To see a World in a Grain of Sand
And a Heaven in a Wild Flower
Hold Infinity in the Palm of your Hand
And Eternity in an Hour
-- from "Auguries of Innocence" by William Blake

Reading the opening stanzas of Blake's poem, I'm pretty sure he was talking about microbes at Cedar Creek. Start with sand. There is a lot of sand at Cedar Creek, thanks to its location on the Anoka Sand Plain. The worlds within a gram* of sand contain hundreds of millions or more microbial genomes—figuratively, infinity in the palm of your hand. In this infinity are microbes that provide nutrients for plant growth, cause plant diseases, suppress plant diseases, sequester carbon, decompose dead plants and animals, and produce hormones to alter plant growth dynamics. The long-term experiments at Cedar Creek provide outstanding platforms for studying the dynamics of plant and soil microbiomes and microbial genomes, and the factors that determine the functional capacities of native microbiomes. In my lab, we are especially interested in microbes that suppress plant pathogens and make healthier, more productive plants, and in the microbial and plant-microbe species interactions that mediate microbiome composition. Some recent research questions in our group include:

*Do plants select for microbes that can suppress plant pathogens or help plants grow better? In Dave Tilman’s Big Biodiversity experiment plots, we found that monocultures—where a single plant species is growing in the absence of competition from other species—have significantly more pathogen-suppressive soil bacterial populations than highly diverse, 16-species plant communities. Perhaps interspecies competition among plants limits the likelihood of plants investing in pathogen-suppressive soil bacteria that could end up benefiting their competitors!

*Are there connections between the aboveground and belowground microbial worlds? We altered fungal microbiomes on leaves using foliar (leaf-level) fungicides over 10 years in the Big Biodiversity experiment. We found that fungal communities in the soil differed significantly in plots treated with foliar fungicides when compared to control plots, and that the magnitude of the difference in fungal microbiomes was significantly correlated with differences in aboveground (continued on page 8)
Welcome Shealyn!

We are excited to welcome a new face to the Cedar Creek education team! For the next eleven months, we will have the pleasure of hosting our first-ever Minnesota GreenCorps member, Shealyn Elstein. Shealyn was born in North Carolina and graduated from North Carolina State University with a B.S in Environmental Science and a minor in Outdoor Leadership. After graduation, she spent time working as an intern with the National Park Service in southeast Utah, and then as an Education Coordinator at a local non-profit (Piedmont Wildlife Center) in her hometown in NC. Shealyn is excited to continue learning and growing as an environmental educator at Cedar Creek, and tells us that she is very curious to see how she fares through her first Minnesota winter!

This will be Cedar Creek’s first year participating, and our focus will be Community Readiness and Outreach.

Shealyn will be assisting in all aspects of our public programs, from developing and delivering K-12 programs to organizing community events. She will work closely with our education team, as well as with partners in the local schools, community and government. As she formalizes her personal project over the coming months, you can expect to see the rollout of new resources to communicate our science and to inspire meaningful environmental action in our community. In the shorter term, she’ll be leading some of our programs, including a winter tree ID class - come learn something new!

The Minnesota GreenCorps program is a statewide initiative, administered on behalf of AmeriCorps by the MN Pollution Control Agency. Its aim is to preserve and protect Minnesota’s environment while training a new generation of environmental professionals. The program has been running since 2009 and has placed more than 250 members at over 130 organizations across the state. Members serve at their host sites from October through the end of August.

We are thrilled to have someone with Shealyn’s background and interest joining the team and look forward to her many contributions to our community and programming. If you see her around the property, please make her feel welcome - and perhaps bring her an extra scarf or some hand-warmers once the weather starts really getting cold!

Coordinator’s Corner

Fall is, above all, a season of transitions. It might be 85° one day and 45° the next. Most of our summer birds are leaving for warmer wintering locations, and many of our resident wildlife are changing gears from the breeding season to something slower, quieter and more solitary. These transitions are happening on the human side of Cedar Creek as well: our buildings might be filled with researchers today and 3rd graders tomorrow. As the summer field season comes to a close, interns leave for other jobs and data and reports are submitted - but scientists also have a chance to dream about their next big question and begin writing proposals for next year’s work.

