Spring/Summer 2013

MONTANA Naturalist

All About Bones

Protecting Wolverines

Arrow-leaf Balsamroot

Guide to MNHC Summer Camps Inside!

page 9

Montana Natural History Center
Connecting People with Nature

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

Spring/Summer 2013

MONTANA Naturalist

Features

Departments

Special Pull-Out Section

Ken Curtis

Cover – A gopher snake curls up at 9000 feet in the Madison Range. "I was surprised it was so high up the mountain," said photographer Pat Clayton.

Check out more photography on his website, www.fisheyeguyphotography.com.

Montana Natural History Center
Connecting People with Nature

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Photo by Allison De Jong

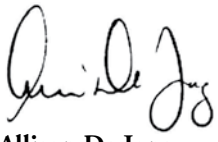
An uncommon white shooting star blooms on Waterworks Hill in Missoula.

As I write this, the sun is flaming the western clouds after shining brightly on a brilliant April day. I love springtime in Montana, whether the days be warm and sunshiny, giving color to our winter-white skin; cool and rainy, bringing out the green on the hills; or even chilly and snowy, surprising us with a last wintry burst. No matter the weather, we can get out into nature—or find ways to keep learning even while staying inside.

On those warm bright days you could wander out into the wilds and look for bones, testing your identification skills (page 4), or hike up a sunny hillside and glory in the carpet of yellow that is arrow-leaf balsamroot in the spring (page 14). On a cold, rainy day, try hunkering down with a cup of tea and watching an episode or two of "The Brain Scoop" with Emily Graslie of the University of Montana Zoological Museum (page 13). Or read up on wolverines and take the time to submit a comment about their proposed listing under the Endangered Species Act (page 6). You can even bring your technology outdoors and use your smartphone (if you have one) to get involved with a variety of great citizen science projects (page 9). Or start making your summer plans and sign your kids up for one—or more!—of our fantastic summer camps (page 16).

Whatever the weather, I hope that the changing season inspires you to keep finding new ways to connect with nature and enjoy the beauty that is never more than a few steps away for those of us fortunate enough to live in Montana.

Happy spring!



Allison De Jong
Editor
adejong@MontanaNaturalist.org

Bone Up on Bones!

Story and photos by David Dyer

Fig. 1 Metatarsal and metacarpal of a white-tailed deer.

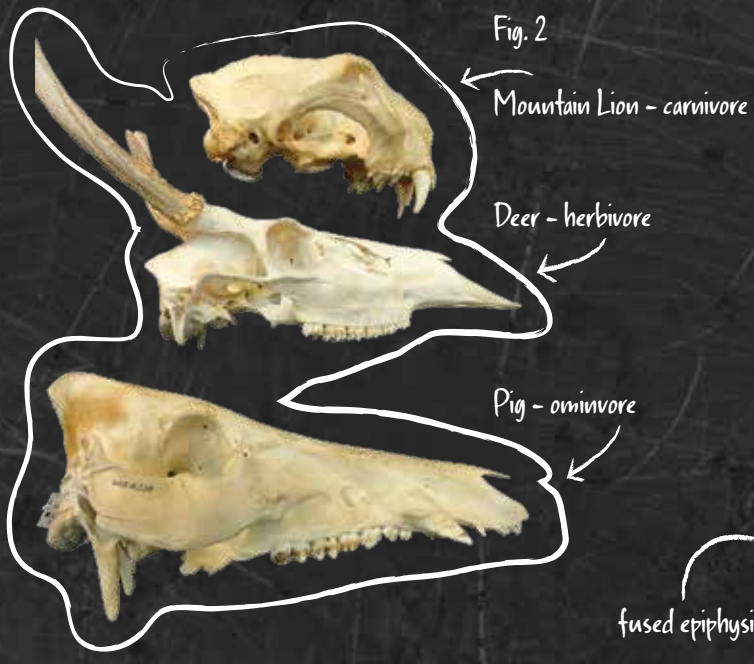


Fig. 3 Tibias of an adult and juvenile coyote.

When hiking in Montana's forests or mountains you will often come across bones or skulls of various animals, especially if you learn to be on the lookout for them. Some wildlife species, especially mammals, are nocturnal or have secretive habits and are not commonly seen. Skeletal elements, such as bones, skulls, and teeth are often the only remaining evidence of these elusive animals.

But what can you tell by looking at a bone or part of a skull? Aren't they just "old bones" with nothing to tell us? Well, no. In fact, after getting used to looking at bones and some practice keying out skulls using guide books, you can start to piece together the stories of the skeletal elements that you find. The first thing people always want to know is, "What species is it from?" Sometimes the answer is obvious, as with the skull of a bison or a skull with antlers from a mule deer. Other specimens are more difficult and will take practice and time to learn. This is the challenge—and the fun—of bone identification! Sometimes you can identify bones using guidebooks, but particularly difficult ones may need to be taken to a museum for comparison with known specimens.

In the field you may not always be able to make the correct species identification, but there is still much you can tell about the animal. Bone identification can be like detective work; look for clues in the bones themselves. Does the animal have elongated, fused bones in the feet (metapodials)? *[see figure 1]* That can give you a clue that the animal has modified feet for fast running, and the bone is likely from a large ungulate such as a deer, elk, or pronghorn. Does the animal have widened upper limb bones (femur, humerus)? If so, it may be a swimmer with wide modified limbs for pushing water, like a beaver or muskrat. Or maybe the bone is very thin and light, which is a clue that it's a bird bone.

If you're lucky and find a skull or jaw, the teeth will tell you many things about the animal. Mammals eat a large variety of foods, and thus have very specialized teeth. With a little practice you'll be able to identify the animal's species based on the appearance of the teeth—and not only

Bone Identification at the Zoological Museum

At the Philip L. Wright Zoological Museum at the University of Montana, we assist many people in the identification of skeletal specimens from across the state. The museum contains a huge comparative collection of skulls and post-cranial skeletons, and it's an excellent resource for bone identifications. We work regularly with archaeologists, identifying and analyzing hundreds of fragments of animal bones and teeth from archaeological sites. Wildlife biologists sometimes need bones identified from scats of wolves or other carnivores when conducting research on food habits. *[see figure 6]* We also assist the State Crime Lab and UM Anthropology Department in identifying bones that are sent into the lab from sheriff's departments around the state. Animal bones sometimes turn up in human forensic cases and arrive at our museum for species identifications. We are also involved in the up-and-coming field of wildlife forensics. This deals with animal remains that are involved in legal cases. As such, we've helped state game wardens on poaching cases where correct identification of skeletal specimens was critically important.

But the most fun is looking at what people discover while hiking, digging in their gardens, or exploring a riverbank! We've seen it all, from the finds that turn out to be common species such as deer, elk, cattle, horses, and bears, to extinct Ice Age species, to, well . . . the more unusual! Once

Fig. 4 Fractured and healed black bear humerus, from gunshot injury (left), and normal humerus (right).

Fig. 5 Bacterial infection in a bighorn sheep mandible (lower), and normal mandible (upper).

Fig. 6 Bones and teeth from a great horned owl pellet.

Disclaimer: Though we discuss the study of animal bones in the field, please note that many species are regulated by state and federal wildlife laws. This includes–among others–endangered and threatened species, all migratory birds, and game species. The laws may also cover animal parts, including bones. Please, never collect bones without knowing the laws and proper permits needed. Also be aware of potential health hazards from handling animal remains; latex or nitrile gloves are recommended.

that, but you'll be able to make inferences about its food habits as well. Is it a carnivore, herbivore, or omnivore? *[see figure 2]* Is it a grazer or browser? The teeth will tell you! Also, teeth are a good indicator of the animal's age. Greatly worn teeth are usually from an older animal, while less worn teeth mean it's from a younger one.

Another way of determining the animal's age are the epiphyses, which are the ends of bones that, when an animal is young, are still separate from the main bone shaft, but become fully fused to the shaft by the time the animal reaches adulthood. *[see Figure 3]*

Once you get all these basics down, then it's fascinating to try to make inferences about the life and death of the animal. A surprising number of skeletal specimens found in Montana show evidence of healed fractures. *[see figure 4]* These mostly arise from gunshots, being hit by cars, and from inter- and intra-species competition. The severity of injuries that wild animals can suffer and still survive with no medical treatment is impressive. Other bones may show signs of obvious diseases, such as bacterial infections in the jaw or in long bones. *[see figure 5]* It may be possible on some occasions, but not always, to identify the cause of death.

