



Montana Natural History Center

Winter 2018-2019

MONTANA Naturalist

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

Life in the Cold: Exploring Winter Streams



Blackfeet Stand-up Headdresses | Exploring with iNaturalist | A Tale of Two Scientists

MONTANA Naturalist Winter 2018-2019

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Cover – A Northern Pygmy-Owl sits in a cottonwood tree in Northwestern Montana during the first snowfall of the season.

Photo by Steven Gnam, gnam.photo.

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tidings

When the temperatures drop into the teens (or below), and the sun shines down from a bright winter-blue sky, I am

taken back to my midwestern roots. Northwest Iowa has a lot of cold, sunny days. Missoula's greyer winters were difficult to adjust to, my first few years here, even though I love the snow and cold.

But then I learned the trick: get outside, no matter how grey the day. In fact, the gloomier the weather, the more I benefit from getting out in it. When I'm surrounded by snowy expanses, the warm reddish-brown bark of ponderosa pines, and the deep green branches of Douglas-firs, it doesn't matter how grey the sky is above me.

It's a good reminder that it's always worthwhile to make that effort, even though it's not easy to get oneself outside on these dark days around the solstice. But there's vividness and life to be found even in winter, even on the bleakest-seeming of days. Chickadees and nuthatches chirp away in the trees. Voles scamper through their subnivean tunnels. There are always tracks to be found—squirrel, snowshoe hare, and coyote or bobcat or marten if you're lucky.

Those reminders come through in this issue, too: ecologist Kara Cromwell explores winter streams, painting a vivid picture of the life beneath the surface (page 4). Naturalist Tait Sougstad discovers a community of nature lovers through a citizen science app, and finds himself looking more closely at the world around him through all the seasons (page 20). Let our ice and snow quiz (page 11) inspire you to get outside and take a closer look at some of the unique beauties of this season. In addition, enjoy a look into Montana's cultural history in Rosalyn LaPier's feature on Blackfeet stand-up headdresses and their fascinating origin story (page 7).

These next few months, let's make that extra effort. Get outside and take in the season, if only for a bit. Perhaps it's just a few deep breaths of crisp air while standing in your backyard. Or perhaps it's an entire day spent exploring in the snow. No matter how long you're outdoors, be on the watch for those bright moments—a Pileated Woodpecker hopping about in your Norway maple; the peppery scattering of snowfleas along a wintry trail; the sight of a moose, huge and silent, in the snowy woods.

Here's to a long and lustrous winter.

Allison De Jong

EDITOR

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A ponderosa pine stands piled with fresh snow, beautiful even on a cloudy day.

PHOTO BY ALLISON DE JONG

A photograph of a winter forest scene. In the foreground, a stream flows through a dense forest of tall, thin evergreen trees. The ground and the stream banks are covered in a layer of snow. A large, fallen log lies across the stream, partially submerged, with many smaller branches and debris scattered around it. The water in the stream is dark and appears to be flowing over the log, creating a small waterfall or rapids. The background is filled with more trees, their branches also covered in snow. The overall atmosphere is cold and serene.

LIFE IN THE COLD:

Exploring Winter Streams



PHOTO BY CORDEL ANDERSON

BY KARA CROMWELL

If there's one thing Montanans are ready to tell you about streams in winter, it's that the fish are still eating. If you're tough enough, if your line doesn't freeze, if there's open water, you could fish Montana's trout streams any day of the year. That fish eat through the winter is no doubt true, and reassuring for the tough-enough of us, but don't stop there. Beneath the surface, so to speak, is a complex world that deserves closer attention.

Because trout are top predators in streams, it's possible to view the act of a trout gulping prey as a kind of grand culmination, nutrition laboriously making its way into the highest reaches of the food web under the least favorable conditions. The production of a stonefly, for example, is a process fueled by sunlight, accelerated by warmth, enabled by countless adaptations, behaviors, and no small dose of chance. You could think of a stonefly as a packet of nutrients sequestered in heterotrophic biomass (if that's your thing) or think of it as a two-milligram miracle. Either way, if a trout rouses its chilled muscles to strike a stonefly on a wintry day, it's a dramatic plot point in a longer storyline.

We humans of northern latitudes have conveniences that buffer us from winter's truths—we have furnaces, thermal base layers, grocery stores stocked with bananas. But for the wildlife we live among, winter is a prolonged period of unproductive conditions when animals are challenged to consume enough food to provide the energy they need for survival and, if they can manage it, growth. But to grow in winter is a tall order. In the insect life cycle, the larval stage—which occurs between egg and adult—shoulders the responsibility of putting up sufficient energy reserves to eventually devote to reproduction. A common and strategic version of the aquatic insect life cycle is for larvae to feed and grow when conditions are best, stocking up biomass through spring and summer and emerging from the stream as adults before winter comes. Although some aquatic insects surmount the odds, winter is a cruel time to mature to adulthood and unfurl your wings. Fragile adult insects are often compelled to fly to locate mates and disperse, which would be costly if not impossible in cold winter temperatures. In contrast to larvae and adults, which busy themselves to the tasks of growing, mating, or dispersing, eggs are predisposed to patience. Enclosed and provisioned with an independent food supply, eggs can withstand the austerity of winter. Overwintering in a dormant egg is a common strategy for many stream species.

Another way to solve the problem of winter—which is to say, the problem of having a lot of developmental ground to cover before temperatures plummet—is to get two or more summers' worth of growth under your belt. Rather than racing toward adulthood in the course of one summer, take a lesson from the millennials: stay at home another year or three, delay adulthood, focus on personal growth (the literal kind). This is the approach the largest stoneflies take. To reach the size of the iconic salmonfly, for example, takes some waiting. Not only do those large insects spend years as larvae, taking advantage of multiple summers for growth, they survive winters as larvae and make the most of those conditions by continuing to grow even as temperatures drop to a critical point. At the risk of understatement, there is something you might call a “word” that scientists use to label the thermal threshold for growth: *entwicklungsnullpunkt*. It literally means the point-of-zero-creation, the temperature below which growth is physiologically impossible. The *entwicklungsnullpunkt* of some stoneflies can be impressively low, approaching zero degrees Celsius. This means their physiology is tuned to allow them to capture and digest food, then transform food into biomass even in frigid water, when the biochemical reactions underlying those processes are running at a slow creep.

But for overwintering insects, growth is a secondary problem: food comes first. If we backtrack through the food web of a winter stream, where does nutrition originate? To locate the origin of

***entwicklungsnullpunkt*:**

It literally means the point-of-zero-creation, the temperature below which growth is physiologically impossible.

A showcase of elaborate stream habitat in Rattlesnake Creek near Missoula, MT. Complexity in the stream channel creates essential refuges for overwintering animals.

winter food sources we have to travel backward in time. Courtesy of autumn leaf fall, many forested streams have something of a food bank for the bleak months ahead. Insects can shred fallen leaves for food, or can filter out or graze on detritus that results from leaf breakdown. In this way they spend winter eating nutrients that trace back to summer sun and warmth. Algae are another food source, and some continue to grow on rocks in streams through winter if light is available. But if you took a close look (like, really close—you would need a microscope) you would see a different community of algae thriving in winter compared to summertime, similar to the turnover of wildflower species we are used to seeing in meadows between spring and autumn, as different species bloom and die back in turn.

