

Narrowleaf Bittercress (*Cardamine impatiens*): A newly recognized invasive species in Minnesota

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Narrowleaf Bittercress:

- Early detection species in Minnesota
- Ranked highly invasive in New York state
- Noxious weed in Connecticut and Massachusetts





First year:
Plants form a rosette and rarely
flower

First or Second year:
Plants bolt and flower on an
erect stem



- Annual or biennial forb

Basal rosettes have 3-11 leaflets
with rounded lobes and asymmetrical bases





Bolted plants have 6-20
lance-shaped leaflets

~1" long

Edges may be smooth,
jagged, or sharply
toothed

6-31" tall

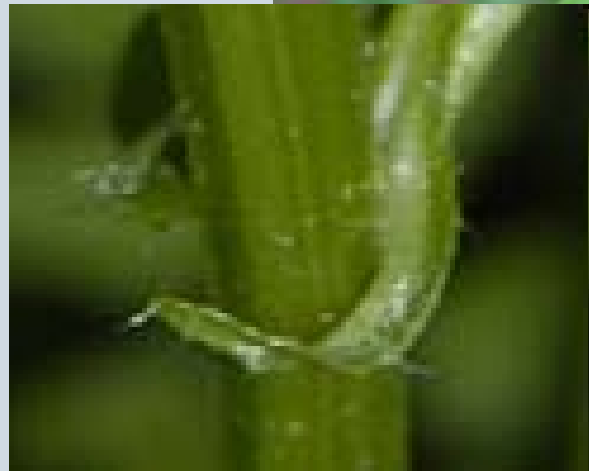




Distinguishing Characteristic:

Where the leaf joins the stem are a pair of narrow, pointed lobes (auricles).

When the leaf is detached from the stem the auricles remain.





Flowers are in rounded clusters averaging $\frac{1}{2}$ inch across at the top of the plant and at the end of branching stems



Individual flowers are white to greenish, tiny with 4 petals ($\sim 1/10$ " long)

Typically absent or indistinct

Flowers as early as May



Photos taken 5/03/10



- Thin seedpods (siliques)
- 1-2" long
- From May to September (we see in late May to early June)
- One fruit yields 10-26 seeds
- One plant yields $>5,500$ seeds
- Ripened pods burst open and shoot seeds several feet from plant
- Plant reproduces exclusively from seed



