Survey of Invasive Plants in Sunfish Lake Park

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Invasive vs. non-native - definitions

The University of Minnesota defines invasive species as “A non-native organism that causes harm to the environment, the economy or human health.” Invasives can be catastrophic for the local ecosystem. In contrast, non-native plants are simply exotic in a region, but do not have the aggressive characteristics that create widespread distribution and total coverage that enable true invasives to outcompete the native species in the ecosystem

Invasive species can be introduced in various ways, most notably human intervention. They can spread in many forms, including little burs attached to your clothes, or seeds spread by the wind or animals. Their efficient distribution systems make it hard to regulate their spread.

It is common knowledge that trails are vectors for invasive growth, and are often where infestations begin. Trails are like highways for invasives, whose pollen, seeds, or burrs are carried by hikers, bikers, and animals at full speed from one area to the next. Next time you’re leaving the park, just as you would check for ticks, make sure to look for any burrs/seeds/pollen and wipe off your boots.

The best thing to do is stop their spread before they get too serious. That’s why your help is needed! During removal efforts, the best way to slow population growth is removal or destruction before the plant starts seed development.

Project Summary

This summer, we identified 10 of invasive species spotted in the park (excluding buckthorn, as there are already extensive removal efforts), chosen considering the DNR’s noxious weed list and the help of local ecologists. Using a program called EDDMaps to track coordinates in the park, we mapped out the species destructions on ArcGIS software, creating the compiling maps below. We focused primarily on the spots on or just off the park’s trails, since they’re the most accessible and likely where a majority of the noxious plants are being spread.

Results - Spot checks in areas far from the trails found significantly fewer invasive species, and lower concentrations of invasive individuals. On the restored prairie, there is some birdsfoot trefoil. In the forested area, there are Japanese Barberry and Oriental Bittersweet. These two are spread by the birds (and probably other animals) who eat their berries, in the same manner as buckthorn.

Future goals of this work include writing grants to begin removal of these species, and just general monitoring of the flora in the park. Future efforts could include invasive species pulling day, where volunteers could come to pull/treat noxious weeds in the park.

What makes invasive species so invasive?

These species have advantageous qualities, allowing them to outcompete native species.

- Massive seed production - are able to make so many seeds, they spread very quickly, mulleins are a great example

An example of the seed stalk of a mullein, that can have up to 1000 seeds.

- Quick growers - simply put, many invasives are aggressive and masters at growing twice the rate of native plants
- Hardy seed banks - some of these plants produce hundreds of seeds in one season, which can lie dormant in the soil for many years, preserving the population distribution area even after all visible specimens have been pulled.
- Vast root systems, which can survive mowing - Canada Thistle is especially difficult to eradicate due to its extensive system of horizontal underground roots at least eight inches deep.

An example of a Canadian thistle root system.

- Lack of predators – in their home soil, populations are kept in check by a variety of factors, including soil pathogens, specific climates, and grazing animals. But in non-native regions, in different ecosystems, few of these checks exist, contributing to unnaturally rapid population growth.

How can they affect native plants/ecosystems?

- Harm native plants, alter the local ecosystem
    - choke” native species, growing them over completely
    - cause changes in soil composition, introducing new nutrients, depleting others, act as wells for soil-borne pathogens, or introduce chemicals themselves,
    - increase soil erosion
    - pollinators can be more attracted to invasive species, further decreasing native plants’ chances of reproduction
- Act as hosts or carriers for disease
    - Japanese barberry is a reserve for black stem rust, a fungal disease that affects wheat crops
- Some are harmful to humans
    - yellow foxtail and wild parsnip, skin to plant contact causes burns
- Economic loss
    - expensive to remove, as they continually repopulate
    - dangerous to farmland, can decrease crop yields

Survey Results by Species

Invasive plants spread in a variety of ways, which are referred to as vectors. Many invasives likely spread through maintenance and use of trails, which is inevitable, and thus difficult to mitigate. They can also spread via pollinators, burrs that attach to animal fur, berries that are eaten by animals, and wind dispersal.

