Glyphosate Applications

MPRB NATURAL RESOURCES

2016-2018

Who applies the herbicide

- Conservation Corps of Minnesota Crews
- Contractors working for MPRB
- Contractors working for Friends of the Mississippi River (FMR)

All have Minnesota Department of Agriculture licensing for pesticide applications

What was applied

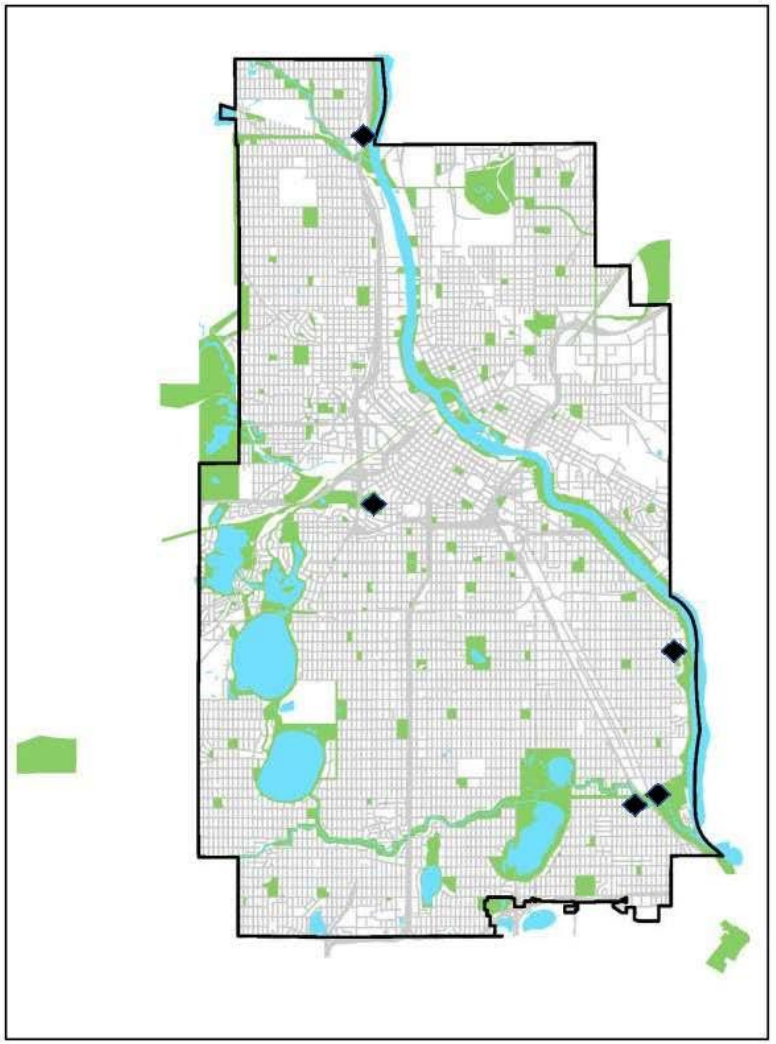
Aquaneat and Aquastar

Aquatic formulations of glyphosate which are formulated for use near or in water.

3 gallons of glyphosate
400 acres of natural areas managed

Natural Resources Application Areas
(2016-2018)

- Minnehaha Park Prairie
- Minnehaha Park Storm Water BMP
- North Mississippi Park Prairie
- West River Rd. at 36th Prairie-Savanna, Woodland
- Loring Pond Hybrid Cattail Control



Landscape types where the herbicide is applied

- **Natural Areas**

  Planted Natural Areas

  North Mississippi Prairie, Cedar LK bike trail

  "Remnant" Native Plant Communities

  Prairie savanna, woodland

- **Special Projects**

  Loring Pond cattail control project

Why it is applied:
Special Projects

Loring Pond
Neighborhood desire to remove cattails from the pond.

