



Montana Natural History Center

Spring/Summer 2017

MONTANA Naturalist

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

CLIMATE: A Story of Change



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Cover – An American bullfrog peeps above the water in a small pond near Victor, MT. American bullfrogs are not native to Montana, and with their voracious appetites and high rates of reproduction, they can be detrimental to native frogs, turtles, and even waterfowl. They were introduced to the Bitterroot Valley in the late 1960s. Photo by Seth GaleWyrick, www.galewyrick.com.

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Connecting People with Nature

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tidings

Volunteer Larry DePute has spent the last year or so articulating bird skeletons for display at the Montana Natural History Center (page 19).

This spring I had the

pleasure of sitting down

with him and learning more about what he does. Surrounded by bones at the UM Zoological Museum prep lab, Larry and I talked about avian anatomy and some of the things he's learned in the articulation process. As a retired physician assistant, he's particularly fascinated by the similarities and differences between human skeletons and bird skeletons.

We looked closely at the ribs of a Rough-legged Hawk, Larry pointing out that they are flat and that each rib comes in two pieces, whereas human ribs are round and all of a piece. Bird rib cages are thus compressible and flexible, which helps them absorb the strong movements of the wing muscles. Larry also pointed out the furcula (the wishbone, in layperson's terms), which corresponds to the clavicles in humans. While we have two clavicles, however, the furcula is a fused bone, acting as a spring that helps pull the wings back up after the downstroke. In Trumpeter Swans, the furcula is not only functional but beautiful, with a sleek, continuous curve. (Take a look the next time you visit MNHC.)

What a finely crafted world we live in. And where we are today is the result of billions of years of evolution and natural selection, of which we get to see the latest—but not the last—adaptations. What we see is only the most infinitesimal part of the process.

Many of the pieces in this issue ponder the past and our connection to it. UM Paleontology Center Collections Manager Kallie Moore takes us on a journey through two and a half billion years of Earth's history, looking at the shifts in climate and the ebbs and flows of life on this planet (page 6). Writer Claire Voris listens to the haunting cries of Sandhill Cranes, reveling in a sound that's been heard for millions of years (page 20). Rosalyn LaPier, of the Blackfeet and Métis tribes, explores the history of freshwater mussels both from an ecological perspective and in Blackfeet mythology, finding an intriguing correlation between the two (page 4).

Being reminded of our minor role in the long span of history can be jarring sometimes. We don't often like to think of ourselves as insignificant. Yet being aware of our unique place in time and space ultimately enriches our connection to the earth and our own home landscapes, reminding us that we are part of something vast and sweeping. So, this spring and summer, enjoy your space on this planet, whether it's in Montana or farther afield. Revel in this time and place in which you find yourself, and in the varied, magnificent, and intricate interconnections of which we are all a part.

Allison De Jong

EDITOR

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Hiking toward Mount Tiny in the Anaconda-Pintler Wilderness, surrounded by ancient rocks and far-reaching vistas.

PHOTO BY GREG PETERS

Montana Mussel Mythology & Ecology

BY ROSALYN LAPIER

M ythology

One starry summer night a young Blackfeet woman named *Soatsaki*, or Feather Woman, noticed a bright star in the sky and proclaimed, "That is a very bright star. I should like him for a husband." Several days later as Feather Woman was gathering firewood, a handsome young man walked before her path. She asked his name, and he answered, "I am *lipisówaahs*, the Morning Star. One night, when you looked up at me, you said that you wished me for a husband. Now I have come for you." He then placed an eagle plume feather in her hair and together they went to the Sky World.

lipisówaahs introduced her to his father *Naató'si*, the Sun, and his mother *Ko'komiki'somm*, the Moon. His parents welcomed her and were happy that their son had a human wife. *Ko'komiki'somm* presented her new daughter-in-law with four berries and a mussel shell with water. Even though Feather Woman was very thirsty she could not finish all the water in the shell. She did not learn until that moment that this shell held all the water in the world.

BLACKFEET CULTURAL USES OF MUSSEL SHELLS

The Blackfeet once called themselves the *Saokio-tapi*, the Prairie people, when they lived on the northern Great Plains. In the streams and rivers of the wide open prairies lived two native freshwater mussels that the Blackfeet used in their everyday life: the fatmucket and the giant floater. They used the mussel shells as vessels to drink water or broth, to mix medicines or paint, to create jewelry, and as material for personal adornment.

My grandmother Annie Mad Plume Wall's grandfather Spotted Bear owned a small bundle that held four mussel shells, each with a different colored inner shell: red, yellow, green, and

white. Spotted Bear used them to "make medicine," as the Blackfeet say. Individual Blackfeet came to my grandmother's grandfather to ask for assistance in changing the natural world, for they believed that they could alter it with supernatural intercession.

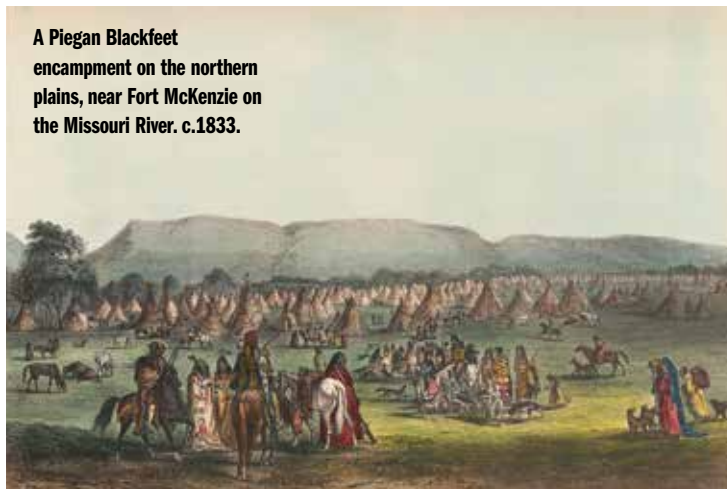
Spotted Bear would mix certain herbs together in a specific shell, make a tea, and then pray to his supernatural allies. Each corresponding shell could charm someone into falling in love with another person, cure an illness, improve the stamina of a horse, or win at gambling. (I will not share which colored shell did which activity.)

The Blackfeet believed that these freshwater mussel shells, in addition to being able to change the natural world, also held a female creative essence. Spotted Bear named his female relatives after each one of the mussel shells that he owned. My grandmother chose one of these names, *Ikotsimiskimaki*, for my youngest daughter. Her name comes from the red shell that Spotted Bear used, and translates as "Salmon-colored Supernatural Fossilized Shell Woman."

The western pearlshell is the only native mussel found on the west side of the Continental Divide in Montana. Found in cold streams and rivers, some western pearlshell mussel beds include tens of thousands of individuals, quietly filtering the water around them.

ROGER TABOR (USFWS)

A Piegan Blackfeet encampment on the northern plains, near Fort McKenzie on the Missouri River. c.1833.



JAMES G. CLARK, LIBRARY OF CONGRESS

FRESHWATER MUSSEL ECOLOGY

Aquatic ecologist David Stagliano reports in *Freshwater Mussels in Montana* that Montana has three native freshwater mussel species, three introduced species, and one invasive species [see sidebar] currently living in our streams and rivers. The three native species—the western pearlshell (*Margaritifera falcata*), the fatmucket (*Lampsilis siliquoidea*), and the giant floater (*Pyganodon grandis*)—were all used by the Blackfeet and other tribes of Montana. There is evidence of indigenous use of both the western pearlshell and fatmucket up to 2,000 years ago at archaeological sites in Montana.

Freshwater mussels play an important role in the health of Montana's aquatic ecosystems. They are filter feeders, helping clean the water around them by removing small particles of sediment and other detritus. They serve as a food source for river otters, muskrats, and other critters. Their shells have growth rings, like trees, which tell us their age as well as show changes in their environment over the years. They are sensitive to pollution and can live up to 100 years, which makes them great indicators for the health of our rivers. Scientists can study both live specimens in streams and rivers or the empty shells to learn about mussels' lives.

Freshwater mussels are sensitive to changes in their aquatic habitat such as agricultural run-off, damming, silt, pollution, stream temperatures, changes in fish population, and other kinds of degradation. Continued scientific study and conservation efforts are important to protect our native species of mussels. As David Stagliano wrote, "Each species is an irreplaceable part of our natural heritage."

They are sensitive to pollution and can live up to 100 years, which makes them great indicators for the health of our rivers.

