



Montana Natural History Center

Spring/Summer 2019

MONTANA Naturalist

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

Caching & Cognition:

How Animals Store—and Find—Their Food



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Cover – A river otter (*Lontra canadensis*) pulls itself up on a log in Quake Lake near West Yellowstone. Photo by Michael L. Haring of Big Sky, Montana. See more of his work at istockphoto.com/photos/mlharing.

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tidings

Last week my husband and son and I hiked one of our favorite nearby trails, up Waterworks

Hill on the north side of Missoula. A dusting of fresh snow brightened the highest surrounding peaks, and patches of snow still nestled in crannies and crevices on the lower hills. Those hillsides were mostly pale and brown, but green spears of grass were beginning to poke through last year's dry blades. And along with the bunchgrass, I saw the succulent-looking leaves of the bitterroots

there—and there—and there—a promise of the bright flowers to come.

We walked farther, past the radio tower and up the long rise beyond, and I saw them then, my first blooming wildflowers of spring: the deep purply-pink petals of douglasia, brilliant against the rocky ground. Then a meadowlark trilled, and as we headed around the curve of the hill and down towards the gully we saw more douglasia, and a few scattered yellowbells, and a whole swath of buttercups, and then, above, the vivid indigo flash of a mountain bluebird.

Spring had definitely arrived.

I love this reminder that the shifting of seasons isn't any one thing, but the beautiful wild mix of birds returning, snow melting, wildflowers blooming, days lengthening. To be a witness to this is a gift.

And as naturalists, that's what we do: witness the wonders, both great and small, that nature has to show us. In this issue, Drew Lefebvre admires the intelligence of squirrels and birds who store their food for the future, and revels in their diverse and fascinating ways of finding it again (page 4). Rob Rich tells the story of a new species of slug and the biologists who discovered it, pondering the importance of this discovery in a time when so many species are being lost (page 8). Ellen Knight has crafted a beautiful "seasonal round," an artistic representation of the turning of the seasons and the wild creatures that help her mark them (page 23). And Mike Canetta reflects on how hiking in grizzly country heightens his senses, inspiring a richer appreciation of the wild places and wild creatures around him (page 20).

This spring and summer, what will you witness? Perhaps you'll explore some of the new trails on Mount Dean Stone (page 11), or visit the Moon-Randolph Homestead, where human history and natural history are uniquely entwined (page 15). Or perhaps you'll venture farther afield, to the many wild places we're so lucky to have in Montana, and find yourself observing new landscapes, new ecosystems, new wildlife. What stories will you find—and tell?

Allison De Jong

EDITOR

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Rocky Mountain douglasia (*Douglasia montana*) in full bloom on Waterworks Hill in Missoula—a definite sign of spring.

PHOTO BY ALLISON DE JONG

CACHING & COGNITION:

How Animals *Store—and Find—* Their Food



BY DREW LEFEBVRE



When I was very young, my dad gave me his old pocket knife. It felt like a big deal: not only was I being allowed to wield a sharp object, but I was actually being entrusted as its caretaker. I felt certain that this tool was going to come in very handy in the near future, but before that day came, I would need a safe place to keep it. After some deliberation, I decided to hide it in one of several “forts” scattered around my parents’ property. With great care, I dug a shallow hole in the vicinity of my fort. I lined the hole with small stones, placed the knife inside, and covered the whole thing over, taking great care to camouflage my hiding spot. When the disturbance was no longer visible, I knew my work was done. Confident that my knife was safe until I needed it next, I moved on to the day’s next activity.

Well, you guessed it: I never found that knife again.

Having the presence of mind to envision and plan for the future has long been considered a marker of mental aptitude. Another classical sign of intelligence consists of understanding that other individuals have their own unique mental states, and even guessing what those desires or intentions might be (that someone might want to steal my knife, for instance). Where my young self fell short was in a different measure of brainpower altogether: the ability to remember, even when your territory is vast, your surroundings change, or you have lots and lots of things to store in your memory.

As a child, I didn't have the memory to locate my knife again, even though I knew that a day would come when I'd desperately want it. Of course, my survival did not depend on relocating that knife. But for a significant number of animal species, storing and then relocating food—a process known as caching—is crucial to surviving another year. Animals who cache their food demonstrate impressive skills: they execute elaborate stunts to ensure their cache's safety and display incredible feats of memory when the time comes to relocate their hoarded goods. As scientists learn more and more about species that cache, they open a new window into the depths of animal intelligence and memory.

Take squirrels, for instance. Regardless of where you live, you've likely encountered at least one species of squirrel foraging for nuts, seeds, pinecones, buds, or fruit. Here in western Montana, the closely-related fox squirrel and eastern gray squirrel, though native to other parts of the country, have been introduced into a handful of urban areas. Common enough to be treated at times as pests, these squirrels are well-adapted to life near humans.

Both species are known as scatter-hoarders, meaning that they do not create one large cache of food (as does, for example, their smaller cousin the red squirrel). Instead, fox and eastern gray squirrels create numerous smaller caches, usually consisting of one or more pieces of food buried about one inch underground. It's a useful strategy: why put all your eggs in one basket when you can scatter them, helping to ensure that at least some will stay safe from cache-pilferers and natural disasters?

Scatter-hoarding already sounds like a good trick, and it becomes even more impressive when you know more details: an individual squirrel will generally make several thousand caches each season. The caches may be scattered across quite a large range—up to seven acres in some cases. Perhaps even more impressive, not all caches are created equal: some are quite temporary, such as those created upon discovery of a sudden, abundant food source. Squirrels will quickly cache as much food as they can near the source. Then, within hours or days, each of these hastily-dug caches will be unearthed and moved to a more secure site for long-term storage.

The brainpower required to keep track of thousands of caches spanning several acres, some of which are temporary, is almost mind-boggling. How do squirrels do it? Partly, they rely on sense of smell. The scent of squirrel saliva—either their own, or a nearby

squirrely competitor—is an important factor in cache retrieval. So is a highly accurate spatial memory. Recently, a team of researchers from UC Berkeley has made an insightful discovery about how squirrels use their spatial memory to keep track of their thousands of caches. It involves a mnemonic device and a special cognitive tool called spatial chunking.

A mnemonic, defined as a cognitive device used to improve recall, is a tool familiar to anyone who has attempted to memorize a seemingly random sequence. To remember the notes *E, G, B, D, F* on a music staff, for example, many of us were taught that *every good boy deserves fudge*. Spatial chunking is a specific type of mnemonic that breaks down physical space into divisions based on content. For instance, imagine you are trying to organize your

garage. If you break down all your belongings into content-based categories (camping gear, sports equipment, carpentry tools, etc.), you can then choose to store each category in a different physical space. You might decide that camping gear goes on the shelf, sports equipment belongs in the cabinet, and carpentry tools stay on the workbench. That way, you don't have to memorize the precise location



Eastern gray squirrels generally bury their caches about one inch underground.

of every individual item in your garage; you just remember which spatial “chunk” corresponds to each category.

Scientists have long considered spatial chunking to be an important aspect of human intelligence, and it has been observed in animals in laboratory settings as well. Evidence of this mnemonic is less common in wild animals, though, which is what makes this recent discovery so interesting. In this study, researchers fed a variety of nuts—four different types—to wild fox squirrels, then used a GPS to track where the squirrels cached them. They found that the squirrels stored their food according to type: hazelnuts in one area, pecans in another, and so on. The theory is that by spatially chunking their caches, fox squirrels decrease their memory load, thereby increasing their accuracy when it's time to retrieve their hidden food.