So the next time you're out tramping about in the Montana wilds and find, say, a jaw bone, instead of saying, "Oh, it's just some old bone," with just a little study you can do a much fuller interpretation: "Oh, this is the left mandible from a large ungulate; it's an herbivore, and it has teeth adapted for browsing rather than grazing; it lived to full adult age; it suffered from an abscess probably resulting from this food still impacted between its teeth . . . and it's from an elk!" Won't your friends be impressed?

—David Dyer is the Curator of the Philip L. Wright Zoological Museum at the University of Montana, and owner of the consulting business Osteo-Identifications. He is also on the Board of Directors of the Montana Natural History Center.

Part of the comparative skeletal collection at the Philip L. Wright Zoological Museum.

we got a call about a cranium found deep in the woods of Alberta, Canada. It was rounded, like a human skull, and the discoverer was sure it was the first physical evidence of Bigfoot! We were stumped at first, although we could rule out a bipedal creature because of the positioning of the opening for the spinal cord. Turns out it was a well-worn partial skull of a caribou. The antlers had broken off and the entire braincase had been eroded to a rounded appearance from being tumbled in a river. So you never know what you may find, and it's always fun for us at the museum to see the next discovery and to help teach people about wildlife and natural history.

What's Next for Gulo gulo?

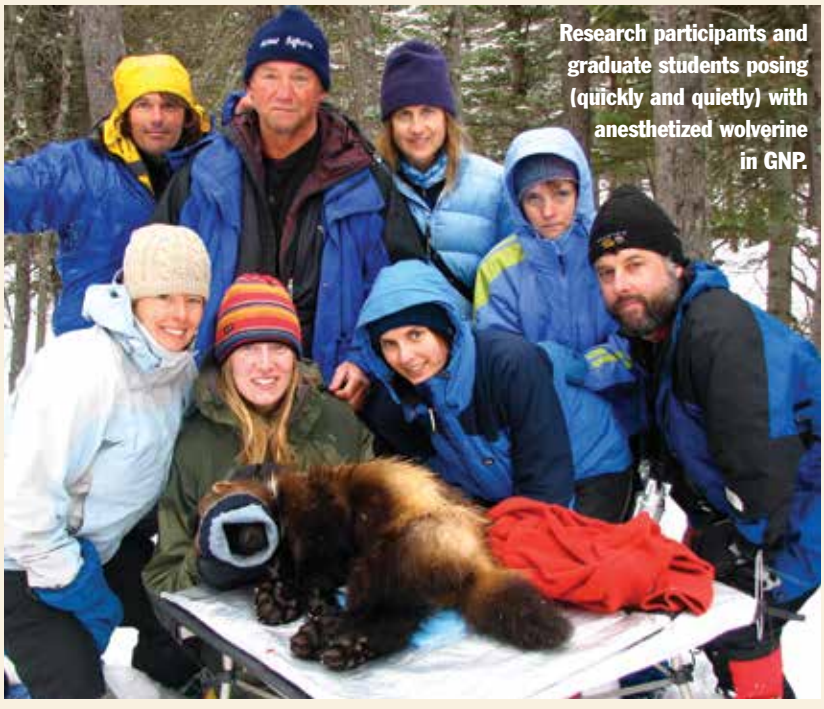
Cool Critters, Warming Planet

By Kylie Paul

"RRRRRRRrrrrrrrr…." It was the coolest sound I had ever heard. Emanating from a live trap built out of logs, the sound was a growl from a 30-pound creature that had transformed into a dragon, or maybe a dinosaur. To confirm it was a wolverine—a big cousin of the weasel—and not a pterodactyl, I peered in, then jumped back immediately as the bundle of brown fur rushed toward the trap opening and snarled at me. No wonder these fearless animals have been known to chase grizzly bears off a carcass, and one was documented charging straight up the last 5,000 feet of the tallest peak in Glacier National Park in 90 minutes . . . in winter.

In 2006, I had the opportunity to spend a weekend on the wolverine research project in Glacier National Park with a University of Montana graduate school class, and we were lucky enough to be there to capture a wolverine in a live trap. It was surreal to be able to touch its oversized paw, long crampon-like claws, and dense fur, while it was anesthetized and as the biologists were gathering data from the individual. I'd been around wildlife trapped for research before, having worked on wolf, prairie dog, and songbird field projects. But this was different. I knew this might be the only wild wolverine that I would ever see. I was face to face with one of the rarest and toughest critters in the lower 48, one whose future remains all too uncertain.

Flash forward to 2013. I now work for Defenders of Wildlife, a national nonprofit organization with offices in Montana. We focus on conservation of imperiled wildlife, and the primary species I work on is none other than *Gulo gulo*, the wolverine. It is a fascinating animal, full of apparent contradictions—solitary and territorial yet family-oriented, tough as nails yet vulnerable to disturbance, slowly expanding its range in recent years yet with grim long-term prospects. Wolverines have eked out a living under tough conditions in the past, but the danger of climate change melting away their snowbound habitat looms large in the near future.



Research participants and graduate students posing (quickly and quietly) with anesthetized wolverine in GNP.

Big feet for a small creature: perfect crampon-studded snowshoes!

Log trap used to safely capture wolverines for research in GNP.

Photos by Kylie Paul

Photo © Lynne Stone, naturepl.com

Wolverines are northern creatures with two subspecies. The Old World wolverine is found in Europe and Asia (Norway, Sweden, Finland, Russia, China, Mongolia), and the New World wolverine is found in North America, where they thrive in Alaskan and Canadian boreal forests, tundra, and alpine habitats. The southern portion of their range extends into the lower 48 states, where warmer ambient temperatures restrict wolverines to high elevations. They live in rugged, remote country, spending most of their time in mountain ranges near or above timberline.

By the early 20th century, wolverines were mostly killed off from much of their range in the lower 48 due to indiscriminate predator control and unregulated trapping. However, it appears they have been slowly recolonizing their former territory over the last several decades. They currently are found in the North Cascades Range in Washington, in the Wallowa Range in eastern Oregon, and the northern Rocky Mountains of Montana, Idaho, and Wyoming. Wolverines once existed in the Sierra Nevada Mountains of California and the southern Rocky Mountains in Colorado, and in the past few years, a single male wolverine has migrated back to each area.

Biologists estimate there are currently fewer than 300 wolverines in the lower 48. Wolverine populations here have likely always been small, relative to other wildlife species. For comparison, Glacier National Park supports the densest populations of wolverines in the contiguous U.S. with 40 to 50 individuals, whereas its population of grizzly bears is about 250. Elsewhere wolverines generally exist at very low densities due to inhospitable habitat conditions, low prey densities, and the resulting need for huge territories. Additionally, wolverines have one of the lowest reproduction rates known for mammals. Most troubling is that biologists estimate as few as 35 wolverines are breeding in any given year, which can severely diminish the genetic diversity needed for the species' long-term survival.

Meanwhile, wolverines' biggest challenge is approaching, as their snowbound habitat is expected to steadily decrease. And wolverines need snow. Female wolverines give birth in dens dug deep into snow that lasts until late spring, providing warmth and shelter for their young. Yet areas that maintain spring snowpack are threatened by climate change. The U.S. Fish and Wildlife Service (USFWS) states that habitat is likely already reduced from historic levels due to climate change. Scientists predict that wolverines could lose 63 percent of their snow-covered habitat by 2099. The loss of spring snowpack may have catastrophic effects for wolverines—threatening the success of dens and the kits' ability to survive and thus decreasing the number of wolverines that can survive in the habitat that remains, making it harder to travel between patches of that suitable habitat, and eliminating populations from small mountain ranges that will no longer have enough snowy habitat.

It is a fascinating animal, full of apparent contradictions—solitary and territorial yet family-oriented, tough as nails yet vulnerable to disturbance, slowly expanding its range in recent years yet with grim long-term prospects.

These current and impending impacts to wolverine habitat from climate change are the primary reason the USFWS recently determined that wolverines warrant federal protection. On February 4, the USFWS proposed to protect wolverines as a threatened species under the Endangered Species Act (ESA). But the Act itself cannot halt climate change. Instead, the USFWS' proposed recovery outline discusses four ways to protect and restore the species: facilitate continued wolverine expansion, reduce human-caused mortality of wolverines, study possible human impacts, and monitor the population.