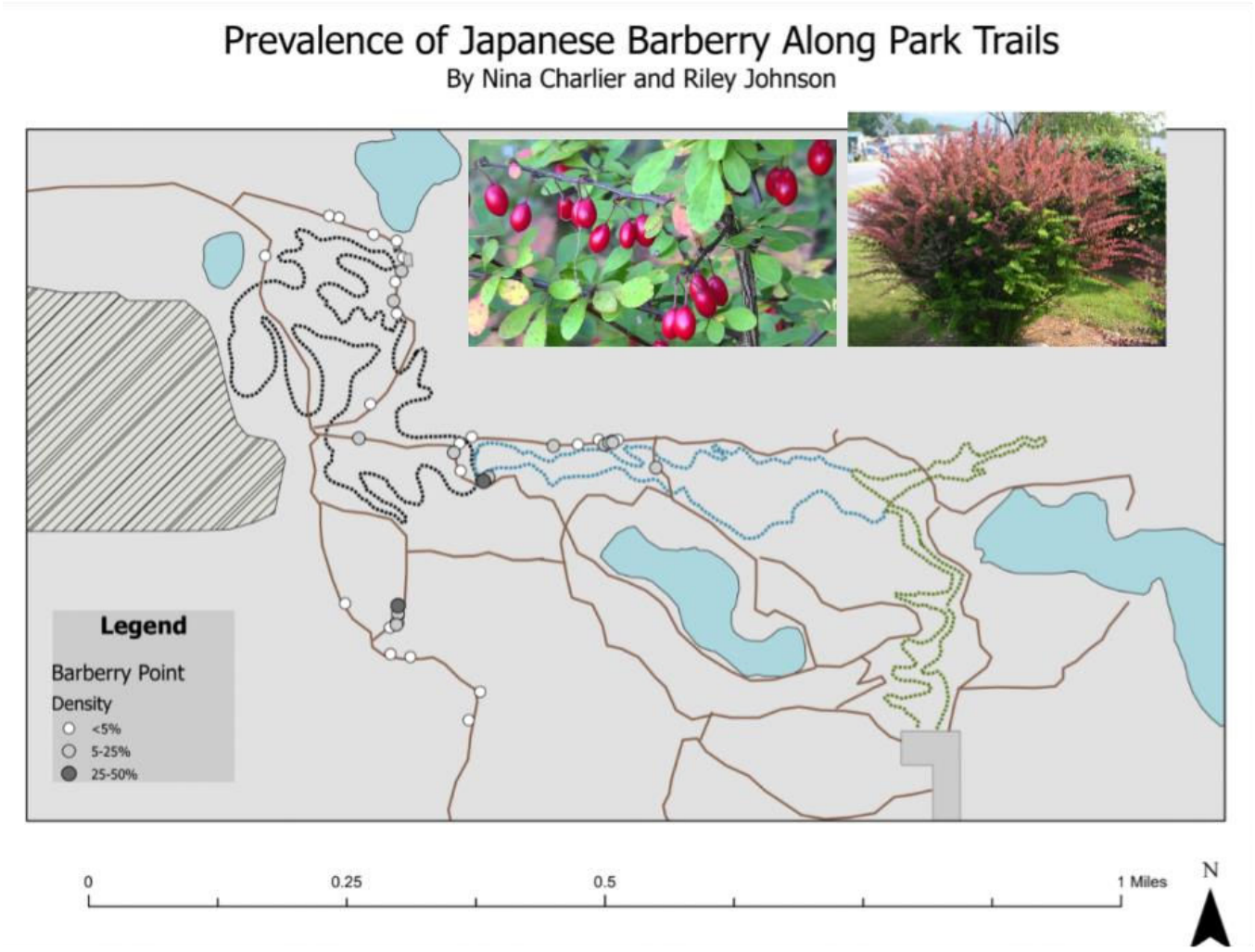
Seeds and burrs can easily hitch a ride on your hiking boots. A good practice is to check your shoes after a hike!

