

Ohio Invasive Plant Assessment Protocol - 2015

Botanical Name: *Phragmites australis*
 Common Name: Common reed
 Family Name: Poaceae
 Assessment conducted by: Allison Mastalerz, Theresa Culley

Step I Outcome: **Invasive**
 Step II Score: **70**
 Step II Outcome: **Invasive**

Team Score

Notes

References

Step I

Directions: Place an "X" in the Score column next to the selected answer to each of the four questions.

1. Is this plant known to occur in the state and listed as "noxious" on any federal or Ohio Department of Agriculture plant list?	Yes. <i>Place on invasive plant list, no further investigation needed. STOP</i>		9		
	No. <i>Continue on to question 2.</i>	X			
	2. Has this plant demonstrated widespread dispersion and establishment (i.e. high numbers of individuals forming dense stands) in natural areas across two or more regions in Ohio? ^a	Yes. <i>Place on invasive plant list, no further investigation needed. STOP</i>		X	Occurs in 5 regions, but information regarding stand densities of populations is lacking.
	No. <i>Continue on to question 3.</i>				
3. Does this plant form self-replicating populations outside of cultivation in Ohio and is it documented to alter the composition, structure, or normal processes or functions of a natural ecosystem?	Yes	X	Species does form self-replicating populations outside of cultivation in Ohio, but the impacts on processes and/functions of a locality vary widely. Information on species impacts on Ohio habitats needed.		
	No				
	Unknown				
4. Is the plant listed as invasive in an adjoining state or a nearby state east of the Mississippi within the USDA Plant Hardiness zones 5-6? ^{b,c}	Yes	X	PA, IN, MI, WV, NY		
	No				
	Unknown				

If the answer was yes for both questions 3 and 4, the plant is placed on the invasive plant list and no further research is needed. Stop here. If the answer is no for both questions 3 and 4, the plant is not considered invasive and no further investigation is warranted. Otherwise, proceed to Step II.

Step II: Invasion Status

Directions: Place the appropriate numerical score (or "U") in the Score column next to the selected answer to each of these 18 questions.

1. Current Invasion in Ohio			
- plant is not found in natural areas (0 pts.)	3	14	
- plant is found in natural areas but only because it persist from previous planting in that location (e.g. old home sites) (0 pts.)			
- plant is only expanding from sites of previous planting (1 pt.)			
- plant occurs in natural areas away from site of planting (3 pts.)			
- Information unknown (U)			
2. State Distribution^a			
- plant is not naturalized in any region of Ohio (0 pts.)	5	9	
- plant is naturalized in only one region in Ohio (1 pt.)			
- plant is naturalized in two regions in Ohio (2 pts.)			
- plant is naturalized in three regions in Ohio (3 pts.)			
- plant is naturalized in four regions in Ohio (4 pts.)			
- plant is naturalized in five regions in Ohio (5 pts.)			
- Information unknown (U)			
3. Regional/US Distribution			
- plant is not considered to be a problem in any other state (0 pts.)	5	2, 3, 4, 5, 6	PA, IN, MI, WV, NY
- plant has been reported as a widespread problem in another non-neighboring state within the USDA Plant Hardiness Zones 5-6 (1 pt.)			
- plant has been reported to be a widespread problem in 1-2 adjoining states (3 pts.)			
- plant has been reported to be a widespread problem in 3 or more adjoining states (5 pts.)			
- plant has been reported to be a widespread problem in similar habitat outside the US (1 pt.)			
- Information unknown (U)			

Step II: Biological Characters

4. Vegetative Reproduction			
- no vegetative reproduction (0 pts.)	5	10: "common reed regeneration and spread are primarily through rhizome and sometimes stolon growth. A substantial amount of common reed establishment also occurs vegetatively through colony breakage and dispersal of rhizome fragments" 15: Some introduced strains of this species are	
- reproduces readily within the original site (1 pt.)			
- has runners or spreading rhizomes that root easily (3 pts.)			
- fragments easily and fragments can be easily dispersed (4 pts.)			
- has runners or spreading rhizomes that root easily AND fragments easily and fragments can be easily dispersed (5 pts.)			

