



Montana Natural History Center

Spring/Summer 2020

MONTANA Naturalist

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



Bison and Biodiversity: History of a Keystone Species

Heartbeats & Hibernation | All About Antlions | Birding in Spain and Montana | Visions of Earth

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Cover – A Bullock's Oriole (*Icterus bullockii*) perches on a branch above Pauline Creek at the National Bison Range on a gorgeous June day. Bullock's Orioles are summer residents in Montana. Photo by Merle Ann Loman, amontanaview.com.

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COMMUNITY FOCUS

Working for Wilderness:
The Great Burn Conservation Alliance

BY ALLISON DE JONG



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tidings

Late last summer I hiked, with my husband, son, and three friends, into Kid Lake in the Great Burn Recommended Wilderness. The landscape was stunning: rocky ridges stretching into the distance, blue sky arcing above the glimmering jewel of the lake, and the scent of fir and warm earth and ripe huckleberries infusing the air. A two-hour drive followed by an easy two-mile hike brought us to a beautifully wild place. My 16-month-old son and our friends' four-year-old daughter loved it. They ate huckleberries off the bushes and splashed in the lake all afternoon and had to be dragged away, sun-kissed and dripping.

These wild places exist in spite of us.

These magnificent, unique landscapes are home to wolverines and pikas, alpine larches and beargrass, glacier-carved valleys and sparkling streams, and so much more. When I visit our wild places, I am constantly in awe of their diversity and allure, and that of the wild creatures that inhabit them.

This issue honors such wildness and variety. From biologist Gil Gale's exploration of bison and their fascinating history—species diverging and converging and diverging again amidst a backdrop of ice sheets and warming periods (page 4)—to a conversation between three naturalists about the amazing adaptations of predatory antlion larvae (page 10), from writer Heather McKee's examination of heartbeats and their relationship to hibernation (page 8) to naturalist Peggy Cordell's familiar-yet-novel experience of birding in Spain (page 24), we are reminded of how wonderfully intricate and complex our world is. Our home. Our planet.

This year we celebrate the 50th anniversary of Earth Day (page 27): 50 years of recognizing, on a planet-wide scale, the importance of stewarding this beautiful blue marble we call home.

This spring, this summer, this year, let's celebrate our planet and this exquisite corner of it that we are so very lucky to call home. Let's celebrate by exploring it, reveling in it, seeking out its wild places and wild creatures and wild flowers.

And let's celebrate by stewarding it—so that all this wild tangle of beauty and diversity is still here when my son is the age I am now. When his children have children, and grandchildren—and beyond. So that, a hundred years in the future, they can splash around in Kid Lake in the Great Burn Wilderness, because it's still there, and still wild.

Here's to this planet, to our wild places, to us. Here's to actively loving it all.

Allison De Jong

EDITOR

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Enjoying warm sun and cool water at Kid Lake in the lovely wildlands of the Great Burn.

PHOTO BY KARA HANSON

BISON AND BIODIVERSITY: A CASE STUDY

BY GIL GALE

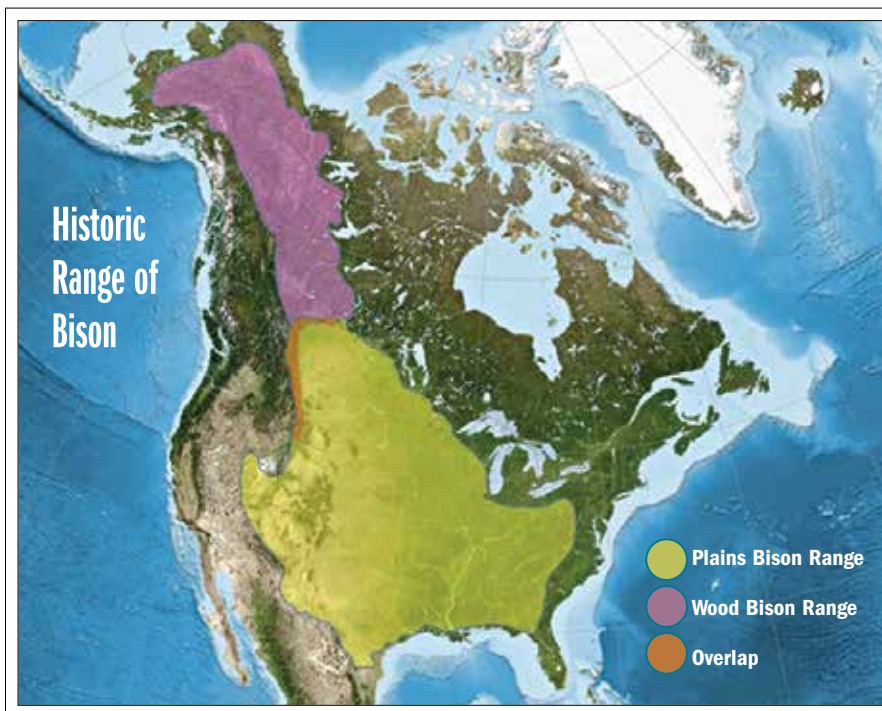
When the fires of August 2000 roared across the Bitterroot Valley and up over the Continental Divide, they left behind an intriguing relic exposed in the ashes high in the Anaconda-Pintler mountain range.

The discovery by one of the fire mop-up crews of a bison skull at over 8,000 feet triggered some interesting questions about what a plains bison was doing in a high-elevation forested zone so distant from any typical habitat. Did this animal represent something more significant than a wandering oddity?

It turns out that bison history and genetics are a bit more complex than many of us Montanans were probably aware. In our time, on the North American continent, there are two subspecies of bison, the plains bison (*Bison bison bison*), which dominated the Great Plains biome, and the northern latitude wood bison (*Bison bison athabascæ*), adapted to the boreal forests and meadow complexes of western Canada and into Alaska

(see historic range map). The bison skull exposed by the 2000 fire was most likely a plains bison. However, a few thousand years ago, it might have been a plains bison or a wood bison or a hybrid of the two.

The story of how bison arrived at their current subspecies genetic configuration coincides with the story of the advance and retreat of the ice sheets and glaciers of the Pleistocene and Holocene Epochs, starting two and a half million years ago and lasting right up to the present. And bison serve as just one featured character among countless



other species in the story that gives us a lesson about the evolutionary process and the importance of biological diversity.

A Utah Department of Natural Resources geological survey report (Major Ice Ages, 2010) reminds us that, believe it or not, we are actually still in the fifth major ice age of the planet's history. You would have to time travel back over two billion years (yes, that's "billion") to witness the beginning of the first major ice age.

Our planet hosts an inherent dynamism on the grandest of scales that

drives the life and death of the major ice ages. Periodic long-term shifts of the earth's plate tectonics, its orbit around the sun, and its tilt, coupled with occasional massive volcanic eruptions, all interact to produce a bewildering assemblage of past and potential long-term climate outcomes for the planet.

Chemical, geological, and paleontological evidence show that the four previous

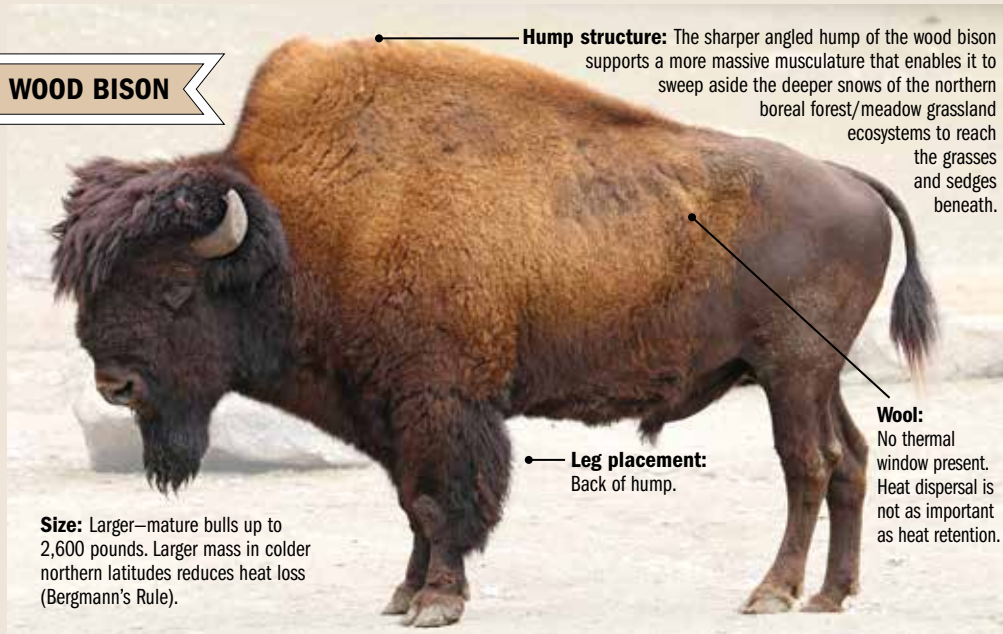
planet-wide ice ages weren't brief. They ranged in duration from 20 to 300 million years. Yet within each of these long ice ages there were multiple warming breaks called interglacial periods (lasting many tens of millions of years) when ice sheets and glaciers retreated and the earth got much hotter than it is now. Inevitably, cooling periods returned and glaciers and ice sheets surged back over lost ground. In North America, we are only about 10,000 years into one of the shorter warming interglacial periods, the Holocene Interglacial.