How invasives spread

Japanese Barberry 

how it spreads: berries eaten by animals, spreading undigested seeds

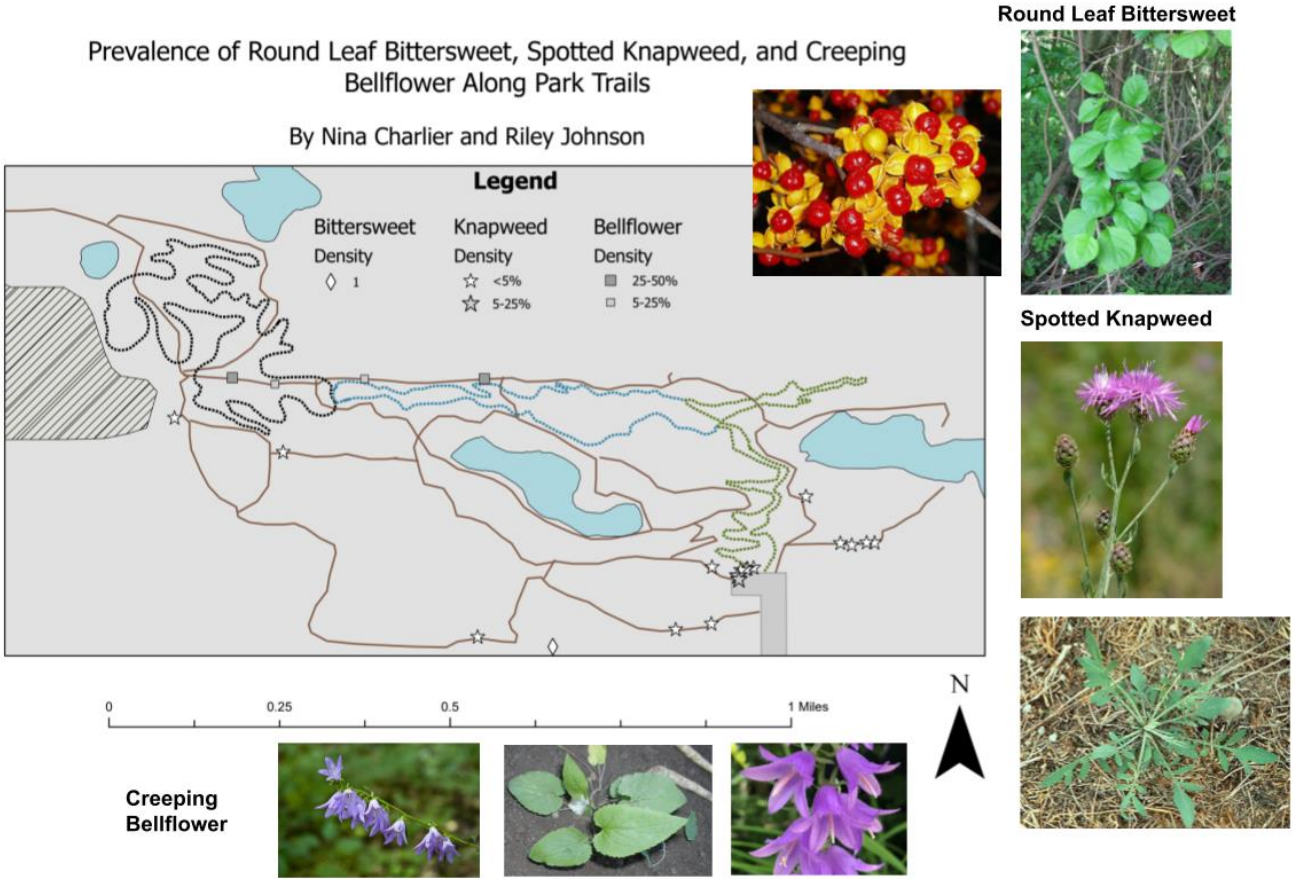
Japanese barberry is commonly planted as a shrub in home gardens. It has spread into wild habits, and is a host for ticks and black stem rust, a wheat pathogen (changing soil microbial communities and causing economic loss for farmers). This thorny plant quickly shades out native plants with its thick, thorny branches. It is spread primarily through its berries.



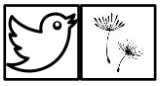
Oriental (round leaf) bittersweet 

how it spreads: berries eaten by animals, spreading undigested seeds

Oriental (Roundleaf) bittersweet is a vine that chokes native plants, and has even been known to cause whole forest canopies to break if its growth is unmanaged. The plant produces berries, which are eaten by animals who simultaneously spread their seeds. It is easily confused with the native American bittersweet, and thus hard to track down and remove.



SPOTTED KNAPWEED

Creeping bellflower 

how it spreads: bring flowers attract pollinators, pollen dispersed in the wind

Not to be confused with the American bellflower, the Creeping bellflower quickly develops into a noxious plant if unmanaged. It spreads via both its complex root system and its seeds. One plant can produce close to 15,000 seeds, which are generally herbicide tolerant. If being pulled, be sure to remove all part of the root system, or complete a follow-up chemical treatment. It was introduced to the US as a decorative plant, originally from parts of Europe and Asia.

Nodding thistle 

how it spreads: pollen carried by pollinators, seeds dispersed in the wind

The nodding thistle, also known as a musk thistle, got its name since the flower is at a 90 degree angle, as if the plant was nodding. It typically colonizes unmanaged land, such as roadsides and ditches, as it has difficulty establishing itself in already dense areas. It spreads quickly because grazing animals tend to leave it alone, due to its bad taste and prickly leaves.

