



Rare Plant
Monitoring
Program

2022 Annual Report

INCOMING!



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Editor's Corner

I'm excited to share all kinds of news about the Rare Plant Monitoring Program! First, let's talk about 2022. In this annual report you'll find stories about one volunteer rediscovering a tiny parasitic plant overlooking Lake Michigan and being transported back in time, another volunteer having a "hot, sweaty, long—but wonderful" day in Door County and someone who submitted 16 separate reports on a tricky rare sedge. There is a report from a Rare Plant Monitoring Program (RPMP) volunteer studying the habitat requirements of the state threatened ram's head lady's slipper, assessments of the 11 climate-vulnerable plants that made up our 2022 Species of the Year and an appreciation for a particularly prolific group of volunteers from southeast Wisconsin. And of course, there is a bounty of great photos of volunteers and the plants they found.



Now, let's talk about the future. I'm thrilled to announce that we have hired a new botanist to help coordinate the Rare Plant Monitoring Program! Jessica Ross started with the DNR's Bureau of Natural Heritage Conservation in April and will bring a wealth of experience to our citizen science project. We are so lucky to have her on the team and can use the increased capacity to develop the RPMP into the program the volunteers who commit so much time and energy deserve. Our increased capacity will allow us not only to improve the program via better communication throughout the busy growing season but also expand the program to potentially include things like group survey events, in-person trainings and more. And we're all ears when it comes to ideas for how the Rare Plant Monitoring Program can grow, so if you have creative ideas, please let us know.



Thanks as always for all the work you have done for rare plant conservation in Wisconsin and enjoy the 2022 annual report!

Kevin Doyle and Jessica Ross

Thank You, Volunteers

Maggy Adams
Derek Anderson
Jan Axelson
Ben Bomkamp
Laura Bradshaw
Vanessa Brotske
Tara Buehler
Aaron Carlson
Jeanne Christensen
Heidi Conde
Anna DeMers
David Eagan
Don Evans
Jacob Friend

Tom Ganfield
Kathleen Garness
Margaret Gibbs-Zautke
Alex Graeff
Emily Henrigillis
Paul Hlina
Eric Howe
Ben Johnston
Zach Kastern
Joanne Kline
Melinda Knutson
Debbie Konkel
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Christopher Noll
Michael O'Brien
Tracy Parker
Norah Pastorek
Kerstyn Perrett
Patricia Plichta
Lynn Preston
Corey Raimond
Ben Redding
George Riggan

Michaela Rosenthal
Shannon Roznoski
John Scholze
Matthew Shruck
Jeff Steele
Juniper Sundance
Phil Sylla
Tom Underwood
Connie Weedman
Amanda Weise
Mary Zaander
John Zydowicz

2022 Highlights

2022 was a busy year. Along with being one of my busiest field seasons, there were a number of personal highlights. My work took me to two of the four Wisconsin counties I had not visited yet, and both, Price and Taylor, were wonderful. I was also able to add a few species to my “life list,” including rarities like great Indian-plantain (*Arnoglossum reniforme*), marsh bedstraw (*Galium palustre*), small yellow water crowfoot (*Ranunculus gmelinii*) and Christmas fern (*Polystichum acrostichoides*).

You, the Rare Plant Monitoring Program volunteers, were busy, too. In total, 223 reports were submitted by over 50 volunteers, a huge source of data helping the plant conservation community better understand how these vulnerable species are doing and where we should put our conservation resources.

Sitting down to write the Rare Plant Monitoring Program annual report each year is a great opportunity to put each survey in its context. Whether they were updates on populations that hadn't been seen in decades, new reports that document rare expansion or examples of how different RPMP volunteers help the program, each survey has a story. Here are some highlights:



Scoring A Small Succulent

Six volunteers submitted reports on prairie fame-flower (*Phemeranthus rugospermus*), including the discovery of three new populations. Ben Bomkamp and Kerstyn Perrett found a new population along the Lower Wisconsin River in Richland County, Ben Redding found one in Adams County and Connie Weedman found one near Sparta. With succulent leaves and flowers that only open in the evening, prairie fame-flower is a strange member of the Wisconsin flora. It's listed as special concern here but is considered vulnerable globally. Luckily, Wisconsin has numerous populations, and our botanists have their eyes out for them!



Plants On Plants

Another strange group of plants are the dodders (*Cuscuta* spp.). These parasitic annuals look like silly string draped over the vegetation of a wetland or prairie. There are only six species of dodder in Wisconsin, four of which are considered rare, but almost all of them are very difficult to identify due to their tiny flowers. Fortunately, the RPMP volunteers are no slouches! Eric Howe found two new populations of hazel dodder (*Cuscuta coryli*) in Kenosha County while Corey Raimond found a new population of smartweed dodder (*Cuscuta polygonorum*) in Grant County. They each snapped excellent photos so I could confirm their identifications. Even parasites have their beauty.



County Records

RPMP volunteers found four county records in 2022. These are populations that represent the first reported occurrence of the species in the county and are important for documenting a species range and how it may be changing over time. Corey Raimond found smartweed dodder (*Cuscuta polygonorum*) in Grant County, Ben Bomkamp and Kerstyn Perrett found whip nutrush (*Scleria triglomerata*) in Crawford County and Vanessa Brotske found Great Plain's lady's tresses (*Spiranthes magnicamporum*) in Brown County.



David Eagan

Found Safe And Healthy

Northern comandra (*Geocaulon lividum*) is one of the rarest plants in Wisconsin. Only two populations are known, both in Door County. Despite its extreme rarity (or maybe because of it), we haven't received an update on either population in at least 23 years. David Eagan rectified that situation by visiting a population in the far north end of the county. Estimating over 1,000 plants at the site, David described the survey as "hot, sweaty, long but wonderful! Nice to get this population back into the column of "healthy and thriving."