HOLY SHELLS

A recent study by Stanford University researchers showed that freshwater mussels could clean 80 percent of the surrounding water within 72 hours. Maybe this was something the ancient Blackfeet understood, and maybe this is why freshwater mussels became important as religious articles. The Blackfeet viewed them as holy, placing restrictions on their collection and use. The mythology of the Moon's mussel shell holding all the water in the world, as metaphor, fits remarkably well with our ecological understanding that freshwater mussels can possess (and clean) the water in a prairie stream. In both mythology and ecology the freshwater mussel safeguards human life. 🐚

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



Western Pearlshell

Margaritifera falcata

- Found in cold streams and rivers on the west side of the Continental Divide
- 2.5-4 inches long
- Inner shell, or nacre, is iridescent pink to purple
- Outer shell is dark brown to black

Fatmucket

Lampsilis siliquoidea

- Found in medium to large warm prairie streams and rivers
- 4-6 inches long
- Nacre is white
- Outer shell is yellow to tan

Giant Floater

Pyganodon grandis

- Found in small to large warm prairie streams and rivers
- Grow up to 6 inches long
- Nacre is pearly blue
- Outer shell is brown to yellow-green

Zebra Mussels: Tiny Invaders

In winter 2017 the State of Montana created the Montana Mussel Response Team to "rapidly assess the extent and severity of the mussel incident affecting Montana's waterways." The

State found freshwater zebra mussel (*Dreissena polymorpha*) larvae in both Tiber and Canyon Ferry reservoirs in the late fall of 2016. Zebra mussels are an invasive species originally from the Black Sea. Without any known native predators in the U.S. they multiply rapidly, killing fish by eating their shared food source, dramatically increasing aquatic plant life, and, by their sheer numbers, disrupting native aquatic ecosystems. Stopping their introduction and spread is the best option, because their eradication is difficult. For more information, visit musselresponse.mt.gov.

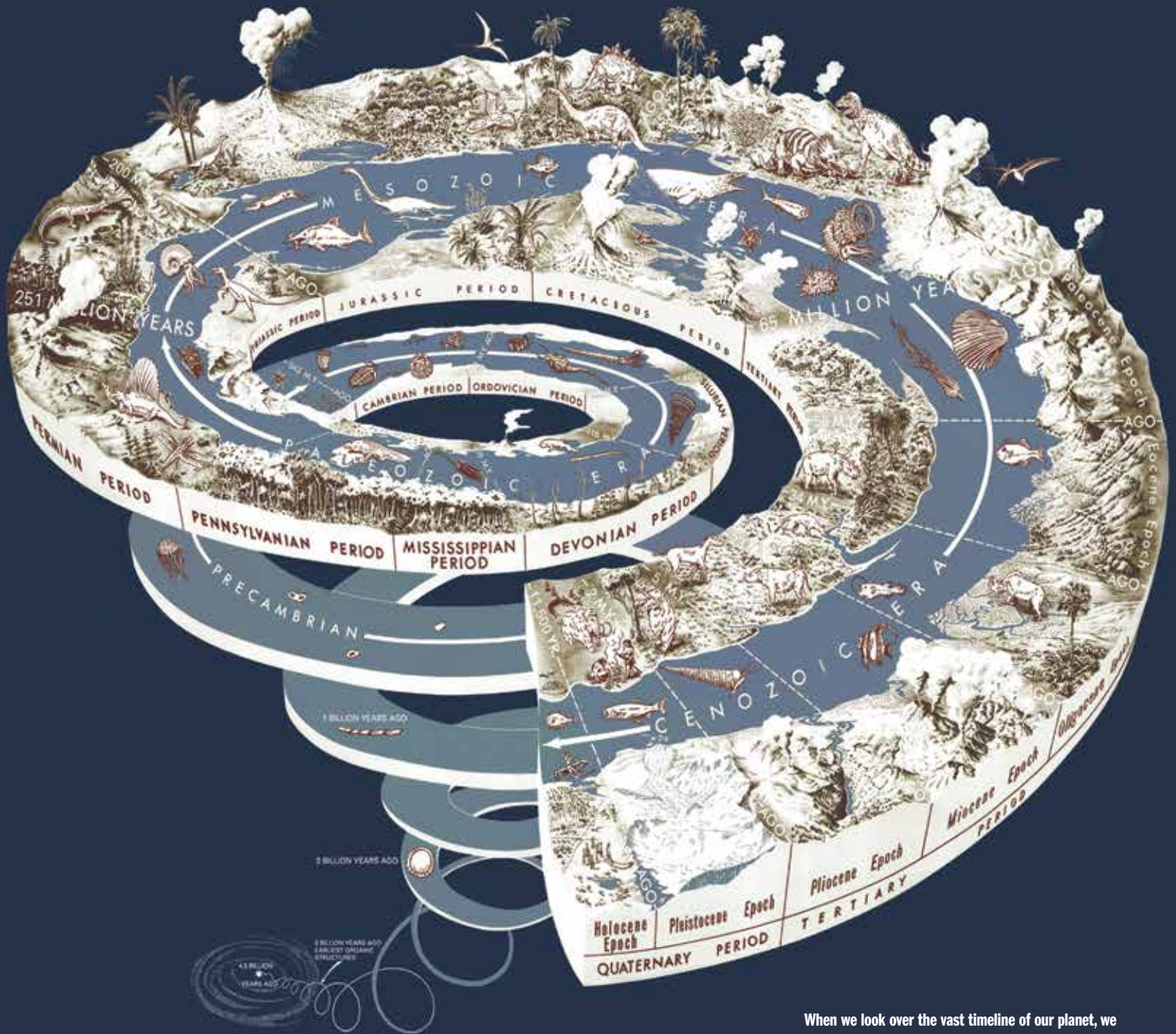
There are three other introduced species of mussels that do not have the same disruptive impact: the black sandshell (*Ligumia recta*), the mapleleaf (*Quadrula quadrula*), and the white heelsplitter (*Lasmigona complanata*).



Though small (only the size of a fingernail), zebra mussels spread rapidly.

Time Traveling with a Thermometer: A Climatic Journey Through Geologic History

BY KALLIE MOORE

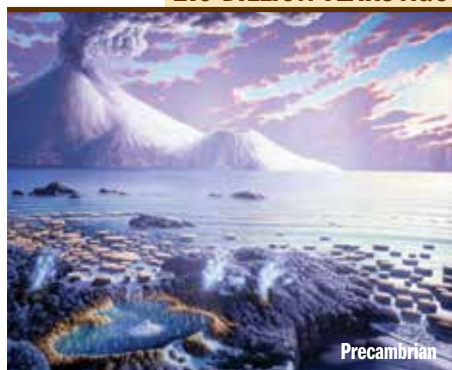


When we look over the vast timeline of our planet, we see that life and climate are inextricably linked. It is because of Earth's climate that life is possible, but it has, at various times, nearly snuffed life out as well.

The human story is brief compared to Earth's long history—but if there's one thing we can learn by looking back, it's that the only constant is change.

Every time I hike Mt. Sentinel, I imagine the Missoula Valley full of water during the Late Pleistocene. I would be sitting on a hilly island, surrounded by a frosty lake that was created by an ice dam on the Clark Fork River. Glacial Lake Missoula was repeatedly filled and discharged between 15 and 13 thousand years ago during the Pleistocene, also known as the Ice Age. Thousands of years later, Glacial Lake Missoula is long gone, as are the huge glacial sheets that covered northern North America. The climate has warmed—gradually at first, and, in the past 100 years, ever more quickly due to human activity. The rate of warming is unprecedented. But this is not the first time in Earth's history that the climate has changed. It has undergone myriad changes, from cool to hot to warm and back again, in the past 4.567 billion years, and there's much we can learn from looking at those changes. So let's travel back in time and explore...

2.5 BILLION YEARS AGO



We will start our climatic journey around 2.5 billion years ago, during the Precambrian, and visit what is now the Lake Superior region of North America. It was covered by a primitive ocean, with a few barren granite islands and volcanoes scattered throughout. The sea would have been carpeted with stromatolites—photosynthesizing microbes—that pumped oxygen into the environment. As iron from the early ocean reacted with this oxygen it created today's Banded Iron Formations and allowed more oxygen to build up in the atmosphere. Aided by plate tectonics, which buried organic material that readily reacts with oxygen, atmospheric oxygen increased to an estimated—are you ready for this?—one percent. (Today, oxygen makes up 21 percent of our atmosphere.) This period is known as the Great Oxygenation Event. Although our time-traveling selves would



still need air tanks to visit the surface, that tiny increase had profound effects, including kickstarting the ozone layer. After the Great Oxygenation Event, Earth went through a period known as the “Boring Billion” (1.85 billion years ago to 850 billion years ago) when no obvious dramatic climatic transitions occurred, but rifting in an early continent deposited the Belt-Purcell Supergroup. The “Belt” is a well-known sedimentary rock formation in Montana, and stromatolite fossils from this unit are found in Glacier National Park. Although it sounds fun to visit Glacier during the Boring Billion, we'll skip it as the oceans were rich in sulfur and would have been extremely smelly. This stinky, steady time was the geological version of the calm before the storm.

