

Natural Lands News

The mission of the St. Olaf Natural Lands is to promote education, conservation, and recreation in our local ecosystems.

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Don Nelson and Students at the Shed

Natural Lands Gift

Don Nelson, one of the major donors to the Natural Lands Endowment, made an additional gift enabling us to increase the Natural Lands Manager position from half-time to full-time in March 2019. Nic Nelson continues in this position and can now much better plan for seasonal needs and work with students. This endowment gift also allows us to support two students for summer research on the St. Olaf organic farm, STOGROW. In addition, we received funds to be used for directly for needed supplies for management. We bought a shed for storage and work space, a newer truck and two all-electric side by side utility terrain vehicles (UTVs). Much of the work on the Natural Lands can be done using the electric vehicles which will lessen the carbon footprint of management and increase productivity. The UTVs, one equipped with a gas-powered water pump, will bring modern tools and techniques to the management of prairie burns. They will also help in training student workers and preparing them for potential careers in land management.

Contributors to this newsletter include Diane Angell, Matt Hallahan, Katie Hoffman, Megan Kartheiser, Kirsten Koerth '19, Andrew Larson '19, Braden Pohl, Nic Nelson, Nick Partington '19, Poonam Rawat, Kathy Shea.



Prairie Burns Spring and Summer 2019

Yellow burn suits protected faculty, staff and students managing the burn

During the past year we had several prescribed burns on the prairie in order to mimic the historical fire regime that helps to maintain prairie ecosystems. Without fires the trees would invade, and all too soon the prairie would be a savannah, and a couple of decades later a woodland. They also play an important role in the balance between grasses like big and little bluestem and legumes. The grasses, with deep roots, spring up immediately after fires, while in areas where it has been a while since a burn, the legumes predominate to a greater degree. When, the summer is

wetter (like this year), the grasses grow more, and there is more fuel for the fires! Various sections of the prairie are burned in a cycle every few years, but the weather has to be just right in order for the burn to work. Nic Nelson, the Natural Lands Manager, leads a burn on the ground. Before starting, we obtain permits from the Minnesota Department of Natural Resources and notify the local fire department. Firebreaks are created around the edges. We start the fire at

the leeward side of the burn area and light new sections on fire as we work our way into the wind. If we started on the windward side, the wind would push the fire into new fuel, and the entire patch of prairie could burn in one uncontrolled fire. A number of land techs help out by standing by the firebreaks, at the ready with water to keep things from getting out of hand. An hour or two later, the whole area is scorched black and lifeless, but not for long. It's quite exciting to return over the course of the next week and see thousands of little green shoots being sent up, heralds of the verdant growth to come.

Seed Collection

Students Bradon Pohl and David Howard worked as natural lands technicians with Nic Nelson, Natural Lands Manager. They have learned and implemented dozens of invasive management techniques, from shearing off the flowers of reed canary grass to cutting and stump-treating buckthorn trees. Most of what they do to remove invasive species is tough work, but the effort that goes into physically removing the invasive plants pays off when the natives they plant grow back instead of the invasive species. In order to have native seeds to plant, students collect seed from existing habitat and store the seed in the blue bins (see photo to right). Seed collection is a great way to learn about plants – for example, going through long clumps of Canadian wild ginger (*Asarum canadense*) to find tiny red flowers helps to understand a plant's growth pattern and preferences. What other plants does it grow by? How much sun does it like? Does it grow in dense patches or is it scattered throughout? By touching and searching each species one develops a sense of the minutiae that defines each plant. Collecting local seed helps you learn about the plants and will provide seed for areas that lack the diversity of our local flora.



Research in the Natural Lands



Rusty-patched Bumble Bee (left)
and Students Surveying Baseball
Pond (below)

Bumblebees

Professor Diane Angell (Biology, Environmental Studies) and student, Izzy Istephenous, surveyed bumble bees on St. Olaf's Natural Lands, Carleton's Arboretum and remnant prairies in the area. Bumble bees are declining nationally as well as in Minnesota. Bumble bees are our biggest and most efficient native pollinators and improve the pollination of many of the fruits and vegetables as well as the diverse native flowering species that inhabit our prairies and woodlands. Soon after the rusty-patched was declared a federally endangered species, this very rare bumble bee was found at St. Olaf and around Northfield. This spring the rusty-patched was declared the official State Bee of Minnesota!

We are working to determine the species of bumble bees that are living in the area as well as what flowers they are using for nectar and pollen gathering. Five years ago, when we first surveyed these prairies, we used nets to capture bees and identified species by placing them in small jars to observe them closely. This involved some skill and effort. Today we are taking advantage of the powerful technology most of us carry in our pockets. Rather than capturing bees we are using

our phones to take short videos. When we get back to the lab we view the video clips to identify species while also noting what flowers they are visiting. We are also using and publicizing the use of Bumble Bee Watch (<https://www.bumblebeewatch.org/>). This website invites citizens to submit their own photos of bumble bees so that identification experts can then review and confirm species. Consider joining us by logging on and adding your own photos. If you choose to submit please choose our "Project" in the drop down menu -Northfield Bumble Bee Count (St. Olaf). Feel free to choose this project even if you are not in Northfield so we can get credit for your observations! Also consider visiting our website (<https://pages.stolaf.edu/bumblebee/>) to track our progress and for more information and instructions on taking photos. While our surveys are not quite complete, we have taken pictures of more than 500 individual bumble bees and identified 10 different species. Happy Bumble Bee Hunting!