Fox squirrels aren't the only species who utilize this type of mnemonic device. Their close relative, the eastern gray squirrel, also categorizes and organizes its caches. Biologists at Wilkes University in Pennsylvania have observed gray squirrels organizing their food based on its value—that is, its quality, weight, and nutritional content. Grey squirrels will even dig up and relocate high-value nuts to cache sites that are more open and less protected. Although

the risk of predation is higher in these open sites, there is a lower chance of another squirrel robbing their cache. This behavior suggests that grey squirrels are able to weigh the value of their food against the risks of predation and theft, calculate the level of risk they are willing to take, and spatially chunk their food according to this tradeoff. That's a lot of brainpower for an 18-ounce mammal!

Though squirrels are excellent examples of scatter-hoarders, they are by no means the only animals fitting that description. Quite a few bird species also demonstrate this behavior, and their feats of memory

are no less impressive. Many birds in the family Corvidae—the group that includes crows, ravens, jays, and magpies—are avid food cachers. Like squirrels, the cognition they demonstrate while doing so hints at a remarkable level of intelligence.

The Canada Jay (until recently known as the Gray Jay), a familiar friend if you've spent time in Montana's high-elevation forests, is a bird that relies on scatter-hoarding to maintain a unique lifestyle in very cold climates. As the jay with the most northern range in North America, these small Corvids routinely deal with harsh winter weather and deep snow. Despite that, they nest and raise their young in February and March, when their boreal habitats are still deep in the throes of winter. How do these intrepid birds manage not only to survive but also raise a brood of chicks in this extreme environment?

The answer, of course, is that they are skilled cachers. Canada Jays spend the warmer months scatter-hoarding as much as they can find. Highly omnivorous, these birds eat almost anything: small rodents, amphibians, other birds, nuts, even blood-filled ticks scavenged from local mammals. They also possess the largest salivary glands of any songbird. These oversized glands produce a special sticky saliva that Canada Jays smear all over their food, creating a sticky blob called a *bolus*. The bolus is then stuck in the crevice of a branch or under the bark of a tree, safely cached until the Canada Jay is ready to retrieve it.

Much like their fellow scatter-hoarders the squirrels, Canada Jays are capable of caching thousands of items each season with impeccable recall. But unlike squirrels, Canada Jays cache their food high in trees rather than underground, enabling them to retrieve their stores even when the forest floor is buried under snow. Canada Jays also reorganize their caches when necessary. Researchers have found that, when exploiting a food source distant from their usual territory, Canada Jays will temporarily cache as much food as possible in a relatively small area. Then, in a behavior similar to squirrels, the jay will return later on, transferring its cached food to a variety of more widely-scattered sites, ensuring the caches' security in the long-term. By capitalizing on its incredible memory through the use of mnemonic devices, the well-adapted



Because of their caching abilities, Canada Jays often nest earlier than many other birds.

Canada Jay is assured of plenty of food year-round—enough to nest and raise chicks months before other birds have returned from their yearly migrations.

Squirrels and jays amaze us with their mental capacity, yet there is another component to their abilities that helps them transcend the realm of good memory into one of deep intelligence: deception. The ability to attribute mental states (desire, knowledge, intention, etc.) to other individuals, and to understand that these mental states may be different from one's own, is known as *theory of mind*.

As a child, although I did not possess the recall to find my knife again, I did have an inkling that someone out there might desire my prized possession for their own. I was aware that an unknown person might act on their desire and steal the knife, so I took steps to conceal it. Furthermore, I knew as well that anyone who did not see me bury the knife would not know its location, and it would remain safe. Similarly, in order to be a truly great scatter-hoarder, you must recognize your competitors and know that they possess desires and knowledge of their own. Who wants to steal from you,

Several caching species engage in deceptive behavior.

how would they do it, and, most importantly, how can you trick them into not doing it? These are essential questions for a successful scatter-hoarder.

Several caching species engage in deceptive behavior. Studies have shown that both eastern gray and fox squirrels employ what is known as deceptive caching: they dig a hole, pretend to throw in their food, cover the hole back up again, and dash off to another location, all while keeping their valuable food item stashed safely in their mouth. Crucially, squirrels only engage in deceptive caching when in the presence of another squirrel, suggesting that they are aware of and can predict the desires and intentions of other individuals. This ability allows them to recognize that a fellow

squirrel may not be a friend, but rather a potential cache-pilferer on the lookout for an easy meal.

Birds, too, engage in deceptive behavior. Common Ravens, also in the Corvid family, have also been observed deceptively caching food. Ravens sometimes forage in groups, but when an individual has an item to cache, it will retreat somewhat from other ravens, often hiding behind a structure to keep out of sight of the rest of the group. If it notices another individual watching, it may interrupt its caching or quickly change sites to avoid being spotted. Canada Jays exhibit similar behaviors. In the presence of other individuals (or even other relatives, such as Steller's Jays), Canada Jays may cease caching altogether until the threat has passed. They also may sort their food by value when in the company of others, carrying the best treats further from the food source, suggesting that they know these valuable items are highly sought-after by pilfering competitors.

Interestingly, some birds have learned to discriminate among

Scrub Jays are able to predict the intentions and behaviors of others by extrapolating from their own experiences...

California Scrub-Jays are particularly fond of acorns, which they hammer open with their stout, hooked bills.



would-be pilferers, sorting out which individual is a threat and which is not, and adjusting their behavior accordingly. Black-capped Chickadees, for example, engage in deceptive caching when in the presence of potential thieves such as nuthatches (who also cache food) and other chickadees. However, chickadees recognize their mate as a non-threat, and will openly cache in front of them. They also recognize that some birds, such as Dark-eyed Juncos, are not cache-pilferers, and will openly and non-deceptively cache in front of them as well.

California Scrub-Jays (yet another Corvid) also display an impressive level of discrimination, a large part of which seems to be learned behavior. In this case, jays that have previously learned how to pilfer from other individual's caches behave differently from those who have not. When these jays cache food

in front of another individual, they generally return soon after and move their stash to another hiding place, presumably one unknown to the observing jay. However, jays that have never before been pilferers themselves do not exhibit this behavior. This suggests that California Scrub-Jays are able to predict the intentions and behaviors of others by extrapolating from their own experiences, a trait surely worthy of consideration for the designation of true intelligence.

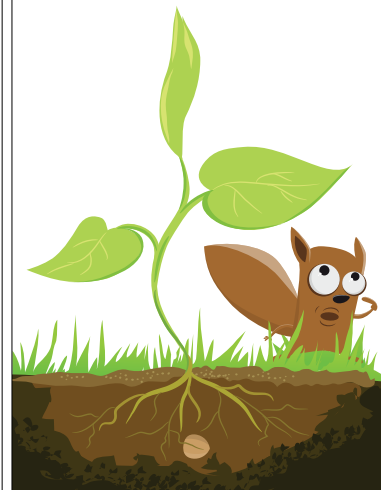
From mnemonic devices to theory of mind, animals that scatter-hoard have evolved an impressive array of cognitive abilities, allowing them to take advantage of their environments in myriad ways. Their skills impress and amaze us, but maybe we shouldn't be too shocked. After all, these animals have been adapting to their surroundings for eons. It should come as no surprise that, when it comes to scatter-hoarding, we humans are surrounded by animal experts. We just need to know where to look. 🐿

—Drew Lefebvre is a Teaching Naturalist at MNHC. In the spring you can find her teaching outdoors, gardening, hiking, and birding. She likes to think her pocket knife is still out there, somewhere.