This week, many of our staff and scientists - myself included - are in sunny California for the triennial All Scientists Meeting. Every three years, scientists from around the Long-Term Ecological Research network gather to share data and ideas, connect with collaborators, and envision the next steps we can take as a community. This year, the Cedar Creek contingent will also be celebrating a personal transition - we have been recommended to receive another six years of National Science Foundation funding, under the new leadership of principal investigators Sarah Hobbie and Eric Seabloom. Having the opportunity to celebrate this continued support of our work with the larger ecological community is a treat!

I hope you’ll enjoy reading about this and other news from Cedar Creek in this fall’s newsletter, with either a cold glass of lemonade or a hot cup of tea - an important fall transition in my life!

Sincerely,
Dr. Caitlin Barale Potter
612-301-2602, caitlin@umn.edu
NSF Renews Funding For Long-Term Research

by Stephanie Xenos, Director of Communications and Marketing for the College of Biological Sciences

Cedar Creek Ecosystem Science Reserve is home to some of the longest running ecological experiments in the world. Researchers draw on the long-term data from these experiments in grasslands, savannas and forests to understand and forecast how human-driven environmental changes will alter the earth’s ecosystems and the ability of ecosystems to provide the services that support human well-being. Key to these efforts is sustained funding.

The National Science Foundation (NSF) recently recommended renewal of funding for long-term research at Cedar Creek for another six-year term, setting the stage for the continuation of longstanding experiments as well as the addition of new studies. This funding is part of NSF’s Long Term Ecological Research (LTER) program, which has provided continuous support for Cedar Creek research since 1982. Using the new NSF funds, project co-leaders Eric Seabloom and Sarah Hobbie along with other researchers at the station will continue work on decades-long studies including the longest-running biodiversity and elevated CO2 experiments in the world, and some of the world’s longest-running studies of nutrient enrichment and fire frequency. At the same time, a number of new initiatives will get the green light. New research projects will:

- Use long-term experimental data to predict the effects of climate change and other human impacts on ecosystems.
- Enhance long-term biodiversity experiments to determine the interactive effects of drought, nutrients, warming, and biodiversity on ecosystem processes and stability.
- Develop and test models that predict how ecosystems recover from chronic nitrogen enrichment.
- Test hypotheses about how fire disturbance and consumers such as bison interact to restructure and alter the functioning of grassland, savanna, and forest ecosystems.

Cedar Creek LTER Co-Director Dr. Sarah Hobbie notes that the renewed funding will allow researchers to continue to explore new directions using the existing experiments. “Experiments will continue with things layered onto them … The bison experiment that launched this summer in the oak savanna was actually layered on top of the longest-running experiment at Cedar Creek, a fire frequency study established in 1964,” says Hobbie. “Forest Isbell is interested in how we can use bison to promote oak regeneration in savannas that experience frequent fire.” Isbell is the associate director of Cedar Creek and an assistant professor in the Department of Ecology, Evolution and Behavior.

The long-term support of UMN and NSF has helped Cedar Creek to become one of the most renowned ecological research sites in the world, and has led to the training of hundreds of students and novel scientific discoveries.
Savanna Soap Opera II: Notes from the Red-headed Woodpecker Citizen Scientists

The Red-headed Woodpecker Recovery Project is a community-driven research initiative investigating the habitat, behavior, and conservation of red-headed woodpeckers (RHWO). As you may recall from previous editions of Field Notes, RHWOs rely on the oak savanna ecosystem and have experienced substantial population declines in recent years. Our work learning more about them is always an adventure, as little is known about the basic biology and patterns of this species! We hope you enjoy these reports of interesting behavior from our citizen scientists and research team.

From citizen scientist Siah St. Clair: [I] thought you might like to see these pictures of this encounter between a red-headed woodpecker and a pileated woodpecker. This looks like a hatchyear male pileated, and he definitely under-rated the tenacity of the RHWO to defend his territory against any and all interlopers. I am guessing it was a male RHWO as it was drumming on a couple of trees all morning. It is not too hard to see the substantial size difference between these two species of woodpecker. The picture on the top right sort of says it all. The Pileated has an expression of surprise on his face, and looks like he is thinking, "Really, this little pipsqueak thinks he is going to chase me away?!" The RHWO looks like he is getting the worst of it with the Pileated spearing his belly with his beak in one picture, but the RHWO would not back off and stood his ground (or tree) and was definitely the aggressor, and a couple of seconds later the Pileated was the one to leave! I don’t get to see something like this every day. And am glad I was able to get some pictures of it.

