Fall 2011

MONTANA Naturalist

At Home on the Range

Heart of a Naturalist

Swift Watching

Fall Nature Outings and More

page 9

Montana Natural History Center
Connecting People with Nature

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

Fall 2011

MONTANA Naturalist

Features

4 **What Makes a Weed?** by Leah Grunzke
And what makes some noxious?

6 **Where the Buffalo Roamed**
by Theo Manno, Ph.D.
Will bison return to Montana grasslands?

Departments

3 **Tidings**

9 **Get Outside Guide**
Fun fall family hikes; test your bird knowledge; amazing larch balls and more

13 **Community Focus**
Ellen Knight's naturalist heart

14 **Far Afield**
Vaux's swifts: fascinating summer visitors

16 **Imprints**
Explorers Club afield: in search of LWPs; garden face-lift; MNHC fall benefit; staff spotlight

18 **Magpie Market**

19 **Reflections**
Clark Fork School Journeyers

Special Pull-Out Section

Cover – Female bison, Wind Cave National Park, near Custer, S.D. Photo by Alan Wilson, www.naturespicsonline.com. Nature's Pics is "a beginners guide to bird, wildlife and natural landscape photography."

Montana Natural History Center
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Photo by Allison DeJong

Thinking about her mother, who died a few years ago, Ellen Knight realized she had been given something very powerful as a child. She calls it "the great gift of benign neglect."

"I do not mean this in any negative sense," says Ellen. "It was the gift of freedom – to explore on my horse or wander about, wherever the spirit moved me, alone or with friends, for hours on end, week after week in the countryside near home. I think it's one of the greatest gifts a child could ever have."

That gift sowed the seeds of a naturalist sensibility that has grown and flourished through the years. Her story (page 13) provides food for thought for parents today, and for anyone who seeks to acquire a deeper understanding of where they live and to connect with others who share a love of nature.

MNHC is rooted in this as well, being a place and a community where people can learn, in the classroom and the field, about our natural history. As stories in this issue show, sometimes natural history is deeply intertwined with cultural history, as in the relationship between grasslands, bison and Native Americans. Sometimes it flies in front of our faces, as on a summer evening full of the darting of visiting swifts; sometimes it's more subtle, as in the dimly understood connections between plants and soil organisms.

The point is: through encounters with nature, whenever and wherever those may be, you are learning about natural history and – with some time and attention to details – you are becoming a naturalist. Have fun!

Caroline Kurtz

Caroline Kurtz
Editor

A Weed is a Weed is a Weed?

Montana researchers unearthing secrets of invasive ecology

By Leah Grunzke

What exactly is a weed? This can be tricky to pin down, even for the most well-versed floraphiles among us. We tend to think of broadleaf dandelions in the lawn, or tenacious quackgrass in the vegetable patch. But then there's the welcome sunflower from last season, whose forgotten head of seeds yielded a few hundred less-welcome offspring in this year. Common yarrow *(Achillea millefolium)* is a delight in a naturalized garden area, but is the bane of a rose garden's formal borders. Common plants like lambsquarters *(Chenopodium)* and chickweed *(Cerastium)* are delicious and loaded with vitamins, but we unapologetically yank them out of gardens in favor of their more "cultivated" edible cousins. Taken together, it seems that one person's weed is another's prized plant.

In Montana, where plant life is so important to wildlife habitat and the economy alike, we hear a lot about certain types of weeds – those whose identities are not so loosely defined. Plants known as "invasive weeds" evolved elsewhere and have been introduced into new regions, where they have large negative impacts on native systems. "Noxious weeds," which are almost all also invasives, are those legally-defined species that render land unfit for agriculture, forestry or livestock, alter habitat in detrimental ways for native wildlife, change fire frequency or intensity, or reduce native plant abundance.

Spotted knapweed
(Centaurea stoebe)

Photo courtesy of Montana Statewide Noxious Weed Awareness and Education Program Archive, Montana State University, Bugwood.org

Invasive weeds wreak havoc on our economy and environment by reducing farm and ranch productivity, affecting quality and quantity of forage for wildlife, displacing native species and decreasing plant diversity, degrading water quality through increased soil erosion and sedimentation, and threatening outdoor recreation. Direct and secondary impacts of knapweed alone are estimated to cost the Montana economy $57 million annually, while the state spends more than $21 million each year on weed management.

The Montana Weed Control Act establishes the list of our state's noxious weeds and legally requires landowners to control these species on their property. Traditional weed control methods include preventing new introductions of weed seeds and plants, rotating crops to minimize weed impacts, introducing insects or pathogens that specifically target invasive weed species, using herbicides, and physically removing weeds by pulling or mowing. But the best defense against this invasive onslaught is our growing understanding of weed ecology.

Not all the same story

Many of our weedy species arrived here from Europe and Asia. These exotic invaders, freed of the natural population checks of their native ranges, aggressively compete with our own indigenous species. But there are scores of common plants that originally were brought here from overseas and have had no detrimental effect on our ecosystem (think of the European mountain ash *(Sorbus aucuparia)*, Asiatic lily *(Lilium sp.)*, or Russian sage *(Perovskia atriplicifolia)*, to name a few). What enables some plants to be destructive, while other species' populations remain in check?

Invasive plants often produce a huge amount of seed throughout the growing season and may spread through vegetative propagation as well, meaning they reproduce without seeds through existing plant structures like roots or offshoots. Invasives that are adapted to a wide variety of adverse soil and climate conditions are able to compete well for water, nutrients and sunlight. These characteristics give certain species an obvious advantage when it comes to reproduction and survival, but some interesting puzzles remain. Why and how do these plants dominate here, yet populations in their native ranges have little impact on other species?

Some invasive species are able to thrive in soils and climates that differ from those they evolved in. What are the mechanics of this success? What factors control the geographic expansion of a species? What is it about the soil, the resource availability or the predators in a region that allow one exotic species to take over, while many other introduced species remain unobtrusive?

Dandelion illustration made with photo by Steve Dewey, Utah State University, Bugwood.org

Spurge photo by Dan Atwater

Leafy spurge *(Euphorbia esula)* **infestation on Missoula's north hills.**

The key to answering these questions, according to University of Montana scientists John Maron and Ray Callaway, lies in taking a biogeographic approach to studying invasive plant populations. People say that, in order to know where you are, you must first understand where you've been. The same principle can be applied to plant ecology, and studying what factors control the populations of these exotic invaders where they are native may reveal the secret to their success where they are introduced. This requires an innovative approach to scientific research that crosses both geographic and cultural boundaries.

Back to their roots

It generally is believed that invasives thrive because their new ranges lack the biological control factors that evolved alongside the species back home. This "Natural Enemies" hypothesis suggests that freedom from attack by certain insects or pathogens allows exotics to gain a competitive advantage over native species. Exotic plants "behave differently" in invaded areas compared to in their native communities. In order to discover the how and why of this behavior shift, we need to compare plant interactions with natural enemies in both their native and introduced ranges.

Ecologists Maron and Callaway are at the forefront of this movement, having been involved in biogeographic research efforts for more than a dozen years. Their labs have teamed up with scientists from across Europe and Asia in a cross-continental comparison of two of our most threatening weed species, spotted knapweed *(Centaurea stoebe)* and leafy spurge *(Euphorbia esula)*. Their studies currently focus on the role pathogenic soil fungi play in helping or hindering exotic invaders' spread.

