Minnesota Department of Natural Resources (DNR) Classification Summary for Invasive Species

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Classification Screening for common reed – nonnative subspecies

Contents

Introduction

This document is a guide to the Minnesota DNR's authority under *Minnesota Statutes*, chapter 84D, to designate invasive species as prohibited or regulated invasive species. The conclusions and recommendations in this document are for information purposes only and do not require the DNR or any other entity to take a specific action.

More information about classifications of invasive species can be found on the DNR website (http://www.dnr.state.mn.us/invasives/laws.html) and in *Minnesota Statutes*, chapter 84D (https://www.revisor.mn.gov/statutes/?id=84D). Prohibited, regulated, and unregulated species are listed in Minnesota Rules, chapter 6216 (https://www.revisor.mn.gov/rules/?id=6216).

How to fill out this classification screening

For more detailed guidance on completing this document, see the DNR's "Guidance for Invasive Species Classification Summaries". The following is a brief guide:

- Fill out the Species Summary section with the species name and a brief description of the species and its current regulatory status in Minnesota.
- Answer the questions in the Eligibility Screening section to determine whether the species is eligible for regulation under *Minnesota Statutes*, chapter 84D.
- If the species is eligible for regulation under *Minnesota Statutes*, chapter 84D, continue to answer the questions in the Classification Screening section and characterize the certainty of the answer for each question.
- At the end of the classification screening questions, summarize the most important points from the answers and judge the overall certainty of the screening.
- Finally, you should make a recommendation for classifying the species, based on the findings of the classification screening.
- Update the table of contents when the document is completed.

Species Summary

Common name: common reed – nonnative subspecies

Scientific name: *Phragmites australis* ssp. *australis*, not including *Phragmites australis* ssp. *americanus*

Brief description: A wetland grass that ranges in height, between 6-15 feet, typically the tallest grass where it invades. The leaves are blade-like and are flat, smooth, 1-2 inches wide, can be 6-18 inches long, and are blue-green or dark green in color. The ligule is typically less than 1 millimeter in length. The flower is robust and located at the tip of the stem and form a dense feathery cluster with a purplish or tawny and flag like appearance. Found in the Midwest in marshes, ditches, roadsides, riverine habitats, and lakeshores. Impedes recreation and shore access due to its ability to grow in dense clusters. The dense clusters can become huge monocultures that spread for acres, displacing native species, degrading fish and wildlife habitat, and altering ecosystem processes.

Present classification in Minnesota: Restricted noxious weed (Minnesota Department of Agriculture); unlisted nonnative species (Minnesota Department of Natural Resources)

Proposed classification: Prohibited invasive species

Eligibility Screening

These three questions determine whether the DNR has authority to regulate the species under *Minnesota Statutes*, chapter 84D.

1. Is the species an aquatic plant or wild animal? For the purposes of this question, "species" includes "subspecies, genotypes, cultivars, hybrids, or genera" (*Minnesota Statutes*, section 84D.04 subd. 1).
    - Choose ☒Yes or ☐No; if yes, continue.
2. Is the species a pathogen or terrestrial arthropod regulated under *Minnesota Statutes*, sections 18G.01 to 18G.15? (*Minnesota Statutes*, section 84D.14(1))
    - Choose ☐Yes or ☒No; if no, continue.
3. Is the species a mammal or bird defined as livestock in statute? (*Minnesota Statutes*, section 84D.14(1)).
    - Choose ☐Yes or ☒No; if no, continue.

Classification Screening

Is it nonnative?

To be classified as an invasive species under Minnesota Statutes, the species must be "nonnative"; that is, not "native" as defined in Minnesota Statutes, section 84D.01, subd. 11. This has two components.

1. Is the species nonnative in Minnesota?

1.1. Is the species naturally present or reproducing in Minnesota? No. *Phragmites australis* is a wetland grass with a cosmopolitan distribution. Four distinct lineages have been identified in North America (Saltonstall 2007, Meyerson and Cronin 2013). One is a collection of several endemic haplotypes that has been formally described as *P. australis subsp americanus* (Saltonstall et al. 2004). Another lineage, often referred to as Haplotype M, is the most common lineage worldwide. Genetic comparisons and historical distribution data have shown that haplotype M was likely introduced to North America, possibly from sources in the United Kingdom, sometime before 1910 (Saltonstall 2002, Plut et. al. 2011). Both native *Phragmites* and nonnative *Phragmites* have been documented in Minnesota (Saltonstall 2002, Melchior & Weaver 2016, Blanke et al. 2019).