Follow the work of the woodpecker team at rhworesearch.org and redheadrecovery.org
25 Years of Field Trips to Cedar Creek

by Bill Capman, Associate Professor of Biology at Augsburg University

When my family and I moved from Champaign-Urbana, Illinois to Minneapolis in 1994 for me to start teaching in the biology department at Augsburg College (now called Augsburg University) I left behind all my favorite natural areas to take ecology students to on field trips. The wonderful tallgrass prairie remnants in pioneer cemeteries, the wonderful patches of forest (with massive old trees) that were great for studying canopy tree replacement dynamics, the Indiana dunes, and other favorite places were all now 400–500 miles away. One of my first tasks upon arrival was to find good natural areas in the Minneapolis area. From the very start it was clear that Cedar Creek Ecosystem Science Reserve was a special place that deserved my attention.

The first time I visited Cedar Creek was in the spring, and I was blown away by the diversity of habitats, the plant diversity, and the wide variety of frogs and toads singing in the various bodies of water. The oak savannas (especially the Helen Alison Savanna just to the south) were remarkably similar to the Miller Dunes area near Gary, Indiana where I had done extensive fieldwork while in college. Yes, there were northern pin oaks instead of black oaks, and some of the other plants were different, but overall I really felt at home. And the walk to Crone’s Knoll through the white cedars and then down the boardwalk into “Lindeman’s Bog” was magical. I knew immediately that I was going to have to bring my students to this place.

This October will be my 25th time bringing students to Cedar Creek. Our routine has been to first visit the Alison Savanna just to the south to talk about glacial history, and to compare how plant communities develop very differently here in this extremely sandy soil compared to, say Wolsfeld Woods in Long Lake, MN, which we visit the week before. We then drive up to the Cedar Creek headquarters and walk over to Crone’s Knoll and Cedar Bog Lake and get to know the plant species there a bit before running a long transect from the lake to one of the big white pines at the top of Crone’s Knoll, with students estimating plant cover for the different species at frequent intervals (totally non-destructive, non-invasive data collection without anyone leaving the trail or boardwalk). I tell my students that this is about looking at the old question of whether communities are tight integrated units vs. “coincidences of species”; but the bigger goals really are to get them thinking about sampling methods, and more importantly, to look really closely at the fine textured diversity in natural plant communities, and to see how plant communities can change rapidly along environmental gradients over short distances. After compiling and discussing our data, we wrap things up with a visit to the beautiful bog at Beckman Lake. We see the wonderful diversity there: the sphagnum moss, the carnivorous plants, the almost alien looking black spruce, the cranberries, the cottongrass and other sedges, and more. We talk about specialized adaptations to acidic low nutrient conditions, we talk some more about glacial history and how plant communities have changed since the retreat of the ice, and we talk about how species otherwise found in arctic tundra such as cottongrass ended up in a bog in Minnesota. And a highlight of course is seeing how walking along the boardwalk can cause nearby trees to shake!

For a number of years, my former student Jared Trost also gave us tours of the BioCON global change project, which was an opportunity for my students to see big science taking place. And if we are lucky, we might see red headed woodpeckers in the savanna areas, or pileated woodpeckers on Crone’s Knoll.

We spend a full day at Cedar Creek each fall, and this is the high point of my ecology course. Amazingly, we’ve only had rain a small handful of times (but students have taken the rain in stride), and more often than not we’ve had beautiful pleasant fall weather. Regardless of the condition, students always go home invigorated and enthusiastic about all they have seen and experienced.

As anyone reading this newsletter surely already knows, Cedar Creek is a beautiful, special place. I feel very lucky to have this amazing natural area at our disposal, and very grateful to the various Cedar Creek staff members who have welcomed us and facilitated these visits over the years.
An Avian Photo Album


Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it’s the only thing that ever has.

As much as I have seen this quote by anthropologist Margaret Mead on t-shirts, bumper stickers, fundraising appeals, etc., I can’t come up with better words to describe the dedicated staff and volunteers of the Red-headed Woodpecker Recovery Project at the Cedar Creek. They are all making a diligent and heartfelt effort to “change the world” on behalf of the red-headed woodpecker. I am privileged to be a part of the volunteer team studying these birds and look forward to every opportunity with fellow volunteer to partake in the observation and photographing of the birds in the oak savanna and the great variety of life that is present throughout this jewel of a preserve.