Plant Partners

Scatter-hoarders are responsible for burying untold numbers of nuts and seeds every year, and although they are experts at retrieving them, it's virtually impossible to unearth every single one. So, what happens to the food left unrecovered? As is often the case in the natural world, part of the answer lies in co-evolution. Some plants have evolved the ability to manipulate the behavior of scatter-hoarding animals, turning them into unsuspecting gardeners.

Plants do this in several ways. Some plants have evolved to produce large, nutritious seeds, which are attractive to scatter-hoarders and may even stimulate hoarding behavior. They may also produce seeds that are difficult to eat right away (because of, for example, a hard outer coating or a chemical constituent) and encourage caching as a way to promote the seed's breakdown. Some plants have evolved to produce seeds that do not emit strong odors, lessening their chances of being found. Lastly, certain plants engage in what is known as *masting*: along with nearby plants of the same species, they produce large seed quantities at intervals of several years. During a bumper crop, scatter-hoarding animals will cache more food than they can possibly eat, leaving the rest in the ground to germinate. So while scatter-hoarders certainly demonstrate enviable intelligence, let's not forget to give some credit to their co-evolvers, the plants.





DISCOVERY IN THE DUFF: A New Slug for the Inland Temperate Rainforest

BY ROB RICH

The inland temperate rainforest is rich with a diversity of life, from old-growth red cedars to fungi. Pondering what other as-yet-unknown species may exist in this ecosystem is fascinating—and an inspiration to protect these special places and creatures.

Back in 2010, Michael Lucid started trapping slugs. As a Wildlife Diversity Biologist with Idaho Fish & Game (IDFG), he was heading up the Multispecies-Baseline Initiative (MBI), one of the most collaborative, comprehensive wildlife surveys ever performed. Over five years across the inland temperate rainforest of Washington, Idaho, and Montana, the MBI sought 19 elusive animals about which little was known, including their existence. The MBI found all but one. Many of the other 18 species were in healthier populations than expected. But the MBI's greatest success may be wrapped in a twentieth, previously unknown species. In March of 2018—after confirming diagnostic observations of the gastropod's genitalia with molecular and genetic evidence—Lucid's team discovered a new species: Skade's jumping-slug (*Hemphillia skadei*).

There hasn't been a project of such devoted gastropod intrigue since Henry Hemphill, the

Delaware-born pioneer who surveyed the genus that now bears his name. A bricklayer by trade, Hemphill was also an amateur malacologist, and he found more treasure in mollusks than the gold he originally sought in the 19th-century American West. From his base in California, he traveled widely and collected much, churning out papers with titles such as "Description of a new California mollusk," "New catalogue of shells for California and adjacent states," and "Descriptions of new varieties of North American land shells." Unfortunately, Hemphill's habit of selling false "varieties" of snails to collectors back East suggest he failed to forget his prospecting days. His brand of science earned a quick profit, but it produced lasting headaches for those puzzling out what species he actually found.

The notion of a "species" remains a difficult concept for classifying life, but today we better understand how a unique genome, a singular ecological niche, and the

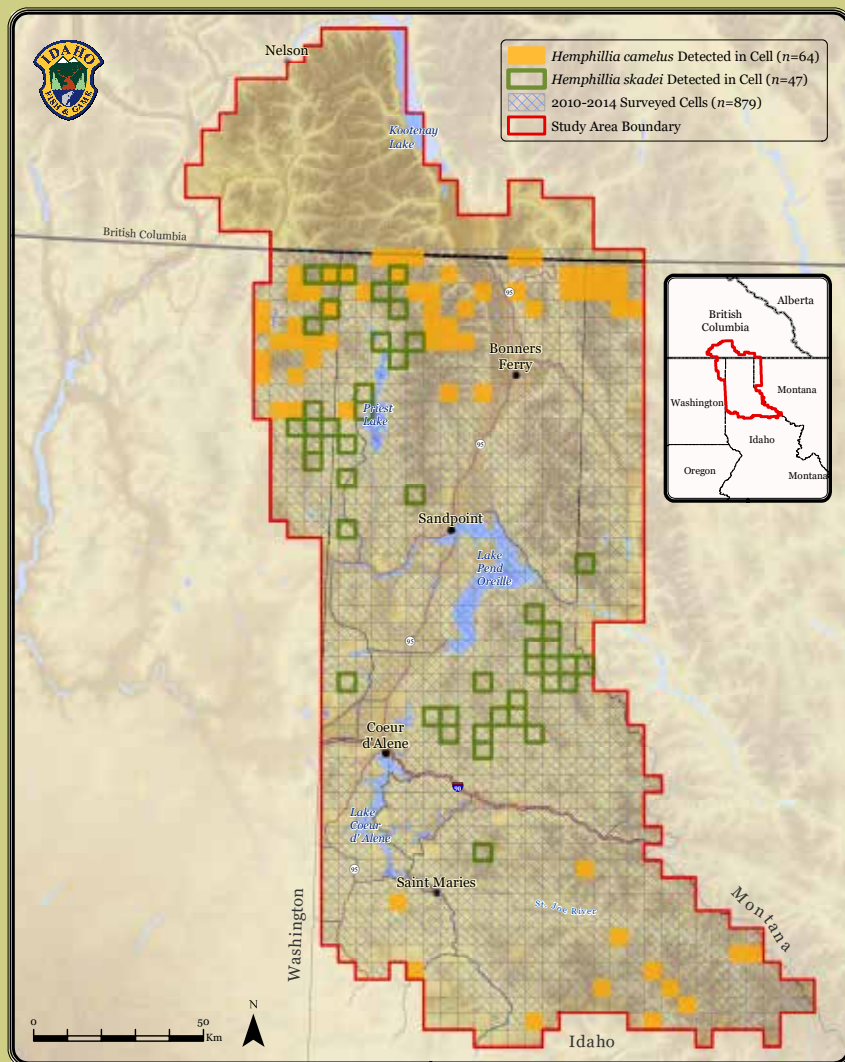


PHOTO: DAVID MOSKOWITZ

PHOTO: ANCIENT FOREST ALLIANCE



Multi-species Baseline Initiative: Hemphillia spp. Detections



This map shows the occurrence of pale jumping-slug (*Hemphillia camelus*, in yellow cells) and Skade's jumping-slug (*Hemphillia skadei*, in green-bordered cells) within the MBI study area. Both species show associations with cooler temperatures and higher elevations than study area averages.

ability to produce fertile offspring play into the definition. It's no longer enough to rely only on phenotype—a different appearance—which a shell-seller may be prone to do. Hemphillian practices have real consequences for conservation today, and it took a bold, pioneering project like the MBI to reconsider organisms that could go extinct before they're accurately seen as unique. As Lucid says, "You can't conserve species if you don't even know what they are."

While Hemphill correctly found most *Hemphillia* to be coastal, the pale jumping-slug (*Hemphillia camelus*) is among the few species that haunts the inland temperate rainforest, a wet ecosystem that develops where Pacific weather confronts the Northern Rockies. There, it is an endemic species, native to nowhere else on earth. Like its maritime kin, the pale jumping-slug is hermaphroditic, living a quiet life sliding among the debris of moist forests with red cedar and hemlock. Yet beyond these generalities, the MBI could not place the pale jumping-slug on a map. And so it joined the humped coin, smoky taildropper, fir pinwheel, and other invertebrates assumed to be imperiled, driving the MBI's original question: what's really out there?

Lucid's team quickly found the region's vast wet wilds did not reveal the slug's presence as easily as holes in lettuce. Success improved with a beer-baiting, a tactic that involved saturating strips of cardboard with Natural Ice, which proved to be more economically feasible than Laughing Dog microbrew. At all 992 of these trap sites, Lucid's team also collected one liter of leaf litter, which was then frozen, dried, and sorted for the quarry. And of course, after checking the trap line, they looked. In timed, 15-minute forays within 50 meters of a central thermometer, they scoured each site as one looks for lost keys, homed in on anything that writhed or glistened in the duff.

