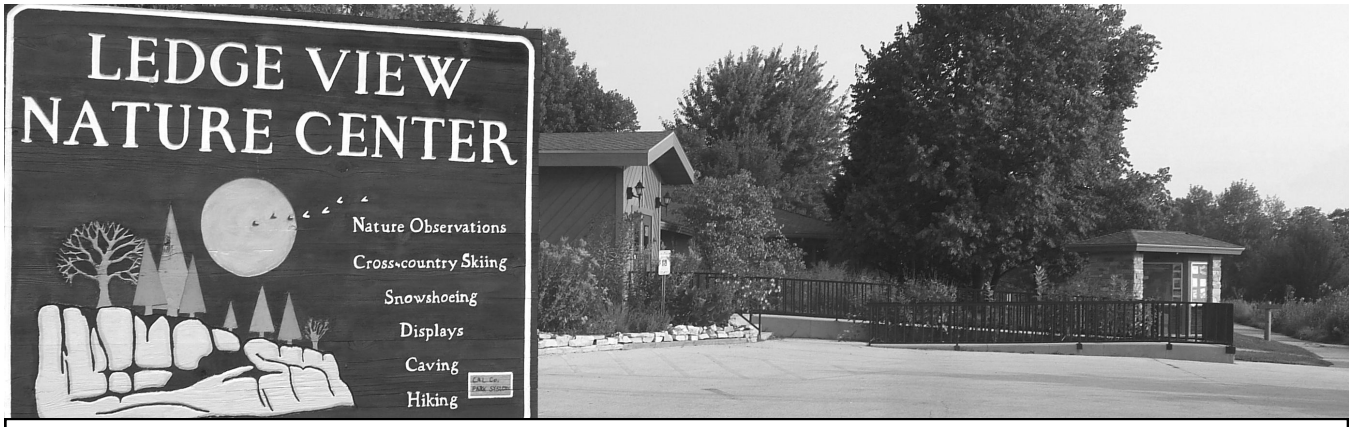

VOLUME 38 NO. 4 *LEDGE VIEW NATURE CENTER NEWSLETTER* *FALL 2019*

Snakes on the mind

By J. Mingari

I had a fox snake type of spring, recently.

I went to visit some friends in March, and as I entered their house, I discovered a very small snake coiled upon the floor of their porch. They have an old farm house with a fieldstone basement, favored by snakes as a hibernaculum. Anyways, the snake was a fox snake, being poked at by the family's cat. It was rescued, but what do ya do with a baby fox snake in March here? There were freezing temperatures every night. The chances of it finding something to eat were slim, and I thought it was unlikely to reach the temperature necessary for digestion of anything it might eat, outdoors.

Since fox snakes eat mice, and we had newborn mice at the nature center, it seemed best to hold onto the snake and feed/water it till it could be released in April. Unfortunately, although the snake used the heated corner in the terrarium and did drink, it refused to eat. This prompted concentrated attacks on the internet to find any reference to feeding baby fox snakes. No luck. The snake died before it could be released.

At about the same time I was the host of a booth featuring the nature center's large fox snake. It behaved extremely well with the hordes of handlers and petting people. I didn't know how it would react to that many people who wanted to stroke it. The best I could do was limit the manipulation of the snake, who wasn't always perceived as a living being with its own agenda. One little girl, running the snake between her fingers as it slithered through my hands, and fascinated by the movement, asked if it was real. Many people wondered if it was native, for they had never seen one. I thought this could be a good thing for the fox snakes, because when they are seen, they are feared. Although, if people don't have experience with the snake, how can they learn to appreciate it?

It reminded me of the day when some workmen were busting up parts of our concrete and fieldstone patio preliminary to repouring the concrete: I noticed raised voices and shovels being brought down with unusual force. It turned out to be in honor of a fox snake that had been curled up in the rocks. Fox snakes are harmless, unless you are their small prey, and they are good snakes to have around, because they eat mice. I was dismayed to find my unsuspected resident dismembered by the guys, who thought they had done me a favor.

Fox snakes have the misfortune of looking and behaving superficially like rattlesnakes and copperheads: They have rusty-colored heads; they're spotted. And like rattlesnakes, they recoil instead of fleeing. Like rattlesnakes, they make a noise with the tip of their tail—but they don't have rattles. Instead, they vibrate their tail in the ground debris and dead leaves when they feel threatened. Then they emit a stinky fox-like musk which grosses out anyone attempting to handle them. Hence the name. And lastly they'll defend themselves by striking. But they are not venomous snakes.

There are people who have asked me if there were snakes at the nature center, and if there were, they would not be coming to visit. I can't think of an animal that ever inspired that kind of revulsion in me (though spiders once came close to it), so I just don't understand this attitude. The closest I can come to

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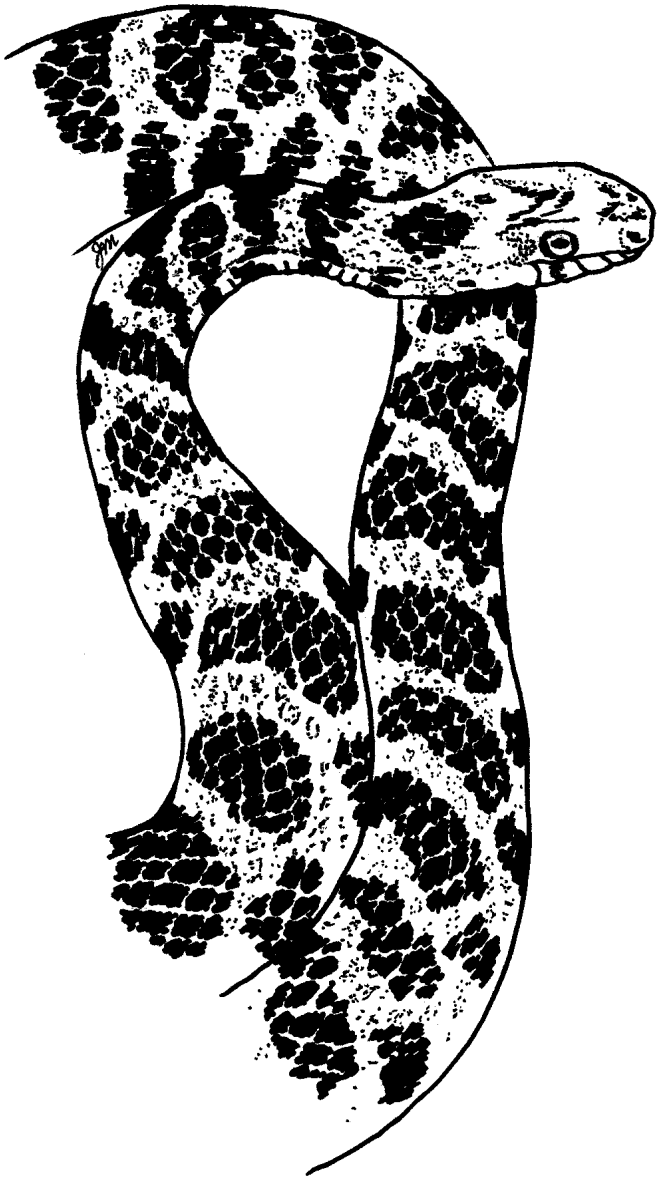
imagining how those people feel is remembering that when I was 6 years old, I was afraid of the toilet tank.

So all these things got me thinking about fox snakes. Some people visiting the booth called it a pine snake and a corn snake. I didn't know-- Are those other names for fox snakes, or distinct species? A little research was in order.

What we have in Wisconsin may be western fox snakes, *pantherophis vulpinus*, though the Wisconsin Department of Natural Resources website lists it as the Eastern Fox Snake. Confusion! Madisonherps.org notes that "Recent taxonomic reclassification …has reclassified all fox snakes east of the Mississippi River as the eastern fox snake…"



Corn snakes are related; they are *pantherophis guttatus*, and they're found in the eastern United States through southern Wisconsin. Pine snakes a bit different; they are *pituophis melanoleucus*, and they're found in the south-eastern United States. So they're not all the same snake.

Fox snakes are straw-yellow to tan, with a rusty-colored head. Their spots are brown shading to dark edging. Their belly is checkered. They are good climbers. Besides mice, they eat rats, baby rabbits, and sometimes also birds' eggs and baby birds.

The little snake we found in my friend's porch was about the size of a new hatchling. Unlike garter snakes and rattlesnakes, which give live birth, fox snakes lay eggs. They mate from April to July, and the eggs are laid from late June to early August. Fox snakes lay from 6 to 29 eggs that are firm and leathery. They're about an inch and a half long, more or less. I've never found fox snake eggs, and information on where they're laid is pretty limited. Snakefacts.weebly.com says the eggs are laid "in humus or rotted wood or under a log." The eggs hatch between late August and October.