Tom Ganfield

More Reports On A Midwest Endemic

Kittentails (*Besseyia bullii*) is a Midwest endemic and imperiled throughout most its range. In Wisconsin, it is doing relatively well, especially in the Southern Kettle Moraine area. In 2022, Jeanne Christensen, Tom Ganfield, Lynn Preston and Zach Kastern submitted reports on a combined 10 populations, including the discovery of a new population on private land. Since Wisconsin has such a strong influence on the global status of this species, the data these volunteers collect will continue to help us learn more about its population trends and how it responds to threats and management actions.



Tara Buehler

The Find Before The Storm

Limestone oak fern (*Gymnocarpium robertianum*) has been found scattered from Grant County to Lake Superior, though the majority of the populations are in northeast Wisconsin. Of these, the largest occurs along the Niagara Escarpment just outside of Green Bay, but it hadn't been seen in 30 years despite at least one survey by an RPMP volunteer. Tara Buehler visited the site this summer and before being chased out by an impending thunderstorm, she found hundreds of fronds. She even took nice close-up photos of the glands scattered along the rachis, which is key to identification.



Derek Anderson

I've Got The Receipts

In 2022, RPMP volunteers submitted a total of 221 rare plant reports. Leading all volunteers was Derek Anderson, who reported on 27 populations. Derek is an expert in the flora of northwest Wisconsin, but within that area, has reported on plants found everywhere, from prairies to barrens to talus slopes and even lakes. Highlights include a 28-year update to a prairie fame-flower population and documenting abundant fruit production in dwarf milkweed (*Asclepias ovalifolia*), a rare occurrence for that species.



Ben Bomkamp and Kerstyn Perrett

Travelling Far And Wide

RPMP volunteers can be an intrepid bunch, willing to travel far and wide to spy a unique plant. Among the group, Ben Bomkamp and Kerstyn Perrett stood out, with 228 miles between rare plant reports. Michaela Rosenthal and Tom Underwood travelled 130 miles, while Derek Anderson and Ben Redding covered 105.



John Scholze

Sedges Don't Scare Me

We all know that sedges are hard to identify. But even “sedgeheads” fear the sedges known as the *Ovales* group for their variability and often only minute differences. John Scholze ain't afraid. In 2022, John submitted 16 reports on clustered sedge (*Carex cumulata*), a member of the notorious *Ovales* group, including an update on a population last seen in 1915! His eagle eye has shone a light on an otherwise easy to overlook plant.



Alex Graeff

Negative Updates

Unfortunately, 29 surveys failed to find their target in 2022. Although not finding what you're looking for is disappointing, the results sound the alarm on the need for intervention. Of particular note, Zach Kastern collected important “negative” data on hairy petunia (*Ruellia humilis*); Amanda Weise and Derek Anderson on dotted blazing star (*Liatris punctata* var. *nebraskana*); and Alex Graeff, Patricia Plichta and Joseph Mui on four populations of fairy slipper (*Calypso bulbosa*), an inhabitant of white cedar swamps.



Ben Redding

The Jolly Old Fern

Christmas fern (*Polystichum acrostichoides*) reaches the western edge of its range in Wisconsin. Although most of our populations are along the Lake Michigan counties, the largest and most viable is all the way over in Crawford County. Despite its importance, this population hadn't been visited since 2000 until Ben Redding was put on the case this fall. On his first visit, he was spurned by the fern, not finding any plants, but he returned later that week to scour the area further. And lo and behold! He found a nice population — even more plants than previously reported — persisting on the site and very few threats.



Eric Moburg

Out Of Place, Not Out Of Time

In 2008, woolly milkweed (*Asclepias lanuginosa*) was found in Polk County, by the far the most northern population in Wisconsin. Since then, it had not been relocated despite at least one survey by a local RPMP volunteer. Eric Moburg visited the site this summer and found 40 woolly milkweed stems across a few nearby sub populations. It's great news for such a disjunct population that has been declining throughout its range in the Midwest.

Rare Parasitic Plant Rediscovered In Dunes Over Lake Michigan

Perhaps the most significant rare plant discovery of 2022 was of one of our smallest plants. Tom Underwood relocated a population of the state-threatened clustered broomrape (*Orobanche fasciculata*) on the dunes along Lake Michigan in Manitowoc County. Tom first set out to find this population, which was last seen in 1979, in 2018, but after “an exhausting search up, over and along deep, dry and unconsolidated sand,” he gave up. Despite coming up empty-handed, when he returned in June 2022, Tom was confident that he’d find the minute, maroon, parasitic plants.

“My informal understanding of this species is that populations can be fairly stable if not all that robust,” Tom said. Despite his confidence, the odds were long that he, or anyone else, would find these strange plants again. Clustered broomrape is a tiny plant that could easily be buried by shifting sand. On top of that, this particular population hadn’t been seen in over 40 years and we didn’t have very precise information on where it was found. It was the proverbial needle in a haystack survey.

But sure enough, within a few steps of beginning his survey, a couple tiny, dried stems from the previous season caught his eye.

“Immediately I observed three live plants in close proximity to the dry stems,” Tom said. “As early as it was in my search, I continued down the sand dunes fully expecting to locate more individuals. No more were to be found.”

Like many rare plant surveys, Tom’s discovery, actually seeing the plants



Clustered broomrape is found in sparsely vegetated dunes.
Photo Credit: Tom Underwood

he was looking for, was only part of what made the day memorable.