Soil microbes that suppress North American native plants' growth often have no effect on, or may even benefit, knapweed and leafy spurge. In contrast, Eurasian soil microbes seem to have a significantly negative effect on these species in their native range. How can this be? And does this account for their vastly different success rates in Europe and North America? By comparing the interactions between soil biota and plants in their native and introduced ranges, Maron and Callaway hope to pinpoint exactly what role these microbes play.

This biogeographic approach has benefits beyond a better understanding of invasive plant ecology. Working alongside scientists from foreign countries gives UM researchers a unique perspective into how science is practiced around the world. It gives lab collaborators and students an opportunity to participate in large-scale studies with genuinely valuable implications. Perhaps most importantly, it unites people from different backgrounds in the common pursuit of conserving biodiversity and protecting the livelihood of our communities. This integrated approach to understanding exotic invaders will certainly be a key tool in future efforts to understand, and hopefully manage, this threat to our local plant and wildlife systems.

This biogeographic approach…unites people from different backgrounds in the common pursuit of conserving biodiversity and protecting the livelihood of our communities.

Leah Grunzke is a Montana native plant enthusiast who wrote about gardening with native grasses in the Fall 2009 issue of Montana Naturalist. *She currently lives in Dillon, MT, developing educational programming for community food and pollinator gardens.*

Where the Buffalo

Will species once again inhabit some native range?

by Theodore G. Manno, Ph.D.

Gardiner, Montana, sits dwarfed by the Gallatin Mountains, the peaks of which straddle US Route 89 and cozy up to Wyoming wilderness across the state border. On the south side of town is the 45th parallel, marking the halfway point between the North Pole and the Equator, and the gateway to America's first national park: Yellowstone – the mother of them all. Only a few miles of this national landmark are within Montana's borders, but this short distance is all that is required to experience a rarity that every American should. They are here, and they are flourishing – bison, or buffalo as they are often called, roaming as far as the eye can see.

Prior to the modern Western settlement opened by the Lewis and Clark Expedition, bison were distributed across Montana and the entire Intermountain West, ruling the Great Plains with massive herds that grazed over thousands of miles. But with pioneering came "manifest destiny" and a commandeering of the land and philosophy once maintained by Native American tribes like the Crow, Sioux and Assiniboine. Today, bison occupy less than 1% of their former range, and their crucial role in a deminishing ecosystem has been effectively eliminated.

Yet hope for the future springs from a few bison that somehow escaped slaughter and found refuge in Yellowstone National Park during the early 20th century. Now with a population of about 3,700, Yellowstone has been home to the last free-roaming, continuously wild, purebred herds of bison in the United States, and many believe the time has come to embark on a long-awaited release of some of them to Native American reservations in Montana. If the transfer occurs, it will be notable for wildlife managers and tribal leaders – especially in light of the continued controversy surrounding how to manage the herd.

Photos by Kevin Fredenberg

A Brief Bison History

pre 1900's: Native Americans enjoy a spiritual relationship with bison until the animal's near extermination.

Last remnants of the American Bison, Yellowstone National Park, c. 1903

1902: Twenty-three bison are discovered alive in Yellowstone.

1917: Brucellosis disease is first found in Yellowstone bison.

1934: U.S. Department of Agriculture embarks on campaign to eradicate brucellosis.

1985: State and federal officials eliminate 88 bison outside of Yellowstone; Montana is deemed "brucellosis free."

1985-1996: State and federal officials and licensed hunters kill 1,899 bison outside of Yellowstone in a state-sanctioned hunt.

1996: Interim Bison Management Plan is implemented, which dictates that every

Library of Congress, LC-USZC4-8152; LC-USZ62-100899

Roamed

Bison at-large on the National Bison Range, Flathead Reservation, evoke a former time.

Gone but not forgotten

Robert Magnan, head of the Fort Peck Reservation's fish and game department, knows about the relationship his people still share with bison.

"Native Americans actually feel the bison are part of themselves," he says. "They supplied us with everything we needed. The hides were used for building teepees, leather for keeping warm, bones for tools, and meat to eat and trade. The head [of the bison] was used to pray with."

For centuries before European settlement, Native Americans of present-day Montana and bison shared a predator-prey relationship. Prior to the introduction of horses, Sioux and Assiniboine hunters would hunt bison by herding them for miles and forcing them to stampede over a cliff, known as a "buffalo jump." The people would then employ specific butchering methods in order to use every part of the animal for survival.

Montana State University professor Robert Garrott studies ecological processes in Yellowstone. He says that besides being a source of life for Montana's Native Americans, bison played a leading role in the grassland community. Their grazing style, which involved continually moving locations, meant that grasses were not eaten all the way to the ground.

"There was a diversity of grasslands that bison occupied in Montana, like sage brush steppe and short grass," says Garrott. "There's a fair amount of research to show that grasslands are stimulated when cropped at a reasonable level. And because bison grazed in a nomadic way, they increased productivity throughout their range."

As a result of their grazing and roaming behavior, bison also had myriad interactions with other species. Prairie dogs foraged in the lush grasses that grew after bison grazing. Cowbirds followed bison herds to catch and eat the insects that were stirred up by the bison's feet. Old, sick or weak bison were preyed upon by mountain lions and wolves.

But the times of bison herds thundering across Big Sky Country as the most numerous single species of large wild mammal on Earth are likely gone forever. European settlement of the West led to commercial hunting, as bison skins were used for clothing, rugs and industrial machine belts – often with the rest of the animal left behind to decay on the ground, in stark contrast to Native American use. The U.S. Army also actively pursued the wholesale slaughter of bison herds, facilitating cattle ranching by settlers and the removal of the major Native American food source in an attempt to force indigenous peoples onto reservations. By the mid-1880s, only a few

Native American and hazing photos by Jim Peaco, YNP

bison testing positive for brucellosis carries the disease and is eliminated if it leaves park boundaries.

Blanketed woman at ceremony (in honor of slain bison), March 6, 1997

1997: More bison are killed in Yellowstone, leading to protests from the action group Buffalo Nations.

2000: Interagency Bison Management Plan is implemented by various Montana agencies, calling for hazing bison back into Yellowstone National Park as a first priority.

Bison hazing near Undine Falls, Yellowstone National Park - 223 bison; February 27, 2003

2005: State quarantines a band of Yellowstone bison and culls for brucellosis.

2011: A new plan to let Yellowstone bison into designated parts of Montana without facing capture or slaughter draws opposition. Two bison are illegally shot and killed outside Yellowstone's north entrance near Gardiner. Bison from Yellowstone may be released to the Fort Peck Reservation.

On the Move Again

No one truly knows what the bison migration was like historically, as it was unalterably impacted by the colonization of North America. However, scientists say that there is evidence of myriad herds that moved across the landscape, many containing hundreds of individuals.

According to studies, bison have relatively predictable movements that depend on, literally, where the grass is greener. Quality of grassland often depends on precipitation and snow melt, which varies seasonally and from year to year, and bison move accordingly to find the best supply. Fire also plays a role – if an area is burned, bison will migrate away from that area, but afterward they may migrate toward it to access fresh-growing plants.