Fox snakes hibernate starting in late fall. *Brumation* is another term for what reptiles and amphibians do. They may drink water, but can go for a long time, months, without food.

One of the things that occurred to me was that maybe the temperature in the baby snake's container was high enough to bring it out of brumation, but not high enough to trigger it to eat. Is there a temperature which triggers snakes to eat? Do they have to have a certain temperature before they can digest? A study on temperature concluded that "selection of higher body temperatures during digestion (…) primarily reduces the time required for digestion." (Wang/Zaar/Arvedsen/Vedel-Smith/Overgaard). Madisonherps.org reports that "Ideal temperatures for fox snakes range from 75 to 80 degrees F on the cool side and 80 to 88 degrees F on the warm side. Reptilia.dk reports that the eastern fox snake, *pantherophis gloydi*, will "eat at temperatures as low as 17 degrees Celsius" (62.6 degrees F). Other websites report that snakes may regurgitate food if the temperature is too low. The veterinarian D. Mader, on Reptiles Magazine.com, states that heat stimulates a snake's appetite, and that if food "remains in the snake's stomach"

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at low temperatures, "it will rot and then act as a medium for bacterial growth. The snake's body protects against this by vomiting up the food when the environmental temperature drops below a certain level." Maybe we should have kept the baby snake cool, and not tried to feed it.

Fox snakes are constrictors. Constrictors, incidentally, don't suffocate their prey. According to a study by Scott Boback of Dickinson College, the constrictors' pressure stops the prey's blood flow, and organs with no blood flow and high metabolic rates shut down, like "the brain, the liver, and the heart itself." (Bittel 2015). And constrictors know when to stop squeezing. Boback fitted dead rats with artificial hearts, and tested boas' constriction of the prey. "Boback clearly showed that boas finely adjust their coils to the beats of their prey. If the artificial hearts were beating, the boas constricted the rats for twice as long and with twice as much pressure as when the hearts were still. And all the while, they kept on tightening, bit by bit. If Boback stopped the hearts (…), the pythons stopped constricting a few minutes later."

Fox snakes can eat prey larger than their head. They can swallow prey whole, headfirst, because their jaws aren't connected like ours are. We were a bit dubious with the little fox snake, because the very smallest newborn mice were still quite a bit larger than its head, but we'd all seen the larger fox snake here eat BIG mice. When we feed the snakes at the nature center and kids are in the room, their faces are plastered to the enclosure's glass in fascination, with varying exclamations and expressions of disgust and amazement. (It doesn't help that they find the mice cute.)

Does the fox snake have teeth? I guess they do. They point inwards, like hooks, but fox snakes don't have long fangs. Another question kids asked was, does it hurt if it bites ya? I think what they really wanted to know was do the teeth puncture the skin and cause bleeding? I've never been bitten by a fox snake, so I can't say. Be nice to the snake, and the snake has no cause to bite. (This does not work with curious squirrels.)

Average lifespan in captivity at least 15 years.

My favorite memory of a fox snake is that of the one who came into the nature center, what—two or three times? several years ago. It was a large snake, and Jean Haack, who was an assistant naturalist here at the time, had to keep putting it outside. Yes, snakes also have agendas.■

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Jane Mingari is an assistant naturalist at Ledge View Nature Center, part of the Calumet County Parks Dept.

WISCONSIN Calumet County Parks Department

Ledge View Nature Center

W2348 Short Rd., Chilton, WI 53014
920-849-1471
Ledgeview@calumetcounty.org

Building hours: 8 am-4:30 pm daily

Ledge View Staff:
Louise Marum Jane Mingari
Stephanie Radandt Intern Robyn Bitter

www.travelcalumet.com
Ledgeviewnaturecenter.org

Adam Backus, Calumet County Parks Director
920-439-1008

Nature Center News

New at the park

This summer Ledge View received slick new snake enclosures and cabinetry for them, thanks to a generous donation from the Richard Kampfer Memorial Fund. See the photo on page 16.

A new quarry fence has also been completed, improving safety at the overlook.

Phone and internet problems

A communications tower has been erected behind the nature center to overcome problems with internet service to the building. The few trees that had to be removed for the tower were cut, split, and stacked to be used in the maple syruping program, to cook sap.

Phones (exasperatingly) went down again for a period this summer, with the result that Ledge View had to change its phone number. The new number is 920-849-1471.

Programs

The Friends of Ledge View Nature Center (FLVNC)-sponsored speaker series produced a couple of special programs this summer, including one by the Timber Wolf Alliance in June, a reptile program in July, and "Bugs, Beetles, & Bookworms" in August.

Staff brought back the Focus on Nature Fun program for two- to four-year-olds on Thursday mornings in summer, introducing children to tadpoles, bats, snakes, insects, salamanders, caterpillars/butterflies, and spiders.

Third-Tuesday adult lunch programs continued to be well-attended. Participants enjoyed homemade soup with a sandwich and coffee, and lectures on "Animals: Fact or Fiction?," "Beetles," and "World's Most Deadly."

And, of course, there were cave tours all summer. The caves remained wet, increasing opportunities for mud fun.

New exhibit

Ledge View now has a gray squirrel, following discussions with the Wisconsin Department of Natural Resources. It was one of many animals that people bring to the park, thinking this the ideal place for releasing, except that the young squirrel had been hand-raised, which would impact his ability to survive in the wild.

The animal has been surprising visitors as it rolls tirelessly around the building inside its exercise sphere. We have found he gives new meaning to the phrase, "being squirrelly," used for hyperactive kids. He explores the world by putting his teeth to it experimentally, and we've all been bitten unexpectedly, sometimes as we were just standing nearby. Stephanie talks about it in her article on page 10.

Behind the scenes

The Calumet County Parks Department now requires staff to go through pesticide applicator training for certification. Staff studied a manual addressing types of pesticides, application methods, handling safety, and other concerns, and had to pass an exam.

Stephanie and Robyn attended a North-Eastern Wisconsin Naturalists Association meeting Aug. 30, where naturalists from several nature centers discussed the development of a nature center app.

Volunteers

Thank-you! to the volunteers who have been center-sitting while staff are out leading weekend cave tours. Center-sitting is usually a quiet two-and-a-half hours "manning" the front counter, handling small sales, taking messages, counting visitors, and supervising use of the exhibit hall. It does not require any experience or specialized knowledge.

We had a sad loss in the end of August when Dan Clausen passed away. Dan was a very active FLVNC member, serving as board treasurer for many years and putting a lot of time into organization of the Escarpment Bicycle Tour, which he founded. It turned out to be the largest fundraiser for FLVNC. He also helped build the bat exhibit at Ledge View. Dan participated in the annual sandhill crane count; and Ron Zahringer recalls Dan was involved in the memorable prairie chicken viewing field trip, distinguished by a collapsing blind seat that sent Dan, Ron, and Dale Voskuil to the ground.

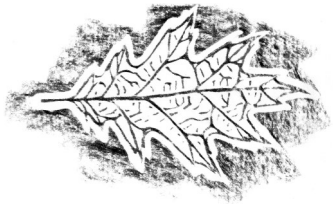
Custodian

Ledge View finally has a custodian. Maddie Halbach was hired in August to handle the nature center's cleaning. Welcome, Maddie! We look forward to working with you. ■

Anecdotes

I heard "Mew…mew…mew" coming from the tall weeds, so I walked slowly in, calling "Here, kitty kitty." I was thinking, at the same time, that R would "kill" me if I brought home ANOTHER kitten—in my 19 years here, kittens had been a common find in the nature center's prairie edge, from the barn below the hill. I got very close, when it suddenly flew away. I had been fooled by a catbird.

I was walking a horde of high school students down to the caves when the girl behind me suddenly freaked out. I heard the boy next to her tell her reassuringly, "You bumped into a leaf."



Ask a naturalist

We found a baby bird in the yard and we don't want our dog to eat it. Can we bring it to the nature center?

The best thing for the bird might be to put it into a bush or tree, and keep your dog away from it. The nature center is not licensed to handle wildlife, so we can't do anything with the bird. You can call a Manitowoc County wildlife rehabilitator's pager, and that person will also give you some information or instructions: 920-323-5609.

We keep hearing this sound, and we're concerned about what it is. It starts out sounding like a raccoon, according to YouTube, but it's not exactly the same. But when we go look, there's nothing there.

This was a tough case to crack. It didn't seem to be a raccoon, so my first thought was that it must be a bird. The habitat was right for a house wren or a chipping sparrow, which both can make chattery sounds, but as the caller listened to those recordings on the internet, they weren't exactly right, either. I hadn't been hearing any gray tree frogs calling yet at the park, but it was about time they started, as warmer weather became the norm. And that turned out to be the source of the sound.

This spring I have had a bird beating against my window. Why is it doing that, and how can I stop it? It's been going on for a couple of days.