Resilience: Bolstering Populations

The best bet to secure wolverines' future is to help them more rapidly expand their population and reclaim habitat they once occupied. This can occur naturally as long as wolverines can move easily across the landscape, find good unoccupied habitat, and breed successfully. In areas with high-quality habitat far from existing wolverine populations, wildlife managers may need to assist with migration or reintroduce new animals. USFWS has identified several reintroduction areas, where good wolverine habitat is most likely to persist into the future, including the southern Rocky Mountains in Colorado, the Sierra Nevada Mountains of California, the Bighorn Mountains in Wyoming, the southern Cascade Mountains in Oregon, and the Uinta Mountains in Utah.

With talk of population expansion and reintroductions, it may sound like wolverines will be swarming all across the West. But keep in mind that wolverines exist at very low densities. They are not a threat to livestock or big game. And the vast majority of wolverine habitat in the lower 48—94 percent according to USFWS—is already federally owned and managed. More wolverines across the West will not impact most of us beyond knowing that wolverines have more places to call home and a better chance of long-term survival.

GNP Photo

There are several projects happening in wolverine country that use wildlife cameras and hair snares to try to document wolverine presence and obtain genetic samples. Here, a wolverine is climbing to get the bait in a hair snare tree, leaving its hair captured in wire brushes fastened to the tree.

Trapping

Other than Alaska, Montana is the only state that allows wolverine trapping. Until 1975, there were no limits on wolverine trapping in Montana. A statewide quota of 12 wolverines was established in 2004 then lowered to five wolverines in 2009. Five animals per year may not sound like a big deal, but to a species already facing the challenges of fragmented habitat and reduced genetic diversity, the loss of even a few breeding individuals can have a significant impact. The proposed listing likely means the closure of wolverine trapping in Montana and making it illegal to catch wolverines in traps set for other animals, giving wolverines one less challenge to overcome.

Human Impacts

In the USFWS' proposed listing, human activities such as land management, recreation, infrastructure development, and transportation corridors are not considered a threat to wolverines, citing a lack of scientific information regarding anticipated effects. Thus, the proposed listing will not curtail such activities across any part of the wolverine's range. However, given the increasing intensity of human activities in and around wolverine habitat throughout the West and the oft-mentioned sensitivity of wolverines during denning season, we should take care to study the potential impacts further. If research shows that human activities are a problem, we need to ensure that we will be able to make different management decisions in the future.

Research and monitoring

As the USFWS' draft recovery outline indicates, a range-wide plan is needed to monitor wolverine populations and genetic health. Due to their small population size, astounding mobility, and remote habitat, solid scientific information is expensive and difficult to gather. Public support for providing federal funds for this monitoring could make a difference.

Climate change is already stealing the snow that wolverines—and, indeed, skiers, snowmobilers, and other winter enthusiasts—need. Though they face big challenges on our warming planet, wolverines will be much better off with Endangered Species Act protections in place. By helping existing populations expand, finding more places for wolverines to again call home, with a solid recovery plan and a little luck, future generations of Montanans will have a better chance of seeing these elusive critters in the wild. And even if I never hear that guttural snarl again, I will have the satisfaction of knowing that wolverines still exist in our mountain landscapes.

—Kylie Paul has long worked with wildlife and played in snow. She now works for the national nonprofit Defenders of Wildlife, which has offices in Bozeman and Missoula.

Learn more! Act now!

One way to get involved in the proposed listing process is to submit a comment during the public comment period, which lasts until May 6, 2013. Head to www.regulations.gov. In the Keyword box, enter Docket No. FWS–R6–ES–2012–0107. Then, in the Search panel on the left side of the screen, under the "Document Type" heading, click on the "Proposed Rules" link to locate this document. You may submit a comment by clicking on "Comment Now!"

Other wolverine resources:

- "Chasing the Phantom," a great PBS NATURE film
- *The Wolverine Way*, by National Geographic writer Douglas Chadwick
- The Wolverine Blog: www.egulo.wordpress.com
- The websites of the Wolverine Foundation (www.wolverinefoundation.org) and Defenders of Wildlife (www.defenders.org)

MNHC Photo

Spring Mushrooms with Larry Evans

Naturalist Field Days

With the growing number of Master Naturalist graduates, we wanted to offer these folks (and others wanting a more in-depth experience) continuing opportunities to develop and hone their naturalist skills. In the tradition of our high-quality Master Naturalist Courses, our Naturalist Field Days pair expert instructors with hands-on field experiences for truly engaging learning opportunities. Field Days offered in 2013 included advanced tracking and winter raptors in January and February, and for spring and summer we have the following topics in store: Spring Mushrooms with Larry Evans on April 20th; Ecology and Identification of Grasses with Peter Lesica on May 25th, and Dragonflies with Nate Kohler and Bob Martinka on August 3rd. Field days are $80 for non-members and $70 for members, with some scholarships available.

Grandparents: Explore Outdoors with Your Grandkids!

Come learn about and explore the natural world with MOLLI and the Montana Natural History Center this summer! Our two-day camp program includes field trips to local natural areas, exploration, an introduction to real-life science careers, and fun! During these two days, grandparents and kids will observe osprey being banded, learn about mark-recapture techniques through a fun activity involving crickets, participate in a point count and enter our data into the Cornell database, and learn about radio tracking and try it out in the field! This camp will meet at Fort Missoula and will run from 9:00-2:00 p.m. on Tuesday, July 9, and Wednesday, July 10. See www.umt.edu/molli for more information and to register.

MNHC Photo

Citizen Science + Smartphones

BirdLog app

While it's definitely necessary to give ourselves plenty of "unplugged" time, smartphones—and their apps—can be a great resource for nature lovers interested in assisting with a variety of citizen science projects. Here are a few apps that caught our attention:

BirdLog: Allows citizen scientists to upload bird sightings from the field directly to the eBird project of the Cornell Lab of Ornithology. This app makes it easy to tally birds as you go, thus providing a more accurate count and more precise locations. Available for both iOS and Android for $9.99.

BudBurst: An app for Project BudBurst, a citizen science and education campaign for the study of the timing of plants' flowering, leafing, and reproduction. The app makes it even easier for citizen scientists to log their observations of local trees, grasses, and shrubs throughout the year. Available for Android; free.

Meteor Counter Created by NASA for citizen scientists to report the time, place, and brightness of cosmic debris/meteors. Available for both iOS and Android; free.

mPING: Report precipitation falling in your area to NOAA (National Oceanic and Atmospheric Administration), with all submissions becoming part of a research project called PING (Precipitation Identification Near the Ground). Available for iOS and Android; free.

Project Noah: An app with the particularly ambitious goal of documenting the world's organisms. Citizen scientists can use the "spotting" feature, which includes taking a photo of the animal or plant and submitting the data, or they can get involved in a "field mission"—assisting with a specific project (logging bird migrations or invasive plant species, etc.) in their area. If you're not sure what you're looking at, submit a photo and let other citizen scientists help with identification! Available for iOS and Android; free.

What's Invasive: An app used for tracking the locations of invasive species. Look up a list (compiled by local biologists and rangers) of the invasives in your area, and, when you spot one, submit its location so that scientists can locate/study/remove it. Available for iOS and Android; free.

Special Pull-Out Section: pull out and post these pages for handy reference.

get outside calendar

April Gallery, all month. **UM Zoological Museum.**

April 17 **Volunteer Naturalist Training,** 3:30-5:30 p.m. **VNS Field Trip Training.** Learn how to teach kids about the flora and fauna of western Montana during the May VNS school field trips. No prior experience necessary.

April 17 **Glacial Lake Missoula Meeting,** 4:00-5:00 p.m. Free and open to the public.

April 18 **miniNaturalists Pre-K Program,** 10:00-11:00 a.m. $3; $1 MNHC members.

April 20 **Naturalist Field Day,** 9:00 a.m.-5:00 p.m. **Spring Mushrooms.** $80; $70 MNHC members.

April 24 **Evening Lecture,** 7:00 p.m. **Naturalist Trivia Night.** $4 suggested donation; MNHC members free.

April 27 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Animal Locomotion.** $3; $1 MNHC members.

May Gallery, all month. **UM Zoological Museum.**

May 1 **Science & Nature Book Club,** 7:00-8:00 p.m. Free.

May 2 **miniNaturalists Pre-K Program,** 10:00-11:00 a.m. $3; $1 MNHC members.

May 2 **Native Plant Gardens Program,** 5:30-7:30 p.m. **Garden Design with Native Shrubs.** $5 suggested donation; MNHC members free.

