Montana Natural History Center

Winter 2017-2018

MONTANA Naturalist

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

Traversing Cascadia:
Exploring our Rainforest and Snow Forest

The Importance of Being Warm | Moon Dogs | Stewarding Our Open Spaces | Wild Photography

MONTANA Naturalist Winter 2017-2018

inside

Features

Cover – On a subzero December night in 2013, Comet Lovejoy, which visits Earth only once every 14,011 years, rises over Mount Brown and Lake McDonald in Glacier National Park.
Photo by John Ashley, johnashleyfineart.com.

Departments

Montana Natural History Center
Connecting People with Nature

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tidings

PHOTO BY ALLISON DE JONG

Evidence of one of the many creatures that share our landscape: fresh mountain lion prints on a snowy trail near Lolo Pass.

Last weekend my husband and I ventured into our public lands to find our Christmas tree. I picked up the $5 permit from the Forest Service office in the morning, and we drove up towards Lolo Pass in the afternoon, transported from the bare, brown valley into a gorgeous wintry landscape. A few flakes were even drifting down as we hiked up a gated Forest Service road. Once we'd gone a mile or two we had the snowy quiet to ourselves, the only sounds the shush of our boots in the snow.

We found some good tree possibilities along the main road, but it was when we turned off to explore an overgrown logging road that we found our perfect tree—a slender seven-foot-tall subalpine fir. And it was perhaps a quarter of a mile further on that we noticed that our tracks weren't the only ones on the brushy road. A line of clear, perfect prints marched forward, disappearing around the bend. Often when I find tracks they're melted out, or I have to follow them for quite a ways before finding a good clear one, but these tracks were very, very fresh and obviously feline. Large feline. Mountain lion.

I imagined it walking there, perhaps twenty or thirty minutes before we did. I imagined it just beyond that bend in the road. I imagined its lean, tawny body moving sleekly through the snow.

Greg and I imagined it might be wise to raise our voices a little.

I was reminded, in that moment, that we humans share our landscape with other creatures. It's not always easy to remember this connection, especially living in a city, traversing the bustling streets between home and work. But as yet another reminder, just this morning I saw two fat raccoons waddling across a residential street in the middle of Missoula in broad daylight—even in the city, we are sharing our space with wild creatures.

We're not always very good about sharing our landscape. Sometimes we need a little help. Morgan Valliant, Missoula's Conservation Lands Manager, has the task of figuring out the best ways to balance human recreation impacts with the city's conservation goals (page 15). Sometimes just being reminded of the diversity of wild creatures on our landscapes is enough, as photographer Kalon Baughan accomplishes with his stunning wildlife camera shots (page 23). Or maybe it helps to think about what we have in common with other creatures, as biologist Wenfei Tong does, pondering how various animals—including humans—have evolved to keep warm in cold weather (page 4). Or perhaps simply reveling in the diversity of the vast, beautiful sweep of our bioregion, as writer and educator Nick Littman inspires us to do (page 8), can help us better understand our place in it.

This winter, I encourage us to consider the other creatures that call this landscape home. Let's look for the tracks, the scat, the caches, and, yes, the wild creatures themselves—and take the time to ponder how we might best steward this space that we all share.

Allison De Jong
EDITOR
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The Importance of Being WARM

STORY AND WATERCOLORS BY WENFEI TONG

Many parents volunteer in their children's schools and classrooms, putting in extra time and energy to help support teachers and ensure that their kids receive a good education—people with children have a strong incentive to invest in this particular example of what economists call a public goods problem. But it's not only in economics that we find public goods problems; evolutionary biology has plenty of them, too. And a big one is generating heat to survive cold weather. In almost any human culture, "warmth" in a person typically refers to their generous and affectionate personality rather than a capacity for generating physical heat. This is probably no accident. Looking at heat as a public goods problem, evolutionary biologists think that one of the reasons for group living could be the mutual benefit of sharing heat through huddling when it's cold outside, and it takes at least two to huddle. Bees do it, bats do it, even rattlesnakes might do it.

HUDDLING BIRDS

Take birds, for instance. Small migrating birds like the European Blackcap Warbler get a thirty percent energy saving from huddling overnight when compared to solitary individuals. Similarly, Tree, Barn, and Cliff Swallows and even Grey Partridges all tend to form groups and huddle together when it gets cold.

Barn Owls are a particularly interesting example of the importance of huddling because there appears to be genetic variation in their strategies for conserving heat that is linked to feather color in this geographically widespread species. Scientists haven't worked out all the genetic links, but blacker owlets tend to be less efficient at generating body heat in isolation and have to huddle more to stay warm. In contrast, paler owlets are better at regulating their body temperature and don't need to huddle as much to stay warm. Indeed, Barn Owl populations that live further north have paler owlets than those that live closer to the equator. You might think that being darker would keep individuals warmer because darker colors absorb more heat from sunlight, but owls don't spend much time in the sun.

PHOTO: CHAD KING, FLICKR.COM

Barn Owl chicks that live in colder climates are better adapted to generating their own heat; this ability is genetically linked to growing paler feathers.

Penguins are an especially good example of group living and huddling being associated with colder temperatures. Most adults of any penguin species have a well-defined personal space, which is apparent if you ever see the squabbling and squawking in a colony on a nature documentary. In contrast, all young penguins are deposited in crèches akin to human nurseries, where they huddle together for warmth while their parents are out fishing. Emperor Penguins are the only penguin species to retain this huddling behavior in adulthood, and it's no coincidence that this species experiences the most extreme cold of all the penguin species. Males cluster together to keep each other warm during the harsh Antarctic winter. Each male is effectively fasting and living off fat reserves until his mate returns after four months to take over, and he has to heat not just himself, but the precious egg sitting on his feet. Scientists sticking temperature probes into individual male Emperor Penguins have found that males in a huddle can afford to lower their personal heating bill by keeping their own furnace about two degrees Celsius lower and getting passively warmed by the rest of the group, compared to solitary males who have to pay a higher energetic cost to keep their core warm.

HUDDLING MARMOTS

Aside from birds, there are examples of mammal species, such as marmots, that support the social heating hypothesis. This rodent family includes woodchucks, which tend to be solitary and live in the warmest climates, and Montana's native yellow-bellied and hoary marmots, which tend to live in social groups, especially in winter.

The best-studied marmot is the alpine marmot of Europe, which overwinters in groups of up to 20 individuals, often including a breeding pair, juvenile offspring from the same year, and subordinate adults that are mostly offspring from previous years. When there are no juveniles in a group, larger groups have more surviving marmots at the end of winter, suggesting that huddling benefits adults. However, when juveniles make up part of the group, some interesting things happen. The juveniles are always in the center of the group, suggesting that the adults are paying a disproportionately large share of the heating bill to keep their young relatives warm, but is this heating bill equally shared among adults?

It turns out that the main overwintering costs for marmots aren't the fasting or the hibernating, but having to re-warm every time they emerge from hibernation—rather like having to heat up a cabin after keeping the furnace off for months. Short of putting temperature probes into marmots before they go underground to hibernate, the easiest way for scientists to see

Emperor Penguins huddle like the chicks of other penguin species to keep out the bitter Antarctic cold.

NATURE PICTURE LIBRARY / ALAMY STOCK PHOTO

who paid the largest amount of energy to the communal heating bill is to weigh marmots before and after hibernation. Those who have lost the most weight probably burned up the most fat to heat the group.

So who does pay more of the heating bill? It turns out that subordinate adults that are unrelated to the family group lose the least weight while the marmot parents lose the most weight when there are juveniles in the group. This makes sense because evolutionarily, it pays to sacrifice some of your own fat stores to keep your children warm and alive. What is more surprising is that some subordinate adult males in the group lose about as much weight as the breeding pair. One possible explanation for this is that some of those subordinate males might actually have snuck a mating or two with the breeding female and so could be more closely related to the juveniles than expected.