MAP: COURTESY OF WES OLSON

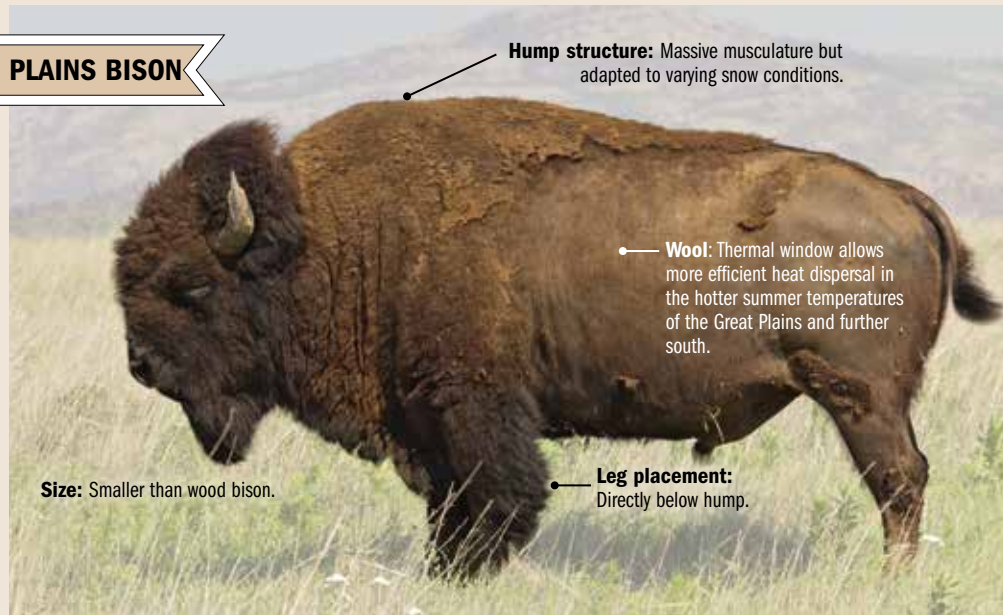


Wood vs Plains Bison: Unique Adaptations

WOOD BISON



PLAINS BISON



Other comparisons between the two subspecies include:

- ✱ Plains bison in much of the Great Plains drier steppe grassland will seek out windswept areas where the snowpack is lighter and the forage more accessible. Plains bison are often observed on ridgetops and exposed south-facing slopes in the wintertime, apparently unfazed by windchill temperatures dropping to -84°F.
- ✱ While both bison subspecies qualify as the largest terrestrial mammal in North America, the wood bison (bull = up to 2,600 pounds) is substantially larger on average than the plains bison (bull = up to 2,000 pounds). The difference in size is related to their habitats. The wood bison is thought to display more ancient characteristics similar to the earlier colonizer, *Bison priscus*.
- ✱ Research shows that wood bison display a higher level of alertness and skittishness in their boreal forest and meadow habitats than plains bison in their open grassland habitats.
- ✱ Despite these differences, the subspecies share many similar features. For example, there is an interesting and critical physiological similarity bubbling around in the digestive tracts of both subspecies that allows them to thrive when forage quality is low. Both bison types host a unique species of ciliate rumen bacteria that are highly efficient at breaking down and freeing the nutrients locked up in low-quality dried grasses. This feature gives bison the ability to process enough forage throughout the year to survive.

The current climate change trend gripping the earth is a wild card that humans have added to the deck. Even the best computer modeling can't accurately predict how this hand is going to play out. But the probability is high that it will have a lasting effect on the evolutionary process and biological diversity consequences on a global scale. Looking at the trend of the previous four planet-wide ice ages and the long-term warming periods between them, things were destined to get a lot hotter over the next many thousands of years anyway, but the human-caused climate change effects will accelerate that process significantly.

The geologic record shows that this fifth ice age in which we live was most likely triggered by the tectonic collision of the North and South American continents over two and a half million years ago. The formation of the Isthmus of Panama sealed off the flow of water between the Pacific and Atlantic oceans, disrupting the ocean currents that controlled long-term climate patterns.

Paleontology studies show that the first bison species (*Bison sivalensis*) started grazing on the European continent about the same time that the two American continents linked up. But to simplify the evolutionary story behind the bison we know today, we'll leapfrog through time to about 130,000 years before present (YBP) when the earliest North American ancestral bison, *Bison priscus*, pioneered its way across the Beringian land bridge from Siberia to Alaska. Hominids were still thousands of miles and continents away from North America when *B. priscus* made its journey.



At this point, *B. priscus* began shape-shifting its form in synchrony with the ebb and flow of the frozen glacial tides. The species started colonizing North America shortly before the onset of another cooling period (the Wisconsin Glacial). During the retreat/advance cycles that occurred within this glacial period, a corridor between the two major ice sheets (Laurentide and Cordilleran) on the continent would open, close, and change position multiple times. These cycles created pulses of movement of bison and other species up and down the eastern slopes of the Rocky Mountains from northwestern Canada and Alaska into central North America. When the ice walls closed in and pinched off movement along the corridor, the isolated populations of bison kept progressing along their separate evolutionary pathways. Biologist Wes Olson says that trying to make sense of the speciation process for bison is like trying to put together a “complex and confusing puzzle when you don’t know if pieces are missing... or even how many pieces there are.”

About 12,000 years ago, the Wisconsin Glacial Period started fading and the Holocene Interglacial warming period (the one we are in now) pushed the ice sheets back above the Arctic Circle, setting the

stage for the next round of bison evolution in North America.

From that time to the present, bison have evolved uninterrupted by glacial cooling cycles. *B. priscus* morphed into *B. latifrons* and *B. antiquus*. About 10,000 years ago, *B. antiquus* split into two subspecies molded by two different habitats. *B. bison antiquus* adapted itself to the grassland regions from western Canada to Mexico and Florida. *B. bison occidentalis* developed a preference and biology better suited to the northern meadows/grasslands from the upper Great Plains into British Columbia and Alaska but some also ventured southward and overlapped with *B. b. antiquus*. These two subspecies began to converge and hybridize by about 5,500 years ago into a single species, *Bison bison*.

Over the next few thousand years, *Bison bison*, through the mechanics of genetic variations, differing ecosystem opportunities, and environmental pressures, diverged in yet another subspecies split. This time the split produced the two subspecies alive today: *B. bison bison* (our plains bison), preferring the vast grassland biome of the Great Plains and beyond, all the way south to Mexico and east to the Appalachian Mountains; and *B. bison athabasca* (our wood bison) which is better adapted to the northern boreal forest

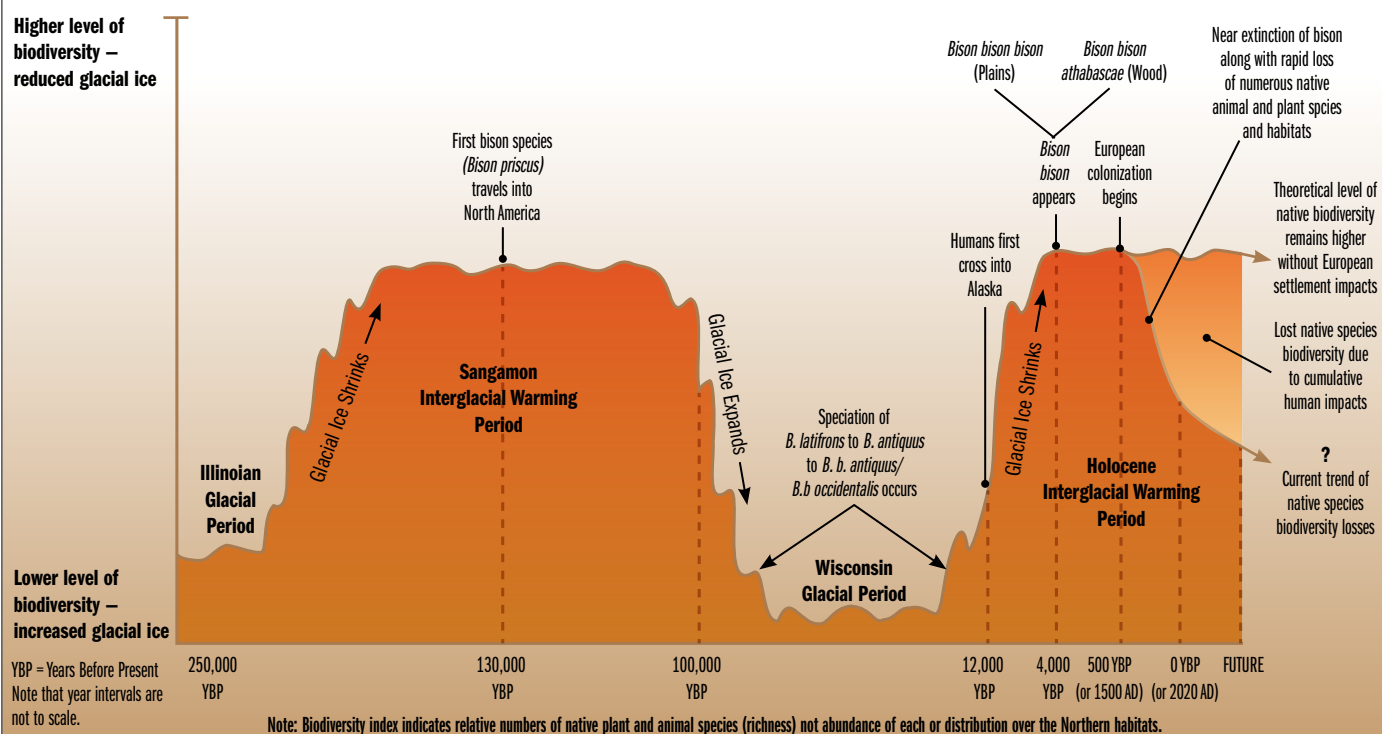
and meadow-grassland complexes of Alaska, the Northwest Territories, Yukon, Alberta, and into northwestern Saskatchewan.

The speciation journey of bison is a living example of how organisms adapt to changing conditions and add to the richness of biodiversity on the landscape. Make the mistake of habitually sweeping away the building blocks of that genetic diversity and evolutionary adaptiveness by repeatedly eliminating species and you eventually end up with a biologically homogenized, impoverished landscape, a land absent of the harmonically rich multiplicity of interacting species.

The conceptual biodiversity graph (below) shows, on the far right side, how the adaptive and evolutionary process was derailed by the arrival of Europeans. Bison serve as one dramatic example of that problem.