These pictures are a handful of the thousands I have taken of birds at Cedar Creek, including a few of the 30 warbler species that have been observed onsite. Enjoy!
A Confusion of Warblers

Blackburnian Warbler

Palm Warbler

Blue-winged Warbler

Magnolia Warbler

Black and white Warbler

Yellow Warbler

Tennessee Warbler

Take yourself for a birding adventure on the Fish Lake Nature Trail!
An Ode to Soil Microbes

(productivity between fungicide-treated and control plots. This suggests that foliar fungi mediate shifts in soil microbiomes specifically through their negative impacts on plant productivity. My lab is exploring functional shifts in soil microbiomes as well: do plants that are under stress from aboveground pathogens create pathogen- or stress-protective soil microbiomes? And, back to Blake….what about the flowers (heaven in a wild flower)? Our results also show that reducing fungal populations on leaves can result in a mid-season rebloom of lupines (heaven)!

Blake closes with eternity, a big word. But by using genomic, transcriptomic, and metabolomic data on Cedar Creek microbes we are literally able to capture the eternity of accumulated evolution within these populations. Specifically, in partnership with the Department of Energy’s Joint Genome Institute, we are studying whole-genome sequences among bacteria from diverse Cedar Creek experiments, and asking questions such as: What genes or traits are conserved across distinct habitats or treatment conditions at Cedar Creek? Are habitat and niche evident in the genomes of our bacteria? Using metatranscriptomic and metabolomic analyses of sympatric bacterial and fungal populations, we are characterizing ways in which communities of microbes are functionally different from individual populations. These data will give us insight into the ways in which coevolution (eternity in an hour) has crafted microbiomes to accomplish collectively what individual microbes cannot or do not achieve on their own, and the potential implications of these collective functions for plant health and productivity.

In closing, while we’re pretty sure that Blake never visited Cedar Creek, our lab is inspired by his words as we seek to collectively accomplish big things in microbial ecology every day.

Linda Kinkel and current team: Lindsey Hanson, JP Dundore-Arias, Sarah Castle, Miriam Newton, Matt Pereyra, Mariah Dorner, Wendy Hughes, Nick Wornson, Matt Michalska-Smith, Molly Kuhs, and Max Zaret.

Dr. Kinkel in the field at Cedar Creek with her 2018 sampling team.
The Cedar Creek Wildlife Survey is a citizen science project started in summer 2016 in cooperation with Jonathan Poppele and the Minnesota Wildlife Tracking Project (www.mntracking.org). The goal of the project is to connect participants with nature and the world around them, survey the diversity of wildlife on the Cedar Creek property, and provide Cedar Creek scientists with valuable data about our wildlife. Surveys take place once a season, with other events and tracking classes scattered throughout the year. You do not need prior tracking experience to participate – come learn this new skill as you put it to use on Cedar Creek’s sand roads during a seasonal survey! Our winter survey will be on January 26th, 2019. In the meantime, we hope you enjoy this report of our summer survey from co-founder Jonathan Poppele.

From Jonathan Poppele, Director of the Minnesota Tracking Project and co-founder of the Cedar Creek Wildlife Survey: On Sunday, July 15th, our group of 15 trackers and naturalists headed out onto the sand roads of the Cedar Creek Ecosystem Science Reserve to look for signs of mammals and other wildlife on the property.

We divided ourselves into three teams for the survey. One team headed to the area just west of the new bison enclosure—a part of the reserve that we have explored very little in our past surveys. Another team began in the North Unit, following the internal road south, then returned to the area around the Lindeman Center. The third team also ventured into the North Unit, continuing north on the internal road.

Our southwestern team began its survey along East Bethel Boulevard, just outside the bison enclosure. East Bethel Blvd proved to be an excellent tracking area, and was filled with bird tracks. The team got some good practice identifying bird tracks, and was able to distinguish the prints of blue jay, sandhill crane, American robin, and mourning dove. Heading into the woods west of the bison enclosure, the team found surprisingly few tracks. They identified prints from domestic cats and domestic dogs—both common on the reserve—along with raccoon, deer and a few small mammals. Conspicuously absent were wild canine tracks. In addition to the dog tracks, the team found one other canine trail, but could not say with certainty whether it was a fox or coyote trail—or even the trail of another domestic dog. The absence of coyote sign, in particular, came as a surprise.