Or jumped. As per their name, jumping-slugs coil and snap to evade predators. While they never really catch air, these feeble distractions may spark enough surprise to deter the likes of a bird, and they're remarkable evolutionary feats for a spineless creature. But the jumping-slugs did not wholly evade the MBI, which found them in a total of 111 sites. Sixty-four of those detected were clearly the pale jumping-slug, but the remaining 47 were something else entirely. The most indicative

MULTI-SPECIES BASELINE INITIATIVE

BY THE NUMBERS



19 data-deficient Species of Greatest Conservation Need (SGCN). The MBI chose animals for their uncertain conservation status, not their charisma. This approach revealed fundamental trends from 2005 (pre-survey) to 2015 (post-survey) suggesting that 6 of the 19 deserved continued inclusion as SGCN, while 10 others were deemed healthy enough to drop off that list.



2,315 sites surveyed. Whether you're targeting a slug or a lynx, you're not likely to find anything if you go out just once in one spot. You've got to put in the time, miles, and faith to find the lesser-loved, seldom-seen creatures of this region. Enough said.



1,169 temperature loggers. Two of the most crucial baseline data points—species' occurrence and species' climate needs—are lacking for more plants and animals than you might imagine. The MBI explored both of these questions, and the ample deployment of temperature loggers confirmed that microclimates with cool refugia are critical for species like Skade's jumping-slug.



46 individual fishers. The fisher (*Pekania pennanti*) is a rare forest carnivore in the weasel family, and before MBI it was thought that few individuals lived across the three-state study area. In some areas there was indeed poor distribution of fishers, but researchers were surprised by the locally abundant concentrations of the animal, especially in the West Cabinets along the Montana border.



0 northern leopard frogs. Amphibians have been declining for decades worldwide, and it was a given they'd feature in the MBI. The MBI

focused on five amphibians classified as SGCN, including the northern leopard frog (*Rana pipiens*), once among the most widely distributed amphibians in North America. But the last confirmed discovery was in 1955, and with zero observations throughout extensive surveys in 2005-2015, the species was deemed extinct in the study area.



18

project partners. Land access permissions,

laboratory assistance, funding, more funding, etc. Without the financial, technical, and administrative assistance of diverse collaborators, the MBI wouldn't have made it through a single year. But with its committed partners, the MBI earned seven grants, powered through five years, and became a beacon for the promise of collaboration.



200 citizen scientists. Have you ever hauled a deer leg on your back through the snow so that it can be tacked to a tree? If so, you might have joined the MBI's intrepid team of volunteer citizen scientists, which included help from Friends of Scotchman Peaks Wilderness, Idaho Conservation League, and Selkirk Outdoor Leadership and Education. From camera monitoring to data entry to

multi-species surveys, these volunteers provided hours of labor, knowledge, and fun that were essential to project success.

feature of slug species is the genitalia, so, with microsurgical scissors and dental probes in hand, Lucid's team went to work. They found the mystery slug's penis was unpigmented and shaped more like a barrel or acorn than the pale jumping-slug's pigmented, peanut-shaped penis.

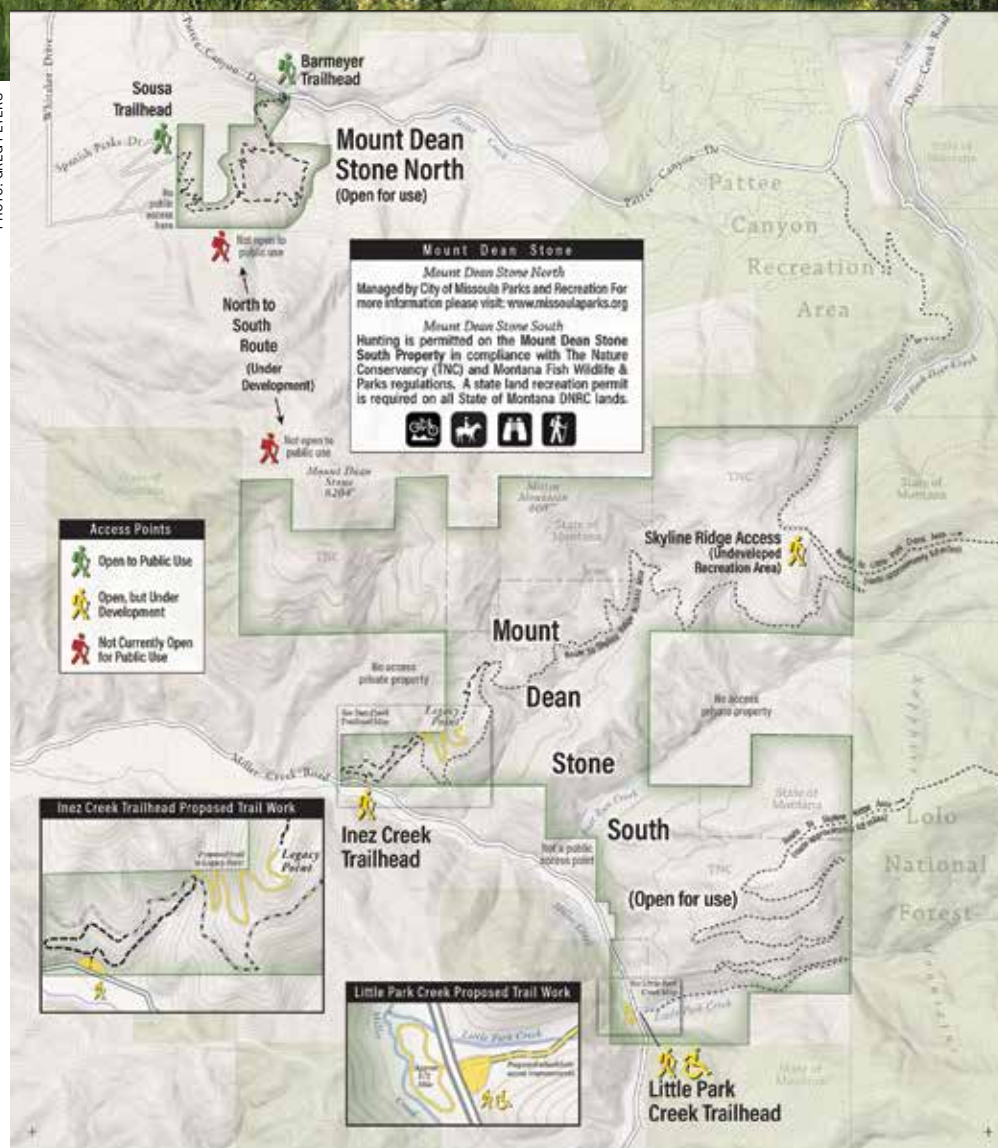
Fine distinctions indeed. And an intriguing theme when this never-seen-before shape not only occurred with regularity, but revealed a unique DNA sequence in genetic testing. Geographically, this new creature was sandwiched between populations of the pale jumping-slug in the Selkirks and Coeur d'Alene Mountains to the north and south, which also happened to be sites with the coolest temperatures. The species seemed to care little for state lines, and Montana's individual—found in the Cabinets—evokes a lesson we're just beginning to understand about the value of protecting transboundary refugia in a warming world.