“The site where I located these plants was quite devoid of human evidence. I could imagine, as I looked around, that the same vista would have confronted Native Americans long before the arrival of the first Europeans. Out to the horizon, I could see no watercraft of any kind, in the sky there were no airplanes or jets with their associated condensation trails, there were no sounds attributable to human activity, no aromas of mega-farms or vehicle exhaust, there was no unnatural debris accumulation. All of the vegetation I walked through, widely disbursed as it was, was contending with the same punishing environmental conditions that have been assaulting this area hundreds if not thousands of years before today.”

This is a sentiment I’ve heard from volunteers over the years. Finding the target plant brings excitement



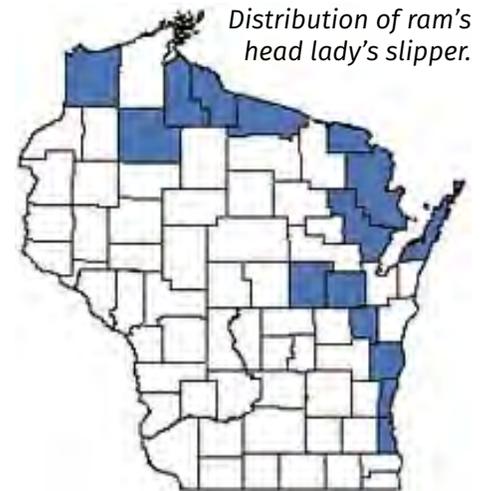
Clustered broomrape is a tiny parasitic plant that does not photosynthesize. The stem is mostly buried underground, so often only the flower stalks are visible.
Photo Credit: Robbin Moran

and a sense of accomplishment, but the beauty of the wild places they are growing in and the feeling that you are stepping into the ancient story they are a part of, cement the memory in a way that stem counts or GPS coordinates never can.

What Does An Orchid Need To Thrive In Wisconsin?



The distinctive flower of ram's head lady's slipper.
Photo Credit: Wisconsin DNR



By Jason Miller
Rare Plant Monitor

Editor's Note: Jason Miller is a Rare Plant Monitor from northeast Wisconsin. He moved to Wisconsin in 2018 and has made some interesting and important finds since then. Jason recently received a master's degree from UW-Green Bay where he studied the state-threatened ram's head lady's slipper (Cypripedium arietinum). The following is a report on what he found.

If you have spent any time driving around the rural parts of Wisconsin, it is a common sight to see a plethora of orchids growing in the ditches along the roads. While this might make it seem that orchids are common occurrences, this is not the case for most orchids. Orchid conservation has been seeing an increase from researchers to landowners. These entities are trying to better understand what requirements orchids need to survive to not only ensure that current

populations thrive but also to expand. Through my research at the UW-Green Bay, my goal was to help shed some light on the requirements of *Cypripedium arietinum* (ram's head lady's slipper).

Life History Of The Ram's Head

The ram's head orchid is the smallest lady's slipper orchid in Wisconsin, typically growing to less than 12 cm tall. When in flower, this species is unmistakable, however, flowering is irregular thus making it a challenging species to find.

This species has a restricted distribution and is only found in 14 states or Canadian provinces and approximately 400 occurrences. Here in Wisconsin, there are 44 populations that have been reported. With my research, my main question was, what are the microsite requirements for this species?

Ideal Environmental Conditions

All plants need their seeds to be deposited into the appropriate

habitat for successful germination. And a plant's long-term survival can be driven by the soil chemistry. The ram's head has been documented in a variety of habitats, which are all uniquely different from each other, but some underlying factor allows the ram's head to grow in each of them. By analyzing the soil of extant populations, it is possible to narrow in on the specific requirements of this species. And further, by comparing these results to historic populations, it can help better understand if there are unseen changes happening to these sites.

Results showed that most soil characteristics fell within levels that have been documented for the habitats this species occupies. For example, the documented pH ranges from 5.41 – 7.0, and the results from my research were 5.2 – 7.0. Comparing extant populations to historic ones showed that the soil characteristics were relatively similar, however, extant populations averaged higher

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for most variables, hinting that something else is at play.

So, What's Next?

Admittedly, there were no groundbreaking results from my research. However, there has been little research done on the ram's head. This work can act as the baseline for other researchers. The ram's head is a challenging plant to find in the field, so further surveys to locate more populations are key to understanding this species.

While the results for the soil analysis are insightful, they are limited in what they can tell us. The soil variables tested do not act

independently from one another but are always interacting, and an increase or decrease in one can influence another. By analyzing more populations, these complex interactions could be examined in detail. While there was a suite of soil characteristics analyzed with my research, there are other factors that were not examined, such as soil temperature, soil moisture or the availability of sunlight that could show to be important for this species.

Ultimately, this species is at the southern extent of its range here in Wisconsin and is quite rare. This creates inherent challenges in understanding its requirements. Are places where *C. arietinum* is not found truly unsuitable to this species or are plants not found in these



locations merely because they were unable to spread to these unoccupied sites? What is clear is that broader investigations across this species range and various habitat types are necessary.

2022 Species Of The Year Review

In 2022, the Species of the Year were 11 plants that appeared particularly vulnerable to climate change. These species are either at the southern edge of their range in Wisconsin or rely on a habitat that is predicted to be impacted by climate change. In total, 13 reports on eight of these plants were submitted in 2022. In the last five years, 46 reports on these species have been submitted. Using this information, we can reassess the status of these plants to see how they are faring.



Floating Marsh Marigold (*Caltha natans*)

Although there have been no updates on this species since one plant was found in 2008, its extreme rarity here in Wisconsin is enough to continue to be concerned. Only three populations are known with a total of 102 individuals. The vast majority of the individuals known in Wisconsin are at one site, which is on private land and is/was actively used for agriculture. The impacts of cattle grazing on the viability of this population is up for debate since the species may benefit from some disturbance. Alternatively, it may be trampled, lost to erosion or decline due to water quality degradation. As a circumboreal species, it is threatened by warming temperatures as well as drought and even catastrophic floods. This species will continue to be tracked as critically imperiled (S1).



