Minnesota Plant Press

The Minnesota Native Plant Society Newsletter

The Minnesota Native Plant Society – *A non-profit organization dedicated to the conservation and appreciation of Minnesota's native plants and plant communities* through education *and public awareness.*

Volume 41 Number 2 **April 2026**

The City of Oaks

by ***Stephen Saupe, MN NPS newsletter co-editor***

If you do a Google search for "City of Oaks," you will learn that this nickname applies to two cities. One is Raleigh, North Carolina. Can you guess the other?

Nope, not Oakland (CA), Oak Park (IL), or Oak Grove (MN).

Nor is it Oakville (Ontario) or Gospel Oak (London), or even Londonderry / Derry (Northern Ireand), although you deserve bonus points if you knew that "Derry" is derived from the Irish word "doire" meaning oak grove or oak forest.

Here's a hint – by an interesting set of circumstances, the other City of Oaks is located where oaks (i.e., genus *Quercus*) are not indigenous.

According to Plants of the World Online (Kew), oaks are primarily temperate species that grow in the northern hemisphere. Like the Woody Guthrie song, oaks range from California to the New York island, as well as through Europe, across southern Asia all the way to the Pacific Ocean.

Give up? The answer is Stellenbosch, South Africa!

Figure 1. Entrance to Eikestad Mall, Stellenbosch, South Africa. Note the oak leaf logo and the unhealthy oak to the left of the entrance. All images in this series by Steve Saupe.

Weird, eh? It's surprising that a city near the southernmost tip of Africa, where the nearest indigenous oak grows more than 6000 kilometers away, adopted its nickname from a tree native to the northern hemisphere.

The nickname is well-earned. Many street trees in Stellenbosch are oaks. I know this because I am currently living and teaching in Stellenbosch. I did a quick survey of the boulevard trees on my street (Ryneveld Street) and calculated that 96% of the trees are oaks. On a section of Victoria Street, there were slightly fewer oaks (92%).

Admittedly, these percentages are an overestimate of the city-wide occurrence of oaks. I know of at least two streets in town, including on a different block of Victoria Street, where nearly all the trees are London plane trees (*Platanus acerifolia*). Nonetheless, the take-home-message is that oaks are very common!

The abundance of oaks is reflected everywhere. The name of the shopping mall, Eikestad, is Afrikaans for Oak City and its logo is an oak leaf (**Figure 1**). The oldest pub in town, and perhaps one of the five oldest in South

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Contact Info
Minnesota Native Plant Society
P.O. Box 16257
St. Paul, MN 55116
Website: www.mnnps.org
eMail: contact@mnnps.org

Africa, is called De Akker (Afrikaans for acorn). The logo for the University of Stellenbosch was once an "S" ending with an oak leaf. This logo was abandoned in 2021, fueled in part by suggestions that the oak leaf represented the oppressive past of the colonial government.

The acorn even features in student traditions. You are not considered a true "Matie" (pronounced maw-tea'), the nickname for a Stellenbosch University (SU) student, until an acorn has fallen on your head. By this definition, I have personally become a Matie – twice!

As an aside, it's not certain why SU students are called Maties, but there are two hypotheses. The name may be derived from the diminutive for the Afrikaans word, *maatjie*, meaning friend or buddy. Alternately, it could be derived from the word for tomato, *tamatie*, referring to the school color, maroon, featured on the logo, sports jerseys, and elsewhere.

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Figure 2. English oak. Stellenbosch, SA.

President's Column – by Scott Milburn

This year marks 25 years since I transplanted myself here in Minnesota. The reason for that move was that I had a deep desire to pursue a career as a field botanist, and Minnesota had a few key elements, including intact natural resources, strong environmental regulation, and a top-notch natural resource agency. These were all theoretical wants, not knowing how this would all play out. As with all major decisions in life, there is an inherent risk where not all moves work out as planned.

In moving here, I had few connections and would hear from others that the people of Minnesota can be socially cold to transplants. What I have found has been pure amazement and pride, in both the natural resources of the state and the people.

First, with the natural resources. I was so impressed by how advanced the state has been in terms of protection and production of educational resources. Two major keystone events as it pertains to land preservation include the establishment of the Scientific and Natural Areas program, as well as the protection of a vast portion of acreage with the Boundary Waters Canoe Area Wilderness (BWCAW).

Regarding the first, this has allowed the state to protect the best of the best, including the various patterned peatland sites across the northern part of the state. The current self-imposed energy crisis brings to mind why this act was forward-thinking. We had the right people in the right place to make the decision to protect these vast peatlands, preventing the possibility of peat mining to use as a source of fuel.

I imagine this was just a shortsighted solution that never gained enough traction at either the state or federal level during the 1970s energy crisis. The latter, the BWCAW, draws people from all over, bringing in dollars that help contribute to the economies of places like Ely and Grand Marais. The BWCAW allows one to leave the modern world behind for a brief moment, allowing individuals to unwind, recharge, and build lifelong memories.

Then we have the plants themselves. Those born here are often surprised to hear we have native orchids, and quite a lot of species. They are also fascinated to hear that we have carnivorous plants and other oddities, like a single epiphytic species. Our species diversity is simply amazing, thanks in part to our four ecological provinces. One can see circumboreal species such as cloudberry (*Rubus chamaemorus*), the endemic dwarf trout lily (*Erythronium propullans*), and the western prairie fringed orchid (*Platanthera praeclara*). We are also in what seems to be the epicenter of moonworts.

Unlike most states, there have been significant investments in advancing science in the state and the production of education material. We have Lee Pfann-mueller, Barb Coffin, John Almendinger, Carmen Converse, and Bob Djupstrom to thank for this. Out of their thinking toward the future, we have important protections, applications, and resources. For instance, many states have a list of endangered and threatened species. The difference here is that we also have legal protections for those species, where protections are lacking in many of these other states.

The mentioned applications include how we collect data, which was used to help guide how we classify native plant communities. We also have the products, focusing on the ecology of our botanical richness, with the many flora resources written by State Botanist Welby Smith. As a state, we have and continue to show the way.

Although I was not born and raised here, I no longer feel like an outsider. If anything, I may carry a deeper appreciation for this

state precisely because I chose it. The federal government's Metro Surge tested our community, but what emerged was something inspiring: a unified stand against an action that sought to demean and exclude those who do not fit a narrow 1950s vision of America. Our community answered that call with care and decency towards those targeted by this operation, including marching on two consecutive Fridays in January through bitter temperatures to assert rights that no administration should be able to silence. Those targeted by the president are, by and large, people pursuing the same dream I had 25 years ago — a better life in a place worth believing in. That gives me tremendous hope. As Minnesotans, we know how to do what is right, and I am confident we will continue to lead the way.

Orchid Growing in the Plant Conservation Program at UMLA

by ***Brian Johnson, MN NPS newsletter co-editor***

In the January 2026 issue of *The Plant Press*, seed collection and banking efforts at the University of Minnesota Landscape Arboretum (UMLA) Plant Conservation Program (PCP) were presented. This article will discuss efforts to grow native Minnesota orchids from banked seed. The orchid propagation team is shown in **Figure 3**.

Figure 3. (above) The team in the orchid propagation lab at UM. Image courtesy S. Saupe.

