opportunity to celebrate our newly-published compilation of 25 years' worth of naturalist observations: *Field Notes from the Montana Natural History Center*. This book recognizes the work—and the passion—of the naturalists who have been connected to the Montana Natural History Center in its first 25 years. We were thrilled to honor three of the people whose hard work, talent, and dedication made this book possible: Caroline Kurtz, Eileen Chontos, and Allison De Jong.

Caroline Kurtz has been part of MNHC for much of the past 25 years, facilitating the *Field Notes* program and launching *Montana Naturalist* magazine in 2004. Her energy, commitment to nature writing and education, and hours upon hours of reading and editing 25 years' worth of *Field Notes* brought this book to life.

Eileen Chontos is the visual artist behind *Field Notes from the Montana Natural History Center*—and *Montana Naturalist* magazine, our annual report, our exhibit area, and nearly every mailing you receive from MNHC. Eileen's artistry and professional skills helped us to take a stack of Field Notes and turn them into a beautiful book.

Allison De Jong is now our *Field Notes* and *Montana Naturalist* magazine editor. She is our resident writer and makes sure the voice of MNHC is reflective of the high standard of nature writing. Her energy and passion helped guide this book to the finish.

LEFT TO RIGHT: Eileen Chontos, Allison De Jong, and Caroline Kurtz

MNHC PHOTOS

Honoring Betty Oleson

It is with enormous gratitude and unending respect that the entire MNHC community, past and present, from board members to staff to volunteers, bids a fond farewell to our friend and colleague Betty Oleson. Her many years of concern, love, and commitment to the Center are visibly inscribed in every room and activity of our nature-based educational organization.

Betty began her service as a board member way back in 2003, and became board treasurer one year later—little did she know she'd be doing this for 13 remarkable years! As MNHC grew and developed ever more programs connecting people with nature, Betty served with great gusto and determination.

Betty was singular in her total immersion and mastery of MNHC's financial details, well beyond the usual set of responsibilities for a non-profit treasurer. She was entirely committed to the complete business of our rapidly changing nature center. She spent significant time at MNHC, working with the executive director and other staff in order to produce comprehensive financial reports for our monthly board meetings. And as a member of the executive committee she had additional assignments and responsibilities beyond those of accounting. Even more impressive is that her years of committed volunteer service were concurrent with her paid work as the Fiscal Affairs Director for the Mansfield Foundation at the University of Montana.

Despite this constant load of responsibility, Betty was always in good spirits, issuing the monthly financial reports with a smile and even a bit of levity. When engaged with complex, difficult, and sometimes confusing committee work, she could provide a piercing clarity when the subject material was confounding others. Betty's talent for condensing a pile of jargon into succinct sensibility is one we all appreciated.

In the past several years MNHC has experienced substantial increments in growth: moving its primary location from Fort Missoula to our present location, followed by a major remodel just two years ago. The number of staff, developing programs, and volunteers increases annually, and we are now extending some of our programs statewide. Much of this would not have been possible without Betty's enthusiasm, dedicated financial oversight, and guidance.

Betty, we are so grateful you have loved and labored with us all this time. And we thank you for all of your wonderful contributions to the Montana Natural History Center and hope to see you in days to come—here and there, on nature's pathway.

—Stephen Speckart,
Vice President, Board of Directors

SPOTLIGHT:

INTRODUCING SARAH MILLAR

This fall Sarah Millar shifted from being one of our board members to one of the MNHC staff as our Development & Marketing Coordinator. Sarah has an M.Ed. from the University of Montana and a B.S. in Wildlife Biology. Her experience includes several field seasons as a wildlife technician, working as a mountain bike ranger for the Forest Service, and teaching elementary-aged students in a variety of settings. Most recently, she and her husband opened The Dram Shop in downtown Missoula. She has a passion for science education, natural history, skiing, and sailing with her family on Flathead Lake, and is thrilled to be working for the Montana Natural History Center.

Sarah takes the place of Deb Jones, our long-time office manager, development coordinator, and finance guru, who has a fabulous new job as Executive Director at the Loyola Sacred Heart Foundation for the Missoula Catholic Schools. We're glad she still stops in to see us sometimes, and we wish her the best in her new position!

Homeschoolers, Have We Got a Program For You!

MNHC is excited to offer our new Homeschool Naturalists program for homeschool families! Homeschool Naturalists takes place from 10:00-11:00 a.m. on the first Friday of the month from November to May. Each month, homeschoolers ages 6-12 will learn about and explore different habitats through the lens of a naturalist. This year's focus is "a naturalist as a scientist," so many of the activities involve research and experimentation. Drop in for one program, or receive a discount for signing up for the entire year. Family discounts are available as well. For more information, contact Stephanie Potts at 406.327.0405 x209 or spotts@montananaturalist.org.