While we're zoomed in on the algae, it's worth paying attention to other dynamics that influence the stream bed. The physical structure of the stream from the ground up is crucial to its biology. Sediment, surfaces of rocks, and open spaces between them are critical habitat for aquatic insects and often for small fish as well. During much of the year, these habitats provide a stable environment where flows are benign and shelters are plentiful. But when winter comes conditions at the stream bed can be changeable. Subfreezing temperatures can trigger anchor ice formation on the rocky bottom of streams, evicting animals from their shelters. Because stream temperatures will swing up and down on daily cycles that parallel air temperatures, anchor ice can solidify and melt again, repeatedly abrading the stream bottom. This physical scouring can kill or displace bottom-dwelling insects and creates inhospitable conditions for fish.

In contrast to ice forming beneath the water, surface ice that collects snowfall can benefit overwintering stream animals by creating an insulated, stable environment. Calm waters with sluggish flow are the habitats most likely to form surface ice, which makes pools critical overwinter habitat, especially for fish. Not only are they thermal refuges, but slow water velocity means that fish occupying them do not have to expend energy holding position against the current.

Appropriate overwinter habitats are critical for fish survival. But sometimes good winter habitat gets ugly. The streams that offer resident fish the best offseason lodging options may not meet a commonly held standard of beauty from the human perspective. A continuous channel of bubbling riffle, open, inviting, and readily wadable, is not to the taste of an overwintering trout. Instead, look for something messy, jumbled. Irregularities in the stream channel—log jams, deep plunge pools, undercut banks, beaver ponds, side channels, and backwaters—shape an underwater landscape rich with essential overwinter refuges. Streams with complexity and clutter are best suited to shelter fish from harsh conditions in both flow and temperature.

Like apartment hunters in a college town, trout diligently seek out the best shelters in the fall. Finding the right place is top

priority because once winter comes trout tend to be homebodies. Unless disturbances intervene, they will hunker down and conserve energy by limiting their movements. But lodging in the most desirable location often means sharing with a lot of neighbors, so it's common for trout to pack into choice pools and slack water areas, or to crowd around sites where warmer groundwater upwells into the stream channel.

This is a bit of an attitude shift for trout, socially speaking. When trout are about the business of feeding in the warmer

months, they will stake out and defend feeding territories, keeping nearest neighbors at a distance. They get aggressive and chase interlopers who might dart in to steal a choice prey item. At these times of seasonal bounty, the best habitats are those where feeding is most efficient. They free trout to make regular deposits into the bank account of energy stores, as the fish grows and accumulates lipid reserves that will see it through winter. When winter comes, the need to forage falls lower on the priority list. Trout are not thinking about adding to the energetic bank account as much as protecting their savings against losses. Habitats that do not demand energy expenditure—those that don't challenge

the fish with swift currents or stress it with freezing temperatures—are at a premium.

And yet we know that fish are still eating in winter. But don't mistake winter foraging for the fleet displays that darting, breaching trout make in summer's heyday. They opt for restraint during winter months. When I asked fishing guides at Missoula's Grizzly Hackle Fly Shop how winter flyfishers entice a trout to bite, they advised: don't be subtle. Put the fly in front of its nose. Use brightly-colored flies as attention-getters. This practical wisdom illustrates the restrictive effect temperature has on fish activity. They are not interested in working hard at searching for and capturing food; they will favor the easy-to-get.

Working within such energetic constraints, it is a challenge for fish to put on weight during the winter. Sometimes their body condition decreases. Especially for the young, winter marks a critical period when survival is at stake. But the project of surviving, growing, and reproducing is never easy and each season brings its own hazards. Forbidding as winter conditions may seem, summer heat is also perilous for trout and it is the recurrence of increasingly hot, dry summers that pose a true threat to Montana's stream ecosystems. The crags and watersheds of the northern Rockies have been shaped by a legacy of ice and snow, as have the wildlife. Weathering the cold is not so much a tax as it is a share of their inheritance. 🐟

—Dr. Kara Cromwell is a stream ecologist with an affinity for invertebrates. She studies the interactions of aquatic insects with parasites, and enjoys finding ways to communicate and celebrate nature's creepy, crawly side.



Lodging in the most desirable location often means sharing with a lot of neighbors, so it's common for trout to pack into choice pools and slack water areas.



Her Dream:

Blackfeet Women's Stand-Up Headdresses

BY ROSALYN LAPIER



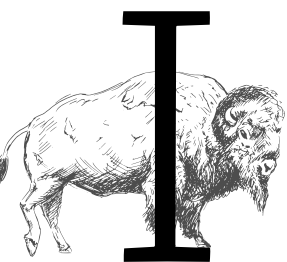
When most people imagine a Blackfeet person in their regalia, they probably visualize a man wearing a large headdress with feathers sweeping backward.

Would it surprise you to know that the Blackfeet historically did not wear the Sioux-style, or “wobbly” headdresses, as one elder called them? Or that it was not just men who wore headdresses, but women, too?

Blackfeet women wore what are called “stand-up” headdresses. And they still do. Stand-up headdresses are very old, from “way back in history,” according to Weasel Tail, an 85-year-old Kainai man living in Browning in the 1940s. “Each one was dreamed,” he said, “and made the way [the headdresses] were seen in dreams.” Cecile Black Boy, a Blackfeet woman who also lived in Browning in the 1940s, remembers the story she learned about the original stand-up headdress.

Previous page: Stand-up bonnet (Blackfeet), ca. 1880. Trade cloth, Golden Eagle feathers, ermine fur, horse hair, bells.

Above: Group of Blackfeet (Amskapi Piikani) men and one woman singing in front of a tipi, ca. 1913. Note the various types of headdresses, including both the stand-up and Sioux-style.



It came from the dream of a woman a long time ago.

One day a young woman went out to collect dried cottonwood branches for her fire.

After she was done with her chore, she lay down to rest and she fell asleep. She dreamed that a buffalo-deity, a being from the supernatural realm, came to her and said, “Daughter, I have come to give you a headdress. But I want you to tell your people not to [kill] my children anymore.”

Stand-up headdresses are different than the Sioux-style headdresses because, as the name suggests, the feathers literally stand straight up. Each stand-up headdress

looks similar but is designed and decorated a little bit differently based on the dream of the creator of the headdress.

She looked at his headdress and thought it was the most beautiful one she had ever seen.

The Blackfeet once called themselves the Saokio-tapi, or the Prairie people. They made the stand-up headdresses from elements found on the prairies that had a connection to the supernatural realm: Golden Eagle tail feathers and plumes (*Aquila chrysaetos*), bison rawhide and sinew (*Bison bison*), white or winter ermine hides (*Mustela erminea*), porcupine quills (*Erethizon dorsatum*), small pins made from willow (*Salix exigua*), and red ochre for paint (iron oxide, hematite).

The buffalo-deity added, “I will teach you the songs to this headdress and give you all my power to be fortunate and be blessed with a good life, if you do as I ask.”

To create a headdress the Blackfeet started with a stiff piece of bison rawhide to make a headband. The rawhide headband was then folded in half and holes were placed along the folded edge to put the hollow shaft, or calamus, of the feather through.

The calamus of each feather was reinforced with a small wooden peg made out of willow. The rachis or central part of each feather was then decorated with a thin rectangular piece of rawhide wrapped with colored porcupine quills and sewn onto the rachis. This made each feather stronger and

enabled it to stand up. Some Blackfeet said the headdresses usually had 14 eagle tail feathers; others said they used more.

The eagle feathers were placed through the holes in the rawhide headband and connected inside of the rawhide with sinew. From the outside, a person could not see the calamus, just the feather sticking out of the rawhide.