This is a very common situation, and different birds engage in it. One reason they seem to do it has to do with the reflection they see. In spring, birds establish their nesting territory, and if a bird sees its reflection in a window within that territory, it may attempt to chase off the "intruder." --Which is hopeless, because it's just a reflection. But the bird burns a lot of energy in the attempt. To change the mirror effect of the window, tape cardboard or fabric over the window.

What is the longest-lived insect?

The 17-year cicada comes to my mind, but according to the Smithsonian Institution, a termite queen can live for more than 50 years. This would be the mound-building-type of termite.

VOLUNTEER COORDINATOR'S REPORT

By Robyn Bitter

We have been enjoying a lot of fun summer programming here at the nature center! In June, we had the Timber Wolf Alliance run a program on Wisconsin Wolf Ecology and Management, bringing those who participated up to date on the ever-changing Timber Wolf situation in our state. It was a very informative and interesting segment of our Guest Speaker Series. Also in June, we had a Summer Solstice Celebration where we had story teller Coral Conant Gilles visit Ledge View to do a few bursts of nature themed story-telling for the kids and families that attended. We also did some nature crafting and roasted s'mores over a bonfire to celebrate the longest day of the year!

In July, we had Randy Hetzel haul his native animal collection to the nature center to give a hands-on presentation on the reptiles and amphibians that call Wisconsin their home. Many families got to learn about the natural history, biology and conservation of our state's beloved cold-blooded inhabitants!

On Aug.17 we had Steve Schindler give a Bugs, Beetles, and Bookworms presentation to the public. This hands-on program featured some familiar and some unfamiliar insects such as one of Wisconsin's native praying mantis species and a few glow-in-the-dark scorpions! Steve explained what sets true insects apart from other "bugs," and how they use different tactics for survival.

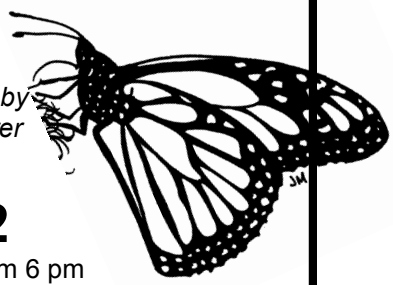
What's coming next? We will be holding another Guest Speaker Series program on Sat., Sept. 28 at 2 p.m. We have the Raptor Education Group, Inc. (REGI) coming to the center to do a presentation on birds of prey. They will be bringing some of their feathered friends to help explain the differences between the raptors that live in Wisconsin.

We are also approaching Halloween Candlelight Cave Tours (Oct. 18 & 19), which I have begun making preparations for as well! If you're looking for a fun volunteer opportunity, we'll need assistance with:

Set-up
Ticket Sales
Popcorn Machine
Hot Dog & Root Beer Float sales
Friend's Group table in the nature center
Tour Guides
Actors in the skits along the tour

Volunteer & Member Social

Featuring a presentation by Mireille and Celeste Lehrer on monarch butterflies

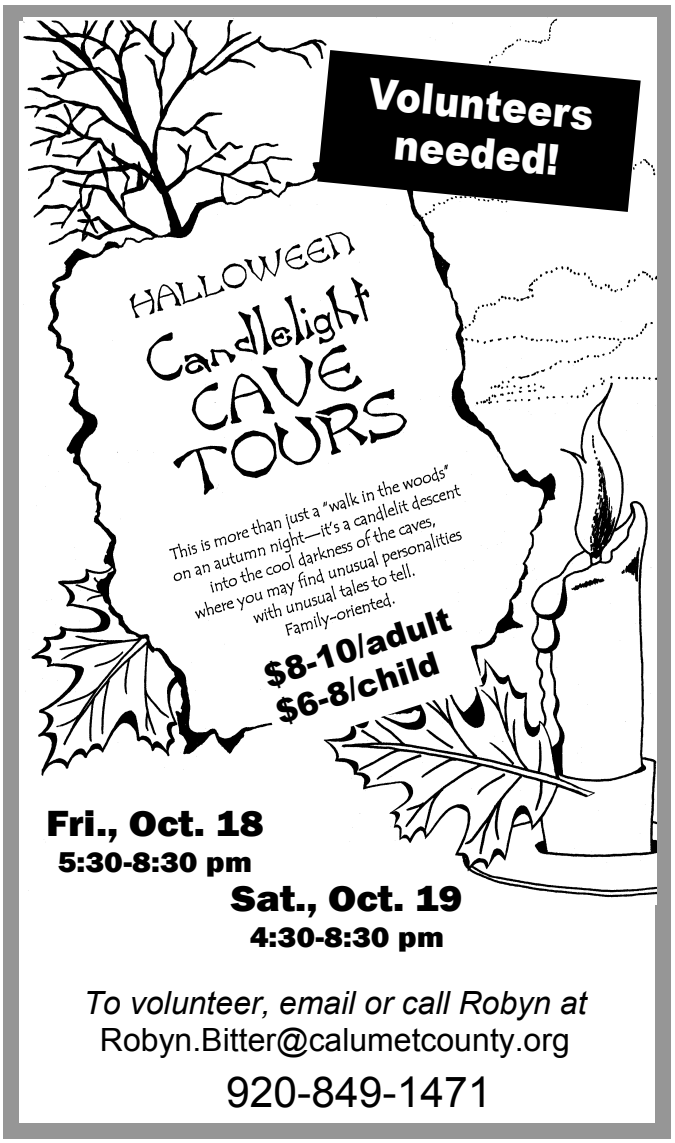


November 2

Dinner 5 pm Program 6 pm

RSVP to Ledge View

920-849-1471



To volunteer, email or call Robyn at
Robyn.Bitter@calumetcounty.org
920-849-1471

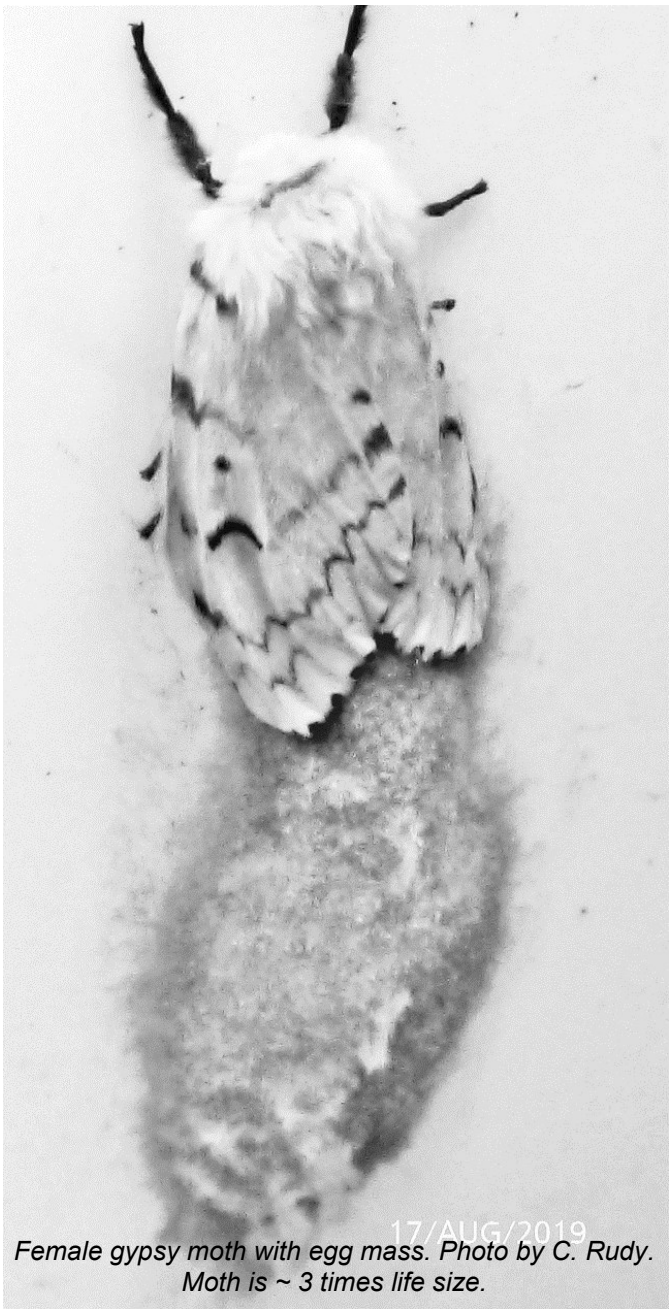
The sad tale of the gypsy moth

By Carroll Rudy

On a recent trip to our cabin in the north woods I noticed a female gypsy moth clinging to the side of the plastic waste basket in our outhouse. A female gypsy moth is a pretty creature, soft and white with a few delicate black markings on her wings. She is an inch long with a two-inch wingspan and looks like any ordinary moth. But those beautiful wings never fly. In fact she hardly moves at all. I determined that she was still alive by touching her, which made her move her antennae and legs. We stayed for five days, and when we left she was in the exact same place as when we came, and still alive. She will stay there until she dies after a life of about 10 days. I feel sorry for her. Imagine having beautiful white wings that never fly. The wings are there, but not the flight muscles.