Complex social groups increase the benefits of huddling for warmth, and although there is a general pattern of colder conditions leading to more complex groups, there are some twists. Unlike the alpine marmots, in which larger groups are more likely to survive the winter, in hoary marmots, neither group size nor composition makes much of a difference. Rather, the main factor influencing group survival is the harshness of the climate, suggesting that no amount of group huddling can save a hoary marmot group when conditions are bad enough. One possible explanation for this is that the snowpack in the Alps is always very deep, insulating alpine marmot groups and the heat they generate, whereas hoary marmots in the Canadian Rockies often experience much thinner snow packs, combined with colder external temperatures, suggesting fewer benefits from huddling.

In yellow-bellied marmots, which experience less extreme winters than alpine or hoary marmots, and are correspondingly less social, there actually seems to be a cost to being too friendly. Biologists have found that marmots with very strong, affectionate social ties with other individuals are the ones most likely to die during the winter, whereas the most antisocial individuals are most likely to survive. This surprising and somewhat disheartening finding could be due to the very high energetic costs of re-warming, and the fact that yellow-bellied marmot groups are less cohesive than alpine marmot groups. So if the group isn't good at re-warming all at once, some individuals—the ones with strong social ties—pay a disproportionately high price to warm the group and are consequently more likely to lose so much weight they die. Juvenile marmots, in particular, seemed to disrupt the group's re-warming schedule by trying to warm up too early. In contrast, the antisocial marmots that hibernated alone instead of in a huddle don't have to be sensitive to someone in the group trying to warm up too soon and are more likely to survive just paying their personal heating bill at the optimal time.

So how does all this expensive re-warming take place? Marmots and other mammals, like humans, have an extra way to warm up that hasn't evolved in other warm-blooded animals like birds. It's called brown adipose tissue, or brown fat, a highly specialized tissue in which every cell is like a little heat production machine. These specialized cells produce heat by short-circuiting the reaction all cells use to make the energy. Instead of fueling all the little chemical reactions that keep us alive, brown fat cells dump this energy out as heat. By mobilizing their brown fat stores, hibernating marmots begin to re-warm their muscles, which can then continue the re-warming process by shivering.

In yellow-bellied marmots, which experience less extreme winters than alpine or hoary marmots, and are correspondingly less social, there actually seems to be a cost to being too friendly.

Yellow-bellied marmots are more likely to survive the winter if they don't have to help heat up the younger marmots in the huddle.

PHOTO BY WENFEI TONG

HUDDLING HUMANS

Not surprisingly, brown fat is especially common in human infants as well as in hibernating mammals. What is more intriguing to many in the health industry is that adult humans have brown fat too, and that individuals vary considerably in how much brown fat they have. We know that thinner people tend to have more brown fat—what you might typically call a "high metabolism"—presumably because people with a lot of brown fat are converting more calories into heat. However, there isn't yet a consensus on what causes this variation in the proportion of brown fat in adult humans, or even if it's the main cause of not putting on weight easily.

A curious, but possibly related aspect of human biology is our hairlessness. One of the other strikingly hairless adult mammals (also highly social) is the naked mole rat of Africa, and they spend a lot of time huddling and looking like a very large litter of pink young mice or rats. When you think about it, a thick winter coat makes lots of sense if one is trying to keep precious body heat in, but if one is trying to share the heat in a huddle, an insulating barrier or hair or down would simply get in the way of efficiently transferring heat.

Hairless, pink young like songbird chicks or young mice and rats are typically helpless and not terribly good at generating their own heat. They are hairless for the very good reason that any heat produced by one is more efficiently shared by all. During the breeding season, many adult songbirds develop a naked area of exposed skin with lots of blood vessels near the surface called a brood patch, to transfer heat more efficiently to their eggs and chicks. In contrast, the typically endearing downy young like young penguins, ostriches, chicks, or ungulates are born much more independent in many ways, including being able to stay warm without social assistance.

HUDDLING AS A PUBLIC GOOD

And now we're back to the public goods problem. With huddling, everyone in the group benefits equally, but some individuals may contribute more (thereby paying a greater cost) than others. It pays the most individually to be a cool rat pup in a warm huddle. But then what determines who pays?

Recall that in alpine marmot families, the main heat donors tend to be the parents or close relatives of the juveniles that need the most help staying warm. This is best explained by the fact that marmots able to selectively help relatives with heat donations beget more offspring than those that indiscriminately sacrifice their own heat resources to aid the survival of unrelated individuals. Perhaps there's a sort of genetic switch with a rule, where if you are hibernating with close relatives who smell similar, you produce more heat, whereas if you aren't related, your heat-producing genes stay off, leaving you more energy and fat stores for surviving the spring, while passively absorbing heat from the group.

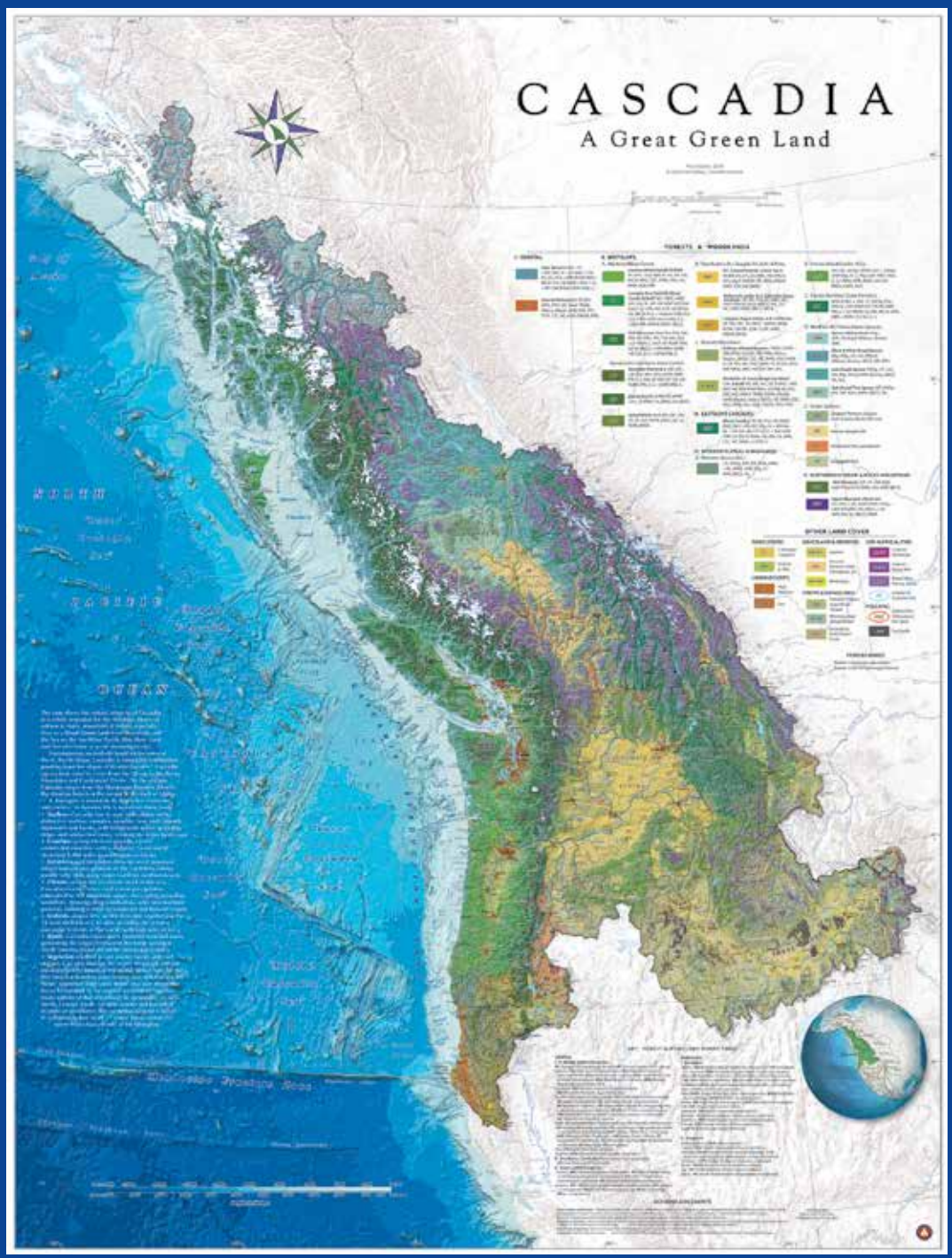
If the key condition for genes to be switched on or off is how likely the gene is to be present in other members of a huddling group, then in a group of huddlers, heat-producing genes should have evolved to donate more heat to related individuals in the group, but to be switched off and selfish if they are surrounded by non-relatives. When parents are perfectly faithful to each other, then on average, their children all share half their genes. But not all parents are perfectly faithful couples. In many rodent species, females mate with more than one male, so a litter will share the same mother, but not everyone will have the same father. As one might predict, genes for turning on heat production in mouse pup brown fat cells tend to be switched on when inherited from mothers, while the copy of the same gene inherited from fathers is switched off.