May 4 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Animal Wonders Inc.** $5; $3 MNHC members.

May 11 **Saturday Discovery Day,** 9:00 a.m.-3:00 p.m. **Project Learning Tree Educator Workshop.** $35; $30 MNHC members.

May 15 **Glacial Lake Missoula Meeting,** 4:00-5:00 p.m. Free and open to the public.

May 16 **miniNaturalists Pre-K Program,** 10:00-11:00 a.m. $3; $1 MNHC members.

May 25 **Naturalist Field Day,** 9:00 a.m.-5:00 p.m. **Ecology and Identification of Grasses.** $80; $70 MNHC members.

June Gallery, all month. **Emily Graslie: Still Life, Still Lives.**

June 5 **Science & Nature Book Club,** 7:00-8:00 p.m. Free.

June 6 **miniNaturalists Pre-K Program at the Fort Gardens,** 10:00-11:00 a.m. $3; $1 MNHC members.

June 6 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

June 6 **Native Plant Gardens Program,** 5:30-7:30 p.m. **Grasses to Plant, Grasses to Pull.** $5 suggested donation; MNHC members free.

June 7 **First Friday Gallery Opening,** 4:30-6:30 p.m. **Emily Graslie: Still Life, Still Lives.**

June 13 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

June 15 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Plants and Pollinators at the Gardens.** $3; $1 MNHC members.

June 19 **Glacial Lake Missoula Meeting,** 4:00-5:00 p.m. Free and open to the public.

June 20 **miniNaturalists Pre-K Program at the Fort Gardens.** 10:00-11:00 a.m. $3; $1 MNHC members.

June 20 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

June 20 **Native Plant Gardens Program,** 5:30-7:30 p.m. **Native Plant Identification.** $5 suggested donation; MNHC members free.

June 27 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

July Gallery, all month. **Emily Graslie: Still Life, Still Lives.**

July 11 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

April

MNHC Hours:
Tuesday-Friday, 9 a.m. - 5 p.m.
and Saturday noon - 4 p.m.

Admission Fees: $2/adults,
$1/children under 12 (maximum $6)
Free/children under 3 and MNHC members

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		April Gallery, all month. **UM Zoological Museum.** 16	**Volunteer Naturalist Training. VNS Field Trip Training,** 3:30-5:30 p.m. **Glacial Lake Missoula Meeting,** 4:00-5:00 p.m. 17	**miniNaturalists Pre-K Program,** 10:00-11:00 a.m. 18	19	**Naturalist Field Day. Spring Mushrooms,** 9:00 a.m.-5:00 p.m. 20
		23	**Evening Lecture. Naturalist Trivia Night,** 7:00 p.m. 24	25	26	**Saturday Kids Activity. Animal Locomotion,** 2:00-3:00 p.m. 27
		30	**May**	**miniNaturalists Pre-K Program,** 10:00-11:00 a.m.	**May Gallery,** all month. **UM Zoological Museum.** 3	**Saturday Kids Activity. Animal Wonders,** 2:00-3:00 p.m. 4
		Western tanagers arrive 7	**Science & Nature Book Club,** 7:00-8:00 p.m. 8	**Native Plant Gardens. Garden Design,** 5:30-7:30 p.m. 9	10	**Saturday Discovery Day. Project Learning Tree Educator Workshop,** 9:00 a.m.-3:00 p.m. 11
12	13	14	**Glacial Lake Missoula Meeting,** 4:00-5:00 p.m. 15	**miniNaturalists Pre-K Program,** 10:00-11:00 a.m. 16	17	18
Adult dragonflies escape from their exoskeleton 19	20			23	24	**Naturalist Field Day. Ecology and Identification of Grasses,** 9:00 a.m.-5:00 p.m. 25
26	27			30	31	**June** 1
		Science & Nature Book Club, 7:00-8:00 p.m. 5	**miniNaturalists in the Gardens,** 10:00-11:00 a.m. **Volunteer Day at the Fort Gardens,** 4:00-6:00 **Native Plant Gardens Program,** 5:30-7:30 p.m. 6	**First Friday June Gallery Opening,** 4:30-6:30. **Emily Graslie: Still Life, Still Lives.** 7		8
		12	**Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m. 13	*Chorus frogs chorus* 14	**Saturday Kids Activity. Plants and Pollinators at the Gardens,** 2:00-3:00 p.m. 15	

MNHC Photo

MNHC Photos

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

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
16	*June 17-21* **Fish, Frogs, and Pollywogs** (Pre-School) **Reptile Roundup!** (Grades 1-3) **Folklore, Fantasy, and Fables** (Grades 1-3) **Rocking Raptors** (Grades 3-5) 17	18	**Glacial Lake Missoula Meeting,** 4:00-5:00 p.m. 19	**miniNaturalists in the Gardens,** 10:00-11:00 a.m. **Volunteer Day at the Fort Gardens,** 4:00-6:00 **Native Plant Gardens Program,** 5:30-7:30 p.m. 20	21	22
23	*June 24-28* **Insect Insanity!** (Grades K-1) **Go Fish!** (Grades 1-3) **Naturally Spooky!** (Grades 1-3) **Wildlife Wizardry** (Grades 3-5) 24	25	26	**Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m. 27	 MNHC Photos	
30	**July** **July Gallery,** all month. **Emily Graslie: Still Life, Still Lives.** 1	2	3	*Bald eagle young fledge* 4		
Summer Outdoor Discovery Camps *See Imprints for details, page 14.*	*July 8-12* **Mini-Biologists** (Pre-School) **Art Adventure** (Grades 1-3) **Rockin' Rocks I** (Grades 1-3) **Wild Explorers** (Grades 3-5) 8	9	10	**Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m. 11	12	13
	July 15-19 **Predator Prowl** (Grades K-1) **Jr. Survivor Camp** (Grades 1-3) **Super Sleuths** (Grades 1-3) **Hooked on Fishing** (Grades 3-5) 15	16	**Glacial Lake Missoula Meeting,** 4:00-5:00 p.m. 17	**miniNaturalists in the Gardens,** 10:00-11:00 a.m. **Volunteer Day at the Fort Gardens,** 4:00-6:00 **Native Plant Gardens Program,** 5:30-7:30 p.m. 18	19	**Master Naturalist Field Weekend. Alpine Flowers,** 8:00 a.m. Saturday-5:00 p.m Sunday. 20
	July 22-26 **Animal Adventures** (Pre-School) **Mammals Galore** (Grades 1-3) **Mineral Madness** (Grades 3-5) **Backcountry Explorers** (Grades 6-8) 22	 29	**Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m. 25	**Go Tubing with a Naturalist,** 3:00-5:00 p.m. 26	**Saturday Kids Activity. What Lives in Silver's Lagoon?** 2:00-3:00 p.m. 27	
	July 29-August 2 **Hooray for Habitats!** (Grades K-1) **Garden Safari** (Grades 1-3) **Rockin' Rocks II** (Grades 1-3) **Color in Nature** (Grades 3-5) 28		**miniNaturalists in the Gardens,** 10:00-11:00 a.m. **Volunteer Day at the Fort Gardens,** 4:00-6:00 **Native Plant Gardens Program,** 5:30-7:30 p.m. 1	**August** **First Friday August Gallery Opening,** 4:30-6:30. **Wendy Evans.** 2	**Naturalist Field Day. Dragonflies and Damselflies,** 9:00 a.m.-5:00 p.m. 3	
	August 5-9 **Waddling Waders** (Pre-School) **Bugs and Slugs** (Grades 1-3) **The Earth's Timeline** (Grades 1-3) **Creepy Crawlies** (Grades 3-5) 4	5	6	**Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m. 7	**Go Tubing with a Naturalist,** 3:00-5:00 p.m. 8	**Saturday Kids Activity. Insects and Art at the Fort Gardens,** 2:00-3:00 p.m. 9
	August 12-16 **Wonderful Wetlands** (Grades K-1) **Jr. Naturalists** (Grades 1-3) **Adventures in Science** (Grades 1-3) **Eco Warriors** (Grades 3-5) 11	12	13	**miniNaturalists in the Gardens,** 10:00-11:00 a.m. **Volunteer Day at the Fort Gardens,** 4:00-6:00 **Native Plant Gardens Program,** 5:30-7:30 p.m. 14	15	*Perseid meteor shower* 16

get outside calendar

July 17 **Glacial Lake Missoula Meeting.** 4:00-5:00 p.m. Free and open to the public.