Image from Minnesota Department of Agriculture



Mississippi River

St. Croix River

Minnesota River

Seeds will germinate in the water



Habitat of Narrowleaf Bittercress

- Floodplains
- Wet woods
- Along rivers and streams

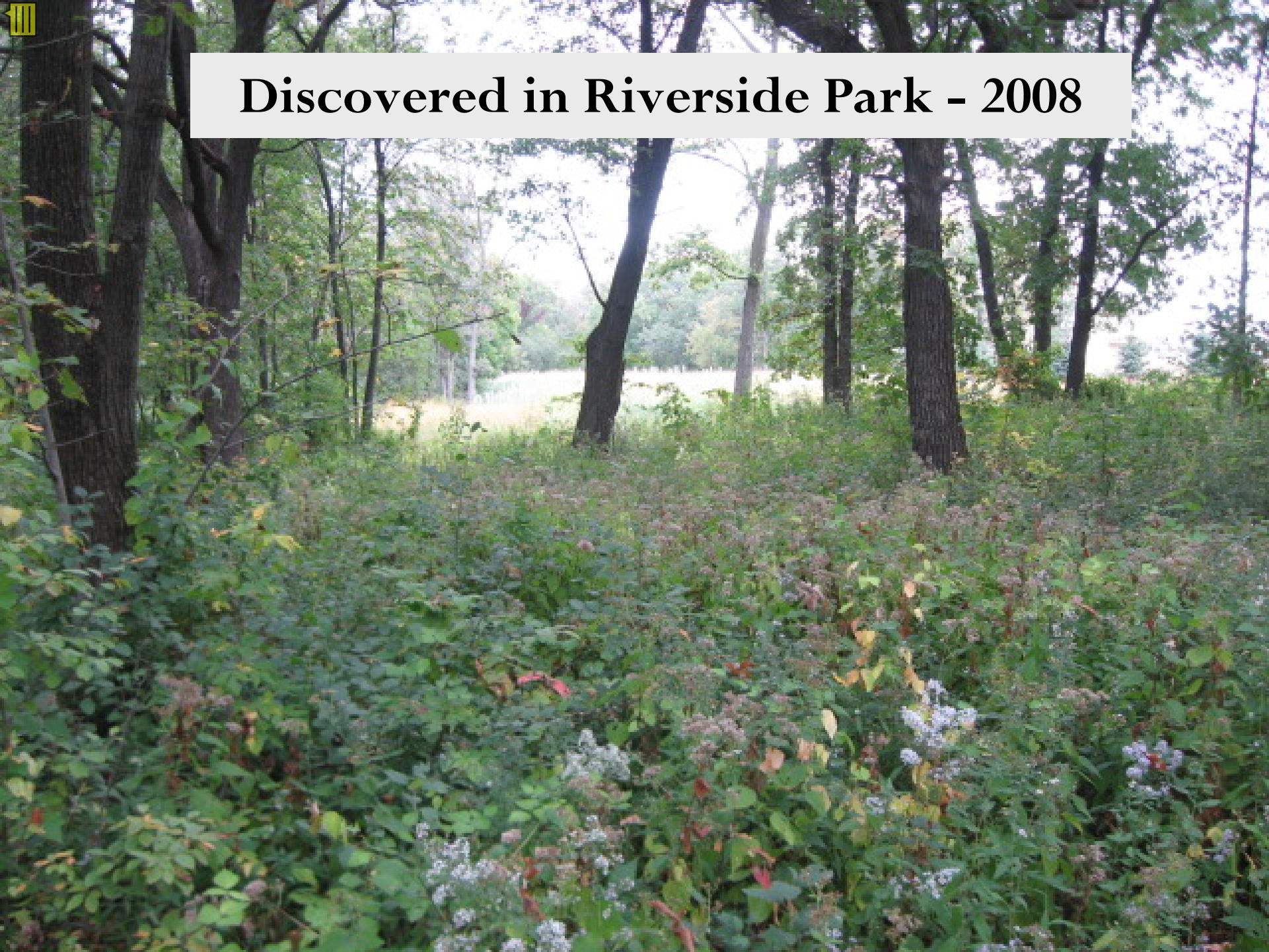


The ability for one plant to self-pollinate and produce large quantities of seed indicates invasive behavior and should be closely monitored.





