



Montana Natural History Center

Fall/Winter 2026

MONTANA Naturalist

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

For the Wiley Coyote, Resistance Is Fertile



Seed-Stashers & Bird-Pines | Super Moons of Winter | Missoula's North Hills | Science Beyond the Classroom

inside

Features

4

SEED-STASHERS & BIRD-PINES

BY CEDAR MATHERS-WINN

8

A WESTERN MONTANA QUEER FIELD GUIDE: A PEOPLE'S NATURAL HISTORY OF MISSOULA'S NORTH HILLS

BY PRIYA SUBBERWAL

10

MOON WATCHING: THE SUPER MOONS OF WINTER

BY MARY ANN REUTER



10

Cover – A coyote in Yellowstone National Park prowls through the snow, nose low to the ground, just before retrieving a cache that it (or another animal!) had stashed away for later.

Photo by Kyle Moon / Moon Man Photography. See more of his photos at moonman.photography.

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4



8

Departments

3

TIDINGS

13

GET OUTSIDE GUIDE

Book reviews: *Forest Euphoria* and *Feathered Forest*; Kids' Corner: summer camp art; fall & winter phenology

14

CELEBRATING 35 YEARS OF MNHC!

17

VOLUNTEER SPOTLIGHT

Randall Martin and Sue McDonald

18

IMPRINTS

Summer camp recap; introducing our new VNS curriculum; spotlight on intern Ken; gratitude for our many supporters; new mural unveiling; MNHC's new wheels; welcome Program Director Drew Lefebvre; Open House a smashing success; Notes from Our ED

22

COMMUNITY FOCUS

Science Beyond the Classroom at Sentinel High School

BY ALLISON DE JONG



18



24

24

FAR AFIELD

For the Wiley Coyote, Resistance Is Fertile

BY DARBY MINOW SMITH

26

MAGPIE MARKET

27

REFLECTIONS

Great Blue Heron & Cedar Waxwing

BY AMY THOMAS

The Montana Natural History Center is located within the traditional homelands of the *ᠠᠲᠠᠶᠠᠭᠠᠨ* (Bitterroot Salish) and *Qlispélix* (Kalispel) peoples who have lived here since time immemorial. The Montana Natural History Center is dedicated to the recognition of the first peoples of Missoula and the integration of Salish language, culture, and Indigenous knowledge.



Montana Natural History Center
Connecting People with Nature

120 Hickory Street, Suite A
Missoula, MT 59801
406.327.0405
MontanaNaturalist.org

STAFF

Kellen Beck
DEVELOPMENT DIRECTOR
Nora Christy
TEACHING NATURALIST
Beth Conway
MARKETING & EVENTS COORDINATOR
Alyssa Cornell
COLLECTIONS MANAGER
Allison De Jong
COMMUNICATIONS COORDINATOR & EDITOR
Hope Ensminger
MUSEUM YOUTH PROGRAMS COORDINATOR
Jennifer Grigg
FRONT DESK ADMINISTRATOR & VOLUNTEER COORDINATOR
Laura Lee
BOOKKEEPER
Drew Lefebvre
PROGRAM DIRECTOR
Ryan Mahar
TEACHING NATURALIST
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COMMUNITY PROGRAMS COORDINATOR
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TEACHING NATURALIST
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TEACHING NATURALIST COORDINATOR
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YOUTH EDUCATION ASSISTANT

VNS FIELD INSTRUCTORS

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tidings

I attended a fairly small high school in a small Midwestern town, and

the science classes were pretty basic: Physical Science, Biology, Chemistry, and, if you were a real science nerd, Physics. Did I have fun in my chemistry class culturing the bacteria on kitchen sponges in order to determine which brand of dish soap was most effective? Yes. Do I wish I had gone to the regional science fair with my pretty cool science project instead of attending my junior prom? ...Also yes.

So I was very impressed (and a little envious) when I chatted with Kelly Nelson, a high school science teacher taking our summer Master Naturalist course this June, and discovered that she teaches a year-long research class to her students at Sentinel High School. It's essentially a guided independent study, where the students develop a research question according to their interests and are paired with professional scientist mentors who help them with their projects throughout the year (read more on page 22!).

What I love most about all this is that these teens get to work on something real, something they're curious about, and add their discoveries to the body of scientific knowledge. But I also love that this project connects high schoolers with the community, and vice versa. There's something so rich—and inspiring—about connecting with people who are not in our direct circles, who are in different life stages. This diversity offers new perspectives, broadens our experiences. That can get messy, sometimes, but it reminds us that there are many ways to be in the world.

The other pieces in this issue touch on differences, too—and on the complexity of relationships between diverse species. Naturalist Cedar Mathers-Winn shares the fascinating ways whitebark and limber pines have evolved to depend on Clark's Nutcrackers and other birds to spread their seeds, each relying on a species outside itself to survive and thrive (page 4). Read about the complicated, intertwined human history and natural history of Missoula's North Hills from Priya Subberwal, who reflects on how human activity has irrevocably changed the landscape yet built community, too (page 8). Mary Ann Reuter looks to the Moon, exploring the tension between humanity's millennia-long awe of our nearest celestial neighbor and how we think about it now that it's within reach (page 10). And then there's the long, fraught history between humans and coyotes, which Darby Minow Smith considers from her perspective as a fifth-generation rancher, finding admiration for coyotes' ability to thrive in spite of us (page 24).

Relationships—whether between people, or amongst diverse species—are complicated. But these interconnections are essential and worth celebrating. At MNHC we embrace this every day; connecting with our human and non-human community has been the heart of our work for the last 35 years (page 14). You are all part of these complex, wonderful relationships that we so cherish and honor. Thank you for the mess, the learning, the fun. Thank you for being here with us.

Allison De Jong

EDITOR

adejong@MontanaNaturalist.org



MNHC's array of rainbow t-shirts: as fun and colorful as our staff, community, and the work we get to do!

MNHC PHOTO

SEED-STASHERS & BIRD-PINES

BY CEDAR MATHERS-WINN

If you've never looked between the scales of a pine cone, you might be surprised by what you find there. Or any Montana conifer, for that matter. Like a maple, the seeds have wings. And although they might look a little different, they work the same way: the seed spins as it falls, so the wing generates lift, so the seed has a few extra seconds to catch a breeze and float somewhere a little distance away from its parent tree. It might not move far, but over time, this is how conifers have come to spread across and dominate most of the ecosystems that the Rocky Mountains have to offer.

That's how it works for most pines, anyway. But, of over a hundred different pine species worldwide, there are about twenty that break the mold. The seeds of these pines are wingless, and what's more, they are extremely large and heavy. These hefty seeds are packed full of calories, fat, protein, and nutrients that all contribute to getting a young pine started off with everything it needs, even in harsh environments. And indeed, these trees tend to do well establishing themselves and surviving in places where others can't, from Mexico's arid Mesa Central to the subalpine slopes of the Himalayas. But, being particularly weighty and lacking any means of buoyancy, these seeds aren't going far on their own. Luckily, they don't have to.

As it turns out, these hefty seeds do have wings—they're just on another organism's body. These seeds are dispersed by birds.



Clark's Nutcrackers have long, strong bills that serve as both chisel and tweezer, perfect for breaking apart pine cones—like this one from the whitebark pine it's perched on—and efficiently removing the seeds.

Though not common, these so-called “bird-pines” are widespread. In the Desert Southwest and all throughout the Mexican highlands, the many species of pinyon pine are dispersed by jays; Pinyon Jays in the north, Mexican Jays further south. But elsewhere in the world—from the Mediterranean to Siberia, from the Swiss Alps to the Himalayas—the seeds of these bird-pines are dispersed by another, related group of birds: the aptly named nutcrackers.

In Montana, we are blessed with not one but two bird-pines: the limber pine (*Pinus flexilis*) and the whitebark pine (*Pinus albicaulis*). Both are dispersed primarily by Clark’s Nutcracker.

Nutcrackers and jays belong to the family Corvidae, a

notoriously crafty and mischievous group that also includes the ravens, crows, and magpies.

There’s a lot to love about corvids: many are bold, highly social, extremely adaptive, and possess remarkably complex systems of communication. Corvids are also noteworthy for their proficiency at storing food and retrieving it later. This may not sound impressive at first, but consider this: Pinyon Jays cache tens of thousands of pine seeds each year, and recover about 95 percent of them. Ever lost your car keys? Exactly.

The impressive capacity for these and other specialized corvids to remember absolutely mind-boggling numbers of caches requires some serious brainpower. Evolution has bestowed these expert cachers with an enviable hippocampus, the region of the brain responsible for spatial memory. Interestingly, while most corvids cache food to some extent, those that don’t invest as much in this strategy also have smaller hippocampi—good evidence for the function of this particular chunk of brain in this particular group of birds.

In fact, there is quite a bit of variation in how much different corvid species cache, how good they are at remembering where they put things, and the size of their hippocampi. Most corvids aren’t the masterful cachers that Pinyon Jays are, and some, like the Jackdaw of Eurasia, don’t seem to cache at all. For the most part, corvids are “only okay” as cachers—the majority of the world’s ravens, crows, and jays cache food, but not that much, and they don’t rely on it the way the highly specialized cachers do. But some are truly amazing.

Among the most extraordinary of caching corvids is Clark’s Nutcracker. This bird will create tens of thousands of caches each year, each containing on average three to five seeds. This can amount to nearly 100,000 seeds *per bird, per year*. And they do this over a massive home range of around 60 square miles. Of this unimaginable number of seeds, over their impossibly large



Clark's Nutcrackers can cache up to a mind-boggling 100,000 seeds a year—and recover more than half them.

ranges, they recover about 60 percent. Maybe not as impressive as the Pinyon Jay’s 95 percent, but still pretty dang impressive. And as we’ll see, it’s ultimately a good thing for them that they leave those 40 percent behind. More on that later. For now, let’s marvel a bit longer at the Nutcracker.

Clark’s Nutcracker is a stately-looking bird: gray body, black wings with white along the back edge, and a white tail with the two middle feathers black. Their voice is usually what gives them away; a harsh, cranky-sounding call, somewhere between a creaky door and a malfunctioning printer. They’re easiest to spot doing what they’re best known for: hacking apart pine cones with their long chisel-like bills; delicately plucking out the seeds, the chisel now tweezers; and then carefully testing each one to see if it’s a keeper.