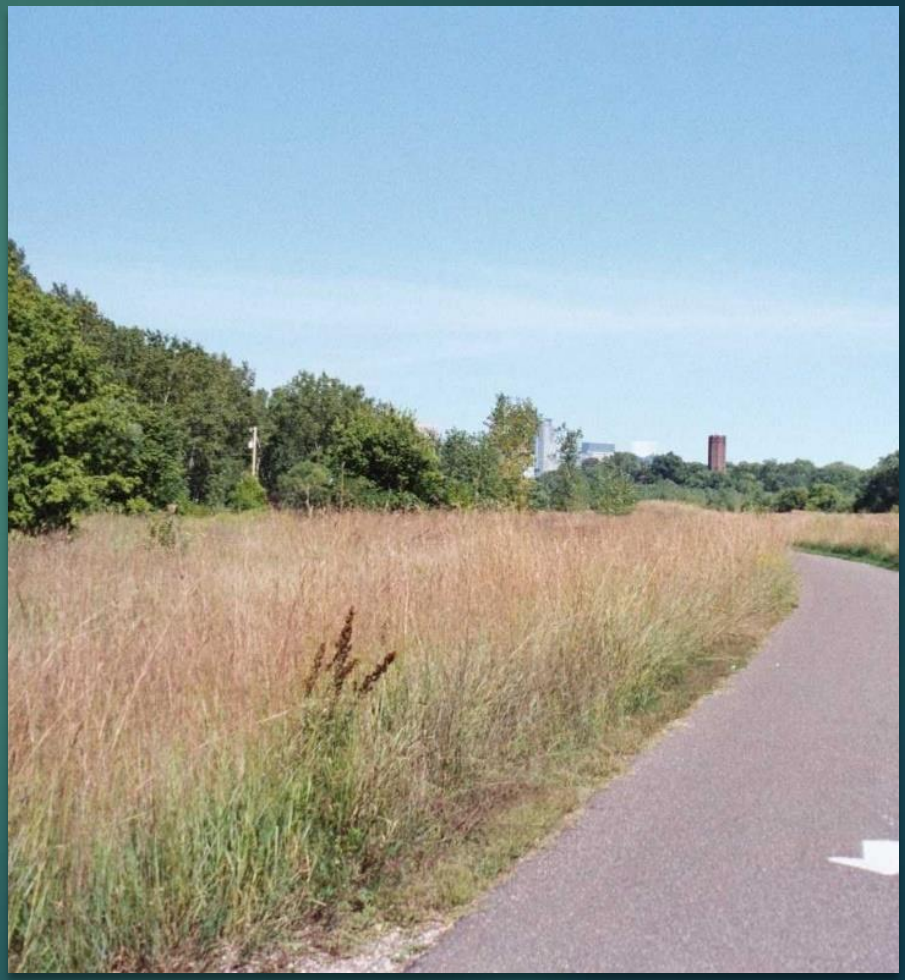
2014 Minnesota State Senate passed Legislation authorizing the MPRB:
"to remove all hybrid and narrow-leaved cattails by mechanical removal and chemical control at Loring Lake…and replant the shoreland with native species".

Why it is applied:

Management of Natural Areas (Planted and "Remnant")

Targeted Plants:

- **MDA Noxious Weeds** listed as a weed that must be controlled on the MDA list
  Ex. Canada thistle
- **Aggressive plants** that if left uncontrolled will take over native vegetation
  Ex. Reed canary grass, buckthorn, burdock



Natural area management goals

A) Priority Natural Areas-

"Remnant" natural areas mapped in the 2007 Comp Plan

Ex: River Gorge
36th Street Savanna
44th Street Woodland

Areas planted for a special purpose ex. North Mississippi Prairie, Cedar Lake bike trail prairie

B) MPRB staff site management goals: Maintain higher quality sites by controlling problem plants.

C) System-Wide Natural Areas Plan

Goals:
Develop a ranking system

Assess all park natural areas and develop management recommendations.

Management Goals:

Quality ranking developed for the Natural Areas Plan.

"B" ranking= Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive and weedy plants

Site management plan will lay out strategies on how we maintain a natural area to it's current quality ranking or improve it to a higher quality

Why we have challenges in natural areas

Historical

- **Invasive species** Introduced as food sources (1800s, 1900s).
- **Landscape plants** that moved from private property into park areas.
- **"Fill" soils** in park areas that are contaminated with weed seeds. Ex: MnDOT projects Longfellow Gardens and North Mississippi prairie

Ongoing

- Not a garden area where there are staff onsite every day working.
- Natural areas are an open system – people and animals moving from one area to another spreading weed seeds.
- Emerging invasive species Ex: Oriental Bittersweet, Japanese barberry