In the economics of evolution, individual genes can switch on or off to be more or less selfish in a public goods game involving the sharing of heat. Human societies encounter all sorts of public goods problems, from education to transportation to clean water. Some can or are supposed to be solved by taxes; others, like the environment and all the ecosystems services nature provides, from clean water to pollinating our crops, are trickier. If one of the evolutionary benefits we derive from living in highly complex social groups is the sharing of heat, including with unrelated adults and children, humans just might be able to "switch on" our capacity to cooperate in other public goods problems, such as our shared dependence on a healthy natural environment.

—Dr. Wenfei Tong is a research associate at the departments of Organismic and Evolutionary Biology at Harvard and the Division of Biological Sciences at the University of Montana. She works for the Avian Science Center in the College of Forestry, studying the effects of fire and bison grazing on songbirds at the National Bison Range.

TRAVERSING THE INTERIOR RAINFOREST AND SNOW FOREST OF CASCADIA

STORY AND PHOTOS BY NICK LITTMAN



The Cascadia Map by Dr. David McCloskey may be purchased through the Cascadia-Institute.org.

On my living room wall, I have mounted a many-colored map. I stop to look at it often, not to see where I am going, but to remember where I am.

The map does not show me much about topography, or where highways go, or how big Seattle is compared to Missoula. What the map shows me is where I exist within *Cascadia*–my bioregion.

Bios is Greek for life, *regia* is Latin for territory. My bioregion or *life territory* is an area defined by its natural systems, a region governed by abiotic and biotic commonalities—geology, climate, elevation, flora, and fauna—instead of arbitrarily-drawn political boundaries. In a bioregion, the cycles of life are intricately intertwined—cedar and fern, spruce and caribou, white-bark pine and Clark's Nutcracker; all the relationships within the region, including the human ones, are adapted to and depend upon the character of the land. Although my home of Missoula sits within a dry, rain-shadowed valley, the character of my region, this "great green land" of Cascadia, begins and ends with the ocean.

In northern Cascadia, the Pacific provides the water, and the mountains—the Cascades, Coast Range, Columbias, and many smaller ranges—receive it and return it through their rivers. The falling of this water supports some of the most magnificent forests in the world. Before moving to Montana, I knew only of the forest that is emblematic of Cascadia: the dripping and decaying coastal rainforest stretching from northern California to southeastern Alaska. However, as I began to explore the broader geographical patterns of my bioregion on foot, walking into the Bitterroot, St. Joe, Cabinet, Selkirk, and Purcell mountains, I've been introduced to the two inland forests of my region: the interior maritime forest and the snow forest.

The dense canopy of old-growth rainforests limits what plant life can survive on the forest floor; western sword ferns are one of the species that thrive in deep shade.

The map of Cascadia helps me to notice patterns within my bioregion. At first these patterns are only interpreted from the map: I can see that the interior maritime rainforest is labeled as a "maritime cedar-hemlock" forest and the snow forest is labeled as "upper montane." As I've lived in the Inland Northwest longer, I've begun to ground-truth these patterns and learn what lines and shades look like when transposed onto earth and bark and mountain. It is this process of observation and discovery that has helped me to acquire a sense of connectivity and scale. Visiting these patches of interior maritime forest, the Ross Creek Cedars beside the Cabinets or the Kokanee Creek Cedars in the Selkirks, has helped me to appreciate how far these forests stretch and how connected they are, both to each other and to the natural systems that have helped to create them.

The interior maritime forest is the largest inland rainforest in the world. It is a broad diagonal stroke on the map that includes land in three states and one province. The forest begins in the south along the Selway and Lochsa rivers in Idaho. In the north it disappears just past Prince George, British Columbia, in the Cariboo Mountains. The variation across this span is significant: more rain falls in the summer as you move further north, and the size and maturity of the northern cedar-hemlock forests I've seen in the Purcells cannot be rivaled by the remaining old-growth stands within Montana. However, walking up Trout Creek from the Clark Fork Valley to the crest of the Bitterroots, or up the East Fork of the Bull River from the Bull River Valley to the top of the Cabinets, or up Kokanee Creek from Kootenay Lake in the Selkirks will all yield a similar floristic shift from interior maritime forest, to snow forest, to no forest.

Late spring—mid-June—is the time I enjoy this landscape the most. The creeks are deafening and water seems to be coming from the very pores of the mountain. From the valley, I climb up a steep V-shaped valley under a canopy of giants. Here, the earth is spongy underfoot—carpeted with a continuous layer of moss. Red, green, blue, and white lichens provide vibrant color to the forest, clinging to the trunks of live and dead trees. All around me many species of fern and the tall bristled stalks of Devil's club populate the forest floor, but few other understory species can live beneath the overhead shade. I walk easily through the dappled light of this forest, keeping my eyes up to find the tops of the trees towering above me.

The giants above me are the overseers of this apex forest—the broad-trunked western redcedar *(Thuja plicata)* and drooping-crowned western hemlock *(Tsuga heterophylla)*. With the right conditions, redcedars can grow to 150 feet tall and 10 feet in diameter and live for up to 1000 years, and hemlocks can stretch to 120 feet tall and live for 500 years. These trees create one of the few true "old-growth forests" that you can find in the Inland Northwest. They are able to

flourish 350 miles from the coast, weathering the heavy snows and dry, hot summers of the interior due to the precise climactic conditions created by the mountains. In the spring, snowpack nourishes the trees through May and rain falls in June. When the trees enter the parched summer season their roots are kept hydrated by the many creeks, trickles, and seeps that drain the higher-elevation snow forest.

The giants fall away as I reach the snow line; the broad cedar and hemlock trunks are replaced by the skinny spires of subalpine fir, Engelmann spruce, and lodgepole pine, trees that are much better at sloughing off a snowpack that will reach eight to twelve feet deep. I have entered the upper montane zone—the snow forest. Later in the summer, a scraggle of huckleberry bushes will make it challenging to move through here without stopping, but in June I crunch along the crust of snow and notice how it provides a continuous drip of water to the photosynthesizing trees. In places where the snow thins, glacier lilies splash the white canvas with yellow.