Minnesota has about 48 species of orchids that grow in the wild. Given the relative rarity, beauty and public interest in these species, it is appropriate that they are represented in the seed bank (**Figure 4**). Currently, seed samples from nearly all of Minnesota's native orchid species reside there. Since ten of them are categorized as endangered, threatened or special concern, it may be comforting that their seed in particular has been banked.

But this comfort may not last long. Unlike "orthodox" seed, which can be banked using standard preparation and storage conditions, many orchid seeds are classified as "exceptional." This means that they might not be effectively banked long-term with traditional techniques.

On top of that, it is well known that orchids are difficult to propagate. A few of them, including the showy ladyslipper (*Cypripedium reginae*), may be grown from seed and purchased from commercial greenhouses, albeit at a steep price.

Figure 4. (left). Orchid seed in the bank at the UMLA. Image courtesy S. Saupe.

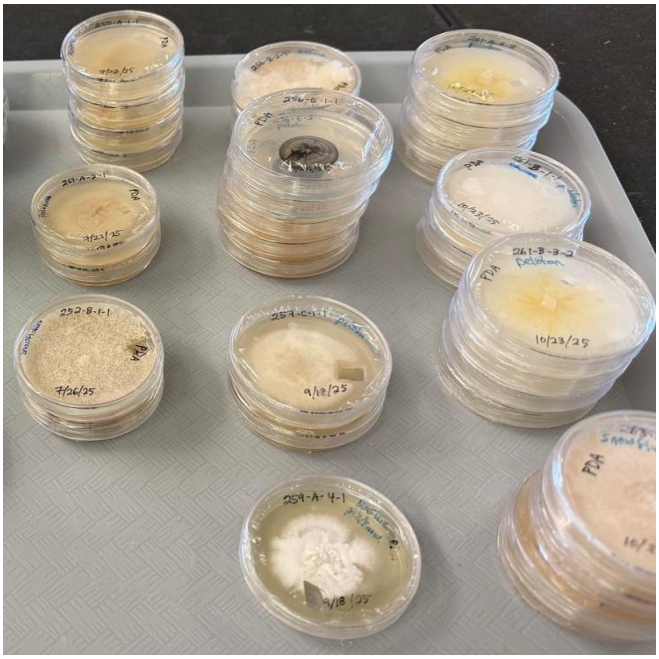

Figure 5. Harvested fungi growing on agar plates. Image courtesy S. Saupe.

Figure 6. Protocorms of Pogonia ophioglossoides on the mother plate. Image courtesy S. Saupe.

For most of the others, the methods for growing them are not well-established. What would happen if a population were close to elimination and a decision was made to try to restore it? Just having the seeds might not be enough if there is no proper procedure to grow them. For this reason, research into orchid seed growing is an increasingly important activity in the Plant Conservation Program.

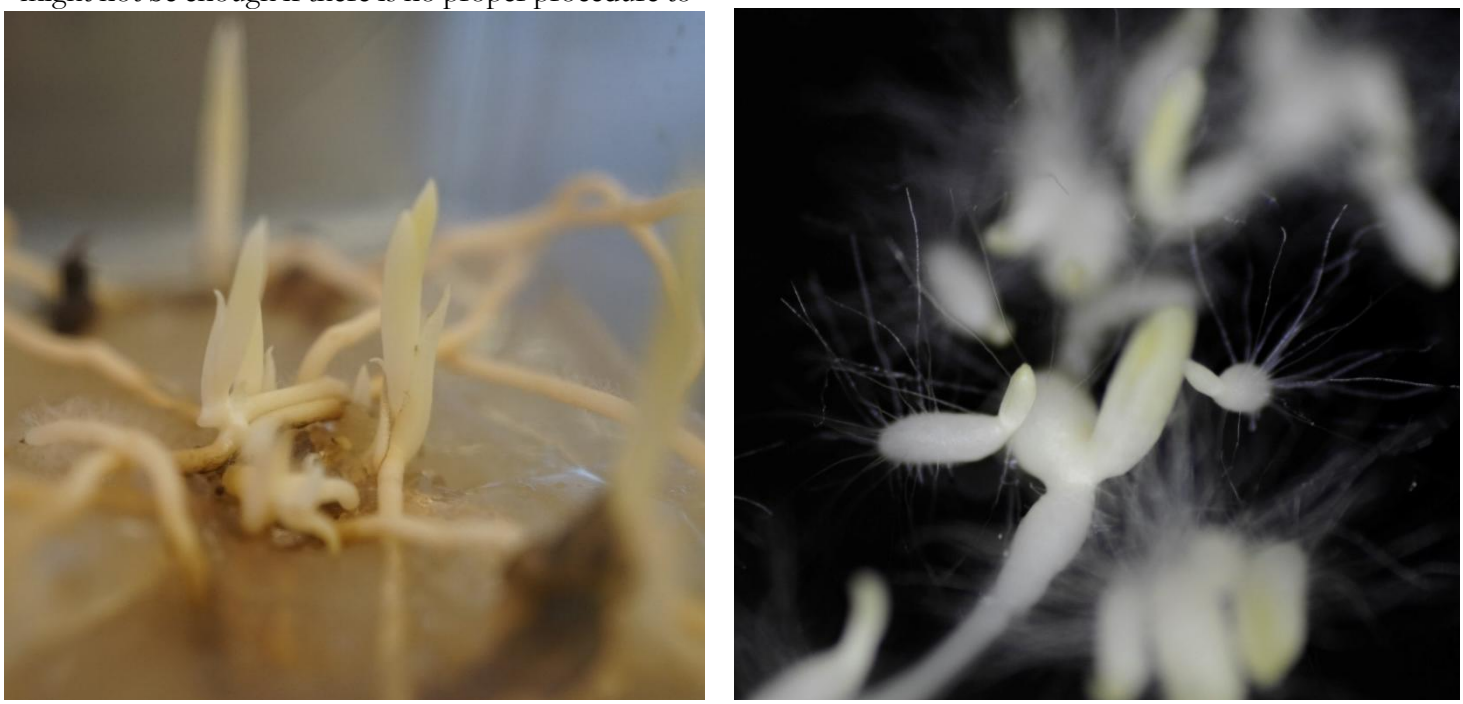

Figure 7. Orchid seedlings that have differentiated roots and shoots. A. Cypripedium acaule (left). B. Liparis loeselii (right) On the left is a shoot (small knob) that is emerging from a protocorm. The hair-like structures are rhizoids that help anchor the protocorm to the substrate. In the center is a more developed protocorm that has a shoot pointing to the upper right and an even longer root pointing to the lower left. Images courtesy K. Drewiske and the UM team.

Unlike the seeds from other plant species, orchids lack a mechanism to store food for growth. As such, they rely on specific soil fungi to grow. But which fungi are necessary for which species? In addition to gathering the orchid seed, PCP staff collect some roots from each species. Back at the lab, PCP staff break open the root cells to locate pelotons, the coiled cluster of fungal hyphae. The peloton is removed using sterile technique and the hyphae are placed on an agar plate containing nutrients. This allows the hyphae to grow and coat the plate. Once a fungus has been established on an agar plate, it can be used to colonize other plates, so that a collection of fungi can be developed (**Figure 5**).