While Clark’s Nutcrackers may only store a few seeds in each cache, that doesn’t mean they’re only carrying around a couple seeds at a time. These birds are known to fly up to 20 miles to a good stash spot, so they need to make these trips efficient. To help them out, the nutcrackers have evolved a specialized structure called a sublingual pouch. This adaptation is unique to the world’s four nutcracker species, Clark’s in North America, and the Northern, Southern, and Kashmir Nutcrackers of Europe and Asia. The sublingual pouch is basically a stretchy sac extending from a hole under the tongue and contained within the neck. And they can hold a lot of seeds; Clark’s can carry as many as 150 at a time. Nutcrackers will stuff that pouch so full that you can see the bulge in their necks.

Once the sac is stuffed, the nutcracker will fly to a caching site and get to work. Sites run the gamut from forests to meadows to recent burns to barren subalpine slopes. The caches themselves can also be just about anywhere: in a mound of moss, wrapped in lichen on a tree branch, placed under a stone, or buried in the soil.





Clark's Nutcrackers have huge territories—around 60 square miles—and may fly up to 20 miles to stash the seeds they collect.

Nutcrackers will carefully hide just a few seeds from that throat bag in each little spot, carefully covering them with soil, a small rock, a patch of moss, etc. A lot of the forest management and scientific literature will tell you that Clark's Nutcrackers *prefer* to cache seeds in bare, open areas, but the evidence for this is lacking. The observational studies that these claims are based on are likely to be biased by the fact that it's just easier to see them make caches in open areas. But, as it turns out, these particular cache sites end up being especially important, somewhat for the bird but more so for the seed.

Recall, the trees producing these wingless seeds are often the ones found in some of the most extreme environments—dry, cold, windy, rocky, and unwelcoming. Regardless of whether nutcrackers specifically seek out these kinds of environments, they have a lot of seeds to put into caches, a lot of caches to find space for, and only so many different kinds of habitat for all of them. We don't have a great understanding of their preferences, but either way, those harsh, open, largely unvegetated, and easily observed sites get a lot of use.

And these are the sites where those seeds—about 40 percent of which are getting left behind each season—are most likely to germinate into trees. Essentially, the forgotten seeds have been planted, and many of them right in the habitat where they do best. In forgetting, on average, almost half of the seeds they cache, these helpful birds have supplied their own future generations with the food they will depend on. Think of them as accidental gardeners. At a landscape level, and with literally thousands of seeds.



Those trees have no other way of getting to their preferred habitat than by being carried by nutcrackers.

lifestyle, or “life history” in biology-speak. Plants like dandelions, lodgepole pines, and cheatgrass live fast and die young. They germinate, grow, pump out as many seeds as possible, and die after a relatively short time. Dandelions usually live two to ten years, lodgepoles up to about 150, and cheatgrass is an annual, dying after a single season and relying on its seeds to keep the population alive (which they're pretty good at doing). Other plants use the opposite strategy: they live slow, and they die old. The arrowleaf balsamroot, a relative of the dandelion in the botanical family Asteraceae, doesn't even flower for three to five years, and can live up to 80. Researchers estimate bluebunch wheatgrass can live from 50 to 100 years. And limber pines can live to be over 1,000. There's a tree in the Absaroka Mountains between Montana and Wyoming that was 1,921 years old in 2005. Limber pines won't even start producing seeds until they are at least 20 years old, often 50, and don't reach full maturity until at least 100. This is a patient species of tree.

Spreading the seeds around is another issue that requires a bit of strategy. Dandelion seeds are tiny and fluffy and can get where they need to get on the wind, and dandelions can make a lot of them because each individual seed is so cheap to produce. For the bird-pines, with their enormous flightless seeds, they've really hedged their bets on the birds. It makes sense, then, that they'd go the extra mile to get the seeds to those birds.

First, of course, there's the giant, tasty, nutritious seeds. But the birds need to see that there are cones on a tree before they will land on it.

With their long-distance commutes, Clark's Nutcrackers are often flying pretty high up in the sky, so the cones need to be obvious. A common strategy among bird-pines, and one that our whitebark and limber pines use, is to only grow cones on the outer branches

There's some strategy involved in being a plant.

Some of it comes down to



Limber pines present their cones in groups at the ends of their branches, making them easily visible from the air for high-flying Clark's Nutcrackers.

at the top of the tree. Another thing that sets these pines apart in our area is the shape of their crown. Rather than forming a narrow profile around a central trunk, something that helps many of our other conifers avoid broken limbs under heavy winter snows, limber and whitebark have multiple trunks, arching upwards, providing many more places to show off their goods.



The relationship between the bird-pines and the pine-birds is deep, complicated, and fascinating.

But it's not unique. There are many, many plants that specifically rely on birds to disperse their seeds. In the east, Blue Jays are major cachers of acorns, facilitating the spread of oak trees. In our area, Townsend's Solitaires and junipers have a similar relationship. In this case, the persistent juniper "berries" (actually cones that have evolved to be edible) are the solitaire's winter food. They digest the fleshy cone, then poop the seeds out elsewhere. In the tropics, hornbills and toucans perform this service on much larger fruits, such as those of nutmeg and mahogany, and are among the only flying creatures large enough to do so. At a broad scale, any plant that has invested in making a fruit is doing so to attract some bird or mammal that will help disperse its seeds.

Of course, a limber pine doesn't require a nutcracker for its seeds to germinate.

A cone might roll down a hill and drop a few seeds; that could work too. Not very efficient, and certainly doesn't get these trees uphill in the first place, but it works. There's something characteristic, though, of a lot of pines "planted" by Clark's Nutcrackers. If the typical cache has three to five seeds, then you might expect three to five trees if the cache isn't recovered. And a lot of times, that's exactly what you get! Three to five trunks all growing out of the same little spot on the ground, an old nutcracker's cache hole.

Where I live in Bozeman, there's a little park right in town on the top of a hill. (If you're ever there, it's called Burke Park.) On one dry stretch of slope on that hill, there are tons and tons of limber pines. It's the only place in town that I've seen them. There are a few younger trees here and there, slim, solitary trunks reaching steadily up toward the sun and just starting to produce cones. But mostly it's older trees, and the older trees all come in groups of two, three, four trunks, all fused at the base. On each of these clumps, there are folds in the bark where these separate trunks join, graft scars running all the way to the ground, the only sign that these trees started as separate seeds. Planted by a nutcracker, probably over a hundred years ago, before there was even a town here. And every year, as summer starts sinking back into fall, the nutcrackers return, extracting the seeds, reaping the crops planted by their ancestors. 🦉

—Cedar Mathers-Winn is a naturalist, educator, and writer living in Bozeman, Montana. He received his Master's degree from the University of Montana studying Black-capped Chickadees—another caching species, to which he provided winter-long all-you-can-eat sunflower seed buffets in exchange for a little data and a lifelong connection to one of the world's coolest birds.

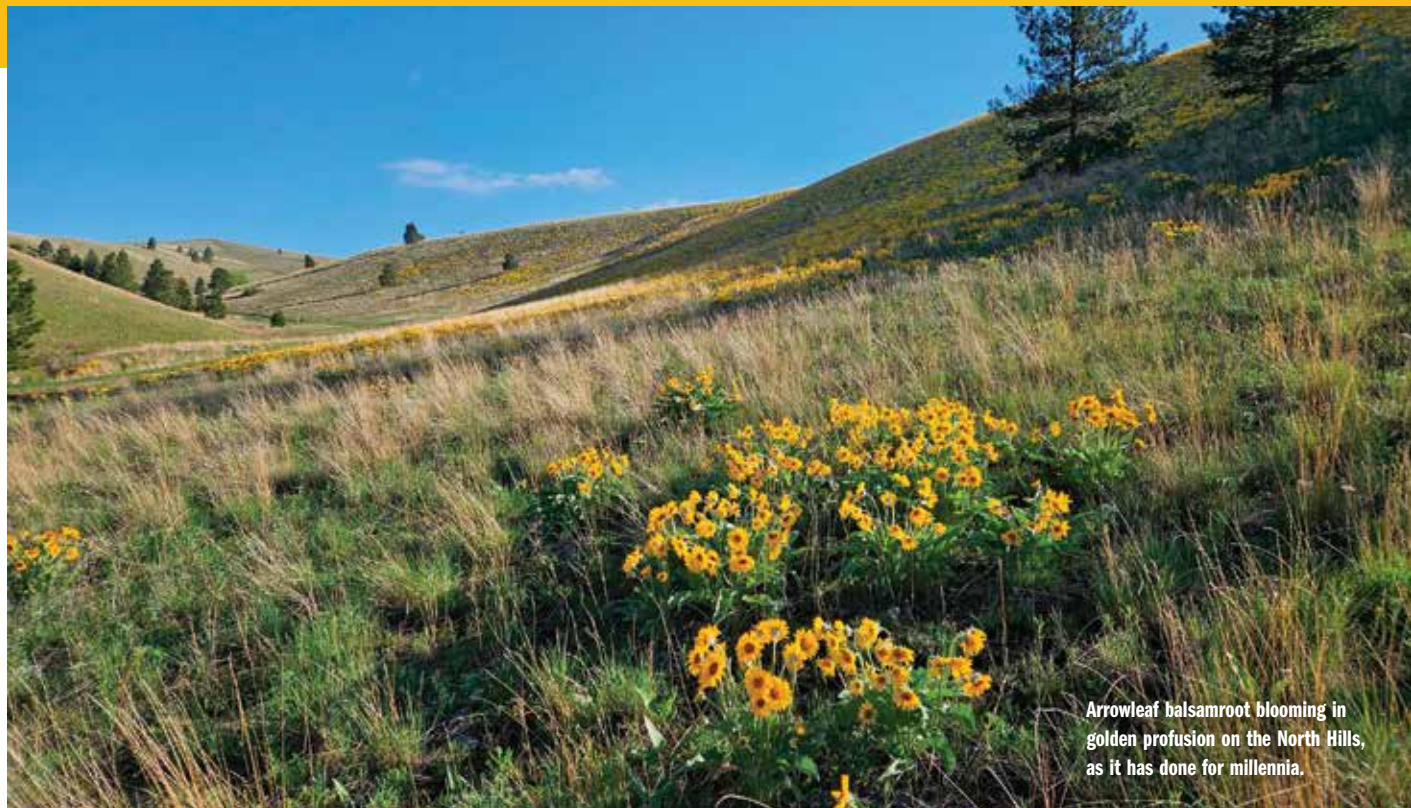
*A longer version of this article is available at MontanaNaturalist.org/bird-pines.