720 MILLION YEARS AGO

There are not many safe spots to experience the “storm” of intense climatic changes during the Late Precambrian; the best seat would probably have been on the moon. From this vantage point we could watch as the planet became more and more white until finally it was almost completely encased with ice. This icy world is called the Snowball (or Slushball) Earth and formed around 720 million years ago. A runaway cooling effect is thought to have caused the Snowball Earth; that is, cooling led to more cooling, that led to yet more cooling. There is evidence that liquid water existed around the equator, volcanoes, and hydrothermal vents where habitable zones were sustained, but Earth's average temperature dropped to -50 degrees Fahrenheit! But even during this global glaciation, Earth's tectonic plates continued to move, and greenhouse gases slowly built up in the atmosphere...

which tilted the climatic table in the other direction, beginning a period of runaway warming. By 670 million years ago Earth had become a Hothouse Earth, completely free of ice. Over the following 180 million years Earth swung back and forth through at least two more Snowball/Hothouse cycles, with the last ending just before the start of the Phanerozoic Eon and the Cambrian Period.

635 MILLION YEARS AGO



The Snowball/Hothouse cycles played a central role in the evolution of life by continuing to raise atmospheric oxygen. By 635 million years ago, we intrepid time travelers could breathe easily for the first time while exploring the surface of our planet, so let's start in what is now Western Australia. On the bottom of sunlit shallow seas, we would encounter some of the oddest creatures ever to live on Earth. Known as the Ediacaran biota, these enigmatic circular and frond-shaped animals bear little resemblance to modern life, and their relationship to Cambrian forms is hard to interpret. By 530 million years ago hard parts evolved in animals and the resulting surge of fossils is known as the “Cambrian Explosion,” viewed best from Yoho National Park in British Columbia, Canada, in the Burgess Shale. By 400 million years ago small,

primitive, leafless vascular plants began living on land, and arthropods followed close behind. Surprisingly, the largest life on land was a 25-foot-tall tree-like fungus called *Prototaxites*. Now, not only could human time travelers breathe, but we could construct giant fungus-log cabins, eat twig-plants and insects, and drink fresh water.

380 MILLION YEARS AGO

But more huge changes were around the corner. During the Carboniferous Period, vast forests covered the land and pumped oxygen into the environment. As the forests grew, large amounts of detritus were buried, sequestering carbon that would later (after increased temperatures and pressures) become the coal deposits



we use today. From 380 to 300 million years ago oxygen rose from 18 percent to 30 percent or possibly more. This second Great Oxygenation Event provided many fascinating places one could visit: the eastern United States, Nova Scotia, France, or Scotland...but if you are prone to insectophobia, you'd probably want to skip this period. Although insects seem to be a pretty predictable group, they reflected the most notable change during this time and grew to enormous sizes. Dragonflies were the size of crows, millipedes grew up to eight feet long, and scorpions were over two feet long!

251 MILLION YEARS AGO

Life was flourishing on the supercontinent Pangaea—until it came crashing down as the Paleozoic Era ended. “The Great Dying” of 251 million years ago is known as the largest mass extinction event in Earth’s history. Over 95 percent of marine life and 70 percent of life on land died out. Although scientists are still working to determine the causes, they do know it was



Jurassic Period

gradual and climate driven. Oxygen levels dropped back down to 20 percent, and sea levels declined as glaciers advanced. Massive volcanic eruptions blocked sunlight, created acid rain, and reduced the ozone layer. It took an estimated 30 million years for life to recover.

Life not only recovered, but it evolved into the scene-stealing dinosaurs during the Mesozoic Era. This era started with the Triassic Period, which was hot and dry. The climate cooled during the next period—the Jurassic—and glaciers started to form, but by the Early Cretaceous Period the climate started to warm again. In fact, during this time the climate warmed even the north and south poles, and all glaciers disappeared. The Arctic had lush forests with ginkgo trees and was inhabited by dinosaurs. If we were to visit Montana 75 million years ago, we would be pleasantly surprised. The Western Interior Seaway connected the Arctic Ocean with the Gulf of Mexico, creating beaches in Montana! Unfortunately, they would be hard to enjoy,

since large tyrannosaurs (earlier relatives of *Tyrannosaurus rex*) would make us fear for our lives. A climatically-driven gradual decline in biodiversity was aided by the eruption of enormous flood basalts in India about 66 million years ago. Then, 65 million years ago, a large meteorite struck the Yucatan Peninsula, setting in motion the most well-known extinction event in prehistory. Dust and debris blocked the sun. The lack of sunlight caused a major decline in photosynthesizing plants and algae, resulting in the extinction of herbivorous animals, and, consequently, the carnivorous animals that depended on them. Possibly nothing over 50 pounds survived. Survivors included small omnivores, insectivores, and scavengers, making early crocodiles the largest land animal. The reign of dinosaurs was over.

65 MILLION YEARS AGO

Mammals quickly filled the niches left open by the extinction of the dinosaurs, and it was during the Cenozoic Era—the Age of Mammals—that the most well-documented climate shift in Earth’s history occurred. The Paleocene-Eocene Thermal Maximum (PETM) is ominously similar to what is happening to our modern climate. The hot climate from the Mesozoic carried over into the Cenozoic, but the PETM represents a dramatic spike caused by 100 thousand years of warm positive feedback cycles. Microscopic shelled marine organisms record a rapid rise in greenhouse gases and



Western Interior Seaway, ~75 million years ago

a corresponding rise in temperature around 56 million years ago. This temperature increase was possibly as high as 16 degrees Fahrenheit, and it happened quickly—over a period of only 20 thousand years. The major causes of the PETM were climate change due to volcanic activity, methane release from frozen deposits on the seafloor, melting permafrost, and wildfires. The effects were severe. In the ocean, there was a mass extinction of marine micro-organisms, some bottom waters became dangerously void of oxygen, all of the water became acidic, and circulation ran “backwards”—imagine all the currents running in the opposite direction—for at least 40 thousand years. On land, the PETM is well recorded in Wyoming’s Bighorn Basin and shows plants and animals moving toward the poles, as lower latitudes became hot and arid.

50 MILLION YEARS AGO

The rapid warming during the PETM left the land free of ice. But once again, as it had done so many times before, the climate shifted back.

Around 50 million years ago the climate started to cool, and by 34 million years ago glaciers had formed on Antarctica. Although a small warming event occurred during the Oligocene (25 million years ago), most warm, tropical environments were replaced by cooler, more open forests and extensive grasslands by 15 million years ago, leading to the diversification of grazers. Relatives of horses, camels, rhinos, and elephants roamed across Montana—this would be an ideal time to visit for a prime safari experience! Also during this time (~35 million years ago), the subcontinent



Pleistocene Epoch

of India slammed into Eurasia, raising the Himalayas and the Tibetan Plateau. The shifting landmasses resulted in the development of monsoon cycles, which were fully in place by eight million years ago. This cooling trend laid the foundation for the most recent cycle of glaciation.

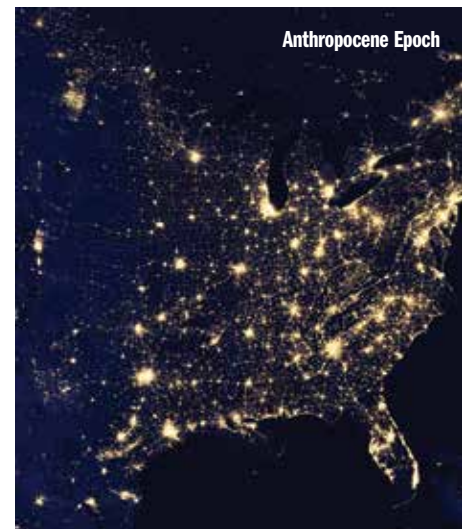
2.6 MILLION YEARS AGO

During the Pleistocene, or the past 2.6 million years, the northern hemisphere has gone through repeated Ice Age cycles, consisting of glacial advances followed by interglacial warm periods. At their maximum extent, continental ice sheets plowed as far south as Kansas and covered all of Europe. Land bridges allowed life, including early humans, to spread to distant areas. The final major glacial pulse lasted from about 26 to 19 thousand years ago, and the Ice Age officially ended 11.7 thousand years ago. Although we are currently in the interglacial Holocene Period, human activity is pushing the climate into a new positive feedback warming cycle, throwing Earth out of its Ice Age cycles and spawning the proposed Anthropocene Epoch.