The pupa she emerged from was a thin empty dark brown shell folded in a dead maple leaf about five inches below where she was perched. She was sitting just above a tan mass that looked like matted wool, about one and a half-inches long, three quarters -inch wide, and somewhat raised above the plastic surface to which it was tightly glued. Under the felty surface of this mass were from 500 to 1,000 eggs that should hatch late next April. I doubt that these eggs will ever hatch because during the time when the male moths seek females, she was closed up in our outhouse. When the female moth comes out of the pupa, she already contains the eggs that she will lay. If a male can't reach her, the eggs will not be fertilized. Normally, mating takes place in the four days after the female comes out of the pupa.

The male gypsy moths look different. They are smaller brown moths that are vigorous flyers, and are more numerous than the females. They can be seen flying by day or night through the forest in early August, seeking females which they find by scent, "sensing" her pheromones with their feathery antennae. They mate with any female they find, usually perched on the bark of the tree upon which she pupated. After emerging from her dark brown pupal case



Female gypsy moth with egg mass. Photo by C. Rudy. Moth is ~ 3 times life size.

that was hidden under a piece of bark or under a dead leaf, she crawls a few inches into the open where the males can find her. Then she never moves again. She simply deposits her eggs where she sits, and sits there until she dies. Often a bird or small mammal such as a mouse finds and eats her leaving only the discarded wings on the ground, unless the animal that ate her swallowed her whole. The egg masses on our cabin had already lost their mothers.

Why the name? "Gypsy" referred originally to people who travel. Gypsy moths are native to Eurasia and Africa, where they have many natural enemies that control their populations. But in America there

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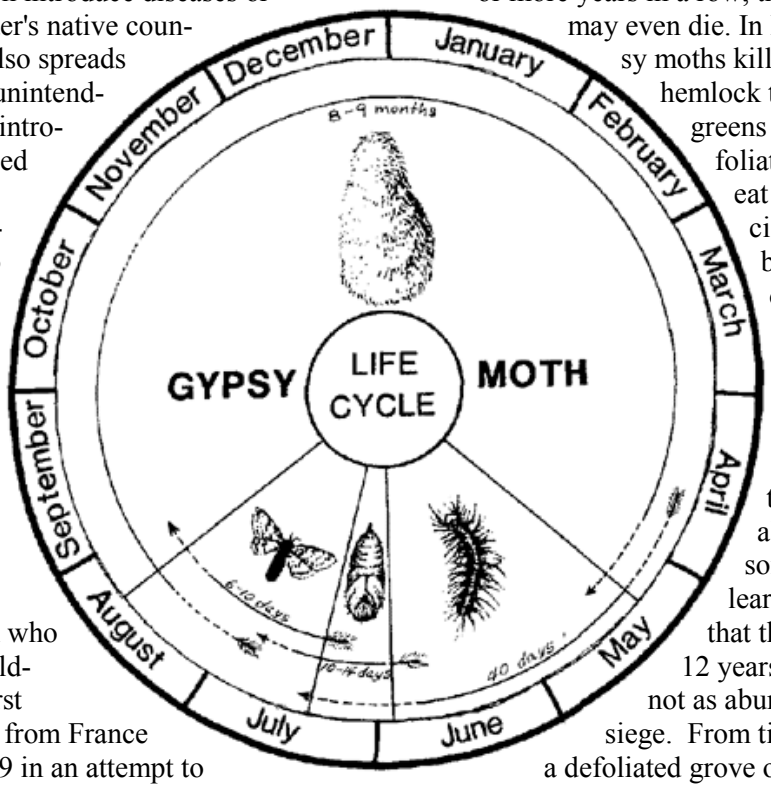
are no natural enemies, so the gypsy moths reproduced here without any limitations. Populations became so enormous that they defoliated entire trees. As they spread they defoliated entire groves. This is typical for invasive species that come into new countries with no natural enemies. Plant or animal, they reproduce in such vast numbers that they crowd out native species.

Humans like to think they are in control of the world, and in their ill-conceived attempts to control such situations they often introduce diseases or parasites from the invader's native country, only to find that it also spreads out of control and kills unintended species. In this case, introduced diseases have killed most of our native silk moths-- those big, beautiful species that used to live in our hardwood forests, such as the luna moth.

How did gypsy moths get here? Seldom can we pinpoint the exact person who introduced a pest species, but in this case we know it was Mr. E.L. Trouvelot, a Frenchman who was trying to breed a cold-hardy silkworm, who first brought the gypsy moth from France to Massachusetts in 1869 in an attempt to cross them with native American silk moths. That is a genetic impossibility, but he did not know that. Some larvae escaped from his breeding pens and quickly became established in his neighborhood, from which they then quickly spread. They were good travelers.

By 1912 the moths had spread to the neighboring states near Massachusetts. In the 1920s they reached New York State, and by 1930 they were in Pennsylvania. By the 1950s they reached Michigan, and in the 1990s they were in the Wisconsin counties next to Lake Michigan. The first time the caterpillars defoliate a forest in any state, it starts a panic that they will kill all the trees, and control methods are begun. Quarantine is the first attempt in hopes of controlling their spread by not shipping logs or firewood from infested areas. Spraying insecticides on colonies of caterpillars is the method of choice in most cases, and as this generates a lot of income for pest controllers, it goes on for a few years, often resulting in spraying of entire forests.



An invasion of gypsy moths gradually builds to the point where they eat all the leaves from a tree, or a grove of trees. Trees can grow new leaves and soon recover, but if they are stripped of their leaves for two or more years in a row, the trees weaken and may even die. In Marinette County gypsy moths killed some beautiful old hemlock trees, for the evergreens are very slow to refoliate. Gypsy moths will eat the leaves of 300 species of trees and shrubs, but are especially fond of oak and poplar. After the peak invasion, whether sprayed or not, populations settle down after a few years, because some of their diseases come along with them, and some species of birds learn to eat them. After that they erupt every 10 to 12 years in larger numbers, but not as abundantly as in the first siege. From time to time I have seen a defoliated grove of aspen trees in Marinette County, but the trees soon recover and the affected area does not spread.

Gypsy moths are a species of tussock moth, a genus of caterpillars that are bristly hairy with brush-like tufts of hairs on their backs. Many are very attractive, and the gypsy caterpillar is no exception. The bristly larva has five pairs of blue tufts on the head end, and six pairs of red tufts on the rest of its length. Most birds don't like to eat a mouthful of hair, but blue jays, grackles, cuckoos, and a few other birds are happy to have the extra food, and can increase their populations. Mice, squirrels and other small animals also take advantage of the food bounty. The adult moths as well are enjoyed by many birds, mice,

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and owls. Gypsy egg masses remain stuck to tree bark from August to April and furnish food for small birds and mice, who eventually learn to search them out for tasty winter snacks when insects are scarce.

I mentioned early on that female gypsy moths never fly, living their entire lives where the caterpillars pupated and depositing their eggs there. So how have they traveled so far? The newly-hatched caterpillars can fly! Like some spiders, they spin silk threads from which they dangle in the trees to travel from an area they have eaten to a new patch of leaves. A good strong wind will pull them loose and they fly to new trees. A hurricane on the East Coast once spread them to several new states.

But their best helpers are human. Caterpillars and new female gypsy moths in summer will crawl up onto cars, trailers, tents, furniture and other items that people carry along on their summer vacations. The first egg masses I ever saw were beside parking lots, and the first one I saw at home was on my boat. Another example is the caterpillar clinging to our car miles away after we left our cabin. How many caterpillars did we bring home? We have had gypsy moths in our yard for years, but they have never defoliated our trees, probably thanks to the many birds we encourage by feeding and providing habitat.

Gypsy moths will never go away completely, but will settle into a rhythm of higher and lower populations similar to our native insects. They affect all the other creatures in the forest that compete for food, and all the creatures that eat the caterpillars and moths adjust their populations along with them. However, gypsy moths can severely stress trees by defoliating them. Can you control gypsy moths? Not really, but you can help. No, don't spray insecticides—Spraying might be the worst thing you could do if it also kills the gypsy moth predators and competitors. Instead, consider:

Male gypsy moth is about half the size of the female, darker, and has feathery antennae. Photo by Carroll Rudy.

Encouraging bird populations. Feed winter birds that will eat the gypsy moth eggs and blue jays that like to eat the caterpillars. Woodpeckers and chickadees will eat the eggs of almost any insect.

KEEP TREES HEALTHY: Enhance growth conditions for isolated trees by encircling them with mulch or ground cover plants that do not compete for moisture and nutrients the way dense grass layers do.

Water the shade and ornamental trees in periods of drought to maximize recovery during refoliation.

Fertilize shade trees.