Groups of two to five trunks are a good sign of trees that sprouted from an abandoned nutcracker cache. To be sure they are actually separate trees, look for a graft scar running from the spot where two trunks meet and the ground; this is where two trees have fused.



A Western Montana Queer FIELD GUIDE

BY PRIYA SUBBERWAL



Arrowleaf balsamroot blooming in golden profusion on the North Hills, as it has done for millennia.

PHOTO: GREG PETERS

A People's Natural History of Missoula's North Hills

the hillside turns gold, and you can see the bright faces of the balsamroot flowers from all the way across town. What I love most, however, is the lifespan of these sunny yellow flowers—research reveals that one plant can live up to 80 years, though rumor has it they are actually known to survive for over a century. It comforts me, the thought of an old flower—it feels paradoxical and mysterious. As a new resident of the Northside, I often find myself thinking of them presiding over the valley. Witness to centuries of change within the ecosystem, they reemerge and reach for the sun every May throughout it all, their deep roots holding the hills in place. It makes you wonder what all they have witnessed, what they've endured.

The natural history of the North Hills is inseparable from the human history of the adjacent Missoula Valley. Since time immemorial, the hills have served as a complex trail system for

The arrowleaf balsamroot that paints the faces of Missoula's North Hills yellow every year are a well-loved feature of the town's ecology. Visible from far below in the valley, these perennials have a long relationship with the landscape. Each spring,

the Séliš-Qłispé tribes, and were a site for camas digging and buffalo hunting. To the Indigenous people of this region, the entire balsamroot plant bears gifts. From the roots which are boiled for medicine to the leaves, petals, seeds, and stems which are a food source, this golden aster is a bountiful harbinger of summer. Until at least the late 19th century, the site served as a burial ground for the tribes, and remains a sacred site today. Resting among the hundred-year-old roots of the balsamroot flowers are ancestors, entangled in the soil, memories of what came before.

In 1862, the Homestead Act facilitated the mass displacement of Indigenous tribes by offering to settlers up to 160 acres of surveyed public land if they "improved" the land by cultivating it. Of course, the land was already being cultivated by the Séliš-Qłispé tribes and served a wide variety of uses. However, these Indigenous relationships to land were not profitable to the vision of Euro-American expansion and settlement, which forced elimination and assimilation of native people to settler culture. In the span of a few decades, buffalo hunting grounds and sites of digging camas and balsamroot were replaced by ranches, farms, and orchards, including the still-standing historical Moon-Randolph Homestead, constructed in 1889. In 1891, Indigenous people were forcibly removed from the land and relocated further north, to what we now know as the CSKT reservation in what is called the Salish "Trail of Tears." But, try as they might, colonizers could not force out all native presence from the land. The fields of balsamroot remained.

Around the same time, in 1883, the construction of the railroad that runs through north Missoula began—the same year the town was incorporated. The Northern Pacific Railroad was making its way to Idaho and Washington, bringing industry and freighting coal and lumber across the west. Construction turned the Northside into a predominantly immigrant neighborhood where railroad workers lived. German, Irish, French, Chinese, Italian, and Japanese workers employed by the railroad during its expansion in the late 1800s and early 1900s built many of the houses still populating the Northside today. For a long time, the Northside was the only neighborhood in Missoula where people of color could own land, and remained a hub of culture and community for immigrant and working-class people throughout the 20th century into today. Small backyard gardens transformed the Northside into a food forest of the marginal, where fruit trees still grow in alleyways and raspberry bushes push up against railroad tracks.

In 1966, the interstate highway I-90, the cross-country route linking Seattle to Boston, began construction in Missoula. The peach orchard that marked the border between the Northside neighborhood and the North Hills rising up behind them was razed to make way for the road. The house I currently live in was picked up, turned 90 degrees, and put back down so the front entrance no longer faced what would become the roaring interstate, which now fills the house with the white noise of 18-wheelers daily. Many other Northside houses weren't as lucky. Missoula was one of few locations where residential homes were sacrificed for the interstate route. While public hearings over the construction of the highway were contentious, the project was pushed forward with the goal to facilitate commerce (the secondary goal was related to national defense following the Cold War; in the event of a war, strategic highways were prioritized to move hypothetical troops and military supplies). This sandwiched the residential neighborhood between the railroad and the highway in a thin sliver.

While proximity to these veins of industrialism kept housing more affordable in the neighborhood, it also bisected the landscape. The highway made literal the hypothetical line that had existed in western settler imagination for centuries—the imaginary line between humans and nature. The 19th-century homes and

"What I love most, however, is the lifespan of these sunny yellow flowers—research reveals that one plant can live up to 80 years ..."

orchards that were demolished for this construction weren't the only losses; the Montana Department of Transportation records nearly seven thousand roadkill deaths a year on I-90. What makes a landscape liveable or accessible to some comes, in this case, at the cost of others.

Today, the Northside is a living memory of its layered pasts. Whispered murmurs in Missoula still call the North Hills "Buried Indian Hills." The architecture of the neighborhood is reminiscent of its industrial past, with many of the homes built by early railroad workers still standing, relocated and rearranged by the highway a century later. The neighborhood is home to Missoula's longstanding legacy of tenant rights advocacy, and community land trust homes strive to keep the Northside affordable to those it has historically served against increased costs of living. It remains an immigrant, working-class neighborhood, and a hub of the town's queer community. It hosts the oldest community garden in Missoula, established in 1970, where people continue to cultivate land to feed themselves and others as has been done for centuries, long before the arrival of settlers to this place and throughout its industrial history. It's the hope of this Northsider that the neighborhood may continue to grow and evolve in remembrance of its roots, and might serve as a site of land back projects in future years, including the continued rematriation of native species in the North Hills and increased housing affordability, ensuring that this ecosystem remains a place where people of all backgrounds can live and grow together.

While camas and bison no longer live in the North Hills, maybe there's a world where they come back, alongside the people who tended them. The balsamroot remain, serving both as a reminder of the violence of Missoula's history and the resilience of the people and plants to whom this place is home. Every spring they reemerge, turning their golden faces to the sun, stubborn in their beauty, and you can almost hear them whispering, *Yes, we are still here. We are not going anywhere.* 🐦

—Priya Subberwal
is an artist, writer,
community organizer,
and educator from
Frisco, Colorado.
*They live in Missoula,
Montana.*



Above: The Northside's vibrant community garden, still going strong in 2026.



Left: The Northern Pacific Railroad brought industry to the Missoula area, unequivocally altering both the social and natural landscapes.



Moon Watching: The Super Moons of Winter

BY MARY ANN REUTER

Stargazers have long considered still winter nights the best time to view the heavens. Our ancient ancestors observed the sky in more than just the dark season, though. One changing heavenly body kept their attention as they charted seasonal changes: the Moon. For me, it remains a source of mystery and wonder.

This photo of a crescent Moon and crescent Earth was taken by an Artemis II astronaut during lunar flyby on flight day 6. This captures one of the final moments before their loss of signal with Earth as the Orion spacecraft flew around the far side of the Moon, reemerging and regaining contact approximately 40 minutes later.

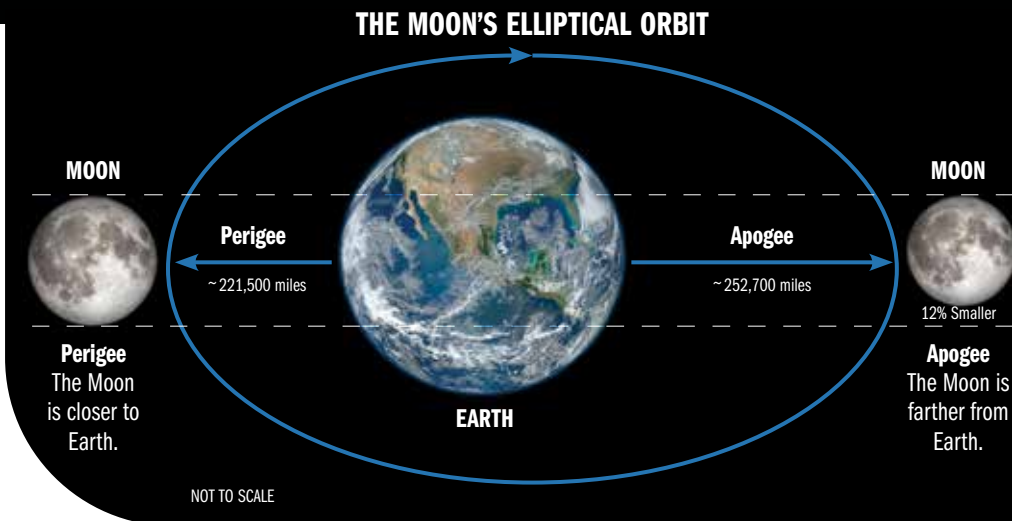
The ancient tradition of moon watching continues today. If you missed NASA's International Observe the Moon Night on September 19, 2026—an annual celebration of lunar observation, science, and exploration—don't worry. After golden autumn moons that celebrate the harvest and the hunt, winter moons turn silvery—and, this year, HUGE. With four “super moons” in a row, you will have plenty to look at.

November's Beaver Moon, December's Cold Moon, January's Wolf Moon, and February's Snow Moon follow September's Harvest Moon and October's Hunter's Moon in 2026 and into 2027. A super moon occurs when a full moon (or less obvious new moon) coincides with the Moon's closest point to Earth—or perigee—in its elliptical orbit. As a result, these full moons appear larger and brighter in the night sky, especially near the horizon.

A full moon occurs when the Moon sits opposite the Earth from the Sun, allowing its Earth-facing side to be fully illuminated. December's full moon will likely be the closest to Earth, scientists say—only 221,667 miles away, as opposed to its average distance of 239,000 miles—and the brightest of the year. This makes the evening of December 23, 2026, a cause for celestial celebration, after the winter solstice on December 21, the shortest day and longest night of the year in the Northern Hemisphere. The best time to view this and the other dramatic super moons this winter will be at moonrise over the eastern horizon.