1.2. **Does the species naturally expand from its historic range into Minnesota?** No. Molecular evidence indicates that nonnative *Phragmites* was introduced to North America from a likely overseas source and the plant could not have naturally expanded to Minnesota from its native range. Plut et al. (2011) used genetic analysis to determine that the United Kingdom was a likely source of the non-native *Phragmites* in the U.S.

How certain are these answers? Very certain; supported by peer-reviewed literature.

Likelihood of introduction

This is a criterion for classification of an invasive species under Minnesota Statutes, section 84D.04, subd. 2(1). The terms "introduce" and "introduction" are defined in Minnesota Statutes, section 84D.01.

2. **Is the species likely to be introduced to Minnesota if it is allowed to enter or exist in the state?** Yes. Nonnative *Phragmites* has been documented morphologically and molecularly in MN (Saltonstall 2002, Melchior & Weaver 2016, Blanke et al. 2019). Nonnative *Phragmites* is known to exist at 17 wastewater treatment plants in Minnesota (personal communication from MPCA, 2017). It was allowed to enter the state for wastewater treatment plants because people thought it could not spread by seed.

   How certain is this answer? Very certain; supported by peer-reviewed literature and recent field and molecular studies (MN Phrag project by the University of Minnesota).

Likelihood of survival

This is a criterion for classification of an invasive species under Minnesota Statutes, section 84D.04, subd. 2(2). The term "naturalize" is defined in Minnesota Statutes*, section 84D.01 as "to establish a self-sustaining population…in the wild."*

3. **Is the species likely to naturalize in Minnesota if it were introduced?** Yes. Field and molecular studies conducted by the MNPhrag project in 2016-2018 have confirmed self-sustaining populations of nonnative *Phragmites* in the wild in Minnesota.

   How certain is this answer? Very certain; supported by recent field and molecular studies.

Potential negative impacts

For a nonnative species to be defined as "invasive" under Minnesota Statutes*, section 84D.01, subd. 9a, the species must: cause, or have the potential to cause economic or environmental harm, harm to*

human health; or threaten or have the potential to threaten the use of natural resources in the state. This question has four components: economic, environmental, health, and natural resources.

4. Is the nonnative species an invasive species as defined under Minnesota law?

4.1. Does the species cause, or may it cause, economic harm? Maybe. No known impacts to crop production in the literature. There is a concern that introduced *Phragmites* could threaten wild rice production, not based on direct evidence but based on overlapping habitat requirements (Falck, pers comm. as cited in the Minnesota Noxious Weed Advisory Committee Risk Assessment 2016). Other potential economic impacts may include increased costs to maintain drainage ditches, costs to manage fire (or to recover from fire damages), costs to manage non-native *Phragmites*. Martin and Blossey (2013) did a survey of U.S. land managers and found that more than $4.6 million dollars per year was spent on non-native *Phragmites* management per year from 2005-2009.

How certain is this answer? Moderately certain; good evidence that some known impacts would have secondary economic impacts.

4.2. Does the species cause, or may it cause, environmental harm? Yes. Nonnative *Phragmites* has been shown to reduce native plant diversity through rapid growth, litter accumulation, hydrological alterations, and allelopathy (Ailstock et al. 2001, Chambers et al. 1999, Farnsworth and Meyerson 1999, Galatowitsch 2012, Holdredge et al. 2010, Price et al. 2014, Rudrappa et al. 2007). Nonnative *Phragmites* can grow in such dense stands that it alters ecosystem structure and function. Considered to be an ecosystem engineer, introduced *Phragmites* growth and rapid litter accumulation alter hydrology, and cause changes in nutrient cycling, soil properties, surface temperatures, and light levels within marsh communities (Gucker 2008, Meyerson et al. 2009). These changes have been associated with reduced plant and animal diversity and with significant alterations at the base of the food web (Able & Hagan 2000, Able & Hagan 2003, Benoit & Askins 1999, Gratton & Denno 2006, Meyer et al. 2010, Meyerson et al. 2009, Gucker 2008). Nonnative *Phragmites* also hampers wetland restoration by crowding out target plant communities (Meyerson et al. 2009). Nonnative *Phragmites* can increase methane emissions from wetlands (Mozdzer and Megonigal 2013). Other potential environmental impacts may include impacts on nutrient cycling and light levels (Meyerson et al. 2009).

How certain is this answer? Very certain; impacts documented in peer-reviewed literature.

4.3. Does the species cause, or may it cause, harm to human health? Yes. Dense stands of nonnative *Phragmites* are believed to have contributed to fires (https://www.greatlakesphragmites.net/uncategorized/httpgreatlakesphragmites-netp2863/).