In Yellowstone, high elevation grasslands on the Wyoming side are covered by snow in the winter, so bison move downslope into Montana to access available forage. For a long time there were too few bison to migrate. But as the Yellowstone population increased in number, limited food during winter has rejuvenated their migration. Montana State University scientist Robert Garrott says that even with the current debate over management methods, the migration can be looked at as a success story because it shows that the bison herd is large enough to need more food than what is available on the Wyoming side of Yellowstone during the winter.

hundred bison remained, and the grasslands were ecologically affected.

"When areas are grazed hard sometimes they don't produce fire naturally," says Garrott. "With proper grazing, there will be fire [i.e., fires can happen] and afterwards the vegetation that grows is nutritious and draws even more grazing. With cattle replacing the grazing of bison, fires were suppressed."

Garrott says that animals like bison that graze in one area and move on also tend to enhance the quality and diversity of nutrients in an ecosystem by dropping urine and solid waste, but scientists are unsure as to whether the pattern is the same with cattle. Magnan adds that the shift to cattle may have even changed the type of plants in some ecosystems.

"The cattle start in one spot and eat the grass down," he says, "and that means there's a better chance for noxious weeds to take hold."

Bison jam at Yellowstone National Park.

Photo courtesy of Theo Manno

The road to return

Since the precipitous decline of bison, various reintroduction efforts have attempted to restore the animals to some of their former range, mostly in National Parks or select private lands. For the first time in more than 100 years, the tribes of Northeastern Montana are preparing for the return of wild bison descended from the original herds that occupied the West. The event, which is slated for late summer or early fall pending an environmental report on five possible tribal management areas, would mark a milestone in an interagency plan by federal, state and tribal managers of Yellowstone bison to cultivate bison herds on tribal lands. Montana state officials have already inspected the acreage.

"Distributing the bison means that if there was a disaster in one place that wiped out the bison, they could be rebuilt from other populations," says Magnan, "we're talking about receiving 150 head of bison on about 5,000 acres. We've finished fencing and set up all our watering. We're really looking forward to getting the bison."

The transfer comes at an important juncture, as the behavior of the Yellowstone herd has made it tough on wildlife managers recently [see sidebar]. The importance of bison in the grassland ecosystem revolves around their status as roaming grazers that migrate with the seasons. When they roam, the bison can wind up on private ranching lands, unaware of politically-imposed boundaries like the Wyoming-Montana state border or the park boundary.

That is a problem for Montana stockgrowers who are concerned about brucellosis, a disease that can cause cows to miscarry. There are no recorded cases of brucellosis transfer occurring between bison and cattle, but ever since the disease was found in Yellowstone bison in 1917, controversy has surrounded the tactics used to manage the roaming habits of the herd. The sale of cattle depends on Montana maintaining its "brucellosis-free" status.

"The state of Montana portrays bison as livestock," says Magnan. "We are working together [with the state], but I think we need to start thinking of bison as wild animals."

As part of an interagency plan to keep Montana brucellosis free, hundreds of Yellowstone bison have been corralled during their winter migration into Montana. Many of the captive bison were to be slaughtered until Montana Governor Brian Schweitzer granted them a "stay of execution" in February.

Thus, the return of bison to the Fort Peck Reservation would come at a critical time. Aspiring to be the first of several reservations in Montana where bison can roam unmolested, Fort Peck hopes to become a leader in building a new frontier, where agriculturalists, Native Americans, ranchers and town residents can all flourish. To do so, there will be many decisions ahead.

"Bringing bison back to grasslands may help with grassland restoration efforts," says Garrott, "but it depends on how they are managed."

Theodore G. Manno, Ph.D., a biology instructor and freelance writer based in Tucson, Arizona, wrote about sage grouse and energy development in eastern Montana in the Summer 2010 issue of Montana Naturalist.

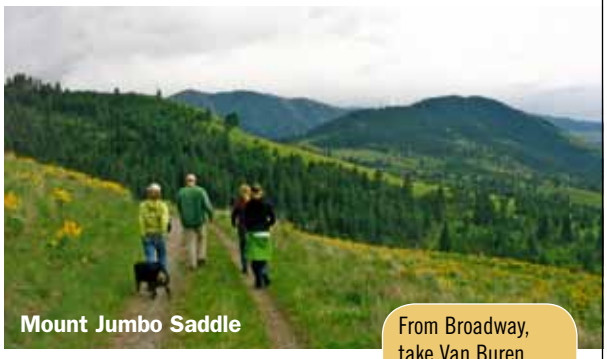
Photos by Allison De Jong

Family Hiking

Some options for fun fall outings

Autumn is a great time to get outside into and enjoy the crisp air and sunshine. Here are a few places near Missoula that are fun for the whole family to explore; the length of the trips can vary with the ages of hikers:

Mount Jumbo Saddle – A short drive from anywhere in Missoula, the Mount Jumbo Saddle is wonderful for an afternoon amble, with a variety of options. You can take the southern trail up through the forested slopes of Mount Jumbo to the summit, where you can drink in the brisk breezes and enjoy a lovely view of the valley. Or you can take the North Loop, a little less steep, which passes through open grassland before sloping up through Douglas-fir and ponderosa pine forest. In the woods you'll reach an intersection of trails; if you continue to the northeast you'll meet up with the Woods Gulch trail and a network of trails on the Lolo National Forest; if you continue on the North Loop trail you'll find your way back to the trailhead, with sweeping views of Waterworks Hill and the Missoula Valley on the way.



Mount Jumbo Saddle

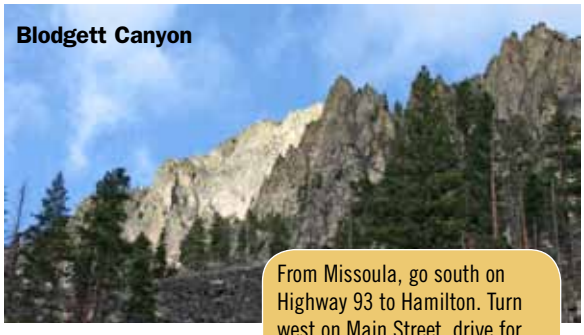
From Broadway, take Van Buren Street north, which turns into Rattlesnake Drive. Turn right on Lincoln Hills Drive and follow 1.5 miles through residential areas to the gravel parking lot and trailhead.

Glen Lake – Perfect for a day hike or an easy backpacking trip, the Glen Lake trail is a great option for the whole family. While beautiful year-round, Glen Lake is a particularly lovely destination in the fall – which peaks in September at higher elevations – when the alpine larches *(Larix lyallii)* blaze yellow and orange. The northwesterly three-mile (six miles round trip) trail begins in open pine forest and rises gently through an area burned in 2006. The open landscape offers wide views of the Bitterroot Valley and the Sapphire Mountains to the east. After 1.3 miles, the route dips down to a saddle and back up through more burned forest, with views of St. Mary's peak to the north and the Selway-Bitterroot Wilderness to the west. The trail then curves to the southwest, and you'll come upon Glen Lake about 2.5 miles from the trailhead. A quarter of a mile farther on are two small, unnamed lakes. All three are rimmed with alpine larches and have several relatively flat, open spaces nearby, ideal for enjoying a picnic or pitching a tent.