I continue walking steeply through the snow forest for several thousand feet up the mountain. From north to south across its range, the habitat the snow forest creates supports some of our most charismatic North American mammals—gray wolves, grizzly bears, wolverines, and mountain caribous (mountain caribous are mostly found in the northern Columbia Mountains, though they have been found in the southern Purcells which dip into northwestern Montana). Wolves and grizzly bears mostly use this habitat when it is snow-free, but wolverines and caribou have both adapted to living on the snow. Caribou can spread their hooves wide to act as snowshoes, and in mid- to late winter the heavy snowpack allows them to reach the bryoria lichen (old man's beard) higher in the trees. Wolverines scavenge widely for carcasses across the subalpine and alpine, and their large paws in comparison to their bodyweight keep them above the snow.

To the north and south this wide green ribbon stretches for hundreds of miles, supporting one of the most diverse and unique ecosystems in this part of the world.

A fiddlehead fern opens up along the Selway River, at the southern reaches of the interior maritime forest.

The trees thin out as I reach higher elevations and then stop altogether. In the Columbia Mountains—the Selkirks, Purcells, Monashees, and Cariboos—glaciers hang to the mountaintops, remnants of the last ice age. High on the ridgetops, snowdrifts last into July and August. When they melt, the meadows explode into a tapestry of color, the long-awaited expression of summer.

At the crest of the mountains a broad sweep of life-producing forest falls off below me. To the north and south this wide green ribbon stretches for hundreds of miles, supporting one of the most diverse and unique ecosystems in this part of the world. Looking west I can thank the distant Pacific Ocean for the nourishing clouds it sends my way. The creeks below me trickle into rivers that flow into the mighty Columbia River, returning the waters to their source, completing the cycle. Putting this place within a bioregional context reminds me that the processes that sustain each of the thousands of species within these forests are vast and far more complex than I will ever be able to understand. I must be content to observe and to record, to appreciate and to listen. Little by little, the many-colored map of the "great green land" comes into focus.

—Nick Littman loves to explore, teach, and write about the intricacies of place. He teaches for the Wild Rockies Field Institute and the Missoula Writing Collaborative.

The wide valley surrounding Glacier Creek in the Purcell Mountains of British Columbia is filled with extensive cedar-hemlock forests, while the higher elevation snow forest is already living up to its name in late September.

Kids' Corner

This year MNHC's Homeschool Naturalist program is exploring the theme of "A Naturalist as an Artist," which means that the kids get to explore natural history topics through a variety of artistic mediums: painting, drawing, dancing, creating. For October's lesson on leaves, the students used a colorful collection of leaves to make beautiful nature mobiles. This is a great project to do at home, too!

Your nature mobiles are limited only by your imaginations. Add as many interesting natural objects as you can find!

Left: Mobile crafted by Nora Custer, age 10.

Below: Mobile crafted by Bethany Nobel, age 6.

Materials:

- Canning jar rings
- Twine or string
- 12"-18" stick (to hang the suncatchers/pinecones from)
- Contact paper
- Pressed leaves and flowers (or conifer needles, cedar leaves, Ponderosa pine bark, or any other flat natural objects you can find!)
- Pinecones or other larger natural objects you might want to include

This project allows the artist to study plants as well as make a lasting art project that will look great year-round. You will want to collect leaves and flowers to press a few days before you complete the project. To create the mobile, crease the contact paper in half, peel one half of the sheet, place your pressings the way you want them, and stick the second half of the contact paper to itself to encase your pressings. Trace the canning jar ring around the desired area and cut just inside the line so that it will fit. Tie your string to the canning jar rings and to your stick at the desired heights and distances before gently pressing your contact paper into the rings. For added flare, hang a pinecone or two on your mobile as well!

Save the Date for Summer Camp Registration!

Join us for a fun-filled summer of learning and exploration at MNHC's Summer Outdoor Discovery Day Camps! MNHC's camps, for young naturalists ages 4 through fifth grade, connect kids to nature through field trips to local natural areas, science and art activities, games, and much more! Visit MontanaNaturalist.org in early 2018 for more information, camp dates, and descriptions. Registration will open on **March 15th**. Scholarships are available for those in need; please apply online before **March 1st** so you can sign up immediately when registration opens. We look forward to connecting your children with nature this summer!

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 21 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Program free with admission.

January 4, 11, 18, 25 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Program free with admission.

January 6 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Hibernation Celebration.** Program free with admission.

January 19 **Homeschool Naturalists,** 10:00-11:00 a.m. and 2:00-3:00 p.m. **Minerals and Rocks.** $5-$7. Registration required.

February 1, 8, 15, 22 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Program free with admission.

February 1-March 9 **Summer camp scholarship applications accepted for pre-approval.** (Applications received after March 9 are welcome, but might not be approved before registration opens.)

February 3 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Ice Age Animals.** Program free with admission.

February 16 **Homeschool Naturalists,** 10:00-11:00 a.m. and 2:00-3:00 p.m. **Raptors.** $5-$7. Registration required.

March 1, 8, 15, 22, 29 **miniNaturalist Pre-K Program,** 10:00-11:00 a.m. Program free with admission.

March 3 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Rockhounding!** Program free with admission.

March 10 **Members-Only Discovery Day,** 10:00 a.m.-2:00 p.m. **Wonderful Waterfowl at Lee Metcalf.** Free. Kids welcome! Registration required.

March 15 **Summer Camp Registration Opens!** Visit MontanaNaturalist.org for details.

March 16 **Homeschool Naturalists,** 10:00-11:00 a.m. and 2:00-3:00 p.m. **Birds.** $5-$7. Registration required.

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

April 14 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Beaver Lodge Boogie.** Program free with admission.

April 20 **Homeschool Naturalists,** 10:00-11:00 a.m. and 2:00-3:00 p.m. **Glacial Lake Missoula.** $5-$7. Registration required.

Adult Programs

December Gallery, all month. **Claudia Paillao: Felted Birds.**

January 9, 16, 23, 30 **Evening Program Series,** 7:00-8:30 p.m. **Amazing Minerals with Bruce Baty.** Join us for a four-class series with geologist and retired Hellgate High School earth sciences teacher Bruce Baty, and learn fascinating facts about minerals! $30 members; $35 non-members. Registration required.

January 10 **Five Guys Fundraiser,** 5:00-7:00 p.m. 15% of sales go to MNHC. Have a hearty burger for dinner at Five Guys and know you're helping us connect people with nature!

January 10 **Evening Program,** 7:00 p.m. **Naturalist Trivia Night!** $5 suggested donation; MNHC members free.

SUN	MON	TUE	WED	THU	FRI	SAT
December						
December Gallery, all month. **Claudia Paillao: Felted Birds.** 24	25	26	27	28	29	30
			Closed for the holidays December 25-26, December 30, and January 1.			*Mule deer bucks begin to shed antlers*
January						
				miniNaturalist Pre-K Program, 10-11 a.m.		Saturday Kids' Activity, 2-3 p.m. **Hibernation Celebration.** 6
31	1	2	3	4	5	
		Evening Program Series, 7-8:30 p.m. **Amazing Minerals with Bruce Baty.**	Five Guys Fundraiser, 5-7 p.m. Evening Program, 7 p.m. **Naturalist Trivia Night!**	miniNaturalist Pre-K Program, 10-11 a.m.		Community Discovery Day, 12:30-3:30 p.m. **Lee Creek Snowshoe Walk.** 13
Mice, weasel tracks tangle in snow	8	9	10	11	12	
		Evening Program Series, 7-8:30 p.m. **Amazing Minerals with Bruce Baty.**	Glacial Lake Missoula Chapter Meeting, 3:30 p.m.	miniNaturalist Pre-K Program, 10-11 a.m.	Homeschool Naturalists, 10-11 a.m. and 2-3 p.m. **Minerals and Rocks.** 19	20
14	15	16	17	18		
		Evening Program Series, 7-8:30 p.m. **Amazing Minerals with Bruce Baty.**	Evening Program Series, 7 p.m. **Understanding the Maintenance of Species Diversity in Western Montana Grasslands with John Maron.**	miniNaturalist Pre-K Program, 10-11 a.m.		*Flocks of mixed-species birds forage together* 27
21	22	23	24	25	26	
		Evening Program Series, 7-8:30 p.m. **Amazing Minerals with Bruce Baty.**		**February** miniNaturalist Pre-K Program, 10-11 a.m.		Saturday Kids' Activity, 2-3 p.m. **Ice Age Animals.** 3
28	29	30	31	1	2	
			Evening Program, 7 p.m. **Hunting and Gathering Lecture Series: Seasonal Round: Understanding the Landscape with Rosalyn LaPier.** 7	miniNaturalist Pre-K Program, 10-11 a.m.		10
Snowshoe hares nibble conifer buds and shrub bark	12	13	14	15	16	
				miniNaturalist Pre-K Program, 10-11 a.m. Evening Program, 7 p.m. **Naturalist Trivia Night: Valentine's Day Edition!**	Homeschool Naturalists, 10-11 a.m. and 2-3 p.m. **Raptors.** 16	17
18	19	20	Glacial Lake Missoula Chapter Meeting, 3:30 p.m. 21	miniNaturalist Pre-K Program, 10-11 a.m. 22	23	24

