

MONTANA

Fall 2008

Naturalist

**Searching for
Ghosts**

Unloved Lodgepole

**Island on the
Prairie Sea**

**Can You
Find Plants'
Buried Treasure?**

see Get Outside Guide,
page 9



Montana Natural History Center
Your Base Camp for Discovery

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

MONTANA Naturalist

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Special
Pull-Out
Section



Cover photo — Eugene Beckes took this photo from Olson Road, along the southern edge of the Ninepipe Migratory Bird Refuge in the Mission Valley. He writes, "I have found GBHs to be difficult subjects. They are very wary birds and always fly if I stop my truck anywhere near them. However, this bird was simply standing along the edge of a pond when I saw it. I had my camera as ready as I could and made the shot hand-held, using the window frame as a brace. It was taken with a Nikon D300 camera using a Nikon 80-400mm VR lens." You can contact the photographer at starkraven@blackfoot.net.

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Your Base Camp for Discovery

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tidings



MNHC Photo

Students study plant diversity on a Visiting Naturalist in the Schools field trip.

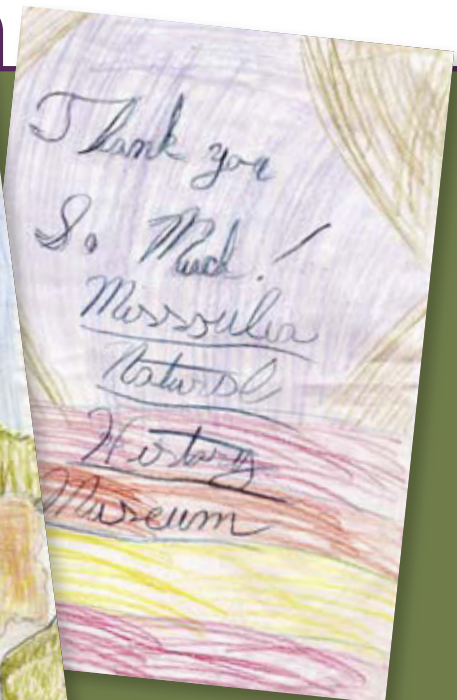
This summer could go on forever as far as I'm concerned. The still-green hills, cold streams and cooler (than last year) temperatures, especially at night, feel delicious. But we can already see the movement toward fall in the ripening berries, the asters and goldenrod and, most notably for me, the changing light. Already the days have shortened by one hour and 19 minutes since the summer solstice. By Labor Day, we will have only 13 hours and 19 minutes of daylight to soak up. Animals and plants respond to nature's cues, especially shortening photoperiod, by preparing in many different ways for colder, darker times ahead. So, like the industrious pika, now is the time for us all to make hay while the sun shines.

September brings a wealth of opportunities for outdoor exploration and learning, including a chance to get involved in the Visiting Naturalist in the Schools program, which serves students in 4th and 5th grades. Under the guidance of MNHC's staff naturalists, volunteers can receive training in topics related to natural history and ways to engage students in the field, which can be put into practice in classroom visits or on field trips. You are cordially invited to stop by MNHC on Tuesday, September 9 at 5:00 for refreshments and a volunteer naturalist orientation to learn more about Visiting Naturalist in the Schools. Just one way to keep abreast of events and processes in the world around us. Enjoy!

Caroline Kurtz

Caroline Kurtz
Editor

Artful Appreciation



gray ghost

Story by Hank Fischer
Photos by Cassie Hartman

A day in search of *Strix nebulosa*

It was the first week in June in Yellowstone, arguably the best time of year to see wolves and grizzlies. But as we motored up the Lamar Valley, we didn't even slow down at the den site of the Slough Creek wolf pack. We hardly glanced at the foothills across from the Yellowstone Institute, where certainly we could have spotted grizzly bears on the forested slopes. We zipped right by the juncture of Soda Butte Creek and the Lamar River, probably the most dependable place in the park to see wolves.

Forget the charismatic megafauna. We were on a mission to find a far more elusive quarry – a gray ghost that flies on silent wings and disappears in the forest like a phantom, a solitary creature whose nest is almost impossible to find. We were on the hunt for a great gray owl.

For some, finding a great gray owl is the Holy Grail of birding. This trip was organized at the behest of a die-hard birder friend who had never seen a great gray and badly wanted to add it to her considerable life list. I had promised her we would remedy that deficiency.

I had a secret weapon. My friend Dan Hartman, a noted Yellowstone photographer and naturalist, had agreed to be our guide. Dan lives and breathes owls, and is incredibly knowledgeable about their natural history. The year before, Dan had guided a group I was part of to a record seven great gray owls in a single day.

But when we pulled into Dan's photo gallery in Silver Gate, he had a long face. He hadn't seen a great gray owl in several months, and he'd been out looking almost daily. He said he had found two owls that had been hit by cars (great grays are noted for flying very low over the ground in search of prey), and that heavy late spring snows had disrupted normal owl behavior.

But my birder friend was undeterred, so the hunt was on. Ideal habitat for great grays consists of dense forests with occasional meadows. If these meadows are wet and boggy, all the better. In Yellowstone, great grays feast on voles and pocket gophers.

First we head up the Beartooth Highway out of Cooke City. We

find displaying blue grouse and even spot a sandhill crane on a nest, but no owls. We head through Sunlight Basin toward Cody and Dan leads us to a spectacular golden eagle nest – a rocky aerie with two chicks – but no great grays.

So it's back to Yellowstone to one of Dan's favorite spots in Lamar Valley, where we run into a black bear. We also spot a spectacular Williamson's sapsucker and marvel at its striking yellow belly, but not a sign of *Strix nebulosa*.

Afternoon shadows are creeping in, but Dan has one last idea: an old haunt in the deep forest on the far side of Dunraven Pass where he used to see owls ten years ago. He's concerned that the snow might still be deep there. He checks our group to see how game we are. We share knowing glances that this is a final act of desperation. Off we go.