Discovered in Riverside Park - 2008





Mississippi National River and
Recreational Area



Fortin Consulting began assisting the National Park Service
and St. Paul Park at Riverside Park in 2002





Buckthorn management



Tree planting





Conduct
routine
plant
inventories



Great plant diversity



Kitten-tails
(*Besseyia bullii*)

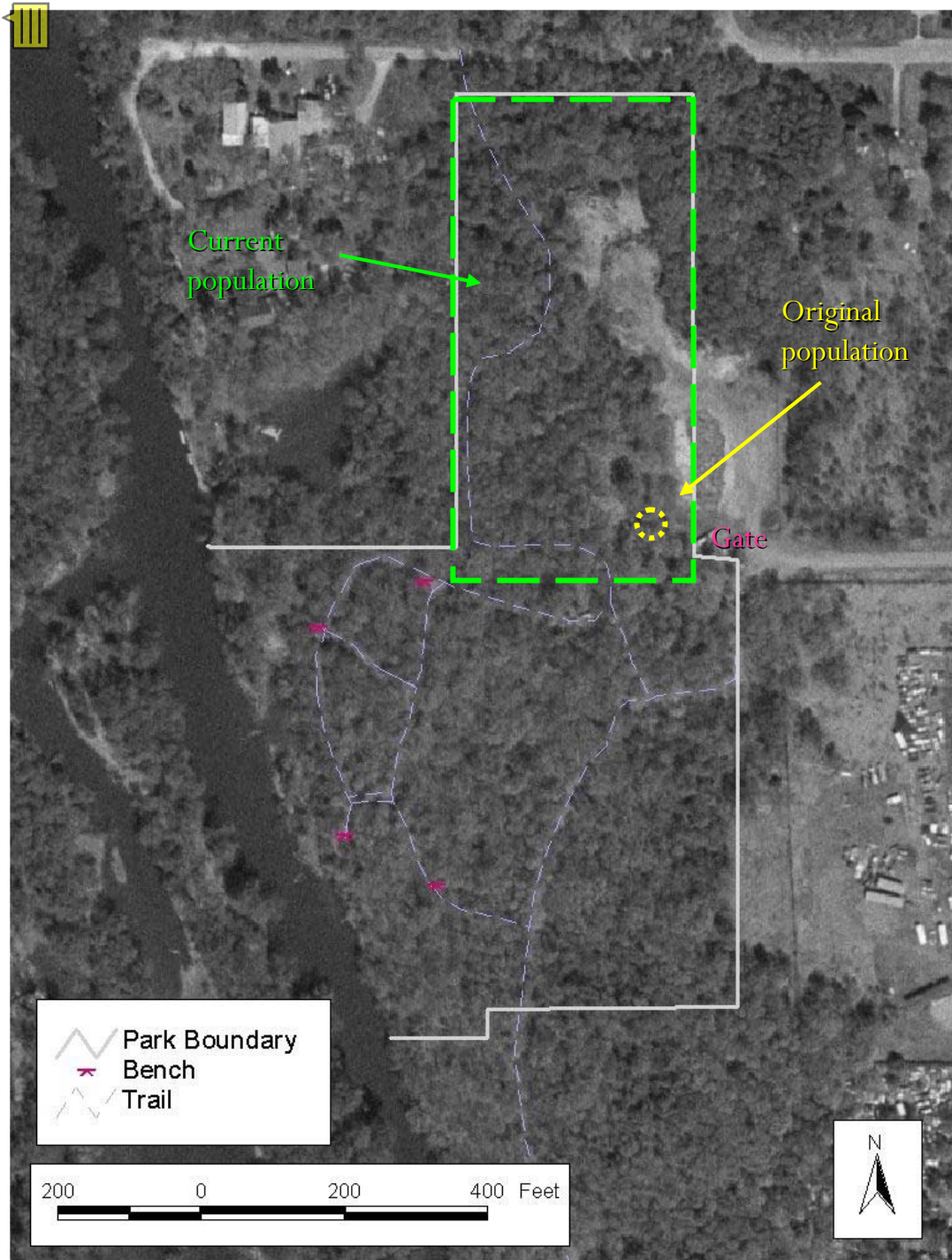
A Threatened Species
returned to the woods