July 18 **miniNaturalists Pre-K Program at the Fort Gardens,** 10:00-11:00 a.m. $3; $1 MNHC members.

July 18 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

July 18 **Native Plant Gardens Program,** 5:30-7:30 p.m. **Seed Collecting with Native Ideals Seed Farm.** $5 suggested donation; MNHC members free.

July 20-21 **Master Naturalist Field Weekend: Alpine Flowers.** 8:00 a.m. Saturday to 5:00 p.m Sunday, with overnight camping, taught by Greg Peters and Brian Williams. $145; $130 MNHC members. Call 327.0405 to register.

July 25 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

July 26 **Go Tubing with a Naturalist,** 3:00-5:00 p.m., $5 suggested donation; MNHC members free.

July 27 **Saturday Kids' Activity,** 2:00-3:00 p.m. **What Lives in Silver's Lagoon?** $3; $1 MNHC members.

August Gallery, all month. **Wendy Evans.**

August 1 **miniNaturalist Pre-K Program at the Fort Gardens,** 10:00-11:00 a.m. $3; $1 MNHC members.

August 1 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

August 1 **Native Plant Gardens Program,** 5:30-7:30 p.m. **A Look at Medicinals.** $5 suggested donation; MNHC members free.

August 2 **First Friday Gallery Opening.** 4:30-6:30 p.m. **Wendy Evans.**

August 3 **Naturalist Field Day,** 9:00 a.m.-5:00 p.m. **Dragonflies and Damselflies.** $80; $70 MNHC members.

August 8 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

August 9 **Go Tubing with a Naturalist,** 3:00-5:00 p.m. $5 suggested donation, MNHC members free.

August 10 **Saturday Kids' Activity,** 2:00-3:00 p.m. **Insects and Art at the Fort Gardens.** $3; $1 MNHC members.

August 15 **miniNaturalists Pre-K Program at the Fort Gardens,** 10:00-11:00 a.m. $3; $1 MNHC members.

August 15 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

August 15 **Native Plant Gardens Program,** 5:30-7:30 p.m. **Soil Life.** $5 suggested donation; MNHC members free.

August 21 **Glacial Lake Missoula Meeting,** 4:00-5:00 p.m. Free and open to the public.

August 22 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

August 29 **Volunteer Day at the Fort Gardens,** 4:00-6:00 p.m.

Look for these program symbols in *Montana Naturalist* and on our website at www.MontanaNaturalist.org.

Adult Program

Youth Program

Volunteer Opportunity

Visit www.MontanaNaturalist.org for directions. To register or to learn more, call MNHC at 327.0405.

Photo by Simon Pierre Barrette

Black-Backed Woodpecker: Unsung Hero

In Montana's nearly 22.5 million acres of forest, we have undeniable evidence of pine beetles' swift, well-orchestrated attacks. The army of beetle soldiers burrows into the heart of a Ponderosa or lodgepole pine, then carves out galleries to serve as nurseries for their larvae, which then feed on the phloem layer of the tree. But the black-backed woodpecker, among other animals, feeds on the beetle larvae, killing the would-be beetle soldiers and helping to limit the severity of the attack.

The remains of fire-charred or beetle-killed forests may not seem like a prime ecological habitat, but to the black-backed woodpecker *(Picoides arcticus)* this is home. This western Montana resident is a medium-sized woodpecker about 9½ inches in length. Male and female adults are almost identical except for the male's bright yellow crown. Their backs are covered in an ebony plumage that hides them perfectly among the charred trees. Their flanks are barred in black and white. Their eyes have a minute white dash behind them and a thin white line running underneath.

Black-backed woodpeckers have exceptionally large heads for their frame, giving them an almost "bobble head" look as they drum, slowly and continuously, on tree trunks. While most woodpeckers have four toes, the black-backed woodpecker has only three. The "missing" toe allows the black-backed to position its upper body and head further away from the tree trunk, where it can deliver an even more powerful blow as it tries to reach its prey—the beetle larvae under the bark.

So how do black-backed woodpeckers feed on the larvae? Using techniques known as pecking and gleaning, the black-backed woodpecker strips bark from a dead tree or log and eats the exposed the beetle larvae underneath. Any larvae left behind are vulnerable to the elements and other pine beetle predators—and so the black-backed woodpecker stays on the frontlines, threatening every pine beetle it finds.

~By Joshua Diede

Book Corner:

Bone up on Bones Further Reading List

For those of you who'd like to take your bone-identification skills to the next level, check out the following books:

Animal Skulls – A Guide to North American Species by Mark Elbroch

Mammals of Montana by Kerry R. Foresman

Key to the Mammals of Montana by Kerry R. Foresman

Mammalian Osteology by B. Miles Gilbert

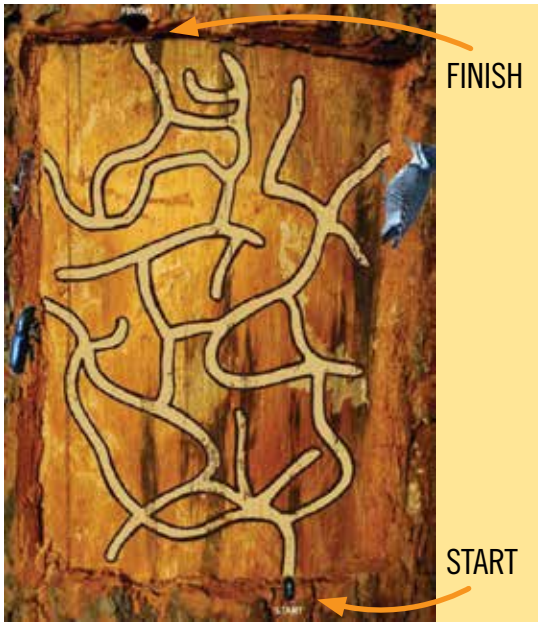
Skulls and Bones – A Guide to the Skeletal Structure and Behavior of North American Mammals by Glenn Searfoss

~list compiled by Dave Dyer

May is like a burst of energy.
May smells like a magnolia in full bloom.
May tastes like an apple pie right out of the oven.
May looks like the sun dancing over a patch of wildflowers.
May lives in a golden eagle waiting to be seen.
May is like a bunny, soft, sweet.

By Celeste Burchenal, 5th grade, Sussex School

Guide the western pine beetle through the gallery to the safest exit!



Getting the Inside Scoop on Emily Graslie

By Allison De Jong

On a sunny afternoon in February I biked over to the University of Montana to visit with Emily Graslie, volunteer Curatorial Assistant at the University of Montana Zoological Museum (UMZM). Emily's made a big internet splash recently with her YouTube show "The Brain Scoop"—to the tune of 96,000+ subscribers and growing—and I wanted to talk to her about the content of her show and how she got into her volunteer work at the UMZM.

Two years ago, as a senior studio art major at UM, Emily began using the museum's collection to practice scientific illustration. "The more I got involved in my internship," she told me, "the more I realized how desperately this place needed some help. We only have one part-time curator [Dave Dyer] and there's no way he can get everything done." She began helping out in small ways at first, but as she became more interested in the doings at the museum, she eventually became the UMZM's second staff person—as a volunteer.

In the two years she's been involved with UMZM, Emily's done all she can to raise awareness for the UMZM in particular and natural history museums in general. In an effort to find a community of like-minded people both in Missoula and beyond, she began a blog for the museum in the fall of 2011, where she shares photos of specimens, discusses biology and taxidermy, and answers questions from readers. The blog's popularity led to local internet entrepreneur Hank Green interviewing Emily last fall for his YouTube channel "SciShow"; he realized she had the engaging personality and unique knowledge to host a YouTube show of her own, and so, in January 2013, "The Brain Scoop" was born.

"The Brain Scoop" (named after a taxidermy tool used for—you guessed it—scooping brains) airs twice a week, and thus far Emily has provided her viewers with videos on a wide variety of topics, including an introduction to the UMZM; a tour of the dark basement where a too-large portion of the collection (some 3,000 specimens) is currently collecting dust; an overview of some of the museum's more unique specimens (including a pangolin); and a couple of longer, more intense videos detailing the process of skinning and gutting a wolf that was donated to the museum by Fish Wildlife & Parks. While some of the videos are not for the weak of stomach—beware any videos that begin with the "Grossometer"!—they are fascinating, informative, and entertaining. Emily's passion for her work is always evident, even when she's confronted with tasks that would make most stomachs a little queasy.