The teams that headed to the North Unit found a great many more canine tracks—though again, no prints they could positively identify as coyote. At the beginning of the survey, just outside the gate, the second team found a large set of canine prints. The tracks had a number of wolf-like characteristics, but did not look like the prints of the wolf our group has been tracking in the North Unit for the past year. Could these be the tracks of a different wolf? Or are they simply the tracks of a large domestic dog? Opinions were split within the group. Inside the gate, the team found a great many fox tracks. Red fox appeared to be moving comfortably in the open and along the roads. Meanwhile, the deer seemed to keep off the roads in the open -- only following along the roads in the cover of the forest -- and there were no signs of coyote in the area. This pattern of abundant fox tracks, no coyote, and wary deer is consistent with what we have seen when wolves are active in the area. And the third team did, indeed, turn up fresh wolf tracks.

As they continued heading north, the third team identified a set of fresh wolf tracks. Like the tracks spotted outside the gate, these prints appeared to be larger than the wolf tracks we had been seeing in our surveys for the past year. Some members of the team also thought they were seeing (continued on page 11)
Cedar Creek: Eyes on the Wild

by Meredith Palmer and Caitlin Potter, Cedar Creek scientists studying wildlife behavior via remote cameras.

Learn more about your chance to be a part of a brand-new wildlife research project going on at Cedar Creek Ecosystem Science Reserve!

Researchers at Cedar Creek are taking a step into unknown territory: for decades, scientists have rigorously monitored, manipulated, and experimented with the incredible plant diversity within Cedar Creek’s grassland and forest ecosystems. Carbon has been measured, nitrogen flux quantified, seedlings meticulously counted. From this incredible body of work, we have discovered some amazing things about the functioning of the natural world. But what about the animals??

Cedar Creek, in addition to being home to hundreds of long-term plant and soil biodiversity projects, is also an incredible and active community of animal life. Rodents are stealing seeds, deer are chowing down on grasses, and recently, wolves and other predators are returning to this ecosystem. All of these interactions structure the natural functioning of this community in ways that have yet to be explored. To understand how these animals might effect ecosystem dynamics, researchers have recently deployed a vast network of trail cameras across Cedar Creek’s 5600 acre property. These cameras are triggered by motion and body heat to take pictures whenever wildlife pass in front of the cameras, providing a peek into the secret lives of these animals. The research team has set up over a hundred cameras in all types of habitats, and have already captured high-resolution data on the movement and activity patterns of over a dozen species, including wolves, foxes, coyotes, deer, and turkeys. These data will be paired with Cedar Creek’s extensive collection of data plant and soil dynamics to study how predators structure ecological communities.

To successfully complete this project, we need your help! Each of these 100+ cameras generates thousands of images each month – more than the team can go through on our own. We desperately need assistance classifying the overwhelming amount of data that is pouring in. Our scientists need to know what kinds of animals are in each image, how many of them there are, and what these animals are up to. To that end, we are in the beta testing phase of a new, online citizen science project called “Cedar Creek: Eyes on the Wild” and we will be counting on YOU to help us identify animals once we officially launch later this year. Don’t worry if you aren’t familiar with each and every species that may be found in Cedar Creek - the Eyes on the Wild interface will walk you through how to select different animals based on different characteristics that you might see in the pictures. Even if you don’t recognize the species, every classification helps! With many eyes looking at each photo, getting the identification ‘wrong’ is not a problem.

This project is also a wonderful opportunity to learn about the diversity of animals in Minnesota. You’re guaranteed to come away with a new appreciation for our state’s wildlife and to learn something you didn’t already know about a species you love. We also invite you to stay up-to-date on what our trail cam researchers are doing by joining in the discussion on our discussion boards, blog, and Facebook page. And the best part is, you can take part in this ground-breaking research initiative without ever leaving your couch. Invite your kids to join you! Invite your grandparents! We look forward to having your help with this exciting new project.
We invite you to join us on our winter survey, which is scheduled to take place on January 26th (cross fingers for good weather!). Come join us as we explore these and many other questions and deepen our connection with this special landscape. You can also follow along with our project on iNaturalist: www.inaturalist.org/projects/cedar-creek-wildlife-survey.