Spring of 2008

Unknown plant
observed during a
routine plant
inventory

An isolated patch near
the gate of Riverside
Park





Spring 2009

In only one year, the plant spread throughout the northern portion of the woods dominating much of the understory

And you thought garlic mustard was bad

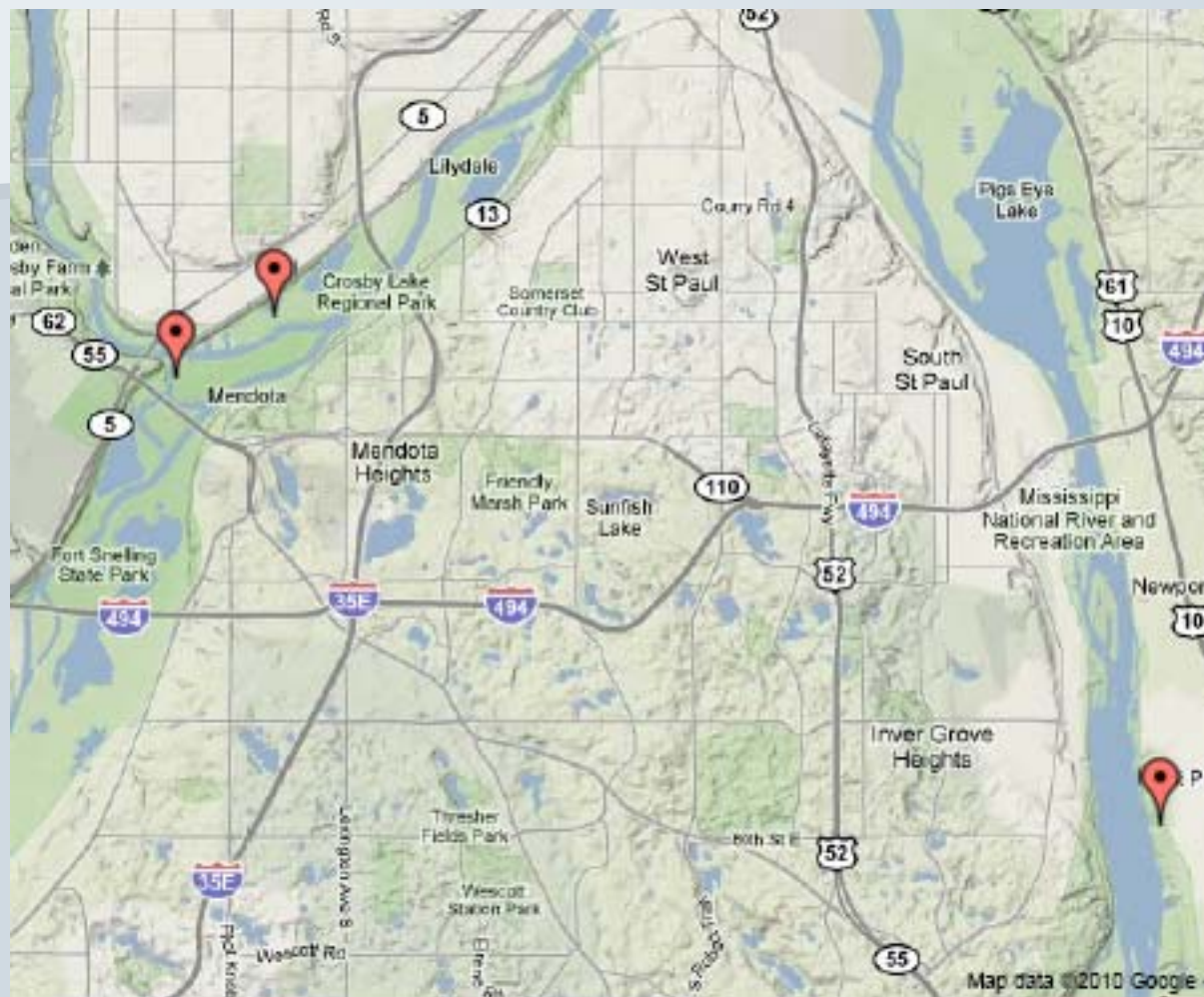




Spring of 2009
The unknown plant was identified:
Cardamine impatiens



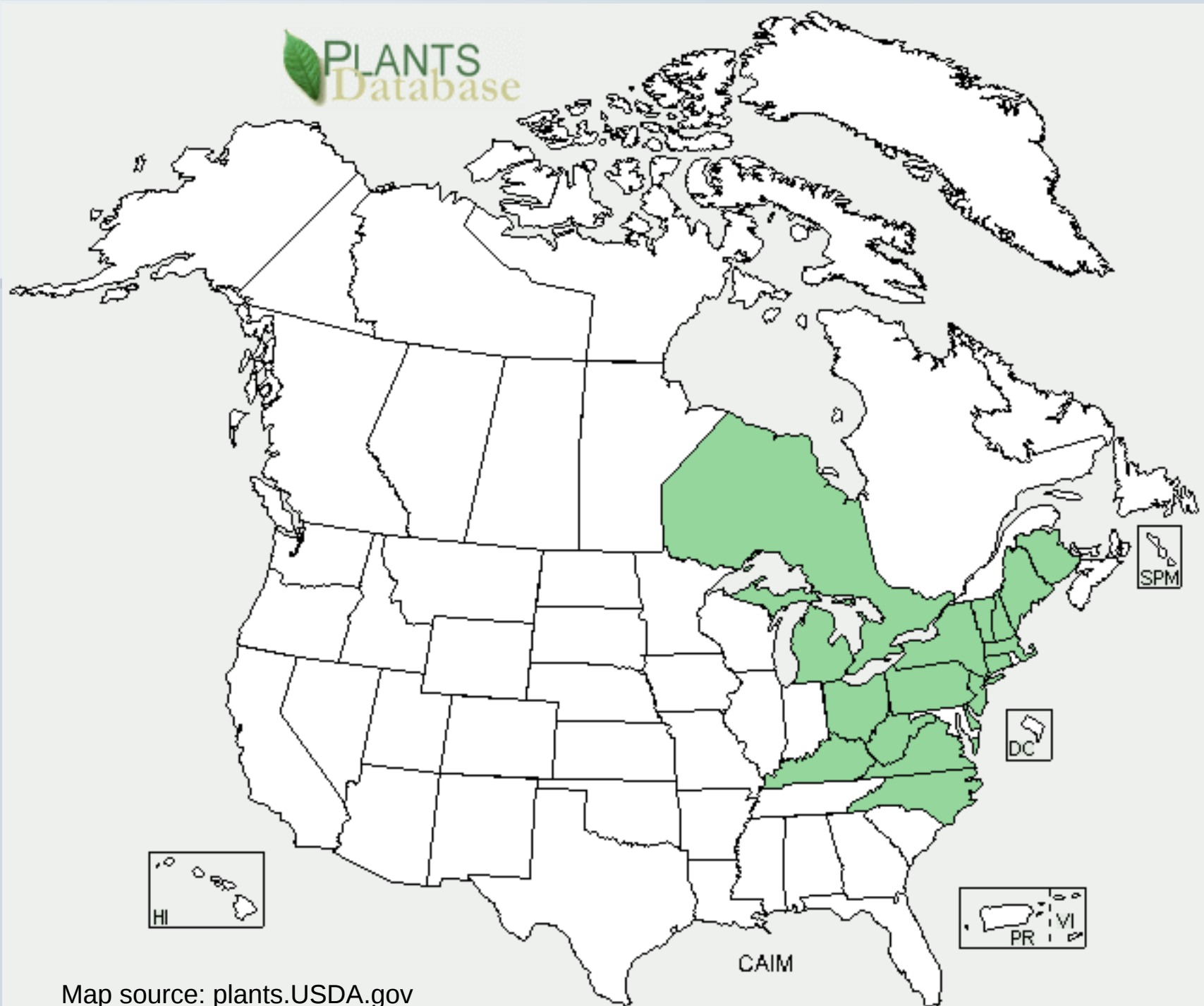
Minnesota Department
of Agriculture mapped
its location