Creeping (Canada) thistle 

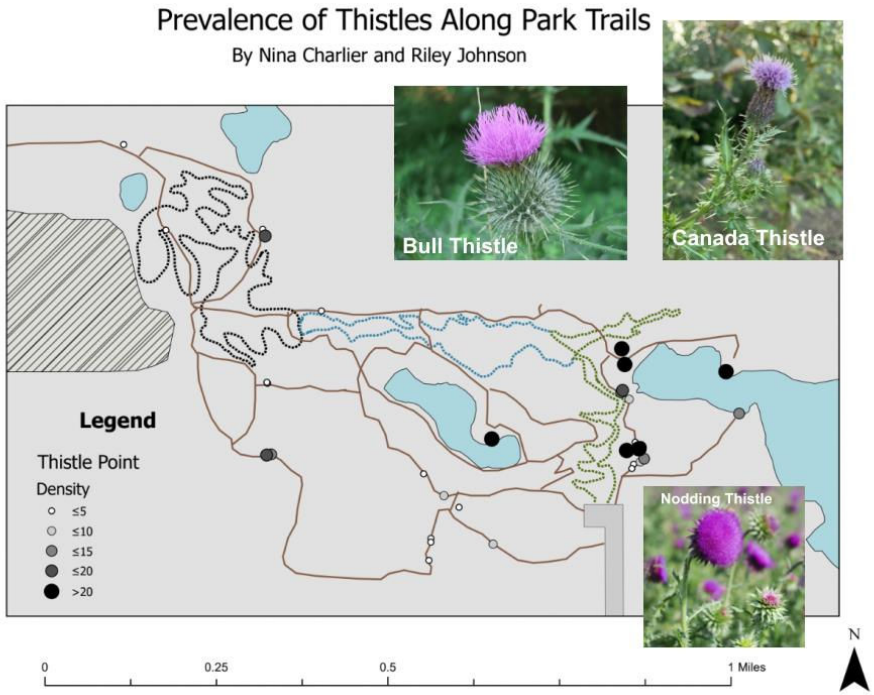
how it spreads: pollen carried by pollinators, seeds dispersed in the wind

Canada thistles, or the creeping thistles, are a particularly aggressive invasive. In mid-July, the flowers produce white fluffy windblown seeds. In addition, they have root systems going up to 15 feet deep. This renders pulling efforts practically useless, since a new plant can spread and sprout simply from its roots. Chemical treatments are the most effective option for removal. They are known to be allelopathic, secreting chemicals through their roots, disrupting neighboring plants. They should not be mowed after seeding, since that only increases seed dispersal.

Bull thistle 

how it spreads: pollen carried by pollinators, seeds dispersed in the wind

Like all thistles, bull thistle's spiky leaves ward off grazing animals that normally keep plant populations in control. Bull thistles can grow up to 6 feet tall, outcompeting the majority of its neighbors. The protective spikes of the plant makes it hard to pull out by hand.