Although each advance of a glacial period smothered and obliterated most life forms underneath their 5,000- to 10,000-foot-deep frozen masses, those kinds of uncontrollable natural extinctions are a normal part of life on the planet. Life forms always find a way to come back in some fashion. Biodiversity conservation

Conceptual Biodiversity Index for Bison Habitats of Canada & Northern United States Affected by Glacial Period Ice Sheets—All Species





becomes an issue in our time when human actions are causing species reductions and extinctions and threatening to permanently eliminate potential evolutionary and adaptive options.

Historically, bison were an enormous animal species in enormous numbers occupying an enormous amount of North American real estate while performing an enormous ecosystem-altering keystone role for thousands of years. In North America, no other species over the last 130,000 years can make that claim on a similar scale of ecological significance. Before the collapse of their historic range, the two subspecies roamed habitats covering millions of square miles (see historic range map).

Bison were the dominant keystone herbivore throughout most of North America for thousands of years. Keystone species perform a critical role in sustaining the overall structure and processes of an ecosystem and influencing which other types of plants and animals make up that ecosystem. Only a select number of species qualify as keystone, but all species fill a niche and a biodiversity function. Millions of elk and pronghorns shared a common habitat but did not play the same significant keystone role as bison. The keystone role makes a powerful example of the importance of maintaining biodiversity in general.

"Bison wallowed, rubbed, pounded and grazed the prairies into heterogeneous ecological habitats," writes conservation scientist Keith Aune. "Their role was essential to the ecology of the grasslands." We can see one specific example, among many, of that keystone function in the hundreds of millions of wallows that bison excavated to cool off, mudcake themselves against insects, and perform their rutting rituals. These wallows captured and held precious water, creating habitat for grassland birds, amphibians, insects, and smaller mammals over entire landscapes.

The American Phytopathological Society lists six good reasons to concern ourselves with promoting and conserving a healthy level of biodiversity on our planet. In no particular order: 1) ethical/spiritual/cultural reasons such as showing respect for and acknowledging a responsibility to steward

wildlife, plants, and landscapes; 2) aesthetic reasons such as recognition that nature possesses an inherent beauty; 3) ecosystem services which provide natural support systems for all species including humans; 4) material reasons which provide tangible economic benefits and products to humans; 5) continuance of the evolutionary process on genetic (individual/population) and ecological (ecosystem/biome) scales; and 6) insurance for the future by keeping all biological-based options open to serve the five previous purposes.

The destruction and alteration of the vast prairie and northern forest/meadow habitats by humans in so many ways (agriculture, forest harvest, roads, general

"BISON WALLOWED, RUBBED, POUNDED AND GRAZED THE PRAIRIES INTO HETEROGENOUS ECOLOGICAL HABITATS. THEIR ROLE WAS ESSENTIAL TO THE ECOLOGY OF THE GRASSLANDS." —KEITH AUNE

construction, urban-exurban expansion, mining, and the introduction of non-native invasive species) has impacted overall biodiversity more than the near-extinction of the keystone North American bison alone. However, the fall from prominence of this largest of all keystone species in North America intensifies the cumulative impacts. As Wes Olson points out, "the nearly complete extirpation of North American bison did irreparable harm to the stability and populations of a multitude of plants and animals."

The current bison conservation efforts involve preserving genetically pure subspecies through "conservation herds" and regaining at least a portion of the bison's rightful role as the dominant keystone heir to the grassland biome. The conservation herds of wood and plains bison today carry only a tiny fraction of the DNA bank and variations available for the raw material that allows the evolution of a species to progress. The combined number of plains bison in genetically pure conservation herds now number about 20,000 individuals. The remnant wood bison

conservation herds now number about 7,000. In other words, 99.999 percent of the native genome plains bison (that once numbered over 30 million) and 99.96 percent of the native genome wood bison (that once numbered about 170,000) were mass slaughtered in the 30-year surge of European colonization west of the Mississippi River between 1860 and 1890.

The recovery picture is even more complicated because, in efforts to create the ultimate rangeland animal, ranchers have introduced cattle DNA into their private bison herds. Now many of the 450,000 bison outside the conservation herds carry a small percentage of cattle DNA. Yet had the bison rescue and preservation effort of both subspecies never occurred, then the hope of recovering even a fraction of the complex ecological functions and evolutionary pathways of these original biomes would have been lost for all time.

After years of work by a coalition of conservation groups, Congress unanimously passed and President Obama signed the bipartisan National Bison Legacy Act in April 2016, which established the bison as America's national mammal.

This iconic charismatic species in a world of shrinking biological diversity was pulled back from the brink of extinction by the perception and action of a few individuals and small groups. They understood Aldo Leopold's caution, made over 70 years ago, that the only common-sense way to "tinker" with the natural world responsibly, ethically, and sustainably is to make sure you save all the parts. As we try to manage this planet from which so many parts, from the tiny to the keystone, are rapidly disappearing, this is an increasingly challenging task—and an increasingly essential one. 🦏

—After a long career with the U.S. Forest Service as a rangeland manager and ecologist, Gil Gale continues an active role in the effort to conserve biological diversity.

ADDITIONAL INFORMATION WEBSITES:

American Bison Society: ambisonsociety.org

Wildlife Conservation Society: wcs.org

Ancestral Bison Conservation Society: ancestralbisonconservation.org

COSEWIC Report 2013 (Committee on the Status of Endangered Wildlife in Canada: Wood and Plains Bison)

HEARTBEATS AND HIBERNATION IN THE ROCKIES

BY HEATHER MCKEE



WHOOSHoop. WHOOSHoop. WHOOSHoop.

It can sound like distant thunder, the ocean, metal flexing, or a bass drum. It's the first sound mammals hear—a mother's heartbeat pushing through the placenta. From there, the heartbeat becomes a metronome for life. *Allegro*. Excitement. *Adagio*. Relaxation.

We are familiar with our own variations in heartbeat, normally 60 to 100 beats per minute (bpm). But for other species in Montana, that range can be far wilder, particularly during the extremes of the seasons and the animal behavior associated with them.

In the icy winters of Montana, when food and warmth are scarce, some animals descend into torpor, reducing their energy use through slowed metabolism and decreased body temperatures. There are a wide variety of states of torpor—some animals can descend involuntarily into a daily torpor, like bats and hummingbirds. On a cold night, a hummingbird's heart rate may drop from more than 1,000bpm to only 50bpm.

Other animals descend into lengthier torpors in the coldest months, reducing their body temperatures to nearly the ambient temperature, and slowing their metabolisms to less than ten or even five percent of normal. These are the animals we call true hibernators. In general and worldwide, the larger the animal, the more capability there often is for hibernation.

You might think bears are examples of true hibernators, but even they have some surprises. Although we don't share their ability to deeply rest, the bear's heart is uncannily similar to ours.

WHOOSH. Bisecting the heart, the atrioventricular valves snap shut behind a blast of blood to the ventricles. *oop.* The smaller semilunar valves perched at the boundaries to the lungs and body swirl shut. **WHOOSHoop. WHOOSHoop. WHOOSHoop.**

If you were to rest your head on a bear's chest and listen for a heartbeat while it was in hibernation (I wouldn't; read on to find out why) you might wonder if it was still alive. Garrett Tovey, Citizen Science Specialist for Yellowstone Forever and former wildlife biologist for state and federal agencies, says Yellowstone National Park bear heart rates decrease from about 80-90bpm during active seasons to 8-19bpm during hibernation. Breathing slows to only a breath per minute.

Scientists in Yellowstone are beginning to believe bears may actually be "super hibernators"—named so for their ability to hibernate while keeping a fairly high body temperature. This means they can mobilize nearly *instantaneously* from lethargy—likely an adaptation to be able to protect winter-born young.

"A bear's heart rate can increase from less than 10bpm to over 100bpm within seconds of being disturbed," Tovey says. A rapid tempo change. "I've seen griz wake up and take over a wolf kill midwinter. It's not a comatose state, more of a lethargic state."

Of course, you can also just simply *freeze* in winter. Boreal chorus frogs creep under logs and freeze solid—or nearly so. No heartbeat. No breathing. Dead? Alive? Dead? Alive? Exploring heartbeats and hibernation expands our concept of those two apparent poles.

Tovey explains that the chorus frogs increase the sugars in their blood by 200 percent to enter hibernation. These frogs reduce the water in their cells and organs to prevent bursting when the temperatures drop below freezing, then mobilize glycogen from their livers to flood their blood with simple sugars. This glucose reduces the freezing point of the fluids inside their cells and organs, and the water is directed to pockets under the skin to freeze.

Butterflies, too, use the sugar trick. Insects do not have blood, per se. But their bodies are filled with a nutritious slush, called

hemolymph, that swirls nutrients around inside their bodies, propelled by multiple tiny, rudimentary hearts. So, behind a wedge of bark, adult butterflies like the delicate Milbert's tortoiseshell can survive through winter with their hemolymph flooded with glucose.

So, do *any* animals actually fit our standard definition of a true hibernator? The ground squirrels and bats of Montana do—experiencing the reduced metabolism and drastically lowered body temperature of torpor for extended periods of time. A ground squirrel's heart rate may drop from 400bpm to just five or six during its hibernation, and its body temperature can dwindle to nearly freezing. Its waking process can take hours.

With no fresh green grass and few of their predators hibernating, simply being mostly dormant and hidden under the snow can increase an animal's life expectancy by five times that of non-hibernators in winter. Many tiny rodents are not as lucky as the ground squirrel, and must remain active under the snow through winter, leaping through snow-insulated tunnels to their larders.

Many animals migrate, transform, or eke out a hard living in barren Montana winters, and many of them don't survive—their bodies and hearts freezing into the snow and becoming food for the survivors.

Despite the paucity of winter, surprisingly few animals actually hibernate in Montana. The truth is that significant anatomical adaptations have to happen for an animal to opt out of winter. From sugar-loading in butterflies to metabolic recycling in black bears, the ability to be active in only the productive months of the Rocky Mountains is complicated, specialized, and valuable.