We make the long drive up and over Dunraven Pass and the snow hasn't receded much. It's still at least two feet deep in the trees. We arrive at our destination: a dense lodgepole forest with a small meadow. Dan says this first opening links to two larger meadows, deeper in the forest. The snow is patchy in the meadows, and water is flowing

everywhere. We will definitely get wet. We start post-holing through the snow to the first meadow, sometimes risking walking on downed trees to stay out of the water and mud.

Where the ground is bare we see a spider-webbing of dirt pathways where the winter labor of pocket gophers has been exposed by the melting snow. Dan declares it spectacular owl habitat, but we see nothing in the first two meadows. But at the entrance to the third meadow, Dan bends down and picks something up. When he turns to face us, his eyes are gleaming and he's holding a wisp of a feather in his hand. It's a fresh great gray feather, he says. I don't know how one gauges the freshness of feathers, but we all believe him.

Dan knows what he's looking for now. His eyes sweep the periphery of the meadow, looking hard at every broken tree top and gnarled branch that would make a suitable owl perch. But there's nothing. I can feel the spirit of the group dropping like the






temperature as we stand ankle-deep in the mixture of slush and water. It's been a long day and daylight is nearly gone.

But Dan's not done. He puts his hands to his mouth, puffs out his cheeks and blows a low whoo-hoo-hoo. The sound has barely died out when a great gray owl sails out of the deep woods, glides noiselessly across the meadow on its four-foot wings and perches in a tree less than 50 feet away. Its yellow eyes burn brightly as it stares at us with its flattened disklike face and huge rounded head.

This marvelous bird is not at all alarmed by our presence. We enjoy a close-up examination through our binoculars, observing that while great grays stand taller than a great horned owl, they are not nearly as powerfully constructed. The physique is slimmer and the talons not so strong.

After a few minutes the owl sails off into the dark woods, doubtlessly with pocket gophers on his mind. In the fading light our little group squishes back to the car, chattering excitedly and replaying the final sighting multiple times. We're glowing with the same satisfaction as if we had just bagged a six-point elk. While this hunt may have only produced memories, they are ones sure to last a long time. 

MNHC board chairman Hank Fischer also works for the National Wildlife Federation and formerly owned a business that led trips to Yellowstone National Park. Cassie Hartman, daughter of Dan Hartman, has been photographing wildlife since she was 10. You can visit the Hartman's website at www.wildlifealongtherockies.homestead.com.

Great Gray Facts

- large gray owl, rounded head and no ear tufts
- identified by prominent facial disc, white "moustache" at bottom of face
- females are larger than males (46 oz. vs. 34 oz.)
- wings are very long (48-60 inches)
- very tall bird (28 inches)
- nest in broomed-off tree tops or in nests of other raptors
- lays 2-5 eggs, most commonly 3
- preys primarily on small rodents



By Peter Lesica

Stuck Between a Squirrel

Lodgepole pine is an impressive plant. I say this in spite of the fact that lodgepole forests are among our least diverse plant communities and provide a less than emotionally moving backcountry experience. The trees most often are small and grow close together, resulting in “doghair” stands. These are surpassed in their impenetrable nature only by stands that have self-thinned, leaving two-thirds of the poles stacked at all angles. As the Lewis and Clark diaries attest, these forests are generally not welcoming and majestic.

What is impressive is the fact that lodgepole has one of the largest ranges of any tree in North America, dominating more than 50 million acres (50 times bigger than Glacier National Park), from the Yukon south to Mexico and from the Pacific Ocean to South Dakota and Colorado. Three common geographic races are recognized in this large geographic range: var. *contorta*, the shore pine, occurs in sandy soil along the coast; var. *murrayana*, Sierra lodgepole, is found in California’s Sierra Nevada Range; and var. *latifolia*, the Rocky Mountain lodgepole, with the largest distribution, is centered in the Rocky Mountains. How does such a scrawny little tree with a spindly crown come to be so abundant?

Several traits contribute to lodgepole pine’s dominance across western North America. It grows well in infertile soils, and it grows fast. But probably the single most important reason lodgepole is so abundant is its ability to colonize after fire. It germinates explosively following fire, forming the dense, even-age stands we are so familiar with. Lodgepole accomplishes this feat thanks to a trait unique among western pines: serotiny.

A sticky business

Serotiny refers to the production of cones that remain sealed shut by resin until

ABOVE: Red squirrels are the predominant predator of lodgepole pine cones.

OPPOSITE: (TOP) Fire creates opportunity for a new crop of lodgepole pine trees. **(MIDDLE)** Serotinous lodgepole cones open as a result of fire, allowing quick repopulation of a burned area.

(BOTTOM) Even-aged stand of lodgepole – a successful but not very diverse community.

[This article originally appeared in the Spring 2007 issue of Kelsey, the newsletter of the Montana Native Plant Society.]



and a Hot Place



opened by extreme heat, usually by fire. Trees without serotinous cones must recruit seed from outside the burned area in order to repopulate, but trees with serotinous cones have a source on site and ready to go.

Lodgepole pine trees in the Rocky Mountains can be either serotinous or non-serotinous. Both kinds have open cones when young, but after 50 to 70 years serotinous trees begin to produce closed cones, while non-serotinous trees never do. Producing open cones early in life may allow lodgepole trees to produce seed



Red squirrels are the predominant predator of lodgepole pine cones and occur throughout the pines' range. Craig Benkman knew that red squirrels feed on serotinous cones as well as open cones. When squirrel predation is high, serotinous cones never get a chance to shed their seeds, but some open cones disperse seeds before they are taken by squirrels. Serotinous trees can be at a disadvantage with squirrels around.