Gearing up for 2017 Summer Camps

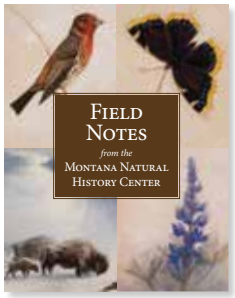
MNHC is looking ahead to a full summer of day camps for kids in pre-K through 5th grade! We will also have options for middle and high school students to get involved and explore nature with us. Look for information about camp themes and dates in early 2017; registration will open in March. Scholarship applications will be available in February so that families can be pre-approved before registration opens. Sign up for our newsletter (www.MontanaNaturalist.org/newsletter) to stay updated on all the latest summer camp news. We hope you'll join us for another great summer camp season!

MNHC PHOTOS

MNHC Holiday Gift Guide

Looking for that perfect present for your mom, grandpa, sister, spouse, friend? Look no further! MNHC has some fabulous gifts, great for holidays, birthdays, or "just because."

Field Notes from the Montana Natural History Center



Our brand-new book of Field Notes is a fantastic gift for nature lovers of all ages. This collection of nature essays, on topics from snowfleas to moose to geology and everything in between, captures the variety of personal experience of natural phenomena and the brilliance of seasonal change in Montana. **$17.95.** Stop by MNHC to purchase in person, or order online at www.MontanaNaturalist.org/field-notes-book.

Explore Cretaceous T-Shirts

Designed by artist and naturalist Tom McKean, these original t-shirts feature a baculite, a prehistoric cephalopod (related to today's octopi and squids) that thrived in seas throughout the world during the late Cretaceous. Available in men's L & XL and women's M, L, XL & XXL (sizes run small). **$20.** Stop by MNHC or call 406.327.0405 to purchase.

MNHC Memberships

What a great way to share the love of nature! We offer individual ($35), family ($60), and grandparent ($75) memberships, which include free admission to the Center, discounts on programs, a subscription to *Montana Naturalist* magazine, and reciprocal admission to more than 300 science centers in North America. For more information and to purchase, visit www.MontanaNaturalist.org/membership.

A quilt of golden western larches covers a hillside near the Crystal Lake trailhead in the Mission Mountains.

Chasing Larches:

Field notes from a season of exploration

STORY AND PHOTOS BY ALLISON DE JONG

It's hard to explore western Montana's wild places and not fall in love with larches. Those fabulous deciduous conifers rank right up there with wolverines and snowfleas and pikas on Montana's list of awesomely adapted species. So when my husband and I made a commitment this fall to get outside on one long hike per week, we focused on visiting prime larchy locations. Of course, where there are larches, one can't help but find other beauties, too. Here are a few observations from a season of larch hunting.

Turquoise Lake in the Mission Mountain Wilderness, second week of September

It's a bluebird day, perhaps a little warm for mid-September, but beautiful nonetheless. This is my first foray into the Mission Mountain Wilderness. After a six-mile hike to the lake, we're eating lunch on a large rock on the southwest side. On the north-facing slope above us, we see those long-awaited splashes of pale yellow: alpine larches, already shifting to gold, the first hint of larch color we've seen. They're a bright complement to the blue-green water and the rocky peaks reflected in it. At that moment, a V-shaped ripple catches my eye—a duck? No, it's a sleek, dark head: a river otter, the first I've ever seen. It tucks headfirst beneath the surface, its sinuous body curving up and then disappearing beneath the water. Perhaps twenty seconds later it surfaces a short distance away. Then dives down again. We watch it resurface, dive, resurface, dive for several minutes until it approaches the far southern tip of the lake and scrambles into the underbrush.

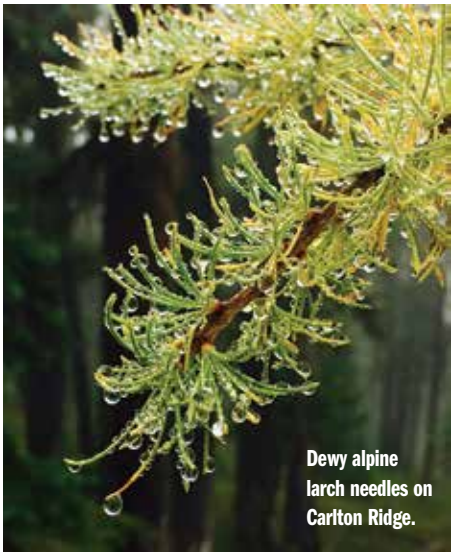
Looking down at Glacier Lake and the Swan Mountains from the Turquoise Lake trail in the Mission Mountain Wilderness.

On our way back down the trail, we gaze east across the valley at the Swan Mountains, tall and grey and snowless. Below us to the south is Glacier Lake, its water the same shade as the lake we've just left. Just then, a loon sends out its lonely cry; the sound rises up and echoes in the air. Farther down the trail, we come across several Steller's Jays, who flutter from tree to tree ahead of us, their feathers as blue as the sky.

Carlton Lake in the Selway-Bitterroot Wilderness, third week of September

The day is grey and drizzly and cool. We hike up the trail and almost immediately walk into a cloud. The mist is thick, hiding the long vistas behind a shimmering grey

wall. Water droplets cling to everything: branches, larch needles, eyelashes. The larches on Carlton Ridge are greeny-gold, just approaching peak color, their hues intensified by the grey day. We walk along the ridge and then descend towards the lake. The water level is very low; we leave many yards of muddy footprints as we approach the water. The fog is so thick we can't even see the other side. At last we return from the quiet, misty beauty back into the world beneath the clouds.