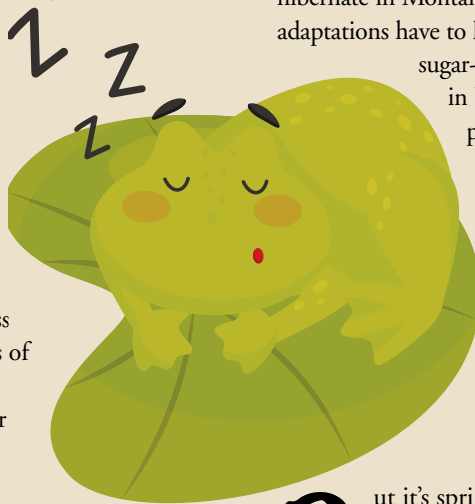
Children's picture books show animals tucking blankets around themselves, looking forward to a long winter's nap, but in real, wild life, hibernation is a stark and essential survival technique with little padding or room for error. A bat that is woken up only once during its hibernation can lose precious fat reserves and starve over the remaining months.

But it's spring now. The winter is nearly behind all of us. Bears and their new cubs are blinking at the cracks of bright light seeping into their dens, rays of light are slipping behind bark where butterflies are hidden, and slow warmth is thawing the detritus where chorus frogs are sequestered. Ground squirrels are furiously shivering to kickstart their hearts.

It is time to be active again.

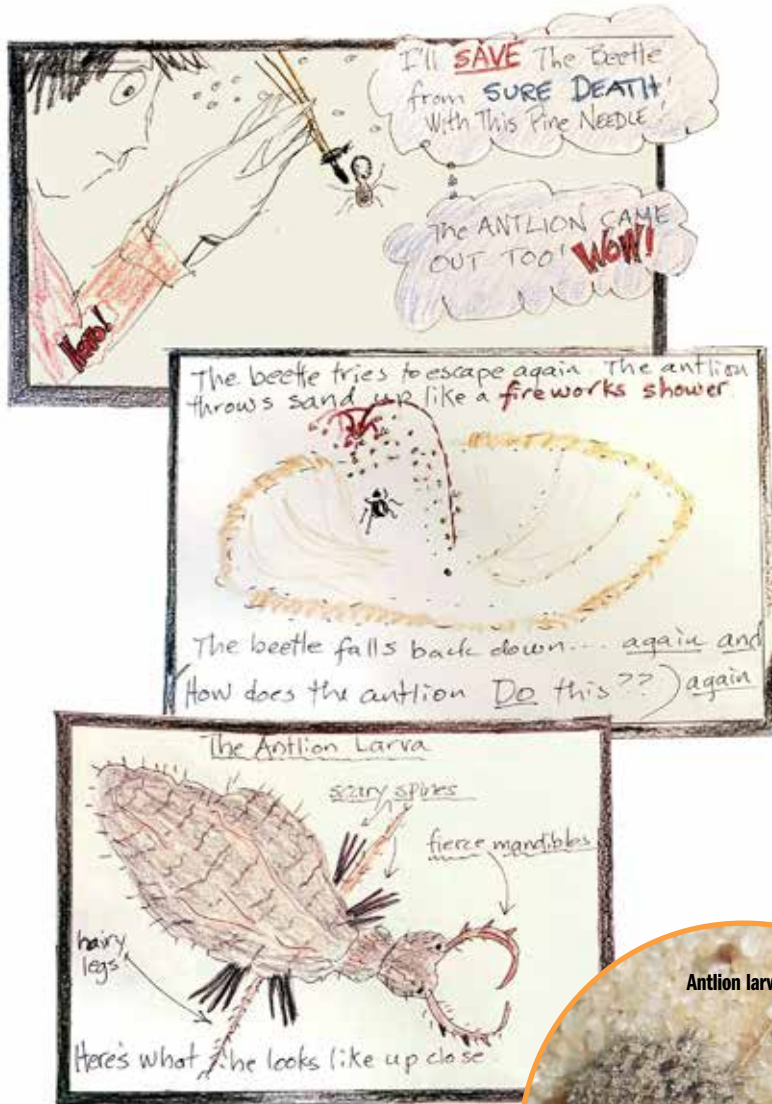
WHOOSHoop. WHOOSHoop. WHOOSHoop. 

—Heather McKee is a science communicator and educator working as the Content Creator at Ecology Project International in Missoula, Montana. She has an M.S. in Environmental Studies from the University of Montana and is a Certified Interpretive Guide through the National Association of Interpreters.



Antlions: A Conversation of Observations | August 2019

WITH ELLEN KNIGHT, KRISTI DUBOIS, AND GLENN MARANGELO



From Ellen Knight, lifelong naturalist:

I have long wanted to see an antlion, so when I found several of their little pits along the Rattlesnake Trail, I explored further. I found three pits, each with a small beetle in it, trying to climb out. First the sand would fall out from under their scrambling legs. Then the antlion, buried at the bottom of the pit, would somehow rapid-fire sand up onto the insect, causing it to lose its footing and fall back down. Finally, when the insect was at the bottom of the pit again, the antlion (from below the sand) would grab the insect with its very ferocious pincers and hold on tight. Sometimes its head would emerge just enough so that it could thrash the insect back and forth vigorously. Absolutely amazing.

I decided to help one of the beetles by lifting it out of the pit. It seemed to be attached to something... which turned out to be the antlion claspng it tightly. The antlion is now in the freezer so I can observe it more closely. The beetle is running free.



Antlion larva



Antlion pits

ALL ABOUT ANTLIONS:

- Antlions are in the order Neuroptera. Only those in the genus *Myrmeleon* dig pits (the rest simply lie in wait just beneath the surface, waiting for prey).
- Antlions are named for the big, piercing jaws that the larvae have. The larvae are also sometimes called “sand dragons” or “doodlebugs.”
- The larvae prefer dry, fine, sandy soil, where they can dig their conical pits for trapping insects.
- To dig the pit, they burrow backwards in a circle, using their heads to toss up sand to one side until the pit reaches the angle of repose—the steepest angle at which the sides remain stable and won’t come tumbling down.
- Antlion pits can be up to two inches wide and two inches deep.
- Look for groups of pits at the base of trees, under bridges or rock ledges, or even in dirt floors in old barns.

DRAWINGS BY ELLEN KNIGHT

ANTLION PHOTO BY GLENN MARANGELO; PIT PHOTO BY ELLEN KNIGHT



From Kristi DuBois, wildlife biologist for Montana Fish, Wildlife & Parks:

Antlions are so cool! We had a lot of them in eastern Montana at the base of sandstone cliffs. It is harder to find good sandy spots for them around Missoula.

The adults are every bit as cool as the larvae. They fly at night, so it is also hard to see them. Here is one we found while mist-netting for bats at the Beartooth Wildlife Management Area years ago.

From Glenn Marangelo, co-founder of the Missoula Insectarium:

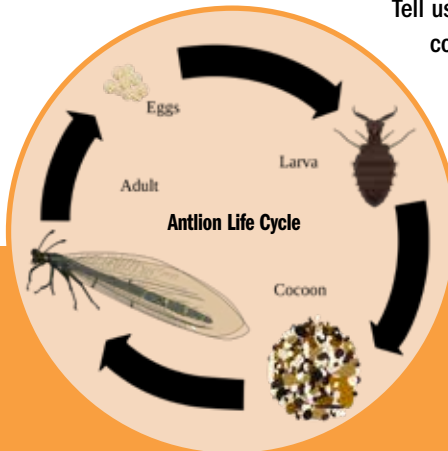
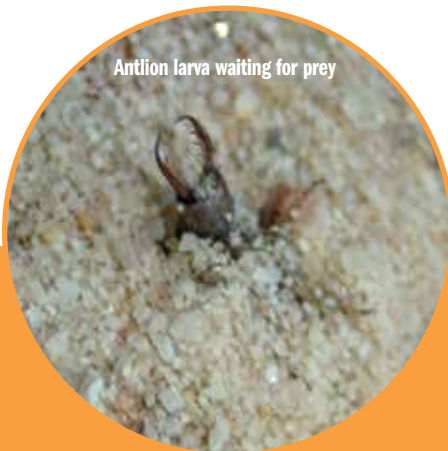
They are so incredible to watch in action. I raised about a dozen of them one summer and they were fun to feed each day. They are pretty amazing in every stage of life—here's what's left after they emerge from their "pupal ball."

For more information, check out the Missoula Insectarium's Bug Bytes podcast episode on antlions: mtrp.org/post/bug-bytes-antlions



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

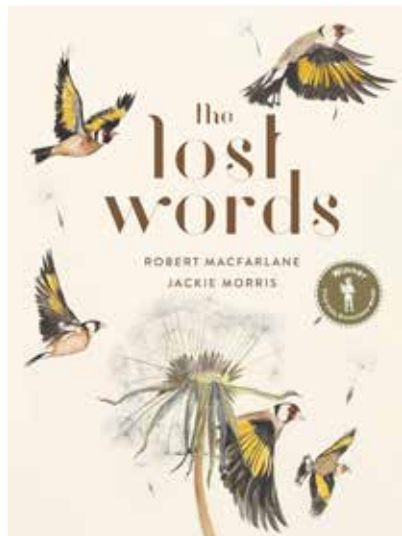
Tell us about the natural history of your place—and it could get published! Send your Naturalist Notes (up to 350 words) and a photo or drawing, if you wish, to Allison De Jong, Editor, at adejong@MontanaNaturalist.org.



- Antlions lie in wait at the bottom of their pit, buried in the sand with only their jaws peeking out.
- When small insects (often ants) begin tumbling down the slope into the pit, the antlion will shower them with sand—it looks like fireworks!—to hasten the prey's descent.

- The antlion sucks its prey dry, then throws out the carcass and reconstructs the pit.
- The larval stage, during which the larvae will molt three times, lasts for two to three years. As the larvae grow, they will dig larger pits and capture larger prey.

- In the spring or summer, the larvae pupate in a spherical cocoon made of sand and silk, sometimes buried a couple of inches in the sand.
- The adults emerge from their pupal case after about four weeks as delicate, beautiful, damselfly-like creatures with clear or spotted lacy wings.
- Adult antlions live for about a month, during which they feed on nectar and pollen, mate, and the females lay eggs in dirt or sand, just beneath the surface.