Benkman wondered whether squirrel predation might be responsible for maintaining the presence of open-cone lodgepole trees even when fire dominates

How does such a scrawny little tree with a spindly crown come to be so abundant?

that can disperse to areas that remained uncolonized immediately after a fire. To be effective, this open-cone period must end and serotinous cones come on-line before the next big blaze. So the 50- to 70-year open-cone period usually corresponds to the average time between fires.

Although individual trees are either serotinous or not, nearly all stands of Rocky Mountain lodgepole are composed of a mixture of the two types (inexplicably, Sierra Nevada var. *murrayana* does not have serotiny). Why both?

Studies in Yellowstone National Park and Montana's Bitterroot Range suggest that lodgepole stands with a higher proportion of serotinous trees experience more frequent fires because of climate or topography, or that those stands were initiated by a fire. Stands exposed to other types of disturbance, such as wind throw or insects, had higher proportions of open-cone trees.

The existence of both types of trees in most stands suggests that most stands experience variability in disturbance types. But this expectation is at odds with the fact that fire is the dominant disturbance throughout most of the Rocky Mountains. Does some other factor bear on the proportion of serotinous trees in the Rockies? Researchers from New Mexico came to Montana to answer that question.



the disturbance regime. If this were true Benkman reasoned, then lodgepole stands in areas where squirrels don't occur should have fewer open-cone trees than stands where they do.

It turns out that there are a handful of isolated mountain ranges where there are lodgepole pines but where red squirrels have not been present since before the last ice age. These include the South Hills of Idaho, the Cypress Hills of Alberta, and the Sweetgrass Hills, Little Rocky Mountains and Bear's Paw Mountains in north-central Montana. Benkman found that these squirrel-free lodgepole pine stands all had more than 85% serotinous trees. On the other hand, Jim Lotan, from the Forestry Science Lab in Missoula, reported that 341 different stands with pine squirrels all had less than 85% serotiny, with the average around 34%.

These researchers showed that it was not just the frequency of crown fires but also the occurrence of squirrel predation that determined the frequency of serotinous and open-cone trees in Rocky Mountain lodgepole pine forests. You can think about all of this and maybe count serotinous trees next time you're bored to tears hiking through a lodgepole forest. 🐿️

—Peter Lesica is a botanist and member of the Montana Native Plant Society.



Beargrass



Wild Onion



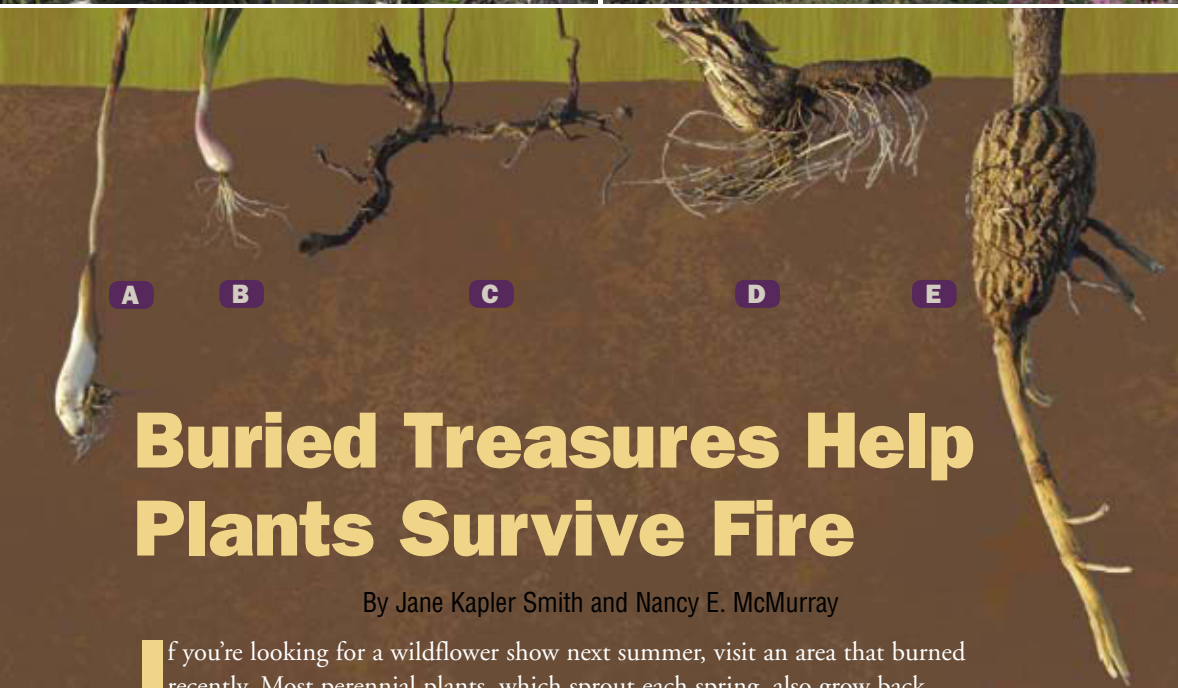
Glacier Lily



Arrowleaf Balsamroot



Fireweed



Buried Treasures Help Plants Survive Fire

By Jane Kapler Smith and Nancy E. McMurray

If you're looking for a wildflower show next summer, visit an area that burned recently. Most perennial plants, which sprout each spring, also grow back from underground parts – usually stems or leaves – after fire. These tough, energy-storing organs are the “buried treasures” of the plant world. Here are some wildflowers that are common in Montana's forests. Can you match each one with the photo of its underground structure (above)? Check your answers on page 12, and learn more about each plant's “buried treasure.”

The “August Singularity”

In weather circles, a singularity is a phenomenon associated with a specific calendar date. Like a late-season snowstorm that always occurs on April 15, for example. For years, a particular weather pattern originating off the northwest coast of Canada has brought a storm front through Missoula on August 20, resulting in downpours and drowning visitors to the Western Montana Fair.