Avoid stressing trees. For example, construction projects tend to compact soil and prevent moisture from penetrating to small feeder roots. Excavations chop off roots.

Avoid applying lime or weed killers around trees. These chemicals can seriously damage shallow tree roots.

AND DESTROY EGG MASSES

Scrape them off into a container of soapy water and flush them.

Or use homemade horticultural oil: Mix one tablespoon of liquid soap with one cup of cottonseed oil, safflower oil, soybean oil or other liquid vegetable oil. Mix 1½ tablespoons of your oil mixture for every one cup of water. Shake mixture well and apply to egg masses. A small paint brush or household spray bottle will work.

You have from mid-August until April to destroy unhatched egg masses. Warm fall and winter days are a nice time to check for them.

Target "fresh" egg masses that were produced during the summer; they will feel firm and be darker tan in color than older egg masses. Masses from previous years appear faded and feel spongy. Look for egg masses on tree trunks and the undersides of branches, on buildings, in firewood piles, and on vehicles. To see what they look like go to: https://bygl.osu.edu/node/859.■

Carroll Rudy is a retired biology teacher and a member of the Friends of Ledge View Nature Center.

Wildlife needs to stay wild

By Stephanie Radandt

Looking on the internet for unusual animals as pets, you can find things like flying squirrels, fennec foxes, leopards, servals (African small cat), sugar gliders, chipmunks, and gray and fox squirrels. I love to watch the videos of these pets interacting with their owners, the antics the animals get into and just how loving they can be, but this is only the good side that is shown in the videos. What is not shown is what happens when the animal's natural instincts take over. One couple who has a red fox show what their house looks like-- furniture chewed on with holes, walls scratched up and chewed on, everything that can be played with or chewed on is, and the fox is good at opening cupboard doors. This couple actually tells you if you are thinking about a fox as a pet, think again.

This July a baby squirrel (at the time he was around 4 months old) was brought to Ledge View. A family brought him here to release him, because he was a nuisance at their house, constantly climbing up their legs, begging for food, and trying to play with their dogs. It was obvious that someone had hand-raised the little guy, and if he would have been released out here he would have traumatized some hikers by trying to crawl up their legs and just following them down the trail. After two conversations with different people in the DNR, we were given permission to keep him. He is owned by the state, but we are allowed to keep and house him for educational programs on why wildlife needs to stay wild. I always thought it would be fun to have a squirrel as a pet, but I can now say without a doubt they are more work than any other pet I have ever had.

Gray squirrels, also commonly referred to as "tree rats" around the park, are very common. They range all over the eastern United States to just west of the Mississippi River and north to Canada. They prefer expanses of mature, mixed hardwoods, but can be found in city parks, the suburbs, and right under your bird feeders. They are alert, aggressive, and inquisitive rodents, which are very fast at moving and jumping through the tree tops. Gray squirrels are busiest during the day, usually for a couple hours after dawn, then again in late afternoon. They do not hibernate so they are busy in the fall, hiding nuts and tree seeds in hundreds of locations throughout the forest floor, called scatter hoarding. These hidden nuts are for winter foraging. Surprisingly, squirrels are able to locate from memory and smell many of the nuts they buried, and the ones forgotten may sprout and grow into new trees. Squirrels are secretive, deceptive, and suspicious when it comes to their precious trove of nuts. They are wary when burying their food, and will sometimes only pretend to hide it if they suspect they are being watched. The paranoid hoarders will dig up and rehide their snacks several times in an effort to throw off potential thieves.

Squirrels as pets, though...definitely not a good choice. You need a lot of patience, space, time, you can't mind mess-

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Wildlife needs to stay wild

es, and need a high pain tolerance. Squirrels have a lot of energy; think of a toddler with severe ADHD who can't sit still for more than a few seconds, always moving, climbing, jumping, and getting into absolutely everything. Our squirrel needs to spend two to three hours a day outside of his cage to burn off his energy and interact with people. He is very curious, gets into everything, and "goes to the bathroom" wherever he is at that moment.

Squirrels make large messes. The bottom of his cage has pine bedding that he is constantly digging in to either bury or find his food, which means he is constantly throwing bedding everywhere. When given nuts outside of his cage, he sits and shreds the shell, just throwing it all over the place. Plus he requires a balanced diet which is a challenge in captivity. I have been spending time outside gathering nuts and tree seeds so far but if you have ever collected nuts from the wild you know that you are lucky in one in four being any good, so lots of nut-collecting going on. But that is only a portion of his diet. He also eats fruits, vegetables, and insects.

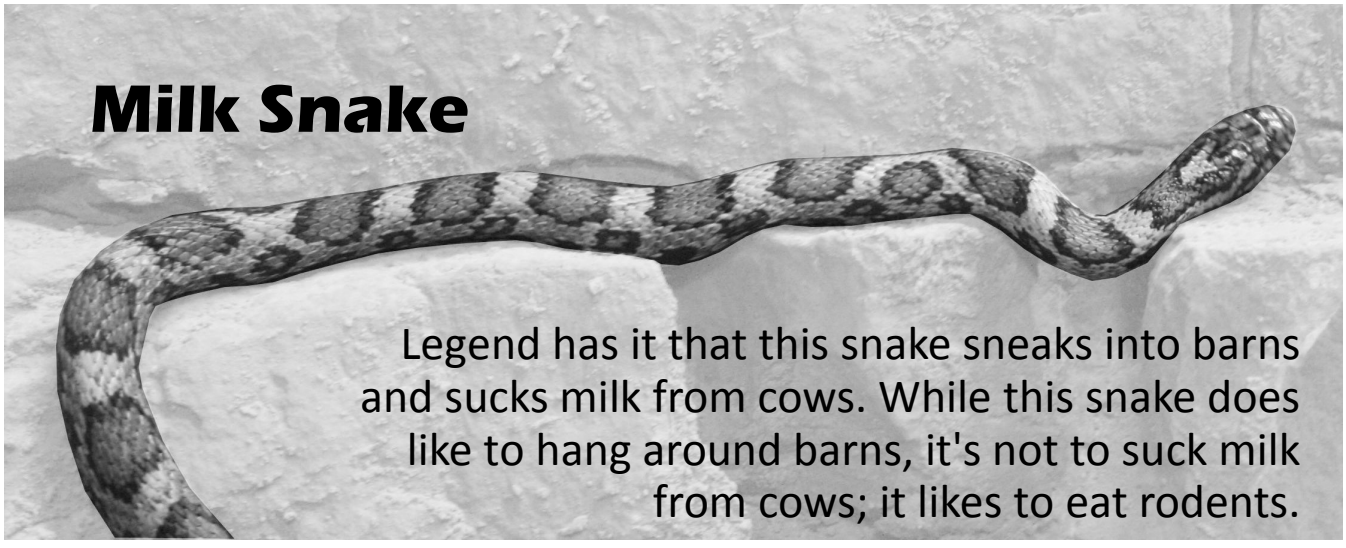
Squirrels have sharp nails designed to pierce bark to allow them to climb trees. On skin that usually means scratches, and sometimes they can be deep. Squirrels' teeth grow continually throughout their life so they need to be continually worn down. Many hard objects need to be provided to ensure he is wearing down his teeth. Squirrels nibble, chew and bite anything and everything. To discover if something is food, they will attempt to bite it, which may include fingers, chairs, pens, cords, phone cases, staplers, Chap Stick containers or anything lying around. When he plays, which he loves to do, he bites the same way as a kitten or puppy. But when he is not in the mood to be handled, or if he is scared, he will bite hard enough to draw blood. There is no training to prevent this like with a dog or cat; this is his natural instinct coming through.

The biggest reason not to own a squirrel is that it is a wild animal, and if we truly love wild animals, they deserve to be free. We cannot provide them with the space to run like wild squirrels do; their diet changes throughout the year with what is available; they don't have a chance to learn normal squirrel behavior, then have an innate fear of humans and other animals; and in Wisconsin it is illegal to possess, own, control, restrain, or keep any wild animal. Wild animals have evolved over the course of millions of years as independent, free-living creatures; their place is in their natural environment, not to live a life in captivity. ■

Stephanie Radandt is a naturalist assistant at Ledge View Nature Center, part of the Calumet County Parks Dept.