There's certainly been a hiker or a hunter who's walked by this species before, and the slug's surely been sighted by the Ktunaxa people who have long shared its habitat. And yet, maybe not. Existence is not a given, and we're still just learning how to see and name the new-old creatures who shape this planet, this rainforest, our home. And so, as the Anthropocene renders each species more precious than ever, this slug was named with a nod to Skaði, the goddess of Norse mythology known to ski and hunt among the wintry peaks. But the slug was also named for Skade, the young girl—born to Lucid and his wife Lacy Robinson, the fellow MBI biologist and co-author of the paper that welcomed the slug to the scientific world. Their daughter will come of age in a new climate, and in her name these biologists find vulnerability and hope. Even the microclimates are changing, and just by slowing down and looking closely, Skade's parents find promise in those tiny places. There, where it's subtly cooler or wetter or more resistant to fire, there just might be a species or a process that, dotted across the landscape, can teach us how to thrive. 🦎

—Rob Rich is a naturalist, writer, educator, and beaver believer. His work has appeared with Earth Island Journal, High Country News, Sierra, Camas, and other publications.

Exploring Mount Dean Stone

PHOTO: GREG PETERS



Thanks to Five Valleys Land Trust and The Nature Conservancy, there's new open space to explore in Missoula! Last summer, the **Barmeyer Trail**, accessible from both Pattee Canyon Drive and Spanish Peaks Drive, opened to the public. This three-mile loop trail gives hikers beautiful views of the Missoula Valley, Pattee Canyon, and the Bitterroot. Wildflowers abound in the spring and summer, and the steep sections (of which there are several) will get your heart pumping!

While the Barmeyer Trail is the only Mount Dean Stone trail managed by the City so far, two other trails on Nature Conservancy land are open for exploration:

Inez Creek is a single-track trail that winds up the mountain to a scenic overlook called Legacy Point. The trailhead is about seven miles up Miller Creek Road. Just two miles past that is the **Little Park Creek** trailhead, which follows old logging roads that switchback lazily up the canyon, following the creek for part of the way. This trail connects to the ridge running all the way north to the Pattee Canyon Recreation Area, though the 9.6-mile trail is undeveloped in places. While Inez Creek may not be best for small children, Little Park Creek is a great trail for families. (However, you may want to wait to visit until later in the summer to avoid the ticks!)

Please note that there is currently no public trail over the Mount Dean Stone summit connecting the Barmeyer Trail to the Inez Creek and Little Park Creek trails.

Want to help build and improve the trails on Mount Dean Stone? Five Valleys Land Trust will be offering several volunteer days this summer—learn more and sign up for updates on Five Valleys' website: fvlt.org.

MAP: FIVE VALLEYS LAND TRUST

get outside calendar



Programs for Kids

Programs free with admission and/or membership.

MAY

2, 9, 16, 23, 30

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

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



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

SEPTEMBER

5, 12, 19, 26

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

14 Saturday Kids' Activity,
drop in between 2:00 and 4:00 p.m. *Raptors of the Rockies.*

28 Saturday Kids' Activity,
drop in between 2:00 and 4:00 p.m. *Raptors of the Rockies.*



OCTOBER

3, 10, 17, 24, 31

miniNaturalist Pre-K Program,
10:00-11:00 a.m. *Creepy Crawlies.*

5 Saturday Kids' Activity,
drop in between 2:00 and 4:00 p.m. *Spooky Skeletons.*



19 Saturday Kids' Activity,
drop in between 2:00 and 4:00 p.m. *Spooky Skeletons.*

HUNTING AND GATHERING

LEARNING TO READ THE LANDSCAPE

Join Us for Our 2019 Lecture Series! Hunting & Gathering: Learning to Read the Landscape

Join us for a further exploration of the tradition of hunting and gathering, from food and clothing to the naturalist's habit of creating collections. Each of our six speakers will share their expertise, from identification and use of the object of the hunt to identifying the landscape or phenology clues that will help hunters and gatherers to find what they're looking for.

Upcoming Speakers:

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

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

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

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

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

For more information and to purchase tickets, visit:

MontanaNaturalist.org/hunting-and-gathering



Volunteer Opportunities

JUNE

6 Volunteer Appreciation BBQ, 5:00-7:00 p.m. Enjoy good food and conversation with MNHC staff and your fellow MNHC volunteers in appreciation of your time and effort in helping out with our May VNS field trips and many other programs throughout the year!

SEPTEMBER

5 Volunteer Naturalist Training, 5:00-6:00 p.m. Introduction to volunteering with the Visiting Naturalist in the Schools Program. No prior experience necessary.

19 Volunteer Naturalist Training, 5:00-6:30 p.m. Learn how to teach kids about the flora and fauna of western Montana during the October VNS school field trips for 4th & 5th graders. No prior experience necessary.

MNHC Hours:

Monday-Friday, 9 a.m. - 5 p.m.
Saturday, noon - 4 p.m.

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

FREE admission for MNHC members, ASTC Travel Passport Members, and EBT card holders!

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

Visit MontanaNaturalist.org to register for programs and become a member.

For more information, call MNHC at 327.0405.



The Montana Natural History Center
thanks the

GOOD FOOD STORE

for sponsoring our 2019 lecture series -

**HUNTING AND GATHERING:
LEARNING TO READ THE LANDSCAPE**

WEASEL: JANA M. CUSAR/USFWS; RATTLESNAKE: ROY WOOD, YELLOWSTONE NATIONAL PARK; HUCKLEBERRIES: BROCKEN INAGLORY, WIKIPEDIA; COYOTE PUP: JOHN GOOD, YELLOWSTONE NATIONAL PARK; TANAGER: TERRY L SPIVEY, PHOTOGRAPHY, BUGWOOD.ORG; SAGE GROUSE: BOB WICK, BLM.



Adult Programs

APRIL

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

26-28 Naturalist Field Weekend, Friday-Sunday. *Sage Grouse Experience*. \$450; \$420 MNHC members. Registration required.



MAY

8 Evening Program, 7:00 p.m. *Sip & Stitch: The Art of Bookbinding with Audra Loyal*. \$35; \$30 MNHC members.

16 7th Annual Women's Luncheon to support the Summer Camp and Girls' STEM Camp Scholarship Fund, 11:30 a.m.-1:00 p.m. \$100. For more info and to purchase tickets, visit MontanaNaturalist.org.

18 Naturalist Field Day, 8:00 a.m.-3:00 p.m. *Birding by Ear*. \$80; \$70 MNHC members. Registration required.

JUNE



1 Community Discovery Day, 9:00 a.m.-1:00 p.m. *Beginning Fly Fishing: Approaching the Sport with a Naturalist Mindset*. \$40; \$35 MNHC members. Registration required.

12-14 and 17-18 Summer Montana Master Naturalist Course. FULL. Visit MontanaNaturalist.org for information on our spring 2020 course.

15 Naturalist Field Day, 8:00 a.m.-3:00 p.m. *Tour the Bison Range with a Naturalist*. \$80; \$70 MNHC members. Registration required.

22 Naturalist Field Day, 8:00 a.m.-3:00 p.m. *Tour the Bison Range with a Naturalist*. \$80; \$70 MNHC members. FULL.

SEPTEMBER

4 Hunting and Gathering Lecture Series: A Big Year of Birding and Beyond with Sneed B. Collard III and Braden Collard, 7:00 p.m. \$10; \$5 MNHC members; students FREE.

6-8 Women's Yoga and Outdoor Adventure Retreat, Friday-Sunday. At the Theodore Roosevelt Memorial Ranch on the Rocky Mountain Front. \$450; \$425 MNHC members. Registration required.



OCTOBER

October 1-December 10 Certified Interpretive Guide Training Course, Tuesdays, 4:00-7:00 p.m. \$235. (Certification is an additional \$150.) Registration required. Visit MontanaNaturalist.org for more information.