The storm was so predictable that finally fair organizers capitulated and began to open the fair a week or so earlier.

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

Photo by Ed Austin & Herb Jones, YNP

Photo by Ed Austin & Herb Jones, YNP

Photo by Ed Austin & Herb Jones, YNP

Photo by Jane Kapler Smith

August 25 Volunteer Naturalist Training, 4:00-5:00 p.m. **What is a Naturalist?** Volunteer orientation and training for Visiting Naturalist in the Schools September class visits.

August 30 Saturday Discovery Day. Canoe Day-trip with Naturalist Lee Metzgar, 8:00 a.m.-5:00 p.m. \$30 MNHC members/\$35 non-members. Space is limited; registration required. Call 327-0405 for details.

September 6 Saturday Discovery Day. Bear Days with Jamie Jonkle, time TBA.

September 9 Volunteer Naturalist Orientation, 5:00-6:00 p.m. Learn how to get involved with MNHC's Visiting Naturalist in the Schools fall field trips! Refreshments provided.

September 13 Saturday Discovery Day. Fall Mushroom Foray with Larry Evans, time TBA.

September 13 Volunteer Naturalist Training, 10:00 a.m. – 3:00 p.m. **Riparian Habitat Field Trip.** Learn about riparian ecosystems and ways of teaching children in the field. This training will help prepare volunteers for leading educational stations during school field trips in October. Free. Call 327-0405 for details.

September 16 Volunteer Naturalist Training, 4:00-5:30 p.m. **Riparian Birds and Wildlife.** Learn about the common birds and other wildlife we'll be observing during our fall school field trips. This training will help prepare volunteers for leading school field trip stations in October. Free. Call 327-0405 for details.

September 18 Volunteer Naturalist Training, 4:00-5:30 p.m. **Field Sketching and Journaling.** Learn techniques for improving drawing skills, observation skills, and how to keep students engaged and learning through field sketching and journaling. This training will help prepare volunteers for leading school field trip stations in October. Free. Call 327-0405 for details.

September 20 Saturday Kids Activity. Winged Wonders, 2:00 p.m.

September 24-28 Raptor Research Foundation 2008 Annual Conference. Special lectures by William Clark, Ken Dial, Erick Greene. Raptor photography workshop with Rob Palmer. Special presentation "The Legacy Lives on—A Tribute to John and Frank Craighead." For registration information, contact Chelsea.thompson@umontana.edu, 243-4866.

October 4 Saturday Kids Activity. Dynamic Dinosaurs!, 2:00 p.m.


October 8 Evening Lecture Series. Montana Owls with Denver Holt, 7:00 p.m.

October 10 Jump In and Join the Fun. MNHC dinner and auction. For reservations, call 327-0405.

October 11 Saturday Discovery Day. Owl Banding with Denver Holt, time TBA.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
MNHC Hours: Tuesday-Friday, noon - 5 p.m. and Saturday noon - 4 p.m. Admission Fees: \$1/adults, \$.50/children 4-12, free/children 3 and under and MNHC members.				August		
			20	21	22	23
	 Volunteer Naturalist Training, 4:00-5:00 p.m. What is a Naturalist?		Chokecherries ripen			 Saturday Discovery Day. Canoe Day-trip with Naturalist Lee Metzgar, 8:00 a.m.-5:00 p.m.
24	25	26	27			30
September						 Saturday Discovery Day. Bear Days, time TBA.
31	1	2	3			6
	Fawns have lost their baby camouflage	 Volunteer Naturalist Orientation, 5:00-6:00 p.m.				 Volunteer Naturalist Training, 10 – 3 p.m. Riparian Habitat Field Trip.
7	8	9	10	11	12	13
		 Volunteer Naturalist Training, 4:00-5:30 p.m. Riparian Birds and Wildlife.		 Volunteer Naturalist Training, 4:00-5:30 p.m. Field Sketching and Journaling.		 Saturday Kids Activity. Winged Wonders, 2:00 p.m.
14	15	16	17	18	19	20
			 September 24-28 Raptor Research Foundation 2008 Annual Conference. Special lectures by William Clark, Ken Dial, Erick Greene.		Listen for elk bugling	
21	22	23	24	25	26	27
			October			 Saturday Kids Activity. Dynamic Dinosaurs!, 2:00 p.m.
			Blue grouse move to higher elevations	1	2	3
			 Evening Lecture Series. Montana Owls with Denver Holt, 7:00 p.m.	8	9	10
					 Jump In and Join the Fun. MNHC dinner and auction.	 Saturday Discovery Day. Owl Banding with Denver Holt, time TBA.
					11	12
						13
						14
						15
						16
						17
						18

Photo by Jeff Foot, YNP

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
19	20	21			24	25
26	27	28			31	1



Volunteer Naturalist Training,
4:00-5:00 p.m.
Plants: What are Flowers For?

Photo courtesy of YNP



Saturday Kids Activity.
Bats! Bats! Bats!,
2:00 p.m.

*Beavers add
to winter
food caches*

November



Evening Lecture Series. Wildlife CSI,
Mike Schwartz,
7:00 p.m.



Saturday Kids Activity.
Totally Turtles!
2:00 p.m.

2	3	4	5	6	7	8
9	10	11	12	13	14	15



*Peak of mule
deer mating
season*



Saturday Kids Activity.
Terrific Turkeys,
2:00 p.m.

30	1	2	3	4	5	6
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Volunteer Naturalist Training,
4:00-5:00 p.m.
Plants: What are Fruits For?