One of the fungal cultures is then introduced to orchid seeds on a growth medium containing oatmeal and agar. If all goes well, the orchid seed will incorporate fungi and swell large enough to break and shed the seed coat. This germinated seed has some cell size differentiation--smaller cells at the apical end and larger ones at the basal end--but no discernable root or shoot tissue. This is called a protocorm. (**Figure 6**).

It has been known for about 100 years that orchids can be grown asymbiotically on nutrient-rich agar without mycorrhizae, but modern research has shown that germination can be more successful with specific living fungi. As noted earlier, the fungi first exposed to the seeds are of the species that are found in the root of the adult plant. However, it is not a given that the plant will require the same species of fungus in its germination or early growth stages as it needs at maturity--some orchids are known to use different fungal symbionts as seeds than they do as adults. Fungi can enter the orchid at various stages, but the symbiosis is typically maintained throughout the life of the plant in most of Minnesota's orchid species.

If germination is successful, it can take anywhere from 14 to over 300 days, varying widely between species, to reach the protocorm stage. The protocorms are left on the original agar plate (the mother plate) until the orchid starts to differentiate into a stem and roots (**Figure 7**). This can be additional weeks to months, again depending on the species. Then the orchid seedlings are transferred to a larger plate called the "replate". After 1-2 years they are removed from the agar plate and placed into a well-draining potting mix (often a simple mix of perlite and sphagnum for many orchid species) and grown in the greenhouse (see **Figure 8**). After a total of 2-4 years, they would be ready for transplanting in the wild.

Though there have been many successes, there is still work to be done for a number of species. Key variables PCP researchers are exploring include the media used at different stages of orchid development, the species of fungi that the seeds are exposed to, and the timing of exposure to light once the seed germinates.

Figure 8. Liparis loeselii seedlings in the greenhouse. Image courtesy B Johnson.

Thus far, many of the Minnesota orchids have yielded some of their early stage propagation secrets. However, there are some that haven't. For example, none of the coral root (*Corallorhiza*) species have been propagated. One hypothesis to explain this is that they have a more complicated relationship with fungi because they never develop the ability to

photosynthesize. Another species that has defied propagation is the showy orchis (*Galearis spectabilis*). Given the time requirements for reaching transplant age and the number of variables involved, progress may seem slow. But the work of the PCP group is helping to protect Minnesota's native orchids.

(**Editors' note –** David Remucal gave the February 2026 presentation to the MN Native Plant Society. It was entitled "Active augmentation and recovery of rare species and native orchids – what we're learning so far." A video recording of the presentation can be found on the Plant Society webpage.)

News from the Bell Herbarium

by ***Zan Tomko (Minnesota Master Naturalist & Bell Herbarium volunteer)***

Note from Tim Whitfeld, Bell Herbarium Collections Manager. We're lucky in the Herbarium to have a team of dedicated volunteers helping with all aspects of curation in the collection. One volunteer, Zan Tomko, has been volunteering once a week for the past year. Over that time, she has focused her efforts on mounting specimens collected by Don Henson in the early 1990s from the Upper Peninsula of Michigan. This set of around 1,800 specimens was gifted to us from the University of Michigan Herbarium. It's not unusual for herbaria to send specimens back and forth, just like philatelists or baseball card collectors exchange their collections with fellow enthusiasts. We were grateful to receive this interesting set of specimens from Michigan and here's what Zan reports about the experience of working on these botanical collections.

I never had the good fortune of meeting Michigan artist and botanist, Don Clifford Henson (1945-2020), but I have developed a close connection to him. I came to know Don through his collection of plants from the Upper Peninsula of Michigan (U. P.) while I was helping to accession part of this collection into the Bell Herbarium. These botanical specimens came to us as a gift from the University of Michigan Herbarium and they provide a useful comparison to specimens we have from similar habitats along parallel latitudes in Minnesota.

The specimen of *Carex capillaris* pictured in **Figure 9** is an example of Don's work. On June 11, 1992, Don collected these three sedge specimens in Menominee County, Michigan. He carefully arranged them on a page of the *Barron's* business weekly, numbered the collection 3511, and layered it in a field press with other plants from this area. This specimen, along with all the others Don collected, started a chain of custody that traveled through the years, across states from Michigan to Minnesota and into the collection of the Bell Herbarium.

Don was a Trompe l'œil artist and owned a flourishing studio and gallery, *Tamarack Studio*, in the Upper Peninsula town of Manistique. With the hands of an artist and the eye of a skilled field botanist he collected over 4,000 botanical samples. Don frequently helped with the Michigan Natural Features Inventory (MNFI) and received contracts from the State to survey and gather plant specimens in the U.P.

When he laid out these three *Carex capillaris* specimens, on June 11, 1992, he instinctively arranged the roots, stems, and seed heads in a manner that would preserve the profile of the specimen to its best advantage and capture the lyrical lines created by the energy of a summer's day. In the pre-digital frontier of 1992, Don wrote field notes about each specimen and his wife, Jane, helped him with typing out the official labels that contain pertinent information linked with the sample. The information about these three *Carex* plants reads like a poem:

In cedar
on shallow rich soil
over limestone cobble
at the edge of a cedar swamp

Figure 9. Carex capillaris specimen from the Bell Herbarium. Image courtesy Zan Tomko.

Figure 10. Botrychium lunaria specimens from the Bell Herbarium. Image courtesy Zan Tomko.

Like many botanists, Don played favorites – *Carex* and *Botrychium* (**Figure 10**) were species dear to him.

He collected common and rare plants and his keen eye even helped him to identify a new hybrid species of grass in the U.P., x*Calammophila don-hensonii,* named in his honor by two eminent botanists, Anton Reznicek and Emmet Judziewicz from Michigan and Wisconsin respectively. The grass grows on the sandy shoreline of Lake Superior in Alger County, Michigan and is a rare example of an intergeneric hybrid that came about when dune grass *(Ammophila breviligulata)* and blue joint grass *(Calamogrostis canadensis)* took a shine to one another.

Don's collections and all the other botanical specimens that have been accessioned into the Bell Herbarium collection over the years do not rest in storage. Each specimen documents botanical diversity at a particular place and time. They also provide crucial information for taxonomy and ecology. Furthermore, the specimens contain another deeper layer of critical information - access to tissue samples for chemical and molecular analysis. Since its establishment in 1888 the Bell Museum Herbarium has accumulated hundreds of thousands of specimens, in many cases dozens or hundreds of samples of a particular species. Every sample represents a point in time that contains valuable environmental and ecological information.

Within this large botanical collection of individual species, specimens have been used for various research projects. For example, a recent Minnesota DNR study of *Phragmites* took DNA samples from the specimens to track the spread of different genetic strains of this invasive grass. Data from the Herbarium are available to everyone online in the in the Minnesota Biodiversity Atlas (https://bellatlas.umn.edu/).

After Don C. Henson selected this *Carex* sample; it was touched by six or seven other people as it worked its way through the specimen pipeline and into the Herbarium collection. **Figure 11** is an illustration of the basic accession process for every botanical specimen.