PRESENT DAY

Here in the Anthropocene, we are already seeing the effects of human-caused climate change: coral bleaching, climate patterns shifting, permafrost melting, and methane bubbling up from the deep oceans. Although Earth’s climate has gone through some dramatic changes over the past 2.5 billion years, the rate at which humans are now altering the environment has no equivalent in the geologic or atmospheric record. In just over 60 years, humans are getting

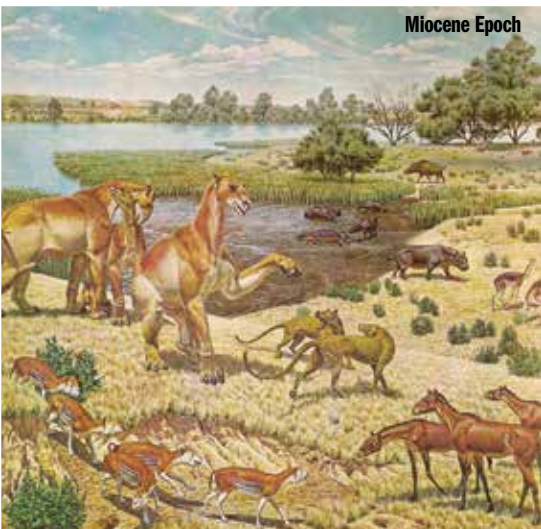
dangerously close to the climatic effects that took over 20 thousand years to attain during the PETM. This global experiment is completely untested and the outcome is unknown. The next hundred years will be a telling time for humanity. Our world will likely become warmer and major coastal cities will have to deal with expensive, but manageable, sea level



Anthropocene Epoch

rise of a few feet. However, some models suggest we will surpass the warming of the PETM—over 16 degrees Fahrenheit—leading to catastrophic changes. So as I relax on Mount Sentinel, it’s hard to imagine what Missoula will look like in a century, although it will probably not be the frosty daydream from the Ice Age. One thing is for certain, the Earth and its life will continue on, with or without us, far into the future. 🦋

—Kallie Moore has been the Collections Manager, or “Fossil Librarian,” of the University of Montana Paleontology Center since 2008. She is in charge of organizing the collection and making it accessible, as well as participating in outreach events, supervising volunteers, and renovating displays.



Miocene Epoch



PHOTOS BY CAROLINE STEPHENS

Notes from the Moon-Randolph Homestead

BY CAROLINE STEPHENS, CARETAKER

We moved in as new caretakers when the dryland pastures were brown, at the end of last summer. In the evenings when the sun was low, it would catch the seed heads of the grass, and now, in early spring, with the new growth just coming on, it still does. I ache to see the grass tall and green, like I think so many of us do after a long winter.

But for now, in early spring, we have been watching as birds migrate back north and reflecting on what we've seen in our short time at the Homestead. Winter, with its short days and slight temperatures, has been a good time for us to start to understand the nature of this place. It's a place where both human and non-human nature has been adapting to one another for a long time. With its thicket of wild plums, creaking outbuildings, piles of wood siding, old wagon frames and car parts, broken harrows and wood stoves, apple orchard and garden, the Homestead is also full of burrows, dens, and nests, and all manner of tracks and sign. Here is a catalog of observations from the cold season, as we anticipate the greening of the pasture and the blossoming of the apple trees.

- The coyotes that use the road all the winter, their tracks straight and long.
- The Red-tailed Hawk that hunts from its perch on a power pole above the orchard. The Gray Partridges it hunts, and nearby, the place where the hawk made its catch, broad-winged primary and secondary feather marks printed in cold snow.
- The vacant bird nest made of dry grass and orange, plastic bailing twine, hanging from the crook of an apple branch.
- A mid-century car hood on the side of a hill, the hood covered in snow but for one small circle of metal, melted out from the warmth of the hare living underneath.
- The starlings that spend all day at the tops of the orchard trees, mocking the call of the Red-tailed Hawk—that raptors' screech—and now, in early spring, announcing the presence of songbirds migrating north, telling us the meadowlarks are back before we see them.

The Moon-Randolph Homestead, located in the hills north of Missoula, is open for tours free to the public every Saturday, May through October, from 11 a.m. to 5 p.m. Contact the caretakers at moonrandolph@gmail.com or visit our Facebook page for more information on history, events, workshops, and private tours.



●●●

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 we may publish it! Send your Naturalist Notes (up to 350 words) and a photo, if you wish, to Allison De Jong, Editor, at adejong@MontanaNaturalist.org.

The Great Eclipse Caper of 2017

BY BEV ENGELMANN

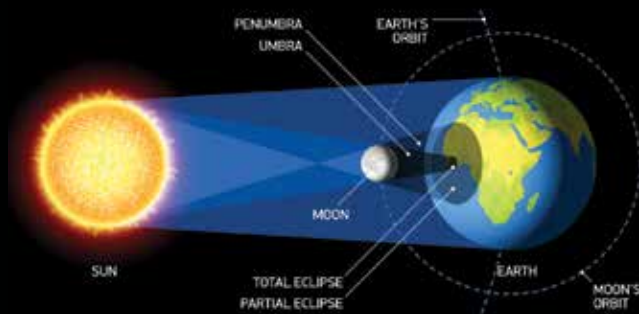
On August 21st, 2017, Montanans can be a part of a unique event: a solar eclipse that will be nearly total, depending on your location. The duration of the eclipse will be around two hours and forty-five minutes, with 93 percent totality occurring at approximately 11:30 AM. To view 100 percent totality, you must journey to specific places in neighboring Idaho or Wyoming.

This could be a once-in-a-lifetime experience for Montanans, as the moon moves between the sun and Earth and casts its shadow over us. The next solar eclipse will occur in 2024 and require travel to the eastern U.S.

The 2017 path of eclipse totality will cut an arc across the U.S. from south of Portland, Oregon, in the west to mid-South Carolina in the east. The eclipse should be dramatic and visible—described as “midnight at midday”—unless it is obscured by cloudy weather or smoke from summer wildfires.

Regardless of viewing conditions, options for “indirect” viewing—such as imagery downloads from high altitude balloons—may be available. If the day is clear, exercise great caution for “direct” viewing: wear certified eclipse glasses, which are relatively inexpensive.

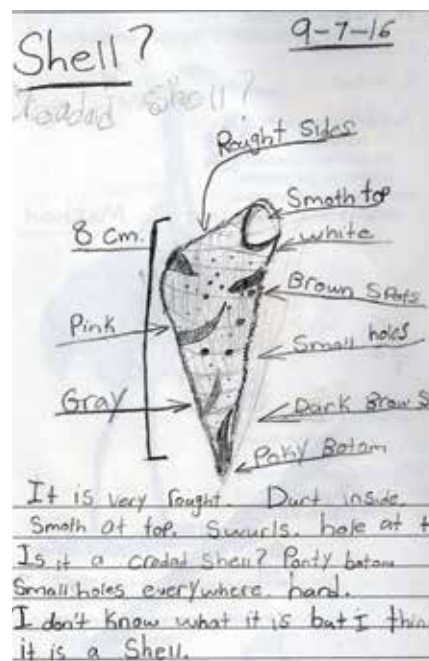
In the days prior to the event, interested Montanans should monitor local news media outlets, to learn about community resources for viewing the eclipse. We hope that many of our citizens will enjoy participating in The Great Eclipse Caper of 2017!



get outside guide



Great Horned Owl by Brinley Tahbo



Shell drawing by Aalia Patel

Kids' Corner

One of the best parts of MNHC's Visiting Naturalist in the Schools program is taking the kids outside on full-day field trips in October and May. Enjoy these observations from young naturalists in Susie Graham's 4th grade class at Chief Charlo Elementary!

get outside calendar

MNHC Summer Hours: (May 29 - August 28)

Monday-Friday, 9 a.m. - 5 p.m.

Saturday, noon - 4 p.m.

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

Programs for Kids

April 20 miniNaturalist Pre-K Program,
10:00-11:00 a.m. Program free with admission.

April 27 miniNaturalist Pre-K Program,
10:00-11:00 a.m. Program free with admission.

May 4 miniNaturalist Pre-K Program,
10:00-11:00 a.m. Program free with admission.

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

May 13 Saturday Kids Activity, 2:00-3:00 p.m.
We Love Bugs! Program free with admission.