As always, our entire group enjoyed a rich day in the field. We answered a few questions, and generated many more. Has a new wolf arrived at Cedar Creek? If so, has it displaced or joined the wolf we have been following for the past year? Where are the coyotes? While we were not surprised to find them scarce in the North Unit, given the apparent wolf activity there, we did expect to see signs of them in the southern part of the property, near East Bethel Boulevard. Have they moved in with the bison? Headed across the road into the surrounding neighborhoods? Or are they just staying off the roads? These are questions we investigated without much luck at our fall survey, and which continue to lead to additional paths of inquiry.

Field Season Wrap-up

Cedar Creek's 2018 summer interns spent much of the field season clipping vegetation, drying it, and sorting it to species. This allows researchers to accurately and precisely measure productivity in our many long-term experiments, providing insight about the effects of variables like carbon dioxide, fertilizer, biodiversity, water, fire and other environmental influences on plant growth. Just how much vegetation was clipped and sorted this year? If you laid it the clipped strips end to end, 4.5 MILES!! Of course, the strips are only 6 inches wide - but that's still just enough vegetation to make a grass/forb/legume road from the big research fields to the new brewery in Bethel to celebrate! Next time you're out, raise a glass to our hardworking intern crews and their fearless leaders/Cedar Creek research coordinators Kally Worm and Troy Mielke!
Caught on Camera!

5th graders from St. Francis Elementary investigate the Harstaad insect collection

Black bear tracks after the rain

Carnivorous pitcher plants in bloom

Fall in the peat bog

Cedar Creek Wildlife Survey participants construct tracking plates for the fall survey

Downed trees, Crone’s Knoll

Katie Schroeder collecting data in BigBio

Water lillies on Fish Lake

Send your photos to Caitlin (caitlin@umn.edu) for inclusion in a future edition of Field Notes!
Caught on Camera!

Summer interns assist with data collection in BigBio

Puddle detail

Leaf detail on the Fish Lake Nature Trail

Photography workshop participants photograph the ecology of the Beckman Lake peat bog

Perching red squirrel

Bee expert Pam shows a marked bumblebee on our bee survey

Juvenile red-headed woodpecker caching acorns

Mid-summer on the oak savanna

Send your photos to Caitlin (caitlin@umn.edu) for inclusion in a future edition of Field Notes!
Upcoming Events

October 4th, 5-9pm: East Bethel Fire Station Open House (OFFSITE):
Drop by the fire station in East Bethel (2751 Viking Blvd) to meet neighbors and community organizations. Cedar Creek will have a table and we’d love to say hi! (free, families welcome)

October 7th, 1-3pm: Where Did the Bison Roam? Grazers, Browsers, and Savanna Plants.
Enjoy a brisk fall hike through the oak savanna at Cedar Creek with botanist Barb Delaney. We’ll look at different areas within the bison enclosure to see what was eaten and what was not. Meet at the Fish Lake Nature Trail parking area at 12:45 then begin our hike to the gate on Durant Street. (A few cars can park at the gate to lessen walk). Autumn is a beautiful time to see what grew in the savanna uplands and wetlands. This year is unique. The bison had a major impact on the plant life. We'll compare inside and outside the fence. And, as always, Barb will highlight some of her favorite areas of plant diversity in the wet swales and dry sand prairie. Rain or shine. SPACE LIMITED; RSVP REQUIRED. email Caitlin (caitlin@umn.edu) to RSVP. ($10 cash, adults recommended)

October 12th - 14th: Minnesota Phenology Network annual gathering:
The Minnesota Phenology Network invites you to join them for a weekend of community and information-sharing! MnPN is group of citizen scientists, researchers, educators, and enthusiastic Minnesotans with a general interest in learning about nature and particular interest in phenology (the study of seasonal cycles in plant and animal timing). We gather each year to share our thoughts and findings from the year, and learn from each other and experts in the field. There’s always plenty to learn for both novice naturalists to expert researchers! The gathering at Cedar Creek will include a mix of interesting walks, workshops, keynote presentations and a BioBlitz. Registration, schedule and details online at mnpn.usanpn.org/node/111. REGISTRATION REQUIRED. (fee to attend, adults recommended)