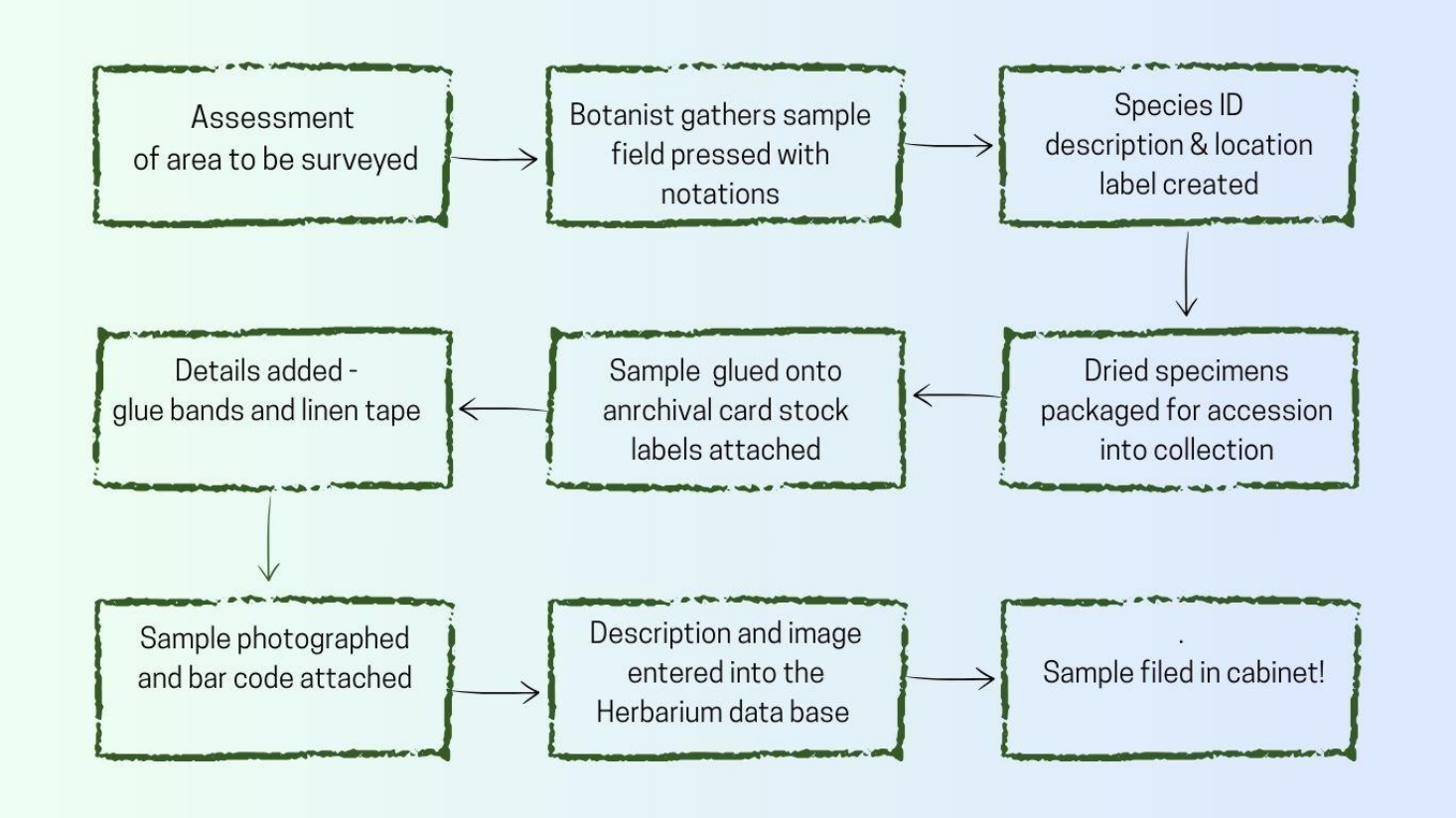

Figure 11. Collections work flow sheet. Image courtesy Zan Tomko.

The fact is, without the helping hands of volunteers and students who work tirelessly for the betterment of plants, our Herbarium would struggle. The collection is here today because of the generosity of many. Don Henson's specimens are now part of the Bell Herbarium and thanks to his efforts, we have a great representation of 1990s plant diversity from the U. P. of Michigan.

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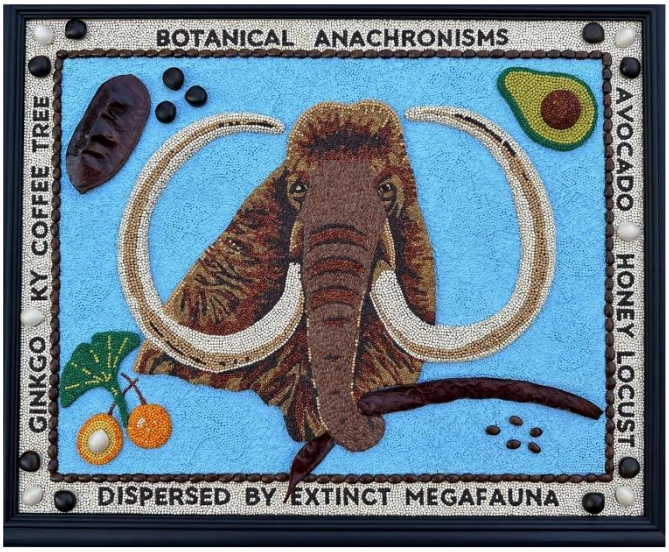
Plants are Smarter than you Think! Botanical Anachronisms

A New Botanical Anachronism.

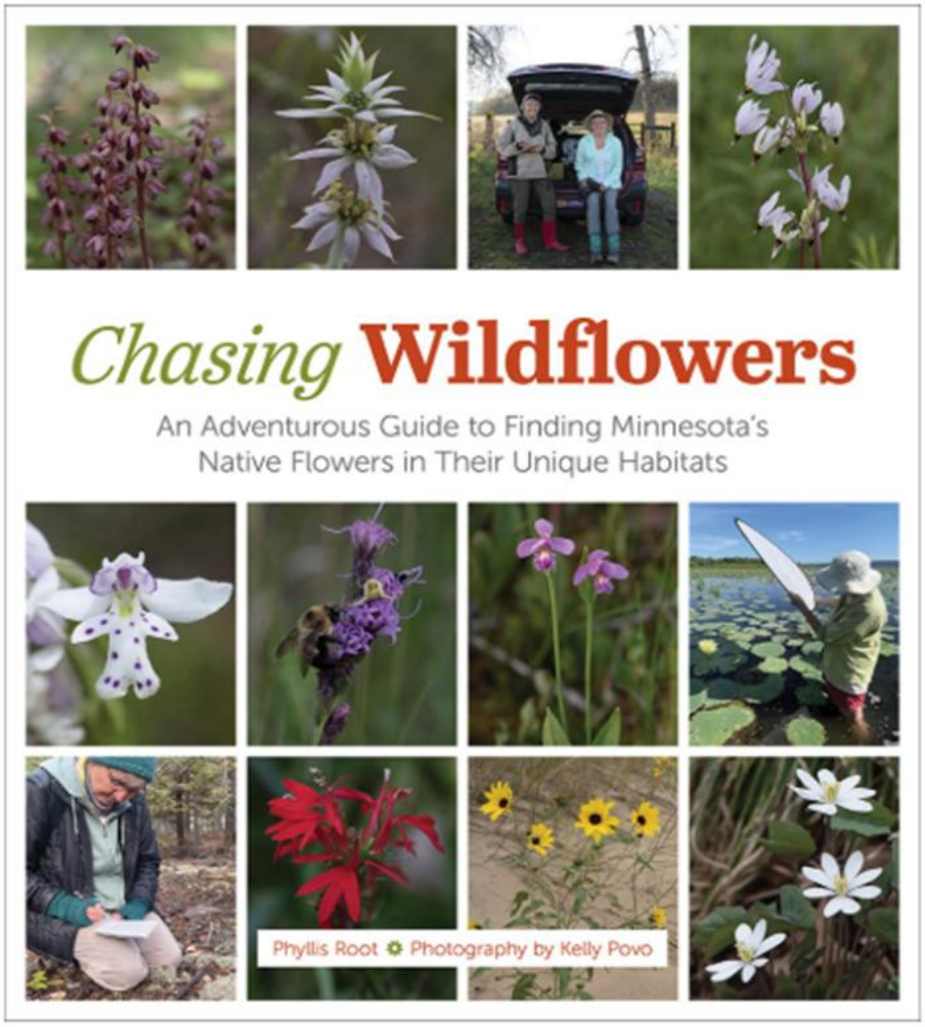
A botanical anachronism is a plant whose disperser has gone extinct. My daughter Amy and I (Steve Saupe) even created a seed artwork about this topic that we entered in the 2025 MN State Fair. Examples include honey locust and Kentucky coffeetree, both of which may have been dispersed by mammoths. A new report suggests that horse chestnut was likely once dispersed by now extinct European elephants. Check out the story at https://doi.org/10.1002/ppp3.70167.