SARA HOLLERICH, USFWS

NPS PHOTO TIM RAINS

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

SUN	MON	TUE	WED	THU	FRI	SAT
				March		
		Non-profit Tuesday at Caffè Dolce, 5-9 p.m.	**Teachers-Only Science & Nature Night,** 5-7:30 p.m.	**miniNaturalist Pre-K Program,** 10-11 a.m.	*Canada geese reclaim nesting territories*	**Saturday Kids' Activity,** 2-3 p.m. **Rockhounding!**
25	26	27	28	1	2	3
 *Buttercups bloom*			**Evening Program,** 7 p.m. **Naturalist Trivia Night!**	**miniNaturalist Pre-K Program,** 10-11 a.m.		**Members-Only Discovery Day.** 10 a.m.-2 p.m. **Wonderful Waterfowl at Lee Metcalf.**
6	7	8	9	10		
		Evening Program, 7 p.m. **Hunting and Gathering Lecture Series: Hunting for the Ancient Past: Field Guide to Montana Fossils with Kallie Moore.**		**miniNaturalist Pre-K Program,** 10-11 a.m. **Summer Camp Registration Opens!**	**Homeschool Naturalists,** 10-11 a.m. and 2-3 p.m. **Birds.**	
13	14	15	16	17		
		Glacial Lake Missoula Chapter Meeting, 3:30 p.m.		**miniNaturalist Pre-K Program,** 10-11 a.m.		
18	19	20	21	22		
				miniNaturalist Pre-K Program, 10-11 a.m.	 *Aspen catkins swell and open*	
25	26	27	28	29	30	31
April				**miniNaturalist Pre-K Program,** 10-11 a.m.		
 *Earthworms surface*						
3	4	5	6	7		
		Evening Program, 7 p.m. **Naturalist Trivia Night!**		**miniNaturalist Pre-K Program,** 10-11 a.m.		**Saturday Kids' Activity,** 2-3 p.m. **Beaver Lodge Boogie.**
10	11	12	13	14		
		Glacial Lake Missoula Chapter Meeting, 3:30 p.m. **Evening Program,** 7 p.m. **Volcanoes and Climate Change with Ian Lange.**		**miniNaturalist Pre-K Program,** 10-11 a.m. **Volunteer Naturalist Training,** 4:00-5:30 p.m.	**Homeschool Naturalists,** 10-11 a.m. and 2-3 p.m. **Glacial Lake Missoula.**	
15	16	17	18	19	20	21
Hungry bears feed on new green shoots of many plants			**Evening Program,** 7 p.m. **Hunting and Gathering Lecture Series: Foraging the Mountain West with Thomas Elpel.**	**miniNaturalist Pre-K Program,** 10-11 a.m.		
22	23	24	25	26	27	28

CATKINS, BUTTERCUP PHOTOS: MATT LAVIN, FLICKR.COM

JOSEPH BERGER, BUGWOOD.ORG

January 13 Community Discovery Day, 12:30-3:30 p.m. **Lee Creek Snowshoe Walk.** Free. Registration required.

January 17 Glacial Lake Missoula Chapter Meeting, 3:30 p.m. Free and open to the public.

January 24 Evening Program, 7:00 p.m. **Understanding the Maintenance of Species Diversity in Western Montana Grasslands with John Maron.** $5 suggested donation; MNHC members free.

February 6-May 8 Montana Master Naturalist Course. FULL. Check MontanaNaturalist.org for information on our summer course.

February 7 Evening Program, 7:00 p.m. **Hunting and Gathering Lecture Series: Seasonal Round: Understanding the Landscape with Rosalyn LaPier.** $5 members; $10 non-members; students FREE.

February 15 Evening Program, 7:00 p.m. **Naturalist Trivia Night: Valentine's Day Edition!** $5 suggested donation; MNHC members free.

February 21 Glacial Lake Missoula Chapter Meeting, 3:30 p.m. Free and open to the public.

February 27 Non-profit Tuesday at Caffè Dolce, 5:00-9:00 p.m. 15% of the evening's sales go to MNHC. Enjoy a delicious Italian dinner while supporting MNHC!

February 28 Teachers-Only Science & Nature Night, 5:00-7:30 p.m. Teachers, join us to celebrate your work in the classroom! There'll also be live naturalist demonstrations and materials to explore. FREE.

March 7 Evening Program, 7:00 p.m. **Naturalist Trivia Night** hosted by the Clark Fork Coalition. $5 suggested donation; MNHC members free.

March 10 Members-Only Discovery Day. 10:00 a.m.-2:00 p.m. **Wonderful Waterfowl at Lee Metcalf.** Free. Kids welcome! Registration required.

March 14 Evening Program, 7:00 p.m. **Hunting and Gathering Lecture Series: Hunting for the Ancient Past: Field Guide to Montana Fossils with Kallie Moore.** $5 members; $10 non-members; students FREE.

March 21 Glacial Lake Missoula Chapter Meeting, 3:30 p.m. Free and open to the public.

April 11 Evening Program, 7:00 p.m. **Naturalist Trivia Night!** $5 suggested donation; MNHC members free.

April 18 Glacial Lake Missoula Chapter Meeting, 3:30 p.m. Free and open to the public.

April 18 Evening Program, 7:00 p.m. **Volcanoes and Climate Change with Ian Lange.** $5 suggested donation; MNHC members free.

April 25 Evening Program, 7:00 p.m. **Hunting and Gathering Lecture Series: Foraging the Mountain West with Thomas Elpel.** $5 members; $10 non-members; students FREE.

Volunteer Opportunities

April 19 Volunteer Naturalist Training, 4:00-5:30 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 experience necessary.

Skiing in Our Winter Wonderland

There are many great ways to get outside in winter, from building snowpeople in your backyard to skinning up a mountain for some backcountry skiing. For a family-friendly and relatively inexpensive way to explore wintry landscapes, cross-country skiing is a great option, and western Montana has many wonderful places for both classic and skate skiing. Here are a few of our favorites:

▶ **Chief Joseph:** Though a two-hour drive from Missoula (south on Highway 93, just across the highway from Lost Trail Ski Area), it has some of the most reliable snowfall in the area, and is generally skiable from December 1st through April 15th. With 13+ miles of groomed skate and classic ski trails ranging from easy to difficult, well-marked junctions and trail maps, and a cozy warming hut with a generous supply of hot cocoa, it's absolutely worth the drive. Find snow reports and grooming info at bitterrootxcclub.net.