October 16th, 12pm - 1pm: An Update on Minnesota’s Deer Management Plan:
Join your neighbors at Cedar Creek for a live broadcast of this month’s Sustainable Forests Education Cooperative webinar, part a monthly seminar series put on by the U of M Extension and the U of M Department of Forest Resources. The webinar will be shown live in the Lindeman Research and Discovery Center conference room. October’s speaker is Leslie McInenly from the Minnesota DNR. Bring your lunch. More details will be available on the Facebook page and at z.umn.edu/18web leading up to the event. (free, adults recommended)

October 17th, 6pm - 7:30pm: Nature Talk with Cedar Creek: Red-headed Woodpeckers (OFFSITE; Johnsville Library):
Long-time volunteer and ornithologist Jim Howitz will present a low-key lecture about our community-driven research into the red-headed woodpecker, a species of special concern in Minnesota. The presentation is part of joint programming offered with the Anoka County Library system and will take place at the Johnsville Library in Blaine. (free, adults recommended)

Additional events will be listed on Facebook and the Cedar Creek website.
Upcoming Events

**October 20th, 10am - 11:30am: RHWO End-of-Season celebration:** Volunteers and citizen scientists on the Red-headed Woodpecker Recovery Project are invited to join lead researchers and fellow volunteers for an end-of-field-season wrap-up and celebration. Dr. Elena West will speak about this year’s work and preview next year’s projects. (free)

**October 20th, 9am - 3pm: Volunteer Workday at Helen Allison Savanna:** Join Cedar Creek naturalists and volunteers at the Allison Savanna Scientific and Natural Area as they work to enhance the oak savanna by helping to reduce shrubby species that have run amuck. The Allison Savanna site is just south of Fish Lake and the bison enclosure. This workday will give you a chance to directly contribute to savanna conservation! Please RSVP rgauger@tnc.org. Details on page 18. (free, ages 10+)

**October 24th, 6:30 - 8pm: Ecology Book Club at Cedar Creek:** The Ecology Book Club meets on the 4th Wednesday of each month at Cedar Creek. October's book is A Love Affair With Birds by Sue Leaf. Join us for a provocative discussion! No need to have finished the book to join in and no science background necessary. Questions? Email cedarcreekbookclub@gmail.com (link sends e-mail) or visit our facebook page. (free, adults recommended)

**November 3rd, 10am - 11am: Native Seed Saving and Propagation:** Interested in learning new techniques for your native garden? Pam Frink, horticulturalist and founder of the White Bear Lake Seed Library, will share her knowledge about how to save and grow native seeds at home. Please note: this is not a seed collection event, although information will be provided about how and where to get native seeds. (free, families welcome)

**November 6th, 2:30pm - 4pm: How to Identify Trees in Winter:** Join Shealyn Elstein, Cedar Creek’s new GreenCorps member, for a fun-filled afternoon of tree identification! Come prepared to work inside and out to learn about our local trees and how to tell them apart after their leaves have fallen. (free, families, welcome)

**November 14th, 6:30pm - 7pm: Nature Talk with Cedar Creek: From Monkeys to Minnesota (OFFSITE; St. Francis Library):** Education coordinator Caitlin Barale Potter will give a photo-heavy lecture about her Ph.D research on geladas, an unusual primate found in Ethiopia, and how her field work connects to her job here in Minnesota. The presentation is part of joint programming offered with the Anoka County Library system and will take place at the St Francis Library. (free, adults recommended)

**November 20th, 12 - 1pm: Forest Inventory with LiDAR: Minnesota’s Approach:** Join your neighbors for a live broadcast of this month’s Sustainable Forests Education Cooperative webinar, part a monthly series put on by the U of M Extension and the U of M Department of Forest Resources. The webinar will be shown live in the Lindeman Research and Discovery Center conference room. November’s speaker is Dennis Kepler from the Minnesota DNR. More details will be available on the Facebook page and at z.umn.edu/18web leading up to the event. (free, adults recommended)

Let us know if you can attend by contacting Caitlin at caitlin@umn.edu or 612-301-2602
Upcoming Events

November 28th, 6:30 - 8pm: Ecology Book Club at Cedar Creek: The Ecology Book Club meets on the 4th Wednesday of each month at Cedar Creek. Our November meeting will discuss "Climate: A New Story" by Charles Eisenstein. No need to have finished the book to join in and no science background necessary. Questions? Email cedarcreekbookclub@gmail.com or visit our facebook page. (free, adults recommended)

