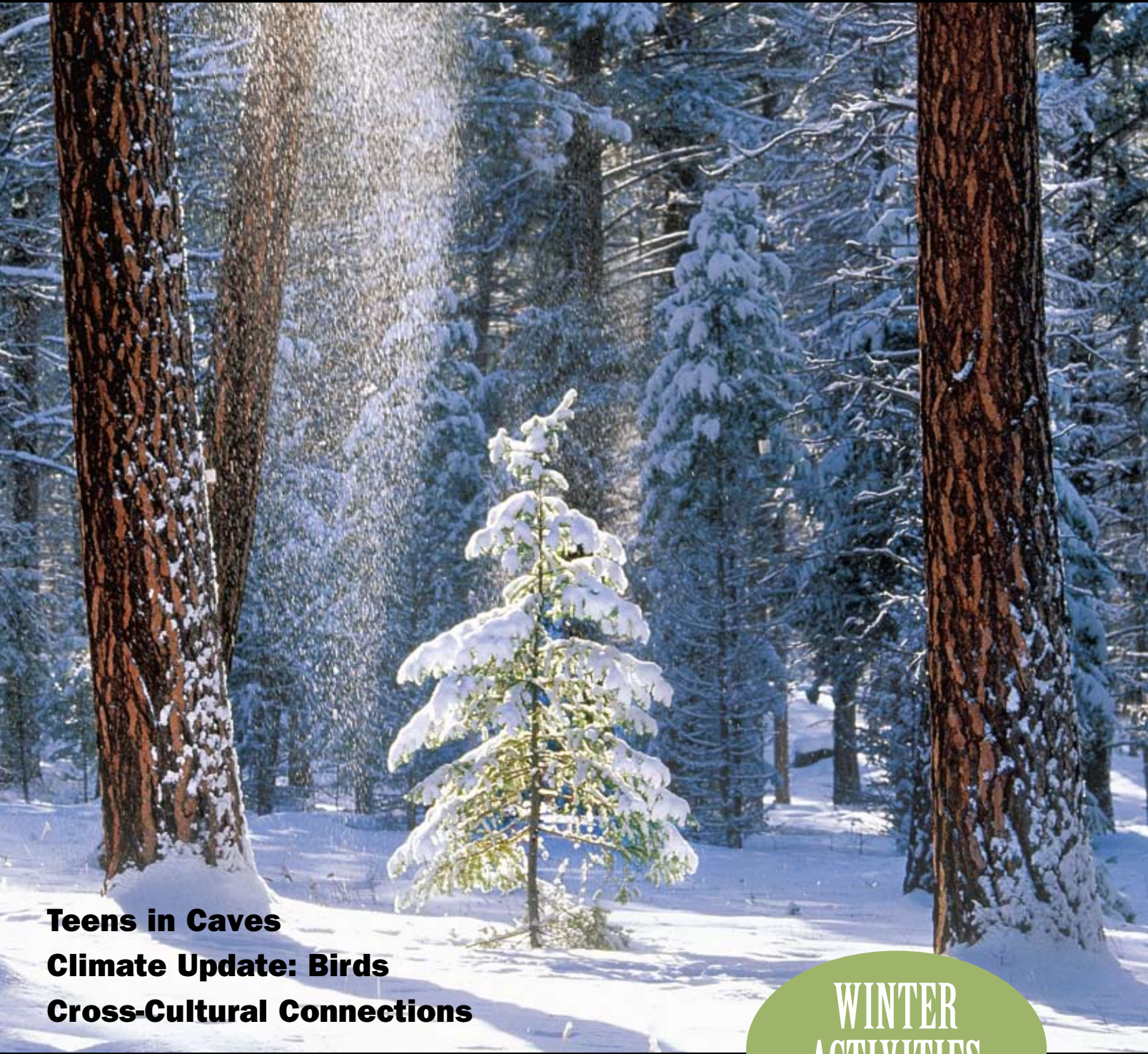


MONTANA Naturalist

Winter 2010-2011



Teens in Caves
Climate Update: Birds
Cross-Cultural Connections

**WINTER
ACTIVITIES**

page 9



Montana Natural History Center
Connecting People with Nature

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

MONTANA Naturalist

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Pull-Out
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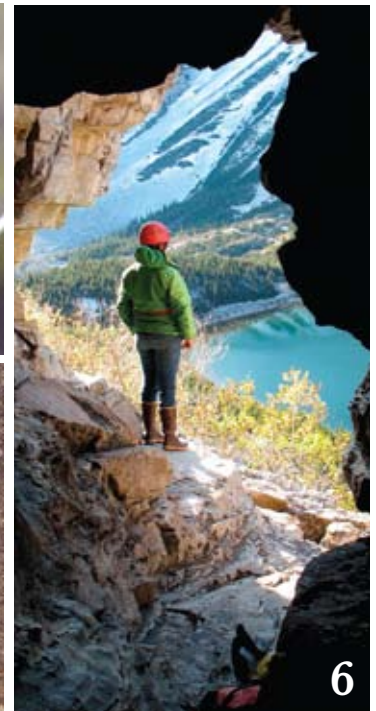
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16



14

Cover – Photo by Nelson Kenter, taken in 2001 in the Lubrecht Experimental Forest. "I was out with the camera and noticed the small tree with the back lighting. When I started shooting, snow was falling from the larger trees as the sun began to melt things. Waiting for that to happen in my frame, I got lucky and captured the moment," he says. For more images, go to www.kenterphotography.com.

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tidings



Photo: U.S. Fish and Wildlife Service

Brrrr. As this issue goes to press, some really cold air is blowing down from Canada, bringing wind and snow to our state. While this might bode well for outdoor recreation this season, I can't help thinking about the wild creatures out there, hunkering down, biding their time until conditions are a bit better for foraging. They all have their strategies – some leave, some go dormant, some must stay on the hunt for food. As snow accumulates, it's fun to see what wildlife stories can be read in the tracks left behind. Maybe not all is as quiet as it seems, especially under snow's protective blanket.

If you're in the mood for hunkering down yourself, you might want to check out the reading list on page 9 or consider our upcoming Evening Lectures listed in the Calendar. If you like to stay active, we have a lot of Discovery Days and field trips planned to explore nature in winter. There's always something new to discover outside, and we hope this issue will give you some ideas. Thank you for taking part!

Happy Holidays,

Caroline Kurtz
Editor

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Out of Sync

Birds are sensitive indicators of a shifting climate

By Amy Cilimburg

Rocky mountain
gray jay

Right now, many of us are looking forward to the holidays and the tasty food traditions that come along with them. We might be a little miffed to be told that peppermint is backordered and there will be no candy canes this year. Likely we'd adapt our sweet tooth to a few missing ingredients – but can our wildlife, whose patterns and behaviors are matched so tightly with ecological systems, do the same? For birds, especially, certain foods are more than a tradition.

If you've spent any time watching birds, you'll know that much of their life is about finding food to fuel the high energy demands of their bodies. This time of year, our resident chickadees and nuthatches are constantly on the go – flitting up, down and around pine trees looking for tasty overwintering spiders or insect grubs, or gleaning around shrubs for seeds and berries – all in search of the calories they will need to survive a Montana winter. And when it comes to keeping bellies full, we know that timing can be everything.

Ecologists and naturalists together have documented the importance of synchronicity – in this case, the coincidence of birds and key food sources. Short-distance migrant songbirds like bluebirds, for instance, arrive to stake out territories just as the first flush of insects appear. But as global climate trends continue, there's increasing concern that important food sources will be out of sync with birds' seasonal behavior.

Ecological mismatch?

A recent study of Northern European migratory birds looked at fifty years of migration data from BirdLife International (the European cousin of Audubon). Using data from citizen scientists, the researchers found that long-distance migrants were more vulnerable to shifts in climate than birds that traveled shorter distances. Why? The increasingly early arrival of spring at far-off breeding sites is making it more difficult for birds to match the timing of their arrival with their traditional food smorgasbord. In a nutshell, spring is arriving earlier than birds can track and they increasingly are missing the best food – and this means less success raising offspring. As the authors comment, "Peaks in food abundance, such as insects,

are very narrow in northern latitudes; so if you arrive too late and miss the peak, then you miss the best opportunity to raise your offspring.”

