Phragmites: Effective strategies to reduce the statewide threat

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Phragmites australis

- Perennial, cool-season wetland grass
- Global distribution
  - North America
  - South America
  - Europe
  - Africa
  - Asia
  - Australia
- Multiple distinct haplotypes
Effects of invasive *Phragmites*

- Reduces plant diversity & habitat quality
- Reduces abundance and diversity of amphibians, fish, wetland birds, etc.
- Alters food webs
- Impacts infrastructure
  - Water access
  - Agricultural drainage
  - Roadway sight-lines

Phragmites Research – University of Minnesota
2017-2019

- Document distribution of invasive *Phragmites*
- Assess risk of spread (genetic diversity & seed viability)
- Assess response options and strategies
Distribution in Minnesota

- 435 verified populations (◆)
- 40 counties
- High regional variation
- 15 wastewater treatment facilities have used or currently use invasive Phragmites (▲)
Risk of spread by seed

Viable seed has been documented in the southern 2/3rds of MN

<table>
<thead>
<tr>
<th>Region</th>
<th># Sampled Populations</th>
<th>Populations w/ Viable Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>10</td>
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<tr>
<td>6</td>
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<td>6</td>
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<tr>
<td>7</td>
<td>2</td>
<td>1</td>
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<tr>
<td>8</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>
Genetic diversity and viable seed production

↑ Genetic diversity
↑ Viable seed production
Latitude and viable seed

Lower latitude =
↑ viable seed production
Patch Size & Reproductive potential

Minnesota populations
- Most still small
- Many with low genetic diversity
- Many with low seed set

Window of opportunity

<table>
<thead>
<tr>
<th>Area (sq ft)</th>
<th># Populations</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 500 sq ft</td>
<td>175</td>
<td>40</td>
</tr>
<tr>
<td>&gt;500 sq ft – ¼ acre</td>
<td>210</td>
<td>48</td>
</tr>
<tr>
<td>&gt;¼ - 1 acre</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>&gt;1-2 acres</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>&gt; 2 acres</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Unknown</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>435</td>
<td></td>
</tr>
</tbody>
</table>
Coordinated response assessment

An assessment to support strategic, coordinated response to invasive *Phragmites australis* in Minnesota

1. Regional assessments of response needs
2. Potential approaches for response
3. Planning and networking
4. Resources for regional response teams

Find this document on MNPhrag.org
## Regional response framework

<table>
<thead>
<tr>
<th>Unit</th>
<th># Pops</th>
<th>#WWTPs</th>
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<tbody>
<tr>
<td>Northwest</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>North Central</td>
<td>4</td>
<td>1</td>
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<tr>
<td>St Louis</td>
<td>67</td>
<td>0</td>
</tr>
<tr>
<td>Northeast</td>
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<td>0</td>
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<tr>
<td>Central West</td>
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<td>0</td>
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<tr>
<td>Central North</td>
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<td>1</td>
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<tr>
<td>Central South</td>
<td>71</td>
<td>5</td>
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<tr>
<td>Central East</td>
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<td>Southwest</td>
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<td>0</td>
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<tr>
<td>South Central</td>
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<td>1</td>
</tr>
<tr>
<td>Southeast</td>
<td>23</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>435</strong></td>
<td><strong>15</strong></td>
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</tbody>
</table>
What is meant by response?

Outreach, surveillance, coordination, monitoring, or control conducted with the goal of preventing, stopping, or reversing spread of an invasive species.

Photos courtesy of Lorene Gray
## Estimated cost of response

Estimated costs of mowing and herbicide treatment for three years on all verified populations (as of May 2019): $818,500-2,019,000

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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</thead>
<tbody>
<tr>
<td>Mowing</td>
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<td>Herbicide</td>
<td>treatment</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Mowing</td>
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</tr>
</tbody>
</table>

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![Image of people mowing reeds in the snow](image-url)
Prioritizing Control Efforts for a Single Species by Density of Infestation

Outliers – Highest Priority
- Lowest density of infestation
- Goal = eliminate small isolated infestations
- Prevent the reproduction & survival of outliers
- Monitor annually beyond the known infestation for new outliers
- Lowest level of commitment, resources and effort needed

Advancing Front
- Goal = control the advancing front and perimeter of core infestations
- Prevent the expansion of the core infestation

Core – Lowest Priority
- Highest density of infestation
- Goal = suppress the interior of core infestations
- Highest level of commitment, resources and effort needed

Note: Effective control may require the use of multiple control methods. Control efforts must be followed up by monitoring for new plants, regrowth, and flowering, generally within the same growing season. Monitoring should be done annually.

Source: Brock Woods & Jason Granberg, 2017
Recommended Coordinated Response Scenario

Three levels of response needed:

- High (more than 10 populations)
- Low (10 or less populations)
- Surveillance only (no populations)

Response recommendations includes:

- Management
- Monitoring
- Surveillance
Resources on MNPhrag.org

About Phragmites
Map of occurrences
Management information
Identification guide
Invasion biology

Assessment of Response Capacity

Webinar: http://z.umn.edu/PhragWebinar
Questions?

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MNPhrag.org

Thank You!