For the following ski areas, visit missoulanordic.org for snow reports and grooming info.

▲ **Lolo Pass:** Another ski area with very reliable snow, Lolo Pass is only an hour from Missoula, west of Lolo on Highway 12. It has eight miles of groomed ski trails, as well as many more miles of multi-use trails maintained by the Missoula Snowgoers snowmobile club. The three-mile groomed loop is great for beginners, while more experienced skiers can explore the six-mile loop. Skiers of all abilities will enjoy the warmth (and hot beverages!) at the Lolo Pass Visitor Center. Parking is $5 per vehicle or $35 for a season pass.

Lubrecht: Just 30 miles east of Missoula on Highway 200, Lubrecht Experimental Forest has 12+ miles of groomed trails ranging from beginner to intermediate. Snow conditions vary and grooming is intermittent, but usually happens prior to weekends. Lubrecht is one of the few groomed ski areas that allows dogs.

Pattee Canyon: When conditions are good, the trails in the Pattee Canyon Recreation Area, just a few miles east of Missoula, are a great place to ski. There are six miles of groomed classic and skate ski trails; ski the north side for flatter trails, or challenge yourself with the hillier loops on the south side. You can also explore the ungroomed trails in Crazy Canyon or the gated roads off of Deer Creek Road.

▼ **Rattlesnake Recreation Area:** Perhaps the most popular local cross-country ski spot when snow falls in the valley, the main Rattlesnake Trail is just six miles north of downtown Missoula. The trail is multi-use, for winter bikers and hikers as well as skiers, and offers five miles of groomed snow for classic skiing (the trail is not wide enough for skate skiing). With its gently sloping trail, this is a great spot for beginners.

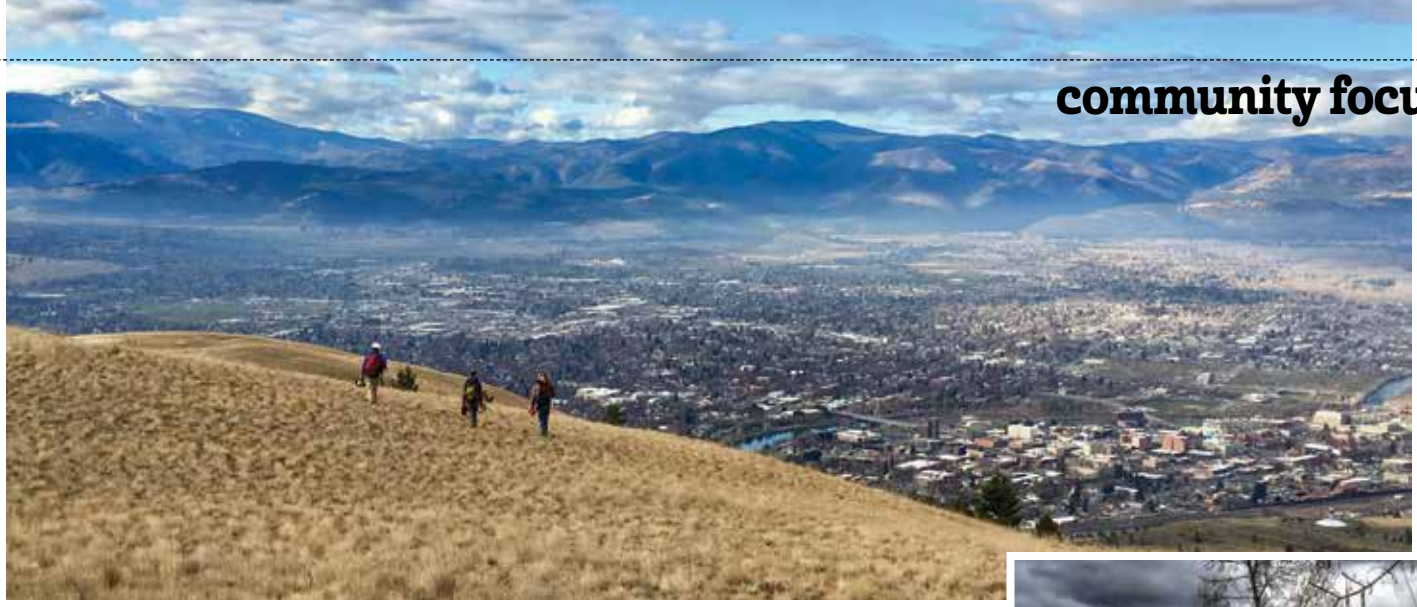
Seeley Lake: With a little more snowfall than the neighboring valleys, Seeley Lake's 11 miles of groomed skate and classic trails are a wonderful wintry destination, just an hour from Missoula. The trails are well signed and include easy, intermediate, and difficult skiing opportunities, and most are groomed daily. In addition, there are 200+ miles of multi-use trails in the area, maintained by the local snowmobile club.

Interested in traveling a little farther afield? Check out Homestake Lodge near Butte (22+ miles of classic/skate), Mount Haggin near Anaconda (17 miles of classic/6 miles of skate), Blacktail Mountain near Lakeside (15 miles of classic/skate), Echo Lake adjacent to Discovery Ski Area (8+ miles of classic/skate), Moulton Reservoir near Butte (9 miles of classic), and the Rendevous Ski Trails near West Yellowstone (20+ miles of classic/skate).

Need to rent skis? Rentals for boots, skis, and poles average about $15. In Missoula, check out the Trail Head, Open Road Bicycles and Nordic, or UM Campus Recreation.

Happy skiing!

PHOTOS BY ALLISON DE JONG



PHOTOS BY MORGAN VALLIANT

Morgan Valliant:
Steward of Missoula's Open Space

BY ALLISON DE JONG

Above: **Conservation crew working on top of Mount Jumbo.**

Right: **Transporting planting materials to a restoration site on the Clark Fork River.**

We Montanans love our open spaces, from wilderness areas to National Forest lands to the recreation areas in and around our communities. The city of Missoula is fortunate to have more than 4200 acres of open space—as well as a dedicated Conservation Lands Manager to help oversee them.

Since Morgan Valliant stepped into the position in May 2008, he's been in charge of managing Missoula's natural, cultural, and recreational resources, which includes everything from planning and building trails to writing grants to rebuilding historic structures to revegetating areas with native plants. The variety is endless—as are the challenges and opportunities.

One of Morgan's favorite opportunities is preparing new land acquisitions for public use. This one- to two-year process includes inventorying each new parcel, developing a plan for its use, getting public input, building the trails, then opening it up to the public. "It's a lot of fun," he says, "doing that full-picture planning, making smart decisions, and opening up a new area."

On the flip side, however, is one of the greatest challenges Morgan faces: effectively managing the lands that had been in the system for a decade or two before his position was created. "The toughest part," he says, "is just trying to get these lands up to our standards"—standards that have been applied to all of Missoula's more recent acquisitions. When the city acquired Mount Jumbo, the North Hills, and other open spaces twenty or thirty years ago, there was no one to create a management plan, no one to do the comprehensive inventory needed to figure out what wildlife and plant life should be protected, no one to determine the best places for trails. In the meantime, the level of use on these inadequately planned lands and trails has increased exponentially, making sustainable improvements vital.

"Missoulians love the outdoors," observes Morgan. "But increasingly, the people who are using these lands are not as aware of the impacts they're causing, how they're threatening the integrity of these habitats." Because many of Missoula's open spaces are meant to provide both a place for human recreation and habitat for native plants and animals, much of Morgan's work focuses on balancing recreational impacts with conservation goals. And this makes education essential.