Back in North America, we’ve learned that even common, non-migratory birds are affected by a warming world. The gray jay – found around almost every forested campground in Montana – is one such bird. It’s vulnerable because it caches – or stores – food for leaner months. Every fall, while migratory birds are heading south, gray jays are busy stocking up for winter on their mountain territories. They collect and store berries and carrion, and rely on the cold fall weather to preserve these hidden stores. Not only is that food valuable to the birds that stored it, but it is vital to their chicks, which hatch weeks before any new berries bloom or insects swarm on the freezing mountainsides.

However, climate change is warming those mountainsides and resident species are facing serious problems. For gray jays, a rapid shift in seasonal patterns means finely-tuned foraging and breeding behaviors will be out of sync with the alpine forests. A warmer fall can rot food stored for the winter, and a late winter can lower survival odds for gray jay chicks. A double whammy of warm fall followed by harsh late winter can wipe out the chicks born that year.

In Ontario’s Algonquin National Park, researchers Thomas Waite and Dan Strickland have been studying how and why gray jays are disappearing from eastern Canada (at a latitude similar to Montana’s). Twenty years ago, Waite and Strickland observed Canadian forests dense with jay territories, each occupied by a stable, experienced breeding pair plus mature chicks from earlier broods that stayed home for a few years to help their parents raise

subsequent generations of nestlings. Today, these territories appear to have decreased in quality, and their occupants are mostly younger jay couples with low nesting success and high “divorce” rates.

Local news

Back home in Montana, what might be in store for our birds as climate changes? A good place to get a handle on this is the recently published 2010 State-of-the-Birds Report. This report, released jointly by the U.S. Fish and Wildlife Service, partnering agencies and conservation organizations, gives one of the best

pictures so far of just how our wildlife species and habitats might fare in a warming world.

For this report, researchers analyzed how vulnerable all North American birds are to global warming, based on climate impacts to the habitats on which they depend. For example:

● **Warmer temperatures** diminish the

Every year gray jays build a new nest, often beginning as early as late February. Eggs are laid in March and the female jay incubates them in the well-insulated nest at a time of year when night-time temperatures may still go below zero. Eggs hatch in early April and, if all goes well, young birds leave the nest 23 days later, around the first week of May.

amount of available water in streams and wetlands. Healthy riparian and wetland plants need water to grow, and it is these plants that support the insects on which so many of our songbirds, like common yellowthroats and willow flycatchers, rely.

● **Wetlands** that depend on snow melt may diminish or disappear, and wetland birds such as the western and Clark’s grebe and the northern pintail, are vulnerable to changes to

their summer breeding habitats. Far eastern Montana’s prairie pothole region – the edge of North America’s duck factory – will not hold the water these birds are accustomed to, and waterfowl populations will undoubtedly suffer.

● **Arid lands** in Montana – our grassland and sagebrush-shrub steppe – are predicted to become overall warmer, yet also more variable in year to year temperature patterns. Climate change magnifies the threats to species already of conservation concern, such as the greater sage grouse and Sprague’s pipit, both candidates for listing under the Endangered Species Act.

While there is much to be concerned about in the State-of-the-Birds Report and other findings from researchers around the globe, the science serves to provide tools for conservation planning and as a wake-up call for anyone who treasures our rich biodiversity.

Researchers and conservationists are discussing strategies such as “climate adaptation reserves,” which expand the existing network of parks and protected areas with new preserves, buffer areas and connecting corridors that will allow species to move and survive as the climate changes. Reducing non-climate stresses within the reserves will be essential.

Many state conservation organizations, like Montana Audubon, for which I work, are listening to the birds. Countless citizen volunteers and professional scientists are gathering data to help illuminate threats to our birds, and it will take even more committed people to create and advocate for a better future. If we fail to act, the next generation inherits a biologically impoverished world. If we do act, and the birds could shake a feather in thanks, I think they surely would. 🐦

Amy Cilimburg is the Director of Bird Conservation for Montana Audubon. Kate Webbink provided research on gray jays for this story. For more about how gray jays and other Montana birds are reacting to global climate change, links to the 2010 State of the Bird Report, and ideas for how you can become an active citizen scientist and part of the climate solution, go to www.mtaudubon.org.

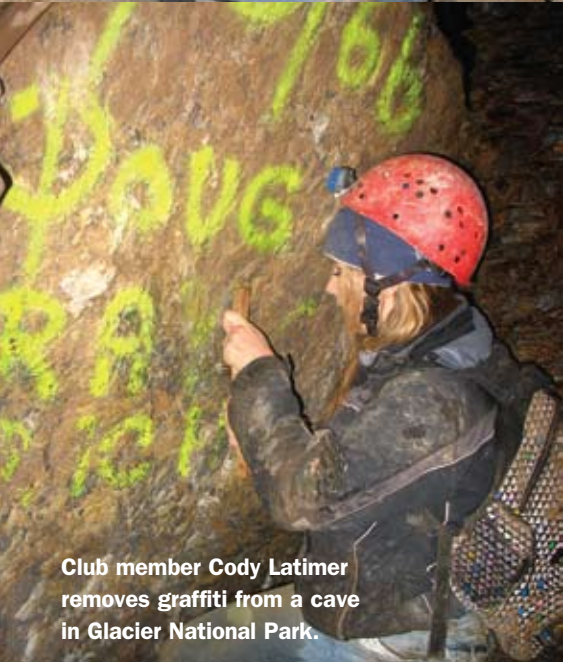
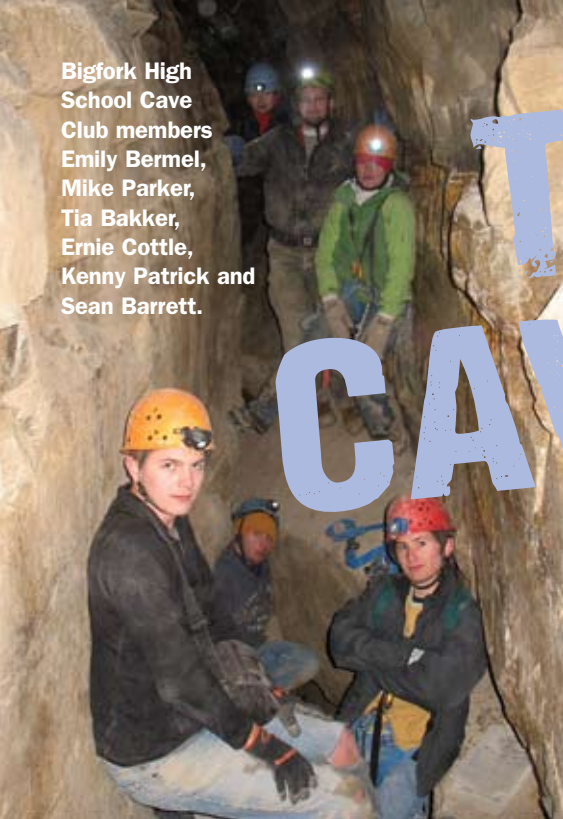


Bigfork High School Cave Club members Emily Bermel, Mike Parker, Tia Bakker, Ernie Cottle, Kenny Patrick and Sean Barrett.