Dewy alpine larch needles on Carlton Ridge.

Fish Lake in the Selway-Bitterroot Wilderness, fourth week of September

Twenty miles up Lost Horse Canyon, the alpine larches are at their peak, blazing yellow-orange on the mountainsides. We cross from Montana into Idaho and back into Montana as we hike. The shrubs are crackly-dry here, their leaves brown and shriveled, making harsh scraping sounds as we brush by them on the trail. The day is part sun, part cloud, and we don and shed layers, a strange dance. At the lake, we inflate our brand-new kayak, and my husband insists that I be the first to try it. I paddle out into the quiet water, admiring the golden trees on the slope at the far end of the lake. Just when I'm equidistant between shorelines, a dark grey cloud appears over the ridge to the west, and ten seconds later the squall hits. Cold raindrops pelt down, and a fierce breeze blows me halfway down the long length of the lake. I float there for a moment, damp, chilly, shocked. But a few minutes later, the wind and rain subside, and I'm able to make my slow way back to Greg. When his turn comes, the water is smooth as glass the entire time.

Glen Lakes

Glen Lakes in the Selway-Bitterroot Wilderness, first week of October

It's our annual pilgrimage, this hike. Every fall we come here to see the alpine larches, but this is the first year we've seen them glowing yellow and orange in so many other places first. The colors, as always, are rich and stunning, from the larches to the bright reds of the huckleberry leaves to the always-vivid green of the heather. I find caddisfly larvae pulling their sand-grain cases around beneath the water. I admire the familiar craggy ridgeline above the lake. I walk slowly among the gold-clad trees, basking in their glow.

Sawmill Gulch in the Rattlesnake Recreation Area, second week of October

It's so close to home, yet I've explored this area very little. It's a hazy, overcast day, and the light is diffuse yet harsh. But I revel in the variety of the landscape we explore, from grassland to open mixed-conifer forest to a stand of western larches, which, since they live at lower elevations, are just starting the shift from green to yellow. We pass a tumbledown cabin, and I ponder the people who lived there a century ago, nestled beneath a steep ridge. At the end of our loop, we are surprised by a view of the main Rattlesnake corridor and one of our favorite larch-covered hillsides, splashed with greens and golds. From above and behind, it takes us a moment to recognize it. It's bigger, brighter, wilder.

Fish Lake, calm again after the squall.

Crystal Lake in the Mission Mountain Wilderness, third week of October

We are in the middle of one of the wettest Octobers on record in western Montana, and misty rain falls on us during our entire adventure. At the lake, the opposite hillside is awash in golden splendor. Even after weeks of chasing larches, the sight of so many flame-colored trees awes us. To the north, snowy mountains connect lake and sky. Those white peaks, shimmering in the mist, seem like something out of a fairy tale. But their beauty is real, and we are here, now, witnessing it. Hiking out, the clouds lift and the sun streams through, gilding the larches against their dark backdrop of sky. Across the valley, the snowy peaks of the Swans disappear into the clouds. We come upon a snowshoe hare hopping on the dark ground beneath the trees, half brown, half white.

Blodgett Canyon

Blodgett Canyon in the Bitterroot National Forest, fourth week of November

The day after Thanksgiving, we hike several miles into Blodgett Canyon. This is the southern limit of the western larch's range, and we notice only a handful along the road to the trailhead. They are bare, their bright needles long shed, a dusting of new snow narrowly piled on their brown, knobby branches. On the trail, the snow gets thicker the farther in we go, making the footing uncertain. Our attention turns downward, to the stories told in the snow. Lots of squirrel tracks, and several snowshoe hares. The impossibly miniature prints of a small mammal—a mouse or shrew, perhaps? And then some larger tracks we first assume are a pet dog's, until we realize they are going the opposite way as the two sets of human tracks. We find a couple of clear prints: cat, not dog. Too big to be a bobcat. Mountain lion. I imagine it, lean and tawny, padding along the trail, the forest quiet around it.

Winter Solstice

BY DANIELLE LATTUGA

My mother claimed it was the longest day of her life.
Of course I don't remember
taking my first breath,
sliding from the dark on the darkest day of the year.

But I do know it was raining,
when it should have been snowing.

I have since learned
that cardinals
are buoys,
having swallowed
the sun

and they carry her
in their small bodies,
all sparks and embers,
no matter
the turn of the earth

—whistling merrily
like rain on prayer bells, first words,
broken glass.

I have since learned that
should
is merely
human invention

but
hope
is a red bird
against
white snow

scattering light
on dark days,
on birth days,
no matter
the turn of my mind.

Writer's note: Cardinals are far more common in my childhood home of Vermont, but they do make the occasional appearance in Montana—which, for this writer, makes them an even more remarkable embodiment of hope.

Danielle Lattuga is a writer, editor, and Master Naturalist who lives happily in Missoula, Montana. You can read more of her work at letterstomontana.com.

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