Book Review:

The Lost Words: A Spell Book

by Robert Macfarlane and Jackie Morris

Words describing natural phenomena are starting to slip from our collective vocabulary. *Acorn*, *otter*, *kingfisher* are sinking out of sight, replaced by *meme*, *vlog*, *cryptocurrency*. In 2015 around 50 natural history words were removed from the Oxford children's dictionary to make room for words describing technology. What happens when we forget—or, worse, when we never learn—what an adder is, or a bramble, or a dandelion?

Nature writer Robert Macfarlane and children's author and illustrator Jackie Morris crafted this beautiful book to honor twenty of these "lost words"—to honor them, but also to bring them back through lovely, evocative illustrations and lyrical acrostic poems. Robert and Jackie call this a spell book, its poetry and images summoning the lost words back into our language, our landscape, our hearts. Reading this book is a magical experience for children aged 3 to 103.

Nature Writing Activity

Writing about nature is one way to ensure that it—and the words that describe it—remains rich and real in our lives. Try timed (nature) writing! Anyone can do this—it's a great activity for kids as well as adults. If it's a nice day, go outdoors with your notebook for a little extra inspiration.

Set a timer for 10 minutes. (Or five. Or two. Or twenty.)

Here are some writing prompts to get you started:

- Visualize a place in nature that you love. Be there. See the details. Now write about it. What colors are there, sounds, smells?
- What is your earliest memory of nature?
- Write about an experience in nature that changed your life (in big or small ways).
- If you were an element of nature, what would you be?
- Take an element of the natural world that you feel strongly about and write about it as though you love it. Then write about the same thing as though you hate it. Then write about it perfectly neutrally.
- Find or think of a natural object (leaf, insect, rock, bird), and write: "This reminds me of myself because...." Then do it again with another object. And another.
- Make a list of your nature obsessions.
- Make a list of questions you have about the natural world.
- Make a list of your favorite wild/natural places.
- Make a list of your favorite individual trees.
- Mud. Stars. Flesh.
- Wind. Mountain. Light.
- Taste. Moonlight. Summer.
- Start with "I remember" and keep writing memories that take place in nature. You can dive into one memory or make a list. Or both.

If you write something you're interested in sharing, please send it to adejong@MontanaNaturalist.org, and we may publish it in a future issue!



Phenology is the study of timing: when Mountain Bluebirds return in the spring, or the first buttercup blooms, when larches put out their bright green needles, when ground squirrels wake from hibernation, when Osprey chicks hatch. This spring and summer, challenge yourself to a phenology scavenger hunt. Document your observations with a journal or camera (or both!). Go a step further and submit your data to iNaturalist or eBird!

Here are a few ideas to get you started, but feel free to add more!

_____ • First blooming flower that you see (what is it?) _____

First time you see blooming:

- _____ Buttercups
- _____ Yellowbells
- _____ Bitterroots
- _____ Lupine
- _____ Douglasia
- _____ Shooting stars
- _____ Serviceberry



Note when you saw your first:

- _____ Western Meadowlark
- _____ Mountain and Western Bluebirds
- _____ Western Tanager
- _____ Yellow Warbler
- _____ Osprey
- _____ Sandhill Crane
- _____ Northern Pintail
- _____ Mourning cloak butterfly
- _____ Spring azure butterfly
- _____ Bumblebee



More firsts:

- _____ • When did the snow disappear from Lolo Peak?
- _____ Mount Sentinel?
- _____ Your backyard?
- _____ • When was the last snowfall of the season?
- _____ • When did the western larches leaf out?
- _____ The alpine larches?
- _____ • When did you see your first baby bird this spring?
- _____ What was it?
- _____ • When did the Osprey hatch?
- _____ Canada geese?
- _____ Mallards?
- _____ Chickadees?



Happy observing!

Submit your observations to adejong@MontanaNaturalist.org for a chance to win a one-year family membership to MNHC!

Come up with your own!

Kids' Corner

Linda Manchester, Master Naturalist, and her granddaughter, Lila Farrell, love to journal and paint on their camping trips. Last summer they found an interesting old-growth Douglas-fir while hiking in the Pioneer Mountains east of Wisdom, Montana, and five-year-old Lila decided to paint it. Enjoy!



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.



get outside calendar



Programs for Kids Programs free with admission and/or membership.

MARCH

5, 12, 19, 26

miniNaturalist Pre-K Program, 10:00-11:00 a.m. *Wild River Animals.*

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

APRIL



2, 9, 16, 23, 30

miniNaturalist Pre-K Program, 10:00-11:00 a.m. *Welcome, Birds!*

11 Saturday Kids' Activity, drop in between 2:00 and 4:00 p.m. *Explore the Watershed.*

25 Saturday Kids' Activity, drop in between 2:00 and 4:00 p.m. *Explore the Watershed.*

MAY

7, 14, 21, 28

miniNaturalist Pre-K Program, 10:00-11:00 a.m. *Spring Surprises.*

9 Saturday Kids' Activity, drop in between 2:00 and 4:00 p.m. *Insect Investigations.*

23 Saturday Kids' Activity, drop in between 2:00 and 4:00 p.m. *Insect Investigations.*

JUNE

13 Adult/Child Naturalist Camp, 10:00 a.m.-3:00 p.m. *Rollicking Rivers.* \$85; \$75 MNHC members per adult/child pair. Registration required.

JULY

11 Adult/Child Naturalist Camp, 10:00 a.m.-3:00 p.m. *Birding Bonanza.* \$85; \$75 MNHC members per adult/child pair. Registration required.

23 Adult/Child Naturalist Camp, 10:00 a.m.-3:00 p.m. *Fun with Flora.* \$85; \$75 MNHC members per adult/child pair. Registration required.



AUGUST

6 Adult/Child Naturalist Camp, 10:00 a.m.-3:00 p.m. *Hooray for Habitat!* \$85; \$75 MNHC members per adult/child pair. Registration required.

SEPTEMBER

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

12 Saturday Kids' Activity, drop in between 2:00 and 4:00 p.m. *Slithery Snakes.*

26 Saturday Kids' Activity, drop in between 2:00 and 4:00 p.m. *Slithery Snakes.*



Learning from Nature as Observers and Scientists

Join Us for Our 2020 Lecture Series! Treading Lightly: Learning from Nature as Observers and Scientists

From time immemorial, humans have found ways to explore, learn from, and connect with the natural world. We do this in a variety of ways, some of which leave more footprints than others. Our 2020 lecture series explores how we can study and observe the natural world while doing our best to minimize our impact. Join us as biologists, philosophers, conservationists, and more share their work and their views on how to learn from nature while treading lightly.

Upcoming Speakers:

April 22nd: Karen Sippy & Ken Stolz

Living Museums: Learning in Missoula's Urban Forests

September 23rd: Cedar Mathers-Winn

The Language of the Wild: Studies in Animal Communication

October 14th: Christopher Preston

Treading Lightly in the Anthropocene

November 11th: Hosted by Marc Moss

Live Community Storytelling: Notes from the Field

\$5 members; \$10 non-members; students FREE. Tickets for fall lectures available August 1st.

Thank you to The Dram Shop for providing beer and wine for these events!

For more information and to purchase tickets, visit: [MontanaNaturalist.org/treading-lightly](https://montanaturalist.org/treading-lightly)



Volunteer Opportunities

MNHC's **BEETLES** (Better Environmental Education, Teaching, Learning, & Expertise Sharing) professional learning sessions are continuing through the spring!

FREE. For anyone interested in environmental education - please join us for any or all. For more information or to RSVP, contact Stephanie Potts at spotts@MontanaNaturalist.org.

MARCH 23

Nature and Practices of Science, 9:00 a.m.-12:00 p.m.

APRIL 20

Questioning Strategies, 9:00 a.m.-12:00 p.m.

APRIL 15

Volunteer Naturalist Training, 4:00-5:30 p.m. Learn how to teach kids about the flora and fauna of western Montana during the May VNS school field trips for 4th and 5th graders. No prior experience necessary.

SEPTEMBER 2

Volunteer Naturalist Orientation, 4:00-5:30 p.m. Introduction to volunteering with the Visiting Naturalist in the Schools Program. No prior experience necessary.

SEPTEMBER 16

Volunteer Naturalist Training, 4:00-5:30 p.m. Learn how to teach kids about the flora and fauna of western Montana during the May VNS school field trips for 4th and 5th graders. No prior experience necessary.



GOOD
FOOD
STORE

The Montana Natural History Center

thanks the

GOOD FOOD STORE

for sponsoring our 2020 lecture series -

TREADING LIGHTLY: LEARNING FROM NATURE AS OBSERVERS AND SCIENTISTS

APRIL:

Ospreys return

Look for
shooting stars,
yellowbells,
spring beauty,
Missoula phlox

MAY:

Western larches
are growing bright
green spring
needles

Listen for Western
Meadowlarks

JUNE:

Cutthroat trout
begin to spawnPronghorn fawns
are born

Listen for
chorus frogs

JULY:

Wild berries
begin to ripen

Look for the
summer triangle in
the night sky: Vega,
Deneb, and Altair

AUGUST:

Bull elk may begin
to spar

Pikas are
cutting and drying
grasses to store
for winter use

SEPTEMBER:

Last Cedar
Waxwings fledge
and shift diet
from insects
to berries

Milkweed goes
to seed



Adult Programs

APRIL

2, 9, 16, 23

**Nature Photography
Four-Part Course,**
9:00 a.m.-1:00 p.m. \$205;
\$195 MNHC members.
Registration required.

7, 14, 21, 28

**Stories in Stones:
Rock ID and Geology Primer
Four-Part Class,**
12:00-1:30 p.m. \$45;
\$40 MNHC members.
Registration required.



**8 Drop in with a Naturalist:
Drawing Signs of Spring with
Jenah Mead,**
10:00 a.m.-12:00 p.m.
Free with admission/
membership.

9 Evening Lecture,
7:00 p.m. *Wildflower Art
with the Native Plant
Society.* \$5 suggested
donation; free for CFNPS
and MNHC members.

**16 KettleHouse Community
UNite Fundraiser at the
Bonner Taproom,** 5:00-
8:00 p.m. Come drink a
beer (or three) and support
MNHC! MNHC receives \$1
from every pint purchased.