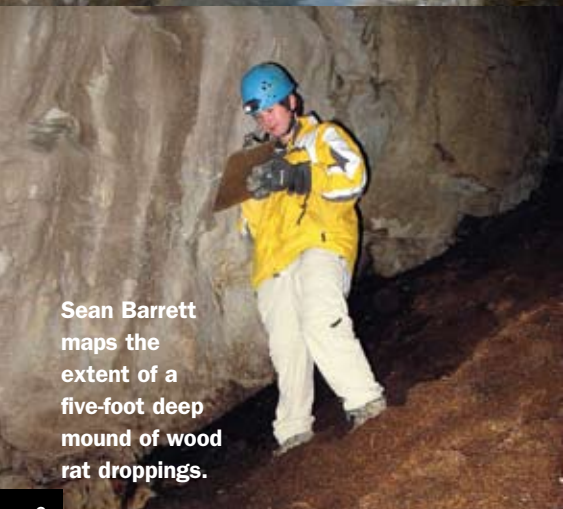
TEENAGE CAVE PEOPLE

A magical combination of conservation and environmental education

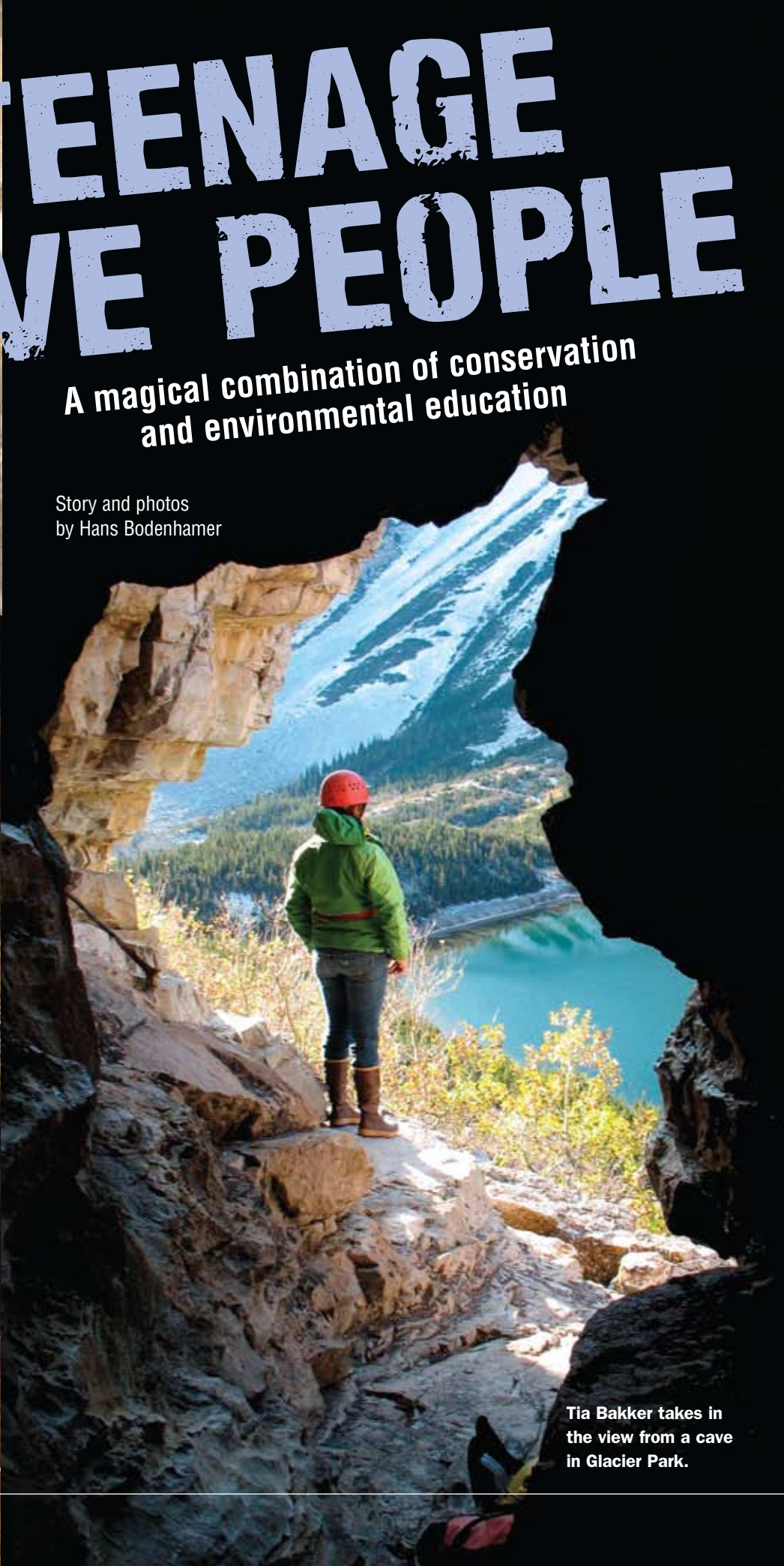
Story and photos
by Hans Bodenhamer



Club member Cody Latimer removes graffiti from a cave in Glacier National Park.



Sean Barrett maps the extent of a five-foot deep mound of wood rat droppings.



Tia Bakker takes in the view from a cave in Glacier Park.

CAVES IN MONTANA ARE TOTALLY DARK AND TYPICALLY COLD, WET AND MUDDY.

They are not the sorts of places you would think could inspire teenagers to become active in conservation. Yet for student members of Bigfork High School's Cave Club the combination is magical. Conservation of cave resources has become a passion for which club members have received national recognition, and for me, their sponsor and biology teacher, the club's projects model a better way to educate young people about science and environmental issues.

Caves are like a little world," Cave Club member Ernie Cottle says. "They contain renewable and nonrenewable resources that can be destroyed by people who aren't careful or don't know any better."

In Glacier National Park, where the club has done most of its work, caves provide habitat for unusual cave-adapted crustaceans and insects. Some caves also contain thick deposits of wood rat droppings that may predate the last ice age, and others contain strange mineral deposits that may be unique in the world. Unfortunately, some visitors to caves do not realize how fragile cave resources are and others are just plain vandals.

The BHS Cave Club began in 2006 as an after-school recreation club, but after a few trips to vandalized caves club members wanted to do more.

"It's crazy! I couldn't understand what kind of person would crawl way back into a cave to spray paint on the walls," says club member Sean Barrett.

Starting in 2007 club members began working with the National Park Service and National Forest Service to remove graffiti from caves. During the next four years club members removed spray-painted graffiti from more than 1,500 square feet of walls and ceilings of four caves, using only water, wire brushes and plenty of elbow grease. Club members were careful not to remove any historic or prehistoric graffiti, or mar any natural surfaces or other features.

In 2008, Jack Potter, chief of the science and resources management division for Glacier National Park, suggested the club take a step beyond graffiti removal and begin an inventory and monitoring program of resources in all of the park's caves. At first, the project involved visitor-impact mapping and photo monitoring for sensitive mineral and biological features, such as bone deposits, wood rat nests, clusters of harvestmen spiders, moon milk coatings, and calcite stalactites and stalagmites. The students photographed and located features on maps, and developed a standard method to describe and classify features so that human-caused changes could be assessed and quantified. As the students became more skilled at inventorying cave resources, their work grew to include a non-collective study of microinvertebrates and the creation of Geographic Information System (GIS) layers to organize, analyze and present monitoring data.

Science and Resource Management Chief Potter says park staff has been impressed with the quality and detail of the Cave Club's work. He adds that the park has used Cave Club recommendations to plan future monitoring efforts to protect cave resources, and is recommending the club for work in other parks.

Glacier National Park managers are not the only ones impressed with the club's accomplishments. On May 21, 2010, the Bigfork High School Cave Club was awarded the President's Environmental Youth Award – one of 10 given nationally by the U.S. Environmental Protection Agency and the first ever for a project in cave conservation. For their leadership, club members Tia Bakker and Ernie Cottle were selected to attend the PEYA ceremony in Washington D.C. They presented the project to a prestigious gathering, which included top-level EPA scientists, senators, EPA Director Lisa P. Jackson and Phillip Cousteau, grandson of oceanographer Jaques Cousteau. The two also met and shook hands with President Obama.

"The PEYA ceremony was awesome, but it was easy to present our project," says Bakker. "We are passionate about the work we do for the park. It has not only opened doors for us, but we absolutely enjoy the whole process."

In addition to accomplishments in cave conservation, the Bigfork High School Cave Club project is being used as a model of environmental education. The club's projects go far beyond traditional school standards and curriculum, and demonstrate how land-managing agencies and schools can collaborate to the benefit of all involved. Glacier National Park gained baseline monitoring and my students developed skills in field data collection, technical report writing and GIS that they would not have gained in the regular classroom.

Starting this year, Bigfork High School has approved an Applied Environmental Science class that expands on the work of the Cave Club. So far, students in the class are working with the U.S. Fish and Wildlife Service, the U.S. Forest Service and Plum Creek Timber Company on projects that include creating vegetation maps, inventorying small lake ecosystems and assessing bat use in caves. The Cave Club also has plans to help continue cave conservation projects in Glacier National Park and the Flathead National Forest. To find out more about the BHS Cave Club and the Applied Environmental Science Class, or if you would like to work with them on a project, please contact me at Bigfork High School, (406) 837-7420.

Hans Bodenhamer worked as a cave specialist for the National Park Service and U.S. Forest Service for many years before he became a teacher. He has only been using GIS for a year, but has become a strong proponent of the technology's educational potential. This summer he and his students were invited to present their work at a gathering of more than 10,000 GIS users at the International GIS Conference in San Diego.

Rubber Boas...

Have you ever seen one?