Small Yellow Pond Lily (*Nuphar microphylla*)

There are at least eight extant populations of small yellow pond lily in Wisconsin, but more are likely to be found with increased survey effort. In the last five years, eight reports have been submitted, including three from RPMP volunteers. At least two of these populations are ranked A or B, meaning they have good or high viability. Most populations are in undeveloped or minimally developed waterbodies, so threats appear minimal. Climate change, along with hybridization with a more common species, are some of the biggest concerns for this species, but the extent of these threats is unclear right now. Until we get a better sense for the total number of populations and the extent of threats, this species should be considered imperiled-vulnerable (S2S3).



Derek Anderson

Squashberry (*Viburnum edule*)

Five reports of squashberry have been submitted in the last five years, including four by RPMP volunteers. Although the species has been reported from a few different locations, all in the Blue Hills, it's possible that most of these were based on misidentifications and there is only one population in Wisconsin. That one population appears to be stable, fortunately, and there are very few threats due in large part to the habitat it is found in. The felsensmeer habitat where squashberry grows is characterized by talus slopes where cold air emanates through the rocks, insulating an otherwise boreal-arctic species from warming temperatures. Additionally, the inhospitable nature of the habitat prevents encroachment and limits recreation. All this has resulted in the population size being very similar to 20 years ago and even 20 years before that. However, the fact there is only one occurrence in the state makes the species extremely vulnerable to extirpation. It should continue to be tracked as an imperiled (S2) species.



Wisconsin DNR

Rock Whitlow-grass (*Draba arabisans*)

Seven reports of rock whitlow-grass were submitted between 2018 and 2021, including three "negative" reports where no plants were found. Although three populations may have winked out, these were small so their loss does not weigh as heavily on the statewide viability of the species. The largest population — in northern Door County — is up to 10 times larger than any other population, but it has not been extensively surveyed since 1997. Since then, Lake Michigan has risen to record levels. How this population responded to those changes has a large influence on the overall status of the species in Wisconsin but is a great unknown currently. Fortunately, all populations are on protected land where they are somewhat buffered from major habitat destruction though threats like invasive species and recreation are still relevant. Overall, this species is tracked as imperiled-vulnerable (S2S3) until more info is gleaned on the status of the large population in northern Door County.



Dave Czoschke

Linear-leaved Sundew (*Drosera linearis*)

Eight populations of linear-leaved sundew have been observed in Wisconsin, but only four have been seen in the last 40 years. Fortunately, these populations appear to be stable, though they do seem to fluctuate over time. Invasive species like glossy buckthorn, Phragmites and cattail could be a threat but currently are not imminent at any sites. Climate change is likely the biggest threat but based on recent population trends (which appear stable), this threat may be relatively small. The constant input of groundwater in the fens linear-leaved sundew is found in may buffer its exposure to increasing ambient air temperature. Further, all populations are situated in relatively good context (e.g., protected sites, adjacent to state natural areas), which buffers them somewhat from surrounding land use that may impact groundwater flow. Lastly, the floating mat the sundews grow on likely buffers them from flooding. This species is still a conservation concern but should be changed from critically imperiled (S1) to imperiled (S2).



Chris Noll

Limestone Oak Fern (*Gymnocarpium robertianum*)

Four reports of limestone oak fern have been submitted in last five years, including three by RPMP volunteers. There are six extant populations of this species, five of which are in northeast Wisconsin and one in Vernon County, and there are between 700 and 1,600 individuals all told. The status of the Vernon County population is questionable because it has not been observed in decades and other populations in southern Wisconsin also seem to have disappeared. The species may have also disappeared from the Lake Superior area. Threats include invasive species and timber harvest, but half of the populations are on state natural areas, where these are theoretically less of a concern. Further, some larger populations of limestone oak fern are in or adjacent to forest stands that have been logged in the last 50 years, so some canopy opening may be beneficial. Overall, in intact cedar swamps, the species appears to be doing ok and more populations may be found in the future. The species should be downgraded from critically imperiled-imperiled (S1S2) to imperiled-vulnerable (S2S3).



Scott Namestnik

Northwestern Sticky Aster (*Canadanthus modestus*)

This species occurs at only one site in Wisconsin, and it was visited in 2022. That survey found the population was actually more extensive than previously thought, which is great news. Around half the individuals had been browsed by deer, but otherwise the plants were robust. Disturbance from a nearby pipeline is a threat, but this is not guaranteed to encroach on the aster. Warming temperatures are also a threat, but since last year's survey found more plants than were seen in 2008 when the population was discovered, we haven't seen their impact yet. The lone Wisconsin population is located within an state nature area, which provides some protection, though invasive species are still a threat. Despite the apparently growing population and high quality habitat, the extreme rarity of northwestern sticky aster is enough to keep it in the most critically imperiled category of concern, S1.