What's old is new, and thanks in part to the Artemis II space mission, the Moon is having a moment—along with dark skies in general. Earth Night 2026, celebrated on September 11, promoted “lights off for a whole night” to point out the excessive use of artificial light and the resulting light pollution and the associated negative consequences for the environment, people, and animals. A hidden new moon on that night allowed the stars in the galaxy to appear to shine more brightly.

Artemis II was a flyby of the Moon in April 2026. It was the first crewed flight beyond low Earth orbit since Apollo 17 in 1972 and the first flight of the NASA-led Artemis program with four astronauts on board. It was also a first for the Space Launch System (SLS), and the first crewed flight of the Orion spacecraft, named Integrity by the celebrated crew.



As the world watched, captivated for ten days by the technical mission and courageous astronauts, a sense of wonder and magic mingled with science and technology. Ordinary people like myself felt a renewed sense of mystery, in awe not just of the Moon, but of our unique home planet Earth—revealed from a distance, a brilliant green and blue against a black expansive universe.

But then again, the Moon has always been a source of spiritual fascination and scientific discovery, as Rebecca Boyle describes at length in *Our Moon*, a history of humankind's relationship with the Moon. In it, she suggests that since the earliest of times, the Moon has reflected our culture back to us—from spiritual mysticism to scientific rationalism. The book largely tells of Middle Eastern and European moon watching through the ages, but does include a chapter on the ancient Anasazi of the desert Southwest.

Other Native American ancestors are credited with naming the full moons and embodying them with the symbolism we are most familiar with. Early European colonists adopted the Algonquin people's descriptions, which were published in the *Old Farmer's Almanac* centuries later. Other tribes may have called the seasonal moons by different names.

November's Beaver Moon is said to represent preparation, grounding, and restoration. It was named for the time when beavers built and fortified their dams and lodges to prepare for winter, according to *The Full Moon Through the Seasons* by Raluna Lockien, a “pocket almanac” of names, symbols, and rituals inspired by Native American traditions.

December's Cold Moon represents introspection, release, and resilience for many. The name reflected the deepening cold and lengthening nights of the winter season in the Northern Hemisphere. The January Wolf Moon brings more introspection, and also instinct and listening, while the February Snow Moon is thought to represent

What Makes Super Moons So Special?

Super moons only happen three to four times a year, and they always appear consecutively. Throughout most of Earth's orbit around the Sun, perigee and the full moon do not overlap.

At its closest point, the full moon can appear up to 14 percent bigger and 30 percent brighter than the faintest moon of the year, which occurs when it is farthest from Earth in its orbit (called an apogee). Even though 14 percent doesn't make a big difference in detectable size, a full super moon is a bit brighter than other moons throughout the year.

It might be hard to detect a super moon visually, but it does have an effect on Earth. Because the Moon is in its closest approach to our planet, it can cause higher tides than usual. The Moon and Earth exert gravitational pull on each other. On Earth, the Moon's gravitational pull causes the oceans to bulge out on both the side closest to the Moon and the side farthest from it. These bulges create high tides. The low points are where low tides occur. Learn more at science.nasa.gov/moon/supermoons/.

stillness, purity, and reflection—and also hunger, as deep snow made hunting difficult for many native tribes.

Native American traditions do not have a separate term or concept for super moons. They named full moons based on observable natural events and seasonal cycles, using those names to track the passage of time and harvest. The Moon's energy was seen as amplified during any full moon, not just a so-called super moon (a modern astrological term). Native American cultures viewed full moons as a time for spiritual connection, performing rituals, seeking guidance, and giving thanks for the abundance of nature.

Today, modern moon watchers use sophisticated telescopes to see the Moon as a physical celestial object instead of a metaphysical one, reflecting a shift to scientific understanding. However, many maria—dark regions of solidified lava—and a few large craters left by ancient asteroid impacts are visible to the naked eye. Binoculars reveal dozens of craters, while a small telescope shows hundreds.

The best place to observe the Moon is along the “terminator”—the illuminated line between the day and night side of the Moon. During the full moon, sunlight shining straight onto the Moon's visible face gives us a flat, shadowless view of the terrain, whereas viewing the terminator while the Moon is waxing and waning allows us to see the details. The shifting line between light and shadow casts the craters, mountains, and other surface features into sharp relief.

After billions of years as Earth's silent cosmic companion, some now view the Moon as our planet's “eighth continent,” suggesting a sort of ownership. It is also considered a steppingstone to Mars, as the Artemis mission has clearly defined it: “Under Artemis, NASA will send astronauts on increasingly difficult missions to explore more of the Moon for scientific discovery, economic benefits, and to build on our foundation for the first crewed missions to Mars.”

Private companies such as SpaceX and Blue Origin are close behind. Decades of exploration have shown that the Moon holds several important resources that future missions could mine. For example, permanently shadowed

craters hold water ice, which could be extracted and turned into drinkable water or broken into its constituents for breathable oxygen and even rocket fuel.

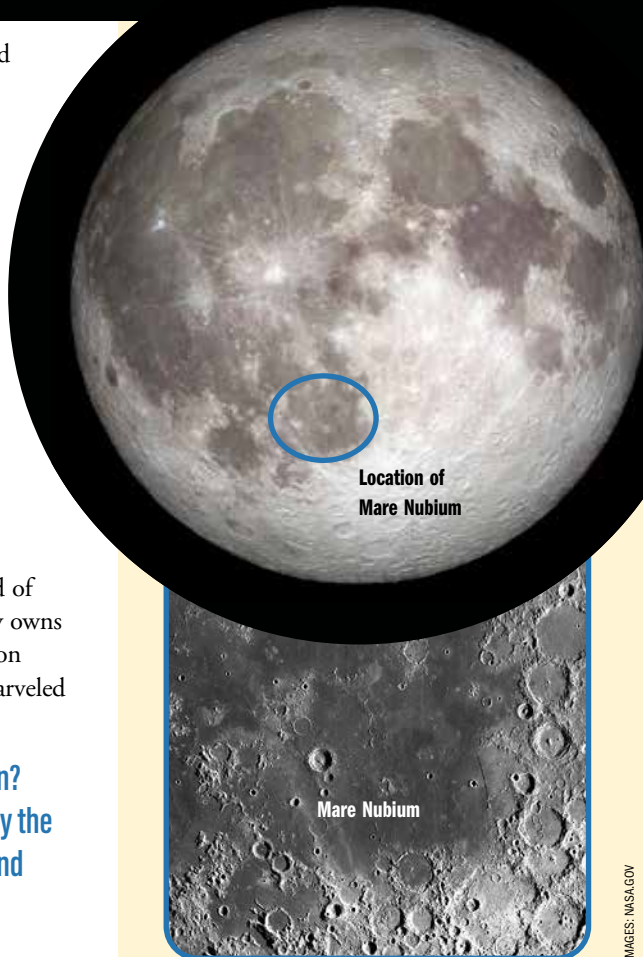
Scientists also know of several heavy elements (used in the production of electronics on Earth) that exist in lunar rocks. And researchers have found hints of a type of helium gas they believe could be used as a clean nuclear power source. But somehow, learning about how the Moon could be used as a resource instead of revered as a mystery makes me sad, like a kind of innocence is lost. I ask: who really owns the Moon? Certainly not a question asked by the ancient ones who marveled at and even worshipped it.

“I ask: who really owns the Moon? Certainly not a question asked by the ancient ones who marveled at and even worshipped it.”

Governments and billionaires may aim to profit from its resources (including through space tourism), but the Moon belongs to everybody, and to nobody at all, writes Rebecca Boyle, and I agree. Much like our own fragile planet, hanging in space, the Moon deserves protection and respect. Just as we must tread lightly on the Earth, we must walk carefully on the Moon. As winter stillness reveals the night sky, and especially as the four super moons rise large and luminous, we must still marvel, *humbled*, at the wild wonder beyond us.

—Mary Ann Reuter is a retired marketing professional who loves reading nature books and writing articles about the natural world. She is a graduate of the Montana Master Naturalist program and also the Wild Wonder Foundation nature journaling educator program. She publishes a Substack blog called “Noticing Nature as a Third Act.”

Editor's note: For this article, we are following the NASA style guide, capitalizing Moon and Sun when referring to Earth's Moon and Sun.



IMAGES: NASA.GOV

How to View the Moon

As part of International Observe the Moon Night, NASA published a six-page series of Moon maps to download. These maps depict the Moon as it appears from the Northern or Southern Hemisphere, including sections dedicated to lunar landforms, lunar maria (seas of basalt), and human landing sites for the famous Apollo 11-17 missions.

For newly hooked moon watchers, NASA offers suggestions for observing the Moon every day of the year with their Moon Viewing Tips (science.nasa.gov/moon/viewing-tips/) and Daily Moon Guide (science.nasa.gov/moon/daily-moon/guide/). You can even observe the Moon like an Artemis II astronaut, using real images from NASA's Lunar Reconnaissance Orbiter to spot craters, mountains, and other features on the lunar surface.

Another website, theskylive.com, allows you to see a LIVE view of the Moon, providing augmented reality (AR) views of the Moon's current position and path from your specific location (handy on cloudy nights). South of the Moon's equator is Mare Nubium darkening the lunar surface and the prominent craters on this basalt plain. You might spot the Montes Jura mountain range that surrounds the northwestern edge of the Sinus Iridum impact site, or notice the bright streaks known as ejecta rays that are visible during the full moon phase.

PHENOLOGY FOR OCTOBER-MARCH

OCTOBER



Spotted tussock moth caterpillars (also known as “woolly bears”) have transitioned into cocoons, in which they’ll overwinter before emerging as moths in the spring.

Triggered by fall rains, chanterelle mushrooms begin to pop up in moist conifer forests.

NOVEMBER

Cottonwoods prepare for the winter by “hardening,” including pulling water from their cells and leaving the sugars to better survive freezing temperatures.

Canada Jays, Clark’s Nutcrackers, and Steller’s Jays appear to move up and down in elevation according to temperature changes.



DECEMBER

Grouse will grow stiff feathers (pectinations) on their feet to help them walk on top of the snow.