December

7	8	9	10			13
14	15	16	17			20

*Non-hiber-
nators
remain on
the prowl*

Photo by Jim Peasco, YNP

Activity Highlight



Winged Wonders

Why do birds fly south for the winter? Join us for a Saturday Kids Activity on September 20 at 2:00 p.m. and we'll learn about big and small Montana birds that migrate, view the nest of a large migrating bird and explore our feathered friends through other fun activities. Our special guest will be a live saw-whet owl! Saturday Kids Activities at MNHC are free and designed for kids aged 5 to 10.

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



Adult Program



Youth Program



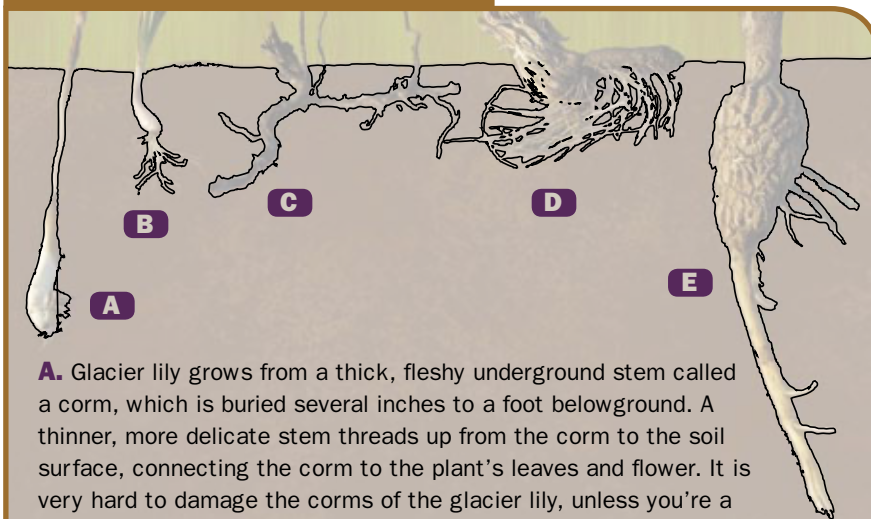
Volunteer Opportunity



Rest is not idleness,
And to lie sometimes on
the grass under
Trees on a summer's day,
Listening to the murmur
of the water,
Or watching the clouds float
across the sky,
Is by no means
a waste of time.

—John Lubbock

Buried Treasure Answers



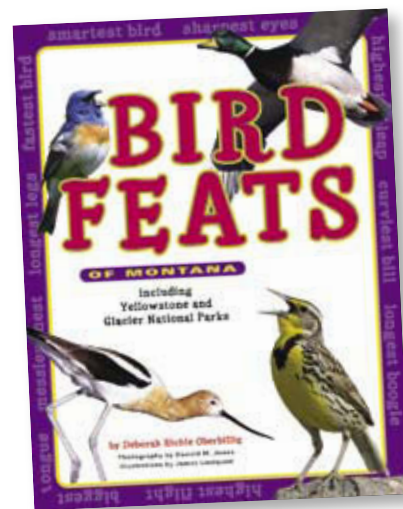
A. Glacier lily grows from a thick, fleshy underground stem called a corm, which is buried several inches to a foot belowground. A thinner, more delicate stem threads up from the corm to the soil surface, connecting the corm to the plant's leaves and flower. It is very hard to damage the corms of the glacier lily, unless you're a grizzly bear. Bears use their strong shoulders and long, sharp claws to dig up and eat these buried treasures.

B. Wild onion grows from a bulb, just like its cousins in the garden. A bulb is a tight cluster of underground leaves. The bulbs of wild onion are small – perhaps an inch long and half an inch wide. They usually grow within a few inches of the soil surface. This must be enough to protect them from fire, because they grow very well in burned places.

C. Fireweed grows from horizontal stems called rhizomes. They are thin and woody, and they usually grow several inches underground so fire rarely kills them. The photo on page 9 shows three fireweed stems growing up from a single rhizome.

D. Beargrass grows from thick, rope-like rhizomes. Thin roots grow out from the rhizomes and reach down into the soil. Because its rhizomes grow near the soil surface, beargrass is sometimes killed by fire. But most often, it survives and thrives in the sunny conditions occurring in the years after fire.

E. Arrowleaf balsamroot grows from a thick, woody underground stem called a caudex. It may be 3 to 4 inches in diameter measure a foot long. Roots branch out from this underground stem and grow several feet down into the soil. This plant is hardly ever killed by fire.



BOOK CORNER

Check Out These Amazing "Bird Feats"

Bird Feats of Montana, Including Yellowstone and Glacier National Parks by Deborah Richie Oberbillig is chock full of cool photos and illustrations that accompany lively and informative text about some of the state's fastest, largest, boldest and smartest birds.

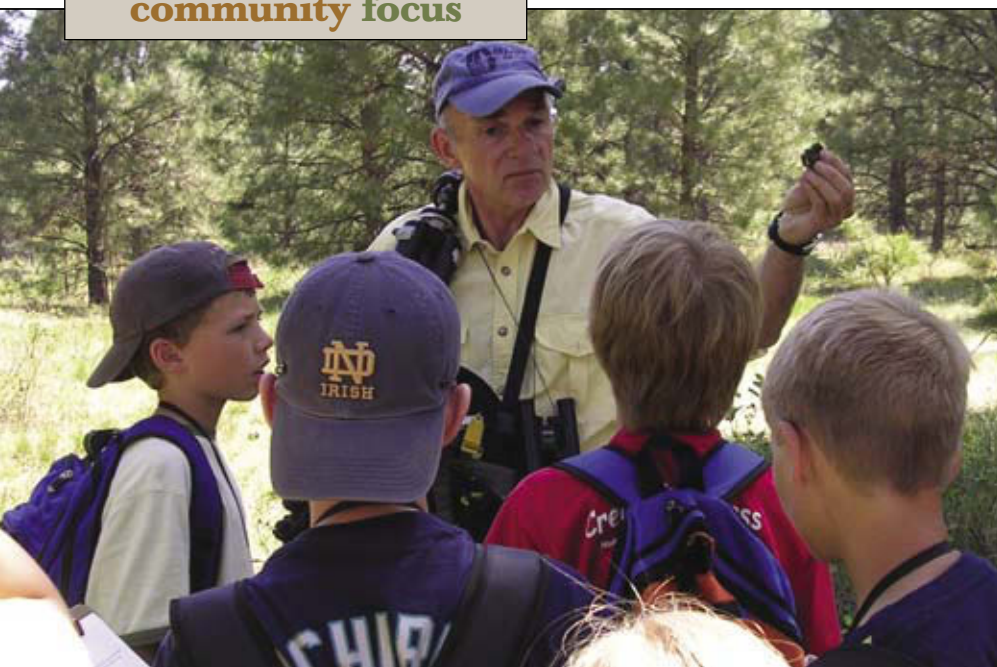
Why is the peregrine falcon so fast? How can an eagle spot a pigeon three miles away? What makes male lazuli buntings such great songsters? Why do northern flickers have the longest tongues?