Wisconsin DNR

Cliff Cudweed (*Pseudognaphalium saxicola*)

Four populations of the Wisconsin endemic cliff cudweed have been visited in the last five years. There is more evidence that populations have declined over the last 30 years. Only the very large increase of one site in 2017 masked this trend. Further, the species' restriction to a specific habitat along a small number of rivers, all of which have seen multiple very extreme flood events in the last 15 years, makes it more vulnerable. It is possible that large floods may remove competing vegetation, which would improve habitat conditions. However, if this were the case, it's likely the 2017 counts would have been higher across the board instead of at just one site. This species should continue to be tracked as imperiled (S2)



Emmet Judzewicz

Marsh Valerian (*Valeriana uliginosa*)

Seven reports of marsh valerian have been submitted in the last five years. At a number of sites, including some of the larger populations, it is clear that the species has declined. However, at least two large populations in northern Wisconsin still exist. Invasive species are a threat at the most southern population (Waukesha County) but less so north where most of the individuals are found. Here, climate change (flooding most notably but presumably drought and warming temperatures as well) along with habitat encroachment are the biggest threats. That said, the species may be somewhat buffered by warming temperatures due to the groundwater flow that characterizes its habitat. This species should continue to be tracked as imperiled (S2).



Wisconsin DNR

Giant Rattlesnake-plantain (*Goodyera oblongifolia*)

There are eight populations of giant rattlesnake-plantain in Wisconsin and more may be discovered, especially in Door County where new populations were found recently. Most populations are very small, but there are at least two large or very large populations considered highly viable. Geographically, the species is limited to the northern tier of counties, suggesting that it is vulnerable to warming temperatures. However, populations along Lake Michigan in Door County and on the Apostle Islands may be buffered by the moderating effect of the lakes. Seven of the eight populations are on protected sites and the eighth is on county forest, so there is little concern about habitat destruction. This species was formerly considered critically imperiled but should be downgraded to vulnerable (S3).



Wisconsin DNR

Lesser Wintergreen (*Pyrola minor*)

There are eight populations of lesser wintergreen in Wisconsin, four of which were discovered in the last 10 years, and more populations will likely be found since the species is easily overlooked. However, all but one population is small, fewer than 70 individuals. One population in Bayfield County had 200 individuals in the mid-1990s but many fewer on the next visit and no plants in 2020 when the site was completely flooded. The fate of this population and whether the numbers rebound weighs heavily on the overall status assessment. Until it does rebound, however, we should assume the population no longer has high viability. Invasive species, herbivory and timber harvest are likely not big threats since populations usually occur in high quality, protected sites, but climate change is a major threat. This species should be tracked as critically imperiled-imperiled (S1S2).

Southern Kettle Moraine Volunteers

Since the Rare Plant Monitoring Program began in 2013, over 1,500 reports have been submitted from 68 of the 72 counties in the state. The map is patchy, matching trends in human population density and large tracts of public land. The Southern Kettle Moraine area of Waukesha, Walworth and Jefferson counties stands out though, as a particularly hot spot for rare plant reports.

“The fact that the Southern Kettle Moraine is so extensive and varied, yet close to some urban areas makes it a great place to get away,” says local RPMP volunteer Lynn Preston. “Because of the different terrains, some areas are easier to access than others, so I think that attracts people.”

Another RPMP volunteer, Zach Kastern, adds “there is a ton of acreage available to us in the public lands around us here.”

The “Southern Kettles” has had more rare plant surveys than any other property or region in Wisconsin since 2013. In total, 22 volunteers have submitted over 140 reports! Twenty-four rare plant species have been surveyed, including federally threatened species and species found nowhere else in the state. And just like volunteers elsewhere, those botanizing in the Southern Kettles area are not just revisiting known rare plant populations. Since 2013, nine new populations have been discovered.

“The only way to protect these rare plants is to know where they are!”

Lynn Preston
RPMP Volunteer



Small white lady' slipper (Cypripedium candidum) was upgraded from vulnerable to imperiled based, in part, on data collected by RPMP volunteers.
Photo Credit: Jason Mills

That may not sound like a lot, but considering this area’s long history of exploration, it’s impressive that new discoveries are still made.

But don’t think that all the survey data coming out of the Southern Kettles means our work is finished there. The proximity to urban areas brings volunteers, yes, but also threats from development, habitat fragmentation, hydrological disruptions and invasive species.

Joan Fritzler,
an RPMP
volunteer from
the Southern

Kettles, said, “Even if covered extensively, due to invasive plants, these populations may disappear over time if not maintained, so I do think it is necessary to keep a close eye on [them].”



The Southern Kettles provide critical habitat for the state threatened prairie milkweed (Asclepias sullivantii).
Photo Credit: Wisconsin DNR

On the other hand, in areas that are getting habitat management, there is hope that sensitive species will return. “There is so much restoration work going on around here that you never know if something lost might be found again!” Zach said.