Distribution in Minnesota

- Battle Creek Regional Park, Ramsey County
- Riverside Park, St. Paul Park, Washington County
- Big Willow Park, Minnetonka, Hennepin County

Map from Minnesota Department of Agriculture website: Terrestrial Invasive Plant Early Detection Mapping





Two consecutive years of hand-pulling (2009 and 2010)

With the help of National Park Service, St. Paul Park, and many volunteers





Fall of 2009 and Spring of 2010
Garlon 3A herbicide treatment (1.5% mixture)





Garlon 3A burned the
leaves, while the
roots grew stronger.





The Herbicide Experiment

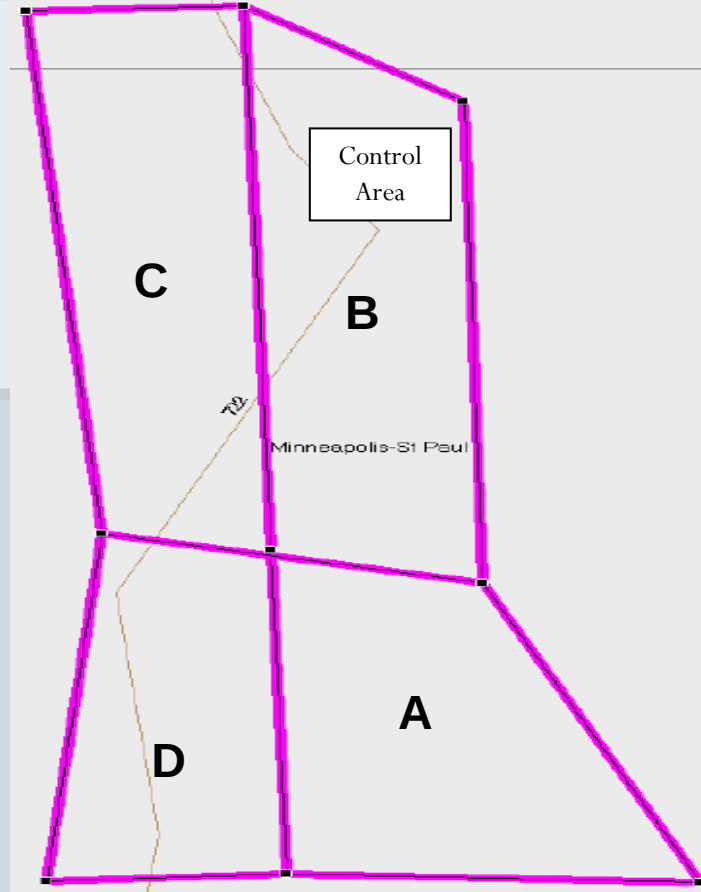
Currently testing herbicides to find the most effective chemical and concentration.



September 2010

Vegetation Survey

- Stem Count and Percent Cover
- 1 square meter vegetation plot
- 2 plots per area
- 5 areas including one control area



Triclopyr and
Triclopyr with Aminopyralid

Area Treated	Herbicide Applied	Application Rate	Amount of Mixture Applied
A	Garlon 4	1 gallon/acre	0.5 gallons
B	Garlon 4	0.75 gallon/acre	2.5 gallons
C	Milestone VM Plus	1 gallon/acre	4 gallons
D	Milestone VM Plus	0.75 gallon/acre	0.5 gallons



Garlon 4

Milestone VM Plus



What will we find Spring 2011?