By David Nikonow



The next time you're out hiking on a nice, sunny day, stop and check out that pile of dog poo – it just might surprise you

I ate last summer, my friend and I were hiking in the Pattee Canyon Recreation Area, the northernmost reach of the Sapphire Mountains near Missoula. Shadows from mature ponderosa pines covered the trail, and between the conifers was a cover of dry, late season grass and flourishing spotted knapweed. As we walked along, we spied what at first we thought was a pile of dog poop in the middle of the path. Upon closer examination, we realized the slick-looking, chocolate-colored mass was actually a coiled snake. What we were looking at was a rubber boa. It was only about 14 inches long and about the thickness of a jumbo hot dog. These snakes have a blunt tail, making it difficult to distinguish one end from the other. After a few moments, the boa slowly slithered away into the grass.

As its name implies, rubber boas are constrictors and they live from California to British Columbia and as far east as central Montana and Wyoming. They are one of only 10 snake species found in Montana, and one of just six that inhabit the western portion of the state. Their range includes many types of habitat, from dry, open forests to moist, dense riparian areas. They prefer to spend most of their time underground and, although they are able to dig, they often use pre-existing rodent tunnels. Such tunnels provide boas with their main groceries in the form of young nesting mammals. Rubber boas have a stable population in western Montana, but we don't often see them because of their underground nature.

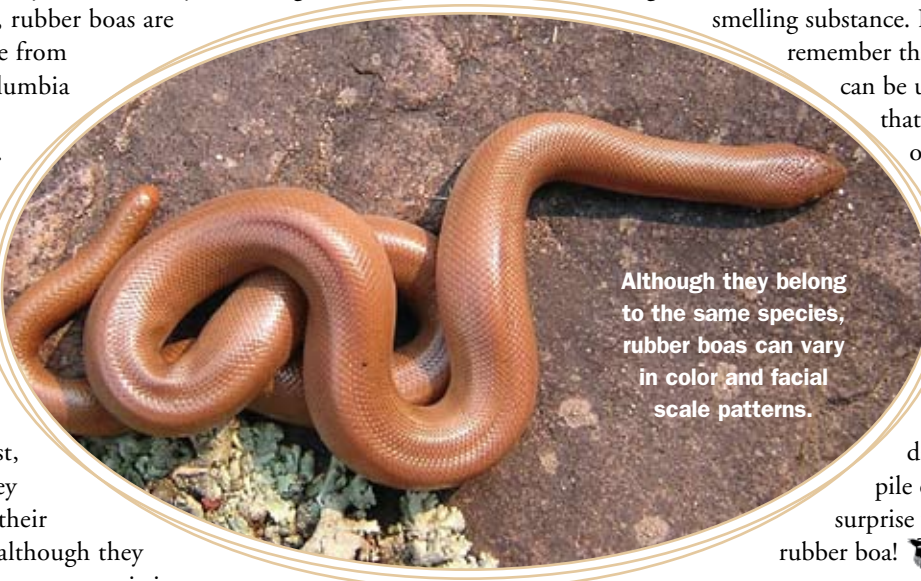
Rubber boas have challenged scientists since they were first discovered. Small differences in facial scale patterns and body color have caused the confusion. Rubber boas first were classified in 1890 into three genera comprising 22 species. Within a decade, natural historians decided that there were only two true species and now, after many more studies, it's believed there is only one genus and one species of rubber boa.

Rubber boas belong to the genus *Charina*, which comes from an ancient Greek word meaning "delight" – and it is a delight to see one! Rubber boas are extremely docile snakes and safe to handle; they typically will just coil themselves around your hand and arm and show no aggression. They've even been used to help rid people of their ophidiophobia, or fear of snakes. Often a rubber boa will refuse to strike, even in defense. Instead, if excited too quickly, a

boa might "musk" a handler or attacker by excreting a foul-smelling substance. But it's important always to remember that they are wild animals and

can be unpredictable; it is possible that one might bite. Like any other wildlife, rubber boas should be appreciated and respected. If you come across one, make sure you don't cause it much stress; leave it in the same condition you found it.

The next time you're out hiking on a nice sunny day, stop and check out that pile of dog poo – it just might surprise you and turn out to be a rubber boa! 🐍



Although they belong to the same species, rubber boas can vary in color and facial scale patterns.

David Nikonow is as a student in the Wildlife Biology program at the University of Montana and is doing research on snowshoe hares. He wrote this essay for the Wildlife Biology Science Writing Class at UM. It aired on Field Notes on Montana Public Radio in August, 2010.



Photo by Hannah Ryan

Photo by Bryce Maxwell

Photo by Matthew Bell

Mark Your Calendars

There are several ongoing and upcoming events regarding birds that would benefit from your participation. You can find out about all of them from Montana Audubon, www.mtaudubon.org.

Project FeederWatch, in which the Cornell Laboratory of Ornithology urges volunteers to “Embrace the winter. Count feeder birds for science!” Counts began in mid-November and continue through April. Interesting results have come from FeederWatch; in 2008 researchers reported a significant decline in evening grosbeaks based on more than 20 years of citizen reports. For complete information, go to www.birds.cornell.edu/pfw.

Christmas Bird Count, during which volunteers count every bird seen or heard during one day within a designated 15-mile diameter area. This is a good event for beginning birders because there are fewer species of birds to learn. You also can participate in a CBC by being a feeder watcher, rather joining a group in the field. Last year, 661 volunteers statewide participated in 32 Montana CBCs, recording at total of 131 species. The Missoula CBC will take place on Saturday, Dec. 18. For complete information about the Missoula event, contact Larry Weeks at bwsgenea@onlinemt.com or go to www.mtaudubon.org for statewide locations. There is a \$5 fee to participate.

Great Backyard Bird Count, in which volunteers take a census of birds over President’s Day Weekend. The next one will happen Friday, Feb. 18 through Monday, Feb. 21. GBBCs engage bird watchers of all ages in counting birds to create a real-time snapshot of where the birds are across the continent. Anyone can participate, from beginning bird watchers to experts. It takes as little as 15 minutes on one day, or you can count for as long as you like each day of the event. For complete information, go to www.birdsource.org/gbbc.

Winter Wonder

Ice is cold
Snow is deep
I’m inside
Warm and asleep

I wake up now
To the sound of rain
On my windowpane

I go outside with
My boots and shawl
And see that it has
Already been fall...

I can plainly see
that now it’s winter...
My favorite season
of them all!

Ella Kurtz, 8

Curl Up and Read

Wanting to curl up with a good book this winter? Here are some suggestions, in no particular order, based on a brief survey of MNHC naturalists. Send your ideas to editor@montananaturalist.org.

Desert Solitaire by Edward Abby

Sand County Almanac by Aldo Leopold

Immense Journey by Loren Eiseley

What Good Are Bugs: Insects in the Web of Life by Gilbert Waldbauer

For Love of Insects by Tom Eisner

The Ants; Naturalist; In search of Nature; The Creation; Biophilia by E.O. Wilson

The Chimpanzees of Gombe by Jane Goodall

Listening Point by Sigard Olson

My Family and Other Animals
by Gerald Durrell

Assorted titles by Mary Oliver (*poetry*)

On Nature by Gary Snyder (*poetry*)

Rats, Lice, and History by Hans Zinsser

Walking the High Ridge
by Robert Michael Pyle

Field Books of Ponds and Streams
by Anne Haven Morgan

Winter World; The Geese of Beaver Bog; Ravens in Winter; Mind of the Raven
by Bernd Heinrich

Last Child in the Woods by Richard Louv

The Snow Leopard by Peter Matthiessen



The Beak of the Finch by Jonathan Weiner

Silent Spring by Rachael Carson

An Exultation of Larks by James Lipton

Chrysalis by Kim Todd

Cadillac Desert by Marc Reesner

December 1 Volunteer Naturalist Gathering, 4:30-6:00 p.m. Come to our Fall Fiesta party and volunteer appreciation event.

December 4 Saturday Kids Activity, 9 a.m.-3:00 p.m. **Snowshoe Stomp.** Join us for a snowshoe adventure in partnership with Missoula Children & Nature. Free; call 327-0405 to register.

December 8 Evening Lecture Series, 7:00 p.m. **Wildlife Corridors.** Presented by Mike Schwartz, geneticist and educator with the University of Montana and the U.S. Forest Service. \$4 suggested donation; MNHC members free.

January 5 Volunteer Naturalist Training, 4:00-5:00 p.m. **Adapting to Winter.** Volunteer training for Visiting Naturalist in the Schools January classroom visits. No experience necessary.