Glen Lake

From Missoula, go south on Highway 93. About five miles south of Stevensville, turn west (right) onto Bell Crossing. Follow for half a mile and turn north (right) onto Curlew Orchard/Meridian Rd. Follow for approximately 3 miles and turn south (left) onto FS 1321. Follow for approximately 8 miles to the trailhead.

Blodgett Canyon – An easy hike in one of the Bitteroot's most beautiful canyons, the Blodgett Canyon trail makes for an ideal excursion – whether you're looking for a two-mile amble or a 25-mile hike. The gradually rising trail, with a few steep stretches, follows Blodgett Creek through Douglas-fir and ponderosa pine forest and along talus slopes, as well as some areas burned in the 2000 fires; look for stunning views of the sheer Blodgett cliffs through the trees to the north. The trail crosses the creek at mile three and, about a mile farther in, you'll come to a small waterfall with a deep pool below. For those looking for a full-day adventure, Blodgett Pass is 10.5 miles from the trailhead, and Blodgett Lake waits just two miles farther, well worth the extra effort. As you hike, keep your eyes peeled for Montana wildlife including deer, elk, moose and even mountain goats.



Blodgett Canyon

From Missoula, go south on Highway 93 to Hamilton. Turn west on Main Street, drive for one mile then turn north (right) onto Ricketts Road for half a mile. Turn west (left) onto Blodgett Camp Rd/FS 736 and follow approximately 4 miles to the trailhead. For those interested in camping, there is a well-maintained Forest Service campground near the trailhead.

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

get outside calendar

August 31 **Volunteer Naturalist Training,** 4:00-5:00 p.m. **What is a Naturalist?** Volunteer training for Visiting Naturalist in the Schools September classroom visits. No prior experience needed.

September Gallery, all month. **Emily Harrington,** original works in mixed media.

September-December **miniNaturalists** every Thursday at 10:00 a.m. No program on Nov. 24, Dec. 22 or Dec. 29. Nature program for pre-schoolers. $1 members; $3 non-members.

September 6 **Fall Master Naturalist Class,** 4:00-7:00 pm. Tuesdays and Thursdays through October 14 with three full-day Saturday field trips. Deepen your knowledge of our native plants and animals. Space is limited. Cost: $395. Call 327-0405 to register.

September 9 **Fort Missoula Native Plant Gardens,** 6:30 p.m. till dark. **Soup and Spud Fest.** Celebrate the garden with food, drinks, music, bonfire, and more! Kids welcome. $5.

September 10 **Saturday Discovery Day,** 9:00 a.m.-3:00 p.m. **Amazing Minerals at the Black Pine Mine.** Join geologist Wayne Farley to learn about, look for (and keep!) minerals at this mine in Phillipsburg. Transportation provided. Cost is $25 MNHC members; $30 non-members. Call 327-0405 to register.

September 14 **Evening Lecture,** 7:00 p.m. **Honeybee Secrets: Everything You Wanted to Know about the Honeybee in One Hour,** presented by UM Head Bee Field Researcher, Scott Debnam. $4 dollar suggested donation; MNHC members free.

September 17 **Saturday Kids Activity,** 2:00 p.m. **Nature's Treasures: Crystals and Gems.** Cost is $1 MNHC members; $3 non-members.

September 21 **Volunteer Naturalist Training,** 4:00-5:30 p.m. Learn how to teach kids about the flora and fauna of western Montana during the October VNS school field trips. No prior experience necessary.

September 24 **Saturday Discovery Day,** 9:00 a.m.-5:00 p.m. **Evidence of Glacial Lake Missoula in the Bitterroot Valley.** Presented by the Glacial Lake Missoula Chapter of the Ice Age Floods Institute. Cost is $35 MNHC members; $45 non-members. Space is limited; call 327-0405 to register.

September 28 **Evening Lecture,** 7:00 p.m. **Friends or Robbers: Pollinators and Plants of the Columbia Basin,** presented by plant ecologist Nan Vance. $4 suggested donation; MNHC members free.

September 29 **Fort Missoula Native Plant Garden Event,** 5:30-7:30 p.m. **Creating Landscapes for Play: Tree Forts, Secret Spaces, and Gardens Designed for Discovery,** by the Montana Natural History Center and Missoula Children and Nature. Free.

October Gallery, all month. **Hobie Hare,** nature photography. Earth-inspired images from the Northern Rockies.

October 5 **Evening Lecture,** 7:00 p.m. **Evolution Today: Return of the Bed Bugs,** presented by UM Regents Professor, Division of Biological Sciences, Fred Allendorf. $4 dollar suggested donation; MNHC members free.

October 8 **Saturday Discovery Day,** Time TBA. **Fall Mushroom Foray,** presented by mycologist Larry Evans and in partnership with the Western Montana Mycological Association. Cost is $25 MNHC members; $30 non-members. Call 327-0405 to register.

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.			**Volunteer Naturalist Training. What is a Naturalist?** 4:00-5:00 p.m. 31	**September** **miniNaturalists,** 10:00 a.m. 1	2	3
4	5	**Fall Master Naturalist Class,** 4:00-7:00 pm. *Tuesdays and Thursdays through October 14* 6	7	**miniNaturalists,** 10:00 a.m. 8	**Fort Missoula Native Plant Gardens. Soup and Spud Fest,** 6:30 p.m. till dark. 9	**Saturday Discovery Day. Amazing Minerals at the Black Pine Mine,** 9:00 a.m.-3:00 p.m. 10
11	12	13	**Evening Lecture Series. Honeybee Secrets: Everything You Wanted to Know about the Honeybee in One Hour,** 7:00 p.m. 14	**miniNaturalists,** 10:00 a.m. 15	16	**Saturday Kids Activity. Nature's Treasures: Crystals and Gems,** 2:00 p.m. 17
Alpine larch turn golden 18			**Volunteer Naturalist Training,** 4:00-5:30 p.m. 21	**miniNaturalists,** 10:00 a.m. 22	23	**Saturday Discovery Day. Evidence of Glacial Lake Missoula in the Bitterroot Valley,** 9:00 a.m.-5:00 p.m. 24
25			**Evening Lecture Series. Friends or Robbers: Pollinators and Plants of the Columbia Basin,** 7:00 p.m. 28	**Fort Missoula Garden Event. Creating Landscapes for Play,** 5:30-7:30 p.m. **miniNaturalists,** 10:00 a.m. 29	30	1
October 2	3	4	**Evening Lecture Series. Evolution Today: Return of the Bed Bugs,** 7:00 p.m. 5	**miniNaturalists,** 10:00 a.m. 6	7	**Saturday Discovery Day. Fall Mushroom Foray,** Time TBA. 8
9	10	11	12	**miniNaturalists,** 10:00 a.m. 13	**MNHC Annual Banquet and Auction. Fall Celebration,** 5:00-9:00 p.m. 14	15
		18	**Evening Lecture Series. Bioprospecting in the Berkeley Pit,** 7:00 p.m. 19	**miniNaturalists,** 10:00 a.m. 20	21	**Saturday Discovery Day. Upper Gold Creek Fall Photography Workshop,** 8:30 a.m.-3:30 p.m. 22
		Orion can be seen in the night sky 25	26	**miniNaturalists,** 10:00 a.m. 27	28	**Saturday Kids Activity. Spiders!** 2:00 p.m. 29

NASA/CXC/Penn State/E.Feigelson & K.Getman et al.