Enjoy this month’s Super Moon on December 23, when the Moon appears a little bigger and brighter because it’s closer to Earth in its orbit.



JANUARY

Falling snowflakes absorb sound, creating a quiet hush during a heavy snowfall.

Pikas, cozy in their dens and subnivean tunnels, feed off the dried plants they collected in the summer months.



FEBRUARY

Muskrats forage underwater - look for lines of bubbles beneath the ice.

Coyotes begin breeding, with 4 to 7 pups born about two months later.



MARCH

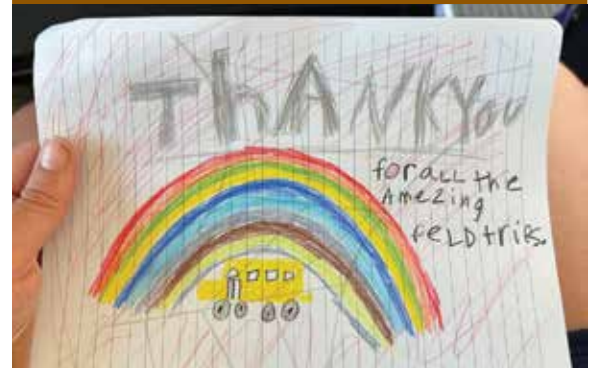
Buttercups, douglasia, yellowbells, and other early wildflowers begin blooming on the hillsides.

Tens of thousands of Snow Geese and other waterbirds stop at Freezeout Lake during their northern migration.



get outside guide

KIDS' CORNER:



MINIC PHOTOS

Our campers had fun with art projects this summer! Here are a few of their fun creations.



Calling All Kids!

Do you have any nature art, photography, poetry, or stories you’d like to share?

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

Celebrating 35 Years of Growing Nature Education

Nestled on the floor of an ancient glacial lake, the Montana Natural History Center has spent over three decades working

Camps! Camps! Camps!

1994: MNHC offered our first summer camp program for children ages 8-12. Today, we provide summer camps for pre-K through 5th grade and have accommodated thousands of campers over the past three decades.



Programs & Events

MNHC staff find great joy in crafting and creating programs to meet the needs (and wants!) of our community. These pages show only a snapshot of the variety of programs MNHC has offered over the last 35 years.

Additional fan favorites include:

- Nature Discovery Traveling Trunks
- Saturday Discovery Days
- miniNaturalists
- Wings Over Water
- STEEM Institute
- Block Party and Holiday Bazaar
- AND MORE!



Native Plant Garden at Fort Missoula

MNHC created the Native Plant Garden at Fort Missoula in **1998**. Thanks to donors and volunteers, the historic garage received a makeover in **2010**. MNHC maintains three native plant gardens in our community, including two onsite at our Hickory Street location: the Harrington Garden and our Nature Adventure Garden.



Deep Roots and Broad Branches

Like a ponderosa pine, MNHC is a familiar fixture of our state. Reaching generations of Montanans, our branches are broad and our roots are deeply invested in this spectacular wild region. Over the years, we've taken advice from the ponderosa, even adding it as a logo in 2003, adapting to the needs of the community by bending to a breeze when necessary, while remaining steadfast in the mission that grounds our work. And we're standing stronger than ever.

Seeds Planted

Founded in 1991, MNHC was dreamed up by Sue Reel, Pat Tucker, and Bob Petty—a dedicated group of educators involved in various efforts across the valley to educate both kids and adults about the natural history of western Montana. They united those efforts into one environmental education organization—you guessed it: the Montana Natural History Center!

Two of our three founders Sue Reel and Bob Petty, with Dave Dyer (UM Collections Manager) and specimens in **1993**—many of which are on display at MNHC today!



MNHC PHOTOS

Education and Wildlife Connections in Montana!

in the community to promote and cultivate the appreciation, understanding, and stewardship of nature through education.

New Growth

Healthy trees GROW! Each year, MNHC engages approximately 14,000 people of all ages across our state and beyond through our programs, curriculum, and events, including summer camps, kids' activities, Visiting Naturalist in the Schools, Master Naturalist certification courses and Field Days, evening programs and workshops, *Field Notes* on Montana Public Radio, museum tours, and so much more.

As we celebrate 35 years of being rooted in our community, we look forward to growing and spreading our branches for the next 35 years and beyond. Whether you've been a part of MNHC since the beginning or are new to our community, you are part of our roots, trunk, branches, bark, and the new growth of the Montana Natural History Center. We are infinitely grateful to have you growing with us.



Publications & Field Notes on MTPR

In 2004, the *Tidings* newsletter and *Field Notes Quarterly* were replaced with the full-color, triannual *Montana Naturalist* magazine. Today's *Montana Naturalist* is a biannual publication and has a circulation of 15,000 readers.

The first *Field Notes* program aired on Montana Public Radio in 1991. Written by naturalists, students, and listeners, *Field Notes* has aired twice a week on MTPR for 35 years.



Annual Banquet & Auction

Candid photo from our annual banquet & auction—our biggest fundraiser of the year—in 2011. MNHC's first auction and membership drive was in June 1992, raising \$1,324.30.

Visiting Naturalist in the Schools Program (VNS)

Piloted in fall 2001, VNS is our longest-running and foundational nature education program. Providing fourth- and fifth-grade classes with seven classroom visits and two field trips throughout the school year, our teaching naturalists reach more than 1,500 students in 70 classrooms across western Montana annually.



In July 2026, we honored our 35 years of nature connection with a lively, educational, and fabulous Open House & Membership Drive. We had such fun celebrating with you all!



Home Sweet Home

1991: MNHC's first home is room M-9 of Jeannette Rankin Hall on the UM campus, followed by room 302 of the Botany building in 1992.

1998: MNHC moves to its new home at the Post Headquarters building at Fort Missoula.

2004: After months of planning and fundraising, MNHC purchases its current home, the former Big Sky Brewery building at 120 Hickory Street, and starts renovations, opening to the public in 2005.

2012-2014: MNHC remodels the building exterior to create a more welcoming facade, followed by interior renovations to turn unfinished storage space into offices, a large classroom, conference room, green-screen room, and library.

Book Reviews

REVIEWED BY PRIYA SUBBERWAL

Forest Euphoria: The Abounding Queerness of Nature

by Patricia Ononiwu
Kaishian

**Patricia Ononiwu
Kaishian's Forest
Euphoria**

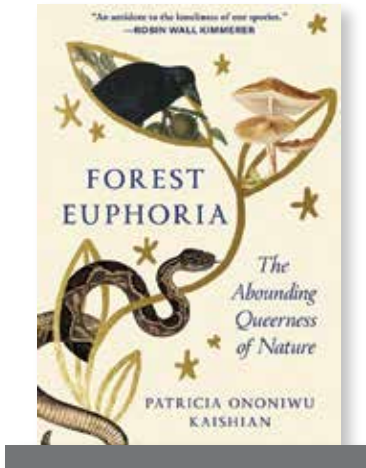
is a churning, oozing, glittering memoir braiding queerness, ancestral landscapes, and social movements with sharp science writing and precise ecological observation. Kaishian takes a sporous and branching approach to her research, seamlessly moving between the personal and the systemic and citing traditional ecological knowledge, folklore, lived experience, and scientific literature to take readers with her through swampy culverts, cicada swarms, and cemeteries alive with the chatter and cackle of crows.

It's a joyous romp where no one is left behind, and a service to nature writing and queer theory both. Kaishian's ability to situate the slimy, squirmy, and soiled within axes of contemporary power and violence—and always with an orientation towards community—is caring, and balances the delicate line of being both honest and hopeful.

Kaishian's book sits in a larger theoretical movement towards queer ecology, and suggests what I hope will be a larger shift in the discourse—that queer ecology means more than giraffes who have gay sex, or trans parrotfish. Instead, this book's queerness works to, as she puts it, “make a mess of categories, to make a mess of anything that demands unreasonable, stifling cleanliness.” The memoir follows a young scientist from a childhood spent taking refuge in swamps through a (sometimes stinging) coming-of-age, falling-in-love, and building-of-career in a time of crumbling empire, cultural displacement, and ecological collapse.

This book has something in it for everyone. For anyone who's ever felt alone, misunderstood, or who struggled to place themselves within the human and found solace in the wild just outside the door—this book serves as a reminder that there's a place for you. Here, in the woods, next to the uncurling ferns and murmuring mushrooms. A soft and gentle nod to the churning family of life right outside the window, beneath the soil, under our feet.

—A longer version of this review was first published online at advaya.life.



REVIEWED BY ALLISON DE JONG

Feathered Forest: Aloft with Birds in Ancient Trees

by Marina Richie

**Marina Richie's new
book is one you can
(and should) judge by its**

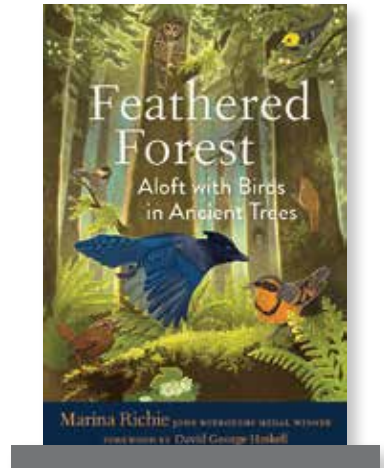
cover: verdant, lush, rich with life and movement and unfolding layers, there's more to discover—and love—with each closer look. Dayna Walton's gorgeous illustration captures the eye, and Marina's vivid storytelling, a wonder-filled weaving of science and personal experience, draws you along amongst the ancient forests and diverse wildlife of Cascadia.

Feathered Forest is an homage to the ancient trees that used to cover our landscapes and have now been reduced to small, scattered refugia. Yet these relict forests still teem with layers of life, from soil full of mycelial connections to the cool, protected mid-layers to the sunshine-drinking, fog-scraping canopy. Marina is a lifelong naturalist, and her knowledge of these places, and the flora and fauna that inhabit them, shines through this book like sunlight filtering through old-growth trees.

This book is also a love story. Marina's soul-deep care for western redcedars and Sitka spruces and Douglas-firs and redwoods, and the Pacific Wrens and Spotted Owls and Vaux's Swifts and Marbled Murrelets and all of the other creatures that depend on them, is the thread that runs throughout. And a story about loving wild places and wild creatures, in this overwhelming time of development, habitat loss, and ever-intensifying climate change, is of necessity one of heartbreak.