Very persistent plants

Canada thistle requires a ***multi-year, integrated control strategy****. The key to control is recognizing the problem and being persistent with control measures…*

A typical seedling in the 2-leaf stage, ***14 days after emergence, will have a root that is 6 in. long, with as many as 18 lateral roots****… A 3-week-old seedling can regenerate after the top-growth is clipped.*

…Tillage (pulling) can aggravate a thistle problem. Small root fragments often survive adverse conditions. Under favorable conditions, even a ***1/2 in length of root can generate new growth.***

Because Canada thistle has ***a massive capacity to produce roots and shoots*** *eventually growing up as new plants, killing the top-growth is like giving thistle a haircut. The only way to control the entire root system is to use a herbicide that translocates deeply into the roots*

-Manitoba Ministry of Agriculture

What we do:
multiple plant management strategies

Plant Biology

- Annual vs perennial
- Reproduction of the plant
- Seed viability

PLANT NAME	PLANT BIOLOGY	NON-CHEMICAL CONTROL METHODS	HERBICIDE CONTROL METHODS	NOTES
Bird's Foot Trefoil (Lotus corniculatus)	PERENNIAL; reproduce through seed, rhizomes, above ground runners	Repeated mowing, keep <2" for several years. Small populations hand pulling, all roots must be removed. Prescribed burns increase seed germination	Clopyralid after re-greening from burn or mowing	similar control methods to crown vetch
Canada thistle** (Cirsium arvense)	PERENNIAL; mainly reproduces through rhizomes; seed viability - over 20 years	Repeated mowing (prior to flowers opening) 3X per growing season, control with mowing takes 3-4yrs, keep plant to 3 inches height. Prescribed burning needs to be carefully timed can stimulate seed germination. Must burn 3 consecutive years	Glyphosate, clopyralid, or metsulfron foliar sprays @ 2& with surfactant a t 1% mix rate. Applications in early bolting stage when foliage is 6-10" high. April/May Or Sept applications to rosettes most effective	Biological controls are available but are not effective controls on large populations

Biological control agents

- **Purple Loosestrife**

  Biological controls introduced in 1980s

  Now established throughout the State

  Purple loosestrife spraying with glyphosate is not a common practice

- **Others:**

  Leafy spurge beetles (Cedar Lk trail prairie)

  Spotted knapweed beetles (Cedar Lk trail prairie, Victory dog park)

Mechanical plant management strategies

- Burning
- Pulling
- Mowing/cutting/browsing/grazing

Prescribed Burning
when possible

Weather conditions must be exact:

- Wind speed
- Humidity levels
- Air temperatures

Additionally:

- No MnDNR red flag warnings
- No MnPCA air quality alerts
- Working around special events (Bike to Work day in May)

Hand Pulling

Mowing

Cutting

Grazing

Browsing

Loring Pond: cutting below water

- **Fall 2015 cutting cattail stems below water** to reduce vigor of the plant for the 2016 growing season

  80% reduction in cattails in the South Bay

- **This method did not work on:**

  Floating mats

  North Bay majority was floating mat and smaller floating mats in South Bay

  Cattails growing in the soil shoreline or upland edge of lake

Mowing/Grazing/Browsing

- Non-selective
- Grazing/browsing may not kill the plants, it will prevent seed production, and if grazed at a sufficient intensity, will lead to a depletion of root reserves and an associated decrease in plant vigor. This will result in a reduced ability of the weed to compete against desirable species.
- Timing and manipulation of the herd is part of the process.

  Ex: animals need to graze the plants at specific times to maximize stress on the plant.

  Animals may need to be corralled in heavily infested areas to allow them to acquire a taste for the plant. There may be an adjustment period before they begin to consume the weed preferentially.

Gardens at Risk from Invasive Species

Fortunately, gardeners play a critical role in slowing the spread of invasive species!

WHAT GARDENERS NEED TO KNOW ABOUT INVASIVES

- Invasive species are those nonnative plants, animals, and diseases that can cause harm to the economy, environment, and human health.
- Most introduced plants do not cause problems; however, those that do have significant economic and environmental costs.
- Invasive species pose a threat to Wisconsin's urban forests which provide important environmental, social, and economic values such as reduced storm water run-off, improved air quality, energy conservation, improved public health, and increased property values.
- Invasive plants reproduce and grow quickly, easily invading adjacent green spaces, woodlands, and even landscaped areas.
- Invasive insects and diseases weaken and sometimes kill trees.