Project in the works at the park:

Interpretive signage for the new snake enclosures



Talking Trees

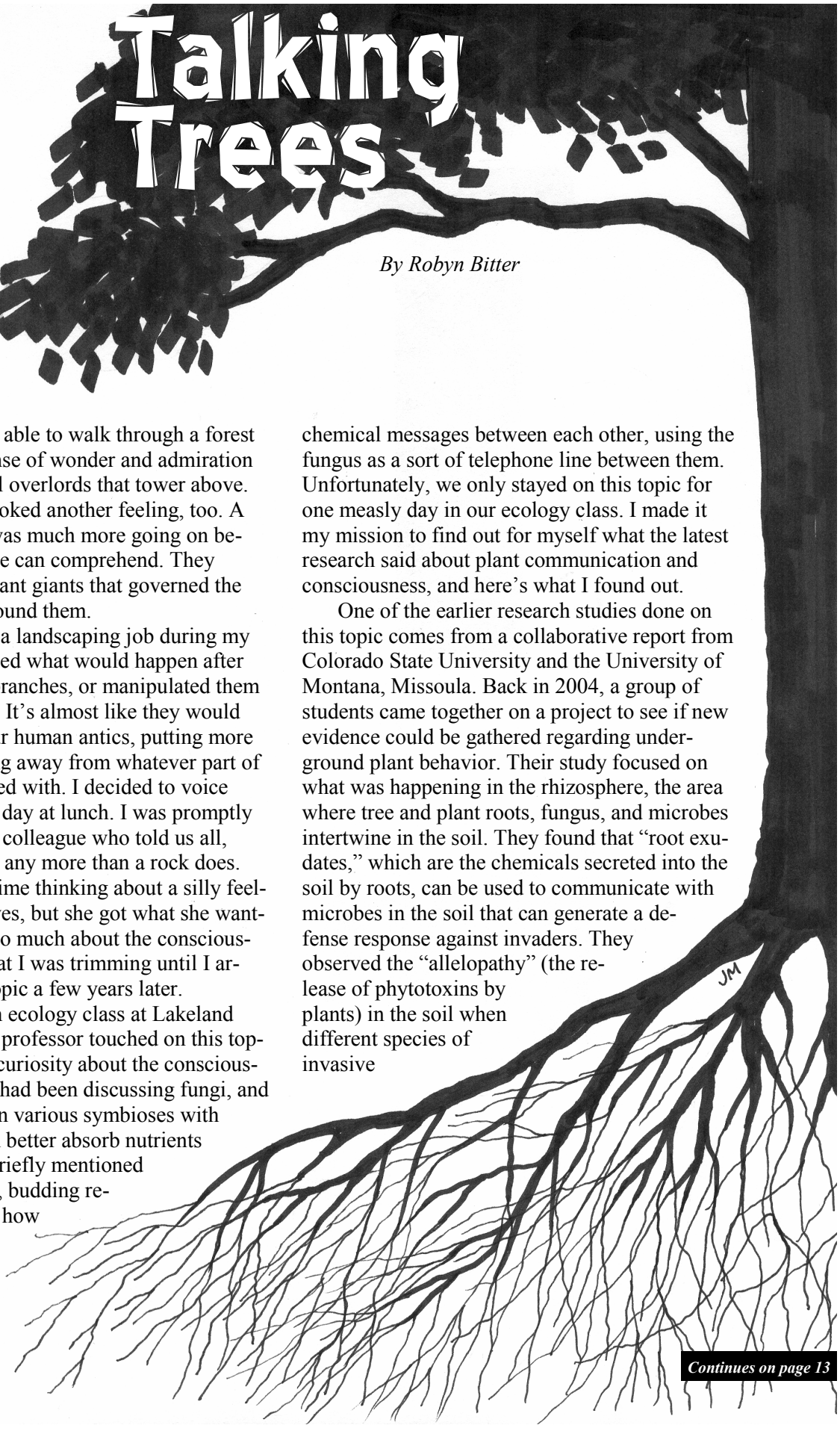
By Robyn Bitter

I've never been able to walk through a forest without the sense of wonder and admiration for the arboreal overlords that tower above. They've always evoked another feeling, too. A feeling that there was much more going on between them than we can comprehend. They seemed to me vigilant giants that governed the forest that grew around them.

I used to work a landscaping job during my college years. I noted what would happen after we trimmed their branches, or manipulated them in some other way. It's almost like they would "learn" to avoid our human antics, putting more energy into growing away from whatever part of them that we messed with. I decided to voice these thoughts one day at lunch. I was promptly curbed by an older colleague who told us all, "Plants don't think any more than a rock does. Don't waste your time thinking about a silly feeling." A bit harsh, yes, but she got what she wanted. I didn't think so much about the consciousness of the trees that I was trimming until I arrived back at the topic a few years later.

I was taking an ecology class at Lakeland University and my professor touched on this topic. It reignited my curiosity about the consciousness of plants. We had been discussing fungi, and how they worked in various symbioses with plants to help them better absorb nutrients from the soil. He briefly mentioned that there was new, budding research centered on how this underground fungal system also works to let plants send chemical messages between each other, using the fungus as a sort of telephone line between them. Unfortunately, we only stayed on this topic for one measly day in our ecology class. I made it my mission to find out for myself what the latest research said about plant communication and consciousness, and here's what I found out.

One of the earlier research studies done on this topic comes from a collaborative report from Colorado State University and the University of Montana, Missoula. Back in 2004, a group of students came together on a project to see if new evidence could be gathered regarding underground plant behavior. Their study focused on what was happening in the rhizosphere, the area where tree and plant roots, fungus, and microbes intertwine in the soil. They found that "root exudates," which are the chemicals secreted into the soil by roots, can be used to communicate with microbes in the soil that can generate a defense response against invaders. They observed the "allelopathy" (the release of phytotoxins by plants) in the soil when different species of invasive



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Talking Trees

plants were introduced. Their findings demonstrated how plants use root secretions to regulate the rhizosphere to the detriment of neighboring, invading plants. Analysis of many compounds released from plant roots have been shown to have harmful effects on other plants. (Bais, Harsh Pal, et al.) The long and short of it is, they got to see plants waging biochemical war on each other in the lab!

Evolutionarily, it makes perfect sense to me that pumping chemicals into the soil that will spell disaster for your neighbor would have evolved in plants over the millennia. But there is even more to it than that! An article that I read off of the Oxford Academic research site explained the inner-workings of the mycorrhizal network. (I'll use MN as an abbreviation!) These MNs are made up of continuous fungal "mycelia" (a network of fine white filaments) linking two or more plants of the same or different species. The MN can connect multiple plant species and multiple fungal species that then interact, creating a very complex and adaptive social network. The comprehensive article explains in great detail how the adaptive behavior of plants, including rapid changes in physiology, gene regulation, and defense response, can be altered when linked to neighboring plants by the MN. For instance, one study that is mentioned in the article observed that Douglas fir trees grew larger when mixed with linked Ponderosa pine trees, than when grown separately. The study concluded that it was likely due to modified growth behavior of the two species to gain access to excess phosphorus via the MN that would otherwise have completely been consumed by Ponderosa pine as 'luxury consumption.'(Gorzelak, Monika A., et al.) Rather than hoard all of the phosphorus resource to themselves, which would have choked out the Douglas firs, the Ponderosa pines shared the resource. This example shows two different species of trees actively working together so that they both can succeed in the same environment. It has been discovered time and time again that the health of a forest increases as diversity increases. Somehow, these "thoughtless" plants have figured that out.

Another 2013 study on the subject comes from the Institute of Biological and Environmental Sciences, at the University of Aberdeen in the U.K. This scientific study examined how fungal mycorrhizal networks, while assisting the plant roots' uptake of nutrients, can also act as a connection for signaling between plants, acting as an early warning system for herbivore attack. Their evidence is the first to indicate that herbivore-induced signaling molecules can be transferred from plants infested with aphids to uninfested neighbors via a common fungal MN. In their research, once the aphids had infested a plant, it sent out signaling molecules via root secretions. Insect herbivory caused changes in the production of plant secretions, particularly those that were repellent to aphids but attractive to aphid enemies. The research team demonstrated that these anti-aphid root secretion effects can also occur in aphid-free plants, but only when they are connected to aphid-infested plants via a common MN. This underground messaging system allows neighboring plants to start their herbivore defenses before attack. (Babikova, Zdenka, et al.) In my mind, that's similar to a neighbor calling another neighbor on the phone to let them know what brand of herbicide they used to wipe out their garden infestation, before it becomes a problem for the whole neighborhood!

I know that there is a long way to go within the realm of plant communication research, but it excites me that more people are tuning into this very real phenomenon. To have real evidence to back up what was supposedly just one of my silly feelings is empowering. So now I have another feeling: that this is only the beginning of a monumental discovery about consciousness; that it is not as black and white as we currently make it out to be. The fact that plants have the ability to send and receive chemical messages to warn their friends of potential invaders is enough for me to suspect that trees and plants are among the alert contenders on this planet.■

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Robyn Bitter is a naturalist intern at Ledge View Nature Center, part of the Calumet County Parks Dept.

By Louise Marum

Chipmunks

the tiny, tenacious, town criers of the woodland

I was barely halfway through my first cup of morning coffee one Saturday recently when I was roused from my sleep haze by a commotion outside my kitchen window. A high pitched and frenzied "chip,chip,chip,chip" along with a scraping, crunching metal sound. Quickly making my way out the back door and around the side of the house I was met with a scene of destruction. Evidently a chipmunk seeking refugee from my hunting husky had gone up our downspout. My dog hates this small, lively and vocal member of the squirrel family! So much so that in trying to chomp the little critter she had crushed the end of our metal downspout with her strong jaws. She now sat amidst my flattened flower bed staring intently at the crumpled downspout. The incarcerated rodent loudly protested.