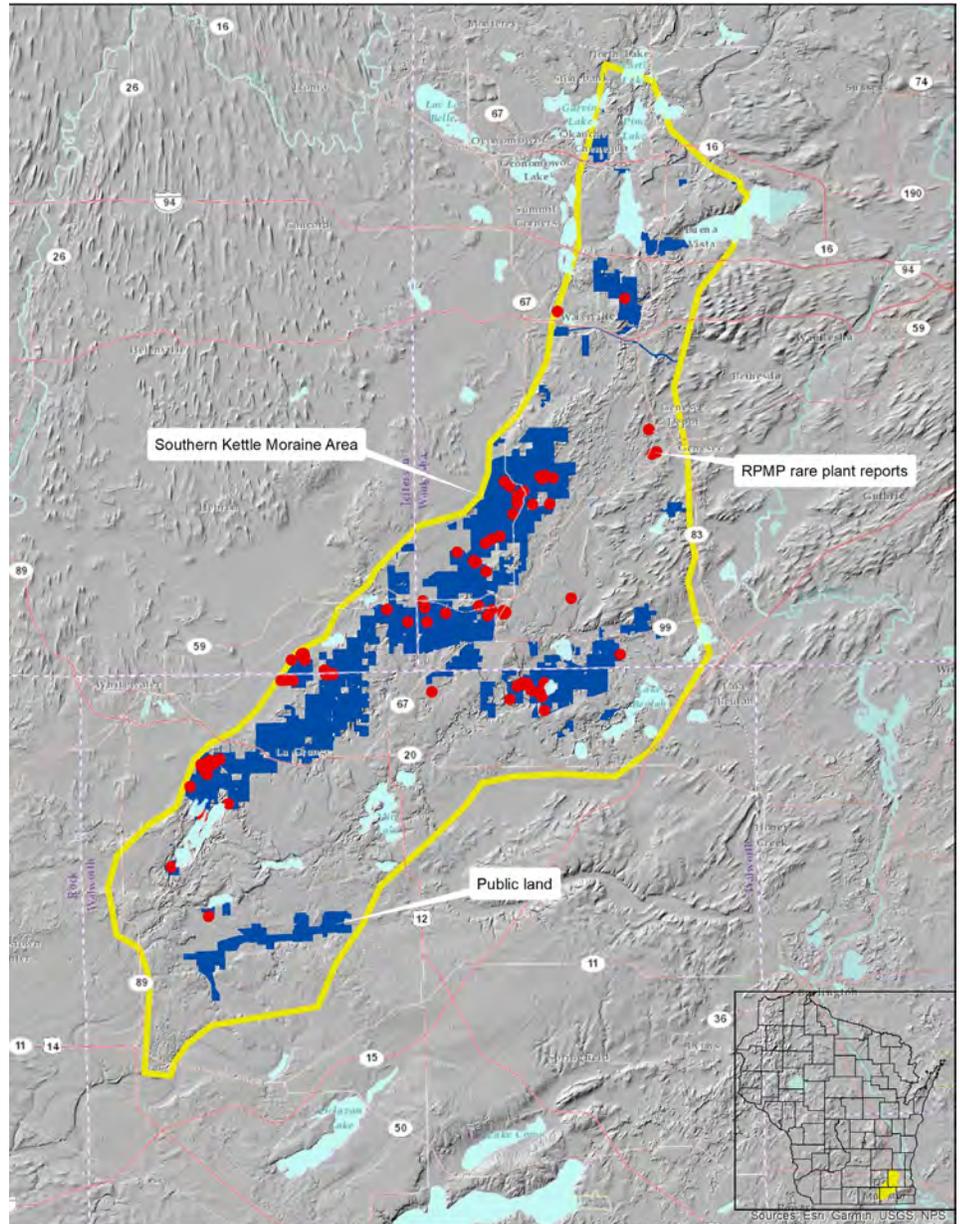
“The opportunities to educate and reconnect people to the land around here are numerous,” said Zach, “and I’m happy to help when I can.”

Lynn added the final word, reminding us that the data volunteers collect directly informs habitat management. “The only way to protect these rare plants is to know where they are!” she said.

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Here are some highlights from the Rare Plant Monitoring Program in the Southern Kettle Moraine area:

- Earleaf foxglove (*Agalinis auriculata*) is known from only two locations in Wisconsin, and both are in the Southern Kettle Moraine. Volunteers have monitored one population, finding plants growing in new areas within the site for the first time.
- In 2017, small white lady's slipper (*Cypripedium candidum*) was the Species of the Year. This orchid is scattered across southern Wisconsin, but almost a third of all populations are found in the Southern Kettle Moraine, making it a critical habitat area. Volunteers stepped up, submitting 10 reports, helping us upgrade small white lady's slipper's status from vulnerable to imperiled. Surveying a population of hundreds of these small beauties in a thin slice of prairie along a roadside was a personal highlight for Lynn Preston. "I've driven by this spot so often and had no idea these little gems were growing there," she said.
- One third of the state-threatened prairie milkweed (*Asclepias sullivantii*) populations are in the Southern Kettle Moraine area, including the only two considered to have good viability. Three volunteers have submitted nine reports on prairie milkweed over the years, including both of the highly viable populations.



- The unique geologic history of the Southern Kettle Moraine has created a rich natural heritage. One of the important features in this landscape is a high density of calcareous fens. These communities require constant groundwater flow through calcareous substrate, and the

flora associated with these fens are themselves unique and often rare elsewhere in the state. Three fen specialists surveyed by RPMP volunteers in the Southern Kettle Moraine are beaked spike-rush (*Eleocharis rostellata*), slender bog arrow grass (*Triglochin palustris*) and hairy valerian (*Valeriana edulis* var. *ciliata*).

Missouri Rock-cress

Each year the Rare Plant Monitoring Program picks a plant deserving special attention. Monitors are not required to survey for the species of the year, but the idea is to gain a statewide status update for a particular plant while also building excitement and allowing participants to become more familiar with one plant species.

Species Overview

Missouri rock-cress goes by the Latin binomial *Boecheera missouriensis*. The genus *Boecheera* was once considered synonymous with *Arabis* until genetic studies showed that these groups were in fact distinct. In the broad sense, *Boecheera* is a large genus, with over 100 species spread across North America, Greenland and eastern Russia. More recent studies suggest that most plants found in eastern North America, including Missouri rock-cress, should be placed in the genus *Borodinia* while the name *Boecheera* would almost exclusively apply to western species. In Wisconsin, 50 populations of Missouri rock-cress have been reported. But of these, only 25 have been seen in the last 40 years. Seven populations have been searched for recently without success.

Habitat And Range

Missouri rock-cress is found in rocky or sandy sites, usually with relatively little canopy cover. These sites can be oak-pine barrens, dry woodlands, bedrock glades or even sand prairies. Populations are scattered across the

Canopy closure may be more of a threat than the presence of weedy species like Kentucky bluegrass, sheep sorrel or even spotted knapweed.



