



Road Talk

Ontario's Transportation
Technology Transfer

Digest

Ministry of Transportation

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Improving Sightlines for Drivers

Improving the drive by tackling invasive species

Ontario's Ministry of Transportation (MTO) is evaluating a new approach to improving sightlines for drivers by getting rid of invasive species growing along highways. MTO is using native plants and arbuscular mycorrhizal fungi (AMF) to get rid of unsightly roadside obstructions, making it easier for drivers to get where they're going.

In Ontario, invasive plants such as phragmites australis—a tall, dense reed—often form thick patches on the roadside that are difficult to manage and costly to maintain. Spraying or cutting phragmites offers only short-term results. That's why MTO is evaluating a new approach: using native tallgrass prairie plants and AMF to prevent phragmites from growing back.

Why Invasive Plants Are a Problem

Invasive plants dominate landscapes, creating safety hazards by obstructing sightlines and drainage systems while driving up maintenance costs.

What AMF Does

AMF forms symbiotic relationships with plant roots, strengthening soil and reducing erosion. AMF has been linked to notable declines in invasive and non-native plants. MTO is using AMF that is highly compatible with conditions found in southern Ontario.



Figure 1: Wild bergamot (*Mondarda fitulosa*), cup plants (*Silphium perfoliatum*) and Virginian mint (*Pycnanthemum virginianum*)

Pilot Design: Highways 401 and 402

MTO set up two study locations along Highways 401 and 402 in western Ontario to evaluate five treatment methods for eliminating phragmites:

- **Conventional:** Spray with glyphosate and cut dead material.
- **Standard:** Spray, cut and drill-seed MTO's standard roadside mix.
- **Native Seed:** Spray, cut and drill-seed native grasses and forbs.
- **Native Fungus:** Spray, cut and drill-seed native AMF.
- **Native Restoration:** Spray, cut and drill-seed native grasses, forbs and AMF.



Figure 2: Phragmites have a simple root system. Deep-rooted native prairie plants can establish themselves easily and strengthen the soil.



Figure 4: West Operations Vegetation Coordinator Jessica Smeekens showing a 13-metre-long phragmites rhizome.