The outside of the headband was then decorated with red ochre paint and white ermine skins attached on both sides near the temples, and with other decorations or designs based on the maker. After the Blackfeet began to trade with Americans, they decorated the outside of the headbands with red wool flannel instead of red ochre paint, and shiny brass tacks.

A rawhide string was added to the back of headdress to tie or tighten and then untie the headdress. When the headdress was not in use it could be untied, rolled up, and carried over the shoulder.

The young woman agreed.

She learned all the songs and ways to use the headdress from the buffalo-deity, who continued to return in her dreams until she completed her training.

The Blackfeet believe that it is important, even necessary, to create relationships or allyships with the supernatural realm. In her dream, the young woman creates a relationship with a supernatural being, the buffalo-deity, who teaches her about the stand-up headdress. She then creates the headdress using elements from the natural world.

In one version of the story, the young woman remained unmarried for many years, using the headdress herself.



However, around the turn of the last century, about the time that Browning became a town in 1895, elders said that the Blackfeet began to wear the Sioux-style headdresses.

Annie Bear Chief, a 70+-year-old elder, said that the Blackfeet were introduced to “those wobbly bonnets” when Browning grew as a town. She lamented that “our old bonnets were beautiful, straight up” and decorated with porcupine quills.

In another version of the story, the young woman was married and she told her husband of the dream. He collected eagle tail feathers for his wife to make the headdress.

After the young woman learned all there was to know about the stand-up headdress, she transferred her knowledge and the headdress to her husband and then their son.

This is how the Blackfeet believe that the stand-up headdress was introduced to them. They have always worn the stand-up headdress since they were first dreamed into existence by a Blackfeet woman; the headdress continues to be transferred or exchanged among Blackfeet women.

The transfer of a sacred object can sometimes take days or even months, because it can only happen after a person learns the story and songs of the object, as well as how to make it. Collecting the natural materials, such as the feathers, quills, or furs, can take time as well because they may come from different ecosystems on the landscape and are collected during different seasons of the year.

Three Calf, a Blackfeet elder, said that the Blackfeet readily adopted the Sioux-style headdresses because they were not viewed as sacred or connected to a supernatural ally and thus did not require a transfer ceremony like the stand-up headdress. “By the late years of the 19th century,” he said, “few people were alive who had the [supernatural] power to make the stand-up bonnets; and it could be made only by one who had that power.” He added that the Blackfeet believed that the “stand-up bonnets were a sacred thing.”

However, today there is a resurgence and revitalization of Blackfeet lifeways, food systems, language, and ecological knowledge. The Kaa-poi-saam-iiksi—the Women’s Stand-up Headdress Society—has been revitalized, with dozens of members in both Canada and the United States.

In *Her Dream*, as the young woman put on her headdress, it brought together two worlds—the natural world and the supernatural realm—through her dream, the story, the songs, the natural materials from the prairies, and the relationship with her ally, the buffalo-deity.

Today, many Blackfeet women are returning to wearing stand-up headdresses and bringing those two worlds together again for a source of community health and well-being. 🦅

—Rosalyn LaPier (*Blackfeet/Métis*), Ph.D., is an Associate Professor of Environmental Studies at the University of Montana and Research Associate at the National Museum of Natural History, Smithsonian Institution. She is the author of *Invisible Reality: Storytellers, Storytakers and the Supernatural World of the Blackfeet*, University of Nebraska Press, 2017.

Note: In the early 1940s ethnohistorian John C. Ewers set out to interview elders and knowledgeable Blackfeet in Browning, Montana, about the history of the stand-up headdress. The quotations in this piece all come from Ewers’ research.



Betty Cooper, Michelle Eagle Plume, and Theda New Breast, all members of the contemporary Women’s Stand-up Headdress Society.



community focus



Kay Hajek



Mariah McIntosh



Field technicians collect data, counting the number of seedlings in a research plot in the Blackfoot Valley.

PHOTOS COURTESY OF KAY HAJEK AND MARIAH MCINTOSH

Life in the Field: *A Tale of Two Scientists*

BY ALLISON DE JONG

Not all of us can be professional scientists, but we all benefit from their research and the way it expands our knowledge of the world. But what goes into research and the process of adding new knowledge? Let's take a glimpse into the lives of two scientists: Kay Hajek and Mariah McIntosh, ecologists who are working for John Maron's lab at the University of Montana, researching grassland plants in the Blackfoot Valley. Kay is a post-doctoral researcher and plant ecologist overseeing the science and action side of the project, and Mariah helped collect field data as an undergraduate and is now focusing on restoration ecology as a graduate student in the resource conservation program at UM.

Kay and Mariah and the rest of the field crew are looking at the patterns of plants in Montana's grasslands, studying why different species that compete for the same resources are able to coexist, with no one species winning out over the others. Over the course of a summer they collect seeds, identify plants, set up experiments, record data, and even wield shovels to dig the occasional trench or two. It's all part of the life of field researchers.

A further glimpse into that life shows the choices that led to field work and careers in science. Both Kay and Mariah were drawn to science because of its potential to solve real-world problems. "But I didn't grow up thinking, 'I want to be a

scientist,'" says Kay. Instead, she began with a love for the outdoors, then kept following what interested her, a path that took a few twists and turns but ended up leading her to a Ph.D. in plant ecology. Mariah chose to study science when, as a college freshman, she saw how research can be used to solve critical conservation problems, and has been honing her skills as a researcher and a problem-solver ever since.

Solving problems—both professional and scientific—has been a constant in both women's careers, as has the confidence that comes from finding good solutions. From figuring out her career goals to completing her Ph.D. after taking time off, Kay has learned the importance of pairing communication with action, talking with trusted friends and colleagues about her challenges and figuring out how to overcome them.

Mariah takes a similar tactic, facing her challenges head-on and not being afraid to ask for help when she needs it. She jokes that in her undergraduate project—on how plants intersect with mycorrhizal fungi—"anything that could possibly go wrong, did." But she's learned a lot about persevering, and she's looking forward to publishing her thesis later this year. And taking the lead on that research project

Visit MNHC and check out our newest exhibit, the Naturalist Field Station! Learn more about Kay and Mariah and what it's like to do research in the field!

from start to finish has given her a lot of confidence. "It's shown me that I'm capable of doing all of the parts of science, and that's really rewarding," she says.

Their work in the field has also been rewarding, both in and of itself and as a stepping stone to what comes next in their careers. "Plant ecology is more or less a basis for restoration ecology," says Mariah, whose goal is to work on ecological restoration problems.

Kay agrees. "The information we generate through this project helps us have a better understanding of grassland ecosystems, and all of that informs management and restoration." She looks forward to eventually shifting toward work that focuses on natural resource management and conservation.

In the meantime, both know that the research they're doing is helping to create a deeper understanding of western Montana's grasslands, which will in turn improve how we manage and conserve this ecosystem. "That's the basic idea of science," says Kay. "Asking one little question at a time—it all adds up and impacts the world." 🦋

Read a longer conversation with Kay and Mariah at [MontanaNaturalist.org/kay-mariah-interview](https://montanaturalist.org/kay-mariah-interview).

Investigate Ice!

Frozen water can take some pretty incredible forms! Take our quiz, and then go out and see if you can find any of these yourself. Perhaps you'll even find some fantastic formations that aren't on this list. Happy icy investigations!



A Pancake Ice

Pancake ice is—you guessed it!—round, and forms when ice on a stream or river breaks up and gets spun around in an eddy, creating ice circles that can be anywhere from a foot to ten feet in diameter. Pancake ice forms when there is still some water movement and the temperature hovers around freezing. Often the individual “pancakes” will bump into each other, creating a raised band of slush around the edges, resulting in “pancakes” with high edges and low centers.