Written for children ages eight to 12, *Bird Feats* covers 40 of Montana's birds – from calliope hummingbirds to trumpeter swans – in sections that discuss a variety of bird feats, from birds with the niftiest nests to birds with the wildest behaviors. Learn how bobolinks navigate by the stars with an internal compass of magnetic crystals. Discover the secret to the crane's dance. Find out why magpies have the messiest nests.

As Kate Davis, director of Raptors of the Rockies, says, "Deborah...has a flair for grabbing the reader right away, old and young alike, and causing them to think, ponder what may seem obvious and explore mysteries from the natural world."

Bird Feats, with color photos by Donald Jones and illustrations by James Lindquist, is available for \$14.95 from local bookstores, through online retailers or from Farcountry Press at (800) 821-2874 or www.farcountrypress.com.

Photo by Jane Kapler Smith



MNHHC Photo

Wherever He Goes Nature is Charles Miller's Avocation

By Brian Williams

CHARLES MILLER grew up in rural Holmes County, Ohio, surrounded by woods and small farms. City life and television passed him by, he says; the outdoors was his big-screen tv. There he learned the basic life cycle of cercropia moths, the behavior and needs of a screech owl and the excitement of "running fast with a butterfly net."

Now, after a career in the medical field that led him from Saudi Arabia to Missoula and the University of Montana, he continues to help spark the same passion in local elementary students. Many hundreds of school kids over the past five years got their first close up view of a great horned owl or a pileated woodpecker through Charles' spotting scope on a bird-watching hike with the Montana Natural History Center.

From identifying birds and butterflies to preparing museum quality study skins to teaching children and adults alike, Charles Miller embodies the true spirit of a naturalist.

Q: What are your first memories of being a naturalist?

CM: My first memory is of being outside [all] the time. I had a mom and a dad who were interested in letting me explore. My mother would take me on nature walks around the farm and back into the woods. We'd pack a little picnic lunch and go for a half day, catch a couple bugs... it was great. She liked to have us interested in the outdoors. And of course my dad, he showed me his [butterfly] collection from when he was in high school or grade school, I can't remember which, but he still had it.



Q: Any stories or moments that stand out from that time?

CM: I went to a school that was Grade 1-12 all together, and the seniors in biology always had to make an insect collection. Well, word got out that there's this guy and his brother down in 5th grade who collect insects. So a couple enterprising seniors, and seniors never talked to 5th graders, met us in the hallway, gave us a couple bucks, wrote down what insects they wanted and we'd go collect them. And so next year, the seniors said "hey this requirement is easy, you just go down there to the 6th grade..."

Q: Did you ever have a moment of epiphany about natural history?

CM: When I began skinning birds for collections at the University of Montana, I saw for the first time the marvel of birds, a beauty only suggested in views through binoculars or spotting scope. As Hornady, a noted Smithsonian taxidermist, once asked, "Do birds have souls? Yes, the skin of the bird is its soul, and when mounted by skillful hands, it becomes comparatively immortal."


Q: You spent 8 years in Saudi Arabia. Were there any moments over there when you glad to be a naturalist?

CM: Well, yeah, a lot of people were bored because it was desert. To them it was nothing, to me it was the greatest thing... The birds would literally sit on the ground in the shadow of poles. And, of course, I was close to Africa, just a three hour trip [away]. Namibia, why would anyone go there? Well, birds. I went over to Borneo, trying to find the Rajah Brooke's Birdwing butterfly. That was the kind of thing I did because of my interests.

Q: Since retiring from the University of Montana, you've spent thousands of hours teaching kids about natural history. Any particularly fond memories?

CM: Well, there are so many. I really like to see [kids] looking at a bird through a scope. Just to see their excitement and hear what they say when they can see the feather detail on a bird, wow.

Q: Any advice for getting kids excited about natural history today?

CM: Take away the distractions: the t.v. and the cell phone. Get them outside and being curious. 

A young Charles with screech owl (LEFT). Charles and his brother with some of their study collections (BELOW).



Photos courtesy of Charles Miller

Crazy Geology

By Kerry Fine

The Crazy Mountains rise up like an island on a prairie sea. (BELOW) The area of exposed igneous rock in the Crazies is one of the largest in the world.

I have always been a wayside geologist, curious about formations encountered along roads and trails. Recently, while driving west on I-90, near the town of Big Timber, it occurred to me that the mountains you see rising so dramatically in front of you to the north are not part of the Rocky Mountains. In fact, when you look at them in satellite photos, the Crazy Mountains appear to be an island of gray peaks with a ring of green growth, floating on the prairie. And, in fact, the Crazies are a type of formation referred to as an island mountain range.