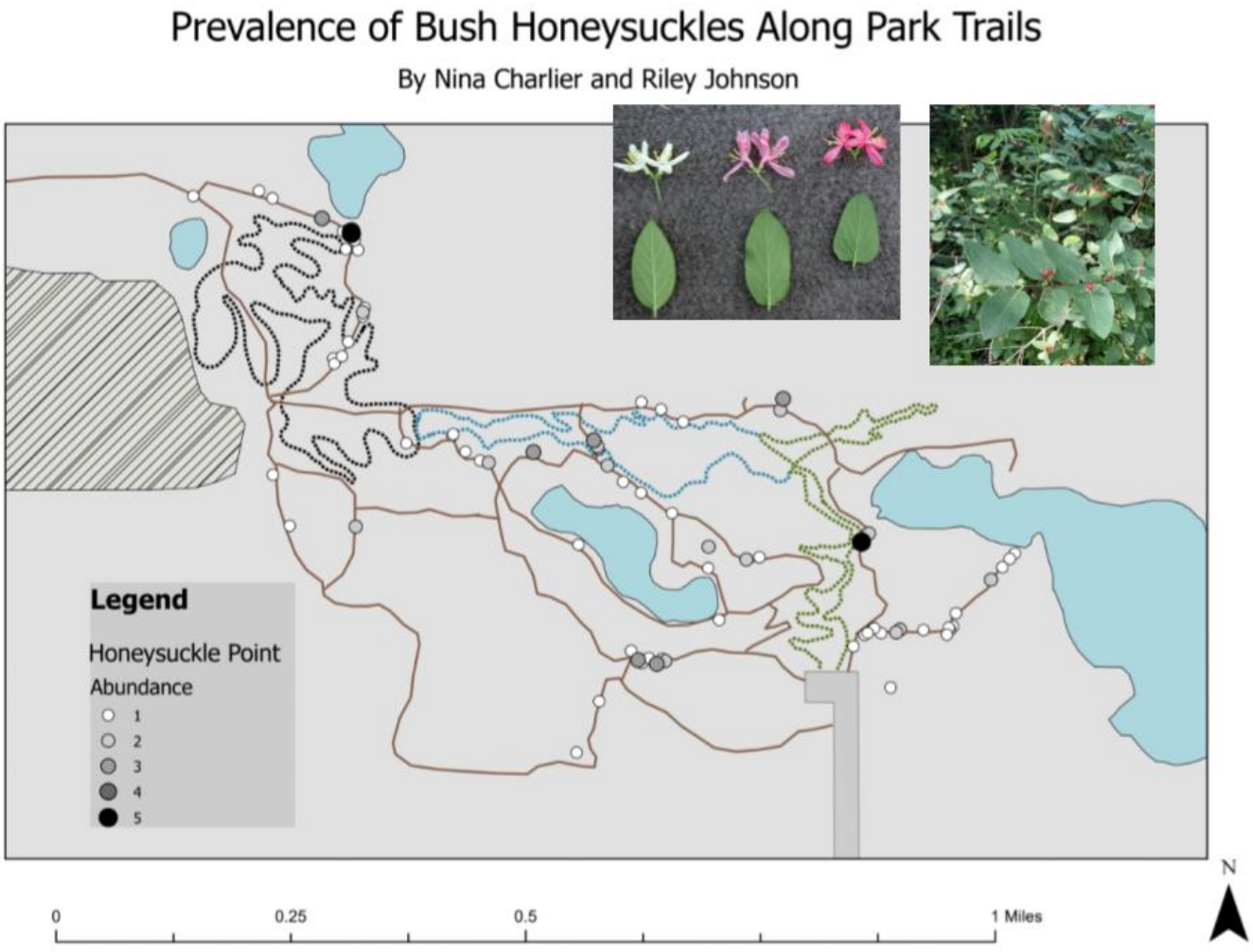


Tartarian and Morrow's honeysuckles

how it spreads: berries eaten by animals, spreading undigested seeds

We found two varieties of honeysuckle in the park, Morrow's and Tartarian, which are very hard to tell apart, so we combined their data. There is also a native species of honeysuckle, the Northern bush honeysuckle. They are most easily identified by their flower colors, which makes summer the ideal time to ID these plants.