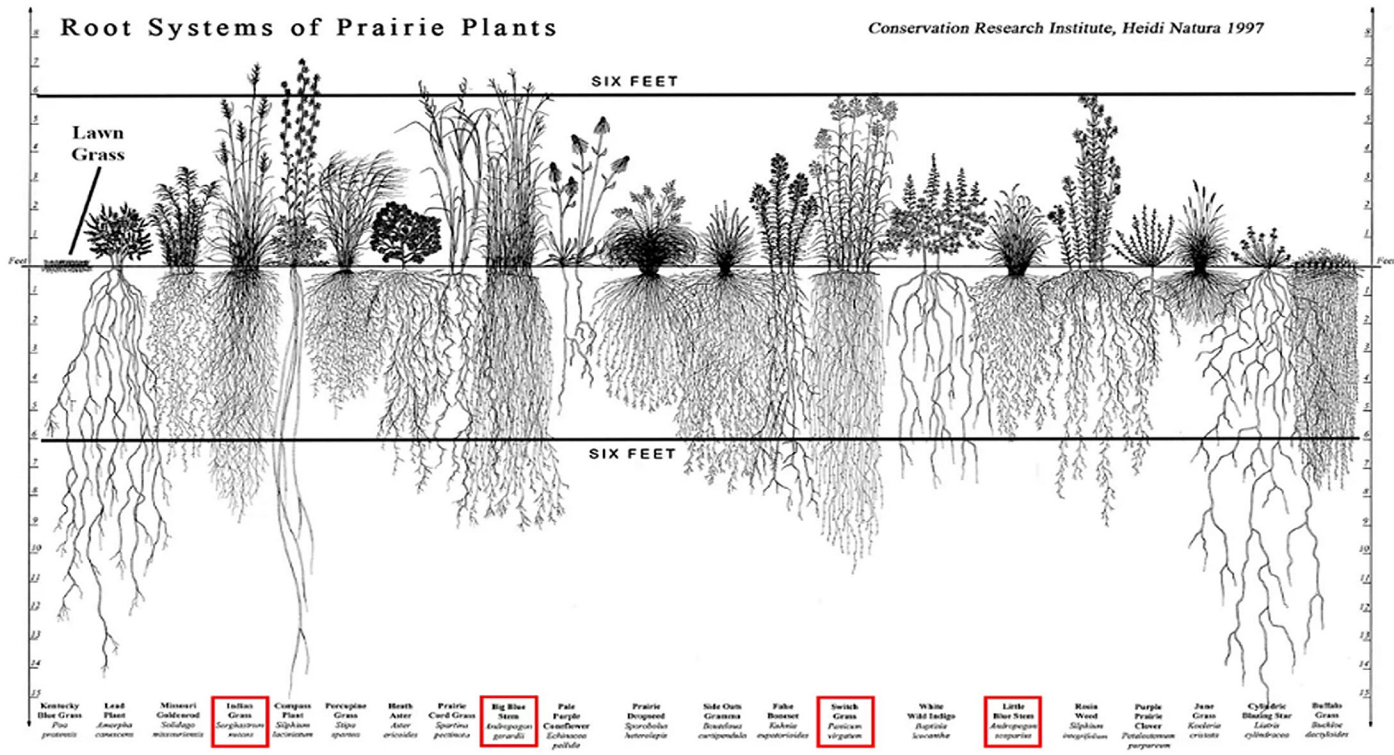


Figure 3: The rooting structure of prairie plants. The grasses highlighted in red are part of MTO's pilot.



Figure 5: West Operations Vegetation Coordinator Jessica Smeekens measuring species composition.

Plot Treatments



Figure 6: Conventional plot treatment. Bull thistle (a noxious weed) is the most dominant plant. Vacant soil invites more invasive and noxious species.

Figure 9: Native fungus plot. This approach attempts to determine whether the key to ecosystem recovery is driven by plants or fungus. Preliminary results show a combination achieves the greatest restoration.



Figure 7: Standard plot treatment. An abundance of phragmites.



Figure 8: Native seed plot. Dense native plant cover lowers the risk of erosion and invasive and noxious species.





Figure 10: Native restoration plot. Native tall prairie grasses hold back phragmites but are difficult to establish on sites with degraded soil.

Preliminary Results

Early observations are encouraging. Plots treated with native seed and AMF showed little to no reinvasion by phragmites or other aggressive weeds, while conventional treatments experienced rapid recolonization.

Monitoring the 401/402 Pilot

MTO is expanding the pilot project by:

- Monitoring vegetation and soil composition, soil erosion and stability, and using geospatial records to link treatments with outcomes
- Conducting spring and fall surveys
- Standardizing data for year-over-year reporting

These metrics will support annual reporting, cost-benefit analyses and recommendations going forward.

Benefits for Highways

Operational advantages: Safer, cleaner rights-of-way improve sightlines and drainage while increasing resilience to invasive species.

Economic efficiency: Fewer repeat treatments and chemicals improve long-term outcomes.

Environmental gains: Native plants and AMF restore biodiversity and improve pollinator habitats, resulting in healthier soils, enhanced water infiltration and reduced sediment runoff.

Conclusion

Pending the pilot's outcome, MTO may consider using native plants and AMF in maintenance contracts going forward.

Short-term fixes cannot address persistent invasive species. A restoration-based approach offers a promising blueprint for improving sightlines, protecting infrastructure and reducing long-term costs.

Effect	Conventional	Standard	AMF Alone	Native Seed	Native Seed + AMF
Prevalence of phragmites	Medium	High	Low	Low	Lowest
Prevalence of non-native plants	High	High	Medium	Low	Lowest
Prevalence of native plants	Low	Lowest	Medium	High	High
Stem density	Lowest	Medium	Medium	High	High

Table: Preliminary observations of Highway 402 median treatment plots.

The differences between the Native Seed and Native Seed + AMF treatments were less pronounced, likely because the Native Seed plot was bordered on both sides by Native Seed + AMF plots, allowing AMF to spread naturally.

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