January 8 Saturday Kids Activity, 2:00 p.m. **Exploring the Tropical Cloud Forest** with local author Sneed B. Collard III. \$1 MNHC members; \$3 non-members.

January 12 Evening Lecture Series, 7:00 p.m. **The Natural History of Bark Beetles.** Presented by Diana Six, University of Montana professor of forest ecology. \$4 suggested donation, MNHC members free.

January 22 Saturday Discovery Day, 8:00 a.m.-4:00 p.m. **Winter Ecology of the Clearwater Canoe Trail.** Led by Missoula-area naturalist Hobie Hare. \$35 MNHC members; \$45 non-members. Call 327-0405 to register.

January 22 Saturday Kids Activity, 2:00 p.m. **Hibernation Celebration.** \$1 MNHC members; \$3 non-members.

January 29 Saturday Discovery Day, 9:00 a.m.-3:00 p.m. **Forest Insects in Winter.** Led by Montana DNRC Forest Entomologist Amy Gannon. \$25 MNHC members; \$35 non-members. Call 327-0405 to register.

February 2 Volunteer Naturalist Training, 4:00-5:00 p.m. **Bone Detective.** Volunteer training for Visiting Naturalist in the Schools February classroom visits. No experience necessary.

February 2 Evening Lecture Series, 7:00 p.m. **Understanding the Urban Forest.** Presented by Ben Carson, Missoula City Urban Forester. \$4 suggested donation, MNHC members free.

February 5 Saturday Kids Activity, 2:00 p.m. **Tricky Trackers.** \$1 MNHC members; \$3 non-members.

February 12 Saturday Discovery Day, 7:00 a.m.-5:00 p.m. **Winter Raptor Workshop.** Led by Denver Holt, raptor expert and director of the Owl Research Institute. Gain insight into winter raptor natural history and learn helpful raptor identification tips. \$45 MNHC members; \$55 non-members. Call 327-0405 to register. OPI credits available.

February 15 Spring Master Naturalist Class, 4:00-7:00 p.m. Tuesdays through May 10 with three Saturday full-day field trips. Deepen your knowledge of our native plants and animals and get a jump on Master Naturalist certification. Space is limited. Call 327-0405 to find out about cost and to register.

February 16 Evening Lecture Series, 7:00 p.m. **In Decline: Missoula's Native Grasslands and Long-Eared Owls.** Presented by raptor expert Denver Holt. \$4 suggested donation; MNHC members free.

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY


SATURDAY

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

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


January

 **Volunteer Naturalist Training,** 4:00-5:00 p.m. **Adapting to Winter.**

 **Evening Lecture Series.** **The Natural History of Bark Beetles,** 7:00 p.m.

 **Saturday Kids Activity.** **Exploring the Tropical Cloud Forest,** 2:00 p.m.

 **Saturday Kids Activity.** **Hibernation Celebration,** 2:00 p.m.


 **Saturday Discovery Day.** **Winter Ecology of the Clearwater Canoe Trail,** 8:00 a.m.-4:00 p.m.


 **Saturday Discovery Day.** **Forest Insects in Winter,** 9:00 a.m.-3:00 p.m.

Red fox ➤



Photo by Jim Peaco; NPS

 **Volunteer Naturalist Training,** 4:00-5:00 p.m. **Bone Detective.**

 **Evening Lecture Series.** **Understanding the Urban Forest,** 7:00 p.m.

February

 **Saturday Kids Activity.** **Tricky Trackers,** 2:00 p.m.


 **Saturday Discovery Day.** **Winter Raptor Workshop,** 7:00 a.m.-5:00 p.m.

 **Saturday Kids Activity.** **Out of this World with Astronomy,** 2:00 p.m.


Photo by Jim Peaco; NPS


 *Hairy woodpecker*

 **Spring Master Naturalist Class,** 4:00-7:00 p.m. *Tuesdays through May 10*

 **Evening Lecture Series.** **In Decline: Missoula's Native Grasslands and Long-Eared Owls,** 7:00 p.m.

 **Spring Master Naturalist Class,** 4:00-7:00 p.m. *Thursdays through May 12*

 **Evening Lecture Series,** 7:00 p.m. **Soaking Up the History of Montana's Hot Springs.**

 **Volunteer Naturalist Training,** 4:00-5:00 p.m. **An Experiment in Lift.**

March

 **Saturday Kids Activity.** **Animal Tales: Legends from Around the World,** 2:00 p.m.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			 Evening Lecture Series. Black-Footed Ferrets, 7:00 p.m.			
6	7	8	9	10	11	12
	Male & female Barrow's Goldeneye >					 Saturday Kids Activity. Turtle Time! 2:00 p.m.
13	14					19
						 Saturday Discovery Day. Snow Geese Migration at Freeze Out Lake, 7:00 a.m.-6:00 p.m.
20	21					26
					April	
27	28	29	30	31	1	2
Frosted prairie grass >			 Volunteer Naturalist Training, 4:00-5:00 p.m. Fill the Bill.			
3	4	5	6	7	8	9
			 Evening Lecture Series. Adventure Underground: Exploring Montana Caves, 7:00 p.m.			 Saturday Discovery Day. Spring Naturalist Hike, 9:00 a.m.-4:00 p.m.
		12	13	14	15	16
			 Visiting Naturalist in the Schools Field Trip Volunteer Orientation, 4:00-5:30 p.m.			 Saturday Kids Activity. The Dish on Fish, 2:00 p.m.
		19	20	21	22	23
						< Pronghorn antelope
24	25				29	30
May						
1	2				6	7

Photo by Jim Peaco; NPS

Photo by Sam & Mary Cissel; NPS

Photo by JF Douglass; NPS

February 17 Spring Master Naturalist Class, 4:00-7:00 p.m. Thursdays through May 12 with three Sunday full-day field trips. Deepen your knowledge of our native plants and animals and get a jump on Master Naturalist certification. Space is limited. Call 327-0405 to find out about cost and to register.

February 19 Saturday Kids Activity, 2:00 p.m. **Out of this World with Astronomy.** \$1 MNHC members; \$3 non-members.

February 23 Evening Lecture Series, 7:00 p.m. **Soaking Up the History of Montana's Hot Springs.** Presented by author Jeff Birkby. \$4 suggested donation; MNHC members free.

March 2 Volunteer Naturalist Training, 4:00-5:00 p.m. **An Experiment in Lift.** Volunteer training for Visiting Naturalist in the Schools March classroom visits. No experience necessary.

March 5 Saturday Kids Activity, 2:00 p.m. **Animal Tales: Legends from Around the World** with live animals from Animal Wonders. \$3 MNHC members; \$5 non-members.

March 9 Evening Lecture Series, 7:00 p.m. **Black-Footed Ferrets.** Presented by Randy Matchett, U.S. Fish & Wildlife Service senior wildlife biologist. \$4 suggested donation; MNHC members free.

March 19 Saturday Kids Activity, 2:00 p.m. **Turtle Time!** \$1 MNHC members; \$3 non-members.

March 26 Saturday Discovery Day, 7:00 a.m.-6:00 p.m. **Snow Geese Migration at Freeze Out Lake,** led by Mike Schwitters. \$30 MNHC members; \$40 non-members. Call 327-0405 to register.

April 6 Volunteer Naturalist Training, 4:00-5:00 p.m. **Fill the Bill.** Volunteer training for Visiting Naturalist in the Schools April classroom visits. No experience necessary.

April 13 Evening Lecture Series, 7:00 p.m. **Adventure Underground: Exploring Montana Caves.** Presented by Mike McEachern, chairman of the Northern Rocky Mountain Grotto chapter of the National Speleological Society. \$4 suggested donation; MNHC members free.

April 16 Saturday Discovery Day, 9:00 a.m.-4:00 p.m. **Spring Naturalist Hike,** led by a Montana Master Naturalist. Free.

April 16 Saturday Kids Activity, 2:00 p.m. **The Dish on Fish.** \$1 MNHC members; \$3 non-members.

April 20 Visiting Naturalist in the Schools Field Trip Volunteer Orientation, 4:00-5:30 p.m. Learn how you can help teach kids about the flora and fauna of western Montana during our May Visiting Naturalist in the Schools field trips.

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

 Adult Program

 Youth Program

 Volunteer Opportunity



Harvestmen
cluster in
a cave

Photo courtesy of Hans Bodenhamer

creepy

they can pack themselves together pretty densely – and maybe that is why they do it. Some people speculate that harvestmen congregate to over-winter. Although this association doesn't really gain them much warmth, it might have something to do with humidity and water conservation. Another idea is that the clusters involve mating, while some research suggests harvestmen congregate to increase the power of a defensive pheromone they give off.