**22 Drop in with a Naturalist:
Drawing Signs of Spring with
Jenah Mead,**
10:00 a.m.-12:00 p.m.
Free with admission/
membership.

**22 Treating Lightly Lecture
Series: Living Museums:
Learning in Missoula's
Urban Forests with Karen
Sippy & Ken Stolz,** 7:00 p.m.
\$10; \$5 MNHC members;
students FREE.

**24-26 Master Astronomer
Train-the-Trainer Workshop,**
6:00 p.m. Friday-5:00 p.m.
Sunday. \$70. Registration
required.

**29 Sip & Sketch: LIVE Hawk
Gesture Drawing,** 7:00 p.m.
\$35; \$30 MNHC members.
Registration required.

MAY

**9 Discovery Day: Glacial
Lake Missoula Field Trip,**
9:00 a.m.-5:00 p.m. \$20;
\$15 MNHC and GLM
members. Registration
required.

**28 Summer Camp
Scholarship Luncheon,**
11:30 a.m.-1:00 p.m.
\$100. For more info and
to purchase tickets, visit
MontanaNaturalist.org.

**29-31 First Annual Nature
Journaling Conference
at the Montana Natural
History Center. FULL. Visit
MontanaNaturalist.org
for information on other
upcoming programs.**

JUNE

6 Naturalist Field Day,
10:00 a.m.-4:00 p.m.
*Plants in the Park with
Peter Lesica.* \$80;
\$70 MNHC members.
Registration required.

**8-12 Summer Montana
Master Naturalist Course.**
FULL. Visit MontanaNaturalist.
org for information on our
spring 2021 course.

AUGUST



8 Discovery Day,
10:00 a.m.-1:00 p.m.
*Monarchs in Montana:
Citizen Science! at the
Fort Missoula Native Plant
Garden.* \$10; \$5 MNHC
members. Registration
required.

**12 Paddlehead Baseball
Community Night,**
7:00 p.m. Come enjoy the
game and support MNHC!
MNHC receives 100% of
ticket proceeds purchased
through a special link on
our website. \$12.

SEPTEMBER

**23 Treating Lightly Lecture
Series: The Language of
the Wild: Studies in Animal
Communication with Cedar
Mathers-Winn,** 7:00 p.m.
\$10; \$5 MNHC members;
students FREE.

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

Admission Fees:
\$4/adults (18+), \$1/children (4-18),
\$8/family rate, Free/children under 4,
\$3/seniors and veterans
**FREE admission for MNHC members,
ASTC Travel Passport Members, and
EBT card holders!**

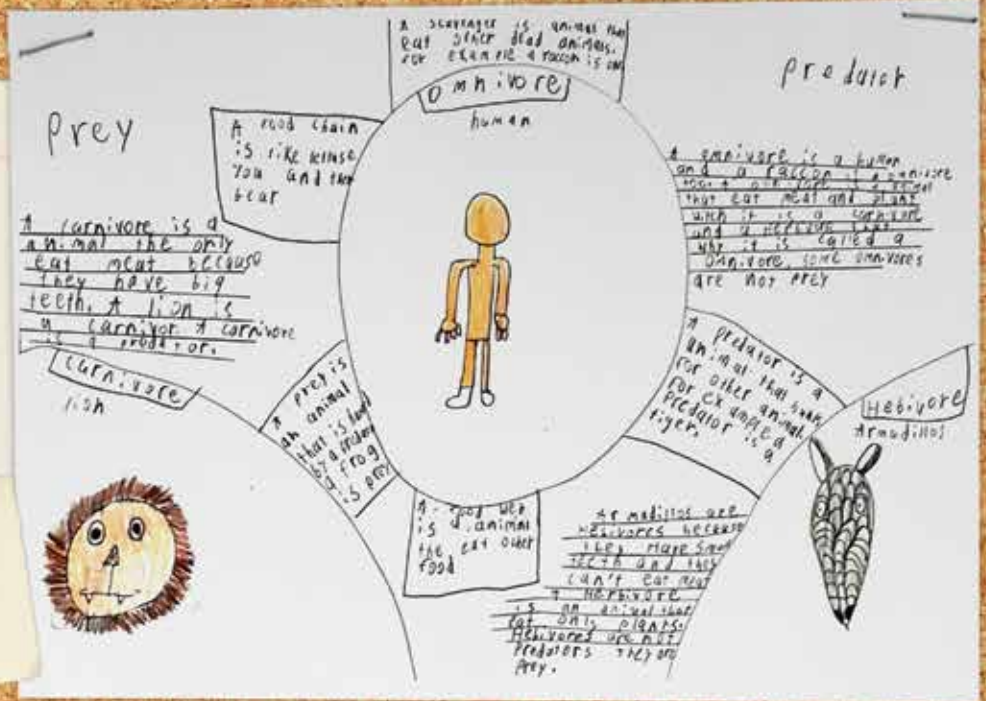
**Programs and events held at MNHC,
120 Hickory Street, unless otherwise noted.**
**Visit MontanaNaturalist.org to register for
programs and become a member. For more
information, call MNHC at 327.0405.**

*Programs subject to change. Please check our website
calendar for the most up-to-date information.*

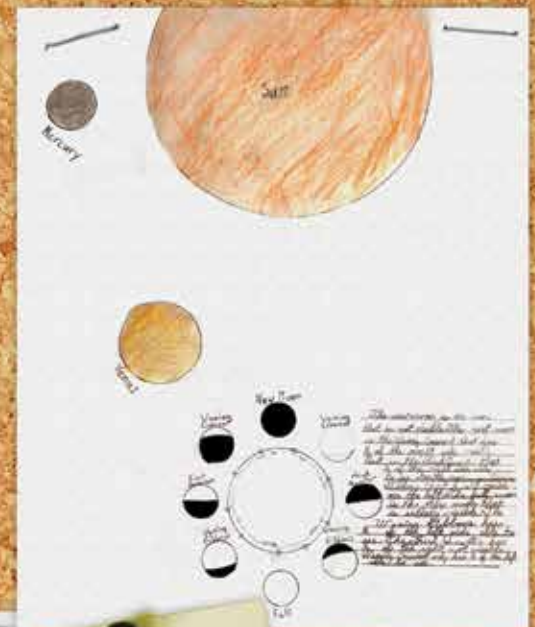
get outside guide

Courtney Fisher's 4th-grade class at Pablo Elementary School has been creating some lovely projects in their science lessons. We love working with Courtney and her students for our Visiting Naturalist in the Schools program. Enjoy this sampling of student work!

Omnivore/Herbivore/Carnivore
Above right by Miranda Draper
Below left by Jayleen Baca



| Carnivore | Omnivore | Herbivore |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| A carnivore is an animal that eats only meat. Carnivores mostly eat herbivores but they can eat omnivores and sometimes other carnivores. | A omnivore is a kind of animal that eats only plants, some plants and animals. herbivores have some omnivores will hunt there food like hunters that let some carnivores do them digest some food. | A herbivore eats only plants. Some herbivores have special digestive tract that let them digest some food. |
| Fennec Fox | Skunk | Deer |



Phases of the Moon
Above by Luke Horner
Left by Miranda Draper



CALLING ALL TEACHERS:



Are your students creating fun and interesting science/nature projects? We'd love to share their work in *Montana Naturalist*! Contact Allison at adejong@MontanaNaturalist.org for more information or to submit student work.

Farewell to Lisa Bickell

In December we said goodbye to Lisa Bickell, Education Director and longest-serving MNHC staff (Lisa interned at MNHC during college in 1999 and came on full time in 2004—when MNHC was still located out at Fort Missoula). We are deeply grateful for all that she has done

for MNHC in the past 15+ years! Lisa was instrumental in growing the Visiting Naturalist in the Schools Program; she shepherded dozens of teachers through our Forest For Every Classroom place-based educator workshops; she brainstormed, crafted, and supported new programs, exhibits, ideas, and partnerships; and throughout her decade and a half at MNHC was its most steady, shining light. We miss her, and are grateful that her new adventure—running her own business, Field to Frame Interpretive Design—means that she's still involved at MNHC, as we

continue to upgrade our natural history exhibits as well as create new ones. (Look for our Montana Fossils exhibit coming this summer!)

Thank you, Lisa, for lending MNHC your considerable talents, creativity, kindness, and enthusiasm for so many years. We wish you the best!



MNHC PHOTOS

Coming Soon: New Exhibits!

Come visit MNHC soon: we're adding three new exhibits in the spring and summer!

Have you ever come across tracks and signs left by other animals, like a deer? What about small animals like insects? The **Missoula Insectarium's** upcoming exhibit will be tracking the "little things." You'll discover clues left behind by a local insect and explore other examples using your different senses. Around a half dozen live exotic and native arthropods will be on display to further spark your curiosity and wonder. We can't wait to share this exhibit with you later this spring. Until then, pause to examine the miniature worlds that are all around you!

We'll also be switching out our current Naturalist Field Station exhibit for **Naturalist as Photographer**, featuring historic nature photography from the Wedemeyer Collection as well as modern nature photography from local artists. Like our previous installments in the Naturalist Field Station, this exhibit will be hands-on, experiential, and appealing to people of all ages. Come check it out!



Our biggest new exhibit focuses on **Montana Fossils**. Montana has a rich fossil record, representing nearly every major time period in Earth's history. Come learn how the diversity of life has adapted to Earth's changing geology and climate, leading to the forms we see today, and how studying the past may provide insight into the evolutionary future. This exhibit is the result of a collaboration with the University of Montana Paleontology Department, who is loaning us many specimens to complement our own collection.

New Summer Camp Offerings!

Every summer, MNHC connects hundreds of kids to nature through our Outdoor Discovery Day Camp programs. Our camps feature daily field trips, skilled instructors, unique opportunities to connect with scientists and naturalists, and lots of time for exploration and play in the outdoors.

This year, we're proud to respond to community demand by offering even more summer options for younger and older campers alike—from new half-day programs for elementary-aged campers to special in-depth experiences for middle schoolers. We're also offering new adult-child guided Naturalist Camp Days to help kids and their parents, grandparents, or other caregivers explore Montana's nature together.