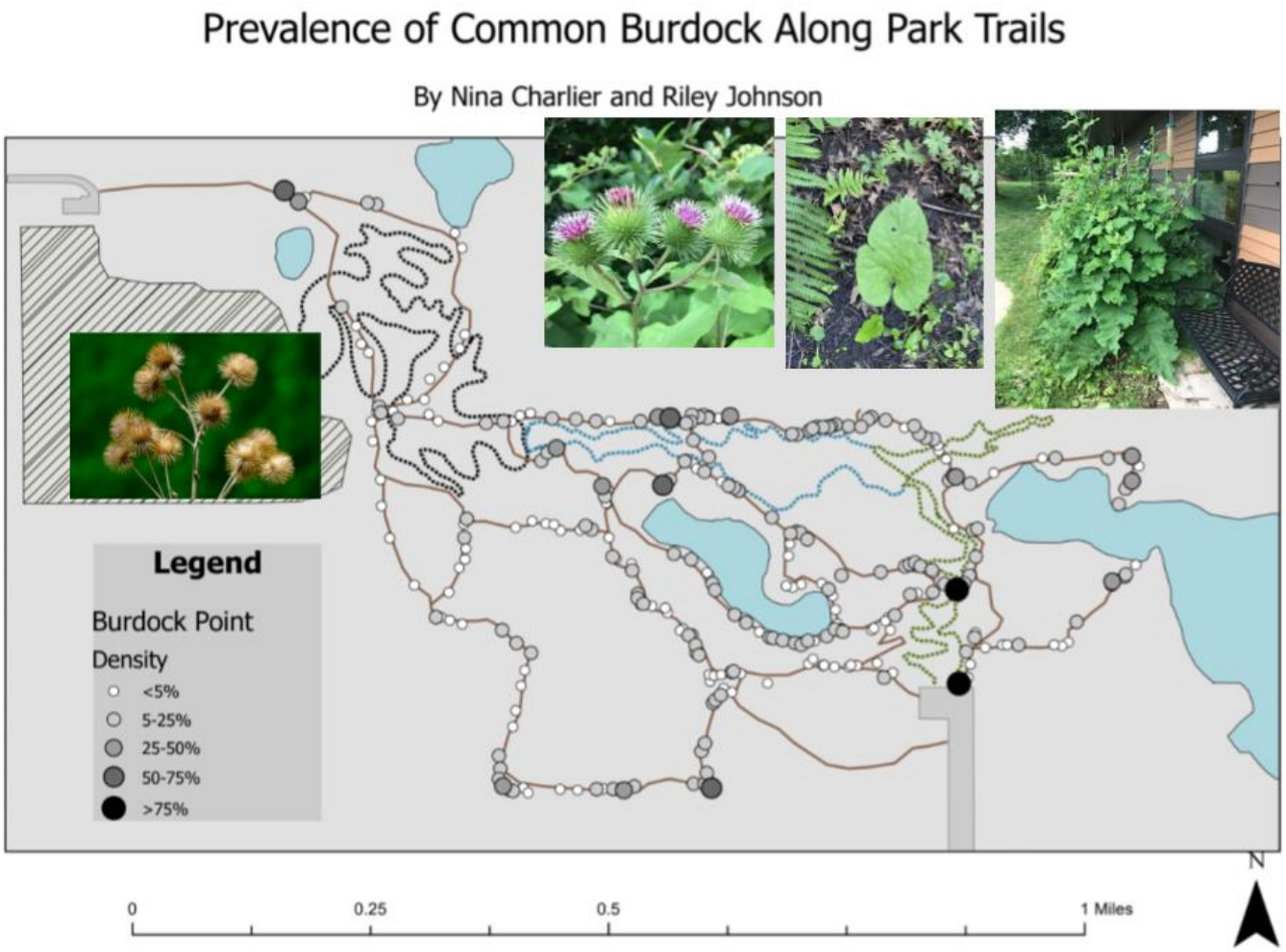
These shrubs start out small, but rapidly develop into massive multi-stemmed trees, engulfing local plants. They take resources from the understory ecosystem, including sunlight, moisture and soil nutrients. As a berry-producing plant, they are carried all over by birds and other grazers.

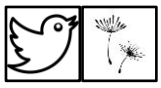


Common burdock 

how it spreads: burrs that latch on to animal fur or your clothes

Burdock was found all over the park, although you may not notice it during its first year of life. With a persistent seed bank and a vicious resistance to herbicides, burdock quickly grows out of control, even growing taller than Tony! The burrs attach easily to passer-byers, animal or human, effectively and efficiently spreading the new seeds.