Feathered Forest will break your heart, maybe more than a little. It clearly lays before us the challenges old-growth forests and their diversity of species face. Yet it also reminds us that all is not lost. These ancient trees and feathered marvels still exist because of humans who advocated and fought for their protection. Let us, as Marina writes, “Save every wild feathered forest left....Renew and heal what we have harmed.”

**Join Marina in Missoula at Fact & Fiction on Thursday,
November 19th, at 7:00 p.m. for a book reading and signing!**



volunteer spotlight

Randall Martin & Sue McDonald



Randall Martin has been volunteering at the Fort Missoula Native Plant Garden since 2024, and has been a consistent and stellar volunteer for the past two years. He's the guy that shows up on Sunday mornings right at 9:00 and works hard until 11:00, even when it's raining. Whether he is pruning shrubs that no one else can reach, pulling wheelbarrows of weeds, or moving heavy things

around, he's always working hard. "I can always rely on Randall to get tasks done and I'm so grateful for his help," says Elena Ulev, MNHC's Garden Manager. Thanks to his help, the Garden is looking beautiful! *Thank you, Randall!*

Our Visiting Naturalist in the Schools (VNS) team felt incredibly lucky this year to have the opportunity to work with **Sue McDonald**. While she had volunteered with the program before, this spring was the first time many of us had the privilege of working alongside her.

Sue is an incredibly passionate and knowledgeable naturalist, and we were so grateful for the opportunity for both our students and staff to learn from her throughout the season. As the season began to wind down and we all started feeling the pull of summer, Sue helped center us and reminded us that the

work we do is something worth celebrating. For the first time in years, we hosted an end-of-year celebration with our staff, volunteers, and loved ones. It was a wonderful day that would not have happened without Sue.

The VNS team truly is a community, and volunteers like Sue are a big part of what makes it feel that way. We're so grateful for all she brings to VNS! *Thank you, Sue!*



We have so many great ways to get involved with MNHC! Join us in the field and classroom with our VNS program. Or assist with kids' drop-in programs, help in the Garden, fill in at the front desk, join one of our event committees, write a Field Note, and so much more! Interested? Visit our website to fill out an application or sign up for our volunteer newsletter at MontanaNaturalist.org/volunteer/.

Help with our Visiting Naturalist in the Schools program this year! Our VNS program works with 1,600 4th- and 5th-grade students in 70+ classrooms in Missoula and beyond. Join us outdoors for our October and May field trips, and assist with classroom visits the rest of the school year. For more information and to sign up, contact Nora at vnsvolunteer@MontanaNaturalist.org.

MNHC FALL BANQUET & AUCTION

FRIDAY, OCTOBER 16, 2026 • 5-9 PM
UNIVERSITY CENTER BALLROOM

Join us at our largest fundraiser and celebration of the year! Our auction is brimming with fantastic items and experiences that inspire creativity, curiosity, and adventure in our beautiful Montana and beyond. You'll be able to bid on everything from unique private tours and dinosaur digs to Yellowstone adventures, Baja escapes, beautiful artwork from local artists, and more. Tickets are on sale now—visit MontanaNaturalist.org/auction to purchase yours today!

Many thanks to all of our donors and sponsors who make this fundraiser possible. Interested in sponsoring our auction or donating an item? Please contact Beth Conway at bconway@MontanaNaturalist.org.

All funds raised go directly to supporting our work of connecting people of all ages with the natural world. We are grateful for our amazing community!



imprints

Celebrating Summer Camps!

This fall, we are celebrating everyone who made 2026 another successful year for our summer **Outdoor Discovery Day Camps!** With a wonderful team of dedicated year-round staff as well as five seasonal naturalists, this year we welcomed **329 campers for eleven weeks** of outdoor exploration. And with the help of our generous donors, we were able to award more than \$22,000 in scholarships to help get kids from preK through fifth grade outside and exploring the natural world, making our camps accessible to the kids who need them the most.

In addition to spending time at MNHC and our Nature Adventure Garden, this year our campers traveled all over the Missoula area, visiting tried-and-true summer adventure spots like Greenough Park, the Clark Fork Natural Area, Council Grove State Park, Maclay Flat, Rock Creek, Beavertail Pond, and Travelers' Rest State Park. We also enjoyed working with our many generous community partners, such as the Missoula Butterfly House and Insectarium, the Missoula Fire Sciences Lab, the Watershed Education Network, the UM Bird Ecology Lab, the Rocky Mountain Elk Foundation, Garden City Harvest, and Soil Cycle. And we are so grateful for our friends at the Missoula Public Library, who were always willing to help us out in a pinch when the skies were a little too smoky and we needed an indoor space for our campers to spend an afternoon.

After a busy summer like this one, our summer staff have earned a brief, well-deserved rest before they switch gears and head into back-to-school mode. Many thanks to our outstanding donors and community members like you for helping us get kids outside, exploring, and learning about nature!



Introducing Our New Visiting Naturalist in the Schools Curriculum

The VNS team is so excited for this new school year! The opportunity to engage with so many students and share our curiosity and connection to the natural world is what makes our work so incredibly rewarding.

As our new school year starts, you may notice changes to our old lessons and a few brand-new lessons. With new understandings of environmental education and the value of student-led learning in a changing world, the VNS team has been working to reimagine the curriculum and introduce more relevant topics. All of our changes support Next Generation Science Standards, Climate Literacy, and Indian Education for All.

We began this endeavor by writing a new lesson for September, introducing the skills of a naturalist that the students will spend the year honing. For October we created a lesson that familiarizes students with diagrams, and shows the importance of observing the small details in things. We also rewrote a fall field trip lesson to be taught in the classroom in November, introducing "structure and function," a core concept to our year-long scope and sequence. These three lessons were introduced in the fall of 2025 and we received overwhelming positive feedback.

While many of our lessons have changed, either in their entirety or simply the way we teach them, the core of VNS has always been, and will continue to be, an inspiring connection to the natural world.



Spotlight on Ken!

MNHC welcomed University of Montana student **Ken Burton** this summer as our first official collections intern. Entering his senior year, Ken is studying history and anthropology with a focus in public history. Ken expertly handled each project throughout the summer, conducting thorough inventories of a few of our archival and osteology collections, and even took on the tricky task of bird egg identification. Thank you to Ken for his wonderful work this summer, and we here at MNHC wish him the best during his final year at UM!



MNHC PHOTOS



Clockwise from top:

In January, our community gathered at the Fort Missoula Native Plant Garden for a chilly, magical evening of winter fireside storytelling with Chris La Tray.

4th-graders from Paxson School catch and identify insects on their spring VNS field trip at Council Grove.

Practicing watercolor mixing skills in an art workshop with Nancy Seiler.

Teaching Naturalist Ryan Mahar leads a birding lesson for summer Master Naturalist participants.



Gratitude for the Foundations and People Who Support Our Programs

Thank you to the **Cinnabar Foundation** for supporting MNHC general operations again in 2026 and for 22 years of support and helping us connect people of all ages to nature in meaningful ways.

Thank you to the **William and Margaret Wallace Foundation** for another year of generous support for the VNS program and helping us mentor 4th- and 5th-grade students to become naturalists these past 20+ years.

Sending gratitude and thanks to our friends and founders at **Drollinger Family Charitable Foundation** for another year of generous support and for being with us on this journey since the very beginning!

Huge gratitude to our friend **Nathan Johnson** for a very generous donation this year!

Thank you **Amy and Neil Stiener** for increasing your annual gift so meaningfully.

MNHC is open Tuesdays - Saturdays, 10 a.m. - 4 p.m. Please check our website and social media for details.

Admission Fees:

\$7/adults (18+), \$3/children (4-18), \$15/family rate, Free/children under 4, \$5/seniors and veterans

FREE admission for MNHC members, ASTC Travel Passport members, Native and Indigenous peoples, and EBT card holders!

Visit [MontanaNaturalist.org](https://montanaturalist.org) to register for programs and become a member. For more information, call MNHC at 406.327.0405.

MNHC Unveils New Mural!

MNHC has partnered with artists **Aspen and Cameron Decker** for the creation of a large-scale mural located on the west-facing exterior wall of our building. We are excited to announce the painting has begun and is set to be finished by the end of September!

This mural centers on the traditional **Salish Camas Dig and Bake**, one of the most significant food practices of the Bitterroot Salish people. Created as a contemporary ledger-style work, this striking piece combines place-based history with cultural storytelling rooted in Salish homelands, emphasizing the deep relationship between the Salish people and the land.

This mural serves as a visible and enduring acknowledgment that Indigenous knowledge is inseparable from the natural history of this place. Through culturally grounded imagery and Salish language, the mural functions both as artwork and an educational resource, inviting visitors to understand the land through Indigenous ways of knowing.



Thank you to our donors who have made this incredibly meaningful partnership possible: Candace Crosby and Dudley Dana, Dawn and Tim Payne, the Charles O'Boyle Foundation, the Llewellyn Foundation, and the Missoula Downtown Foundation.

Join us on Friday, October 2nd, at 5:00 p.m. to celebrate the completion of the mural!



MNHC Gets New Wheels!

This summer, **Jane and Mark Katz** donated a Honda CR-V to the Montana Natural History Center, turning a long-held dream into reality.

For years, MNHC has dreamed of having a dedicated staff vehicle to reduce the wear and tear that rural travel places on employees' personal vehicles. Their generous gift makes that possible while directly supporting our Visiting Naturalist in the Schools Program.

Our new staff vehicle will help us travel more efficiently and cost-effectively to rural classrooms, allowing us to continue bringing hands-on nature education to 4th- and 5th-grade students in their own communities. Jane and Mark also donated snow tires, making those journeys safer for our staff on Montana's rural winter roads.

We are incredibly grateful to the Katz family for this thoughtful gift. Their generosity will help keep MNHC educators—and our programs—on the road for years to come.

Welcome (Back) Drew!