How certain is this answer? Reasonably certain; impacts have been observed elsewhere.

4.4. Does the species threaten, or may it threaten, the use of natural resources in the state? Maybe. Nonnative *Phragmites* may threaten the use of natural resources in the following ways: could invade wetlands used for waterfowl hunting and could impact upland hunting in some areas; could impede access to fishing spots, impact recruitment of fish; may impact Boating and water recreation; and may impact views from shorelines.

How certain is this answer? Moderately certain; impacts are possible based on observations from other locations.

Natural resource impacts

This is a criterion for classification of an invasive species under Minnesota Statutes*, section 84D.04, subd. 2(3).*

5. Would the species have potential adverse impacts in Minnesota, in particular on: native species, outdoor recreation, commercial fishing, and other uses of natural resources in the state?

- Choose ☒Yes or ☐No; if yes, continue to 5.1.

5.1. If so, what would be the magnitude of these adverse impacts? Impacts on native species: Nonnative *Phragmites* has been shown to reduce native plant diversity through rapid growth, litter accumulation, hydrological alterations, and allelopathy (Ailstock et al. 2001, Chambers et al. 1999, Farnsworth and Meyerson 1999, Galatowitsch 2012, Holdredge et al. 2010, Price et al. 2014, Rudrappa et al. 2007). Nonnative *Phragmites* can grow in such dense stands that it alters ecosystem structure and function. Considered to be an ecosystem engineer, introduced *Phragmites* growth and rapid litter accumulation alter hydrology, and cause changes in nutrient cycling, soil properties, surface temperatures, and light levels within marsh communities (Gucker 2008, Meyerson et al. 2009). These changes have been associated with reduced plant and animal diversity and with significant alterations at the base of the food web (Able & Hagan 2000, Able & Hagan 2003, Benoit & Askins 1999, Gratton & Denno 2006, Meyer et al. 2010, Meyerson et al. 2009, Gucker 2008). Nonnative *Phragmites* also hampers wetland restoration by crowding out target plant communities (Meyerson et al. 2009). Nonnative *Phragmites* can increase methane emissions from wetlands (Mozdzer and Megonigal 2013). Other potential environmental impacts may include impacts on nutrient cycling and light levels (Meyerson et al. 2009). Impacts to outdoor recreation: Can impede access to water recreation activities and waterfowl hunting. Impacts to commercial fishing: unknown.

How certain is this answer? Moderately certain; supported by some peer-reviewed literature and observations in other areas.

Management options

This is a criterion for classification of an invasive species under Minnesota Statutes, section 84D.04, subd. 2(4).

6. **Would we be able to eradicate, or control the spread of, the species once it is introduced in Minnesota?** Nonnative *Phragmites* has already been introduced in Minnesota. There are control methods but they are costly to implement.

   Control efforts in other states have shown success with various combinations of treatments such as herbicide, mowing, burning, and restoration (Gucker 2008, Great Lakes *Phragmites* Collaborative). Coordinated efforts in Nebraska have reduced infestations and improved flow conveyance in the Platte River (Walters, unpublished data). Restoration of ecosystem function and biodiversity are also possible upon control (Gratton & Denno 2006, Walters, unpublished data, Ailstock et al. 2001). However, other studies have questioned the long-term and landscape scale effectiveness of control, and more research is likely needed into the long-term impacts of control and the integration of restoration activities with control treatments (Hazelton et al. 2014, Martin & Blossey 2013). Blanke et al. (2019) describes management needs on a statewide level.

   Blossey et al. (2018) submitted a petition to the USDA APHIS for the US field release of *Archanara geminipuncta* and *Archanara neurica* as biological control insects of introduced *Phragmites australis* on August 20, 2018. The USDA APHIS Technical Advisory Group (TAG) reviewed the proposal and recommended release on April 19, 2019. The biocontrol insects may not pass further regulatory steps due to concerns about threats to native *Phragmites* (Cronin et al. 2016, Kiviat et al. 2019). There is also some question as to population-level effectiveness/impact of potential biocontrol agents (Larkin, personal communication).

   How certain is this answer? Moderately certain; we have information from other locations.