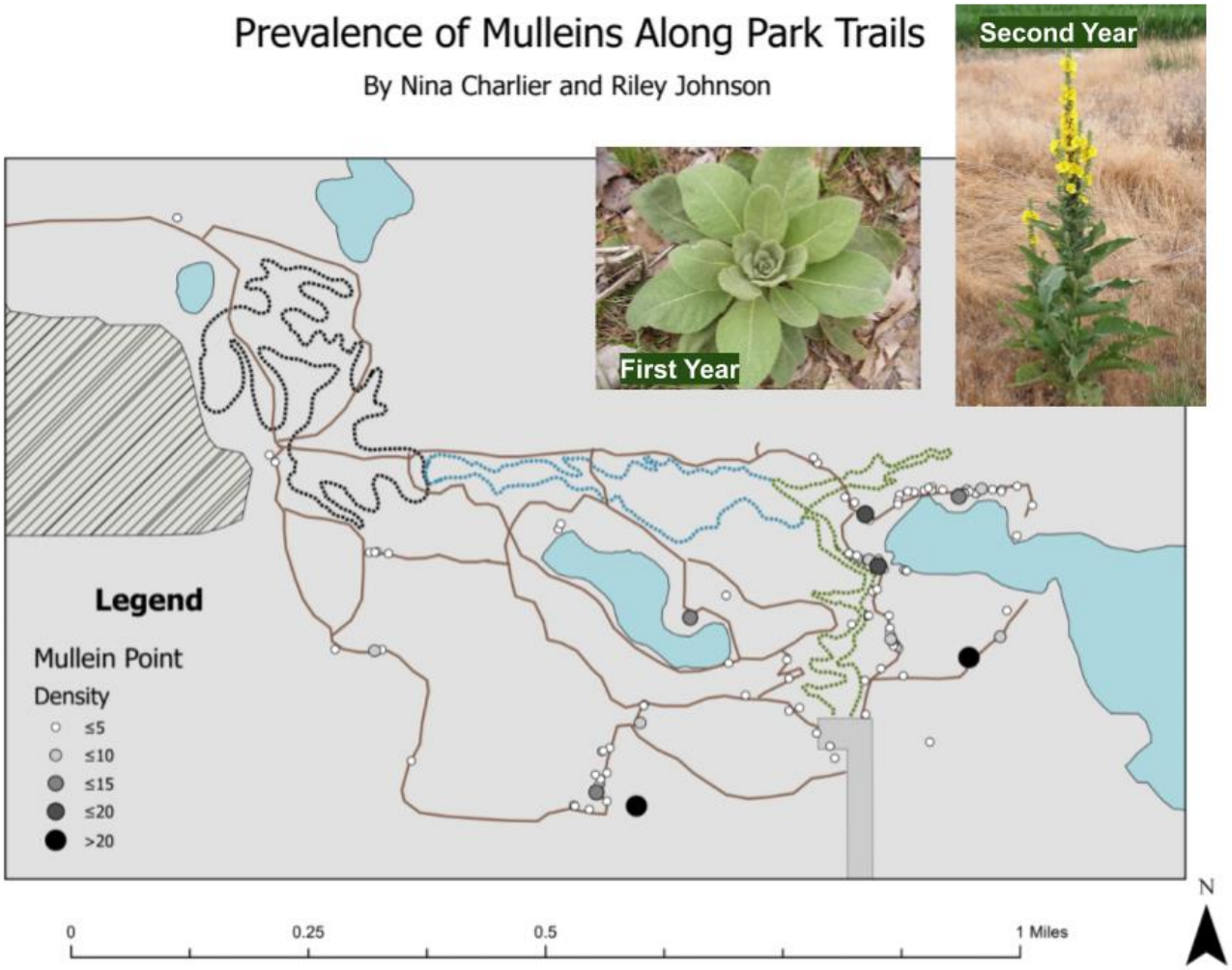


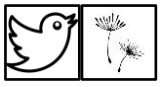
Lesser mullein 

<u>how it spreads: pollen carried by pollinators, seeds dispersed in the wind, hardy seed production</u>

Looking at the side of any Minnesota highway, you'll be able to easily spot a mullein towering over the other vegetation. They can grow over 7 feet tall, and a single plant can produce up to 175,000 seeds per season. These seeds have been found to remain viable after over 100 years of dormancy. With an efficient distribution plan, and a large "footprint" per plant, they quickly prevent establishment of native grasses in prairies, where the soil is particularly ripe for colonization following natural fires. They are a biennial plant, with the first years growing as a short weed and the second year plant growing tall. It is best to remove them as first years, before they're big and start to produce seeds.

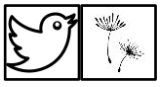
While surveying the park, we often said, when there's one mullein, there's bound to be a million more. We found the small first year specimens growing just under the towering second years'. In one instance, we cut the seed pod off a mullein, only to return a week later and see the plant quadruple the amount of seed pods in response.