B Window Frost

When the outside temperatures are below freezing and the inside air is humid, the moisture in the air can condense as ice crystals on the inside of a window pane. Often forming intricate shapes, the spreading crystal structures can look like feathers, ferns, flowers, and more. Take a closer look. What do you see?

C Snowflakes

Snowflakes form when water vapor turns directly into ice—condensing on a tiny particle of dust or pollen in the air—and skips the liquid stage. They are six-sided, and, when the temperature is right, form lovely complex patterns as more water vapor condenses onto the original snow crystal as it falls through the air.

D Snow Rollers

This fascinating and rare phenomenon occurs when temperatures are near freezing and a thin layer of wet snow lies on top a layer of ice or powder snow. The final piece is force: wind or gravity, which causes the snow to roll along the ground, gathering layers as it goes. Snow rollers are usually cylindrical and look very much like hay bales—in fact, they are also called “snow bales” or “snow donuts.”

E Penitentes

Named for their resemblance to crowds of people kneeling in penance, these “penitent-shaped snows” are found at high altitudes, occurring when the air is very dry and the dew point is below freezing. This combination causes the snow to go directly from a solid to a gas without turning to liquid in between, resulting in a melting pattern that creates a series of jagged, steep-sided snow structures that lean in the general direction of the sun.

F Ice Discs

Another rare phenomenon, ice discs form in the bends of slow-flowing rivers, where the current breaks off a piece of ice as it forms on the surface, then rotates it, grinding it against the surrounding ice until it smooths into a circle. The ice disc remains in the bend of the river, rotating slowly. Ice discs can be quite large—as much as 50 feet across.

G Ice Castles

Ice castles occur when the air temperature drops below freezing while the temperature of the soil remains above freezing. Water in the soil is drawn to the surface and freezes once it comes into contact with the air, forming delicate columns. Other names include “ice fringes,” “frost columns,” and “needle ice.”

H Ice Ribbons

The unusual appearance of this striking formation has inspired a variety of different names, including “ice wool,” “rabbit ice,” and “ice flowers.” Ice ribbons form when the ground is not yet frozen but the air temperature drops below freezing, causing the sap in the plant to freeze and crack the plant’s stem. Water is drawn out of these cracks through capillary action, turning to ice as it hits the air and creating layer after layer of thin “ribbons.”

I Cat Ice

This ice formation is more common, and most of us have probably seen it—it’s the very thin, brittle ice that forms in puddles and other small bodies of water. When the water beneath recedes and refreezes, it creates a series of concentric circles, and is called “cat” ice because it’s theoretically able to hold the weight of a light-footed cat. Being heavier, humans of all ages have fun walking on and breaking this ice!

get outside guide

ANSWERS TO QUIZ, left to right each row:
D. Snow Rollers, C. Snowflakes, G. Ice Castles,
F. Ice Discs, B. Window Frost, E. Penitentes,
H. Ice Ribbons, I. Cat Ice, A. Pancake Ice

get outside calendar

MNHC Hours:
Monday-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
MNHC members get **FREE** admission!

Programs for Kids

Programs free with admission and/or membership.

December 27 **miniNaturalist Pre-K Program**,
10:00-11:00 a.m.

January 3, 10, 17, 24, 31 **miniNaturalist Pre-K Program**, 10:00-11:00 a.m.

January 5 **Saturday Kids' Activity**,
2:00-3:00 p.m. **Hibernation Celebration.**

January 19 **Saturday Kids' Activity**,
2:00-3:00 p.m. **Hibernation Celebration.**

February 7, 14, 21, 28 **miniNaturalist Pre-K Program**,
10:00-11:00 a.m.

February 2 **Saturday Kids' Activity**, drop in
between 2:00 and 4:00 p.m. **Animals in Winter.**

February 16 **Saturday Kids' Activity**, drop in
between 2:00 and 4:00 p.m. **Animals in Winter.**

March 7, 14, 21, 28 **miniNaturalist Pre-K Program**,
10:00-11:00 a.m.

March 2 **Saturday Kids' Activity**, drop in
between 2:00 and 4:00 p.m. **Rockhounding!**

March 23 **Saturday Kids' Activity**, drop in
between 2:00 and 4:00 p.m. **Rockhounding!**

April 4, 11, 18, 25 **miniNaturalist Pre-K Program**,
10:00-11:00 a.m.

April 13 **Saturday Kids' Activity**, drop in
between 2:00 and 4:00 p.m. **Explore Our Watershed.**

April 27 **Saturday Kids' Activity**, drop in
between 2:00 and 4:00 p.m. **Explore Our Watershed.**

Adult Programs

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



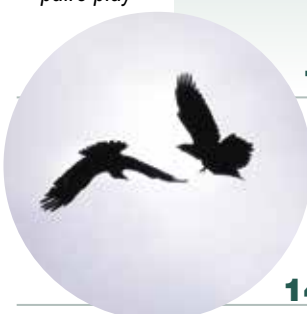










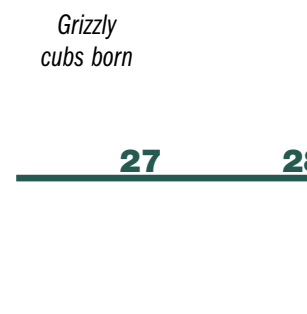
















January 8, 15, 22, 29 **Evening Program**, 7:00 p.m.
Four-part Class: Seasonal Round Workshop with
Christine Wren and Sally Thompson.
\$30; \$25 MNHC members. Registration required.

January 25 **Naturalist Field Station Exhibit Opening**,
4:30-6:00 p.m. Come celebrate our newest exhibit!
We'll also be offering free admission all day!

January 26 **Naturalist Field Day**, 9:00 a.m.-5:00 p.m.
Tracking with Swan Valley Connections. \$80; \$70
MNHC members. Registration required.




January 30 **Evening Program**, 7:00 p.m.
Naturalist Trivia Night! with the International
Wildlife Film Festival. \$5 suggested donation;
MNHC members free.

February 1, 8, 15, 22 **Discovery Day**, 10:00-11:30
a.m. **Four-part Class: Geology Rocks with Bruce Baty.**
\$45; \$40 MNHC members. Registration required.