Pond Ecology

Students Katie Hoffman and Margo Groskreit worked with Professor Meredith Holgerson (Biology, Environmental Studies) to sample seventeen ponds in southcentral Minnesota, including three sites within the Natural

Lands: Big Pond, Baseball Pond, and Soccer Pond. Across these sites, we are comparing how land use influences pond ecology and biogeochemistry. Two of the biogeochemical parameters we are measuring are pond ecosystem metabolism and greenhouse gas emissions (e.g., carbon dioxide and methane). Both parameters reflect how the ponds process and transform nutrients and carbon, including external and internal sources. For instance, high loads of nutrients will increase ecosystem productivity, while



higher carbon inputs will increase greenhouse gas flux. Whether a landscape is forested or altered by development or agriculture can influence these dynamics.

Since the Natural Lands have been restored to prairie and forest from agricultural use, they offer a unique perspective for our study. It appears that the Natural Land's agricultural history has left behind a legacy of nutrients in the ponds. We've observed that Big Pond has high productivity and dramatic swings in dissolved oxygen (i.e., high from daytime productivity, low from nighttime respiration). {We will compare the Natural Lands ponds to other sites to explore how pond ecosystems function across diverse land uses.} Ultimately, our study provides important data on how land use influences how pond ecosystems process and cycle nutrients and carbon, with implications for greenhouse gas emissions.

Research on Conifers and Agriculture

Conifers

Students Megan Kartheiser and Allie Raduege worked with Professor Kathy Shea (Biology, Environmental Studies) to study growth and survival of trees in the conifer reforestation area, southwest of Big Pond. Conifers native to northern Minnesota were planted in 1993 and 1999 as an educational resource on land that had been in agriculture for many years. The trees have been tagged, measured and mapped in 2001, 2004, 2011 and now in 2019. Red pine, white pine and jack pine were the largest tree species in terms of height and diameter. Soil organic matter was 6.8-7.6 percent suggesting adequate nutrients for tree growth. Some conifer seed reproduction has occurred, with conifer seedlings found in more open areas. Deciduous seedlings and saplings will need to be managed. Overall the adult conifers are growing well and reproducing some in this warmer climate.



StoGrow - Students Matt Hallahan and Poonam Rawat worked with Professor Kathy Shea and local farmer Becca Carlson '11 of Seeds Farm to manage the student farm STOGROW, now located near the wind turbine. They researched types of vegetables, sustainable growing practices, and how run a small business. All the produce from the farm is directly sold to the St Olaf food service company, Bon Appétit, where it helps feed the St. Olaf community. To prepare for the summer project, the 2019 farmers enrolled in a half-credit sustainable agriculture course in the spring semester and they met with the manager and head chef at Bon Appétit to incorporate suggestions into a crop plan for the summer. The new Natural Lands Shed provides a place to store STOGROW equipment and allowed the farmers to make full use of the hoop house for growing tomatoes and peppers. They installed an electric fence to deter deer from eating the crops. Additional long-term plantings of fruit trees or berries are also being considered. Results of their studies go into a manual for reference by future farmers.



Open Door Preschool

Once a month, the Student Naturalists visit Open Door Preschool to teach a lesson about the natural areas surrounding Northfield. These lessons are short and digestible for the kids, and center on fun plants and animals that can be seen at different times of the year. This year we had lessons on bird migration, animal tracks, small mammal pelts, frog calls and snake skins. The most exciting lessons are the trips to the St. Olaf prairie, which is right up the road from the preschool. The preschoolers get a tour of

the prairie and the surrounding forest by the Student Naturalists once during every season, so they can see how the landscape changes throughout the year. They also are able to apply some of what they have learned during the previous Student Naturalist lessons. This year, some kids remembered the bird calls we taught them, animal tracks, and even the songs we sang about turtles and chickadees in earlier lessons. During the prairie visits we played games based on concepts we learned, observed the sights and sounds of animals, and played in the snow. The lessons we brought to the preschoolers seemed to make a large

impact on them and they were excited to get involved. They always had lots of questions (some about the material and some about random ideas), and wanted to go outside. These visits were also fun and informational for the Student Naturalists. I personally found that I learned a great deal about teaching and keeping kids engaged in material, and how to simplify material for young kids. Overall, one of my favorite parts of being a Student Naturalist was sharing some of the most interesting aspects of the Natural Lands with a group of kids who were so excited to learn.