Book Review: *Chasing Wildflowers: An Adventurous Guide to Finding Minnesota's Native Flowers in Their Unique Habitats* (by Phyllis Root; photography by Kelly Povo)

review by ***Brian Johnson (MN NPS newsletter co-editor)***

Just for a moment, think back to your first major native plant expedition or a trip to a habitat that is new for you. What were you looking for? How did you know where to go? Were you properly equipped? Were there any particularly memorable aspects (good or bad) to the trip? *Chasing Wildflowers* captures the wonder, excitement and anticipation that accompanies a visit to new place to explore.



Unlike a typical field guide where native plants might be organized by plant family, flower color, or blooming date, the organizing theme in *Chasing Wildflowers* is the habitat in which the plants are found. There are ten habitats presented, plus ditches and roadsides. For example, the Goat Prairie chapter contains a short explanation of what a goat prairie is, followed by about a dozen pictures of some of the more unusual plants that can be found there, including bladderpod (*Physaria ludoviciana*), clasping milkweed (*Asclepias amplexicaulis*) and plains wild indigo (*Baptisia bracteata v. leucophaea*; **Figure 12**).

Each chapter also includes Field Notes and Sidebars, sections which describes one of the authors' trips to the habitat, including something interesting that happened, or their personal response to being at the site. Furthermore, the end of the book lists places where one can go to see each of the habitats.

The book is interesting to read and well-designed. Phyllis Root's prose is clear, colorful and descriptive. In addition to accurate descriptions of the plants, her trip descriptions help the reader feel like a third friend lucky enough to be along for the adventure (**Figure 13**).

The photos by Kelly Povo are beautiful and capture the detail of even small plants and flowers. She seems to be able to catch a pollinator or other insects in action as well. In addition to the major habitat sections described earlier, there is a page devoted to clothing and other gear that makes for a safe and (more) comfortable trip, and another that would help someone learn what to look for to identify a new plant.

Figure 12. Plains wild indigo (Baptisia bracteata v. leucophaea) on a goat prairie in SE Minnesota. Image courtesy of Kelly Povo.

Chasing Wildflowers is a welcome follow-up to their first botanical book, *Searching for Minnesota Wildflowers*. The subtitle of that work was "A guide for Beginners, Botanists, and Everyone in Between." Those words serve as an apt description for the target audience of this book as well. It can be found in bookstores or purchased on *Amazon*.

(**Editors' note** –-This issue's *Destination Botany* contains a description of one of their trips.)

Figure 13. Phyllis (left) and Kelly get ready for departure on another adventure. Image courtesy of Kelly Povo.

For the Sake of Peat: Minnesota's Peatland Resilience Initiative

*by **Meredith Cornett, MN DNR***

*(**Editor's Note** – This is a summary of the presentation at the March 2026 MN Native Plant Society meeting. For more information, please view a recorded version of the talk at https://mnnps.org/video/ or visit https://www.dnr.state.mn.us/wetlands/peatland-resilience-initiative.html.)*

When it comes to climate change, Minnesota has a low-profile superpower: peatlands. The state's bogs and fens are rich with sphagnum mosses, sedges, and centuries of stored carbon. The Winter Road Lake Peatland Restoration Demonstration Project, led by the Minnesota DNR and many partners, is piloting peatland restoration methods with targeted effectiveness monitoring to help inform best practices.

Figure 14. MNDNR staff pause after surveying greenhouse gases and vegetation at Winter Road Lake Peatland SNA piloting the PREM methodology. L to R: Becky Marty, Jamie Mosel, Sage Pasquale, Meredith Cornett, Charlie Tucker. (Summer 2025) Photo by Scott Milburn.

Peatlands are identified in Minnesota's Climate Action Framework as a priority for protection and restoration. Their deep organic soils (histosols) store immense carbon reserves, but when peatlands are ditched or drained, those soils begin to decompose, releasing greenhouse gases. Rewetting can reverse that trend, restoring peatlands' function as long term carbon sinks.

Minnesota contains more peatland than any other state in the lower 48, yet our history with these landscapes is complex. Early 20th century drainage efforts left thousands of miles of ditches across the state. Today, more than 4,000 miles of those ditches intersect peatlands, resulting in the drying of soils and increases in greenhouse gas release within 100 meters from ditches. Restoring hydrology is essential to restoring ecological function.

The 2023 Minnesota Legislature established the Peatland Protection and Restoration Demonstration Project to address this challenge. At Winter Road Lake Peatland Scientific and Natural Area (SNA), the DNR and a diverse steering committee—including Red Lake Nation, local counties, watershed districts, the Lake of the Woods SWCD, HDR, and USFWS—are designing restoration treatments tailored to site conditions.

Figure 14. Scott Milburn (Midwest Natural Resources) (L) and Sage Pasquale (R) survey vegetation at Winter Road Lake Peatland SNA (Summer 2025). Photo by Meredith Cornett.

To understand how restoration affects vegetation, hydrology, and greenhouse gas flux, the team is piloting the Peatland Restoration Effectiveness Monitoring (PREM) frame-work. All monitoring sites lie within the Warroad River Watershed within the Winter Road Lake Peatland SNA, where the prevailing native plant community is the Northern Rich Fen Basin) system—OPn92.

Withing PREM, vegetation monitoring occurs at three levels: functional groups (Level 1), indicator species (Level 2), and full flora surveys requiring expert botanists (Level 3). Each season begins with calibration to ensure consistent cover estimates across observers. Full flora and indicator surveys take place in late June, when sedges are most identifiable. Field crews work quadrat by quadrat along transects extending from one side of a drainage ditch to another, including a plot within the ditch itself.

Initial results show strong relationships between vegetation in relationship to the ditch. For example, narrow leaved sedges and sphagnum mosses increase with distance from the ditch, while broad leaved sedges decrease. Preliminary data also suggest that greenhouse gases vary with water levels and other site conditions. Methane flux is highest where water levels are elevated, and carbon dioxide flux is highest where peat is driest.