Programs and events held at MNHC's new home - 120 Hickory Street - unless otherwise noted.

November

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
30	31	1	**Evening Lecture.** Medicinal Plants for the Cold Season, 7:00 p.m. **Volunteer Naturalist Training.** Flowers & Fruits, 4:00-5:00 p.m. 2	**miniNaturalists,** 10:00 a.m. 3	4	**Saturday Kids Activity.** The Wild Life of Elk, 2:00 p.m. 5
Bohemian waxwings return 6	 Photo by Randen Pederson	**Evening Lecture Series.** This is Montana: Montana Geography, 7:00 p.m. 9		**miniNaturalists,** 10:00 a.m. 10	11	**Saturday Discovery Day.** Whitebark Pine vs. Bark Beetles, 9:00 a.m.-2:00 p.m. 12
13	*Snowshoe hares grow white winter coats* 21	**Evening Lecture Series.** Montana's Smallest and Most Ferocious Mammals, 7:00 p.m. 16	**Fort Missoula Native Plant Gardens.** Fall Wreath Creation, 5:30-7:30 p.m. **miniNaturalists,** 10:00 a.m. 17	18	**Saturday Kids Activity.** Keeping Warm with Feathers and Fur, 2:00 p.m. 19	
20	22	23	24	25	26	

December

 Photo by Joy Viola, Northeastern University, Bugwood.org	29	30	**miniNaturalists,** 10:00 a.m. 1	2	**Saturday Discovery Evening.** Winter Night Sky Astronomy, 7:00-10:00 p.m. 3	
	6	**Volunteer Fall Fiesta,** 4:30-6:00p.m. **Evening Lecture Series.** Topic TBA, 7:00 p.m. 7	**miniNaturalists,** 10:00 a.m. 8	9	***Special* Saturday Kids Activity.** Snowshoe Stomp! Time TBA. 10	
11	12		**miniNaturalists,** 10:00 a.m. 15	16	17	
18	19	Photo by Bryan Harry, NPS	22	Look for these program symbols in *Montana Naturalist* and on our website at www.MontanaNaturalist.org. **Adult Program** **Youth Program** **Volunteer Opportunity**		
25	26	*Elk forage at lower elevations* 27	28	29	30	31

get outside calendar

October 14 **MNHC Annual Banquet and Auction,** 5:00-9:00 p.m. at the Doubletree Hotel. Join us for our Fall Celebration. Bid on exciting trips and experiences in our live and silent auction, enjoy a delicious dinner, and reflect with us on a year of accomplishments and fun.

October 19 **Evening Lecture,** 7:00 p.m. **Bioprospecting in the Berkeley Pit.** UM Research Professors Don and Andrea Steirle discuss the potential for finding anti-cancer agents in the acid mine-waste lake. $4 suggested donation; MNHC members free.

October 22 **Saturday Discovery Day.** 8:30 a.m.-3:30 p.m. **Upper Gold Creek Fall Photography Workshop.** Presented by photographer and naturalist Hobie Hare. Cost is $35 MNHC members; $45 non-members. Call 327-0405 to register.

October 29 **Saturday Kids Activity,** 2:00 p.m. **Spiders!** Presented by Animal Wonders, with LIVE spiders. Cost is $3 MNHC members; $5 non-members.

November Gallery, **all month. Missoula Calligraphers Guild,** Illuminating Nature Through Calligraphy.

November 2 **Volunteer Naturalist Training,** 4:00-5:00 p.m. **Flowers & Fruits.** Volunteer training for November VNS class visits. No prior experience needed.

November 2 **Evening Lecture,** 7:00 p.m. **Medicinal Plants for the Cold Season.** Presented by Clinical Herbalist Britta Bloedorn. $4 suggested donation; MNHC members free.

November 5 **Saturday Kids Activity,** 2:00 p.m. **The Wild Life of Elk,** presented by local author Donna Love. $1 MNHC members; $3 non-members.

November 9 **Evening Lecture,** 7:00 p.m. **This is Montana: Montana Geography,** presented by Richard Graetz of the UM Geography Department. $4 dollar suggested donation; MNHC members free.

November 12 **Saturday Discovery Day,** 9:00 a.m.-2:00 p.m. **Whitebark Pine vs. Bark Beetles: An Ecology Field Day,** presented by UM researchers. Location TBA . Cost is $15 MNHC members; $20 non-members.

November 16 **Evening Lecture,** 7:00 p.m. **Shrews: Montana's Smallest and Most Ferocious Mammals.** Come hear about these marvels of bioengineering from Kelly Foresman, professor of wildlife biology at UM. $4 suggested donation; MNHC members free.

November 17 **Fort Missoula Native Plant Gardens,** 5:30-7:30 p.m. **Fall Wreath Creation.** Presented by Florists of the Bitterroot Flower Shop. $5.

November 19 **Saturday Kids Activity,** 2:00 p.m. **Keeping Warm with Feathers and Fur.** $1 MNHC members; $3 non-members.

December Gallery, all month. **Missoula Calligraphers Guild,** Illuminating Nature Through Calligraphy.

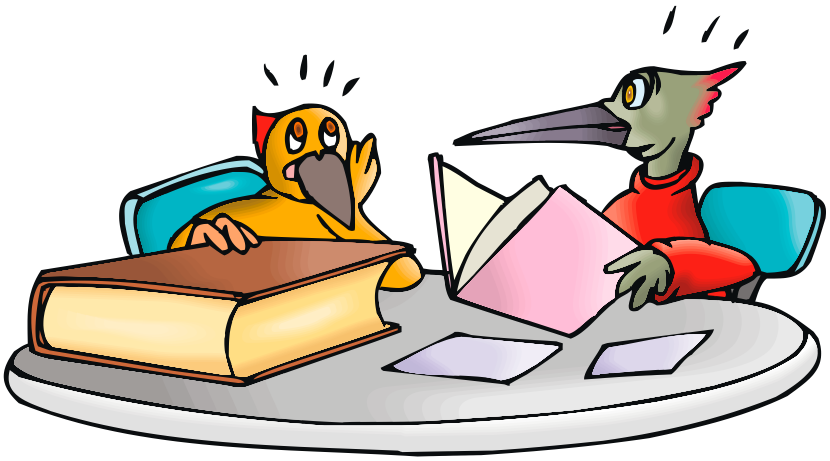
December 3 **Saturday Discovery Day,** 7:00-10:00 p.m. **Winter Night Sky Astronomy;** weather permitting, alternate date Dec. 17. $5 suggested donation; MNHC members free.

December 7 **Volunteer Fall Fiesta,** 4:30-6:00p.m. Enjoy food and drink with fellow MNHC volunteers and staff in appreciation of your time and effort!

December 7 **Evening Lecture,** 7:00 p.m. **Topic TBA.** $4 suggested donation; MNHC members free.