Students in Bigfork High School's Cave Club (see story page 6) have seen clusters in the late fall in caves in and near Glacier National Park. One typical cluster measured six feet long by two feet wide! Last February, club members skied in 13 miles to check the status of other "creatures" (tiny invertebrates, fungi, etc.) in one park cave, because this is the time of year when water flow in the cave is typically lowest. Several feet of snow was still on the ground and the entrance was nearly blocked by a drift, yet there were no harvestmen clusters in the cave! Where did they go?

It's best not to disturb a harvestmen cluster, should you ever come across one, but if they are disturbed the harvestmen flow from the ceiling in a living, pulsating waterfall. It's kind of creepy, but very cool and beautiful at the same time.

Reported by Hans Bodenhamer, BHS Science Teacher

So That's Where They Go...

The weird-looking, tangled mass in this photo are harvestmen (aka daddy longlegs) – a familiar backyard bug that is not a spider, even though it has eight legs. In the late fall, clusters of up to 100,000 harvestmen gather on the ceilings of some caves in Montana, and elsewhere across the United States and Canada as well. When in "cluster-mode," the harvestmen hold on to the ceiling with their pedipalps (feeding appendages) and let their legs dangle down. This posture makes it so

Winter Activities



Scout around for animal holes or tunnels in snow. Hint: look carefully around downed woody debris on the edge of a forest or clearing. Dig a few small tunnels yourself and **leave some seeds or nuts** in them. Check back over the next few days to see if anything has been nibbling them.

On a cold day with at least a foot of snow, **measure the temperature** on top of the snow and under the snow at ground level. Try again on a warm day. How much difference is there?

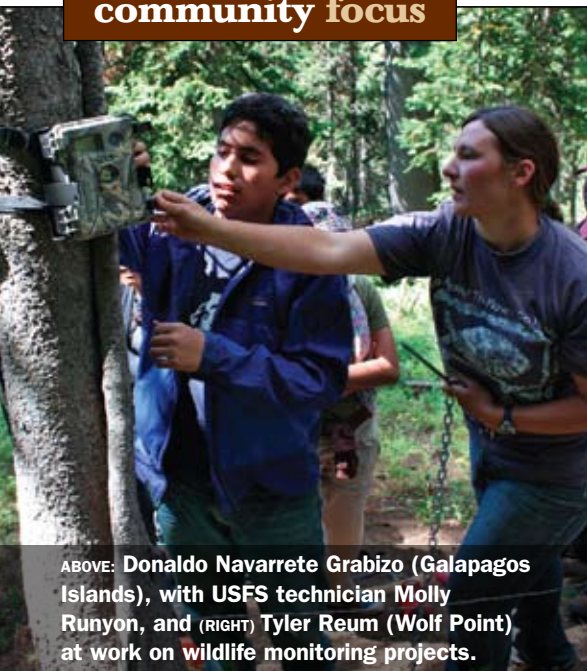


It is said that people of the north have a large number of words to describe different kinds of snow and places where snow is found. Can you **make up new words and definitions** to describe typical types of snow you know?

Pretend you live under the snow and write a story about it. Is it dark or light, quiet or noisy, cozy or lonely?



Do you have a poem or short story about nature that you'd like to see in Montana Naturalist? Send submissions to editor@montananaturalist.com or to MNHC, 120 Hickory St., Missoula, MT 59801



ABOVE: Donaldo Navarrete Grabizo (Galapagos Islands), with USFS technician Molly Runyon, and (RIGHT) Tyler Reum (Wolf Point) at work on wildlife monitoring projects.

Photos courtesy of EPI

Ecosystem, the Galapagos Islands, Costa Rica's Caribbean coast and Mexico's Sea of Cortez. Each program also contains an important cultural exchange component.

Beginning in August, 2009, EPI has brought students alternately from Costa Rica and the Galapagos Islands – and last summer a Native American group from Wolf Point as well – to Yellowstone with support from the World Wildlife Fund, the National Forest Foundation and others. Last summer's courses tasked Galapagueno and Assiniboine/Sioux youth with three different research projects: monitoring hair snares in a study to measure the effects of humans on grizzly bear habitat, studying the effects of blister rust and pine beetles on whitebark pine, and assessing the role of habitat loss on declining bluebird populations. They also got their hands dirty removing abandoned fences to restore open wildlife corridors.

Empowering the Next Generation of Conservation Leaders

By Julia Horn

What could teenagers from the Galapagos Islands, Ecuador and Montana's Fort Peck Indian Reservation possibly have in common? Each group spent a week or more last summer exploring the Greater Yellowstone Ecosystem. There they participated in scientist-led research projects through a program offered by Ecology Project International, a non-profit organization based in Missoula that connects local experts and high-school students to address critical conservation issues.

At the end of their separate experiences, many of the Galapaguenos and the Assiniboine/Sioux youth felt the same as 17-year-old Gema Arevalo from Puerto Ayora on Santa Cruz Island: "This has been more than an experience for me," she said. "It made me realize that I have unlimited potential."

The unlimited potential of today's youth to be tomorrow's conservation leaders also is the vision of EPI's founders, Scott Pankratz and Julie Osborn. As a result of separate experiences in Costa Rica, Pankratz and Osborn realized that the key to conservation globally is to ensure that local residents are engaged in the long-term conservation solution. And the way to do that is by involving them first in ongoing applied research into the problems. In 2000, Pankratz and Osborn piloted a project with a Costa Rican high school, in which students participated in research and protection efforts for critically endangered, nesting leatherback sea turtles. The project was highly successful, and EPI was formally launched later that year. A decade later, their first students have grown to become teachers, politicians, scientists, parents and professionals, weaving environmental stewardship into the fabric of their lives and their communities.

EPI currently operates five- to 15-day field courses for high-school students in four global ecological hotspots: the Greater Yellowstone

"This has been more than an experience for me. It made me realize that I have unlimited potential."

The nine Galapagos students – selected from a competitive pool of 35 applicants – returned home to compare the different management strategies and issues in Yellowstone and Galapagos National Parks, eager to apply what they learned and adapt it to very different circumstances.

The course involving the nine students from Ft. Peck couldn't have been more different in some respects. Although they participated in the same research as the Galapaguenos, they had the additional goal of earning school credit, as all but one had previously failed their high school biology class. EPI instructor Carly Phillips was stunned, however, that the Native American students had struggled academically given how they excelled in the field research.

"In my eyes it's usually not the students; it's the method," said Phillips. "I've witnessed kids with severe academic underperformance actually excel in field-based learning, like the Fort Peck students did."

In her estimation, EPI's experiential learning model is more effective than the traditional classroom model in getting students to think critically and engage with the material.

By offering encouragement and a space for self discovery while teaching academic material in an unconventional way EPI is fostering a feeling of unlimited personal potential among tomorrow's leaders. In this case, starting with kids from drastically different cultures from completely different areas of the world—right here in Montana's treasured Yellowstone. 🐾

EPI's mission is to improve and inspire science education and conservation efforts worldwide through field-based student-scientist partnerships. To learn more about EPI's courses or family trips, or to make a scholarship gift for Montana's rural underserved youth, please visit www.ecologyproject.org.

Julia Horn is a development officer for EPI. Her work is expanding to include exporting EPI's methods and programs to more cities and countries in response to requests from governments, scientists and schools.