Missouri rock-cress grows in sparsely vegetated glades, barrens and sand prairies, mainly in central and northeast Wisconsin. Photo Credit: Corey Raimond

northern half of the state, though most occur in the northeast. Common associates of these habitats include blueberries, huckleberry, bracken fern, poverty oat grass, sweet fern, hazelnut, Hill's oak and pines.

Biology

Though most species in the genus are perennials, Missouri rock-cress is a biennial. After germinating, it produces a basal rosette its first year. In June of the second year,

plants flower, and fruit matures as a slender flat pod called a silique in July. After going to fruit, the plant dies. No studies have examined self-compatibility in Missouri rock-cress, but related plants are self-compatible and pollinated by small bees and flies.

Identification Tips

Rock-cresses, like all mustards, have 4-merous flowers, meaning they have four petals and four sepals, and these are radially symmetric. Distinguishing the rock-cresses from each other, though, can be difficult. Among the 10 or so species in

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Wisconsin, Missouri rock-cress can be identified by its basal rosette leaves and flower size. The basal leaves are pinnatifid, or lobed more than half way to the leaf midrib. Lyre-leaved rock-cress (*Arabidopsis lyrata*) has similar leaves but is much smaller than Missouri rock-cress. Next, look to the flowers. Smooth rock-cress (*Boechera laevigata*) may look similar to Missouri rock-cress, but it does not have lobed basal leaves and its flowers are smaller (3-5 mm vs. 5-10 mm). Also, the petals of Missouri rock-cress are twice as long as the sepals while the petals of smooth rock-cress are only slightly longer than the sepals.

Conservation Concerns

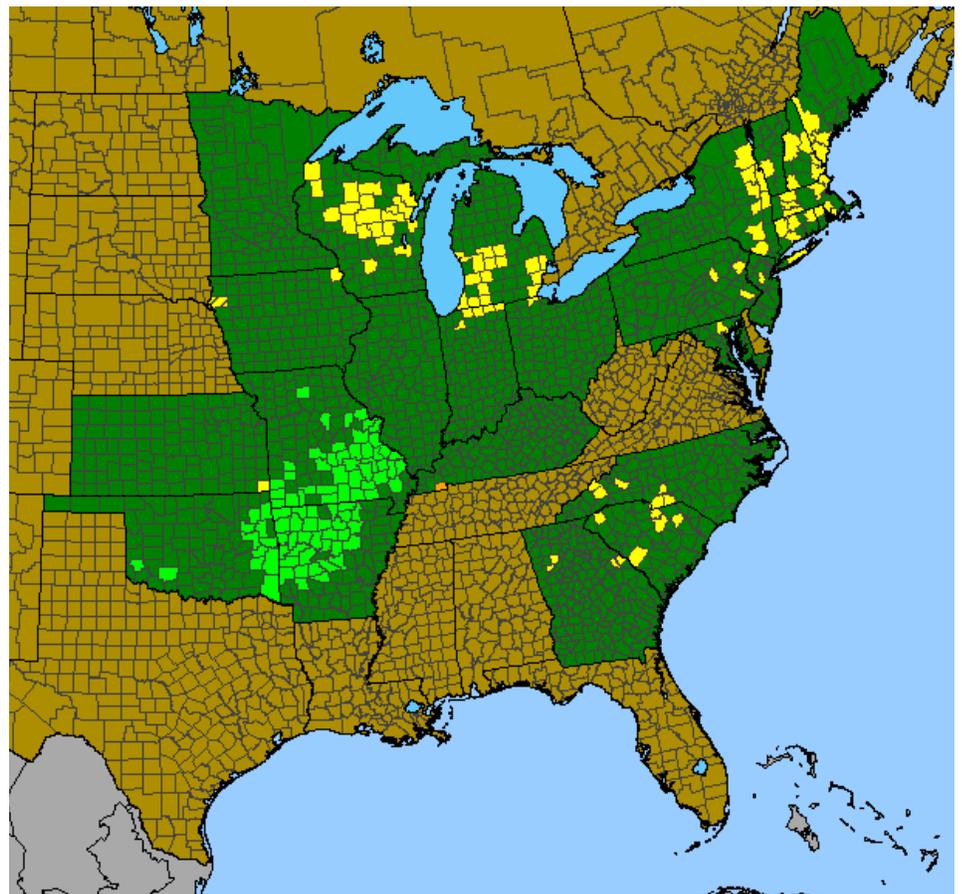
Missouri rock-cress is considered imperiled or critically imperiled throughout its entire range except for a stronghold in the Interior Highlands of Oklahoma, Arkansas and Missouri. Because it requires an at least somewhat open habitat, encroachment is always a threat, and fire suppression or tree planting for timber production will result in habitat loss. When open canopy is maintained, though, Missouri rock-cress seems to be able to handle other disturbances and can persist in otherwise low-quality sites like quarry edges or recovering sandy fields. Take this into consideration if you find a population of Missouri rock-cress this summer. Canopy closure may be more of a threat than the presence of weedy species like Kentucky bluegrass, sheep sorrel or even spotted knapweed. As a biennial seed, production is critical to maintaining population viability, but seeds may not remain viable in the seed bank for very long, reinforcing the importance of maintaining suitable habitat. That said, there is a lot we don't know about Missouri rock-cress and why it may be declining.



Top: The basal rosette of Missouri rock-cress is distinctive and a good way to identify it from similar-looking plants. The basal leaves are pinnatifid, meaning they are deeply lobed along their margins.

Right: The flowers of Missouri rock-cress are white and, like other mustards, have four petals. These flowers are larger than smooth rock-cress, which otherwise looks similar.