May 18 miniNaturalist Pre-K Program,
10:00-11:00 a.m. Program free with admission.

May 25 miniNaturalist Pre-K Program,
10:00-11:00 a.m. Program free with admission.

Adult Programs

April Gallery, all month. **Pete Ferranti:** Landscape Photography.

April 19 Evening Program, 7:00 p.m. Navigating a Changing World Lecture Series: The State Climate Report with Kelsey Jencso. \$5 members; \$10 non-members. Students FREE.

May Gallery, all month. **Willard High School Students: Outdoor Play in 4 Easy Steps.**

May 3 Glacial Lake Missoula Spring Fling,
7:00 p.m. \$5 suggested donation.

May 4-5 Missoula Gives, 6:00 p.m.-6:00 p.m.
Support MNHC during Missoula's largest community-wide fundraiser! Donate online at missoulagives.org.

May 5 First Friday Gallery Opening,
4:30-6:30 p.m. **Willard High School Students: Outdoor Play in 4 Easy Steps.**

May 6 Naturalist Field Day, 9:00 a.m.-5:00 p.m.
Spring Wildflowers with Greg Peters. \$80; \$70 MNHC members.

























May 7 Community Discovery Day,
10:00 a.m.-12:00 p.m. **Birds and Blooms on Waterworks Hill.** Ages 10 and up. Free.











May 10 Evening Program, 7:00 p.m.
Navigating a Changing World Lecture Series: The Next Generation of Climate Change: Students and Solutions with Nicky Phear. \$5 members; \$10 non-members. Students FREE.

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

May 18 Fifth Annual Women's Luncheon to support the Summer Camp Scholarship Fund.
11:30 a.m.-1:00 p.m. \$100. For more info and to purchase tickets, visit MontanaNaturalist.org.

June Gallery, all month. **Willard High School Students: Outdoor Play in 4 Easy Steps.**
No First Friday Gallery Opening.

SUN	MON	TUE	WED	THU	FRI	SAT
April						
 April Gallery, all month. Pete Ferranti: Landscape Photography.			 Glacial Lake Missoula Chapter Meeting, 3:30 p.m.  Evening Program, 7 p.m. Navigating a Changing World Lecture Series	 miniNaturalist Pre-K Program, 10-11 a.m.		
16	17	18	19	20		
		Wolf cubs are born		 miniNaturalist Pre-K Program, 10-11 a.m.		
23	24	25	26	27	28	29
	May		 Glacial Lake Missoula Spring Fling, 7 p.m.	 miniNaturalist Pre-K Program, 10-11 a.m.  Missoula Gives, 6:00 p.m.-6:00 p.m. missoulagives.org	 First Friday Gallery Opening, 4:30-6:30 p.m. Willard High School Students: Outdoor Play in 4 Easy Steps.	 Naturalist Field Day, 9 a.m.-5 p.m. Spring Wildflowers with Greg Peters.
30	1	2	3	4	5	6
 Community Discovery Day, 10 a.m.-12 p.m. Birds and Blooms on Waterworks Hill.			 Evening Program, 7 p.m. Navigating a Changing World Lecture Series	 miniNaturalist Pre-K Program, 10-11 a.m.		 Saturday Kids' Activity, 2-3 p.m. We Love Bugs!
7	8	9	10	11	12	13
			 Glacial Lake Missoula Chapter Meeting, 3:30 p.m.	 miniNaturalist Pre-K Program, 10-11 a.m.  Fifth Annual Women's Luncheon to support the Summer Camp Scholarship Fund. 11:30 a.m.-1 p.m.	Western Tanagers arrive	
		16	17	18	19	20
				 miniNaturalist Pre-K Program, 10-11 a.m.  Fort Missoula Native Plant Garden Work & Learn Days, 4-6 p.m., Thursdays through Aug. 3	26	27
28	29	30	31			
June						
				 June Gallery, all month. Willard High School Students: Outdoor Play in 4 Easy Steps.		
				1	2	3
						Chorus frogs sing
4	5	6	7	8	9	10
Summer Outdoor Discovery Camps	Geology Rocks! 1st - 5th grade June 12-16		 Summer Montana Master Naturalist Class, 8 a.m.-4 p.m. June 14-16 and 19-20			 Naturalist Field Day, 7 a.m.-6 p.m. Investigating Montana Pictographs with Jim Keyser.
	12	13	14	15	16	17

SUN	MON	TUE	WED	THU	FRI	SAT
Summer Outdoor Discovery Day Camps See Imprints for details, page 17.	Wild Wanderers Pre-K – 5th grade June 19-23 19	20	 Glacial Lake Missoula Chapter Meeting , 3:30 p.m. 21	22	 Naturalist 101: Base Camp Rock Creek , 2-6 p.m. Friday, 9 a.m.-5 p.m. Saturday and Sunday. June 23-25. 23	24
	Fantastic Fish and Where to Find Them Pre-K – 5th grade June 26-30 26			29	30	July  July Gallery , all month. Summer Camp Art . 1
	3	4	5	6	7	8
	Birding Bonanza! Pre-K – 5th grade July 10-14 10	11	12	 Members-Only Discovery Day , 3-5 p.m. Ethnobotany at the Native Plant Garden . 15		15
	Habitat Hunt Pre-K – 5th grade July 17-21 17	18	19			22
	Expedition: Explore! 1st – 5th grade July 24-28 Backcountry Biologists 6th – 8th grade July 25-28 24	25	26	27	28	29
	Wonderful Wetlands Pre-K – 5th grade July 31-August 4 31	August  August Gallery , all month. Summer Camp Art . 		3	4	5
	Phenomenal Forests Pre-K – 5th grade August 7-11 7			10	11	12
	Nature's Greatest Hits Pre-K – 5th grade August 14-18 14	15	16	17	18	19
			 Glacial Lake Missoula Chapter Meeting , 3:30 p.m. 15	16	17	18

Cottonwood fluff fills the air

Huckleberries ripen

Cat-faced spiders are up in the eaves

June 14-16 and 19-20 Summer Montana Master Naturalist Class, 8:00 a.m.-4:00 p.m. \$395.

June 17 Naturalist Field Day, 7:00 a.m.-6:00 p.m. **Investigating Montana Pictographs with Jim Keyser**. \$80; \$70 MNHC members.

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

June 23-25 Naturalist 101: Base Camp Rock Creek, 2:00-6:00 p.m. Friday, 9:00 a.m.-5:00 p.m. Saturday and Sunday. **Taught by MNHC Naturalist Christine Morris**. Enjoy a weekend of naturalist summer camp for adults! We'll watch birds, catch butterflies, write and draw in our nature journals, admire wildflowers and trees, and learn about Montana mammals. \$150; \$140 members.

July Gallery, all month. **Summer Camp Art**. No First Friday Gallery Opening.

July 14 Members-Only Discovery Day, 3:00-5:00 p.m. **Ethnobotany at the Native Plant Garden**. Ages 10 and up. Free.

July 19 Glacial Lake Missoula Chapter Meeting, 3:30 p.m. Free and open to the public.

August Gallery, **Summer Camp Art**. No First Friday Gallery Opening.

August 11 Community Discovery Day, 5:00-7:00 p.m. **Seed Collecting at the Native Plant Garden**. All ages welcome. Free.

August 16 Glacial Lake Missoula Chapter Meeting, 3:30 p.m. Free and open to the public.

Volunteer Opportunities

April 19 Volunteer Naturalist Training, 4:00-5:30 p.m. Visiting Naturalist in the Schools Field Trip Training at the Fort Missoula Native Plant Garden. Learn how to teach kids about the flora and fauna of western Montana during the May VNS school field trips for 4th & 5th grades. Field trips run from April 26-June 2. No prior experience necessary.

May 18 & 25, June 1, 8, 15, 22, & 29, July 6, 13, 20, 27 & August 3

Fort Missoula Native Plant Garden Work & Learn Days, Thursdays from mid-May through early August, 4:00-6:00 p.m. Come help build, weed, and plant out in our Native Plant Garden and spend time learning while you work!

Are you handy? Throughout the summer we need volunteers with construction and/or mechanical skills to help us keep our buses in tip-top shape as well as help us with various building projects (exhibits, garden structures, etc.). Interested in being on our "handy person" list? Contact Stephanie at spotts@MontanaNaturalist.org.

get outside guide

Follow the Wildflower Rainbow!

Spring and summer is prime wildflower time! How well do you know Montana's wildflowers? Test your skills with this rainbow assortment—and then go out and see how many you can find. We'd love to see your photos, too; email them to adejong@MontanaNaturalist.org or share them on our Facebook page.