December 1st: Minnesota Ornithological Union Paper Session (OFFSITE). Interested in learning more about bird research taking place across Minnesota, including at Cedar Creek? Attend this annual event at the U of M's Northstar Ballroom for talks, poster sessions and lots and lots of fellow bird nerds! Make sure to stop by the Red-headed Woodpecker Recovery Project table to say hi! More information and registration details on the MOU facebook page. (fee, adults recommended)

December 15th, 5:30pm - 8:30pm: Discovery Dinner: Bison and Savanna Research in East Bethel (OFFSITE; Springbrook Nature Center) Springbrook Discovery Dinners pair lively education programs with a catered dinner for the perfect night out! Join education coordinator Caitlin Potter for a lecture on the oak savanna research being conducted at Cedar Creek. She'll discuss historic and current work on savanna ecosystems, including work involving prescribed burning, bison grazing and citizen science. More details and reservation information available at springbrooknaturecenter.org/821/Discovery-Dinners. RESERVATIONS REQUIRED - ticket includes catered dinner. ($25, adults recommended)

December 17th: Annual Christmas Bird Count. 2018 is Audubon's 119th Christmas Bird Count, and we're excited to have Cedar Creek involved once again! Christmas Bird Counts have taken place on the property since 1945. Join fellow birders to count birds on designated routes across the Reserve and neighboring areas. SPACE IS LIMITED; PLEASE RSVP TO STEVE at sweston2@comcast.net (free, adults recommended)

December 18th, 12pm - 1pm: A Fisheries Perspective on Timber Sale Design: Join your neighbors at Cedar Creek for a live broadcast of this month’s Sustainable Forests Education Cooperative webinar, part a monthly seminar series put on by the U of M Extension and the U of M Department of Forest Resources. The webinar will be shown live in the Lindeman Research and Discovery Center conference room. December's speaker is Jeff Tillma from the Minnesota DNR-Fisheries. Bring your lunch. More details will be available on the Facebook page and at z.umn.edu/18web leading up to the event. (free, adults recommended)

Additional events will be listed on Facebook and the Cedar Creek website.
Cedar Creek Ecosystem Science Reserve is synonymous with ecosystem ecology -- and for good reason. Since 1942, Cedar Creek has played a critical role in advancing our understanding of how we are affecting the environment and how we might protect it.

The unique convergence of Minnesota's biomes and our world-famous long-term research make Cedar Creek Ecosystem Science Reserve a place unlike any other. It's why researchers and graduate students come here from around the world -- and keep coming back. Cedar Creek also offers the public a unique opportunity to both learn about and experience these ecosystems first hand. Each year, thousands of children have their first hands-on encounter with ecology here.

Be part of this incredible legacy by becoming a member! Choose to have your membership gift support research (including opportunities for young scientists), education and community programming, or conservation and restoration of threatened ecosystems, or contribute to the general membership fund and we will use your dollars where the near is greatest.

Enjoy member benefits that keep you connected to Cedar Creek Ecosystem Science Reserve. Memberships are annual. Contributions are 100% tax deductible.

$25 level: Cedar Creek’s quarterly newsletter “Field Notes” and an invitation to an annual members-only event.

$50 level: all of the above, plus discounts on fee-based outreach programs and a set of Cedar Creek greeting cards.

$150 level: all of the above, plus a personal staff-led tour of Cedar Creek.

$3000+ level: Lifetime Members receive all of the above, in perpetuity.

Join online at z.umn.edu/cedarcreekmembership or pick up a membership brochure onsite!
Do You Want To Help Save A Globally Rare Ecosystem?

Join us at the Helen Allison Savanna SNA as we work to enhance the oak savanna by helping to reduce shrubby species that have run amuck. Please RSVP rgauger@tnc.org.

When: Saturday October 20th 9am-3pm
Where: 229th Ave NE, East Bethel, MN 55005

Please bring appropriate work clothes, sturdy shoes, a water bottle, lunch/snacks, work gloves, sunglasses/safety glasses.

Parking Locations: South side of the road of the cul-de-sac of 226th Ln NE and the roadside shoulder of Durant St. (north of 229th Ave.) Please pull as far off the road as possible.

Google map link: https://goo.gl/maps/fU8gxmLM9bS2