16 Evening Program, 7:00 p.m. *Sip and Build: Bone Boxes with Christine Morris*. \$35; \$30 MNHC members.

23 Hunting and Gathering Lecture Series: Beavers in North America: Trapped, Valued, and Why They Matter with Ben Goldfarb, 7:00 p.m. \$10; \$5 MNHC members; students FREE.

PHENOLOGY FOR MAY-OCTOBER



MAY:
Western Tanagers arrive
Arrowleaf balsamroot blooms

JUNE:

Moose calves are born

Coyote pups emerge from dens

Spiderlings born



JULY:

Alpine wildflowers bloom

Huckleberries peak



AUGUST:

August 12/13: Perseid meteor shower

Bull elk shed velvet

Black bears wean cubs



SEPTEMBER:

Snakes begin to den up

SEPTEMBER 23: Autumnal equinox



OCTOBER:

Weasels grow white winter coats

Golden Eagles migrate



Aquatic Animals Activity:

Exploring the Life in Our Waterways

BY STEPHANIE LAPORTE POTTS

All sorts of amazing creatures live beneath the surface of our rivers, creeks, and ponds. Aquatic macroinvertebrates (animals without backbones that live in the water) are an important part of the ecosystem, and they're everywhere!

Where to look:

Try to find a place where the water is shallow enough for younger ones to walk in safely. Water shoes (or old tennis shoes) can help protect little feet from sharp rocks.

You can find many small water creatures with no special equipment at all. Gently turn over rocks to see if you can find caddisfly or stonefly larvae. Look in quiet pools for water beetles, back swimmers, and water striders. You might even find a big dragonfly larvae stalking along the bottom, looking for other macroinvertebrates to eat.

Tools for further discovery:

Use a **clear plastic container** (recycled food containers work well) to scoop up some water and look for swimming creatures like threadworms and blackfly larvae. A **small aquarium net** can provide endless fun catching swimming beetles (and minnows, too!). A **larger bowl or bucket** is also nice for keeping your finds temporarily for observation, and a **magnifying glass** is great for getting a closer look.

Time for observation!

Look closely at the creatures you find. What are they doing? Where do they live? What might help them survive in the underwater world? Draw or paint pictures of your insects, take photos, or try to identify what type they are. Be creative, and have fun!

Once you're done, always make sure to release your finds back into the same body of water and the place that you originally found them.

Want to learn more? Visit MontanaNaturalist.org/aquatic-animals-activity/ for more photos, cool facts, and links to online resources!

Happy exploring!

SIZES OF ILLUSTRATIONS ARE NOT PROPORTIONAL.

ILLUSTRATIONS DEVELOPED BY THE UNIVERSITY OF WISCONSIN-EXTENSION IN COOPERATION WITH THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES. BASED ON A KEY DEVELOPED BY RIVEREDGE NATURE CENTER, NEWBURG, WI.



Caddisfly Larva



Stonefly Larva



Crawling Water Beetle



Backswimmer



Water Strider



Dragonfly Larva



Nematode or Threadworm



Black Fly Larva

Kids' Corner

Visions of Yellowstone

Jayne Jencso, age 9, took these photos on a visit to Yellowstone National Park last summer.



Calling All Kids!

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



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



The Moon-Randolph Homestead: *Rich in History, Nature, and Imagination*

BY ALLISON DE JONG

The Moon-Randolph Homestead sits just north of downtown Missoula, tucked down among the North Hills. I drive there on a sunny day in March, when the piles of snow are finally melting away. And though it's only a short drive from town, stepping onto the 13 acres of the Homestead is like taking a step back in time, into a different way of life, the busy modern world fading away.

This historic site is unique for several reasons, one of which is that it's a public site, on public land, owned by the citizens of Missoula. Its current caretakers are Katie Nelson and Caroline Stephens, who live on and maintain the property—because it is not only a historic homestead, it's a working one. Katie and Caroline raise chickens and pigs, grow a big garden, and maintain the 130-year-old apple trees in the heritage orchard. “It's a real honor to live up here and steward this place for the Missoula community,” Katie says.

And they also welcome—and educate—visitors. The Homestead is open to the public every Saturday from May to October, 11 a.m. to 5 p.m. The site provides rich learning opportunities, particularly about our agricultural history: the impact of the homesteading era and small family farms on the Montana landscape. But there is also much to learn about our cultural heritage and human history, as well as the natural history of

the area. The Homestead's apple trees, chickens, and vegetable garden are an island of domesticity among rolling hills, bunchgrass prairie, wildflowers, and the trill of meadowlarks.

While visitors can drive to the Homestead, the most pleasant approach is by foot; it's about a two-mile walk from any of the North Hills trailheads. “You don't have to plan, just come,” says Caroline. “Tours can be as long or as short as people want them to be.” They also encourage visitors to simply come to have a picnic with their families, or write in their journals, or spend some sweet time outdoors listening to the birds and the sound of the wind. “Spring is a beautiful time to come up here,” Katie adds, “when the lilacs are blooming and the apple trees are blossoming.”

Caroline and Katie have been increasing their community outreach the past several years, from augmenting the Homestead's online presence (moonrandolphhomestead.org, Facebook, and Instagram), to offering more volunteer work days and growing the fall fundraiser, which attracts upwards of 350 attendees. New this year is the Homestead's docent-training program, which will create a team of expert guides to run the Saturday tours. A second new venture this spring is the Homestead planning team, composed of community members


community focus



Whether you visit while the apple trees are in blossom or when the leaves and grasses turn golden, the Homestead is always a beautiful sanctuary. Interested in volunteering? Sign up at moonrandolphhomestead.org.

who are focused on connecting more people with the Homestead. The group is brainstorming new projects such as historic demonstrations and craft-making, K-12 field trips, adult education and workshops, and more.

“We also love to be a host site for other community programming,” says Caroline. Various non-profits bring their summer camps to the property, run workshops, and host events. Such uses are fee-based, but there are opportunities to do some work-trade, too. And volunteer opportunities abound—as Caroline says, “It's a homestead, so there's always plenty to do!”—for kids, seniors, and corporate groups, who do everything from spreading mulch around the apple trees to mending fences to painting picnic tables.

All in all, there are many ways to experience this special place. “When you come here, it's like you happened on an abandoned homestead,” says Caroline, looking around at the gnarled apple trees and tumbled buildings, some restored, some not. “We have a light-handed approach to curation, so there's a lot of room for imagination and curiosity and wonder. It's not tidied up. That's why I think there's such a deep love for this place.” 

imprints

COMING THIS FALL:

Women's Yoga and Outdoor Adventure Retreat at Theodore Roosevelt Memorial Ranch

Ladies, you won't want to miss this experience! Connect to nature and yourself as you practice yoga and enjoy a rejuvenating and exhilarating weekend retreat with other lovely, amazing women with yoga, wellness, hiking, archery, naturalist experiences, and delicious food. Situated at the edge of the Bob Marshall Wilderness on the Rocky Mountain Front, your retreat at the Theodore Roosevelt Memorial Ranch will inspire you with abundant natural beauty and provide a special getaway as you find a deeper sense of connectedness to yourself and your surroundings.



Your yoga and wellness leader is **Sara Close**, founder and CEO of Hello Soul Retreats (hello-soul.com). She has worked with a wide variety of people, from individuals to organizations like Patagonia to help advance their visions

for effecting change in our communities and our world.

Your naturalist guide is **Luke Coccoli**, a lifelong outdoor enthusiast who grew up along the Rocky Mountain Front and manages the TRM Ranch's Rasmusen Wildlife Conservation Center.