Other relevant information

This is a criterion for classification of an invasive species under Minnesota Statutes*, section 84D.04, subd. 2(5). Information that may be included here includes, but is not limited to: economic impacts; regulations in other jurisdictions; and ongoing monitoring programs.*

7. **Are there other criteria the DNR commissioner deems appropriate? If so, discuss.**

- Other regulations
    - Nonnative *Phragmites* is currently listed as a Minnesota State Noxious Weed on the Restricted list. Minnesota Department of Agriculture risk assessments for non-native Phragmites (2012 and 2016) are available for review.
    - Nonnative *Phragmites* is listed as a regulated invasive species in the eastern half of Wisconsin and is prohibited in the western half of Wisconsin.
- Pathways
    - Wastewater treatment plants
        - Approximately 14 wastewater treatment plants in Minnesota use nonnative *Phragmites* in their reed beds for dewatering purposes. The DNR plans to work with those facilities to allow for their continued use of the existing plants for the lifespan of the reed beds while managing the risk of further introduction or spread into the environment in Minnesota.
        - Nebraska prohibits the use of *P. australis* subsp. *australis* in wastewater treatment plant reed beds and Indiana has also banned the practice (personal communication with Hegeman cited in Minnesota Noxious Weed Advisory Committee 2016 risk assessment).
    - Waterfowl hunting: Hunters move emergent vegetation for shooting or observation blinds or for attaching to decoys. Transporting non-native *Phragmites* plants with seed heads could transport seeds. Transportation of seeds is already prohibited by the Minnesota Department of Agriculture's noxious weed law with non-native *Phragmites* as a Restricted Noxious Weed.
    - Trade: there is limited interest in the species in trade – some decorative planting and products (e.g., Pier 1 sold a decorative rooster containing *Phragmites* in winter 2017-2018; the product was removed from sale based on feedback from concerned groups).
- Cost of management: Regional control projects for which expenditures are readily available include efforts in the central Platte river valley of Nebraska, which has spent $4.5 million over six years (Walters, unpublished data); and work in the great lakes totaling over $16 million since 2010 (Braun, pers. comm. in NWAC Risk Assessment). An economic survey of management efforts by Martin and Blossey (2013) found that organizations across the U.S. spent over $4.6 million per year from 2005-2009, but that few organizations had accomplished their management objectives.

- The University of Minnesota MNPhrag project found that volunteer, citizen science observers with some training were able to correctly identify nonnative and native *Phragmites* with reasonably high accuracy (Blanke et al. 2019).
- The MNPhrag project found evidence that nonnative *Phragmites* was producing viable seed and that seed production in MN does not appear to be limited by season length. Because these data were collected in a long winter season, potential for seed production is greater in average years and under future climate change projections (Blanke et al. 2019).
- Further research: the DNR is pursuing funding opportunities and partnering with researchers to find good alternatives to nonnative *Phragmites* for use in wastewater treatment plant reed beds.

Summary

Summarize the findings of the screening form, including whether the species is nonnative and invasive as defined by Minnesota Statutes*, chapter 84D, and characterize the overall certainty of the answers provided above.*

Note that certain answers in the screening form may indicate that the species is not a good candidate for designating as a prohibited or regulated invasive species under *Minnesota Statutes*, chapter 84D:

- If you answered "Yes" to **either** 1a or 1b, the species is not "nonnative" as defined under *Minnesota Statutes*, chapter 84D; consider regulation under other authorities.
- If you answered "No" to **all** of 4a, 4b, 4c, and 4d, then the species is nonnative but may not be "invasive" as defined under *Minnesota Statutes*, chapter 84D; consider whether proposed introductions of this species should follow *Minnesota Rules*, part 6216.0290.

Summary: _____

How certain is this classification summary, overall? _____

Recommendation

*The DNR may choose to recommend whether to designate the species as a prohibited invasive species, a regulated invasive species, or whether the species should be an unlisted nonnative species (*Minnesota Statutes*, section 84D.06). Briefly justify this recommendation and include any additional information*

such as recommended deadlines for updating this screening form and revisiting this decision and gaps in our knowledge that could be addressed by researchers.

Recommendation: Classify nonnative *Phragmites* as a prohibited invasive species in Minnesota. Since 2013, nonnative *Phragmites* has been listed as a restricted noxious weed by the Minnesota Department of Agriculture, which means it is illegal to import or sell in the state.

Appendix

Qualitative uncertainty ratings

Uncertainty rating	Description	Abbreviation
Very certain	As certain as I am going to get	VC
Reasonably certain	Reasonably certain	RC
Moderately certain	More certain than not	MC
Reasonably uncertain	Reasonably uncertain	RU
Very uncertain	A guess	VU

Uncertainty ratings from: "Generic Nonindigenous Aquatic Organisms Risk Analysis Review Process", Risk Assessment and Management Committee report to the Aquatic Nuisance Species Task Force, 1996. Available at https://www.anstaskforce.gov/Documents/ANSTF_Risk_Analysis.pdf (accessed February 14, 2020).

Version notes

References to Minnesota Statutes are to the 2019 version.

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