WHAT DOES THIS HAVE TO DO WITH GARDENERS?

- Invasive propagules, insects, and diseases can be introduced through plant swaps, farmers' markets, and yard sales.
- Invasive species displace, weaken, or kill desirable plants resulting in loss of diversity; degrade wildlife habitat; interfere with recreational activities; disrupt urban ecosystems; and divert millions of dollars for their control.
- Some of the worst plant invaders were introduced as ornamentals or herbs.
- Weeding time and cost can increase due to invasive plants.

HERE'S WHAT YOU CAN DO

- Do not plant invasive species.
- Use garden materials that are free of invasive species and propagules, including wood chips or compost.
- Do not distribute, purchase, or sell known invasive species.
- Garden using plant materials that are site appropriate and less susceptible to damaging pests and diseases.
- Learn about invasive species.
- Remove soil, seeds, and vegetative matter from shoes, clothing, and tools prior to leaving an area.
- Properly dispose of invasive species or materials that may harbor invasive plant seeds. For example, disposal includes bagging for the landfill.
- Backyard compost piles and bins do not reliably generate enough heat for a long enough period of time to destroy weed seeds.

For more information on this and other Urban Forestry groups (landscapers, arborists, designers, growers and sellers.), visit the Urban Forestry Best Management Practices at: http://council.wisconsinforestry.org/invasives/

MDA Noxious Weed List

DEPARTMENT OF AGRICULTURE

2019 Noxious Weed List

www.mda.state.mn.us/plants-insects/noxious-and-invasive-weed-program

The Minnesota Noxious Weed Law (Minnesota Statutes 18.75-18.91) defines a noxious weed as an annual, biennial, or perennial plant that the Commissioner of Agriculture designates to be injurious to public health, the environment, public roads, crops, livestock, or other property. The purpose of the law is to protect residents of the state from the injurious effects of noxious weeds.

There are currently forty-two plant species regulated as noxious weeds in Minnesota. Twenty-three plants are listed as Prohibited Noxious Weeds which consist of two regulatory lists – 14 plants listed on the Prohibited Eradicate List and 9 plants listed on the Prohibited Control List. Fifteen species are listed as Restricted Noxious Weeds and four species are listed as a Specially Regulated Plants that can be enforced under specific conditions. ***Years following a species name designate when it was listed.***

A. Prohibited Noxious Weeds – Attempts must be made by all landowners to control or eradicate species on these lists. These species cannot be transported illegally or sold in Minnesota.

Eradicate List –must be eradicated by killing the above and belowground parts of the plant.

1.	Palmer Amaranth - 2014	*Amaranthus palmeri* S.Watson
2.	Oriental Bittersweet - 2010	*Celastrus orbiculatus* Thunb.
3.	Diffuse Knapweed - 2014	*Centaurea diffusa* Lam.
4.	Brown Knapweed - 2012	*Centaurea jacea* L.
5.	Yellow Starthistle* - 2010	*Centaurea solstitialis* L.
6.	Meadow Knapweed - 2012	*Centaurea x moncktonii* C.E. Britton
7.	Poison Hemlock - 2017	*Conium maculatum* L.
8.	Black Swallow-wort - 2012	*Cynanchum louiseae* Kartesz & Gandhi
9.	Grecian Foxglove - 2010	*Digitalis lanata* Ehrh.
10.	Common Teasel - 2011	*Dipsacus fullonum* L.
11.	Cutleaf Teasel - 2011	*Dipsacus laciniatus* L.
12.	Giant Hogweed* - 2011	*Heracleum mantegazzianum* Sommier & Levier
13.	Japanese Hops - 2011	*Humulus japonicus* Siebold & Zucc.
14.	Dalmatian Toadflax - 2011	*Linaria dalmatica* (L.) Mill.

***Species not known to be in Minnesota, but have been determined to be a threat to invade the state.**

Control List –must be controlled preventing the maturation and spread of propagating parts.