> "People tell me that I've inspired them to pursue the sciences as women, they thank me for being a good woman role model...those are my favorite messages to get."

Emily, who is also currently working on a distance master's degree in Museum Studies from Johns Hopkins University, loves what she does, and is honored and humbled by the positive response from her enthusiastic and rapidly-growing fan base, whose primary demographic is young women aged 13-24. "People tell me that I've inspired them to pursue the sciences as women, they thank me for being a good woman role model…those are my favorite messages to get," she said, smiling. "I get so emotional about it. I love that the majority of my viewers are young women—I think back to what a sensitive age that was. I wish I could have had a positive female role model at that point in my life. If I can do that for these girls—and inspire [young people in general] to pursue sciences in hopes of making the world a better place—that's what I care most about."

Left: **Study skin of a Sunda pangolin *(Manis javanica)* at UMZM.** **Center:** **The Grossometer: you've been warned.** **Right:** **Emily and co. prepare to skin the wolf.**

To watch "The Brain Scoop," go to www.youtube.com/thebrainscoop
To check out "The Brain Scoop" blog, go to www.thebrainscoop.tumblr.com
You can also follow "The Brain Scoop" (and Emily) on Facebook and Twitter.

Photos courtesy of The Brain Scoop, pangolin photo by Emily Graslie.

By Krystal Wolf

Getting to Know Arrow-Leaf Balsamroot, Spring's Bold First Act!

Photo by Krystal Wolf

Every year around March I start to get a little color-starved. The quiet white, ice blue and grey monotones of winter, though beautiful, start to lose their luster and I yearn to see the explosion of color that spring and early summer brings. The snow will soon melt, and the green-brown of the hills will surface. Before my eyes, bursts of bright yellow flowers will transform the hushed winter landscape into a joyous revelry of spring. The arrow-leaf balsamroots are what I most excitedly wait for, because to me they are one of the happiest harbingers of spring here in western Montana. Seeing their bold yellow flowers blooming in April, I know winter is officially over, and soon, very soon, I will be able to feel the warmth of the sun on my skin, so long covered with my winter-weather clothes.

The arrow-leaf balsamroots are what I most excitedly wait for, because to me they are one of the happiest harbingers of spring here in western Montana.

Arrow-leaf balsamroot, *Balsamorhiza sagittata*, is a member of the Aster family, and it closely resembles its sunflower cousins, with its large, bright yellow, sun-loving flowers. Growing in clumps, arrow-leaf balsamroot is often wider then it is tall, growing to one to two feet high, with what appear to be bright yellow flowers blooming singly at the ends of several flower stalks. What looks like one "flower," however, is actually a cluster of many tiny flowers, and each "petal" is actually a fusion of multiple petals. This gives the illusion of a ring of large petals ranging between three and five inches in diameter. On an early spring or summer hike, these masters of petal-illusion are a glorious sight to behold.

The leaves, as suggested by their name, are long and arrow-shaped and tend to grow to about 12 inches long and six inches wide. The leaves are covered with small white hairs, giving them a fuzzy, greenish-gray appearance. The taproots may be several inches thick and they can

Photo by Mary Ellen (Mel) Harte, Forestryimages.com

Photo by Krystal Wolf

Top: What appears to be a single petal is actually an entire flower, called a ray flower.
Bottom: A close-up look at the arrow-shaped leaves for which the plant is named.

University of Nebraska, Lincoln. Weaver, 1917

A study of the vegetation of southeastern Washington and adjacent Idaho by J. E. Weaver, 1917. H,Western hawkweed. K, Prairie Junegrass. B, Arrowleaf balsamroot. F, Idaho Fescue. G, Sticky purple geranium. P, Sandberg bluegrass. Ho, Palouse goldenweed. Po, Slender cinquefoil

extend several feet into the ground, with some taproots being reported at eight feet long! The roots contain a resinous material reminiscent of balsam; hence the name "balsamroot."

Native to Montana and the Rockies, their range extends from the Sierra Nevadas, along the Rockies and up into Canada. Their habitat preferences are dry, exposed open hillsides ranging in elevation from 1000 feet up to 9000 feet. They grow abundantly on dry hillsides and mountain meadows, and can also be found among the plants growing in the understory of conifers. In Missoula, you can't miss them, as they fill the hills (particularly Mount Jumbo) with color every spring. They bloom from April to July, with their leaves and flowers dying back in late summer. A very hardy plant, arrow-leaf balsamroot is drought tolerant, due to its ability to store moisture from wetter periods of the year. Arrow-leaf balsamroot is also fire-resistant. Often growing in fire-prone areas, the taproot usually regenerates after the above-ground part of the plant has been burned away.

Arrow-leaf balsamroot also enjoys a bit of historical notoriety. On their return from the Pacific Ocean, as they journeyed through Montana, Lewis and Clark collected several arrow-leaf balsamroot samples, both in flower and the fully mature seeds. These specimens can still be seen at the Lewis and Clark Herbarium in Philadelphia. Lewis and Clark also encountered arrow-leaf balsamroot in Washington and Oregon, where they met Native Americans collecting the plants along the Columbia River.

Native American tribes have a long history of eating all parts of this plant. The long, dense root has a bitter, pine-scented sap flavor and, once peeled, can be steamed, baked or roasted, usually for several days. Native Americans would often then grind the cooked root into a meal, mix it with fat, and make it into cakes or mix it with berries and eat is as a porridge. The young shoots and leaves, once peeled, can be eaten raw. The seeds, similar to sunflower seeds but smaller, are rich in nutrients and can be dried and roasted for a tasty snack. The dried seeds can also be ground into flour and used to make muffins and other baked goods, and the whole plant is considered a good wilderness emergency food. Arrow-leaf balsamroot also has a long history of being used medicinally by many Native American tribes. The Blackfoot tribe, for example, has long used the root to relieve pain, as well as treat colds, respiratory ailments, wounds, and burns. The root is harvested in early summer and early autumn for maximum potency. The fact that the tenacious taproots can extend up to eight feet into the earth makes harvesting no easy task.

Arrow-leaf balsamroot is an important food source for many of Montana's wildlife species, and its early blooming is welcome relief after a long, hungry winter. Elk, antelope and mule deer feast on the flowers and the leaves in spring and early summer and return to munch on the dried, sun-scorched leaves in early autumn. Bighorn sheep forage on the flowers and leaves throughout the year. Small mammals and birds feast on their abundant seeds throughout the season and sage grouse enjoy the young shoots in early spring. Domestic sheep also forage on the plant, eating the flowers and leaves in spring and early summer. Arrow-leaf balsamroot produces abundant seeds, but they do not bank well in the soil and their growth is very slow, taking between three to eight years to mature, so extensive sheep grazing can have seriously detrimental effects on the plant population.

As one of Montana's boldest wildflowers, arrow-leaf balsamroot is a welcome sight after the long, cold, monochromatic winter. From April to July, if you look to the hills, you can hardly miss it!

—Krystal Wolf moved to Missoula from Seattle five years ago to escape the hustle and bustle of the city. Upon her arrival she was quickly captured by the native wildflowers, who have yet to let her go.

Photo by BLM WY040, Seeds of Success.

Though it does take patience to grow, arrow-leaf balsamroot is a lovely addition to any native garden. It is a perennial, and once the plants mature (it takes several years, so patience is key) they will enliven your garden every spring with beautiful yellow flowers. It is recommended that you start the plants from seed, since arrow-leaf balsamroot is almost impossible to transplant (recall that eight-foot taproot!). For this reason, also make sure you plant your arrow-leaf balsamroot in a place you really do want it . . . and then, once it's established, you can sit back, relax, and enjoy the sunshiny flowers every spring.

Summer Outdoor Discovery Day Camps

Discoveries galore await your children outside this summer! Dive into fun with our Summer Outdoor Discovery Day Camps for kids of pre-school age (3-4) through 8th grade. MNHC week-long camps engage children in the study of nature through field trips, arts & crafts, and scientific exploration. Teens can gain experience in outdoor education through our Leaders in Training Program. Camp themes and content are geared toward students entering the grade levels noted in the fall of 2013, allowing instructors to plan activities that work best for each age range.

Full payment due upon registration. Registration is confirmed ONLY after full payment is received. Registration fee includes a **$50 non-refundable deposit**. Call 327.0405 to register today!