A. Blanketflower - *Gaillardia aristata*

A member of the aster (or sunflower) family, blanketflower looks very much like a miniature sunflower, 1-2 feet tall, and is found in dry grasslands and open forests. Fun fact: what look like bright yellow petals on a blanketflower are actually individual flowers, called ray flowers, while the deep red-orange center is also made up of tiny individual flowers, called disk flowers. Look closely the next time you find one!

B. False Hellebore - *Veratrum viride*

Found in subalpine wet forests and clearings, false hellebore is an easily recognizable plant—it can grow up to six feet tall, and has large, ribbed, oval leaves. The small yellow-green flowers are clustered on tassels that droop from the top of the stem. Up close, you'll see the star-shaped, six-parted flowers with a dark green center.

C. Clematis - *Clematis sp.*

This widespread climbing or trailing vine is found in grasslands, along streams, and in open ponderosa pine and Douglas-fir forests. The flowers have no petals; it is the four purply-blue sepals (which are usually green in other plants) that draw the attention, attached to the vine by long stalks.

D. Indian Paintbrush - *Castilleja sp.*

What look like colorful petals are actually bracts or sepals (specialized leaves), which are red, orangish, or yellow. They form a brush-like cluster—you really could imagine yourself painting with it!—on top of the stems, which can be quite short or up to two feet tall. Look for paintbrush at mid to high elevation, in open forests, grassy slopes, and in disturbed areas.

E. Scarlet Gilia -

Ipomopsis aggregata

Scarlet gilia's flowers are a bright, vivid red, with five petals fused into a long tube. The flowers are clustered along and atop the stem, which is usually 1-3 feet tall. Scarlet gilia is found in open dry forests, grasslands, and on rocky slopes.

F. Camas - *Camassia quamash*

These gorgeous flowers are so blue that meadows filled with them could almost be mistaken for lakes. The rich bluish-purple, six-petaled flowers bloom at the top of 1-2 foot tall stems, and are found at mid elevation grassy slopes and meadows. Lolo Pass's Packer Meadow and the Big Hole are great places to wander through fields of camas.

G. Trillium - *Trillium ovatum*

Think threes! Look for three triangular, deep green leaves topped by three bright white, triangular petals (and if you look close, you'll see three narrow green sepals beneath the petals, too). Trillium is found in moist or wet woods at low to mid elevation.

H. Bitterroot - *Lewisia rediviva*

Our state flower is a showy one, and well worth tracking down in dry grasslands and rocky slopes (such as Waterworks Hill in Missoula). The flowers have many petals which are vividly pink with pale centers, and grow low to the ground. By the time the flowers bloom, the leaves are often withered and gone.

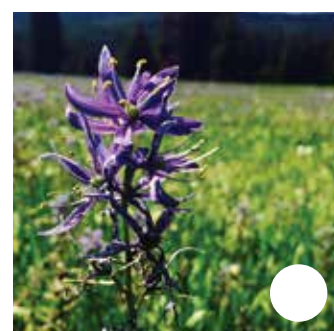
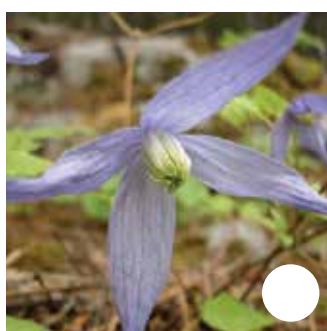
I. Beargrass - *Xerophyllum tenax*

When it's blooming, beargrass is hard to miss. Found in mid to high elevations in open woods, meadows, and clearings, masses of blooming beargrass look like white globes floating a few feet above the landscape. The long stem (up to four feet tall!) rises up from a clump of wiry, grass-like leaves, and atop this stem is a bulb-like cluster of myriad tiny white flowers.

J. Glacier Lily -

Erythronium grandiflorum

These bright golden flowers bloom at the top of slender stems, their petals and sepals curving backward while the yellow stamens hang down. Found in moist mid to high elevation shaded sites and meadows, these lovely, graceful lilies bloom shortly after the snow melts, so look for them at lower elevations in spring and in the high country come summer.



I. Beargrass
B. False Hellebore
C. Clematis
F. Camas

ANSWER TO QUIZ, left to right each row:
A. Blanketflower
J. Glacier Lily
G. Trillium
D. Indian Paintbrush
E. Scarlet Gilia
H. Bitterroot

BEARGRASS, BITTERROOT, BLANKETFLOWER, CAMAS, GLACIER LILY, AND PAINTBRUSH PHOTOS BY ALLISON DE JONG; CLEMATIS, FALSE HELLEBORE FLOWER, AND TRILLIUM PHOTOS BY GREG PETERS; FALSE HELLEBORE PLANT PHOTO BY WALTER SIEGMUND



Going Native with Butterfly Properties: *Bringing Wildness into Your Own Backyard*

BY ALLISON DE JONG

Walk through any neighborhood in Missoula—or, for that matter, in any town in Montana—and what you'll mostly see is lawn. Grass. Sure, there are the ubiquitous Norway maples, a few other species of trees, various shrubs and flowers, maybe even some vegetable gardens, but mostly just a lot of grass.

Marilyn Marler and David Schmetterling are working to change that, one yard at a time. They started with their own, an ongoing project that is nearly two decades in the making. Their small lot in the heart of Missoula has no lawn. Instead, it's home to more than one hundred species of native plants; a thriving vegetable garden; and colorful, gorgeous structures including a greenhouse, a grill shed with a green (living) roof, and a chicken coop. It's also a haven for wildlife, attracting over seventy species of birds and hundreds of varieties of insects.

"Too often people think of their landscaping as being somehow apart from the natural world," David says. "But plants really define a sense of place. We wanted to go out in our backyard in the morning and see the plants that are growing on the hills, on the prairie here."

More and more, other homeowners want to re-envision their yards as well. But most people have little or no background in gardening or landscape design, and aren't sure where to start. Many of David and Marilyn's friends and acquaintances were inspired by the work they'd done in their own yard, and the couple found themselves being asked more and more for their advice.

"People really want for you to go to their house," Marilyn says. "Because every yard is a little different. And people need encouragement, and a plan." So Marilyn and David founded Butterfly Properties, a business that provides garden coaching and consultation, bridging the gap between friends offering a little advice and a landscaping company that takes care of every last detail. David and Marilyn meet with homeowners, providing ideas for design, plant selection, hardscaping, and various structures. They don't do installation, instead working with their clients to determine exactly what they want from their yards, and making recommendations according to those interests.

"So much of landscaping and what people think they have to have is based on some notion of what they're supposed to do," says David. "We try to get people to articulate what they want their yard to be like—to figure out what they really want, and to accommodate that in a plan." And of course Butterfly Properties' plans always incorporate native plants. "Your yard doesn't have to be about work, or fighting nature," David continues. "By planting plants that are adapted to this climate, this environment, it can actually be quite easy to grow things."

Another part of Marilyn and David's purpose in creating Butterfly Properties was to invest more in their neighborhood and give back to the community. In addition to landscaping the yard at Home Resource, they have transformed an in-between

community focus



David and Marilyn's garden is full of eye-catching features, with most of the structures built from creatively-repurposed materials.

bit of public space down the street into an attractive pocket park, full of native plants, interpretive signs, and even wildlife. They also host a wildly popular annual garden tour and plant sale, donating the proceeds to a different local non-profit every year.

David and Marilyn have found a way to make a difference, starting in their own backyard—and they're empowering other people to make a difference, too. "Imagine if one yard on every block, or a part of every backyard, was dedicated to wildlife," Marilyn says. "We can all help make the world a more amazing place." 🦋

To learn more or schedule a consultation, visit butterflypropertiesllc.com. For further inspiration (and lots of great pictures), you can also check out David's blog: montanawildlifegardener.blogspot.com.

imprints



Join Us in Navigating Our Changing World

MNHC has a new lecture series, all about climate change. We know that humans are changing Earth's natural systems in rapid and unprecedented ways. This has propelled our planet into a new geologic era: the anthropocene. How do we navigate these changes we've caused, where can we have positive impacts... and where do we find hope? We're bringing in six experts with a diversity of perspectives to speak on these very things. Join us!

