

Ohio Invasive Plant Assessment Protocol

Botanical Name: *Typha angustifolia*
 Common Name: Narrow-leaved Cattail
 Family Name: Typhaceae
 Posted Date: 7/20/16
 Initial assessment conducted by: Allison Mastalerz

Step I Outcome: **Invasive**
 Step II Score: **73**
 Step II Outcome: **Invasive**

Score

Notes

References

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

Step I	1. Is this plant known to occur in the state and listed as "noxious" on any federal or Ohio Department of Agriculture plant list?		Score	Notes	References
	Yes. Place on invasive plant list, no further investigation needed. STOP	No. Continue on to question 2.			
			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		X	Species occurs in all regions, but information regarding individual populations is lacking.	1,7
	Yes. Place on invasive plant list, no further investigation needed. STOP	No. Continue on to question 3.			
	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?		X		
	Yes	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}		Y	PA	1,2,3,4,5,6,27
	Yes	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

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		7
	- plant is found in natural areas but only because it persists 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	17: 1986 map shows species in Regions 2&3 (lower regions not examined). 27: in all regions	7,17,27
	- 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	PA, IN, MI, WI; native to Europe. 24: not as common as <i>T. latifolia</i> in the eastern US.	2,4,12,24,28,29
	- 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.)			13: Grows through extensive network of underground rhizomes. 17: Species produces a few	
	- reproduces readily within the original site (1 pt.)				

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- 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

	Score	Notes	References
<ul style="list-style-type: none"> - 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	underground rhizomes. 17: Species produces a few, stout, short rhizomes [in Canada], but plant allocates more biomass to rhizome storage and sexual reproduction than <i>T. latifolia</i> .	7,9,13,17
5. Sexual Reproduction <ul style="list-style-type: none"> - 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) 	3	11: Species reproduces sexually, but factors such as water levels can impact production, 14: Both <i>T. angustifolia</i> and <i>T. x glauca</i> can be identified from <i>T. latifolia</i> and other similar wetland species by their pollen grain characteristics. 17: flowers are wind-pollinated, unisexual with pistillate spike positioned below the staminate spike (with a gap between the two); <i>T. angustifolia</i> flowers before <i>T. latifolia</i> with a greater pollen dispersal range; species can be self-fertile. 19: <i>T. angustifolia</i> can cross sexually with <i>T. latifolia</i> throughout eastern North America, as determined with genetic markers.	11,14,17,19
6. Number of Viable Seeds or Propagules per Plant <ul style="list-style-type: none"> - few (0-10) (1 pt.) - moderate (11-1,000) (3 pts.) - prolific (>1,000) (5 pts.) - Information unknown (U) 	5	7: Individuals can produce 250,000 seeds. 17,26: <i>Typha</i> in general produces single-seeded fruits with estimates for a single inflorescence ranging from 20,000-700,000; germination is usually high but dependent on environmental conditions.	7,17,26
7. Flowering Period <ul style="list-style-type: none"> - 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) 	0	10: Approximately 4 weeks. 17: <i>T. angustifolia</i> flowers before <i>T. latifolia</i> . 23: <i>T. angustifolia</i> begins flowering in Ohio about 2 weeks earlier than <i>T. latifolia</i> with shoots that were 15 times more abundance and twice as dense than <i>T. latifolia</i> , but no putative hybrids were found (flowering monitored in Columbus, OH from May 24 to July 27); Figure 1 shows that <i>T. angustifolia</i> flowers from May 24 to less than 30 days later.	10,17,23
8. Dispersal Ability <ul style="list-style-type: none"> - 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) 	5	7: Wind and water dispersed. 17: Wind-dispersed, but when wet, may fall close to the maternal plant.	7,17
9. Generation Time <ul style="list-style-type: none"> - 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) 	3	11: One year. 26: A single seedling of a <i>Typha</i> spp. can produce 6-7 new ramets and grow to cover a square meter of the course of a growing season under favorable conditions (Miao et al. 2000).	11,26
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Step II Score: 73