Some of that education is simply making sure recreators know where the trails are. In 2015 the city completed a comprehensive inventory of its open space, mapping 57 miles of approved trails, finding 19 miles of user-created trails, and identifying 360 problem points (eroding and damaged trails, drainage issues, etc.). Since then Morgan and his crew have been working hard to shut down problematic trails, provide signage at trail intersections, and complete an online, interactive map of Missoula's entire trail system.

The broader educational goal, however, is to create a strong stewardship ethic. The city provides some education by partnering with various groups—including MNHC, the Native Plant Society, the Missoula County Weed District, Run Wild Missoula, and Mountain Bike Missoula, the latter two keying in on topics such as responsible recreation and trail etiquette. Many of these educational efforts are focused on the younger generation. "Kids are budding naturalists," says Morgan. "They understand impacts, they get Leave No Trace. You talk to any fifth grader about the impacts of noxious weeds, and they know."

But teaching kids how to be good stewards doesn't let the rest of us off the hook. It's important for us all to consider our impacts as we explore our open spaces, showing respect for the plants and animals that live here. Doing so not only makes it easier on people like Morgan, who work hard to make our open spaces accessible and thriving, but ensures that our children and grandchildren will also be able to enjoy and explore these places that we love.

imprints

Celebrating Another Fantastic Fundraiser!

Once again, we'd like to thank everyone who attended our Annual Banquet & Auction at the University Center Ballroom on September 30th. More than 430 generous guests helped us raise more than $175,000 (yes, another record-breaking year!) in support of nature education for children and adults. We are especially grateful for your outstanding response to our Fund A Dream challenge, helping us to strongly grow our Wings Over Water and Interactive Distance Nature Education programs in the coming year. 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!

Auction Contributors

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MNHC PHOTOS

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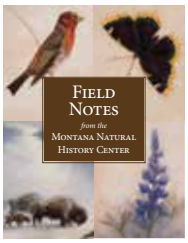
MNHC Holiday Gift Guide

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 beautiful 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. **$22.95**. Stop by MNHC to purchase in person, or call 406.327.0405 or order online at MontanaNaturalist.org/field-notes-book or on Amazon.com.

Naturalist Notecards

With photography by Logan Photography (loganphoto.com), these blank notecards come in packs of six, each card featuring a beautiful and unique collection of natural history objects. A perfect way to say "Thank You," "Hello," or "Happy Holidays!" **$16**. Stop by MNHC, call 406.327.0405, or go to MontanaNaturalist.org/naturalist-notecards 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 MontanaNaturalist.org/membership.

Join Us for our 2018 Lecture Series!

Hunting & Gathering: Learning to Read the Landscape

Join us for an exploration of the tradition of hunting and gathering, from food and medicine to the naturalist's habit of creating collections. Each of our six speakers will share their expertise, from identification and use of the object of the hunt to identifying the landscape or phenology clues that will help hunters and gatherers to find what they're looking for.

Upcoming Speakers:

Rosalyn LaPier, February 7th: Seasonal Round: Understanding the Landscape

Kallie Moore, March 14th: Hunting for the Ancient Past: Field Guide to Montana Fossils

Thomas Elpel, April 25th: Edible Plants: Foraging the Mountain West

Elaine Sheff, August 15th: Medicinal Plants: Nature's Medicine Cabinet

Ted Antonioli, September 19th: Early Mining for Flint and Gold

Tim Wheeler, October 10th: Edible Fungi: From Forest Floor to Fine Cuisine

$5 members; $10 non-members; students FREE.
For more information and to purchase tickets, visit:
MontanaNaturalist.org/hunting-and-gathering

GOOD FOOD STORE

The Montana Natural History Center
thanks the
Good Food Store
for Sponsoring our 2018 Lecture Series -
Hunting and Gathering:
Learning to Read the Landscape

PHOTO BY JENNIFER OAKLAND

Siblings getting outside with MNHC's naturalist backpacks, ready to explore!

As To The Mission

An Appeal

Like all successful organizations, the Montana Natural History Center makes strategic plans in order to carry out our mission. We come up with goals and objectives to fulfill those plans and every year we reflect on the effectiveness of these tasks as the year draws to an end and we plan for the next.

Notably, we achieved much of what we set out to do this year. In fact, we even went a little beyond. We launched Wings Over Water, a STEM program for middle schoolers. We added ten rural classrooms, spread across Montana, to our growing ID Nature program. We hosted an extremely popular and engaging lecture series about the Anthropocene and human-caused climate change. We also made great strides in bringing some exciting new and fantastic exhibits to the Center, which will start opening to the public in 2018.

We are able to do all of this because of the generous contributions of people just like you (and probably you yourself). Businesses, foundations, and community members support our mission to connect people to nature through education.

And it is this consideration of accomplishment and of all the wonderful generosity that has inspired me to make a request of you the reader, an appeal for the holidays and beyond.

I appeal to you to keep learning about our natural world. Visit museums and nature centers. Hang out in wildlife preserves and refuges. Take in our state and national parks. Go for a hike and bring your journals, guidebooks, and smartphone bird ID apps. Document, photograph, and take notes about what you observe. And read, or re-read, the works of E.O. Wilson, Jane Goodall, Carl Safina, or Jedediah Purdy.

Be involved. Volunteer and donate to organizations that are educating people about the environment, and protecting and conserving it.

To learn more, get involved, or donate to the Montana Natural History Center, visit us at MontanaNaturalist.org.

Happy Holidays and thank you for your support,

Thurston Elfstrom,
Executive Director

MNHC PHOTOS

Volunteer Spotlight

This issue's Volunteer Spotlight focuses on two individuals on our Board of Directors who have a deep impact on the Montana Natural History Center: Rick Oncken and Mark Metcalf.

At our recent Auction & Banquet we honored each of them with "The Friend of the Montana Natural History Center" award, which is presented to those individuals who have demonstrated lasting care for the organization.

◀ Rick has been a longtime friend to MNHC. He has a steady, practical way of doing things and, unless a hunting trip interferes, he always attends our programs or events. Rick is a man who shows up. In the words of Board President Tom Roy, "Year in and year out, Rick quietly works his magic in so many ways, helping the organization succeed."

▶ Mark Metcalf joined the MNHC board just a few short years ago, but in that time has helped our distance learning program, ID Nature, grow tremendously. Mark has also been instrumental in leading the charge on our Exhibits Committee (stay tuned for some exciting news!), and many of you know him as the MC extraordinaire at our auction as well as the man who generously donates his time to host *Animal House* parties where he gives the insider scoop. Mark will be leaving Montana—and the MNHC board—in the new year, but says he will come back to MC at the auction again next fall!

Rick and Mark, you have our most sincere thanks for all you do for MNHC!

Lower Miller Creek, Alaska

PHOTO BY SEBASTIAN SAARLOOS

Moon Dogs

BY ELLIE DUNCAN

While moon dogs usually appear colorless, sometimes one can see a faint rainbow. The colors progress from red on the inside to blue on the outside because red light is refracted less strongly than blue light.

Tonight we're staying in a primitive cabin, lit with the enticing orange and warmth of the small cast-iron fireplace. We pull our toasted faces away from the hypnotic flame, determined to observe the night sky from the frozen surface of Lake Como which is just down the rocky hill from the cabin. Hundreds of yards down that hill in the dark, the crunching noise of the gravely sand beneath my friends' boots sounds inches away. The cold air carries sound with the same clarity and translucence the night sky displays.

Hiking cautiously downhill around boulders and uneven stones, I am waiting until I reach the safety of the flat shore before looking up at the sky. Walking takes all my focus in the dark, even with the generous light from the almost-full moon. We make our procession towards the white void which is the snow-glazed surface of the lake. When I finally reach the icy waterside and look up I cry out, "Look at the huge ring around the moon! It's a moon dog!"

"That's called a moon dog?" someone asks, and we marvel at the beauty of the night sky and the halo of light around the full orb of the moon. For some reason I feel an intense need to emphasize how special the ring around the moon is: for me, for all of us, for this place.