Featured Plant: Drummond's Aster, *Symphotrichum drummondii*

Drummond's Aster is a common sight on the hill, blooming in September and October. The pale blue flowers are only half an inch across but the inflorescence (flowering region of the plant) creates small clouds of flowers and this visual is magnified by large clusters of plants. Drummond's aster is found on woodland edges, in savannahs, or open woods. Portions of the Natural Lands and the hill itself fall into the preferred growing habitat for this beautiful fall flower. *S. drummondii* flowers are visited by a wide array of pollinators and have recently been noted to be a fall favorite of the endangered rusty patch bumble bee. You shouldn't have a hard time finding the blooms as they often tip onto the paths. You might also see Natural Lands technicians collecting seed to spread into our forests.



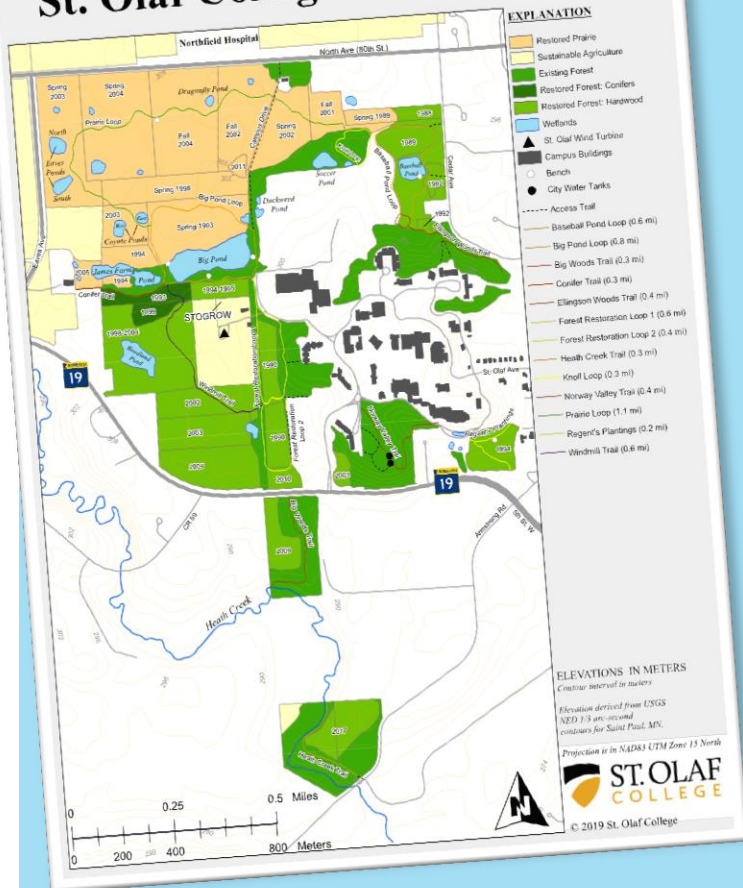
Words from the Curator...

This past year, with the Don Nelson gift, I am pleased to see management of our natural lands resources take another big step forward. With a full-time Natural Lands Manager, we can do a much better job of working on activities such as invasive species management, burns, and seed collection at appropriate times. We can also be more efficient by having a shed close to the natural lands where there is workspace and storage for equipment and the electric UTV's. With updated equipment students receive more appropriate training.

I am privileged to work with student naturalists, research students and technicians on a variety of Natural Lands Projects. Watch for announcement of activities from the Student Naturalists for 2019-20: Ella Doud, Matt Hallahan, Henry Henson, Denver Link, Allie Raduege, Izzy Istephanous. Students working as Natural Lands Technicians for the summer 2019 were Bradon Pohl and David Howard. Summer research students were Megan Kartheiser and Allie Raduege who studied growth and survival of trees in the conifer restoration, and Matt Hallahan and Poonam Rawat who are the farmers for STOGROW. Because we now have funding for students to develop the student farm they can work on studying agricultural methods and appropriate crops, as well as running a profitable business.

Take a walk in the Natural Lands and enjoy the fall weather! Check out the Heath Creek Woods area south of Hwy. 19. We encourage everyone to take advantage of the trails that wind through the woods, and enjoy the beauty of the habitat and wildlife in this area. Please contact us with your comments, suggestions.

St. Olaf College Natural Lands



Heath Creek Woods

This year we continued management and restoration work in the woods surrounding heading Heath Creek, south of the main campus (green areas south of Hwy. 19 on map at left). After a successful winter and spring removing buckthorn in the southernmost part of the woods, we did a burn in the fall to take care of any seedlings that had sprouted over the summer. The understory is now ready for future seeding and the spread of native species, beneath a canopy provided by some very old and beautiful bur oaks and other trees mixed throughout. Almost the entire southern border of Heath Creek woods is now cleared of invasives and is looking very healthy!

Last year, we seeded several species of trees such as bitternut hickory, black cherry, black walnut, oaks (bur, red, white, swamp white) and grasses in a field surrounded by the Heath Creek Woods, to be converted from agricultural land to natural habitat. That land continues to do well, and we are looking forward to seeing native plants spread into the area as it hopefully develops into an oak savanna, and eventually a maple-basswood forest. Enjoy a walk in this area of our Natural Lands!

Let us know about your experiences using the Natural Lands!

Go to: <https://wp.stolaf.edu/naturallands/>

See current happenings on the *St. Olaf Student Naturalists Facebook page*

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