Another Layer of Life

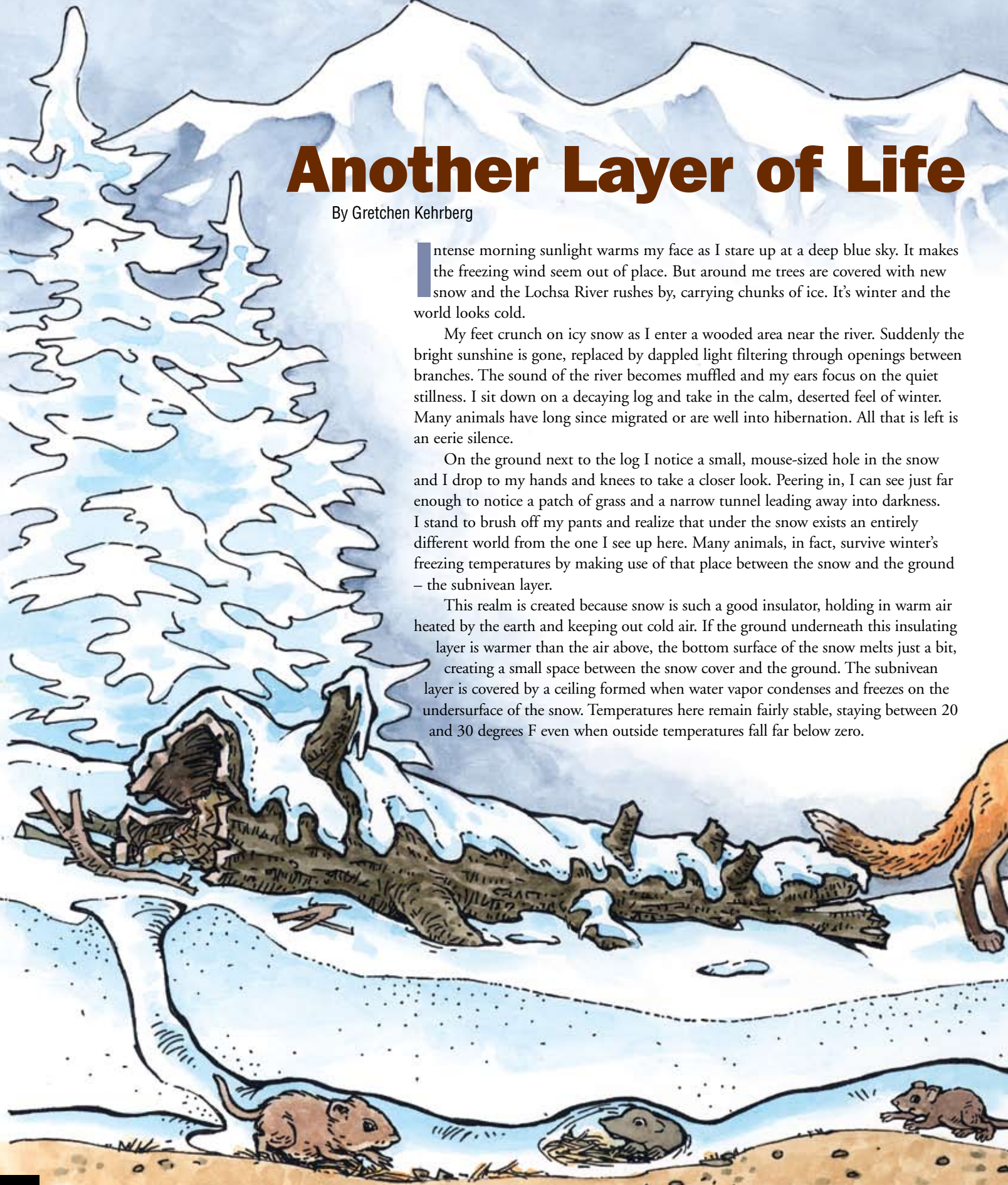
By Gretchen Kehrberg

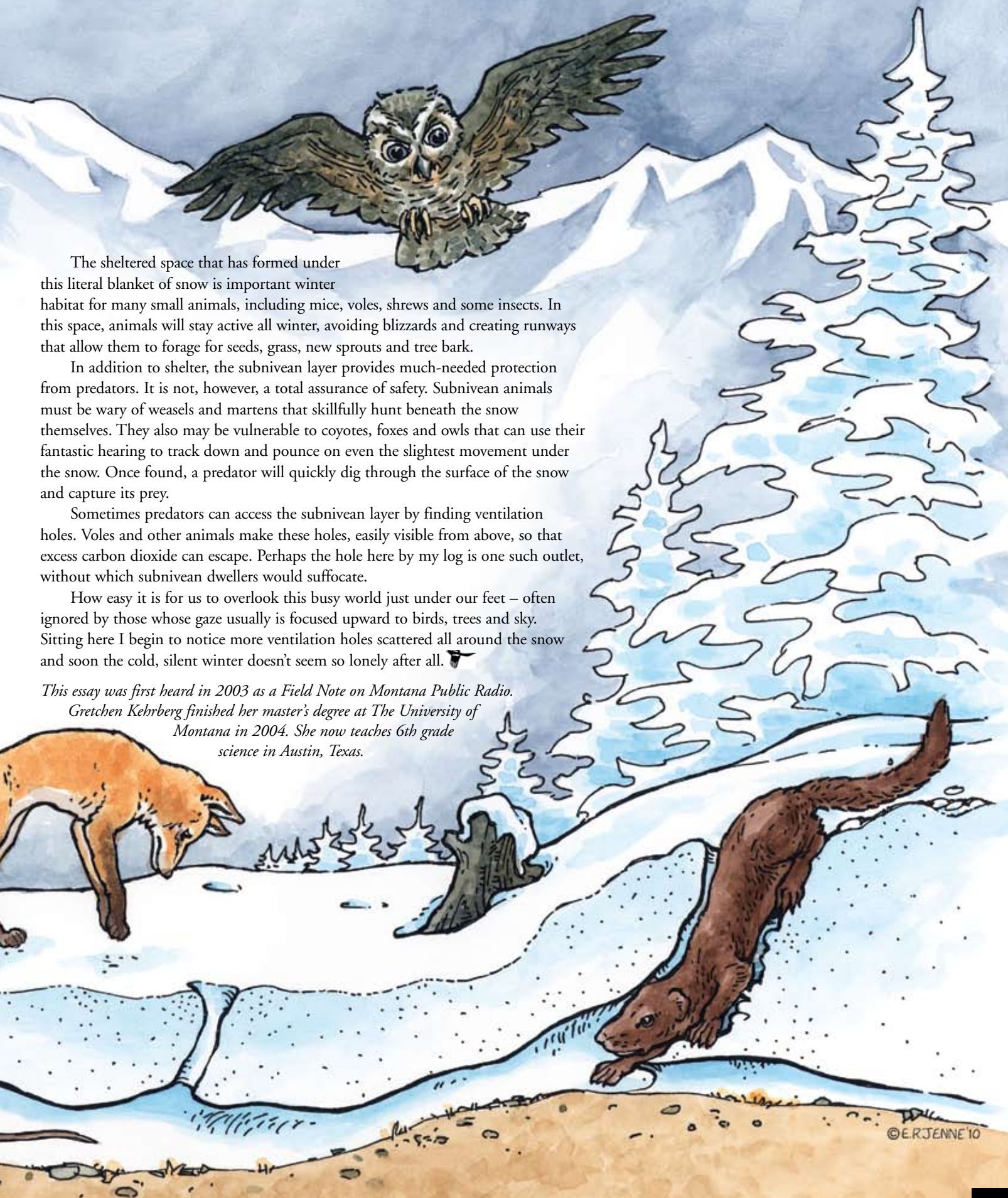
Intense morning sunlight warms my face as I stare up at a deep blue sky. It makes the freezing wind seem out of place. But around me trees are covered with new snow and the Lochsa River rushes by, carrying chunks of ice. It's winter and the world looks cold.

My feet crunch on icy snow as I enter a wooded area near the river. Suddenly the bright sunshine is gone, replaced by dappled light filtering through openings between branches. The sound of the river becomes muffled and my ears focus on the quiet stillness. I sit down on a decaying log and take in the calm, deserted feel of winter. Many animals have long since migrated or are well into hibernation. All that is left is an eerie silence.

On the ground next to the log I notice a small, mouse-sized hole in the snow and I drop to my hands and knees to take a closer look. Peering in, I can see just far enough to notice a patch of grass and a narrow tunnel leading away into darkness. I stand to brush off my pants and realize that under the snow exists an entirely different world from the one I see up here. Many animals, in fact, survive winter's freezing temperatures by making use of that place between the snow and the ground – the subnivean layer.

This realm is created because snow is such a good insulator, holding in warm air heated by the earth and keeping out cold air. If the ground underneath this insulating layer is warmer than the air above, the bottom surface of the snow melts just a bit, creating a small space between the snow cover and the ground. The subnivean layer is covered by a ceiling formed when water vapor condenses and freezes on the undersurface of the snow. Temperatures here remain fairly stable, staying between 20 and 30 degrees F even when outside temperatures fall far below zero.





The sheltered space that has formed under this literal blanket of snow is important winter habitat for many small animals, including mice, voles, shrews and some insects. In this space, animals will stay active all winter, avoiding blizzards and creating runways that allow them to forage for seeds, grass, new sprouts and tree bark.