Because they project so spectacularly from the plains, I had assumed that the Crazy Mountains were part of the great collision of tectonic plates that formed the massive jagged wrinkles of the Rockies. However, the Crazies have a more localized origin. Much like islands in the ocean, island mountain ranges are formed in part by volcanic activity.

Between 25 and 50 million years ago, magma seeped upward through the layers of sandstone and soft sediment that covered the area that is now central Montana. The magma never came to the surface but remained trapped below ground, forming an intrusive pocket of igneous rock, referred to as a stock. The stock measures approximately four miles wide and six miles long. In addition to forming the stock, magma spread outward, away from the stock, through fissures in the layers of sandstone and shale, forming radiating




Photo by R. Robinson, YNP



Photo by Donnie Sexton, Travel Montana

glaciers formed over the area and bulldozed the valleys, eating away about a mile of softer sediment that covered the igneous rock. Because the igneous rock that formed below ground was so much harder than the shale and sandstone surrounding it, the receding glaciers exposed and sculpted the stunning, chaotic-looking structures of the Crazy Mountains that we see today. Indeed, the area of exposed igneous rock in the Crazies is one of the largest in the world. Among the range's many vertical, jagged peaks there are 23 between 10,000 and 11,000 feet. More than a dozen of them are still unnamed. The highest point, Crazy Peak, has an elevation of 11,214 feet.

Glacial erosion may seem unexciting when compared to the tectonic up-thrust formation of the Rockies, yet this slow and steady wearing away created a striking island

range in a relatively compact area, covering about 140,000 acres. On a U.S. Geological Survey map of ecoregions, the Crazy Mountains are carefully outlined and graphed as their own unique ecoregion. Because the peaks of the Crazies project into the clouds, they can draw as much as three times the annual precipitation of the prairie foothills and sagebrush steppe that surround them. Like an island of land at sea, the Crazy Mountains are a biotic island, anchored to the plains, supporting flora and fauna unlike that of the surrounding landscape, and greeting west bound travelers with their first glimpse of the immense geological processes that have shaped our area. 

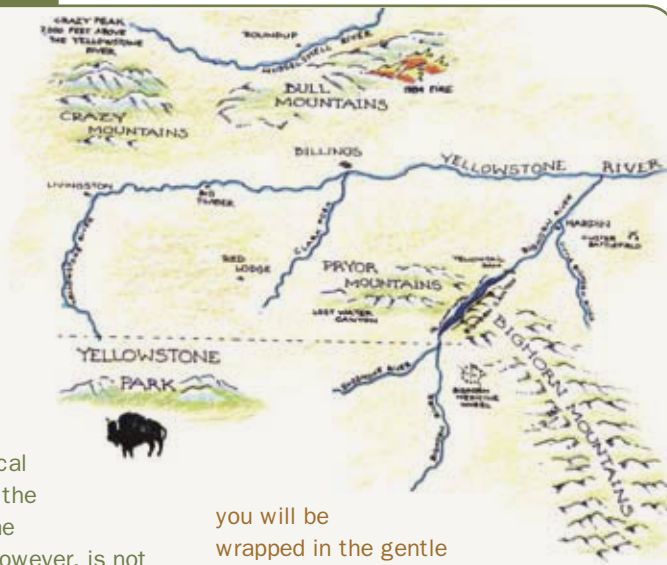
—Kerry Fine is a second-year master's student in the Literature program at the University of Montana and a life-long amateur rock hound.

Other Crazy Info

■ Nowhere else in Montana is the transition from prairie to mountains so dramatic. Over the space of 20 miles, from the low terraces of the Yellowstone River to the top of Crazy Peak, the landscape rises 7,000 feet....

■ Fully half the range is composed of nearly vertical peaks and rock slides at the bases of broken cliffs. The exposed, rocky terrain, however, is not without plentiful water. Alpine basins support lush coverings of vegetation, and 40 high-country lakes...are fed year round by snowfields. Water rushes through cascading streams, forming the headwaters of the Musselshell to the north and the Missouri to the west. The Shields River and Sweetgrass Creek flow from opposite sides of the range to water the Yellowstone.

■ [The Crazies] mark the horizon from great distances. Early travelers, in fact, used them to measure their progress up the Yellowstone Valley. Some say the Crazies even got their name by popping up in the craziest places on the central Montana horizon:



you will be wrapped in the gentle undulations of the prairie, then suddenly, this grand bulge of land breaks up from the horizon.

Other tales say that the wall of mountains was named when a woman settler was separated from her wagon train and wandered into the mountains. She could not survive the isolation and the rugged terrain without going mad, so the range was dubbed the Crazy Woman Mountains. The name apparently stuck, though it was later shortened.

—From *Islands on the Prairie: the Mountains of Eastern Montana*, by Mark Meloy. Montana Geographic Series, Montana Magazine.



Photo by Jim Peaco, YNP

Introduced to the Crazy Mountains in the early 1940s, mountain goats found the habitat greatly to their liking, having a detrimental impact until their population was controlled.

structures called dikes, which resemble rock walls. And in some places the magma was able to spread out in massive sheets that, after they harden, are called sills.

Most likely there were no Vesuvian eruptions, just a slow steady seeping, upwelling and eventual cooling into structures much harder than the sediment and sandstone that surrounded them. Over the long course of time, the slow process of erosion by wind, rain and streams began to shape valleys. During the last ice age,

Summer Campers Get Taste of Field Research with Osprey Project

Kids in several of MNHC's 2008 Summer Science Discovery Camps got to participate in some actual field research on ospreys, carried out by local researchers from the Raptor View Research Institute and the University of Montana. Started in 2007, the Osprey Project involves monitoring a number of osprey nests around Missoula, banding osprey chicks, collecting blood samples and recording "nest productivity" – the number of eggs laid, chicks



MNHC Photo

hatched and birds fledged. The bands on the osprey chicks' legs will help researchers track where these locally born birds spend their winters, as well as determine information about their life history, such as choice of nest sites, how long they live, etc. The scientists hope that blood samples will reveal the

level (if any) of heavy metals concentrated from food obtained in nearby rivers, and help quantify pre- and post Milltown Dam water-contaminant levels. MNHC is grateful to RVRI and UM for including our camps in the Osprey Project, and we hope to continue working with them in the future.