- Information unknown (U)

5. Sexual Reproduction

- no sexual reproduction (0 pts.)
- infrequent sexual reproduction (1 pt.)
- frequent sexual reproduction, but high variation among years in seed production (3 pts.)
- frequent sexual reproduction (one or more events per year) (5 pts.)
- Information unknown (U)

6. Number of Viable Seeds or Propagules per Plant

- few (0-10) (1 pt.)
- moderate (11-1,000) (3 pts.)
- prolific (>1,000) (5 pts.)
- Information unknown (U)

7. Flowering Period

- one month or less per year (0 pts.)
- two months (1 pt.)
- three to five months (2 pts.)
- longer than five months (3 pts.)
- Information unknown (U)

8. Dispersal Ability

- low potential for long-distance seed/propagule dispersal (>1km) (0 pts.)
- medium potential for long-distance seed/propagule dispersal (3 pts.)
- high potential for long-distance seed/propagule dispersal (5 pts.)
- Information unknown (U)

9. Generation Time

- long juvenile period (>5 or more years for trees, 3 or more years for other growth forms) (0 pts.)
- short juvenile period (<5 years for trees, <3 years for other forms) (3 pts.)
- Information unknown (U)

10. Establishment

- unable to invade natural areas (0 pts.)
- can only colonize certain habitat stages (e.g. early successional habitats) (1 pt.)
- aggressively colonizes and establishes in edge habitats (3 pts.)
- aggressively colonizes and establishes in intact and healthy natural areas (6 pts.)
- Information unknown (U)

fragments. 13: Some introduced strains of this species are outcompeting native US strains. 19: Dispersal of species is often thought to be through rhizome transport (natural - water, bird, etc. - or on vehicles, fill movement). 22: Spread of this species is due to two introduced strains: Haplotype M from Europe and now Haplotype Med from the Mediterranean region; native North American strains are not aggressive.

10,11,14,15,18,19,20,21,22,33

3

10: "Many researchers indicate that common reed rarely produces viable seed, while others indicate that viable seed is produced at least sometimes in some locations...Viable seed production may be affected by site factors, but there is little information on the conditions necessary for successful common reed seed development". 16: Seeds are "likely the primary diaspores responsible for establishment of common reed populations" and the species is an "abundant" seed producer, although seed production is "highly variable". 16: a single inflorescence can produce 350-800 seeds. 18: There is a northward decrease in seed production, seed viability, and establishment possibly due to the shorter growing season [from a Canadian study]. 19: Increasing evidence in Ontario of new populations along roads that are due to seed, rather than rhizome transport. Seed production may be as low as 0-5% per flower in most populations, although some populations have up to 59% production. 25: Non-native strains produce more seeds than native strains (at least in ID and UT).

10,11,16,18,19,23,24,25,26,31

5

11: "estimated 350 to 800 seeds could be produced/inflorescence, but only 3-7% of those are viable (at least in the northern limit of the distribution)." 24: approx. 10X seed produced after outcrossing than with self-pollinations. 26: In MD, only 0.4-2.8% of collected seeds were viable.

10,11,24,26

1

10: July-September. 24: In VA, experimental plants were hand-pollinated late August thru early September.

10,24

5

Propagules and seeds dispersed by water, anthropological disturbance. Seeds also dispersed by wind. 16: Seeds are dispersed by water or wind up to 10 km away.

10,11,13,16,20,31

0

10: "common reed may need to reach 3 or 4 years old before producing viable seed." 24: After transplanting rhizomes from an established population, nearly all plants flowered after one year.

10,24

6

10: " Establishment and spread patterns may vary with degree of anthropogenic disturbance, haplotype, salinity levels, and stand age".

10,11,13,33

Step II: Ecological Importance

11. Impact on Ecosystem Processes

- no known effect on ecosystem-level processes (0 pts.)
- moderate effects on ecosystem-level processes (e.g., changes in nutrient cycling)(3 pts.)
- causes long-term, substantial alterations in the ecosystem (e.g., changing fire regime of an area, changing hydrology of wetlands) (6 pts.)

6

Ecosystems impacts rely greatly on specific local conditions. They can be great or small, therefore the 3point answer is given. 10:"Plant diversity, soil properties, sedimentation rates, water salinity, depth to water table, topographic relief, bird and fish habitat use, and food webs may be altered when marshes are converted to dense, monotypic common reed stands." 30: The soil pathogen community is different under non-native strains of reed, compared to native strains.

10,11,14,17,22,23,30

12. Impact on Rare Organisms

- no known negative impact on Ohio State-listed or federal-listed plants or animals (0 pts.)
- negatively impacts listed species, such as through displacement or interbreeding (3 pts.)

0

Information is lacking (may impact Virginia rails and other birds but no references can be found).

13. Impact on Native Animals

- no known negative impact on animals (0 pts.)
- documented direct or indirect negative effects on animal taxa (3 pts.)