December 10 **Special Saturday Kids Activity,** time TBA. **Snowshoe Stomp!** Join us for a snowshoeing adventure in partnership with Missoula Children & Nature. Free. Call 327-0405 to resgister.

Visit www.MontanaNaturalist.org for directions. To register or to learn more, call MNHC at 327-0405.



Bird Quiz:

How much do you know about birds?

Created by Lawson Sondag-Goodloe, 4th grade, Paxson Elementary

1. Which direction do most birds fly to reach their winter homes?
2. True or false? Bluebirds prefer to live in houses without perches by their front door.
3. Does the black-billed magpie migrate in the winter?
4. True or false? There are more than 10,000 different species of birds in the world.
5. What is Montana's state bird?
6. True or false? There is no bird in Montana that swims underwater.
7. Do birds eat butterflies?
8. How many kinds of woodpeckers have been recorded in the United States?
9. True or false? Birds can have lice.
10. Can pet birds learn to open their own cage doors by themselves?
11. What do birds eat?
    a. worms **b.** insects **c.** berries **d.** all of the above
12. Is it safe to let your pet bird or any other pet you have free in the wild?

Now check your answers and see how many you got right!

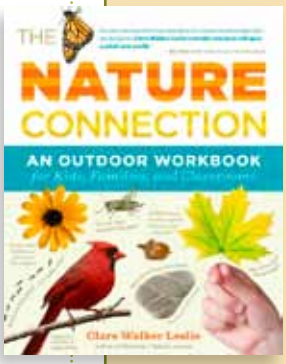
1. South 2. True 3. No 4. True (969 are found in the U.S., 427 in Montana) 5. Western meadowlark 6. False (American dipper, for one; also, many diving ducks, double crested cormorant) 7. Yes 8. 25 (13 in Montana) 9. True 10. Yes 11. D 12. No

How do you rate?

0-3: You better start studying!
4-6: Improving!
7-9: Birds must be your subject!
10-12: You are a bird expert!

book corner

The Nature Connection: An Outdoor Workbook for Kids, Families, and Classrooms
by Clare Walker Leslie
(Storey Publishing, 2010)



This delightful new offering from naturalist and artist Clare Walker Leslie is a great way to get children – and their parents! – to observe and learn about the natural world. Full of activities and nature journaling ideas for every month of the year, *The Nature Connection* teaches kids how to be naturalists and provides a plethora of ways to get started. Leslie gives tips on sketching animals and plants; information about the phases of the moon, bird migrations, geology and a variety of other natural history topics; and lots of space for kids to draw, write down their observations and keep "nature notes" for each month. For budding naturalists who fill up the pages quickly, many of the journal pages are also available online at www.storey.com/thenatureconnection.php. Leslie also includes a special note to parents and teachers, as well as a suggested reading list that includes books for kids, field guides and nature education resources.

Look Out for Larch Balls!

When you're out hiking this autumn, keep an eye out for an unusual piece of nature called a larch ball. Larch balls form when the needles dropped from western larches *(Larix occidentalis)* fall into the shallow water along lakeshores and are compacted into a cohesive sphere by the motion of the waves. Averaging the size of a baseball, larch balls have been found on lakeshores in Glacier National Park, as well as several lakes in the Seeley-Swan Valley, including Seeley and Holland lakes.

Ellen Knight

Heart of a Naturalist

by Marcia Kircher

If you've ever wondered why someone would rather spend time outdoors than pretty much anything else – poking under logs, wading in streams, sitting quietly to watch and listen – here's what I've learned from my friend and lifelong naturalist, Ellen Knight:

We love to walk early in the day, when the smell of the earth is fresh and the air is crisp but with a hint of warmth to come. As we head down a chosen path, Ellen right away notices a ponderosa pine and sniffs its bark to see whether it has that smell of vanilla or butterscotch that sometimes emanates. I ask her, what makes a naturalist?

"I think it's anyone who has a strong affinity for the natural world," she says. "One who is comfortable in this 'home' that always creates a feeling of ease. Naturalists acquire understanding about plants and animals by spending time in a particular place. For me, being a naturalist is being totally absorbed into something beyond the self. All of the senses are so engaged that minutes, even hours, evaporate."

We come to a streamside dotted with cottonwood, aspen and chokecherry. We talk about the trees and plants that fill this space and Ellen carefully starts lifting rocks that lie in the shallow water. She invites me close and points out the stonefly and caddisfly pupae clinging to pebbles underwater, and the mayfly adults that fly and rest above the surface. We share a magnifying loupe and begin to absorb details of the structure, color and texture of these tiny aquatic beings until our attention is distracted by the sudden cry of a red-tailed hawk. How did she come to know so much about the natural world, I ask?

Ellen remembers growing up in Fort Smith, Arkansas. One of her favorite places was right out the back door, with a pasture, a forested hill and a stream with waterfalls and slippery black rocks. She also remembers her mother getting a book about John Muir out of the library for her. "It was the first time I realized that others were as inclined toward the natural world as I was," she says. College professors Richard Beidleman and Andy Sheldon, writers like Tom Eisner and Rachel Carson, and accounts of explorers like John Wesley Powell also helped shepherd her along the naturalist path.

From our spot on the boulder, I find that I am breathing slower, deeper as my ears settle on a breeze rustling the grasses nearby. How can a budding naturalist develop his or her own interest, I wonder?

The answer is simple, says Ellen: "Just try sitting quietly to observe whatever is available." Finding a favorite spot is helpful. For her, the simplicity of Camp Child on the Little Blackfoot River is the perfect setting for observing, learning and being present in the natural world. Another spot she loves is the Blackfoot River Valley and, in particular, the Aunt Molly Road near Helmville. There, potholes that fill with water in the spring support an abundance of bird life, elk herds gather in the winter and bear sightings are frequent. All seasons are equal in Ellen's eyes. She credits Jim Halfpenny and his book *Winter Ecology* with introducing her to the wonders of this often under-appreciated season.

For my friend, and mentor, being a naturalist is a celebration of life, a joy to be shared. I have no idea how long our walk has been this morning. A mourning cloak butterfly floats by on the now-warm breeze, flashing its yellow wing-dots as if acknowledging our appreciation.

Marcia Kircher is on the board of MNHC and often has the pleasure to share walks with Ellen Knight. Together they explore the natural world locally in Montana and elsewhere whenever possible.

When Ellen and husband, Bob Knight, moved to Missoula in 1971, they soon became involved in the Five Valleys River Parks Association, which later became the Five Valleys Land Trust. Bob was a recent law school graduate with a natural resource focus and Ellen had just finished her master's degree with a thesis on the regional river park system of Ann Arbor, Michigan. Then came children and deeper involvement in community and her own learning about Montana's natural history. She was one of a group of people interested in starting a nature center in Missoula – the result of which became the Montana Natural History Center. She served for many years on MNHC's board, and continues to be an invaluable volunteer and supporter.

Photos courtesy of Ellen Knight

Vaux's Swifts

Summer fun watching these visitors

By Kate Stone

In the spring, you can view data collected by Citizen Scientists and literally watch the surge of Vaux's swift numbers as they travel north to roost sites along the coast of California, into Oregon and then to Washington. Combined with observations from other citizen science volunteers along migratory routes, these numbers begin to paint a picture of how Vaux's swift populations move through the seasons, respond to factors like climate, and change over time.