Given the outsized role peatlands play in climate mitigation, accelerating learning about best practices for peatland restoration is essential to adaptive management. Through PREM, DNR and partners are building a knowledge base and community of collaboration to share results and guide climate-smart stewardship—before and after restoration.

Minnesota Wildflowers Plant of the Month: *Salix humilis*

by ***Katy Chayka, Minnesota Wildflowers (www.minnesotawildflowers.info)***

Family: Salicaceae (Willow)
Common name: Prairie willow
Life cycle: Perennial
Plant height: 1 to 10 feet
Bloom season: April – May
Habitat: Sun; average to dry sandy or gravelly soil; prairies, savannas, dunes, bluffs, rock outcrops

Figure 16. Leaves, Badoura Jack Pine SNA, Hubbard County. Image credit by Katy Chayka.

Plant Description

Flowers: Male and female flowers are on separate plants (dioecious) in spike-like clusters (catkins) from buds along 1 year old branches, emerging before the leaves. Male catkins are oval to nearly round, ¼ to 1¼+ inches (6.5 to 34 mm) long, the flowers densely to somewhat loosely packed, each flower with 2 stamens, the tips (anthers) orange, yellow, purple or brown (**Figure 17**).

Female catkins are 1/3 to 1¾+ inches (9 to 47 mm) long, the flowers crowded on the spike, bulbous at the base with a long beak, densely covered in woolly hairs, and on slender stalks 1 to 2.5 mm long. At the base of each male and female flower stalk is a tiny, dark brown, black or bi-color, scale-like bract densely covered in long straight or wavy hairs.

Leaves and stems: Leaves are alternate, ¾ to 3½ inches (2 to 9 cm) long, to 1+ inch wide, 2.5 to 6 times as long as wide, sometimes narrowly oblong-elliptic but mostly widest above the middle or near the tip, rounded to pointed at the tip, wedge-shaped to somewhat rounded at the base, mostly toothless, the edges often rolled under (revolute) and sometimes also a bit wavy (**Figure 16**). The upper surface is medium to dark green, hairless to variously hairy and at least somewhat glossy, the lower surface pale blue-green to nearly white from a dense covering of woolly hairs, sometimes becoming hairless or nearly so with age. At the base of the short leaf stalk is a pair of tiny leaf-like appendages (stipules) that are pointed at the tip, but are often absent.

New leaves are yellowish to green, covered in woolly white or gray hairs sometimes also with a few rust-colored hairs. A network of veins is fairly distinct, the main veins most prominent and curved upward from the midvein. New branchlets are densely short-hairy and greenish-brown, yellowish-brown or red-brown, becoming brown the second

Figure 17. Catkins, Hastings Sand Coulee SNA, Dakota County. Image credit Katy Chayka.

year and the hairs sometimes persisting to the third year. Stems are multiple from the base, slender with smooth to slightly rough, gray to greenish-brown bark. Small colonies may form by a process known as layering, where a branch that touches the ground takes root and forms a new plant, detaching itself from the parent plant.

Fruit: The spike elongates some as fruit matures, the fruit becoming more loosely arranged than the flowers. Fruit is a capsule 5 to 12 mm long, yellowish to reddish when mature, covered in woolly hairs, pear-shaped to narrowly conical with a long, straight to slightly curved beak. The capsule splits into two halves when mature, releasing the cottony seed; this happens before leaves are fully mature.

Notes

There are over 20 species of Willow in Minnesota; Prairie Willow is the only native willow shrub that is commonly found in drier habitats such as prairies, savannas, bluffs, Jack pine stands and forest edges, often in sandy or rocky soil, though it is also sometimes found along shores or the edges of wetter habitats. There are 2 varieties of *Salix humilis*, var. *tristis* and var. *humilis*, both of which are found in Minnesota (see **Figure 18**). Most herbarium records do not specify a var but it is assumed most of those are the more common var. *humilis*.

S. humilis var. *humilis* is typically a medium to large, multi-stemmed shrub up to 10 feet tall, averaging 6 feet (**Figure 19**). Branchlets are red-brown to greenish, woolly hairy to nearly hairless. Leaves are up to 3½ inches long, the upper surface hairless to variously hairy sometimes with a few rust-colored hairs, the lower sparsely to densely hairy; edges are flat to revolute and sometimes minutely toothed or wavy. Stipules are present on later leaves. Male catkins are up to 1 1/3 inch long (34 mm), female to 1¾+ inches (47 mm); capsules 7 to 12 mm long and tapering from the base to the tip. S. humilis var. tristis is dwarfed, rarely more than 3 feet tall; branchlets yellow-brown and woolly hairy; leaves up to 2 inches long, woolly hairy on both surfaces, hairs gray throughout, edges revolute and toothless; stipules absent or obscure; male catkins to ½ inch long, female not much longer; capsules 5 to 9 mm long and more pear-shaped.

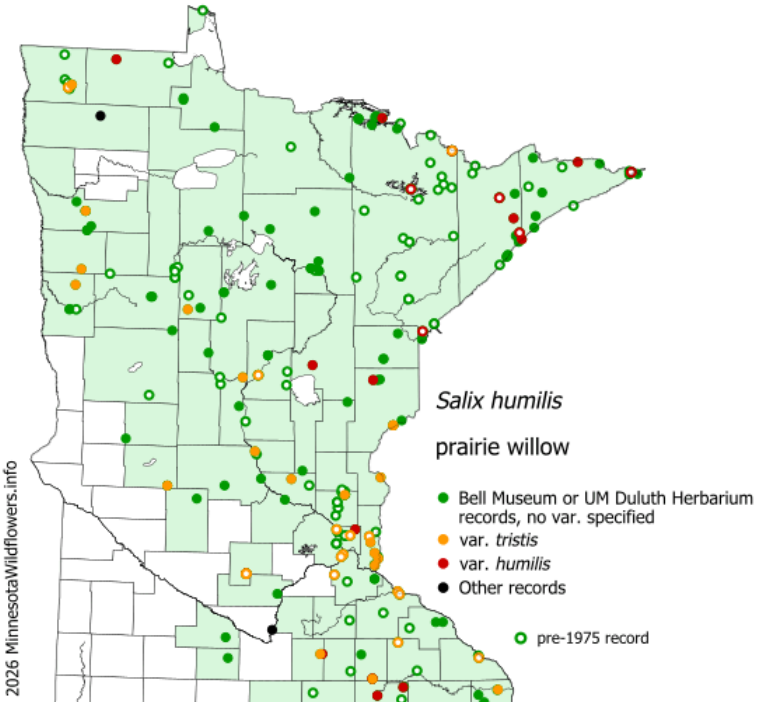


Figure 18. Minnesota county distribution map ©Minnesota Wildflowers Information.

The smaller var. *tristis* vaguely resembles Sage-leaf Willow (*Salix candida*), which is also short statured with woolly-hairy leaves, but the leaves are more linear and up to 4 inches long, and it lives in wet habitats. The larger var. *humilis* is more similar to Pussy Willow (*Salix discolor*), which has mostly hairless leaves with less pronounced veins and larger flowering and fruiting catkins, and also lives in wetter habitats and can take the form of a small tree, which Prairie Willow does not. But like Pussy Willow, Prairie Willow is one of the earliest flowering shrubs and an important food source for emerging pollinators.