SUN	MON	TUE	WED	THU	FRI	SAT
December  December Gallery, all month. Claudia Paillao: Felted Birds. Closed for the holidays December 24-25, December 31, and January 1				 miniNaturalist Pre-K Program , 10-11 a.m.		Small mammals stay active beneath the snow
23	24	25	26	27	28	29
January Raven pairs play 						
30	31	1	2	3	4	5
	 Evening Program , 7 p.m. Four-part Class: Seasonal Round Workshop with Christine Wren and Sally Thompson.		 miniNaturalist Pre-K Program , 10-11 a.m.			 Saturday Kids' Activity , 2-3 p.m. Hibernation Celebration.
	7	8	9	10	11	12
	 Evening Program , 7 p.m. Four-part Class: Seasonal Round Workshop with Christine Wren and Sally Thompson.		 miniNaturalist Pre-K Program , 10-11 a.m.			 Saturday Kids' Activity , 2-3 p.m. Hibernation Celebration.
	14	15	16	17	18	19
	 Evening Program , 7 p.m. Four-part Class: Seasonal Round Workshop with Christine Wren and Sally Thompson.		 miniNaturalist Pre-K Program , 10-11 a.m.	 Naturalist Field Station Exhibit Opening , 4:30-6 p.m.	 Naturalist Field Day: Tracking with Swan Valley Connections. 9 a.m.-5 p.m.	
20	21	22	23	24	25	26
Grizzly cubs born 	 Evening Program , 7 p.m. Four-part Class: Seasonal Round Workshop with Christine Wren and Sally Thompson.	 Evening Program , 7 p.m. Naturalist Trivia Night! with the International Wildlife Film Festival.	 miniNaturalist Pre-K Program , 10-11 a.m.	February  Discovery Day , 10-11:30 a.m. Four-part Class: Geology Rocks with Bruce Baty.		
27	28	29	30	31	1	2
		 Evening Program , 7 p.m. "Wild Love" Naturalist Trivia Night! at Burns St. Bistro.	 miniNaturalist Pre-K Program , 10-11 a.m.	 Discovery Day , 10-11:30 a.m. Four-part Class: Geology Rocks with Bruce Baty.		
		5	6	7	8	9
		 Non-profit Tuesday at Caffè Dolce , 5-9 p.m.	 Hunting and Gathering Lecture Series: Hunting for Archaeological Clues Along the Buffalo Road Trail with Sara Scott , 7 p.m.	 miniNaturalist Pre-K Program , 10-11 a.m.	 Discovery Day , 10-11:30 a.m. Four-part Class: Geology Rocks with Bruce Baty.	
		12	13	14	15	16
		 Evening Program , 7 p.m. Sip and Sketch: Drawing with Graphite with Jenah Mead.	 miniNaturalist Pre-K Program , 10-11 a.m.	 Discovery Day , 10-11:30 a.m. Four-part Class: Geology Rocks with Bruce Baty.	 Saturday Kids' Activity , 2-4 p.m. Animals in Winter.	
		18	19	20	21	22
		Great-horned Owls lay eggs 				23

YELLOWSTONE NATIONAL PARK PHOTO

JIM GOULDIE, FLICKR.COM

SUN	MON	TUE	WED	THU	FRI	SAT
 <p>Bluebirds and Red-winged Blackbirds return</p>			<p>Midges are food for early-arriving bluebirds, trout, and whitefish</p>	<p>miniNaturalist Pre-K Program, 10-11 a.m.</p>	<p>March</p>	
					<p>Saturday Kids' Activity, 2-4 p.m. Rockhounding!</p>	
		26	27	28	1	2
				<p>miniNaturalist Pre-K Program, 10-11 a.m.</p>		<p>Naturalist Field Day: Sure Signs of Spring at Lee Metcalf. 9 a.m.-4 p.m.</p>
		5	6	7	8	9
	<p>Giving Back at Five on Black, 3-8 p.m.</p>	<p>Hunting and Gathering Lecture Series: Stories from 60 Years of Shed Hunting with Jim Phillips, 7 p.m.</p>	<p>miniNaturalist Pre-K Program, 10-11 a.m.</p> <p>Certified Interpretive Guide Training, 9 a.m.-5 p.m.</p>	<p>Certified Interpretive Guide Training, 9 a.m.-5 p.m.</p>	<p>Certified Interpretive Guide Training, 9 a.m.-5 p.m.</p>	
10	11	12	13	14	15	16
<p>Certified Interpretive Guide Training, 9 a.m.-5 p.m.</p>			<p>Evening Program, 7 p.m. Naturalist Trivia Night! with the Clark Fork Coalition.</p>	<p>miniNaturalist Pre-K Program, 10-11 a.m.</p>		<p>Saturday Kids' Activity, 2-4 p.m. Rockhounding!</p>
17	 <p>Marmots come out of hibernation</p>		20	21	22	23
				<p>miniNaturalist Pre-K Program, 10-11 a.m.</p>		
24	25	26	27	28	29	30
<p>April</p>			<p>Evening Program, 7 p.m. Deep Wild vs. Modern Tribalism with Jon Turk.</p>	<p>miniNaturalist Pre-K Program, 10-11 a.m.</p>		
	<p>Glacier lilies bloom through the snow</p>					
31	1	2	3	4	5	6
				<p>miniNaturalist Pre-K Program, 10-11 a.m.</p>		<p>Saturday Kids' Activity, 2-4 p.m. Explore Our Watershed.</p>
		9	10	11	12	13
				<p>miniNaturalist Pre-K Program, 10-11 a.m.</p> <p>Volunteer Naturalist Training, 4:30-6:30 p.m.</p>	<p>Wolf cubs are born</p>	
14	15	16	17	18	19	20
			<p>Hunting and Gathering Lecture Series: The Entomology of Fly Fishing with Diana Six, 7 p.m.</p>	<p>miniNaturalist Pre-K Program, 10-11 a.m.</p>	<p>Naturalist Field Weekend, Friday-Sunday. Sage Grouse Experience. April 26-28</p>	<p>Saturday Kids' Activity, 2-4 p.m. Explore Our Watershed.</p>
21	22	23	24	25	26	27

February 4-May 7 Montana Master Naturalist Course, FULL. Check MontanaNaturalist.org for information on our summer course.

February 6 Evening Program, 7:00 p.m. "Wild Love" Naturalist Trivia Night! at Burns St. Bistro. \$5.

February 12 Non-profit Tuesday at Caffè Dolce, 5:00-9:00 p.m. 10% of the evening's sales go to MNHC. Enjoy a delicious Italian dinner while supporting MNHC!

February 13 Hunting and Gathering Lecture Series: Hunting for Archaeological Clues Along the Buffalo Road Trail with Sara Scott, 7:00 p.m. \$10; \$5 MNHC members; students FREE.

February 20 Evening Program, 7:00 p.m. Sip and Sketch: Drawing with Graphite with Jenah Mead. \$30; 25 MNHC members.

March 9 Naturalist Field Day, 9:00 a.m.-4:00 p.m. Sure Signs of Spring at Lee Metcalf. \$80; \$70 MNHC members. Registration required.

March 12 Giving Back at Five on Black, 3:00-8:00 p.m. 50% of the proceeds are donated back to MNHC. Enjoy a tasty dinner and know you're helping us connect people with nature!

March 13 Hunting and Gathering Lecture Series: Stories from 60 Years of Shed Hunting with Jim Phillips, 7:00 p.m. \$10; \$5 MNHC members; students FREE.

March 14-17 Certified Interpretive Guide Training, 9:00 a.m.-5:00 p.m. \$230. Registration required.

March 20 Evening Program, 7:00 p.m. Naturalist Trivia Night! with the Clark Fork Coalition. \$5 suggested donation, MNHC members free.

April 3 Evening Program, 7:00 p.m. Deep Wild vs. Modern Tribalism with Jon Turk. \$10; \$5 MNHC members and students.

April 24 Hunting and Gathering Lecture Series: The Entomology of Fly Fishing with Diana Six, 7:00 p.m. \$10; \$5 MNHC members; students FREE.

April 26-28 Naturalist Field Weekend, Friday-Sunday. Sage Grouse Experience. \$420; \$400 MNHC members. Registration required.

Volunteer Opportunities

April 18 Volunteer Naturalist Training, 4:30-6:30 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. No experience necessary.

get outside guide

How are you going to explore nature this winter? Here are some of our favorite ideas! What other wintry activities do you love to do? Bring in your completed checklist and be entered to win a free Family Membership!



MNHC PHOTO

Save the Date for Summer Camp Registration!