3

10: "Conversion of wetland habitats to monotypic common reed stands may or may not affect animal use. Findings often differed with the species and age of the animal and vegetation being studied. In many cases, habitat diversity, size, and connectedness may affect wildlife more than plant species composition." 27: There was no effect of reed on anuran (amphibian) populations. 32: Reed populations slowed down wood frog tadpole development but had no effect on survival. 35: There was a significant effect of reed on larvae of the North American bullfrog.

10,14,23,27,31,32,33,35

14. Impact on Native Plants

- no known negative effects on native plants (0 pts.)
- negatively impacts some native plants (increasing their mortality and/or recruitment of certain taxa) (3 pts.)
- impacts native plants to such an extent that community structure is greatly altered (6 pts.)

6

10: "Since its introduction, the nonnative haplotype has expanded its range throughout North America and most dramatically along the Atlantic Coast and in the Great Lakes area. The nonnative type replaced native types in New England and established in the southeastern United States, where native common reeds did not occur historically. In Connecticut and Massachusetts, 19th century common reed samples were primarily native haplotypes, but by 1940, all samples were nonnative. Local extinctions of native haplotypes are not uncommon." Greatly reduces abundances of other native plants, such as triangle orache (Atriplex prostrata) and seaside goldenrod (Solidago sempervirens). 34: non-native strains lowered plant diversity and species composition. 36: Common reed is allelopathic. 38: Reed suppresses a native wetland shrub through allelopathy. 39: In Lake Erie, reed displaced a floating leaf American lotus bed with a monotypic bed from 1993 to 2005.

10,11,12,13,14,17,19,22, 34,36,38,39

15. Hybridization

- no known instances of hybridization with other plant species (0 pts.)
- can hybridize with native Ohio plants or commercially-available species, but seeds are inviable (1 pt.)
- can hybridize with native Ohio plants or commercially-available species, producing viable seed (3 pts.)

3

12: Strong molecular evidence that natural hybridization between native and nonnative genotypes occurs in at least two sites adjacent to Lake Erie. 28,37: Native and introduced strains in the US can hybridize with one another.

12,28,29,37,40

16. Population Density

- occurs only as small, sporadic populations or individuals (1 pt.)
- typically forms small, monospecific patches (3 pts.)
- is a dominant plant in area where population occurs (absolute cover 15-50%) (4 pts.)
- forms an extensive, monospecific stand (absolute cover >50%) (5 pts.)

5

14: Forms extensive monocultures in many North American brackish and freshwater marshes. 17: Large monocultures in MD and VA.

10,11,13,14,17

17. Role in Succession in Natural Areas

- successional information is unknown (0 pts.)
- is an early successional species that temporarily invades a disturbed site but does not persist as the site matures (0 pts.)
- readily invades disturbed sites and persists, but does not interfere with succession (1 pt.)

4

10: "In marsh successions, common reed may be present in any seral stage from pioneer to climax...It regenerates and establishes well on disturbed sites and is often considered a

- readily invades disturbed sites, persists and interferes with succession of native plants (4 pts.)

establishes well on disturbed sites and is often considered a weedy or nuisance species. Generally, common reed is shade intolerant, appears early in primary open water succession, and sprouts rapidly after top-killing disturbances." 39: In Lake Erie, reed displaced a floating leaf American lotus bed with a monotypic bed from 1993 to 2005.

10,11,33,39

18. Number of Habitats Invaded

Forestlands: Floodplain forest, hemlock-hardwood forest, mixed mesophytic forest, beech-maple forest, oak-maple forest, oak-hickory forest.

Grasslands: Alvar*, beach-dune community*, bur oak savanna*, slough-grass-bluejoint prairie*, sand barren*, big bluestem prairie, little bluestem prairie (xeric limestone prairie*+), post oak opening*+

Wetlands: Bog*, fen*, twigrush-wiregrass wet prairie*, marsh, buttonbush swamp, mixed shrub swamp, hemlock-hardwood swamp*, maple-ash-oak swamp, white pine-red maple swamp*

* Considered a rare plant community in Ohio by ODW's Biodiversity Database Program.

+ = xeric limestone prairies or cedar glades and post oak openings are unique to the Interior Low Plateau Region of Adams, Highland and Pike counties, and are not included in Schneider and Cochrane (1997).

- not found in any natural habitats in Ohio (0 pts.)
- only found in 1 broad category (1 pt.)
- found in 2 broad categories or 2 rare habitat types (3 pts.)
- found in 3 broad categories or 3 rare habitat types (4 pts.)
- found in 4 or more rare habitat types (5 pts.)

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10,11,12,13

Total Score:

70

Number of Unknowns:

0

Outcome:

Invasive

Total Points	Assessment Decision
4 or more U	Insufficient Data
0-34	Not Known to be Invasive
35-44	Pending Further Review
45-80	Invasive