More images available at:
https://www.minnesotawildflowers.info/shrub/prairie-willow.

Figure 19. Fruiting shrubs in savanna habitat, Helen Allison SNA, Anoka County. Image credit Katy Chayka.

Destination Botany—Woods Creek (*The Peace of Wild Places*)

by ***Phyllis Root & Kelly Povo***

We've been chasing native wildflowers for years now, and while we love any of the places where we find them growing, we've also come across a few places that feel almost, well, magical. Some combination of light, color, greenery, flowers, terrain, rocks, water, rarity--whatever it is, these places of wonder stay in our minds and our hearts.

- The bog lake at Long Lake Conservation Center where we first saw rose pogonia and grass pink orchids.
- Iron Springs Bog Scientific and Natural Area, where water channels through mosses and bold pitcher plants and tiny polka dotted orchids bloom.
- A dry hill prairie on the western edge of Minnesota after a prescribed burn where we find a flower we've never seen there (or anywhere) before.
- A river valley in the Driftless Area where blooming bluebells blanket hillsides.
- A roadside ditch crowded with so many lesser purple fringed orchids I stop counting at 200.

Figure 20. Two one-sided pyrola (Orthilia secunda) plants. Image courtesy Kelly Povo.

Last July we added a new location to our list of magical places – Woods Creek. It happened like this: We have an event at Drury Lane books in Grand Marais, so we drive up a day early to a cabin to spend some time before the event chasing flowers. We wake in the morning to a dripping sky and an all day forecast of rain, but our rain gear is good, our boots sturdy, and our flower-chasing hearts intrepid. We set out to hike a section of the Superior trail, hoping to see a plentitude of pyrolas.

Fog socks in the lake and blurs the road as we drive, but when we turn inland both fog and rain gradually lighten, and we come to the stretch of trail a friend has told us where we might find one-sided pyrola, which is on Kelly's list of flowers to photograph. We even have hope that we might see the elusive small shinleaf, one of Minnesota's seven pyrolas (**Figure 20).**

The overcast sky and dripping trees feel as though we've been transported to a west coast rain forest. Woods Creek burbles beside us on its way downhill as we follow the trail up. And up. And up.

Editor's Note: Phyllis and Kelly maintain a blog at flowerchasers.com.

Along the way, we spot a clump of orchids that seems almost to glow in the dim light under pines and birches. We've seen this orchid once before and puzzled over it. Its yellow color reminds us of autumn coralroot, but autumn coralroot is shorter and only grows in the southern part of the state. Diligent searching on our phone apps reveals that this is an unspotted and uncommon version of western spotted coralroot. (**Figure 21**)

Figure 21. Yellow spotless variant of Western spotted coralroot Corallorhiza maculata var. occidentalis). Image courtesy Kelly Povo.

We climb past more bright clumps of bright golden unspotted western spotted coralroot, past western spotted coralroot with its reddish stalks and spots, and past a single spotted coralroot barely out of the ground. We always love finding orchids, but we're also on the lookout for pyrola, and we find them, too: one-flowered pyrola, one-sided pyrola, pink pyrola, shinleaf, and green-flowered pyrola along with their near-relation, pipsissewa. We don't find small shinleaf, but the trail stretches on, and we're hopeful.

Deep in a hollow off the trail, we find clasping-leaved twisted-stalk, a flower we've been chasing for years but so much larger than the more common rosy twisted-stalk that at first we mistake it for a shrub. True to its name the leaves clasp the stem, with pale bell-shaped blossoms hanging underneath. Jubilation ensues.

We haven't yet found small shinleaf by the time we have to head back to the cabin to clean up for our evening event. But we know we'll come back another day when we have more time on this enchanting trail. We spend the evening at Drury Lane Books doing one of our favorite things besides chasing wildflowers: talking wildflowers with other wildflower enthusiasts.

All of this happens in July, so we don't know then that come January 2026, when snow and ice cover the ground, Federal ICE agents will invade Minnesota, abducting people out of their homes and cars and from their jobs to deport them, an occupying force that leaves two citizens dead in the streets. We'll put on our whistles and winter coats and boots and join thousands of other community members to march, to stand watch at local schools, to raise money for people's rent, to deliver food, and to run necessary errands for folks afraid to leave their homes. To fight for justice.

When we need a brief break from the terror and brutality of ICE in our cities we'll return in our minds to a place along the Superior hiking trail where unspotted spotted coralroot, pyrolas, and clasping-leaved twisted-stalk grow. We'll rest for a while in the memory of the peace of wild places.

And come summer, we'll head again for a trail along Woods Creek to search for small shinleaf – and whatever other wonders we might find.

MN PlantWatch: Rooted in Conservation, Growing Through Community

*by **Anna Schacher, CCMI MN PlantWatch Assistant***

Minnesota is home to more than 1,700 vascular plant species, of which over 300 are listed as endangered, threatened, or of special concern. Many of these species' subpopulations need a revisit due to outdated or incomplete records of population distribution and health.

When rare plants are hiding under our noses, in a sea of lush green, we turn to passionate volunteers to aid in the search. The Minnesota Department of Natural Resources (MNDNR) and the University of Minnesota Landscape Arboretum (UMLA) partnered together to launch the MN PlantWatch program in 2023. This community science initiative uses the power of volunteers located across the state to collect survey data and seeds from rare plant populations.

MN PlantWatch volunteers take on a role of plant detectives to search for Minnesota's rare plants in their natural and historic habitats, collecting information on population distribution, health, habitat, and threats. The information gathered on MN PlantWatch surveys is used to update the state's rare features database known as the Natural Heritage Information System. Updated information better informs and supports conservation and management needs, education, and research of our rare species.

Figure 22. Gentiana affinis var. affinis (pleated gentian) in bloom. Image courtesy Deanna Leigh, MNDNR.

Figure 23. MN PlantWatch volunteers Andrea Nistler (left) and Brian Johnson working together to collect seed on a survey. Photo by Angie Miner, UMLA.

Survey efforts take us far and wide across our ecologically rich and diverse state, from the northern peatlands in search of delicate orchids in deep sphagnum moss hummocks to the bluffs of the southeast in search of cliffside specialists. On a pleasant morning this past August, we found ourselves at Pembina Trail SNA in Polk County, a beautiful mosaic of prairie. *Gentiana affinis* var. *affinis* (pleated gentian) is the target of our search efforts; a special concern species that was last recorded on this site over forty years ago. It is predominately a western

species but the toe of its range dips into northwest Minnesota, in the footprint of historic Lake Agassiz.

In Minnesota, this beautiful gentian enjoys lowlands in native prairies and saline wetlands. The MN PlantWatch team of staff and volunteers set off in search of suitable habitat, equipped with species ID guides and optimism. Our eyes scan the sprawling prairie of waving grasses and vibrant flowering forbs speckling the landscape. We move across dozens of acres, forming a systematic grid as we search high and low for our target species. Its short stature challenges our keen eyes, but not for long! A volunteer spots a tiny bright blue cluster of flowers nested low amongst the densely packed tall prairie grasses. The team gathers around the newly located pleated gentian and examines its distinguishing features; petals joined together at the base of the flower with small pale "freckles" on the upper surface. Giddy with excitement, we search the remaining survey area and document the population's extent.