On a recent float down the Bitterroot River, we watched a flock of birds foraging for insects high above the water. Among the crowd of soaring and swooping tree swallows, I glimpsed the fast fluttering wings of some quite different birds – summer visitors to northwestern Montana, Vaux's swifts.

It's easy to miss these nondescript, gray-brown birds that have been described as "flying cigars" due to their small, blunt bodies and narrow, curving wings. Although they appear swallow-like, Vaux's swifts are more closely related to hummingbirds; these swifts flap their wings from the wrist, like hummingbirds, rather than from the elbow, like swallows.

Vaux's swifts belong to the bird family Apodidae, which means "without feet." Of course, they do have feet but these are built more for clinging than standing, an adaptation that allows them to roost or nest on vertical surfaces. Not having strong legs means that Vaux's swifts must do things in the air that other birds do while perching or standing on the ground, like foraging for food or mating. They even gather nest material on the wing, flying through trees and breaking off small twigs without stopping, which they carry back to their nest site. They use their saliva to cement nesting materials to the inside of a hollow tree or, occasionally, a chimney. Vaux's swifts are known to cooperatively breed, meaning that one or two extra adults help the breeding pair incubate eggs and feed nestlings.

Like all swifts, Vaux's swifts are almost entirely insectivorous, using their wide mouths to scoop up insects from the air. Similar to common nighthawks, swifts have small beaks and modified feathers around their mouths that help to funnel insects inside.

The chimney at Chapman Elementary School in Portland, Oregon

Chapman chimney photo by Kat+Sam wikipedia.org; swift on chimney photo by P.A.W.S./protoshop C. Young

Their ability to consume insects is impressive; when feeding young, Vaux's swifts may make 50 foraging trips a day, delivering more than 5,000 insects in small packets called boluses.

But perhaps their most striking behavior is their "staging" prior to or during migration. With the change of seasons, Vaux's swifts leave their breeding or overwintering areas and gather at a traditional roost site, often a chimney. They amass at roost sites to join other swifts for migration, to fatten up for the trip, or to rest during the journey. Just before dusk, swifts begin to circle a roost site, their numbers gradually increasing. The group continues to circle as a few individuals dart repeatedly, feigning entrance to the roost. The darkening sky, full of fluttering wings and high-pitched squeaking, goes suddenly quiet as one swift enters the roost and the rest follow in a matter of seconds, as if the roost were a giant vacuum. To make the landing on the wall, Vaux's swifts somehow manage to change from a head-first to a tail-first dive as they enter.

Swift-watching has become a popular pastime in areas where the birds congregate in large numbers. At the Chapman Elementary School in Portland, Oregon, crowds gather to see the more than 40,000 swifts enter the building's chimney at one time. Swift numbers are quite a bit lower at a roost I monitor, at the Fire Hall in downtown Hamilton, Montana. This particular chimney has hosted swifts for decades, though few formal records have been kept. To learn more about Vaux's swifts, a group of citizen scientists are monitoring this and other roost sites along the migration path of the Vaux's swift every Saturday night during the spring and fall migration.

Vaux's swifts arrive at the roost in Hamilton in late April, with numbers peaking in early May. Last year, we observed a high of 218 swifts entering the chimney on May 11; this year, 201 on May 5. Many of these birds probably continue north, though some swifts are seen around the roost throughout the summer. In the fall, the swifts begin to gather at the roost in late August and are gone by mid-September, headed south to warmer weather and more insects.

It's easy to miss these nondescript, gray-brown birds that have been described as "flying cigars" due to their small, blunt bodies and narrow, curving wings.

Though these numbers of Vaux's swifts are not so spectacular compared to sites in Oregon, Washington and northern California, western Montana represents the easternmost edge of their range and very little information has been gathered to date about swift populations here. We do know that they use both large, hollow trees and chimneys for nesting and roosting, however, so capping chimneys at traditional roost sites and removing snags, particularly in riverbottom forests, may have negative consequences for them. Identifying traditional roost sites in towns and protecting large snags in riverbottoms are two steps we can take to support Vaux's swift populations in western Montana.

The next time you float the Bitterroot River, see if you can pick out any Vaux's swifts among the swallows out for a meal. Or, if you're strolling around town at dusk, watch for a cloud of circling swifts that might lead you to a chimney roost.

Kate Stone is an ecologist living in Hamilton, MT. She monitors Vaux's swifts and many other birds with Citizen Scientists from Bitterroot Audubon.

To learn more about citizen science efforts to monitor Vaux's swifts at roost sites, visit http://www.vauxhappening.org.

Do you know of a roost site in your neighborhood? If so, contact Kate Stone at krosestone@hotmail.com or 381-1115.

Nest and baby swift photos by Kate Stone; flying swift by Mike Danzenbaker, www.avesphoto.com

A Vaux's swift rescue occurred in Missoula recently. It appears that their nest came "unglued" from the inside of the chimney and six baby swifts dropped, with the nest, into the fireplace. Three survived the ordeal and we attempted to return the babies to the chimney using a basket on a rope as a pseudo-nest. Our hope is that the adults will return and continue to feed them. If not, the babies will go back to the rehabber.

Top, Recently hatched Vaux's swift. Note the large mouth (perfect for catching insects) and the feet built for clinging.

Middle, Three baby Vaux's swifts show their ability to cling to the inside of a cavity or chimney. These babies were able to cling before they could open their eyes.

Bottom, This Vaux's swift nest once held six young inside a chimney in Missoula. The nest appears to be made out of maple leaf stems and is held together by saliva.


Rufus hummingbird and Lazuli bunting

Master Naturalist Field Weekends


MNHC Photos

Master Naturalists continue their education on special field weekends, which included spotting the two beautiful bird species, above.

This past summer MNHC offered its 100+ Master Naturalist graduates the opportunity to take their skills to the next level with two in-depth field weekends, one focusing on botany and the other on birds. Attendees spent both Saturday and Sunday in the field, learning about plant families and then dissecting flowers and identifying them using a dichotomous key with University of Montana Biology Professor Greg Peters, or learning the field markings, calls and songs of local breeding birds with UM Biology Professor Charles Miller. The classes took place in lovely natural areas around Missoula from O'Brien Creek to the North Hills, and the students finished their learning experiences tired but happy – and bursting with new knowledge.

Garden Classroom Makeover


MNHC Photo

This past year has been an exciting one for the Native Plant Garden at Fort Missoula. Last fall, we began to remodel the historic garage and storage shed that held our garden supplies, tools and curriculum materials. With the help of generous donors, including the Appleseed Foundation, Beaudette Consulting Engineers, the Dennis & Phyllis Washington Foundation, Home Resource, Loken Builders, Lolo National Forest, Marilyn Marler, Missoula County Extension, Montana Native Plant Society, Northwestern Energy, PPL, Sue Reel & Dick Hutto, the University of Montana, several private donors, and the time and effort of dozens of volunteers, the old building has been transformed into a beautiful and functional new space, with a large classroom, office and storage room, big windows and an elegant pergola. This project has expanded both the indoor and outdoor classroom space at the Native Plant Garden, and several MNHC programs this spring and summer have already benefited from the remodeled building.