In addition to shelter, the subnivean layer provides much-needed protection from predators. It is not, however, a total assurance of safety. Subnivean animals must be wary of weasels and martens that skillfully hunt beneath the snow themselves. They also may be vulnerable to coyotes, foxes and owls that can use their fantastic hearing to track down and pounce on even the slightest movement under the snow. Once found, a predator will quickly dig through the surface of the snow and capture its prey.

Sometimes predators can access the subnivean layer by finding ventilation holes. Voles and other animals make these holes, easily visible from above, so that excess carbon dioxide can escape. Perhaps the hole here by my log is one such outlet, without which subnivean dwellers would suffocate.

How easy it is for us to overlook this busy world just under our feet – often ignored by those whose gaze usually is focused upward to birds, trees and sky. Sitting here I begin to notice more ventilation holes scattered all around the snow and soon the cold, silent winter doesn't seem so lonely after all. 🦉

This essay was first heard in 2003 as a Field Note on Montana Public Radio.

Gretchen Kehrberg finished her master's degree at The University of Montana in 2004. She now teaches 6th grade science in Austin, Texas.

In Memoriam:

Byron Weber

May 3, 1945-August 27, 2010

Byron Weber thought that citizens of a community should be the recorders of its natural history—and his life was a shining example of that idea. He considered it a responsibility of people to understand in a deep way their natural surroundings, and for him it was a responsibility undertaken gladly and with great joy. From a childhood spent in outdoor discovery at his grandparents' ranch in the Sweet Grass Hills, through a college degree in biology, service in Viet Nam and subsequent exploration of South America and Montana, he settled into his calling as a naturalist and teacher. At Florence-Carlton Elementary School, as a regular on "The Pea Green Boat" on Montana Public Radio, as a leader of field trips and Discovery Days with the Montana Natural History Center and much more, Byron touched the lives of countless children and adults. He gently led them to a greater appreciation of nature with kindness, humor, patience and attention to the small things. Reflecting on the many scenes of wildlife behavior he was privy to as a result of sitting still, Byron once wrote: "These events filled my childhood with a deep internal happiness. Now they offer me memories of my past and of the real world in which I live. Studying the cycles of nature provides me with comfort in world filled with chaos. I can't imagine a life without my binoculars and notebook."

In memory of Byron, MNHC has established a scholarship fund in his name so that children and schools that otherwise might not be able to participate in summer camps or the Visiting Naturalist in the Schools program for lack of funds may be encouraged to follow his example. For more information, call 327-0405.

MNHC Photo



Byron Weber

a tale of two worlds

By Brenda Bolton

Kindergarten Teacher, Florence-Carlton Elementary School

In our world we cannot wait to
Run,
Pick the buttercups,
Scamper through the grass.

In Weber's World there is time to
Wander,
Count the buttercups,
Listen to the grass rustle.

In our world we love to
Fly like the birds,
Squash a bug,
Chatter like the squirrels.

In Weber's World there is time to
Collect fallen bird feathers,
Study a bug's life,
Gather ideas like squirrels gather nuts for winter.

In our world we delight in
Catching butterflies,
Leaping downed logs—pretending we are deer,
Flutter-falling like colorful autumn leaves.

In Weber's World there is time for
Identifying butterflies,
Wandering over and under logs on the trail of... bugs
And... perching on a tree stump.

In our world we smile as we
Throw a rock or two
Tap, tap, tap trees with a stick
Hoot with the perching owls.

In Weber's World he smiles as he
Gently turns a hard rock to see the soft below
Revels in the colorful woodpecker's rat-a-tat-tat
Keeps a sharp eye like an owl.

In our world we
Wonder aloud.

In Weber's World there is time
To be quiet in wonder.



Building on Our Foundations

MNHC gratefully acknowledges the following foundations and organizations that help make our programs possible. With their support in 2010 we reached more than 5,000 students through our school and afterschool programs; 650 community members through our Evening Lecture Series, Saturday Discovery Days and Master Naturalist courses; and many more teachers, university students and volunteers. **Thank you!**

Pleiades Foundation
William H. and Margaret M. Wallace Foundation
Kendeda Fund
Norcross Wildlife Foundation
PPL Montana Community Foundation
Dennis & Phyllis Washington Foundation
Cinnabar Foundation
M. J. Murdock Charitable Trust
University of Montana
Montana Native Plant Society
Lolo National Forest
Missoula County Extension Service
U.S. Forest Service/Lolo National Forest
"More Kids in the Woods"
Missoula Community Foundation
Southgate Mall
Hellgate Hunters and Anglers



MNHC Photo

Flowers: Not just for smelling

For the past three years, the **Bitterroot Flower Shop** has generously donated hundreds of snapdragons for students in our Visiting Naturalist in the Schools program to dissect and investigate as they learn about plant adaptations. We'd like to thank this local business for helping bring natural history into the classroom in a meaningful way.

Photo courtesy of Valerie Bayer

spotlight:

The Spirit of Volunteers

The recipients of MNHC's **2010 Educator Awards** each bring a high level of dedication and experience to their roles in the Visiting Naturalist in the Schools program. Both are retired teachers who can't seem to stay out of the classroom.

Christine Wren's passion for meaningful education has improved the quality of the VNS curricula in concrete and important ways over the years. She has a knack for looking at a lesson through a student's eyes and creating ways for each child not only to learn something but to explore and experience a new idea in real ways. Students always seem to be pulling on Christine's sleeve, wanting to share a story about a family camping trip or a hike or a discovery they made outdoors. This mentor relationship lies at the heart of connecting children to the natural world.



Photo courtesy of Christine Wren



Photo courtesy of Rod Snyder

Rod Snyder has taken responsibility as lead teacher for two VNS classrooms, and helps out in several additional classes each month at Sussex School, Potomac and with home school groups. He's also a volunteer with our new afterschool program. Rod is a mainstay of VNS fieldtrips, cheerfully teaching kids about insects or plants or adaptations. When kids see him having fun turning over logs and looking through microscopes, they are inspired to do the same themselves, which means he has helped many, many Montana kids grow closer to the natural world.

This year's **Director's Award** goes to **Charles Miller**, who has been closely involved with MNHC for many years and whose impact continues to resonate in our programs today. Charles began volunteering with MNHC in 2000, and was hired as our first staff naturalist in 2002. He taught students in the first years of our Visiting Naturalist in the Schools program, led Elderhostel trips, and took adults and teachers into the field on bird-watching, insect-catching and general naturalist outings. He also has prepared hundreds of bird and mammal study skins, helped restore exhibits, and collected dozens of insect specimens on display at MNHC. Though he has returned to teaching at the University of Montana, Charles continues to help with our exhibits and teaching in our Montana Master Naturalist courses. His commitment to excellence in natural history practice and teaching has left a lasting legacy in our naturalist programming.



MNHC Photo

Valerie Bayer was chosen to receive our first **Outstanding Volunteer Award**. After taking the spring 2009 Montana Master Naturalist class, she signed up to go into a few Visiting Naturalist classrooms. She quickly moved from providing assistance to the lead naturalist to teaching part of the lessons herself and leading stations on field trips.



She worked with MNHC lead naturalist Brian Williams to improve the spring 2010 Master Naturalist course and became an invaluable assistant for the classes. She is always willing to jump in and help out where needed, from tabling at community events and assisting summer camps to leading field trip stations. Valerie is a dedicated, hard-working and cheerful volunteer who has become an asset to many of our programs.

To all this year's winners – thank you!



MNHC Photos

2010 Auction Action

Thanks to some 220 generous attendees, MNHC raised more than \$70,000 from our annual dinner and auction in October; nearly \$22,000 of that in support of the Byron Weber Scholarship Fund.

These contributions help us connect children and adults with opportunities to learn about nature and our local natural communities. In addition, we are grateful to the following people and businesses whose generous donations made the evening possible:



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Zootown Brew



Lodgepole pine
Pinus contorta sp.

Ponderosa pine
Pinus ponderosa

Douglas-fir
Pseudotsuga menziesii sp.

Western larch
Larix occidentalis

Englemann spruce
Picea engelmannii

Are you familiar with the beautiful cones of some of our most common western Montana trees? Each has a different character: strong and woody, prickly (and sometimes sealed shut), with feathery “mouse tails,” papery or knobby. Each has evolved for the purpose of shedding seeds in particular environments and habitats.



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