1.	Common Barberry - 2016	*Berberis vulgaris* L.
2.	Narrowleaf Bittercress - 2011	*Cardamine impatiens* L.
3.	Plumeless Thistle - 1975	Carduus acanthoides L
4.	Spotted Knapweed - 2001	*Centaurea stoebe* L. ssp. *micranthos* (Gugler) Hayek
5.	Canada Thistle - 1872	*Cirsium arvense* (L.) Scop.
6.	Leafy Spurge - 1992	*Euphorbia esula* L.
7.	Purple Loosestrife - 1992	*Lythrum salicaria* L., *L. virgatum* L.
8.	Wild Parsnip - 2010	*Pastinaca sativa* L. (Except for non-wild cultivated varieties)
9.	Common Tansy - 2010	*Tanacetum vulgare* L

B. Restricted Noxious Weeds - may not be sold, transported illegally, or intentionally planted in Minnesota.

1.	Tree of Heaven - 2016	*Ailanthus altissima* (Mill.) Swingle
2.	Garlic Mustard - 2013	*Alliaria petiolata* (M. Bieb) Cavara & Grande
3.	Porcelain Berry - 2016	*Ampelopsis brevipedunculata* (Maxim.) Trautv.
4.	Crown Vetch - 2016	*Securigera varia* (L.) – Formerly known as *Coronilla varia* L.
5.	Wild Carrot/Queen Anne's Lace - 2016	*Daucus carota* L.
6.	Glossy Buckthorn (and all cultivars) - 1999	*Frangula alnus* Mill.
7.	Amur Honeysuckle – 2016	*Lonicera maackii* (Rupr.) Herder
8.	Morrow's Honeysuckle - 2016	*Lonicera morrowii* A. Gray
9.	Bell's Honeysuckle - 2016	*Lonicera x bella* Zabel
10.	Common Reed (non-native) - 2013	*Phragmites australis* (Cav.) Trin. ex Steud. ssp. *australis*
11.	Common or European Buckthorn - 1999	*Rhamnus cathartica* L
12.	Black Locust - 2016	*Robinia pseudacacia* L.
13.	Multiflora Rose - 2011	*Rosa multiflora* Thunb.
14.	Tatarian Honeysuckle - 2016	*Lonicera tatarica* L.
15.	Japanese Barberry Cultivars** - 2017	*Berberis thunbergii* DC.

****Japanese Barberry Cultivars Regulated as Restricted Noxious Weeds in Minnesota**

- *'Angel Wings' • 'Antares' • var. atropurpurea • 'Bailtwo' (Burgundy Carousel®) • 'Monomb' (Cherry Bomb™) • 'Crimson Velvet' • 'Erecta' • 'Gold Ring' • 'Bailsel' (Golden Carousel®; B. koreana x B. thunbergii hybrid) • 'Inermis' • 'Bailgreen' (Jade Carousel®) • 'JN Redleaf' (Ruby Jewel™) • 'JN Variegated' (Stardust™) • 'Kelleris' • 'Kobold' • 'Anderson' (Lustre Green™) • 'Marshall Upright' • 'Painter's Palette' • 'Pow Wow' • 'Red Rocket' • 'Rose Glow' • 'Bailone' (Ruby Carousel®) • 'Silver Mile' • 'Sparkle' • 'Tara' (Emerald Carousel®; B. koreana x B. thunbergii hybrid) • Wild Type (parent species – green barberry)*

C. Specially Regulated Plants –shall be handled, controlled or eradicated according to specified regulations.

1. **Poison Ivy** (*Toxicodendron radicans* L. Kuntze and *T. rydbergii* (Small ex Rhdb.) Greene) - 2010
   Must be eradicated or controlled for public safety along rights-of-ways, trails, public accesses, business properties open to the public or on parts of lands where public access for business or commerce is granted. Must also be eradicated or controlled along property borders when requested by adjoining landowners.
2. **Japanese Knotweed** (*Polygonum cuspidatum* Seib. & Zucc.) - 2013
3. **Giant Knotweed** (*Polygonum sachalinense* F. Schmidt ex Maxim.) - 2013
   Any person, corporation, business or other retail entity distributing Japanese and/or giant knotweeds for sale within the state, must have information directly affixed to the plant or container packaging that it is being sold with, indicating that it is unadvisable to plant this species within 100 feet of a water body or its designated flood plain as defined by Minnesota Statute 103F.111, Subdivision 4.
4. **Amur Maple (***Acer ginnala* Maxim.) - 2016
   Sellers shall affix a label that advises buyers to only plant Amur maple and its cultivars in landscapes where the seedlings will be controlled by mowing or other means. Amur maple should be planted at least 100 yards from natural areas.