You can learn more and register for camps on our website:

MontanaNaturalist.org/summer-camps/.

We hope to see you this summer!



MNHC PHOTOS

SPOTLIGHT:



We are thrilled to welcome Jennifer Robinson as our new Program Director!

◀ **Jennifer** grew up in the Sacramento Valley of California and spent her summers hiking, camping, and exploring the Sierra Nevada Mountains. Her love for the outdoors led her to work with youth in outdoor settings, and Jennifer spent many years volunteering and working as a naturalist at outdoor science schools, summer camps, and as an Interpretive Ranger at national parks in Alaska and California. She earned a B.S. in Environmental Education and Interpretation from Humboldt State University and continued on to earn multiple teaching licenses to blend her passion for education in and out of classroom. After college Jennifer spent six years working as an educator and Program Director for Sierra Nevada Journeys in Reno. Jennifer is now taking her passion of blending formal and informal education into nonprofit leadership and is obtaining her Masters of Educational Leadership at the University of Montana in Missoula. In her free time, Jennifer enjoys cooking meals with friends, going on hikes or walks with her dog Indy, and getting to know the community.

Welcome, Jennifer!

COURTESY OF JENNIFER ROBINSON

Drop in with a Naturalist

Join us for our exciting new program! From November-April, on the second and fourth Wednesdays of the month, community members of all ages can stop by MNHC and spend a couple of hours drawing, sketching, and painting specimens from our collection, with techniques and guidance from MNHC naturalist and artist Jenah Mead. The program is free with admission or membership, and we provide drawing materials (though we do encourage participants to bring their own inking and painting supplies). This popular program is a wonderful way to develop and hone your artistic skills with the guidance of a talented artist, and a great opportunity to study natural history specimens as well. Come draw with us!

We may offer a slightly different version of this program outdoors this summer as well—stay tuned!



As To The Mission

The Joy in Environmental Education

At the Montana Natural History Center, we get people excited. Specifically, we get them excited about nature and how amazing our environment is. (I mean, it sounds pretty nerdy, but learning is actually really fun.)

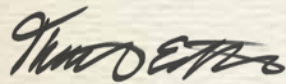
I think back to late last year when Ben Goldfarb, author of *Eager: The Surprising, Secret Life of Beavers and Why They Matter*, gave a lecture at the Center. My wife, who I can say went into the evening skeptical about such a topic, ended up having a wonderful time learning about how amazing beavers are and why they are so great at riparian restoration and reclamation. (Not to mention the incredible true story of beavers literally parachuting into the wilds of northern Canada.)

With more than twenty regular educational programs for people of all ages, we have developed a lot of different approaches to guide people to meaningful discoveries about the world around them. Sometimes, we do this by piquing people's curiosity about a topic. Like beavers. Or like Glacial Lake Missoula, and why it is a fascinating example of the effects of climate change on the environment.

There are so many ways to discover and connect with nature, and have fun doing so. You don't have to be a hard-core birder to enjoy the sight of a Northern Harrier cruising low across a newly-cut field, hunting voles. And you don't have to be a total rockhound to be taken by the beauty of an opal that fluoresces purple and pink under ultraviolet light.

Fun is built into learning about and connecting to nature. So, I invite you to have some fun. Join us for Naturalist Trivia, Sip & Sketch classes, our Brown Bag Lunch series, and a whole lot of other amazing programs for adults. And you can also bring the kids to Saturday Family Activities and miniNaturalists (for the Pre-K set) or enroll them in School's Out and Summer Day camps.

We hope to see you at an MNHC program soon. Here's to us all exploring and connecting with the natural world this spring and summer,



Thurston Elfstrom,
Executive Director

Participants get in touch with their artistic side during one of MNHC's popular Sip & Sketch programs.



MNHC PHOTO

volunteer spotlight



Alyssa Giffin

BY ALLISON DE JONG

Alyssa Giffin grew up in Stevensville, Montana, and, as a native Montanan, has always loved spending time outdoors, exploring this beautiful place. When she came to the University of Montana for college, that translated into majoring in Environmental Studies, and, last summer, led to her working with MNHC's summer camps as an AmeriCorps VISTA. She spent the summer with our preschool camps, developing an evaluation program and, of course, having a great time getting the kids outside and having fun in nature.

"Young kids are great," she says. "They're excited about a lot of things, really curious. They'd, say, watch a bug, then walk around like a bug for a little while. It's fascinating."

Last October, Alyssa led field trips for fourth-grade students in our Visiting Naturalist in the Schools program, and throughout the past school year she has been volunteering with our growing homeschool program, where she loves getting to hang out with the kids. "Alyssa builds quick and meaningful relationships with students and adults alike," says Bailey Zook, MNHC's homeschool program coordinator. "She is one of those rare and lovely individuals who can bring comfort and a sense of belonging to a whole room of people at once."

This summer, we're excited to have Alyssa working with our camps again, this time as our Summer Camp Coordinator. She'll be focusing some of her attention on evaluations for all the camps, as well using her enthusiasm and experience toward helping all our camps—both regular and new offerings—run smoothly.

We so appreciate Alyssa lending her time and talents to our programs. And Alyssa appreciates helping out at MNHC, from testing out her naturalist teaching skills to modeling curiosity and the delight of learning something new. "Since getting involved with MNHC, I've started noticing little things a lot more," she says. "I love seeing how the kids stop and appreciate the natural world. I've gone home and looked up something I don't know after a field trip—the kids inspire me."

And she inspires us.

Thank you, Alyssa!



Thank you so much to all those who celebrated with us at our Annual Banquet and Auction at the University Center Ballroom on October 12th. Over 400 generous guests helped us raise more than \$175,000 in support of nature education for children and adults. 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!

Thank you to our sponsors!

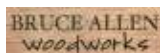
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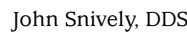
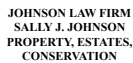
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Anne Guess

Art Attic*

Bagels on Broadway

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Big Sky Brewing

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Blackfoot

Blackfoot Pathways:

Sculpture in the Wild

Park*

Blackfoot River Outfitters

Blacktail Mountain

Blue Mountain Bed

& Breakfast

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Carolyn Snively

Cathy Berendts

Childbloom Guitar

Program

Christine Morris

Christine Wren

Clyde Coffee

Connie Long*

Costco

Courtney Schultz White

DaphneLorna

Diana Six

Diane Devine

Diane Sands

Discovery Ski Area

Dominic Glenna*

Donald Berg

Donald Stierle

Draught Works

E Bar L Ranch

Edward Monnig &

Jackie Wedell

EIC Jewelry

Ellen Knight

Eventyr Woodworking

Fact and Fiction

Fairmont Hot Springs

Finn

Five on Black

Five Valleys Land Trust

Freestone Concrete

Works*

Great Harvest Bread

Company

Grizzly Liquor

Harper Mae by Sam

Hellgate Cyclery

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Home ReSource

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Working for Wilderness: The Great Burn Conservation Alliance

STORY AND PHOTOS BY ALLISON DE JONG

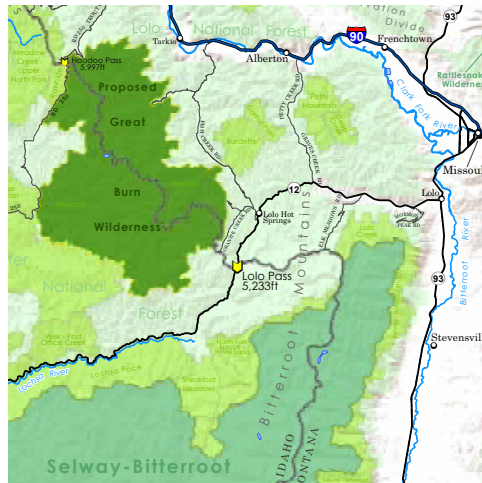
Nearly 50 years ago, a group of students from the University of Montana went on a three-week backpacking trip through what is now the Great Burn Recommended Wilderness. They were so impressed by its beauty and wildness that they formed a study group in order to learn as much as they could about this place and explore what, exactly, made it so special. That was in 1971. Forty-nine years later, that study group has morphed into the Great Burn Conservation Alliance (GBCA), a non-profit conservation organization that works to permanently protect these unique wildlands draped across the border of western Montana and northern Idaho through advocacy, collaboration, and on-the-ground stewardship.

For most of the past 49 years, Dale Harris, one of those UM backpackers, has been the heart and soul of GBCA. He spearheaded the original study group, and it was his tireless advocacy efforts and visits to Washington, D.C., in the '70s, '80s, and '90s that pushed forward legislation to protect the Great Burn. Unfortunately, none of the dozen-plus introduced bills to designate the area as wilderness passed, so the Great Burn remains a Recommended Wilderness, still waiting for its chance at wilderness designation.

Dale transitioned the Great Burn Study Group into an official 501(c)(3) in 2003 and began developing a strong on-the-ground component in addition to the policy and advocacy work. According to Hayley Newman, GBCA's interim Executive Director, it is this on-the-ground presence that has been essential in influencing and informing their policy and advocacy work. "We're experiencing this place," she says. "We're out on the ground, we see what's happening."

The Great Burn Recommended Wilderness encompasses 275,000 acres in the Lolo and Nez Perce-Clearwater national

forests on the Montana-Idaho border. It is part of a much larger wild landscape—1.8 million acres consisting of 42 inventoried roadless areas between Lolo and Lookout passes and the 1.3-million-acre Selway-Bitterroot Wilderness to the south.



The Great Burn's ecosystem is as unique as it is wild. The wildfires of 1910 devastated the area—but the resulting lack of marketable timber also protected it from logging and the roads that come with it. The aftermath of the fires also created incredible subalpine-like conditions in the high country, open meadows and ridges spotted with enormous bleached snags. Thus these hundreds of thousands of wild acres were largely left alone to recover, and now the dozens of pristine alpine lakes, open ridgelines, luxuriant forests, and wild rivers and streams are an exquisite habitat for all manner of wild creatures, from wolverines to mountain goats to lynx to grizzlies. And when it comes to grizzlies, these wildlands are an essential piece of connectivity between the Cabinet-Yaak Wilderness and the Selway-Bitterroot Wilderness, an identified recovery zone. There are no grizzlies in the Selway-Bitterroot—yet. But since 2007 a handful have made their way from parts north into the Great Burn, so the exciting potential is there.