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	Score	Notes	References	
Step II	6	13: In a common garden experiment, both <i>T. angustifolia</i> and <i>T. xglauca</i> exhibited fastest overall growth rates and strongest effects of initial biomass in first few weeks of growth; ramets of <i>T. angustifolia</i> with larger rhizome biomass exhibited new growth more than in <i>T. latifolia</i> ; species and hybrid showed evidence of translocation over a greater number of rhizome segments than <i>T. latifolia</i> .	8,11,13	
	Step II: Ecological Importance			
	6	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.)	The presence of this cattail can lead to hybridization events with native cattail, which in turn produces <i>T x glauca</i> . <i>T x glauca</i> is considered a possible 'next successional step' when <i>T. angustifolia</i> invasions occur, which ultimately leads to dramatic alterations to nutrient cycling and composition and microbial biodiversity. 22: <i>T. angustifolia</i> can be useful for bioremediation of soils. 26: Litter inputs in wetlands through aboveground cattail biomass is greater than cattail litter decay losses.	7,8,22,26
	3	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.)	R. Gardner: Species impacts state-listed plants specifically in fens; for example, <i>Eriophorum viridicarinatum</i> was upgarded to threatened status due to narrow-leaved cattails invading the highly-rich fen springs.	
	3	13. Impact on Native Animals - no known negative impact on animals (0 pts.) - documented direct or indirect negative effects on animal taxa (3 pts.)	11: Monotypic stands reduce ecosystem services to wildlife. 16: But occupancy of secretive <i>Sora</i> birds was positively associated with <i>Typha</i> stands [paper did not distinguish among taxa]. 17: <i>T. angustifolia</i> has been reported in Canada as potentially poisonous to humans and livestock although <i>Typha</i> as a group is generally considered edible. 20: Presence and removal of <i>Typha</i> stands in stormwater basins can affect bird roosting and mosquito presence, potentially affecting West Nile virus transmission to humans. 25: Red-winged blackbirds were the most common visitors (approx. 52% of all visitors) to <i>T. angustifolia</i> -dominated sites.	11,16,17,20,25
		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.)	8:"Because of high rates of primary productivity and slow decomposition, litter accumulates in	

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- impacts native plants to such an extent that community structure is greatly altered (6 pts.)

Score

Notes

References

6

Typha beds, eventually excluding other macrophytes." 18: In a experiment, *T. Angustifolia*, was shown to be allelopathic, reducing the longest leaf length and root, shoot, and total biomass of native river bulrush, *Bolboschoenus fluviatilis*. 25: There was lower plant species richness in sites dominated by *Typha angustifolia* than in *Phragmites*-dominated sites. 26: Sites dominated by invasive *Typha* (both the species and the hybrid combined) exhibited lower native species density; when cattail litter is removed, native species density increases.

7,8,18,25,26

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

Hybridizes with native cattail (*Typha latifolia*) to create a viable, invasive cattail hybrid (*Typha x glauca*)

7,8

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

8: Can create dense stands in wetlands, where it has been measured to cover over 60% of wetland area. 14: "Some aggressively spreading *T. angustifolia* and *T. xglauca* interfere with wetland communities by forming large monospecific stands, out-competing native species, and altering substrate characteristics." 17: Older sites usually contain "a few large clones in comparison to many small clones in newly established sites" for *Typha* in general. 23: *T. angustifolia* was more abundant than *T. latifolia* in Columbus, OH wetland, *T. angustifolia* colonized eight times more area than *T. latifolia* in the 6 years that the wetland was created. 26: In areas around the Great Lakes [including northern OH], the majority of plots examined (53%) contained cover of invasive *Typha* (both *T. angustifolia* and the hybrid combined) of greater than 25% (a mean cover of 37.5% or higher).

8,14,17,23,26

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

4

8: Species can rapidly come to dominate a wetland habitat, and displace native species. Further, *T. angustifolia* hybridizes with a native cattail to produce *T. x glauca*, which has been documented to become the dominant cattail in invaded ecosystem. 17: Both *T. angustifolia* and the hybrid occur in Canada primarily in early to mid-successional communities; they are frequently found in disturbed wetland sites.

8,17

18. Number of Habitats Invaded