Jump into nature with the Montana Natural History Center this summer! Our Summer Outdoor Discovery Day Camps offer week-long adventures for kids ages 4 through 5th grade. Campers make new friends, explore local natural areas, learn naturalist skills from our highly-skilled staff, and have a ton of fun doing it!

- Registration opens **March 15, 2019**
- Scholarship applications due **March 1, 2019**
- Discounts for MNHC members
- For detailed camp schedule, visit MontanaNaturalist.org/summer-camps

We hope you'll join us for a great summer of learning and exploration!

Congrats to Helena Koelle, our Fall Scavenger Hunt winner!

Thanks for participating, Helena, and sharing your beautiful fall photos with us!

Helena won a family membership to MNHC.



Calling All Kids!

Do you have any nature art, photography, poetry, or stories you'd like to share? We showcase kids' work in every issue in our "Kids' Corner"—and here's your chance for that work to be yours!

Send submissions to Allison De Jong, Editor, at 120 Hickory Street, Missoula, MT 59801 or by email to adejong@MontanaNaturalist.org.

imprints



MNHC Holiday Gift Guide

Looking for that perfect present for your dad, grandma, brother, spouse, friend? Look no further! MNHC has some fabulous gifts, great for holidays, birthdays, or just because.

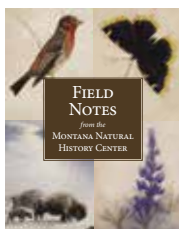


Youth and Adult T-shirts

With artwork by artist and naturalist Jenah Mead, our youth t-shirts (**\$15**) feature a beetle and our adult t-shirts (**\$20**) feature a bison skull. Stop by MNHC to purchase.

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**. Available for purchase at MNHC or online at MontanaNaturalist.org/field-notes-book.



Naturalist Hand Lens & Lanyard

A great gift for the curious naturalist(s) in your life! Our bright, sturdy hand lenses are perfect for getting up close and personal with the natural world, whether you're examining tracks, flowers, scat, or snowflakes. And the matching lanyard lets you easily carry it with you wherever you go! **\$6** for the set. Stop by MNHC 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.

Stop by MNHC to see our entire gift shop full of naturalist gifts from local artists!

HUNTING AND GATHERING

LEARNING TO READ THE LANDSCAPE

Join Us for Our 2019 Lecture Series!

We'll be continuing with last year's popular theme:

Hunting & Gathering: Learning to Read the Landscape

Join us for a further exploration of the tradition of hunting and gathering, from food and clothing 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:

Sara Scott, February 19th:
Hunting for Archaeological Clues
Along the Buffalo Road Trail

Jim Phillips, March 13th:
Stories from 60 Years of
Shed Hunting

Diana Six, April 24th:
The Entomology of Fly Fishing

Sneed B. Collard III and Braden Collard, September 4th:
A Big Year of Birding and Beyond

Ben Goldfarb, October 23th:
Beavers in North America:
Trapped, Valued, and Why
They Matter

Joshua Lisbon, November 20th:
Traditional Wilderness Skills:
Brain Tan Buckskin



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The Montana Natural History Center
thanks the

GOOD FOOD STORE

for sponsoring our 2019 lecture series -
**HUNTING AND GATHERING:
LEARNING TO READ THE LANDSCAPE**

A big THANK YOU to everyone who attended our Annual Banquet & Auction at the University Center Ballroom on September 29th. Over 400 generous guests helped us raise more than \$120,000 in support of nature education for children and adults. We are especially grateful for your exceptional response to our Fund A Dream challenge, helping us to provide outstanding naturalist mentors to the 1700 students in our Visiting Naturalist in the Schools program. And, of course, we couldn't have done it without the following businesses and individuals whose generosity and hard work made the entire event possible. (Please accept our apologies for any missed names.)

Thank you!



MINHC PHOTOS

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 *Heather Blenkiron & Marc Patry
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SPOTLIGHT:

In September we were excited to welcome two new staff to our ranks: **Pat Little**, our new Monday-Wednesday Front Desk Associate, and **Mark Schleicher**, our new Development Director.

Pat grew up in England and came to the U.S.A. in 1980 pursuing a career in aeronautical engineering. One day he got tired of working for large companies, quit his job, and started volunteering at The Nature Conservancy.

Eighteen months later they hired him as their first IT Manager, and he worked for them, in Seattle, for eleven years. In 1994 he took a hawk ID class, which opened his eyes to the world of birds and changed his life. Pat has spent many falls since then sitting in cold drafty blinds on mountain ridges trying to trap and band hawks. Pat and his wife moved to Missoula in 2009. They took the Montana Natural History Center's Master Naturalist class together a few years ago. Pat has learned a lot from attending various nature classes over the years, and he is thrilled to be able to work for an organization that provides nature education. Pat also serves on the board of the Five Valleys Audubon Society, and he is hoping to get some flickers to use the nest box in his backyard if he can keep the squirrels out.

Mark grew up in Minnesota where he discovered and explored his love for nature during frequent family trips to the Boundary Waters Canoe Area Wilderness along with annual cross-country camping trips.

After graduating from the University of Wisconsin-Madison he started his development career at the University of Wisconsin Foundation, which now includes stops at the Natural Resources Foundation of Wisconsin and the University of Montana Foundation. Mark and his wife, Holly, moved to Montana in 2004 and now have two sons, Cedar and Leo, who are great exploration partners in the mountains, rivers, and lakes of Montana.

Welcome, Pat and Mark!



PHOTO COURTESY PAT LITTLE



PHOTO COURTESY MARK SCHLEICHER



PHOTO COURTESY THURSTON ELFSTROM

As To The Mission

CONNECTED

My spouse and I recently vacationed along the southern gulf shores of Texas. We loved visiting new nature centers and conservation organizations as well as birding on both sides of the Laguna Madre.

We saw astounding animals, like alligators and sea turtles, and observed myriad birds we had not previously seen, perhaps my favorite being the Reddish Egret. And of course we saw some familiar faces from our neck of the woods: Great Blue Herons were numerous, but also Peregrine Falcons, White Pelicans, and the ever-present English Sparrows and European Starlings.

I couldn't help but think of how connected we all are, especially as we enjoyed watching Great Blue Herons on the hunt. And not just as a country or a continent, but globally.

And I also thought about the Montana Natural History Center's many connections. Connections to the amazing partners and friends that work to educate people about and conserve nature. Connections to all the amazing people and foundations who support us through their tireless volunteerism or selfless and generous gifts.

All of these connections are the backbone of what we do at MNHC. They allow us to educate the next generation of naturalists, those who will carry on the work of stewarding nature, with early education programs for pre-K children. These connections carry through to our work with elementary, middle, and high schoolers, through programs like Visiting Naturalist in the Schools, ID Nature, and Wings Over Water.

Connections are what help us in our mission to ensure that all people develop a lasting connection to nature that includes a strong stewardship ethic. I leave you with the words of the great Texan, First Lady, and conservationist, Lady Bird Johnson: "The environment is where we all meet; where all have a mutual interest; it is the one thing all of us share."

Thurston Elfstrom,
Executive Director

volunteer spotlight

At this year's Banquet & Auction, we honored three individuals who have given generously of their time and energy to MNHC over the years: long-time board member Hank Fisher, donor and supporter Ron Clausen, and talented bird articulator and general handyman Larry DePute.