Bottom: Missouri rock-cress is found in four distinct regions in the U.S. and is considered rare in most of them. Graphic Credit: The Biota of North America Program



2022 Field Notes



Matthew Shruck

Matthew Shruck joined the RPMP in 2022 and got off to a quick start. He must have a nose for lady's slipper orchids because he was on their trail. Matthew submitted reports on four populations of two separate *Cypripedium* species last year.



Anna DeMers

Anna DeMers was also on the orchid hunt. She searched for three separate populations of putty root orchid (*Aplectrum hyemale*), a special concern plant that appears to be moving north recently. Anna relocated two of the three populations, finding one to be seven times larger than the previous report in 2017!



Aaron Carlson

Aaron Carlson has long been one of the most active rare plant monitors and has found a lot of interesting things over the years. In 2022, Aaron found a prairie false dandelion (*Nothocalais cuspidata*) population at a state natural area along the Rock River that hadn't been seen for 20 years.



John Zydowicz

Although other states have reported that blue ash (*Fraxinus quadrangulata*) is relatively resistant to emerald ash borer, we haven't found that to be true in Wisconsin. **John Zydowicz**, though, surveyed one site last summer and noticed that the mature blue ash trees were at least still living even though they might have been infected. The same couldn't be said for other species of ash at the site. We're hopeful that there will be enough reproduction from these trees to sustain a population at the site in the long term.



Chris Noll

Braun's holly-fern is scattered across a few locations in northern Wisconsin, but the majority are in the Penokee Range, two long ridges through northern Wisconsin made up of rocks over 2 billion years old. **Chris Noll** was poking around the Penokees last summer and spotted a single Braun's holly-fern, part of a population not seen in 26 years.



Liz Birkhauser

The Kickapoo Valley Reserve is one of Wisconsin's floristic gems. Plants typically found much farther north can be seen in all their glory here in central Wisconsin. **Liz Birkhauser** has been making trips to the area for the last few years, and while she's enjoying the scenery, has requested various rare plant surveys to tackle, including the rare sight of putty root orchid (*Aplectrum hyemale*) in flower.



Connie Weedman

Because putty root orchid puts up a basal leaf in fall that stays green all winter, it provides a unique opportunity for a late season rare plant survey. **Connie Weedman** took the prize in 2022 for last report of year, finding around 12 groups of putty root with at least 20 leaves per group.



Maggy Adams

In 2022, **Maggy Adams** returned to a prairie bush clover (*Lespedeza leptostachya*) site with renewed vigor after being denied the year before. Lo and behold, she found 71 plants! Her report was passed on to the property steward who noted that after a crash related to the 2012 drought, Maggy's survey shows that the bush clover population has rebounded to pre-drought numbers.



Jacob Friend

Botanists have noticed a disturbing trend among milkweeds recently. Many species rarely produce viable seed and populations seem to be declining as a result. Perhaps no milkweed in Wisconsin is in more trouble than woolly milkweed (*Asclepias lanuginosa*). **Jacob Friend** visited a population in Sauk County and found two fruiting plants, a reason to hope that this population is healthy and may even support future augmentation efforts elsewhere.



Jan Axelson

Jan Axelson has been doing almost annual monitoring of small white lady's slipper (*Cypripedium candidum*) populations around Madison since 2017. This is one of the earliest flowering non-forested rare plants, a harbinger of the growing season in prairies and sedge meadows. Jan's diligent survey efforts provide important information on how this species fluctuates in the short term.



Kathleen Garness

No moss grows under **Kathleen Garness's** feet. Already a botanical illustrator for the Field Museum in Chicago and a volunteer site steward for a natural area in Illinois, Kathleen joined the RPMP to monitor a population of wild hyacinth (*Camassia scilloides*) in southeast Wisconsin. In 2022, she returned to the site where no hyacinths were found the year before and found almost 1,000 plants! Despite the large number, though, the site needs help. Kathleen said, "The rich diversity of this site is belied by its weedy appearance. The site would benefit from removal of buckthorn and other non-native invasive species."



Margaret Gibbs-Zautke

Twinleaf (*Jeffersonia diphylla*) is part of a monotypic genus, meaning it is the only species in the entire genus. As such, these plants hold a unique amount of genetic diversity compared to genera with many species or species with multiple subspecies. **Margaret Gibbs-Zautke** censused a population in Milwaukee County, finding more plants than had ever been reported going back to 1952!



Shannon Roznoski

In June of 2022, **Shannon Roznoski** was collecting seed from a prairie in northern Green County when she spotted a small population of prairie turnip (*Pediomelum esculentum*). The data Shannon collected add to a nice set of semiannual surveys over the last five years, showing that, though small, this population appears stable, likely due to the consistent habitat management occurring at the site.



Juniper Sundance

Juniper Sundance has submitted 27 rare plant reports over the years, mostly focused on the Lower Wisconsin River, a rare plant hotspot. In 2022, she visited a population of a rare tree, American sycamore (*Platanus occidentalis*), which reaches the extreme northern end of its natural range along the river in Richland County.



John Meland

One of Wisconsin's most charismatic plants is the federally threatened eastern prairie white fringed orchid (*Platanthera leucophaea*). Its beauty is enough to lure any plant enthusiast, but few are willing to put in the work to maintain its fragile wet prairie habitat. **John Meland** is one of the few. Over the years, John has put in hours of work clearing brush from one site in Rock County that relies entirely on volunteer support for habitat management.



Don Evans

Aquatic plants are a group that is often difficult to identify. But the challenge is offset by the joy of paddling across undeveloped northern lakes, so **Don Evans** doesn't mind. Last summer, Don visited a population of small yellow pond lily (*Nuphar microphylla*) that was first reported in 2019. Don's survey greatly improved our understanding of where the plants occur in the lake and how big the population is.



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Learn more at <https://dnr.wi.gov/tiny/1261>