Dates: September 6-8, 2019

Cost: \$425 for members, \$450 for non-members.

Visit MontanaNaturalist.org to learn more and sign up for this unique retreat!



Spend your weekend surrounded by wildness and stunning views like this one at the TRM Ranch.



MNHC PHOTO

VNS Evaluation

This year, the Visiting Naturalist in the Schools program celebrates its 15th year of bringing naturalists into fourth- and fifth-grade classrooms across the region.

To learn more about how the program supports our teachers and schools, MNHC completed an evaluation of the program in 2018 with Portland, Oregon-based Cedar Lake Research. The results, available on our website, provided us great insight into what is working and what needs more attention. We know that the VNS program enhances science curriculum, supports student learning in science, and builds confidence with science for both students and teachers. We also learned that our program can be better structured to support new Montana State Science Standards while igniting wonder and curiosity in the natural world.

SAVE THE DATE FOR OUR ANNUAL BANQUET AND AUCTION

10.12 2019



SATURDAY, OCTOBER 12TH

5:00-9:00 p.m.

University Center Ballroom

Join us to support and celebrate the Montana Natural History Center! Enjoy a fabulous evening of dinner, drinks, conversation, and bidding on our lovely array of live and silent auction items. Tickets will be available this summer. Reserve your seat online at MontanaNaturalist.org or by calling 406.327.0405. \$50 per person.

TRM RANCH PHOTO BY STEPHEN LEGAULT. COURTESY BOONE AND CROCKETT CLUB



SPOTLIGHT:

Courtney Jaynes, Garden Manager

If you're exploring the Nature Adventure Garden at MNHC or our Native Plant Garden at Fort Missoula this summer, you may come across our new Garden Manager, Courtney Jaynes. Courtney grew up in the Kootenai River Valley of northwestern Montana, where she enjoyed fishing, hiking, and exploring in the beautiful Cabinet Mountains. She moved to Missoula with her husband in 2013 and received a bachelor's degree in Natural History Biology from the University of Montana in 2016. She developed a passion for science while working for spectrUM Discovery Area and was inspired to pursue environmental education after completing the Master Naturalist class and then working as a field trip educator at MNHC. In addition to tending the native plant gardens, Courtney also teaches kindergartners in the Clark Fork School after-school program. In her free time, she enjoys increasing her knowledge of Missoula's natural history by taking classes at MNHC, and also loves exploring the vast natural areas in and around Missoula, watching birds, identifying plants, nature journaling, baking, quilting, and playing with her puggle, Miley.

HERE ARE SOME AMAZING HIGHLIGHTS FROM OUR 2018 ANNUAL REPORT!

In 2018, more than **9,300** people of all ages engaged in nature education through programs, volunteering, community events, and center visits with MNHC. They connected to the natural world, felt the wonder and curiosity of being outside, participated in authentic research, engaged with our community, and gained a deeper knowledge of natural history by way of our exhibits, science courses, center tours, and field days.

Over **4,000** individuals visited our Nature Center.

1,700 students in **71** individual classrooms participated in our *Visiting Naturalist in the Schools* program.

These students engaged in **32,300** hours of hands-on science and engineering experiences.

Of those hours, **18,700** took place outside in nature.

1,350 adults participated in *Naturalist Field Weekends, Field Days, and other educational programming.*

We opened two new exhibits: Explore the Magic Planet and Explore Montana Ecosystems.

MNHC staff participated in the *BEETLES* (Better Environmental Education Teaching Learning and Expertise Sharing) Leadership Institute.

Our Staff Scientist received the 2018 'Sense of Wonder' Education Award from the Montana Environmental Education Association.

Completed a formal evaluation of the Visiting Naturalist in the Schools (VNS) program.

Our 2017 Annual Report won *Second Prize* in the American Alliance of Museums' Publications Design Competition.

Exhibits Update

Our popular **Glacial Lake Missoula exhibit** is getting an upgrade, thanks to funding from the Montana State Tourism Grant Program and the Glacial Lake Missoula Chapter of the Ice Age Floods Institute. The newly-designed exhibit will more fully explore the entire scope of the Ice Age Floods from the Missoula Valley to the Pacific Ocean, with particular focus on Glacial Lake Missoula and evidence in and around the Missoula Valley. **MNHC will debut the new Glacial Lake Missoula exhibit on June 14th. Come check it out!**

Come take a glimpse into the life of a naturalist in our **Naturalist Field Station!** We are currently showcasing two grassland ecologists from John Maron's lab at the University of Montana and the work they've been doing in the Blackfoot River Valley. In September we will debut a new Naturalist Field Station exhibit featuring a naturalist as an artist. Through the work of artist **Jenah Mead**, we will explore the extraordinary biodiversity in our local urban parks including Bancroft Pond, the Kim Williams Trail, and Greenough Park. The exhibit will document Jenah's process in exploring these places through nature journaling and will give visitors hands-on opportunities to be naturalists and artists as they use art supplies and journal prompts to do their own work.

Many thanks to Bruce Allen Woodworks and Freestone Concrete Works for their in-kind generosity in the completion of the Naturalist Field Station, and to an anonymous donor for the funding to purchase the Wentzscope.



Students learn about plant ecology on one of our first VNS field trips.

MNHC PHOTOS

As To The Mission

CELEBRATING 15 YEARS OF MENTORING SCHOOLCHILDREN

One of the Montana Natural History Center's largest and most impactful programs, Visiting Naturalist in the Schools—VNS for short—marks its fifteenth anniversary this year.

The VNS program is based on the notion that children are inherently interested in the natural world, and that this curiosity is perfect tinder for sparking a fire of learning and caring about nature through inquiry and observation.

We launched VNS with 24 schools in 2004. Today, VNS is in every public school in Missoula, as well as schools in the Mission, Blackfoot, and Bitterroot valleys. This breaks down to 71 classrooms and 1,700 students every school year. These students are engaged in 32,300 hours of hands-on learning—18,700 of which take place outdoors in nature!

It is not only students who embrace and enjoy the VNS program, but teachers and volunteers who also value the inquiry-based science learning and study of the natural history of western Montana.

And the program effects are real. Teachers report that students are more engaged in learning, especially in science. And we are always surprised and pleased at the many ways the program extends into the community, fostering ongoing mentor relationships between naturalists and students or sparking observations and discussions among family members.

Our deepest thanks to all the teachers, administrators, volunteers, staff, community members, foundations, donors, and sponsors who make this important program possible.

Do you have a story about how Visiting Naturalist in the Schools impacted you, a family member, or a friend? Please let us know!

Thurston Elfstrom,
Executive Director

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. 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!

volunteer spotlight



Chris Rowe

Chris Rowe is a dedicated volunteer with our Visiting Naturalist in the Schools program. Chris began working with MNHC just over a year ago, and quickly became a regular volunteer with VNS. Whether joining us in the classroom or out in the field, his presence is always a welcome addition. Since he gives his time so generously to a variety of classes, quite a few of our staff have had the chance to work with him. Teaching Naturalist Christine Wren writes:

"Chris is so easy-going with adults and kids alike, and it's wonderful to watch him interact with the kids. But the easy-going nature doesn't mean that he's complacent or waiting for guidance. He knows how to help without asking and is confident about being in an elementary school learning environment. He is skilled at blending with whatever direction I choose to take the lesson, even if that is different from other VNS teachers. He knows how to relate to the kids, including when to prod just a little, and when to give more leeway to a hesitant student. I love having him help me and I appreciate his generous gift of time, his positive relationship with the kids, and his strong support of our MNHC mission. He's a real treasure!"