Larry DePute, MNHC Award for Exceptional Volunteerism:

Larry has been volunteering for MNHC since he first moved to Montana four years ago. He's spent countless hours beautifully articulating bird skeletons for our exhibits, as well as volunteering his time as a general handyman around MNHC and helping with some of our children's programs as well. Larry was an integral part of the creation of our Montana Ecosystems exhibit, fixing and improving our taxidermied and articulated specimens, ensuring that this exhibit looks spectacular. One of Larry's primary goals in his retirement is to help others—and we at MNHC are so grateful that he's chosen to help us. We so appreciate his kindness, his twinkle, and his generosity.

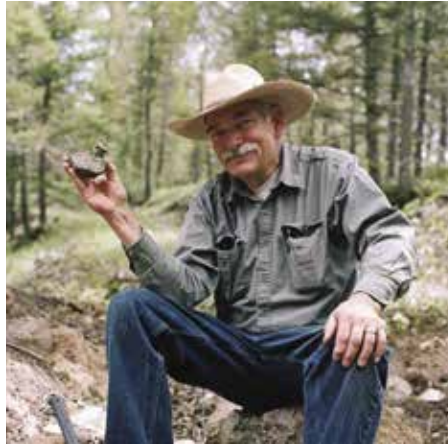


PHOTO BY CHRISTINE MORRIS

Ron Clausen, MNHC Award for Philanthropy:

Ron is not only a super guy and fun to hang out with, but he's a mentor, too. He has opened our eyes to what philanthropy can be: the incredible potential that exists when people work together to achieve something important that does good. Year after year, Ron not only gives generously but also volunteers hundreds of hours arranging multiple fundraising events that benefit nature-based education and conservation in Montana. And this isn't something that he just started doing—this is a lifelong commitment. He brings people together and catalyzes them to action. He does this not for recognition, but because it's the right thing to do.



PHOTO COURTESY RON CLAUSEN

Hank Fischer, MNHC Award for Service

Hank has served on the board of directors since 2003, which means he's attended more than 250 hours of meetings—all time sacrificed that could have been spent actually being outside. For most of those years he's been our Czar of Live Auction items, year after year procuring the bulk of our live auction items for our Annual Banquet & Auction. In addition, Hank has truly done more than anyone to create a culture of philanthropy for MNHC. We are so fortunate to have his loyal service. An organization could not ask for a better champion, and thousands of people have had opportunities to get outside and connect with the natural world thanks to Hank's hard work and lifelong dedication and support of environmental education in Montana.



PHOTO COURTESY HANK FISCHER

Thank you, Larry, Ron, and Hank!

Coming in January: Naturalist Field Station!

What is a naturalist, exactly? What do naturalists do? Our Naturalist Field Station answers these questions and more! Our new exhibit will showcase naturalists at work with a rotating focus on the naturalist as an artist, scientist, and writer. We'll start with Kay Hajek and Mariah McIntosh, ecologists who are studying grassland plants in the Blackfoot Valley. Come get a glimpse into their work, and learn what it's like to do research in the field!

See page 10 to learn more about how Kay and Mariah came to choose careers in science.



PHOTO COURTESY MARIAH MCINTOSH

Exploring iNaturalist in Montana

BY TAIT SOUGSTAD

This last February, with passages from Aldo Leopold sown in my mind, I stood in the 580 section of the stacks at the Billings Public Library, evaluating identification guides. I loaded a tote bag and eagerly started thumbing through the forty pounds of paper, but I crave system, and could not find the best method of study. A book on North American trees seemed to have exhaustive material for identification, and another had helpful plates for trees of the West. Edible and

medicinal plant books were more regional, but were also highly selective in their content and not easy to use as field guides. More problematic was the pesky season. Winter had stripped most of the indicators from any plant protruding from the snow.

On a lark, I did a quick search on the internet for “plant identification apps.” A few popped up, several promising to identify plants from photographs, but I am a skeptic and occasional Luddite, so I demurred. One caught my eye, though,

called iNaturalist. It appeared to host a community, and they had a white paper on how contributions helped teach their image recognition algorithm, so I went out on a limb and joined.

With a selection from the forty pounds in my pack and the app in my

Below: iNaturalist makes it easy to keep track of one's observations, and it's satisfying to watch the list grow. Observations reach “research-grade” level after they have a photo, date, and location, and once the community agrees on species-level ID.

The screenshot shows the iNaturalist Observations page. At the top, there's a search bar with 'Species' and 'Location' filters, a 'Go' button, and a 'Filters' button. Below the search bar, a navigation bar shows 'The World' and a summary of observations: 443 OBSERVATIONS, 256 SPECIES, 123 IDENTIFIERS, and 1 OBSERVERS. The main content area displays a grid of eight plant observations, each with a photo, a name, a scientific name, a 'Research Grade' status, and a date. The observations are: Annual Buckwheat (*Eriogonum annuum*), Bog Wintergreen (*Pyrola asarifolia*), Elephant's Head (*Podisaurus groenlandica*), Gunnison's Mariposa Lily (*Calochortus gunnisonii*), Matte Saxifrage (*Saxifraga bronchialis*), Red Osier Dogwood (*Cornus sericea*), Stemless Point-Vetch (*Oxytropis lamberti*), and Ten-petal Stickleaf (*Montaukia decapetala*).

hand, I took a walk at a nature park near my home. One of the revelations of my evening studies was the identity of a bright red-clad bush that had caught my eye since my first visit to Montana: the red-osier dogwood, which I knew grew in this park. From my car, I made a beeline to the nearest specimen, grinning ridiculously as I made a thorough documentation. My feet sank into the surrounding snowdrift as I took pictures: one of the bark, another of the bark, a close-up of the bark, one of a dead leaf at the base, and finally, an overall view of the shrub.

My plant was identified, geotagged, cataloged, and archived before I even moved on to the next target. I snapped pictures of the resident Canada Geese and California Gulls, and wandered to the next-nearest plants at the edge of the cottonwood forest, puzzling over bark and dead leaves and pith colors, thumbing through the load of guidebooks I'd brought.

Throughout the winter, I continued to use the app and tested out the website's capabilities. The image recognition was passable, but imperfect. Good pictures of common species would yield accurate suggestions, but worse pictures of rarer species gave mixed results. The "Explore" function of the site showed every observation on a map, each of which could be opened, so I spent some time glancing at posts around the state and discovered that, while useful for scoping out specific areas and finding hotspots of activity, it was tedious to browse through observations that could be years old. Where could I find living people making current observations?

Then, one day, a user added identifications to most of my posts, providing clues for several specimens I had abandoned all hope of identifying. It worked! There were people out there! It felt like magic. I left a question in the comments of one observation, and within a day the identifier replied! But how had she even found my posts?

I returned to the Explore page, filtered by "Montana," and instead of looking at the map I tried the "grid" view. There, laid out tidily, starting with the most recent, were all of the posts in Montana. It was like an activity feed for natural history observations in the state. This is where plants give status updates.

I returned there from time to time to see what was happening, and inevitably there were a handful of posts added daily. Some users only had a few to their name, and others seemed to take pictures of everything they noticed. But the activity did not exactly indicate a thriving community. Montana only had 14,000 observations over the decade since iNaturalist's inception. Compare that with Oregon's 80,000, and it seemed bleak.



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Still, it was exciting to interact with professional and amateur naturalists from around the world. iNaturalist has attracted the participation of people with an alphabet soup of doctorates and master's degrees, curators of natural history museums, conservation biologists, researchers, land managers, teachers, and professors, some with tens or hundreds of thousands of identifications. But I wondered why there weren't more participants from Montana, a state with deep roots among the naturalist community. Where were the university science departments and native plant society members? When a backyard bug was identified as a firefly, and I found articles about pockets of firefly colonies in niche habitats around Montana, I wondered why these researchers weren't clamoring to get citizen scientists plugged in to harvest more data. Where were all of the people who would enjoy this as much as I did?