Photo courtesy of NWF

Global Warming

Insights on the Climate Security Act and what happens next

The National Wildlife Federation's Vice-President for Conservation and Education, Jeremy Symons, was at the Montana Natural History Center in late June to discuss the status of the Climate Security Act, currently pending in Congress.

Symons indicated that congressional support for this bill is increasing, but does not have sufficient support at this time to pass as written. He predicted possible action in 2009, since both presidential candidates appear to support a version of the Climate Security Act. Should it pass, Symons expressed hope that the legislation could be a model for responsible environmental stewardship. The NWF and other organizations hope the Act would, among other things, provide

funding to benefit wildlife species impacted by global warming. The NWF also is pushing for the development of alternative energy. Symons indicated that most alternative energy development plans impact wildlife at some level but that the emphasis should be more on reducing these impacts, not rejecting alternative energy sources because of them.

Besides hearing Symons' remarks, the standing room only group enjoyed a reception, conversation and comments by Missoula Mayor John Engen, who recently signed onto the national Mayors Initiative on Climate Change. The event at MNHC was co-sponsored by the NWF, the Clark Fork Coalition and the Earth Friends Wildlife Foundation.

BOARD SPOTLIGHT:

Marilyn Marler serves her community, naturally

Q: Tell us a bit about your background and something maybe people wouldn't guess about you.

A: I grew up in rural California, in the foothills of the Sierra Nevada. I got a B.S. in biology from the University of California/Davis and an M.S. in Organismal Biology and Ecology at the University of Montana. I've lived in Missoula since 1994, have worked as an independent consultant, a researcher at UM, and now as the UM natural areas specialist and weed manager. People may not know that I spent a year in Finland as a foreign exchange student when I was 17, and I ran the Missoula Marathon [in July] – my second marathon ever!

Q: What drew you to serve on MNHC's board?

A: I joined the board in spring 2007, but I'd been working with MNHC as a partner on various plant ecology education programs since 1999. I was drawn to serve

on the board because I really believe in the mission [of promoting understanding and stewardship of nature through education], and I think I have some good skills and contacts that can help at the board level. [MNHC has] an interesting and diverse board; I'm learning a lot.

Q: What is important to you about civic service in general?

A: Civic service has always been important to me. Maybe because of the rural setting in which I grew up, service groups like 4H or Women's Club or Scouts or Lion's Club were the center of social interactions for most families. My family was into 4H and my mom was really involved with the local Women's Club. So to me, it's natural to get to know the community and feel like part of it by serving on boards, volunteering, and now taken to the extreme, serving on city council.

Q: What do you think you bring to your board service?

A: Professional expertise in local botany, which helps with programming and the new [native plant] garden. I also think I have pretty good organizational skills that I enjoy using.

And, by virtue of my work at UM and serving on city council, I do know a lot of people in town now who also can be resources for MNHC.

Q: You've taken on the auction fundraiser for the second year in a row. Why?!

A: I enjoyed doing the auction last year – it was fun, if overwhelming. I think it was the highest-yielding auction to date and that was really satisfying. [This year, though,] I'm making a much bigger effort to delegate tasks to other board members. So far people have helped with everything I've asked, and board president Hank Fischer is working his butt off again this year. He is amazing.

Q: What was the inspiration for the new native landscaping at MNHC? What are you hoping to achieve?

A: It just seems like a nature center should have some native plant landscaping! It can serve as a living exhibit, and teach every person who visits the center that native plants can be beautiful while conserving water and providing resources for small animals, like pollinators and birds. We hope it can be used in programming for years to come. Sharon Browder at

Marler in her native garden at her home.

MNHC Photo

Stone House Landscaping designed the garden for free. She actually did the plan several years ago, but as it was not clear [until recently] that we were going to be able to stay [in this location], it didn't get implemented until this spring. Also, I was not the driving force behind the garden; [former executive director] Anita Maxwell and MNHC staff started planning this years ago.

Q: What is important to you about MNHC, and natural history/conservation in general?

A: The mission statement says it all to me: promoting and cultivating the appreciation, understanding and stewardship of nature through education. I love that MNHC offers programs for all ages and that the content is always science-based natural history. I love the emphasis on participation and getting outside. I've always enjoyed the outdoors, always been inclined towards conservation and stewardship of natural areas. I think people learn most by participating. Nature education organizations like MNHC are becoming more and more important, especially as kids are spending more and more time indoors [with electronic media].



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PRONGHORN

(Antilocapra americana)

Teeth are broad and generally flat surfaced for grinding tough plants, like sagebrush. Eye sockets are large and located on the side of the head to afford a wide-angle view of approaching predators.

BOBCAT

(Lynx rufus)

Bobcats, like other predators, have eyes located toward the front of their face for depth perception needed to pursue and catch their prey. Rather than the long nose of a canine, felines have large auditory bulbs inside their skulls for keen hearing.

WOLF

(Canis lupus)

Carnivores have long, sharp canine teeth for grasping and killing prey, and sharply pointed molars for slicing up meat. The wolf's long nose points to the importance of smell in locating its prey.

RABBIT

(Sylvilagus nuttallii)

Like the pronghorn, rabbits also are herbivores. Their long front teeth, or incisors, are used to grasp and snip vegetation; their small, thin jaws are made for nibbling and can move side to side to grind small pieces. What does the position of their eyes suggest?

Beneath the Skin

Skulls can reveal much about how an animal makes its living.

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