Upcoming speakers:

Nicky Phear, May 10th: THE NEXT GENERATION OF CLIMATE CHANGE: Students and Solutions

Jakki Mohr, September 20th: BUSINESS INNOVATIONS INSPIRED BY NATURE: Biomimicry

Jedediah Brodie, October 18th: BIODIVERSITY IN A CHANGING CLIMATE

Dan Spencer, November 8th:

KNOWING EARTH, LOVING EARTH: Ethics and Science in the Anthropocene

For more information and to purchase tickets, visit MontanaNaturalist.org/climate-change

SPOTLIGHT:



Introducing Jenelle Dowling

We are happy to welcome Jenelle Dowling to the MNHC staff! Jenelle began training as a biologist at the University of Maryland, Baltimore County. She completed her graduate degree in behavioral ecology at Cornell University in New York. Before and during graduate school, she conducted field research in many remote, beautiful, and scientifically interesting locations, with many fascinating species. Jenelle is a dedicated

educator and has had diverse experiences in different teaching contexts, including higher education, early childhood, K-12, prison education, and public outreach. She is a naturalist in her free time and an amateur natural sound recordist, who spends her free time exploring the mountains and following animal sounds with her partner, Cedar.

Jenelle is coordinating our brand-new Wings Over Water Osprey Program, which we are piloting this year. This program (in collaboration with Erick Greene at UM) will incorporate research, education, and conservation, and center on one of Montana's loudest and most charismatic birds!

Thank You, Board Members!

Last year, Ryan Huckleby and Kris Litz rotated off the MNHC board after several years of service. We so appreciate the time and energy they gave to MNHC over the years! And we're grateful they're continuing to be involved in other ways—serving on committees and providing support to various programs. Thank you, Kris and Ryan!



Show Your Support with an MNHC License Plate!

You've probably seen those beautiful Great Horned Owl license plates around...and now is a great time to get your own! MNHC license plates are available at your local County Treasurer's Office. Purchasing this lovely plate is yet another way to support your favorite Montana non-profit! Our plate features artwork by Bitterroot artist Joseph Thornbrugh and design by Missoula's Eileen Chontos.

The first-time cost is \$40, which includes a \$20 donation to the Montana Natural History Center. Renewal fee is only \$20, all of which goes to MNHC!

You don't have to wait until your current plates expire, so buy today!

Become a Member of the Montana Natural History Center!

MNHC members get all kinds of great benefits: free admission to our Center; an annual subscription to *Montana Naturalist* magazine; discounts on MNHC classes, programs, and summer camps; and, through our participation in the Association for Science-Technology Centers' passport program, reciprocal admission to more than 300 science centers in North America. Check out astc.org for a complete list of participating centers.



One of our newest member benefits is free use of our Naturalist Backpacks!

Borrow one for a couple of hours or the whole day. Stocked with binoculars (for both adults & kids), field guides, colored pencils, and other naturalist tools, it's a perfect addition to your outdoor explorations. \$5 rental fee for non-members.



We offer three membership levels: \$35 individual membership, \$60 family membership, and our \$75 grandparent membership, which is a great option for the whole family—it includes you, your children, grandchildren, and any other family/visitors.

Join us...renew your membership or become a member today!

Save the Date for our Annual Banquet and Auction!

Saturday, September 30th
5:00-9:00 p.m.
University Center Ballroom

Join us to support and celebrate the Montana Natural History Center with dinner, drinks, conversation, and our fabulous live and silent auctions!



2017 Summer Outdoor Discovery Day Camps

Geology Rocks! 1st - 5th grade
June 12-16

Wild Wanderers Pre-K - 5th grade
June 19-23

Fantastic Fish and Where to Find Them
Pre-K - 5th grade
June 26-30



Birding Bonanza! Pre-K - 5th grade
July 10-14

Habitat Hunt Pre-K - 5th grade
July 17-21

Expedition: Explore! 1st - 5th grade
July 24-28

Backcountry Biologists 6th - 8th grade
July 25-28

Wonderful Wetlands Pre-K - 5th grade
July 31-August 4

Phenomenal Forests Pre-K - 5th grade
August 7-11

Nature's Greatest Hits Pre-K - 5th grade
August 14-18

Each week, all camps will focus on the same nature-related topic, but students will be divided into age groups, and activities will be geared towards students in a specific grade range (Pre-K-K, grades 1-2 and 3-5). We are offering one middle school camp in which campers will learn about Montana's ecosystems as well as basic outdoor skills, and get to go on a two-night camping trip.

To learn more and to register, visit
MontanaNaturalist.org/summer-camps.



As To The Mission:

As I write this, spring is bursting forth across Montana. Red-winged Blackbirds have been chitting, chakking, and displaying for well over a month. Buttercups light up the countryside. And two weeks ago, a pair of Ospreys arrived at a nest site a quarter mile from our Center, as the Osprey flies.

Ospreys are fascinating birds. They are one of only six bird species with a global distribution, found on every continent except Antarctica. According to the Cornell Lab of Ornithology, Ospreys' range in North America is expanding, and breeding Osprey can be found across most of Montana. To paraphrase UM Professor Erick Greene, where there's water, there's Osprey—which means that almost every school in Montana is within a few miles of an Osprey nest.

It is this great access and the sheer awesomeness of Ospreys that led the Montana Natural History Center and partners at UM Wildlife Biology and SpectrUM to develop an exciting new program to engage middle schoolers in science, technology, engineering, and math. And of course we had the perfect name for our new endeavor: Wings Over Water—WOW for short.

WOW will engage participating schools in real science and provide interaction with their local Ospreys. Multi-day, interactive, and field-based summer institutes at the University of Montana will train teachers to be Osprey experts, and they'll return to their classrooms with our unique and interactive STEM curriculum. During the school year, teachers and WOW staff scientists will lead field trips in which students participate in authentic Osprey research. WOW will also connect middle school classes with expert ecologists, physicists, and engineers so students can build relationships with diverse mentors and stay engaged in science and math.

We are just beginning this exciting WOW journey, and we invite you to come along! Please visit our website at MontanaNaturalist.org to contact us, make a donation, or learn more.



Thurston Elfstrom,
Executive Director



Kids love doing science! These young naturalists get to participate in an Osprey banding project.



The **Museums for All** program provides scholarships to non-profit organizations that work with at-risk youth in the community, ensuring that every child has access to hands-on nature education.

If you work with or know of an organization that would benefit from this program, please contact Stephanie at spotts@MontanaNaturalist.org.

THE MONTANA
NATURAL HISTORY
CENTER

thanks



**Montana
Rail Link**

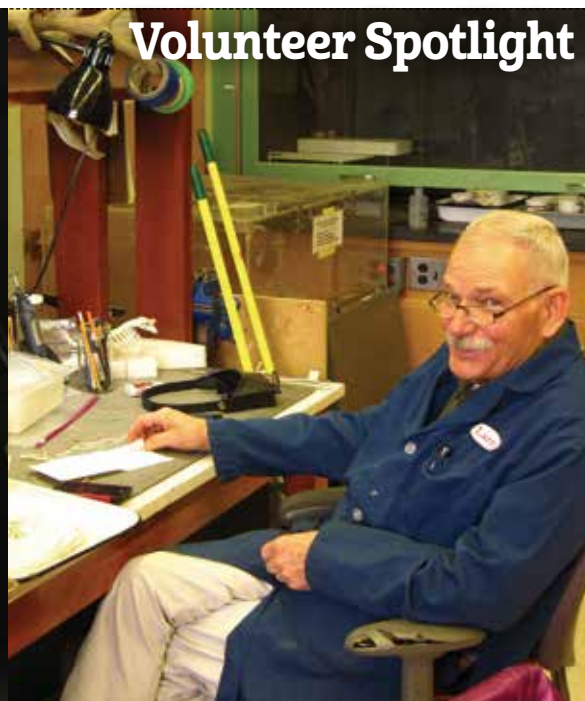
*for
supporting
our*

**MUSEUMS FOR ALL
PROGRAM!**

Larry DePute, Skeleton Articulator

BY ALLISON DE JONG

“Every bird is built a little bit differently. Some of the ways the bones flow—the lines are just beautiful.”



Larry DePute is not your average volunteer. (Well, none of our volunteers are average.) But the volunteer work that Larry does for the Montana Natural History Center is unique. A retired physician assistant and pilot who spent 35 years in Juneau, Alaska, Larry’s interest in anatomy, flight, and natural history has spanned decades. When he and his wife Connie got involved with MNHC nearly four years ago, those interests combined in an unexpected way.

It began with a dead Bald Eagle. Through a permit processed through the University of Montana, Larry was able to collect the skeleton for us. A few months later, he came across *How To Build A Bird* by Lee Post, a book about articulating skeletons (the skeletal version of taxidermy). His knowledge of human anatomy inspired a parallel fascination with bird anatomy, and Larry dove into his first project: carefully putting all those Bald Eagle bones back into place. When the attractive result was hung in the MNHC exhibit area, he asked us, “What next?”