After using a drill to detach the mangled metal pipe piece I emptied the seemingly indignant but otherwise unaffected chipmunk onto the grass. As quick as lightning it zipped away. Victory to the chipmunk that, had it been any less tenacious of a creature, would surely have died of a heart attack over the whole ordeal.

I was surprised to learn that there are 25 different species of chipmunk in the world. Four of these species occupy all or parts of Wisconsin. The gray (or eastern) chipmunk can be found throughout our state primarily in woodland and urban environments. The Ohio chipmunk is found in far southern Wisconsin, and the peninsula chipmunk is found on the Door County peninsula. In the northern half of Wisconsin the least (or northern) chipmunk can be found in coniferous forests.

Chipmunks are generally solitary creatures coming together only in spring to mate. They do, however, connect with each other through their calls. When foraging if a chipmunk detects a predator it emits a warning noise. Naturalists have known about these warning sounds for decades but with new technology a surprisingly intricate communication network has been revealed.

Using tiny recorders attached to chipmunks, scientists have been able to make new observations about these small rodents. Their warning calls differ depending on the source of the threat—on the ground or in the air/canopy. They seem to recognize the chirping noise of each neighboring individual, with some apparently being deemed more reliable town criers than others. Scientists concluded that some individuals are more skittish and are apt to cry "wolf." These chipmunks are sometimes ignored, as neighboring individuals choose to conserve energy. When foraging under constant threat of predation, it pays to be intuitive in order to strike an energy balance between eating and being eaten.

Even though chipmunks are not social, this warning system makes evolutionary sense if you consider the life history of the chipmunk. Chipmunks start reproducing when they are a year old, living on average two to four years. After a gestation of around 30 days, they give birth in April to between two and eight pups. About the size of a bumblebee when born, the

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Chipmunks

pups are blind, naked and helpless. Growing quickly, they first emerge from the burrow at six weeks and strike out on their own at two months. Males disperse, but females remain near the maternal burrow, typically ranging over around half an acre of habitat. This means that neighboring individuals are likely kin, so chipmunks are warning family members of danger when vocalizing.

In the fall, chipmunks can be readily observed scurrying about exhibiting their famous swollen cheeks, an ancient evolutionary commitment to storing food. During the warm months these omnivores nosh on tubers, buds, fungus, fruits, frogs, worms and even bird eggs and hatchlings. As days become shorter they begin diligently collecting large amounts of seed and nuts for their winter cache. These provisions are transported back to their burrows in specially adapted internal cheek pouches that can stretch to three times larger than their head! One study found that a single chipmunk will accumulate eight pounds of food for its winter store. That's totally nuts!

Chipmunks are territorial and protect the openings of their expansive burrows. These can be 12+ feet in length, have several well-concealed entrances, and one or more sleeping areas that contain nests made from soft materials such as shredded leaves. Separate chambers in the burrow are used to store food, and to keep everything clean there is a room for nut shells and waste.

By mid-November chipmunks living in Wisconsin have retreated underground and don't emerge again until March. Much of their subterranean break is spent in a state of torpor, which is best described as an intermittent hibernation. Heart rate, temperature, breathing and brain activity drop dramatically; this cuts energy needs by 75%. Chipmunks wake sporadically but remain underground snacking on food stores, disposing of refuse, and sometimes making repairs to ensure entrances remain concealed.

Chipmunks are vulnerable when existing in torpor for long periods. Predators such as weasels can enter and kill them before they are able to rouse from this state. Their survival is therefore dependent on the quality of the food that has been stored. Research suggests that foods that are rich in fatty acids, such as sunflowers seeds, can dramatically reduce the time chipmunks need to spend in torpor. This in turn increases their chances of survival. Knowing this I am happy to see these entertaining creatures scampering beneath the bird feeders here at Ledge View at this time of the year, diligently collecting the fallen waste seed left by the birds.

Because of their proclivity towards storage instead of immediate consumption, chipmunks play an important role in seed dispersal in the forest ecosystem. They also aerate soils when digging burrows and help to distribute microorganisms that deliver nutrients to tree roots. Abandoned burrows can provide overwintering habitat for other animals such as snakes and toads.

On many occasions upon discovering seed and bulbs dug from my garden I have cursed chipmunks. I have, in the past, also aided my dog in her relentless pursuit of these striped marauders. Despite this I am now glad I did not follow my temptation to empty the downspout-imprisoned individual at my house into the eagerly awaiting jaws of my husky. At the time I could not do this out of regard for its steadfast determination of survival. Now I have a high level of respect for the chipmunk; its unique evolutionary adaptations, ecological roles, and perseverance. I love the ability that new knowledge has in changing our perceptions. I will take some time this fall to enjoy the amusing antics of this delightful little creature.■

Louise Marum is naturalist supervisor at Ledge View Nature Center, part of the Calumet County Parks Dept.

New snake enclosures at Ledge View Nature Center, made possible by a grant from the Richard Kampfer Memorial Fund.

Adult Lunch Programs

Enjoy a lunch of homemade soup and sandwich with coffee, and take in a lecture.
The program takes place at noon.

Please RSVP (920-849-1471) 3-4 days in advance, to help staff prepare for the luncheon.
$5 per person

Non-Mammal Milk Producers
Tues., Sept. 17

Mimics
Tues., Oct. 15

Primates
Tues., Nov. 19

Using Tech in Wildlife Conservation
Tues., Dec. 17

Birds
Tues., Jan. 21

World's Most Unusual
Tues., Feb.18

PUBLIC CAVE TOURS

Reservations
920-849-1471

Ledge View Nature Center has natural solution caves in dolostone.

All cave tours are led by a naturalist and include information on the geology, biology, and human history of the caves. The caves are cool; visitors should consider wearing long sleeves/pants/shoes (not sandals). Caves are accessed by stairs and ladders. Opportunities for exploring are provided. The more fun you have, the dirtier you get. When the caves are wet, "dirt" means mud. **Bring flashlight**. Cave tours usually last about two hours. No access to caves except on guided tour. Tour sizes are limited: please make a reservation.

Ledge View also accepts reservations for weekend and weekday private tours. Minimum charge is for 12 people; maximum group size depends on staff available.

Minors must be accompanied by supervising adult on all tours

Carolyn's Caverns Tour

Optional crawls.
Minimum age 5 years old.
$8 per person. Tour begins at 1 pm.

Sat., Sept. 14	Sat., Oct. 5	Sat., Nov. 2
Sun., Sept. 15	Sun., Oct. 6	Sun., Nov. 3
Sat., Sept. 21	Sat., Oct. 12	
Sun., Sept. 22	Sun., Oct. 13	
Sat., Sept. 28	Sat., Oct. 26	
Sun., Sept. 29	Sun., Oct. 27	

Carolyn's & Mothers Cave Tour

Minimum age 10 years old.
Mothers Cave is ALL CRAWLING.
$10 per person. Tour begins at 9 am.

Sat., Sept. 7	Sat., Oct. 12
Sat., Sept. 28	Sat., Oct. 26

A Friends of Ledge View Nature Center member remembers Dan Clausen

(FLVNC member Dan Clausen passed away 8-31.)

I knew Dan ever since he first joined our group. He was such a smart and versatile man, I never knew what all his interests were.

Dan always went on the crane count. He and Mary fed birds, and Dan knew how to identify the birds he saw. He loved doing the crane count and related in detail afterward all the interesting birds that he saw. I do not think however that formal bird-watching was something he did a lot of; but I actually don't know. I don't recall him going on any of the bird hikes that I led, for if he had I'm sure he'd have been a very active participant and asked a lot of questions. I think he was able to ID birds by himself and didn't need a guide. Sometimes he'd describe a bird that was different to me and ask what it was, but not often.

The Bike Tour was his baby from day one. He used to do much of the work himself from riding and laying-out routes, designing brochures and T-shirts and recruiting volunteers for all the jobs. He put a tremendous amount of effort into it. He volunteered for almost all of Ledge View's events. He must have had tremendous energy.

He was an artist in many respects. He did beautiful calligraphy and added it to all my drawings for bookmarks and designed other things with his beautiful script.

We served on the LVNC friends board (Then Calumet Nature Studies) together for years. He was treasurer after me. That was in a period of tremendous growth for LVNC when our income and outgo went into four and five digits instead of three as we undertook more projects. Dan did a wonderful job at that. Unlike many artistically endowed people, he was good at math, too.