D. County Noxious Weeds

County Noxious Weeds are plants that are designated by individual county boards to be enforced as prohibited noxious weeds within the county's jurisdiction and must be approved by the Commissioner of Agriculture, in consultation with the Noxious Weed Advisory Committee. Each county board must submit newly proposed County Noxious Weeds to the Minnesota Department of Agriculture for review. Approved County Noxious Weeds shall also be posted with the county's general weed notice prior to May 15th each year. Counties are solely responsible for developing County Noxious Weed lists and their enforcement. ***Contact your local County Agricultural Inspector or Designated Employee for more information on County Noxious Weeds***
www.mda.state.mn.us/plants/pestmanagement/weedcontrol/cailist

Adding species to County Noxious Weed Lists

It is up to an individual county to determine if they will have a designated county noxious weed list and the process for selection of species to be added to the list. If the county board of commissioners establishes a county noxious weed list, townships wanting to add species should pass a resolution with the county's Township Association showing that the representative of townships for that county are in favor of adding a particular species and enforcing it. This resolution can then be submitted to the County Agricultural Inspector or Designated Employee for that jurisdiction. It is still up to the county board of commissioners to decide if they want to list and enforce any species submitted to them via the township association or other entities. Minnesota Department of Agriculture approved County Noxious Weed Lists can be enforced by authorized agents of the commissioner under the Minnesota Noxious Weed Law as outlined in *Minnesota Statutes 18.80 – 18.81.*

Townships can also use their local ordinance process to regulate plant species that are not listed by the county or state. Enforcement of species listed via a municipal ordinance is the responsibility of municipal authorities and cannot be regulated under or associated with the Minnesota Noxious Weed Law - *MS 18.75 – 18.91.*

Additional resources for regulated noxious weeds and non-regulated invasive plants in Minnesota

MDA Website - www.mda.state.mn.us/plants-insects/noxious-and-invasive-weed-program
MN DOT Website - www.dot.state.mn.us/roadsides/vegetation/pdf/noxiousweeds.pdf
MN DNR Website - www.dnr.state.mn.us/invasives/terrestrialplants/index.html
MN BWSR Cooperative Weed Management Areas - http://www.bwsr.state.mn.us/grants/cwma/CWMA.html

Grecian Foxglove

Prevention and management

Do not plant Grecian foxglove or move soil containing seed of this species. Avoid direct contact with this plant to prevent toxin absorption through skin. **Wear protective clothing and rubber gloves when handling this species**.

Hand-pulling is not recommended due to concerns about exposure to toxins and disposal issues. However, repeated hand-pulling (wear protective gloves and clothing) in the spring and fall can control very small populations. Pulling larger populations may result in disturbed areas that are ideal for Grecian foxglove seedlings to germinate.

Frequent mowing during the growing season for multiple years may control this species if flowering is prevented. Grecian foxglove **can flower and produce seed on a short stem after mowing.** Because of this, preventing all flowering may be a challenge.

Annual herbicide applications (in spring and/or fall) can reduce Grecian foxglove populations over time. For specific herbicide recommendations, check with your local University of Minnesota Extension agent.

For all management methods, it is important to monitor several years after treatment due to germination from the Grecian foxglove seedbank.

Toxicity

All parts of Grecian foxglove are poisonous in both fresh and dried forms. Cardiac glycosides from Grecian foxglove include digoxin and digitoxin and primarily affect cardiovascular, neurologic, and gastrointestinal systems. Ingesting plant parts or absorbing compounds through skin in direct contact with Grecian foxglove may adversely affect humans and other mammals and could be fatal. It is possible that smoke from burning plants may be toxic.

Wild Parsnip

Wild parsnip is an eye-catching, non-native weed that hails originally from Europe and Asia. There are varieties grown for their edible roots, but whether the wild type came to America as a garden vegetable or in the cuffs of some immigrant's pants, no one knows.

Dried specimens at the University of Wisconsin-Madison herbarium date back to 1894 in southeast Wisconsin, and a specimen was collected on Madeline Island at the northern tip of the state in 1896.