Much of what we know about the Great Burn's landscape and wild creatures is through GBCA. They put several seasonal staff on the ground in the Great Burn every summer: two who work on the Forest Service trail crew, two who live in the backcountry around Kelly Creek and treat weeds, and a roving ranger who understands the landscape intimately, covers an incredible amount of ground, knows the outfitters and the "hot spots" for violations, and reports and deals with issues that come up.

In addition, GBCA runs several volunteer backpacking trips in the summer, bringing groups of four to eight volunteers into the Great Burn to pull weeds, do light trail work, inventory the campsites, and simply allow them to experience this unique place. These trips "are a great way to connect people with the land," says Hayley. "We teach them some of the threats, why the area is special, why they should care."

The Forest Service also benefits from GBCA's knowledge of the Great Burn. Because Forest Service employees tend to move from place to place, crafting a management plan for any one area can be difficult. GBCA provides that necessary deep knowledge of place, taking Forest Service folks into the Great Burn and giving them the opportunity to experience this stunning landscape for themselves.

It is this experience and awareness of the area's wild creatures and ecology and connectivity that is so essential, especially right now as the Nez-Perce Clearwater National Forest is drafting a new management plan, with the Lolo National Forest slated to do the same in the next year or two. "This is hugely important," says Hayley. "[Forest plans] can change the boundaries of the recommended wilderness, they can take away travel restrictions—there are a lot of implications for the travel plans." Since 2017, when the Nez-Perce Clearwater completed an updated travel plan, mechanized and motorized use has been prohibited on the Idaho




side of the Great Burn—but that could change with the new management plan. On the Montana side, motorized use has been prohibited since 2012—and that too could change when the Lolo updates its management plan.

The dual-Forest, dual-state nature of the Great Burn means that managing the area is particularly complicated, and some of GBCA's efforts include keeping the channels of communication open between

the two states and Forests. Right now, however, GBCA is focusing on encouraging those who care about the Great Burn and wild places in general to comment on the proposed forest plan—some variations of which include opening tens of thousands of acres up to snowmobiles or even shrinking or eliminating the Idaho portion altogether. The comment period is open until April 20th; for more information and to

submit comments, visit greatburn.org (GBCA's website) or wildmontana.org (the Montana Wilderness Association's website, which has a streamlined process for submitting comments).

No matter what is decided in the new forest plans, the Great Burn Conservation Alliance will continue its tireless work of preserving the Great Burn: its wildness, its ecological integrity, its unique character. "People have so much love and dedication and passion for this area," says Hayley. "It's an incredible testament to how special this place is." 

Want to get involved? Visit greatburn.org/events.html.

Above: Aptly-named Kid Lake in the Great Burn is one of more than 40 lakes sprinkled through the area, and is a wonderful spot for families—a two-mile hike to a gorgeous, wild destination.

Right: The Great Burn's open ridges, like those above Heart Lake, offer sweeping views as well as ideal habitat for alpine wildflowers.

What Do the Designations Mean?

Wilderness: An act of Congress is required to designate an area as wilderness. To maintain wilderness character, uses such as roads, motor vehicles, mechanized transport, motorized equipment, and structures are prohibited.

Wilderness Study Area: Designated by either Congress or through wilderness review (and includes all areas still undergoing the wilderness review process). These lands are managed in the same manner as designated wilderness to preserve their wilderness character in the event they become wilderness.

Proposed and/or Recommended Wilderness:

These lands have been identified by the managing agency as being desirable for wilderness designation. This does not always mean that they are managed as wilderness; management depends on the agency's current plan for the area.



BY PEGGY CORDELL



A Spanish Inquisition: Comparing Birds in Spain and Montana

In the Burgos province of northern Spain, in the lovely Zamanzas Valley, near the quaint village of Barriolacuesta, stands the Posada Molino del Canto. Situated among walnut trees along the Ebro River, and across from a steep, limestone escarpment, the stone buildings of the posada evoke a tale of a bygone miller's family, carving out a peaceful existence in relative solitude. It was here, while on a hiking trip with a friend late last September, that I had a transformative birding experience that is indelibly written in my memory.

My first formal introduction to birding came while taking the Montana Master Naturalist Course through the Montana Natural History Center last spring. I realize a few scant evening classes and a full-day field trip to Ninepipe National Wildlife Refuge do not qualify me as a “master” of birding – or any of the other topics we covered. But I have always been a curious and enthusiastic observer of the natural world. Before the class, you could have easily described me as an accidental birder. Afterwards I became more intentional.

Javier Morala, our posada host and a passionate and life-long birder, offered us a

guided birding tour throughout the Parque Natural Hoces del Alto Ebro y Rudrón and beyond. Needless to say, I jumped at the opportunity to gain a little more experience sighting and identifying birds – even if they spoke Spanish!

On a crisp morning we set out on our excursion through four distinct habitats under Javier's expert guidance. In a misty open meadow our first sighting of the day was a Short-toed Snake Eagle hunting from a utility pole. Through the spotting scope, his bright yellow eyes beguiled me. Although a little richer in hue, they reminded me of our Bald Eagle back home. It was a short drive through the village to a nearby drought-ravaged sunflower field to train our binoculars on Wood Larks, Eurasian Linnets, and Rock Sparrows, whose calls are very similar to the House Sparrows abundant in Montana.

By late morning we were ascending a rocky outcropping to observe Common Ravens, Carrion Crows, and Eurasian Griffons, which had been soaring on thermals high above us near the escarpment all morning. The griffons are reminiscent of our Turkey Vultures, though technically not

Above left: The patio of the lovely Posada Molino del Canto.

Above right: View from the limestone escarpment overlooking the Valle del Rio Ebro.

Below: Peggy practicing her birding skills in a new landscape.



Eurasian Griffons

related. Retracing our route back along the river, we observed a White-throated Dipper standing on a rock in the fast-moving water, very characteristic of our American Dipper. We also saw the resplendent European Stonechat perched on decomposing logs, surveilling the field for its next meal.

In the early afternoon we zigged and zagged up the switchbacks from the deep valley floor to emerge on the high, dry plateau with its sparse scrub trees and bushes. We were lucky to sight the Northern Wheatear during its fleeting stopover on its migration route from Scandinavia to Africa. We had to be especially quiet to observe the Whinchat, who only nervously left its perch on a nearby bush to snack on insects on the ground.

Leaving the dusty plateau of the natural area, we crossed into the Embalse del Ebro, a national waterfowl refuge since 1987. From the shore of the reservoir, we dined on a gourmet lunch and observed an extensive variety of water birds that rivals what I've seen at the Lee Metcalf National Wildlife Refuge. We saw Mallards, Red-crested Pochards, Grey Herons, Great Egrets, and Marsh Harriers (among others), who were all nesting, dabbling, or swooping on or near the water.

When I travel, I try to be observant of how my natural surroundings compare to what I would expect to find at home. Taking that a step further, as a librarian I'm keen to classify things. Of the 42 species of birds that I saw or heard that day, only four share a common species in Montana: Mallards, Gadwalls, Great Egrets, and Common Ravens. Disappointingly, most of them are quite unremarkable, except for the Great Egret, who graces the logo of the National Audubon Society after conservation efforts helped preserve the species. Seventeen more could be considered cousins (same family and genus, but different species). Most of the rest have only the extended bird family in common, while five are completely unique. In distribution terms, think of a bell curve.

The system we use today to classify all living organisms was developed over two centuries ago by a Swedish botanist named Carolus Linnaeus. It's a taxonomic system from the most inclusive (domain) to the most exclusive (species), with nomenclature that includes scientific,

Latinized names. Professional ornithologists discuss similarities and differences of bird species using this formal language. The reclassification of birds is already underway, and will continue to evolve, especially as DNA testing becomes more prevalent. Currently, there are lively discussions among scientists between lumping versus splitting current bird species. And for those who appreciate that level of science geekiness, follow this link to the MNHC website for a full accounting of birds observed on the tour and their relationship to our species in Montana: MontanaNaturalist.org/birdinginspain/.

Common names, however, usually suffice for birders to distinguish one species from another. But they can also create a communication conundrum. Common names used in Spain and Montana can refer to entirely different bird families, genera, and species. As an example, we've all heard of robins, right? The American Robin (*Turdus migratorius*) found in Montana belongs to the family *Turdidae*; while the European Robin (*Erithacus rubecula*) of Spain is classified in the family *Muscicapidae*, which is not represented in Montana at all.

I enjoy observing and identifying birds, but still need lots of guidance. True confession: I did have to rely on the laser pointer once during our birding tour. Luckily for all of us, there are some helpful resources available. If you like reading, grab a copy of *Sibley Birds West: Field Guide to Birds of Western North America*. If you enjoy meeting people, become involved with a local chapter of the Montana Audubon. If you want to contribute to citizen science, use the Cornell Lab of Ornithology's eBird website and Merlin app. And, if you're ever in Burgos, Spain, and want great opportunities for birding (and hiking), I highly recommend the Posada Molino del Canto and mcbirding.com.

Oh, and don't forget your binoculars!



—Peggy Cordell is a retired teacher librarian of 30 years and a recent graduate of the Master Naturalist program. When she's not traveling or out reveling in the great outdoors, she's volunteering, taking continuing education courses, or enjoying the company of her two granddaughters.

European Stonechat



Northern Wheatear



Whinchat



European Robin





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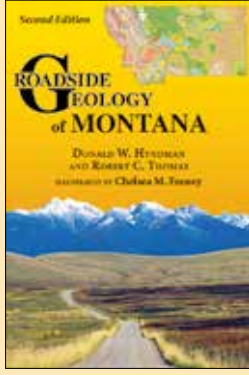
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Visit earthday.org for information on this year’s celebration and ways you can get involved!



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