Bird's-foot trefoil 

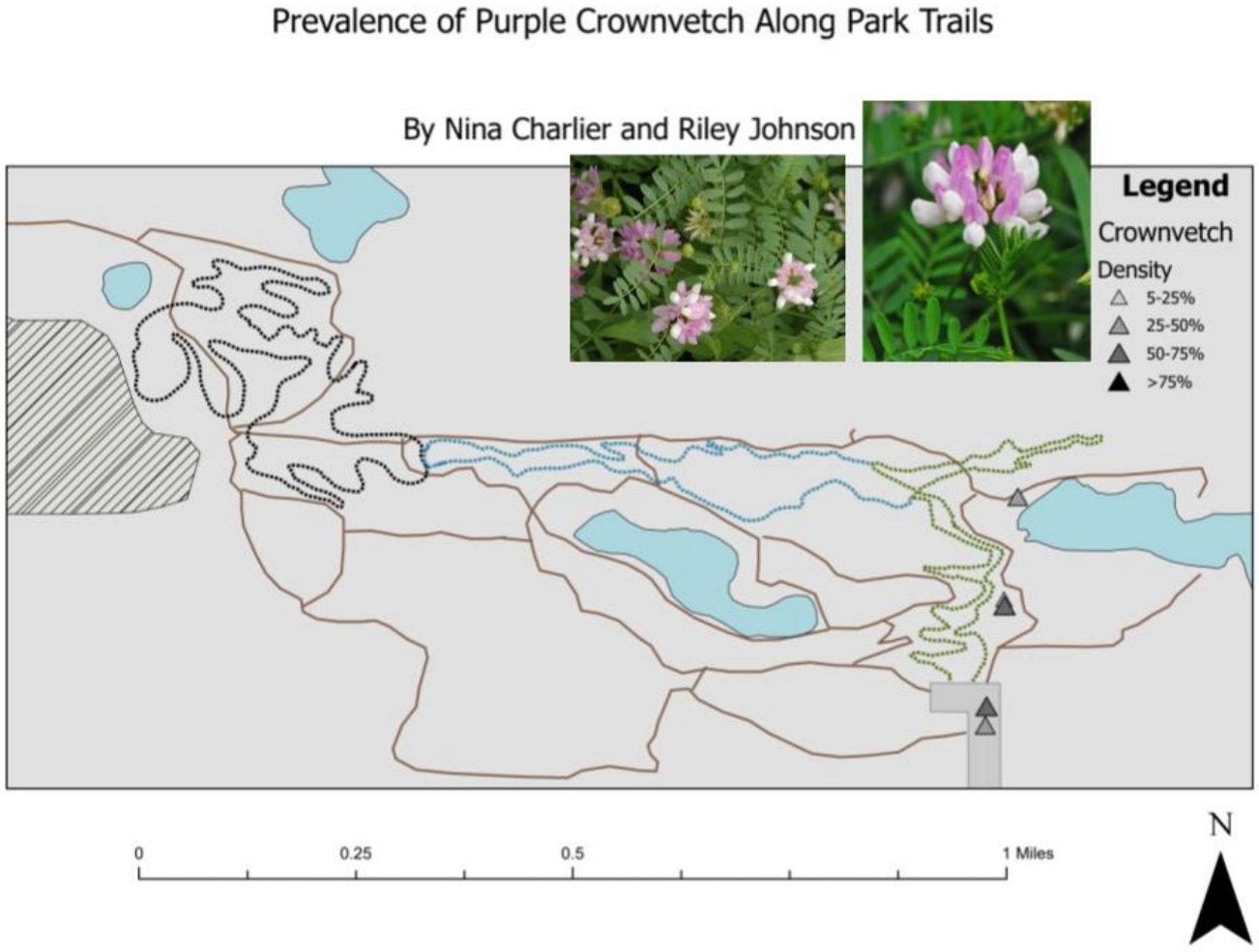
how it spreads: bring flowers attract pollinators, pollen dispersed in the wind

Once you can identify this bright yellow flower, you'll start seeing it everywhere. It has a distinct pattern of three leaves (its namesake) and grows over grass, quickly dominating a prairie habitat. Their seeds stay in the seed bank for up to a decade. Pollinators contribute to its prevalence as well. Native to Europe and Asia, birdsfoot trefoil was introduced to reduce erosion in agricultural systems as well as a forage plant (food for domestic animals).

Purple crown vetch 

how it spreads: wind-borne via wind + wings

This seemingly pretty flower can act as a menace to native flora. Found in prairies, it leaches nitrogen from the soil leaving minimal amounts for other plants. Crown-vetch spreads quickly, and now covers acres of land. It was introduced as a means to control erosion, but spread, and is now a danger to grazing animals, as it is toxic. Seeds can maintain viability in the soil for up to 15 years (enormous seed bank). Attracted by the bright, purple flowers, pollinators help assure that the seeds are fertile. A huge patch is located on the driveway entering the park.



What's the difference between a native weed and an invasive one?

Although both can be pesky, native weeds are important to the ecosystem, and shouldn't be pulled… They won't overpopulate and choke out the local vegetation and also provide a home and food for native insects and birds.

There are native varieties of honeysuckles and bittersweets as well, that look almost identical to their invasive counterparts. The biggest difference is that one has natural predators and is slower growing while the other is aggressive and quickly takes over. It is important to recognize the native plants, and let them grow.

Resources

Native Wildflowers to Plant

- Landscaping with Native Plants - Midwest Invasive Plant Network
- Landscape Alternatives - Minnesota Grown

Further Reading

- MN DNR Noxious species list
- Midwest Invasive Plant Network
- Minnesota Invasive Species Advisory Council
- Noxious Weed Proper Disposal Guide

Report invasives in Minnesota

- MN DNR Report a Pest App
- Citizen Science App iNaturalist

Article Sources

- Minnesota DNR
- Minnesota Wild Flowers
- University of Minnesota