Figure 24. Holes in pleated gentian seed pods left by unknown larvae. Image courtesy Angie Miner, UMLA.

Fast forward to September, we return to Pembina Trail SNA to collect a small percentage of seed from the pleated gentian population. We follow our previously recorded GPS points to the general area, but it is up to our keen eyes to relocate each plant. This time we train our eyes with a new mental search image, one that is far less colorful.

Staff and volunteers sift through brown withering grasses to relocate our target only to find that something found our hidden plants before we did. Larvae claimed the pleated gentian pods as their temporary home and feasted on most of the seed! We carefully inspect every seed pod picked for collection to avoid bringing back any hungry hitchhikers.

Following our adventure at Pembina Trail SNA we collect seed from two additional pleated gentian populations in the region. Collecting from multiple locations preserves a greater genetic diversity that is found in populations across a species' geographic range. We aim to collect seed from at least 50 individual plants within a population to better capture a representative range of local genetic variability, while limiting impact to natural reproduction.

Seeds collected by MN PlantWatch are taken to the UMLA's Rare Plant Seed Bank. A team of staff and volunteers carefully clean, count, and test the seeds for viability. Seeds are then stored in the long-term seed bank or used for purposes such as propagation or outplanting research. The Plant Conservation Program often conducts this research to better understand what conditions are needed to grow plants from the collected seed and how to reintroduce plants into natural habitats. Native plant reintroductions can help strengthen existing populations or possibly restore populations that were lost in the wild.

In 2025 MN PlantWatch volunteers and staff updated records of 92 plant populations and banked seed from over 42 populations! To date, MN PlantWatch staff have trained in 120 volunteers. You can learn more about MN PlantWatch by visiting our website.

This story was reprinted with permission from SNA Nature Notes, Winter 2025

The City of Oaks – *continued from p. 2*

According to an article by Guildenhuys, et al. (2024), there are 47 oak taxa in South Africa. The exact number of species is not known due to the uncertainty in identifying some species, hybridization between species, and species variability. The number likely ranges from 22 to 34. There are about a dozen species in Stellenbosch.

Several of the taxa that are planted in South Africa will be familiar to Minnesota botanists. These include white oak (*Q. alba*), bur oak (*Q. macrocarpa*), northern red oak (*Q. rubra*), and swamp white oak (*Q. bicolor*).

The most common species in South Africa is English oak (*Q. robur*). Its pedunculate (stalked) acorns, similar to those of Q. bicolor, make this species relatively easy to identify (**Figure 2**). It was the first oak to be introduced to South Africa in 1656.

Nearly 200 years passed before any other oak introductions to South Africa were recorded. Holly oak (*Q. ilex*), Cork oak (*Q. suber*; **Figures 25 & 26**), and Turkey oak (*Q. cerris*; (**Figure 27**) were the next introductions in the 1840's.

While roaming the streets of Stellenbosch I have seen several other oak species. These include Algerian oak (*Q. canariensis*; **Figure 27**), pin oak (*Q. palustris*; **Figure 28**), water oak (*Q. nigra*; **Figure 29**), Sawtooth oak (*Q. acutissima*; **Figure 30**), and a few I can't identify.

Stellenbosch is not the only town in South Africa with lots of oaks. They have been widely introduced throughout the country, especially in the Western Cape.

How did this situation arise?

When Dutch settlers arrived in Cape Town, they encountered the Cape Floral Kingdom dominated by fine-leaved, shrubby fynbos vegetation. Though an incredibly diverse flora, there are relatively few trees. The fynbos doesn't provide much wood for furniture, barrels for the wine industry, or shade. The first governor, Jan van Riebeeck, must have recognized this problem and soon began importing English oaks from Holland.

Figure 25. Cork oak, leaves and acorns. Stellenbosch, SA

Figure 26. Cork oak, bark, Stellenbosch, South Africa.

Figure 27. Algerian oak (Q. canariensis). Stellenbosch, South Africa.

Eyeing expansion, van Riebeeck sent Simon van der Stel eastward to look for crop land and a site for additional settlements. About forty miles into his journey, van der Stel encountered his first river, which he cleverly named, Eerste (meaning 'First') River. The banks were lined with trees and he proclaimed the area, "Wild Bosch" (forest).

This place turned out to be the ideal place for a settlement and in a humble gesture eventually called the area Stell's Woods, which became Stellenbosch. As the first mayor, van der Stel, went to work importing and planting English oaks. The earliest records of oak planting in Stellenbosch date to about 1670. He was succeeded by his son, Willem Adriaan, who continued the tradition of planting oaks, which continues to this day.

Figure 28. Pin oak (Q. palustris). Stellenbosch, South Africa.

Unfortunately, there are two main problems with the oaks. Most importantly, the oaks never really lived up to their expectations. Although they do make lovely shade trees, South African-grown oaks grow too fast, which makes the wood unsuitable for construction or barrels. That's because the longer and warmer growing season in South Africa, compared to that of temperate-grown trees, results in wider vessels, the water-transporting cells. As a consequence, the wood has a lower density and is more porous. When dried, the wood produces leaky barrels and warped lumber.

The second major problem is that oaks are susceptible to a variety of diseases. Fungal infections, powdery mildew, root rot, and the polyphagous shot hole borer (**Figure 31**) introduced from SE Asia, have taken their toll. The wider oak vessels not only make for poor quality wood, but have the added disadvantage of allowing fungal disease to spread more readily throughout the tree.

My oak research project also included an assessment of oak health. Out of 121 individuals on Ryneveld and Victoria Streets, 51.2%

Figure 29. Water oak (Q. nigra). Stellenbosch, South Africa.

Figure 30. Sawtooth oak (Q. acutissima). Stellenbosch, South Africa. Inset: acorn.

Figure 31. Polyphagous shot hole borer tunnels on London Plane tree, which is less susceptible to damage than the oaks.

Figure 32. This water oak, growing outside the Natural Science Building at Stellenbosch Univerity is completely surrounded by blacktop. Note how the roots are breaking up the blacktop behind the tree.

Figure 33. Removing a dead/dying oak in Stellenbosch, South Africa, March 2026.

of them were clearly unhealthy. The trees were either dead, nearly dead, or had lots of dead branches with brown, withered leaves. If you look closely at the photo of the Eikstad mall (**Figure 1**), you will notice that it is flanked by a nearly dead oak.

The health of some of the oaks is likely related to their growing conditions. Like street trees around the world, many Stellenbosch oaks don't have the best growing conditions (**Figure 32**).

Nearly every day I've seen evidence of work on the oaks (**Figures 33 & 34**). Oak maintenance must be costly to the city. It seems to me that the Stellenbosch city leaders have a very vexing problem – do they continue to plant oaks which are a beloved symbol of their cultural heritage? Or, is it time to use other species, especially indigenous trees, that would require less maintenance?

I know that Cape Town is starting to adopt the latter strategy. However, I'm not sure how Stellenbosch plans to handle this situation. In the meantime, I find the oaks very comforting. They remind me of my Minnesota home so far away.

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Figure 34. One week after the photo in Figure 1 was taken, this stump is all that remained of the oak tree near the entrance to the Eikestad Mall.

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