Photo taken 3/28/10



Continue control efforts: Dependent on funding

- A spring vegetation survey to determine the most effective herbicide
- A spring hand pulling will be necessary
- Follow-up herbicide treatments
- Continued herbicide testing

Prevention

- Monitor wooded sites
- Hand-pull plants before setting seed
- Increase vegetative diversity
- Clean clothing and equipment



Research Participants:

National Park Service

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Nancy Duncan

Susan Overson

St. Paul Park

Lee Flandrich

and all the Public Works Staff

Minnesota

Department of Agriculture

Monika Chandler

Tony Rieger-Borer

Jeff Evander

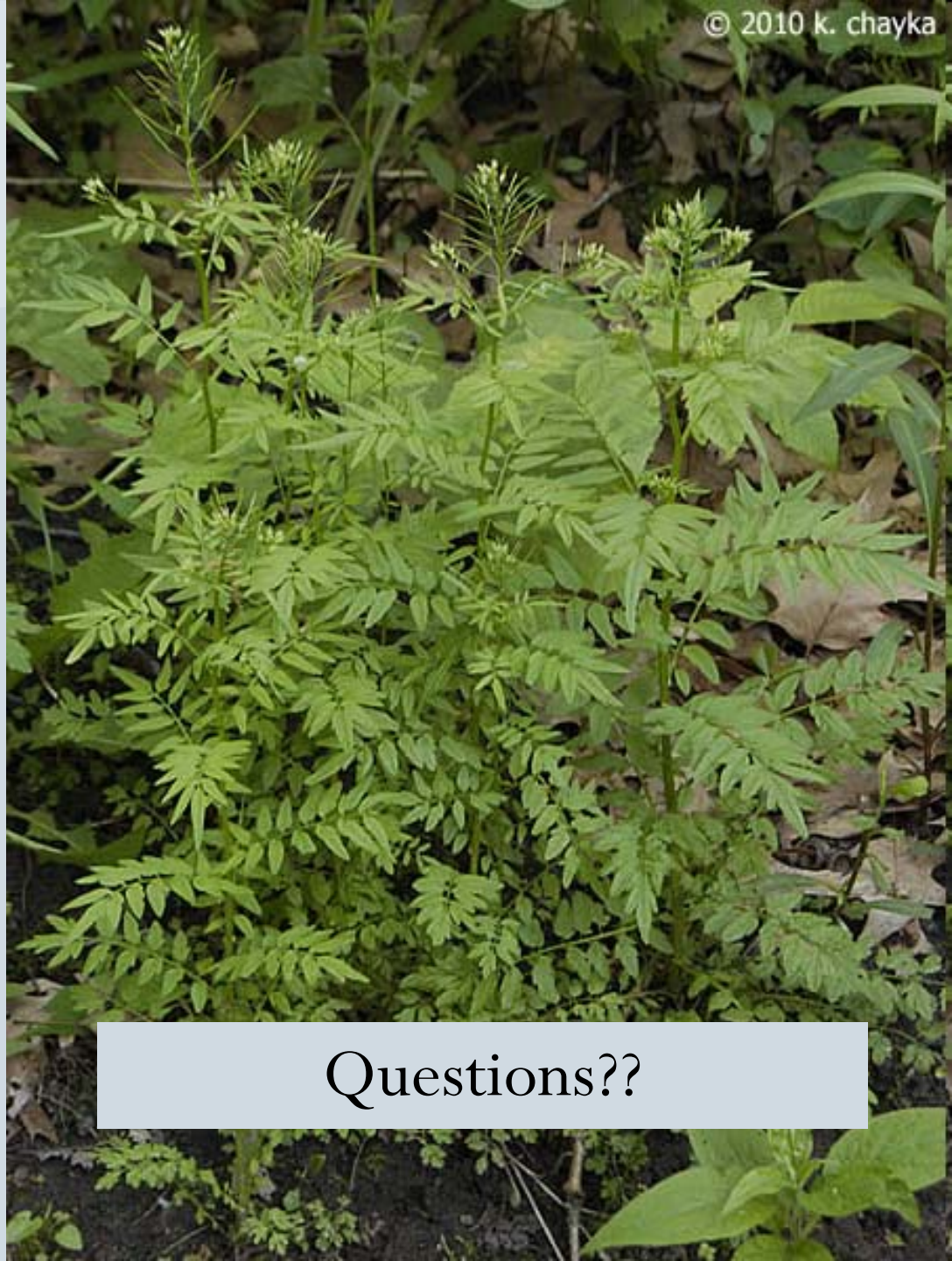
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Questions??