Moon dogs have many names: lunar halos, moon rings, or winter rings. Their scientific name is "paraselenae" and they are made visible by a combination of specific circumstances. First of all, the night must be clear enough to see the moon. Simultaneously there must be a translucent layer of cirrus or cirrostratus clouds: those thin wispy clouds which take little more form than a loose brush mark across a page. Moon dogs are most commonly seen when the moon is full, or nearly so. The temperature must be cold enough to freeze the cloud's moisture, creating hexagonal plate-shaped ice crystals that catch the moonlight. As light is refracted in millions of randomly oriented hexagonal ice crystals suspended in the atmosphere, a colorless ring becomes visible to the naked eye.

According to folklore, moon dogs are signs of approaching storms or bad weather. Because cirrus clouds often appear a few days before a large storm, this lore is scientifically sensible, although the same clouds can occur without any consistent weather change.

Every time I have seen a lunar halo, it feels like some kind of memorandum, or marking of time. I can only remember seeing moon dogs three or four other times in my life, and each time all my attention has been drawn away from *my* night and into the *sky's* night. As the moon's light holds the sky, I feel held too. Moon dogs have been checkpoints for me in my own story, like dog-eared pages in the paperback of my life. Seeing the sky held by the moon's light feels like a reminder of nothing more or less than "Here you are. Here is the sky. You are alive."

—Ellie Duncan grew up in the Bitterroot Valley. Since graduating from the University of Montana in 2015, Ellie has been bouncing around mountainous northern regions of the world as an aspiring naturalist, farmer, and artist.

Naturalist Notes *from Western Montana and Beyond*

13 November 2017

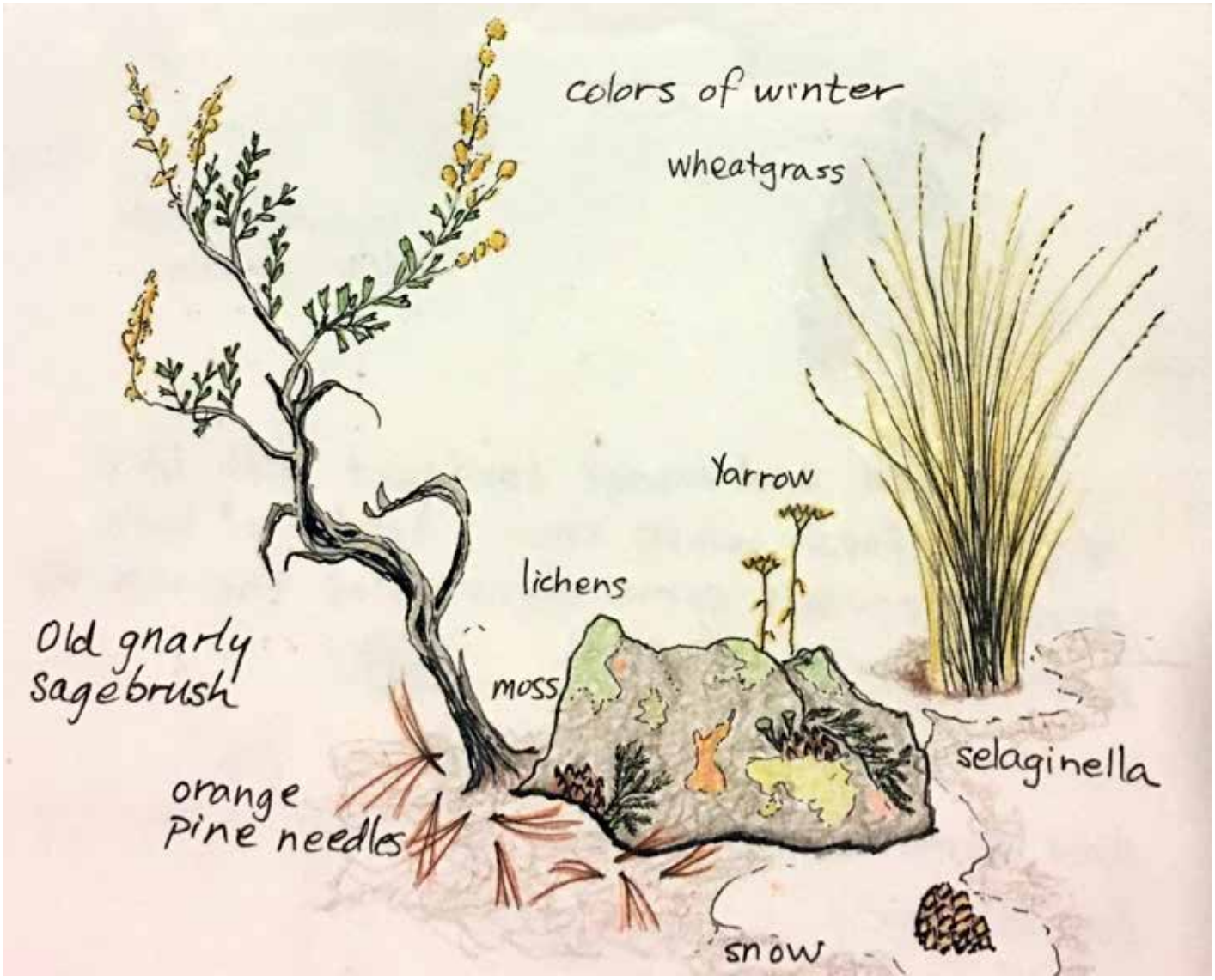
40 degrees & breezy, Willoughby 40, Stevensville, Montana

On a south-facing rocky outcrop, tall autumn grasses have shed their seeds and wave gracefully in the breezes. Surrounded by a young pine forest, I watch from across a ravine as treetops sway the wind to me. Ravens roll, tumble, and croak in these swirling gusts.
The distinct "peep peep" of several Pygmy Nuthatches comes closer as their small flock with chickadees moves towards me. My excitement is hidden in the stillness of my perch as I blend in to my surroundings. First, chickadees come within four feet, and one by one the small tree fills with their chatter. Moving only my eyes, I follow one energetic Pygmy Nuthatch to a branch just two feet from my face. It pauses its endless search for morsels to look at me with one eye and then the other. Suddenly it leaves its branch, coming straight towards me. I hear it flit slowly just inches over my head and perch behind me. It flips me one last look and hurriedly returns to scouring the small pine branches with its mates.

~Deborah Goslin, Master Naturalist

What have you observed outside lately? What wild creatures, flora, and weather exist near your home? What makes your place unique?

Tell us about the natural history of your place—and it could get published! Send your Naturalist Notes (up to 350 words) and a photo or drawing, if you wish, to Allison De Jong, Editor, at adejong@MontanaNaturalist.org.



Wolverine *(Gulo gulo)*

Views of the Wild

WILDLIFE CAMERA PHOTOGRAPHY BY KALON BAUGHAN

American pine marten *(Martes americana)*

Bobcat *(Lynx rufus)*

Canada lynx *(Lynx canadensis)*

Kalon Baughan lives in rural Montana and has made a career in fine art for the past 30 years, working with oils, graphite, charcoal, and his camera. Interested primarily in wildlife art and photography, he strives to capture the allure of animals in their natural environments. He also uses his photography and naturalist skills to support wildlife conservation, studying rare carnivores with remotely triggered trail cameras. Kalon's trail cameras have taken hundreds of thousands of photographs of Montana wolverines, lynx, bobcats, and a host of other wildlife. Through partnerships with state and federal agencies and non-profit organizations, the data gathered is used to inform species-specific conservation in Montana. These experiences have offered him a unique, personalized window into the world of these rare species and help to inform his art. See more of his work at kalonbaughanfineart.com.

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