Not only does Chris generously give his time to VNS, but he enthusiastically jumps into other helpful projects, too. He's quick to provide support and ideas for a variety of behind-the-scenes projects, from organizing a cabinet full of lesson plans to engineering our teaching materials to make them easier to use. We are very grateful that Chris has chosen to spend so much of his time with MNHC, and we know the students are, too!

Thank you, Chris!

Naturalist Notes

from Western Montana and Beyond

*Rattlesnake Creek in Greenough Park, Missoula
September 24th, 2018*

Observations of an American Dipper from photographer and naturalist Eugene Beckes:



● ● ● *Turning over a new leaf! No, wait! Turning over an old leaf! American Dippers (previously known as Water Ouzels) turn over lots of stuff like sticks, leaves, and even rocks in their search for aquatic insects in the streams and rivers they inhabit. Very cool birds.*



● ● ● *This is the biggest fish I've seen an American Dipper score, and I'm pretty sure it's a trout, as it came from Rattlesnake Creek. After it downed the fish, the Dipper perched on a rock and sang for 20 minutes!*

● ● ●

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

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



Walking in Grizzly Country

STORY AND PHOTOS BY MIKE CANETTA

We pulled up to the rather inconspicuous trailhead a few miles outside of Silver Gate. No parking lot; no maps; no signs; just a small turnout on a century-old mining road with a well-camouflaged footpath. This was to be the starting point for our trip into a remote part of the Absaroka Range, just northeast of Yellowstone.

Laid out in front of us was a deep, glacially carved valley with lush meadows that lined a swift, icy-cold creek. This scene is a familiar one to those who have hiked in the mountains of the western United States. What distinguishes this particular mountain valley (and most in Montana) from those in other parts of the West is the presence of one notorious inhabitant: the grizzly. Writers have long romanticized about the wildness endowed to the land by the bear, and ecologists embrace the role

they perform within the biotic community as apex predators. Yet naturalists like myself revere grizzly country for an entirely different reason.

A great naturalist once told me that the fundamental difference between hiking in the Sierras and the Northern Rockies was grizzly bears. In California, he observed experienced backcountry enthusiasts amble on confidently without a care or concern; drop them into Montana, however, and he noticed they were uneasy, often pausing to look over their shoulders to ensure they weren't being followed. It is not so much a fear that grips us when we enter grizzly country, but rather a heightened sense of awareness of ourselves and our surroundings. I've always believed this to be a sort of "sixth sense" that has more or less been lost in our increasingly tame, domesticated lives. Whatever it is, when it kicks in, as it certainly does when we walk

The landscapes of the Absaroka Mountains are made even more stunning by the awareness that grizzlies and other wild creatures inhabit them—whether you see them or not.

amongst grizzlies, a profound experience is sure to follow.

As we began our trek up the valley, I was disturbed by the incredible silence that engulfed us. Not even the sound of birds could be heard. Was there a bear lurking nearby, and every animal besides me knew this? My mind raced. Amidst this deafening quietness, my senses keyed into the aromas of the mature forest around us. Massive Douglas-firs and towering Engelmann spruce filled the valley with a fresh, piney fragrance. The smells of the forest calmed my mind.

As we emerged from the forest edge, a whole new sensory show unfolded. Ahead was a meadow bursting with vivid

pinks, yellows, purples, reds, and blues. There was monkey flower, elephant's head, paintbrush, lupine, sorrel, forget-me-not, and many more. It was intoxicating. I dropped to my knees to closely examine my personal favorite, *Linum lewisii*. Most know it as blueflax, and although it is common throughout the West, its subtle beauty has always captivated me. Soft, delicate flowers grow on a stem so slender that even on a wind-free day, the plants sway hypnotically amidst the grasses. Each stalk can produce dozens of flowers, none lasting more than two or three days, a reminder that nothing lasts forever.

Wildflowers galore, but still no sign of a bear.

As we moved higher into the alpine, my heart pumped vigorously to compensate for the thinning air. At the top of the high mountain pass, we were treated to stunning views of the Beartooth Mountains to the east. It was a perfect place for lunch. We were interrupted, however, by a group of inquisitive American Pipits. These medium-sized songbirds, though fairly plain and brown, are easily identified by their long tails that bob up and down excitedly. Pipits summer high in the mountains of the interior west, feeding on small insects that live on the surface of snowfields. These particular birds fluttered nervously back and forth over our heads, occasionally landing on rocks and allowing a good view. I recalled a story I had once read about an entire population of pipits in the Beartooths whose nests were buried under feet of snow during a freak summer blizzard. Nearly all of them—including the nestlings—survived. And here I was complaining about the lack of oxygen!

The views were splendid, and the birds entertaining, but we still had not seen a bear.



Once we finished lunch, we began our descent into a new drainage. Unlike the lush old growth we had hiked up through, this valley looked a barren place. Scorched by wildfire, it seemed desolate and dead from above. But looks can be deceiving, and as we continued downward, grey gave way to green. Beneath the charred skeletons of dead whitebark pines, ghosts of a previous ecological regime, was a lush understory of wild raspberries, strawberries, and whortleberries! This was the mother lode, and we indulged in it. Within minutes our hands were purple, stained by nature's bounty.

Amidst the ecstasy, I paused, wondering if a grizzly had also discovered this prime real estate. I scanned the landscape, but all I found was a Steller's Jay and more berries.

With daylight diminishing, we continued on, though I secretly wished we could have spent a week in that patch. I was suddenly feeling sleepy, perhaps having eaten one (or one hundred) too many whortleberries. I rambled on, but my attention shifted from my surroundings towards my feet as I tired. Then I tripped. As I recovered, I noticed footprints on



the ground that were far larger than my own. They were unmistakable: wide, with toes almost straight across and claws that reached at least an inch forward. A grizzly bear had found that berry patch. A shot of adrenaline surged through my veins. We were not there in the same moment, but we shared the same physical space, and likely ate berries from the same bushes. We were indeed walking amongst grizzlies.

As we settled into camp that night, I reflected on the many things we had experienced throughout the day: the views, the wildflowers, the pipits, the berries, and the footprint. I couldn't fall asleep; the possibility of confronting a grizzly still dominated my thoughts.

We hadn't seen a bear that day, yet we saw so much more. Such is the beauty of walking in grizzly country. 🐻

—Mike Canetta holds an M.S. from the University of Montana and works for the National Park Service in Grand Teton National Park. He can be found hiking or fly fishing around the Greater Yellowstone ecosystem in his free time.



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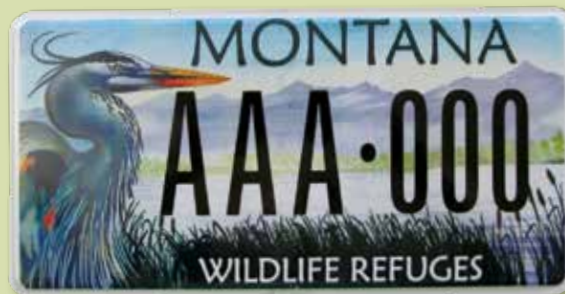
"Dig into the Past"

ARROWHEADS, SPEARS, AND BUFFALO JUMPS
Prehistoric Hunter-Gatherers of the Great Plains
BY LAURI TRAVIS
ILLUSTRATED BY ERIC S. CARLSON

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Ellen Knight created this beautiful seasonal round in a four-part workshop led by naturalist Christine Wren and anthropologist Sally Thompson. She and the other participants found inspiration from a variety of traditions that intimately relate to the cycles of the seasons, and they explored what aspects of each season they found most meaningful, bringing all those pieces together to create a personal, reflective, unique piece of art.

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