We are thrilled to welcome back **Drew Lefebvre** to MNHC! Drew previously worked as a Teaching Naturalist and then Museum Programs Coordinator, and now she returns as our new Program Director. Drew grew up in the hemlock forests of southern Maine and attended college in Boston, where she studied Linguistics and Philosophy. In 2009 she moved to Missoula for a season of trailwork and has been here ever since, building her skills as an educator and naturalist. She holds an M.S. in Environmental Education from the University of Montana and has worked in a variety of environmental fields, including citizen science, trailwork, and natural history courses for a range of ages and skill levels. She is passionate about guiding students toward a deeper understanding of the ecosystems and creatures that are right on our doorstep. In her free time, she loves to explore the outdoors through backpacking, birding, and gardening. You can also find her reading, sewing, and enjoying the wonderful community of Missoula.



Notes from Our ED

Late this summer, 200 people gathered at the Native Plant Garden at Fort Missoula to hear Dr. Robin Wall Kimmerer speak and work alongside us in the garden. This was a big deal for me personally—and for the large crowds of people who adore Robin Wall Kimmerer. I'd helped MNHC start this garden in the late 90s, and nursed it along with time and passion for nearly 30 years.

Robin, author of both *Braiding Sweetgrass* and *Gathering Moss*, was in Missoula to give the keynote address at IndigiPalooza MT 2026. She had asked conference organizers if she could lead a gardening day as part of her “Plant, Baby, Plant” movement. I was beyond thrilled when Chris La Tray and Anna East suggested the Fort Garden as the site.

I had the honor of introducing Robin before her opening comments. Her topic? Gardens matter. Gardening matters. Relationships with plants matter. There is hope in the world if we give time and attention to plants.

That message is refreshing and optimistic. It is straightforward while motivating us to try. To notice. To wonder. And to see those actions as important steps in making life better for everyone.

Like lots of nature-lovers, I have been a fan of Robin for many years. Her current campaign to promote hands-on work especially resonates with me. My previous job, for over 25 years, involved restoring native grasslands, pulling weeds, tending gardens, and teaching people about plant conservation. That work is slow, dirty, and humbling. It teaches you, pretty quickly, that you are not in charge of the land, you're in a long-term relationship with it. I believe strongly in the efficacy of service learning—learning by doing—but Robin's framework is even bigger, speaking to a way of living and giving.



I loved my land stewardship job, and I still love gardening and volunteering on local hillsides and beyond. But I didn't have the powerful language for the integrity and value of hands-on work. Tending plants is good for our own health, for community connections, and for improving the world. Robin has given language to something I had felt for decades but hadn't fully found words for: that caring for plants isn't a one-way act, it is a reciprocal relationship that enhances both the world and our spirits.

I'm learning to incorporate Robin's optimistic vocabulary into my life and my work at MNHC. I'm very grateful for this collaboration with IndigiPalooza MT. I look forward to championing more hands-on learning opportunities as a valued way of living in, and learning about, the natural world.

Want to join us? Become part of our volunteer community by emailing Jen at jgrigg@MontanaNaturalist.org or visit our website to see upcoming volunteer events. We work in the Native Plant Garden at Fort Missoula most Sundays from April through October and you are always invited to plant, baby, plant.

Marilyn Marler
Executive Director

We FILLED the House at Our OPEN HOUSE!



In July, MNHC hosted an Open House and Membership Drive. It was a thrill to host hundreds of people from our community—you filled the museum and gardens with great energy and contagious curiosity for nature connections! People of all ages took advantage of our bird songs trivia, rock painting, bear aware program, geology fun, skeleton conversations, community art project, and more! It was wonderful to meet so many new faces and see long-time members! The Open House coincided with MNHC's 35th anniversary and we revealed a new exhibit (on display through the end of the year!) spotlighting the last three decades of building nature connections in Montana.

In addition, we welcomed over three dozen new members and families, putting us all the closer to our goal of 1,000 members in 2026.

A very special thank you to our volunteers and to our talented educators who helped make the night extra special by sharing their passions for the natural world.

UPCOMING PROGRAMS

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Sentinel High School: Science Beyond the Classroom

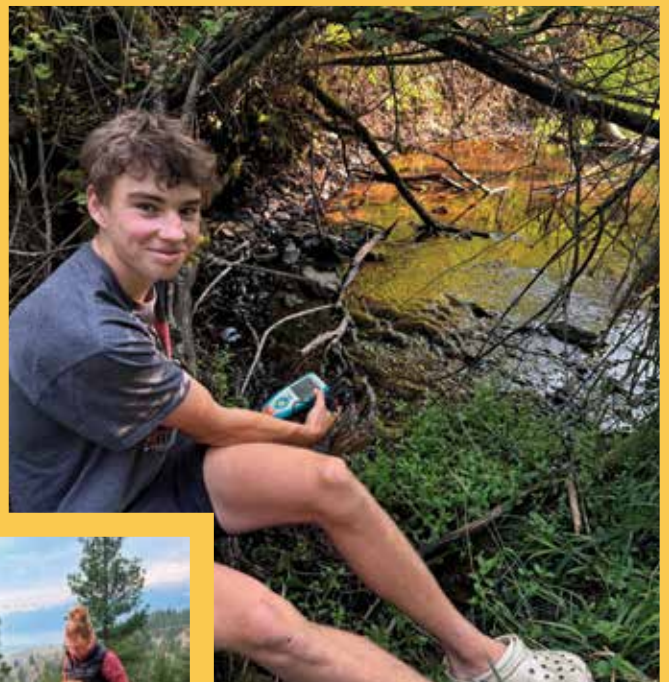
BY ALLISON DE JONG | PHOTOS COURTESY OF KELLY NELSON

This summer I got to participate in one of our delightful Master Naturalist courses, and had the pleasure of spending a week learning with a wonderful group of people, including a science teacher from Sentinel High School. I was wowed when she told me about the diversity of science education opportunities available to high school students here in Missoula.

Kelly Nelson is in her 23rd year of teaching at Sentinel, and for the past decade or so has taught, in addition to her AP Physics classes, a course called Advanced Problems in Science (APS). It's not your typical science class, with lessons and daily homework. In this class, the students spend the year becoming researchers. They hone in on a research question, craft a research plan, and work with local scientists and researchers to try to analyze their data and answer their question in time to present their results at the state science fair in March.

Working under the official rules of the Society for Science, which regulates high school-level research, Kelly's students have to make sure their projects meet the ethics and safety standards. The Science Fair Review committee at the University of Montana looks over each student's research plan to ensure all potential risks are addressed. But as long as those requirements are met, and any preapproval hoops are jumped through, students can focus on anything that captures their interest, with time and money the limiting factors. That leaves room for a wide range of possibilities, and Kelly has delighted in seeing what her students come up with.

"If I have 12 students, I've got 12 different projects," says Kelly. "It's been really fun for me. I get to experience all these other types of research and see all this cool stuff that's happening, even just in our town." One student explored how makeup interacts with the microbiome, culturing bacteria and testing several brands of concealer on it to see how the bacteria was affected. Another student worked at the MPG Ranch in the Bitterroot, attempting a genealogical study on the wild horse herd that hangs out there. Yet another student tested out a technique for crystallization his first year, then, the following year, tried to crystallize molecules that had never been crystallized before. Other students do trout surveys in the Clark Fork River and other local waterways, study stress in dogs at the Humane Society, do neuroscience research using fruit flies in a lab at the University of Montana, survey native and invasive water lily populations in the Clearwater River, and run psychology projects on their fellow students.



Above: Carter Aune collecting water quality data this past summer for his project looking at the decomposition of cottonwood leaves, which he will be presenting at the 2027 Montana Science Fair.



Left: Adaline Schick working at MPG Ranch on her feral horse population study.

Because the APS class is open to sophomores, juniors, and seniors, students have the opportunity to take it multiple years. Some who do so dig deeper into their projects, asking more complex questions, while others try something totally new. Getting to take the class for a second or third year is particularly beneficial for students who are interested in projects involving nature—plant surveys, bird population studies, etc.—because many of those are best done in the summer, and students can start developing those projects the year before.

What makes this class so special, beyond the fun challenge of crafting their own research projects, is that all of these students have the opportunity to work with professional scientists, from wildlife biologists to chemists to neuroscientists. And though APS is offered at all the Missoula high schools and was well established long before Kelly began teaching it, it took time for her to develop her now-robust network of mentors.



Left: Nathan Mizner presenting his project, "Encapsulated Microdroplet Crystallization of Anion Binding Higher Order Helices," at the 2026 Montana Science Fair.

Below: Lily Khang standing next to her poster at the 2025 International Science and Engineering Fair in Columbus, Ohio. Lily won 3rd place at the 2025 Montana Science Fair, which qualified her to compete at ISEF.



Left: Lucy Pfahler putting a urine sample in a container to send off for testing, as part of her study, "Analyzing cortisol level for evidence of stress reduction in shelter dogs after a walk."

"In the beginning, it was definitely a lot of cold emailing," she says. But eventually, as she found mentors in various fields to work with her students, she created an ever-larger network of local scientists

to reach out to when new ideas come up. "Finding a mentor for every student is one of the harder pieces," Kelly says. "But it's been really amazing. There's been a ton of support for helping these young students learn and become researchers."

One of the things the students learn is that having a plan doesn't mean things are going to go according to plan. The student studying the wild horses at MPG hoped to be able to collect their manure for DNA testing—but the stallion wouldn't let her near the herd. The student trying to crystallize new molecules tried again and again—and it never quite worked. "A lot of science is finding out what you don't know," says Kelly. "Which is still knowledge. The next person comes in and knows what didn't work, and skips those steps. It's hugely helpful. Sometimes the students get upset. But that's learning, too."

The final step for the students is sharing what they found—first in an oral presentation to their fellow students, and then in a poster at the state science fair, hosted each spring at the University of Montana. This sharing is an important part of the process, both for adding to the larger body of scientific knowledge and for students to see that science happens in community. The science fair gives them the opportunity to meet student researchers from other schools around the state and talk to—and get feedback from—the judges, who are all scientists themselves. On top of that, there's the possibility of earning prizes, including one of the top three spots, which means a paid trip to present at the U.S.-hosted International Science and Engineering Fair in May.