We had social activities four times a year in those days. Dan and Mary and their three daughters were always there for Christmas parties, outdoor fun days, cookouts, and game nights. We were all young, full of big ideas, optimistic, healthy and active. Most of the members had young children, too. Pot luck dinners and picnics were popular with us, and we all baked desserts to sell at public events. We even cooked all the food for the Escarpment Bicycle Tours.

I do remember once when Dan got stuck in Mother's cave (at the choke), and he took a lot of ribbing for that. I think it inspired the contraption that Jean Haack built for people to test whether they could go through the choke hole.

Dan was always cheerful and full of fun whenever he came to any of our events and social occasions and even at board meetings. He lightened up any occasion. I miss him and we all will. ■

Left: A cyclist chats with Dan Clausen at the Escarpment Bike Tour. Right: Dave Gramling and Dan Clausen.

PHENOLOGY

Fall 2018

Sept. 16, 2018 – Purple New England asters full of green bees, honey bees, three kinds of bumble bees, sulfur butterflies, a late monarch, and flower flies. 2 pm 89F in the shade.
Sept. 19 – Afternoon rain. Brown leaves falling onto trails.
Sept. 20 – It is sunny, with blue skies.
Sept. 26 – In the 40sF early this morning.
Oct. 1 – Another overcast day in the 40s-low 50sF.
Oct. 3 – 3:20 pm 80F.
Oct. 4 – Saw a tagged bat in the caves.
Oct. 6 – First fallen leaves have patterned trails with green, yellow, brown, and black. A few red leaves. 3:30 58F, overcast.
Oct. 7 – Rain & 50F at 3 pm.
Oct. 8 – A lot of rain last night—caves are very wet. Warm, humid day with mosquitoes again.
Oct. 9 – Sunny 68F at 8 am. Lots of boxelder bugs all over the building in the sunshine. 83F at 1:30. The woods are yellow and green.
Oct. 11 – Windy, overcast 38F at 8 am. 43F at 3:30.
Oct. 13 – Frost last night.
Oct. 14 – Small flock of juncos spotted by the building this morning.
Oct. 15 – 8 am 32F. Very windy—leaves swirling in the wind.
Oct. 20 – Snow flurries this morning.
Oct. 25 – Sunny, up to 60F. Saw a small garter snake sunning itself in the weeds.
Oct. 28 – Rainy, gray day. Leaves fluttering out of the trees. Lawn and trails yellow with fallen leaves.
Oct. 29 – A bat flew into the cave while I was talking about bats—cool! Also found another tagged bat in the cave.
Nov. 2 – High 45F.
Nov. 4 – 3 pm 45F, rainy, windy.
Nov. 6 – Cold and wet 48F at 3 pm with rain off and on. Most of the leaves are down. Saw a long V of geese.
Nov. 9 – First snow on the ground.
Nov. 10 – Sunny 21F, breezy at 8 am. Lots of bird tracks in the thin snow cover.
Nov. 12 – Some snow still lingers. 25F at 8 am.
Nov. 13 – Clear and cold 18F at 8 am. Temp got up into the mid 20sF, but the breeze made it feel colder on exposed skin.
Nov. 14 – 8 am 16F.
Nov. 19 – Breezy 28F today.
Nov. 29 – Light snow falling, then fog.
Dec. 2 – Two inches of heavy slushy snow fell overnight.
Dec. 3 – There are about 2 to 3 inches of snow on the ground, full of squirrel and rabbit tracks. Branches and dead flower stalks are flocked with snow.
Dec. 4 – Icicles off the eaves glittering in the sun.
Dec. 9 – Sunny 22F at 2 pm. That snow is still on the ground.
Dec. 12 – Immature bald eagle spotted sitting in a tree right behind the nature center.
Dec. 13 – Hazy 42F at 1 pm. The snow is packy and twigs are water-beaded.
Dec. 14 – Foggy morning. The snow is crusty.

Fall Schedule

Lunch Program for Adults: Non-Mammal Milk Producers
Tues., Sept. 17, noon
Over soup and sandwich with coffee. Please RSVP a few days in advance. **$5 per person**

Raptor Program
Sat., Sept. 28, 2 pm
The Raptor Education Group of Antigo will bring some live birds of prey to show and talk about features unique to these birds. **By donation**

Mushrooms of Wisconsin
Sun., Sept. 29, 2 pm
Join Rob Zimmer for a look at dozens of the colorful, unusual and beautiful fungi of Wisconsin. You will learn all about some of our mushrooms and learn to identify many of the common, and not so common fungi found in our area, as well as which ones should be avoided, if gathering. Rob will also discuss ethical considerations regarding mushroom harvest. **By donation**

Fruit-Pressing
Sun., Oct. 6, 11 am-3 pm
Sun., Oct. 13, 11 am-3 pm
Bring a bushel of apples or pears, a friend to help you, and some jugs for the juice, and you may use Ledge View's fruit press. Limit one bushel per person, please. One bushel can make 2-3 gallons of juice. **$3**

Halloween Wreath Workshop
Sat., Oct. 5, 10 am
Make a witch's hat for your front door. All materials provided. Photo will be on Facebook. Limit 20 people for the workshop. Prepayment required. **$20**

Lunch Program for Adults: Mimics
Tues., Oct. 15, noon
Over soup and sandwich with coffee. Please RSVP a few days in advance. **$5 per person**

Halloween Candlelight Cave Tours
Fri., Oct. 18, 5:30-8:30 pm
Sat., Oct. 19, 4:30-8:30 pm
Enjoy a family-oriented evening visiting Ledge View's trails and caves by candlelight, and meet some unusual personalities with strange stories. Educational rather than scary. Minimum age five years old; minors must be accompanied by supervising adult. No strollers or pets. Wear old clothes—you may get dirty. Caves are accessed by stairs and ladders. Tour will depart every half hour, lasts ~ 1-1/2 hours. This event is a fundraiser. Tickets available at the door, first come, first served, and online at Eventbrite.

Tickets at the door: **$6 kids, $8 adults** (18 and older)
Tickets online at Eventbrite: **$8 kids, $10 adults** (18 and older)

Prairie Wildflower Seed Collecting
Sun., Oct. 20, 1 pm
Participants will collect seeds from a number of prairie wildflower species and learn how to prepare them for planting. **$5 per person**

Lunch Program for Adults: Primates
Tues., Nov. 19, noon
Over soup and sandwich with coffee. Please RSVP a few days in advance. **$5 per person**

Snowman Holiday Wreath
Sat., Nov. 16, 10 am
All materials provided. Photo will be on Facebook. Prepayment by Nov. 5, 2019. **$25**

Wineglass Painting
Sat., Nov. 23, 1 pm
Paint a glass wineglass to decorate your holiday table or commemorate a special event. Paint and wineglasses provided. Stencils and decals will be available, or bring your creativity to make your own design. Prepayment by Nov. 15, 2019. **$5 per wineglass**

Nature Ornaments
Sat., Dec. 7, 1 pm
Make as many nature ornaments as you like; materials will be provided. (Holiday wreaths will be in same room at same time.) **$4 per person**

Holiday Wreaths
Sat., Dec. 7, 1 pm
Wreath greens, pine cones, wire all provided. You bring a wreath frame, ribbon, wire cutter, and pruning shears, and we'll show you how to create your own holiday wreath. (Nature ornaments will be in same room at same time.) **$1 per inch** of outside frame diameter for wreath materials

Homemade Holiday Crafts
Sat., Dec. 14, 10 am
Please see Facebook for more information.

Lunch Program for Adults: Using Tech. in Wildlife Conservation
Tues., Dec. 17, noon
Over soup and sandwich with coffee. Please RSVP a few days in advance. **$5 per person**

Ledge View Nature Center
W2348 Short Rd.
Chilton, WI 53014

We welcome contributions from members for publication in Ledge View
Please submit to the editor by the fifteenth of February, May, August & November.
Editor: Staff, Ledge View Nature Center

❀ *Join Friends of Ledge View Nature Center* ❀

Friends of Ledge View Nature Center is a nonprofit support group for Ledge View Nature Center. Your membership and contributions will help enhance the facilities at Ledge View and promote environmental education. As a member, you receive the quarterly publication LEDGE VIEW and schedule of programs. There are also many volunteer opportunities. Get involved! Complete this form and send to: **Friends of Ledge View Nature Center, P.O. Box 54, Chilton, WI 53014.**

I am a: _____New member _____Renewing member

NAME_____

STREET_____

CITY _____STATE_____Zip_____

TELEPHONE_____DATE_____

E-MAIL (please print) _____

MEMBERSHIP RATES:
please check one

_____Student	**$10**
_____ **60+ Senior**	**$15**
_____Individual	**$20**
_____Family	**$30**
_____Organization	**$35**
_____Contributing	**$55**
_____Life	**$500**

Are you interested in being a volunteer for one of our special events? Or Would you like to serve on a committee, help with fund-raising, teach, or help with maintenance? Maybe you have a special ability you would like to share. If so, call the Nature Center (920) 849-7094 for more information.