Camps begin and end at the MNHC near McCormick Park at 120 Hickory Street in Missoula. Camps include local field trips to surrounding natural areas.

Day Camp Program Hours

Pre-school Camps: Monday - Friday, 9 a.m. to 12 p.m.

Half-day camps: Monday - Friday, 9 a.m. to 1 p.m.

Full-day camps: Monday - Friday, 9:30 a.m. to 4:30 p.m.

Before and after care is available free from 8:30 to 9:30 a.m. and 4:30 to 5:30 p.m.

Cost

Full-day camps
$175/members, $195/non-members

Half-day camps
$85/members, $120/non-members

Pre-school camps
$75/members, $95/non-members

Scholarships are available

MNHC memberships can be purchased annually for $50.00 per family.

Pre-School Camps

Morning camps

For children ages 3-4 Monday - Friday, 9 a.m. to 12:00 p.m. $75/members, $95/non-members

Fish, Frogs, and Pollywogs
June 17-21
Poke around in the water and see if you can find a frog, snake, or turtle! We'll put on an aquatic-themed play, make puppets, and meet a real, live turtle named Slippery Joe!

Mini-Biologists
July 8-12
Spend a fun week learning about insects, mammals, skulls, and tracks. We'll investigate some cool habitats around the Montana Natural History Center and make our own plaster tracks!

Animal Adventures
July 22-26
This week we will explore some of the cool ways animals get around! We'll hop like frogs, crawl like worms, and creep like coyotes. We'll learn about some cool tracks and see who has visited our backyard scent station and bird feeders!

Waddling Waders
August 5-9
Spend some time looking at aquatic invertebrates in a nearby wet area and get our feet wet in a very shallow and safe stream. We'll learn about fish and all the cool bugs they eat!

Kindergarten through 1st grade

Half-day camps

Monday - Friday, 9:00 a.m. to 1:00 p.m. $85/members, $120/non-members

Insect Insanity!
June 24-28
In this camp, we'll learn about terrestrial and aquatic invertebrates and spend some time dipping our nets into the water and sweeping them in the grass to see what we find! We'll make our own insect nets, learn about metamorphosis, and make an insect habitat to observe our catches during the week!

Predator Prowl
July 15-19
What's a predator, and what do they eat? Are you better at camouflage or finding your prey? We'll learn about some surprising predators found here in Montana and look at some real predator skulls!

Hooray for Habitats!
July 29-August 2
In this camp we'll explore different terrestrial habitats found around MNHC. We'll catch insects, look for tracks, and learn about some of the birds that live in the city. We'll also make a habitat for the aquatic critters we catch, set a scent station to see who comes to visit at night, and make our own birdfeeders out of recycled materials!

Wonderful Wetlands
August 12-16
Spend the week getting your feet wet! We'll explore a new, nearby aquatic habitat every day. We'll wade, look for aquatic invertebrates, see if we can spot any osprey, and learn about how important water is to all living things.

1st-3rd grade

Full-day camps

Monday - Friday, 9:30 a.m. to 4:30 p.m. $175/members, $195/non-members

Reptile Roundup!
June 17-21
Join us for a week of adventure and discovery as we explore local ponds! We'll learn about Montana's frogs, snakes, and turtles, use nets to collect and

observe aquatic creatures, explore food chain connections, and discover other fun facts about aquatic habitats. We'll visit Lee Metcalf and Bancroft Pond, and meet a real, live turtle and snake!

Folklore, Fantasy, and Fables
June 17-21
Stories are springboards of discovery and they can teach us tons about nature! We'll begin each day by reading stories that will guide our explorations and our imaginations. We'll learn about the importance of animals in different cultures by exploring different kinds of stories and art. And we'll use our nets, hand lenses, and our own creativity to discover what kinds of stories are unfolding before our eyes!

Go Fish!
June 24-28
Learn about stream ecology, fish in Montana, and how to catch the big one! In addition to fishing, we'll learn about aquatic invertebrates and how they are important to fish. We'll visit local streams and ponds, create our own tackle boxes, and use waders, nets, and fishing poles to reel in adventure!

Naturally Spooky!
June 24-28
From snakes to bats to stink bugs we'll explore the animals in Montana that most people try to avoid! We'll learn all about their natural habitats, what they really eat, and we'll hear stories and folklore as we learn why people are afraid of these animals and discover the real truth that makes them…not so scary!

Art Adventure
July 8-12
Come learn to use pine needles, sticks, rocks, and leaves to make your own unique art. We'll visit the Missoula Art Museum for inspiration, and then create our own nature-inspired work using lots of different mediums like drawing, watercolor and printmaking. We'll create our own costumes and host a play at the end of the week to show off our creations!

Rockin' Rocks I
July 8-12
What do you know about geology? Come spend a week learning about minerals and rocks through fun activities. We'll make our own fossils, learn about the three different types of rocks, and find out what chocolate chip cookies can teach us about mining! We'll even make some instruments out of natural objects to make our own rock band! *(Same program as Rockin' Rocks II)*

Jr. Survivor Camp
July 15-19
Want to learn some useful outdoor skills? We'll spend the week learning about shelter building, how to stay safe and not get lost, how to use a compass, basic map reading skills, and bear awareness. We'll learn Morse code and write each other messages, make our own first aid kit to keep, and even make some delicious ice cream!

Super Sleuths
July 15-19
Improve your stalking skills as we learn about tracking in this fun camp. We'll also answer the ever-popular questions of "Who pooped in the woods?" & "What animal left those tracks behind?" as we explore local natural areas and look for signs of wildlife. We'll create our own track guides, practice tracking each other through the woods, learn about how biologists use telemetry to study animals, and build a scent station to see who hangs around MNHC at night!

Mammals Galore
July 22-26
Come learn about some of the amazing mammals that are found in Montana. We'll take a trip to the Bison Range to look for one of the largest mammals in Montana and spend the week learning about mammals that live nearby. We'll take a trip to the Zoological Museum at the University, make our own tracks, and spend some time studying skulls!

Garden Safari
July 29-August 2
From vegetables to flowers to the insects that crawl underneath, gardens are full of discoveries. We'll learn how plants grow, how we can grow our own plants for food, set up some plant experiments, learn what animals or insects plants need for survival. We'll have lots of time to look for insects and animal signs, make plant crafts, and prepare healthy snacks from our harvest!

Rocking Rocks II
July 29-August 2
What do you know about geology? Come spend a week learning about minerals and rocks through fun activities. We'll make our own fossils, learn about the three different types of rocks, and find out what chocolate chip cookies can teach us about mining! We'll even make some instruments out of natural objects to make our own rock band! *(Same program as Rockin' Rocks I)*

Bugs and Slugs
August 5-9
The world of invertebrates is full of amazing creatures. We'll spend the week looking for insects and other invertebrates using nets, hand lenses, and microscopes to learn more about what makes them so unique. We'll make our own bug nets to keep, set traps to lure insects in, and go on an extra-special trip to the electron microscope at the University!

The Earth's Timeline
August 5-9
Step through our time machine and learn about what life was like from prehistoric times through today! We'll learn about dinosaurs, woolly mammoths, and more. We'll even create our own version of history in a play for the whole camp!

Jr. Naturalists
August 12-16
Discover some awesome hiking trails around the Missoula area! We'll hike short trails every day, swim at Beavertail pond, play fun games and explore our amazing surroundings, and learn how to use naturalist tools like compasses and maps!

Adventures in Science
August 12-16
Spend a week learning what scientists really do. Practice techniques for studying wildlife, learn from the real work of scientists, get out in the field, and learn how to do lots of simple experiments as we see how adventurous science can really be!

3rd-5th grade

Full-day camps

Monday - Friday, 9:30 a.m. to 4:30 p.m. $175/members, $195/non-members

Rocking Raptors
June 17-21
This week we'll learn about raptors and their amazing adaptations. We'll study osprey, hawks, eagles, owls, and falcons to see what we can learn about them. We'll learn how to use binoculars, make kites, and even make some bird houses for raptors that might be living in our backyard!

Wildlife Wizardry
June 24-28
See what amazing experiments you can dream up this week! Explore unique animal adaptations, and learn about animals that change color with the seasons, animals that move without feet, and animals that nearly freeze solid during the winter. We'll take a very special trip to the electron microscope at the University to assist in our investigations!