We directed Larry to our collection freezer. (When people find dead animals, we are often the first place they call!) Over the last year, Larry has unearthed many a treasure from our freezer, articulating a Great Blue Heron, a Great Horned Owl, a Trumpeter Swan, an American Pelican, and now, a Sandhill Crane.

To learn more about Larry’s process, I recently visited him at the UM Zoology Museum prep lab, where curator Libby Beckman has generously given him space to work. Larry sat at a table covered with trays and jars of bones, as well as various adhesives, wire, and other tools. After skinning and gutting a bird and then cleaning as much meat off the bones as possible, Larry places the skeleton in the dermestid beetle colony living in a large plexiglass cage in the corner. The scavenger beetles get into every nook

and cranny, stripping off the rest of the meat. Large birds like a Sandhill Crane or Trumpeter Swan can take a couple of weeks to be fully cleaned.

The next step is washing the bones in warm, soapy water to remove the dead beetles and detritus. Then, since many bones are filled with oil, Larry degreases them by soaking them in acetone or lacquer thinner. Next comes the bleaching process: either brushing the bones with hydrogen peroxide or soaking them in it overnight. Finally, when the bones are clean and white, it’s time to build the bird.

Larry has articulated so many birds by now that he can almost instantly pick out what bone is what and where it goes. He sets the ribcage in a foam block, determines the angle of the neck and spine, and, using small wires and superglue, pieces the bones together. If a bone is broken, he’ll put it back together; if one is missing he’ll fabricate a new one; and if some of the bones are rough or cracked, he’ll fill them in with molding paste. Because his projects are for “show and tell” rather than research, he works to make the finished product as attractive as possible, mounting the birds on wall plaques or platforms, sometimes creating a little bit of habitat.

“It’s been such an education,” says Larry. “Anatomically this has been a lot of fun. Every bird is built a little bit differently. Some of the ways the bones flow—the lines are just beautiful.”

Indeed they are. And now, thanks to Larry’s curiosity, talent, and dedication, anyone can appreciate that beauty simply by stopping at MNHC and taking a look at the intricate interior structure of our feathered friends.



TOP LEFT:
Larry’s first project,
a Bald Eagle skeleton.


ABOVE:
After the bones have
been cleaned by the
beetles, Larry organizes
them, making sure
they’re all accounted
for. The darker bones
in the above photo are
still oily and will need to
be degreased.



Sandhill Spring

BY CLAIRE VORIS

I cannot see the cranes this morning, but I can hear them. They are somewhere in the basin of the valley where the yellow, cow-cropped grasses end and the thicket around the water begins. The Sandhills arrived the night before as a wild flurry of sound, drifting in just after dusk when the silhouette of mountains against sky became



*This way it's like listening
to ghosts, to the echoes of
birds from millennia before.*

PHOTO BY BRIAN GRATWICKE

black on midnight blue and I could not make their bodies out against the dark. I wonder how the cranes knew about the water. Was it the sharp smell of melt? Could they hear the trickle of liquid around rock? Or was it the outline of the snow-fed creek in the moonlight, like the white space between a fingerprint's arcs and whorls, that was so identifiable from the air? Here, one of the cranes called back to the others, *it was safe here once*.

On this lazy Sunday just outside Missoula, I can hear only two cranes from the former flock. Perhaps these are the late sleepers, the teenagers, left by the wayside as the larger family group launched back to the migratory

grind and headed north to their breeding grounds. Spring is the season of courtship, and what I'm listening to may well be the first pairing of lovers who will mate for life. If this is so, they aren't worried about being overheard—their flirtation carries across the dry, flat pasture and up the hill to where I stand. One starts, the other interrupts and finishes. How to describe? The verbs I dredge up don't do their conversation justice. To *chortle*, *clack*, and *coo* are not elegant effects, but *sensuous*, *amorous*, *ardent*—these are the modifiers I am grasping at. I grow tired on my hill trying to come up with ways to bridge the gap between what I hear, *seduction*, and the limitations of our words for sound; a *gargle*, even a *delicate gargle*, lacks the appropriate dose of sex appeal.

The shallow creek that feeds its way, hand over hand, down the rope of its body to the Blackfoot River, has been here for eons. But the water is always cutting new patterns, picking up and depositing sediment in slightly new arrangements with each spring swell. I imagine it like the long-hand of a hurried signature, changing slightly with each new iteration, but always recognizable. How ancient is the bird-memory of a place like this? A ten million-year-old crane fossil was discovered along the Nebraska stretch of the Platte River, where hundreds of thousands of Sandhill Cranes still gather to feed and rest along their migratory route. Today, in western Montana, I listen to the descendants of that bone as they flirt in the bushes. *Yes, my long-necked dearest*, the species will continue.

The *warbling* of the Sandhills bounces between sweating mountains and rolls along the valley floor. In this amphitheater, they are impossible to triangulate, another reason this place may have survived in the memory of safe passage. I give up on finding long, gray bodies with red kerchief caps. This way it's like listening to ghosts, to the echoes of birds from millennia before. When the cranes pause between sweet nothings I catch myself wondering if I'd heard anything at all. Perhaps I had just willed a love story into the barren pre-green spring. The wind rustles the stalks of last year's growth around my feet. I stare beyond the naked but soon-to-bud thicket, and I listen hard. Without crane song, there is only time, water, wind—the elements that persist regardless if the mated pair and I were here to notice. I turn away, walk back toward my responsibilities in places where none of these elements exert so hard a pull. As I do, the Sandhills begin again. It is a particular relief of spring, I think, to overhear two lovers celebrate the coming of the season. 🦢

—Claire Voris is a graduate student at the University of Montana. She will be graduating this spring with her MFA in creative nonfiction writing.



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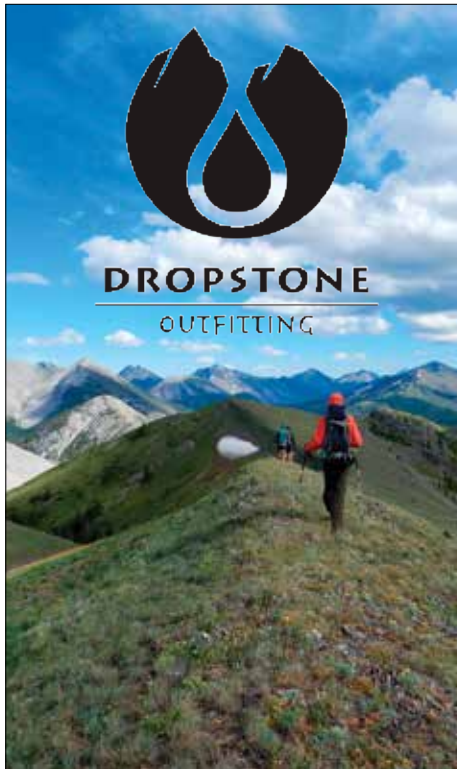
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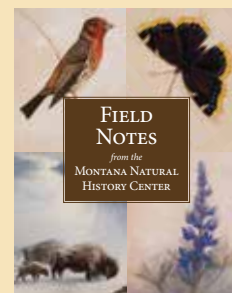


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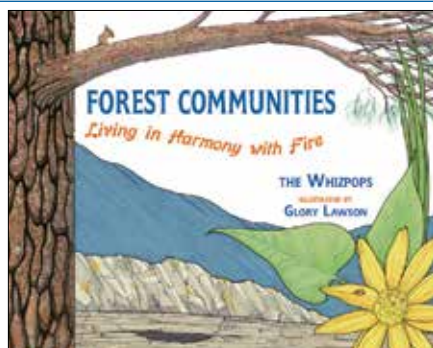
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Learning to See: *Nature Journaling with Nancy Seiler*



This past winter, Missoula artist Nancy Seiler led several Sip & Sketch evenings at MNHC, focusing on butterflies, birds, and bugs. Some participants hadn't taken an art class since high school; others have never stopped drawing or painting. But everyone enjoyed getting to look closely at one specimen, study it, and recreate it with pens, pencils, and paints. Here are some of their creations!



"I have learned that what I have not drawn I have never really seen, and that when I start drawing an ordinary thing, I realize how extraordinary it is, sheer miracle."

~ Frederick Franck, *The Zen of Seeing*





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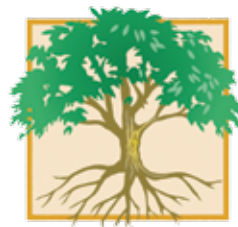
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