It's not only the APS class that provides opportunities for research, however. Sentinel has a robust science



department with ten teachers, and other classes include the usual Earth Science, Biology, and Chemistry, but also Astronomy, Anatomy & Physiology, Wildlife Biology, AP Physics 1 and 2, AP Chemistry, AP Biology, and AP Environmental Science. Chemistry students design and conduct their own air quality projects as part of UM's SPARK program, while Biology students have researched recommendations for planting native plants on the school grounds and the surrounding megapark complex (Playfair Park, the Fairgrounds, YMCA, etc.). The AP Environmental Science class does a yearly spring service project with the Rocky Mountain Gardens, and Wildlife Biology students worked with FWP last year to survey Missoulians about the urban deer population. A number of students take more than the required amount of science classes, sometimes two or three a year—not surprising, considering the unique, hands-on research opportunities many of these classes offer.

Kelly loves being part of a team that provides such diverse opportunities for the students and seeing them grow and learn throughout the year. And, as she guides her students through their projects, month after month and year after year, Kelly finds herself learning right along with them. "I'm always learning," she says. "And I can't predict what I'm going to learn every year. It is really fun." 🐦

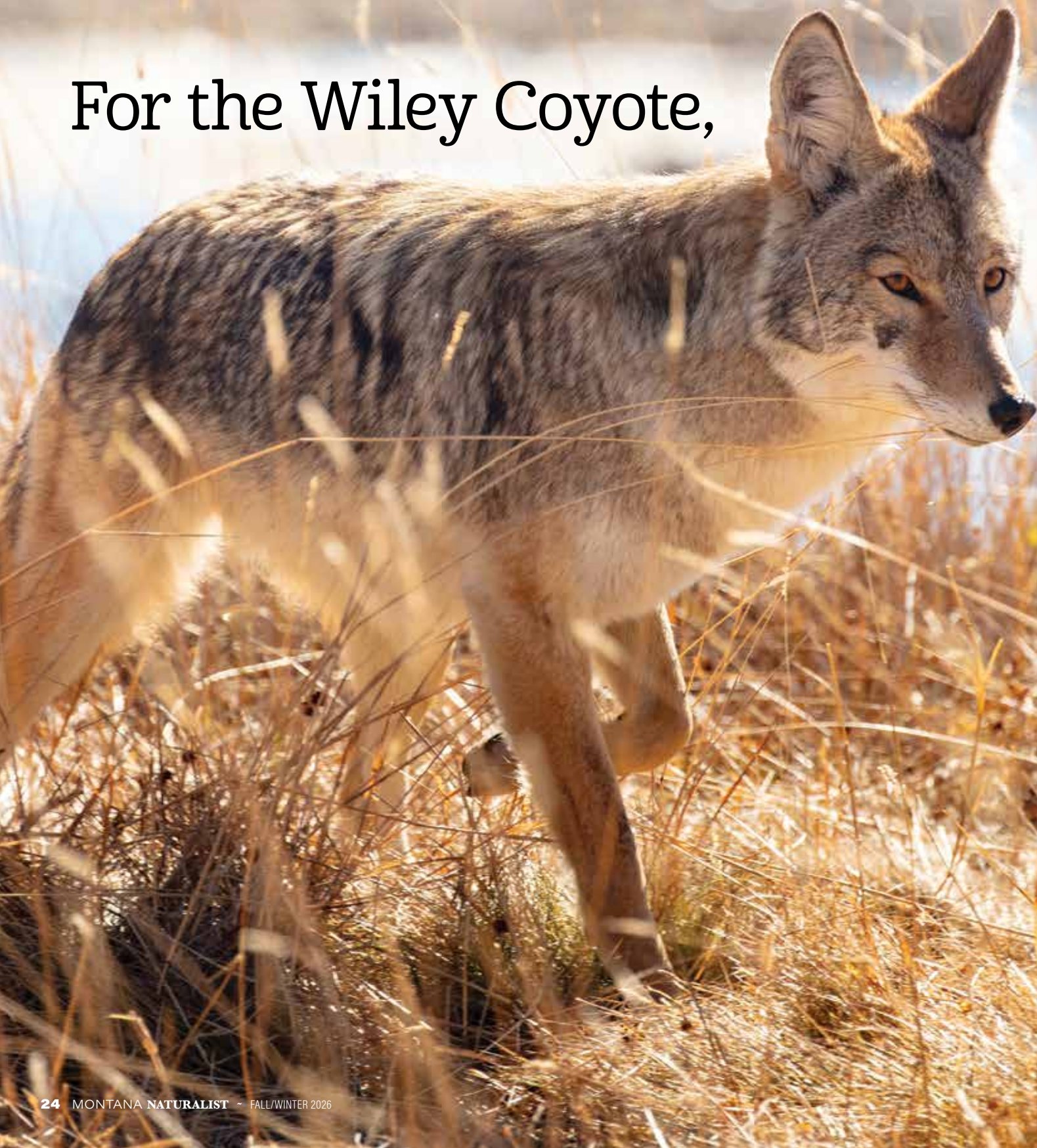
Want to get involved? Kelly is always looking to expand her mentor network of local science professionals for student projects.

Interested in being one? Contact her at kjnelson@mcpst.org.

You can also help with the Montana Science Fair! Hosted by the University of Montana every March, they're looking for people with science backgrounds to be judges, and also general volunteers to help the event run smoothly. Visit umt.edu/montana-science-fair/ for more information.

far afield

For the Wiley Coyote,





Resistance Is Fertile

BY DARBY MINOW SMITH

As a cattle rancher in southwestern Montana, I shouldn't admit to respect that borders on fondness for the coyote.

Across the U.S., a long-despised enemy slinks farther and farther. We've tried all sorts of weapons against this foe—poisons and helicopters, bullets and snares. We've held killing competitions and dedicated wildlife officers to figuring out how to best exterminate it. Our disdain and frustration is reflected in words, calling it trickster, vermin, desperado. It's not even worthy of fleas, said Mark Twain. And yet, for all our efforts, the prairie wolf, the coyote, trots into new territory, and swells in numbers.

As a cattle rancher in southwestern Montana, I shouldn't admit to respect that borders on fondness for the coyote. I often see the animal when we move cows across the rolling land below the Elkhorn Mountains. A lone coyote sits and watches as the herd streams by. Horses, cows, dogs, calves, people—we, the mostly domesticated—turn back our heads to take in its wholly feral stare.

We haven't allowed wholesale shooting of the coyote on our ranch for decades. If an individual starts harassing calves, that's one thing, but my dad turns away

neighbors and friends who want to do us a favor by shooting the animal for sport. My dad likes them too, he admits, sees them as a way that the ecosystem keeps everything cleaned up and balanced, including the pesky ground squirrel population.

It turns out all that killing is counterproductive, anyway. In

places with high rates of coyote hunting, the population rebounds and often surges. By killing coyotes, there is less competition for food, and so the surviving females have larger litters. Coyotes are creatures who can either be solitary or live in packs, and so, under intense hunting pressure, they split off. In order to avoid territory overlap, those coyotes expand into new areas. And so, in our efforts to kill the coyote, we've not only boosted their numbers, we've pushed them farther, their range expanding from Alaska to Panama, from prairie to strip mall parking lot.

We're usually better at killing off things, the wolf being a prime example. The coyote watched their cousins' near-extirpation, and rushed in to fill the ecological hole with yipping snarling kin. It wasn't just the predators that disappeared. Due to overhunting and habitat pressure from the first white settlers, my people among them, this valley was nearly emptied of wildlife by the early 1900s. In black and white photographs, men unload replacement elk from a train car from Yellowstone. Now, in the spring, a boom shakes the hay yards, in an attempt to chase off the hungry results of that successful reintroduction. Now, elk, coyotes, people grumble over the wolf pack padding through the Elkhorns. There's a push/pull with most wild animals—eradication, ecological vacuums, regrets, attempts to make it right, and resulting blowback. Coyotes just turned up their noses at the typical Western animal story.

The historian Dan Flores followed the coyote from its appearance as a god in the oldest American stories to its relentless expansion today. He pointed out that to simply call the coyote a trickster is to miss much of the mystic about them. In the old stories, the coyote is both hero and fool, trickster and wise. Flores called their lonesome, defiant call, "the original American anthem."

Most of us live in the respectable world, of efficiencies and spreadsheets. Where we are good at killing off things, often too good. We think we know the story, even if it's a brutal one, of bullets and cyanide. We are the exceptional species, who decides what lives, dies, is traded on the global market.

That, of course, isn't the only world. Another world slinks along the fencelines. It doesn't care about our tidy beliefs in cause and effect, our proudly held dominion over nature. At twilight, from my house in the sage, I hear the underdogs singing out to each other. Sometimes, I swear, it almost sounds like laughter. 🐾

— Darby Minow Smith ranches and writes in southwestern Montana.

NPS/JACOB W. FRANK

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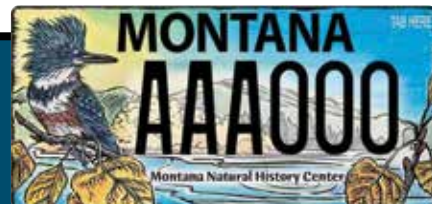
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Great Blue Heron (Ardea Herodias)

Diet: Mainly fish, but also frogs, salamanders, turtles, snakes, insects, rodents and small water birds. Solitary Hunter.

Location:

Clark Fork River.
Forages in any calm, fresh waters or slow-moving rivers, and also in shallow coastal bays. Highly adaptable. Thrives in subtropical mangrove swamps and desert rivers to the S. Ark. coastline.



Behavior:

Slowly wading, neck outstretched, stumbled once, lifted one wing to 'correct' itself.
Stands very still most of the time, occasionally stretching neck straight up like a telescope.

Sometimes a "bottom heavy"

Cedar Waxwing (Bombycilla cedrorum)

Diet: Feeds mainly on fruits year round.
Eg: Cedarberry, honeysuckle, juniper, hawthorn, dogwoods and winterberry

In summer, supplements with insects, as well as tree buds, sap, and flowers.

Location:

Loves open wooded or brushy habitat
Perches fairly conspicuously.



Departed in tight flock of 20-30.
Synchronized movement

Song:
Thin, sharp whistle.
Very high "sreeee!"

Amy Thomas is an artist and Master Naturalist who lives and works in Missoula, Montana. She enjoys creating, birding, phenology, and savoring the little joys of each turn of the season.



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