Explorers Club Afield

When the Montana Natural History Center's Explorers Club sponsors an outing, you can count on it focusing on a unique aspect of nature. July's trip to a ranch along the Bitterroot River near Florence did not disappoint. Our group of a dozen or so took to the field in search of a woodpecker that doesn't peck, a bird that wears colors more commonly associated with tropical species. We were on the prowl for Lewis's woodpecker, named after the famous explorer Merriweather Lewis.

Lewis's woodpecker

Woodpecker photo courtesy of Daniel Casey, American Bird Conservancy

Our trip leader was Kate Stone, who works as a bird biologist on the 8,000-acre MPG Ranch (formerly the Schroeder Ranch), where a major habitat restoration effort is underway. She explained that Lewis' woodpeckers (let's call them LWPs for short) get most of their food by "hawking" for flying insects, fluttering off a branch to snatch tasty morsels out of the air like a waxwing or kingbird. While they may perch on the side of a tree in woodpecker style, searching for bugs on the surface of the bark, LWPs don't have the heavy bill or head anatomy to drill into trees. In fact, they rely on cavities previously excavated by other woodpeckers, primarily flickers, for nesting sites.

It didn't take long for us to spot our first LWP on a dead cottonwood branch overlooking the Bitterroot River – a perfect perch for intercepting insects. Through the spotting scope we got a close look at this slightly-larger-than-a-robin bird; its most striking feature is a pink breast, an extremely rare color for a northern bird, which fades into a gray collar and then a reddish head. In the right light, the feathers on its back, wings and tail appear greenish-black, similar to some swallows.

Kate told us that LWPs are migratory, spending winters in the Southwest where they eat nuts and seeds as well as insects; they sometimes are found in burned areas; and they are believed to be a declining species, although little research has been done.

The Bitterroot River corridor is one of the best places in the northern Rockies to see LWPs.

Explorer's Club outings provide opportunities to go places and discover wildlife that you might not experience otherwise, and are available to MNHC donors and volunteers. If you'd like to be on the mailing list for notification of upcoming field trips, send your email address and phone to office@montananaturalist.org.

—Hank Fischer,
MNHC Board Chair

Kate Stone with a baby American kestrel, a bonus on the Explorer's Club outing.

spotlight:

Staff

We'd like to introduce you to two new faces at the Montana Natural History Center.

Candace Romero, our Administrative Assistant, has just completed her degree in Administrative Management from the University of Montana. She came to Missoula eleven years ago and keeps finding reasons to stay. Candace enjoys hiking, gardening, reading and keeping up with her seven-year-old son, Jeremyah.

Christine Morris is our new Community Programs Coordinator. She's not a completely new face at MNHC, as she has volunteered, worked as summer camp staff and, most recently, led spring field trips for our Visiting Naturalist in the Schools program. Christine has her M.S. in Environmental Education from the University of Montana.

Christine takes over from Tina Hanke, who coordinated MNHC community programs for the past year. Tina is heading to Minnesota to pursue a life goal of opening a brewery, and we wish her the best in this new endeavor!

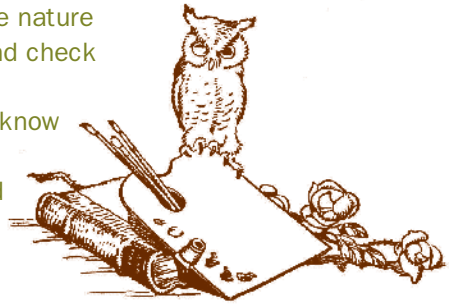
Mark Your Calendars!

MNHC's fall celebration and auction is coming up on Friday, October 14, 2011, at the DoubleTree Hotel. Join us for dinner, conversation and the opportunity to bid on an exciting variety of nature excursions, travel packages, artwork and more. Reserve your tickets today by calling 327-0405 or sending an email to RSVP@MontanaNaturalist.org. $50 per person.

MNHC Gallery Space

If you haven't been to the nature center lately, come by and check out our gallery space!

If you or anyone you know is an artist interested in displaying nature-focused artwork, please contact us at 327-0405 for information about using our gallery.



As Clark Fork School "Journeyers" learned last spring, putting together a magazine has many steps – from brainstorming story ideas to published product.

The combined 3rd through 5th grade class began with individual stories about nature experiences, then learned about writing and rewriting drafts, the difficulty of choosing which pieces to include, how best to illustrate an article, checking facts, what makes an interesting layout and how publications get printed and delivered.

What would your nature publication look like?

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Connecting People with Nature

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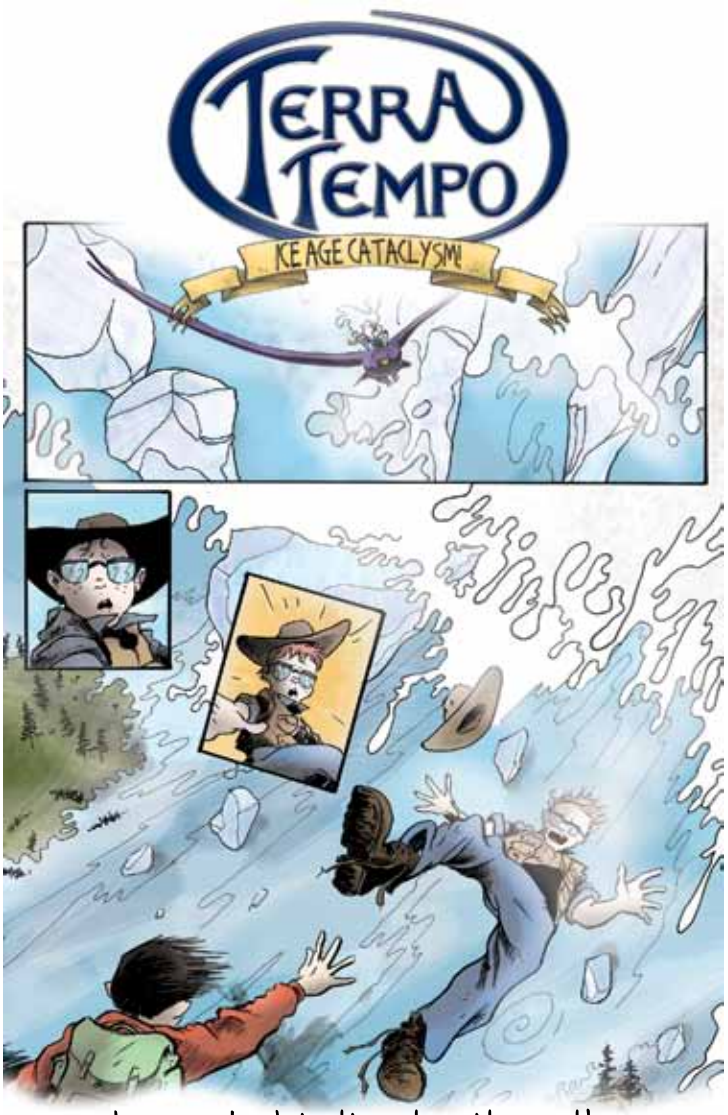

Journey back in time to witness the adventure of the great Missoula Floods!
Learn more about this graphic novel at
www.TerraTempoSeries.com