Memorial Day Weekend came like a freshet. That Friday alone showed 118 new observations from all across the state. People were out. Locals. Vacationers. Road trippers. Hikers. Retirees. College students. New users and old. People with identification skills, those still learning. And

I, as a participant at my desk and on my phone, was learning, too. These were the trees and flowers and birds and bugs people were seeing now. Not things seen sometime by someone and then carefully organized in a reference book, but right here, right now. I identified some plants from my evening readings, and looked up anything I didn't know, so that perhaps someone else could experience the same magic I had. By the end of Memorial Day, as people across the state were preparing to return to work, the observation ticker for Montana had risen by 527, over 300 of which were in Gallatin County alone, and I had contributed to over 100 identifications.

Throughout the spring and summer, the flood of posts continued. Mountain goats in Glacier. Paintbrushes outside of Missoula. Monument plants in the Bridgers. Bison in Gardiner. As each species bloomed, I saw it appear on the site and its name was planted in my mind. When autumn rolled around, the flow of posts stemmed to a trickle. Ten thousand observations had been added between the beginning of June and the end of October.

Something happened to me during that time. As the season progressed, my morning commute transformed from a daily slog to a roadside treasure hunt. Plants invisible in previous years revealed themselves, though surely they were there all along. In the mountains, places we have revisited each year for a decade showed new character and variety. Species I had just learned about in the guidebooks I now saw scattered across the landscape.

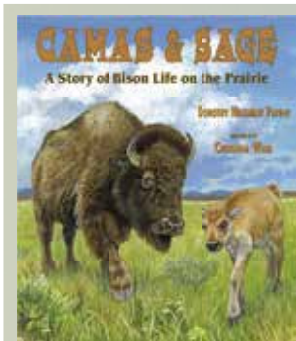
At the nature park near my home with my youngest child toddling along the path, the sunset painted the sky orange above the cottonwood canopy. I saw virgin's bowers and Virginia creepers draping from the limbs. Velvet rosettes of mullein dotted the bank of the Yellowstone, and wild licorice clustered with brown-burred seed pods. We rounded a bend in the trail, and a white-tailed deer snorted and leapt into the brush. I snapped some pictures and watched my boy range away toward the next turn, and marveled at how much more we had to learn. 🦋

—Tait Sougstad lives in Billings with his wife and four kids. You can follow his adventures and observations at [inaturalist.org/people/taitsougstad](https://www.inaturalist.org/people/taitsougstad).




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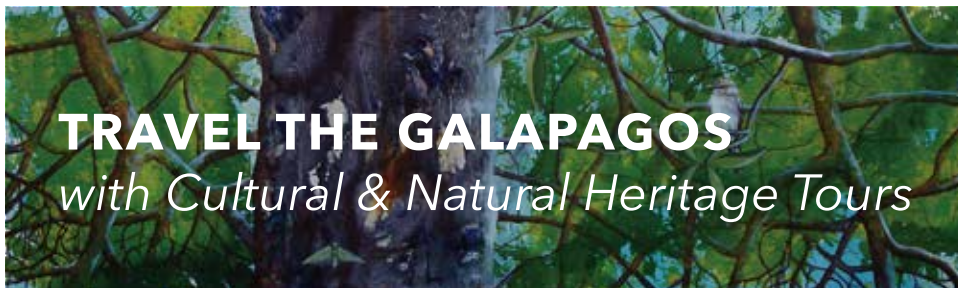
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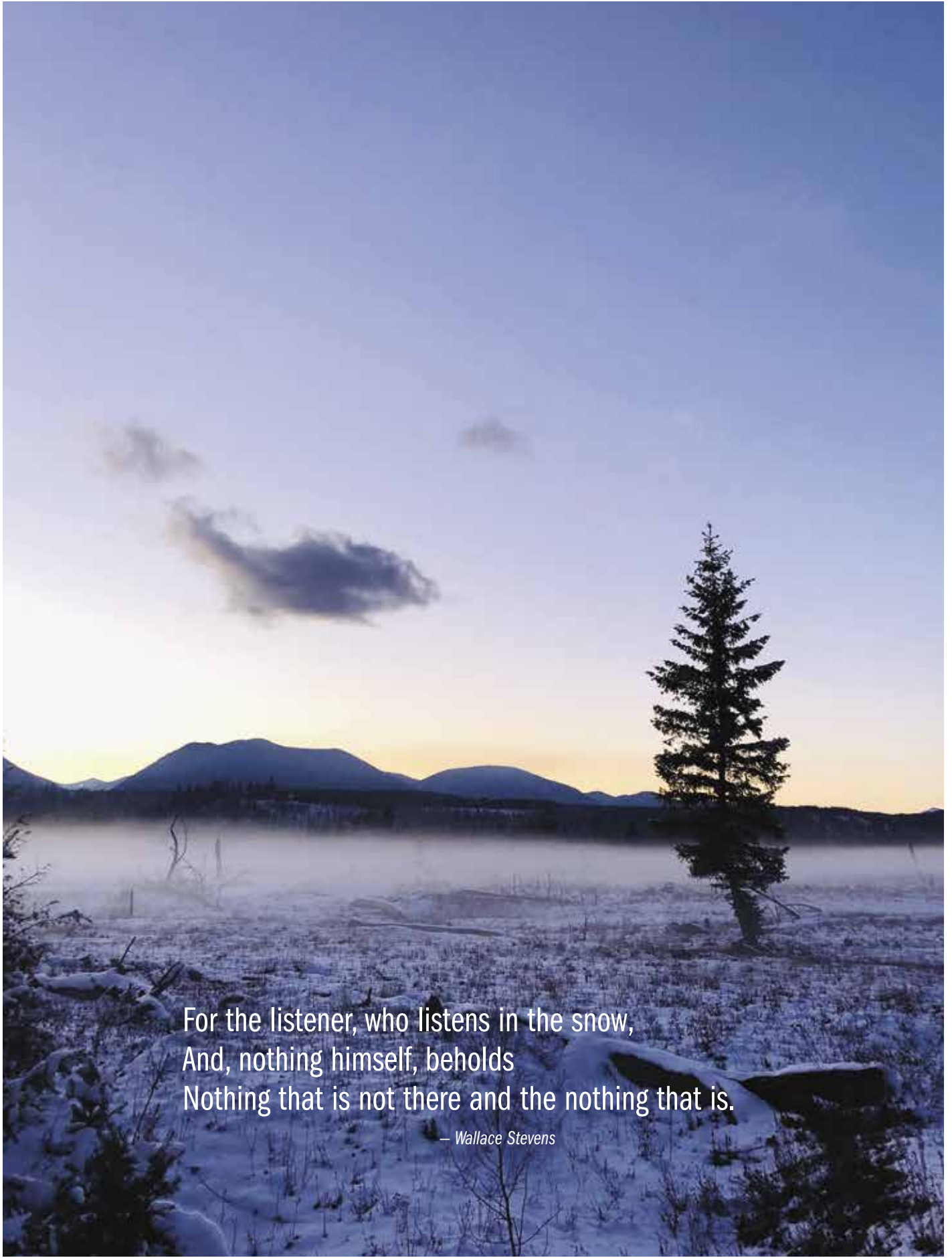
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For the listener, who listens in the snow,
And, nothing himself, beholds
Nothing that is not there and the nothing that is.

— Wallace Stevens



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