Wild Explorers
July 8-12
Come spend a week in the woods this summer that includes one overnight camping trip! We'll explore local trails in Seeley Lake and the Ninemile, and spend one night sleeping out under the stars. We'll kayak, learn about native plants and animals, and practice Leave No Trace Principles. This camp will feature an overnight camping trip from July 11-12.

Hooked on Fishing
July 15-19
Join us for this very special camp sponsored by the Hellgate Hunters and Anglers. Learn about stream ecology, fish in Montana, and how to catch the big one! We'll also learn about aquatic invertebrates and how they are important to fish. We'll visit local streams and ponds, create our own tackle boxes, and use waders, nets, and fishing poles to reel in adventure!

Mineral Madness
July 22-26
Come learn about some of the amazing geology in Montana! We'll spend a week learning about minerals and rocks through fun activities. We'll make our own fossils, learn about the three different types of rocks, and take a special field trip to the mining museum in Butte!

Color in Nature
July 29-August 2
Come join us as we spend a creative week perfecting our art skills! We'll visit the Missoula Art Museum, make baskets and bird feeders out of natural and recycled materials, make our own jewelry, and much more. We'll host an art opening at the end of the week to show off our creations!

Creepy Crawlies
August 5-9
Who doesn't love learning about insects? We'll spend the week seeing what we can catch and learning about metamorphosis. We'll even start our own (live) insect collection to be released at the end of the week!

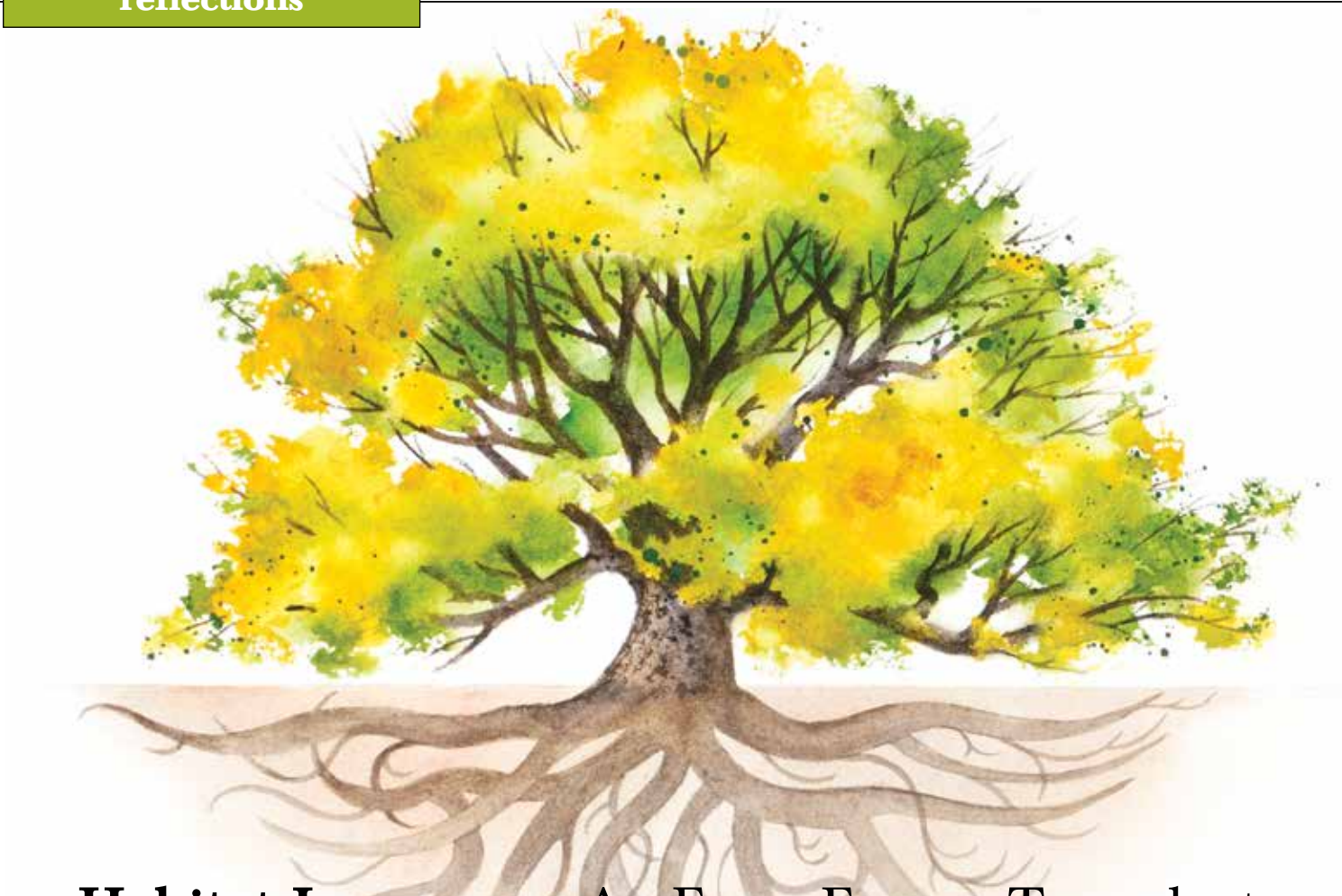
Eco Warriors
August 12-16
Interested in learning about how we can make power with the sun, wind, and water? Come learn all about the fields of Biomimicry and "green" design. You'll see some examples of great inventions, create a solar-powered motor boat, and make a solar-powered oven to roast s'mores in!

6th-8th grade

Full-day camps

Monday - Friday, 9:30 a.m. to 4:30 p.m. $175/members, $195/non-members

Backcountry Explorers
July 22-26
Want to spend a week in the woods this summer that includes a fantastic overnight backpacking trip? We'll hike beautiful trails every day and explore the world around us. We'll also learn about plants and animals common to our region as we get out and explore, and practice Leave No Trace Principles. This camp will feature a one-night overnight backpacking trip from July 25-26. Participants should be prepared for a 2-3 mile hike with a small pack.



Habitat Language: An Essay From a Transplant.

By Shirley Atkins

WHEN PEOPLE I MEET DISCOVER THAT I ONLY RECENTLY MOVED TO THE D.C. AREA FROM MONTANA, they invariably say, "Wow! That must be a change! What are the biggest differences you notice?" They expect me to comment on the traffic, the noise, and the population density. They laugh in surprise when I reflect on the absence of mountains to help me orient myself, the urban forest which is almost entirely deciduous, and the lack of visible stars at night.

I did not realize how attuned I was to the habitat of my heart until I left it behind. Where my rambles in the Rattlesnake Valley were comfortable affairs to a backdrop of familiar song birds and wildflowers, my strolls through Arlington, Virginia, were disorienting. No longer did the opening bars of Beethoven's Fifth alert me to the presence of the Spotted Towhee. A flash of white on that winging shape was not the Black-billed Magpie, but a Mockingbird. I felt lost and bereft.

Happily, I have discovered that what I tried to teach my Clark Fork School students, what Richard Louv professes, and the premise of place-based education, holds true. Know your place well. Become familiar with its language, its relationships, and its seasonal moods. That knowledge, while not transferable in the specifics, does give you a framework for organizing new information wherever your earthly sojourns may take you. By increments, I am learning the new languages and seasonal mood swings of northern Virginia's flora and fauna. That bird, though different, fulfills the role of the Magpie in the Rattlesnake; that oak, though it could not survive the cold and dry clime of the Rockies, is the "Ponderosa Pine" species of this forest.

This spring it was the parade of trees blooming everywhere that made me catch my breath and set my transplanted roots scrambling for a foothold. No Mock Orange or Serviceberry greeted me. Instead, Forsythia and Saucer Magnolia gave way to Cherry and Redbud. The soundtrack was different too. Two upward sliding whistles followed by an emphatic "pew, pew, pew!" has become, for me, the signature call of the eye-catching red Cardinal. Raucous cries accompanied by a saucy flash of color say "Blue Jay!" Repeated snippets of several different songs have finally resolved into a mockingbird's audacious cry for attention. A glimpse of the Washington Monument in the distance helps me orient my internal compass.

Like the new flowers that I have painstakingly nestled into the stubborn red clay soil of my tiny townhouse garden, I am beginning to put down roots and reach up with sprouts. My stay here is likely to be but a brief interlude in a long life, but if I concentrate, I may go back home to Montana fluent in Virginia's habitat language. Intimately knowing one's place, wherever that may be and for whatever duration, is at the heart of feeling at home on the planet.

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