NAME OF SPECIES: Typha angustifolia L.	
Synonyms: Typha angustifolia L. var. calumetensis Peattie;	
Common Name: Narrow-Leaved Cat-Tail	
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES ☒ NO ☐
	2. Abundance: Found in 40 counties throughout Wisconsin (1).
	3. Geographic Range: Wisconsin State Herbarium range maps show this species is more abundant in southeast and eastern Wisconsin (1).
	4. Habitat Invaded: Emergent Marsh and Aquatic Disturbed Areas ☒ Undisturbed Areas ☒
	5. Historical Status and Rate of Spread in Wisconsin: Typha angustifolia was introduced to the University of Wisconsin-Madison Arboretum about 1910 (2). The earliest Wisconsin herbarium specimen vouchered` in Dane County in 1922 (1). N.C. Fassett reported a lone population in southern Wisconsin in 1929. Cat-tails have rapidly expanded their range in recent years, and are now more abundant (3) (4). T. angustifolia spreads more slowly than T. x glauca (4).
	6. Proportion of potential range occupied: Minimal.
II. Invasive in Similar Climate Zones	1. YES ☒ NO ☐ Where (include trends): Locally common throughout Europe.
III. Invasive in Similar Habitat Types	1. Upland ☐ Wetland ☒ Dune ☐ Prairie ☐ Aquatic ☒ Forest ☐ Grassland ☐ Bog ☒ Fen ☒ Swamp ☐ Marsh ☒ Lake ☒ Stream ☒ Other: Microtopographic lows in sedge meadows, disturbed areas with fluctuating water levels (roadside ditches, reservoirs, stormwater retention zones), lake and pond margins, riparian backwaters, shallow ponds, damp depressions in rural or suburban locations and agricultural fields. Can withstand deeper water than T. latifolia.
IV. Habitat Effected	1. Soil types favored (e.g. sand, silt, clay, or combinations thereof, pH): Grows on a wide variety of substrates, including wet sand, peat, clay and loamy soils. Tolerant of basic, calcareous, or slightly salty soils. Tolerant to high concentrations of lead, zinc, copper, and nickel (5)
	2. Conservation significance of threatened habitats: Wetlands provide billions of dollars annually in ecosystems services. Simplified and homogenized systems do not exhibit congruent magnitude of nutrient and carbon sequestration and retention.
V. Native Habitat	1. List countries and native habitat types: T. angustifolia was probably introduced from Europe or Eurasia into Atlantic Coastal North America in the eighteenth century, and has since migrated westward (3).
VI. Legal Classification	1. Listed by government entities? No.
	2. Illegal to sell? YES ☐ NO ☒ Notes: Smith (3) recommended classifying T. angustifolia as a noxious weed in parts of North America.

B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	1. Type of plant: Annual ☐ Biennial ☐ Monocarpic Perennial ☐ Herbaceous Perennial ☒ Vine ☐ Shrub ☐ Tree ☐
	2. Time to Maturity: Plants grown from seed can flower during the second growing season.
	3. Length of Seed Viability: T. angustifolia seeds persist in the seed bank for 70-100 years or longer (6) (7) (9). Viable seeds germinate readily on bare wet soils or under shallow water (5).
	4. Methods of Reproduction: Asexual ☒ Sexual ☒ Please note abundance of propagules and and other important information: T. angustifolia invests more energy into sexual reproduction than clonal growth. Rhizomes are fewer and larger than T. latifolia and T. x glauca (5). A seed bank density of 610 seeds per square meter has been reported (8). A single inflorescence can yield up to 250,000 seeds (7).
	5. Hybridization potential: High. Hybridization occurs between populations of Typha angustifolia and T. latifolia [= T. x glauca], a hybrid with intermediate characteristics and environmental amplitude to its parental genotypes (3) (10). Introgressive hybridization may also occur between ecotypes of the same species (11).
II. Climate	1. Climate restrictions: T. angustifolia is also invasive in subtropical climates.
	2. Effects of potential climate change: Carbohydrate reserves were reduced enough to inhibit spring shoot growth when mean winter temperatures were greater than 8 degrees C (5).
III. Dispersal Potential	1. Pathways - Please check all that apply: Intentional: Ornamental ☒ Forage/Erosion control ☐ Medicine/Food: Other: Used in wetland restoration and constructed wetlands, and for tertiary water treatment. Unintentional: Bird ☒ Animal ☒ Vehicles/Human ☐ Wind ☒ Water ☒ Other: Seeds are small, and can become lodged in animal fur. Vegetative propagules can be dispersed by water.
	2. Distinguishing characteristics that aid in its survival and/or inhibit its control: Can withstand deeper water than T. latifolia and T x glauca (but see (4)). More salt tolerant than T x glauca (4). Invasions are concordant with disturbances, particularly nutrient enrichment, increased salinity, and hydrological alterations. Stormwater hydrology may facilitate invasions in suburban landscapes.
IV. Ability to go Undetected	1. HIGH ☒ MEDIUM ☐ LOW ☐

C. DAMAGE POTENTIAL	
I. Competitive Ability	1. Presence of Natural Enemies: Typha plants are mined by caterpillars of the moths Arzama opbliqua and Nonagria oblonga. Aphids and a snout beetle (Colandra pertinaux) eat leaves and stems. Rhizomes provide food and substrate to muskrats, birds, deer and other mammals.
	2. Competition with native species: Strong competitor, particularly aggressive under nutrient-enriched conditions. Capable of forming dense monocultures.
	3. Rate of Spread: HIGH(1-3 yrs) ☒ MEDIUM (4-6 yrs) ☒ LOW (7-10 yrs) ☐ Notes: Cat-tail expansions are enhanced by nutrient enrichment, wildfire suppression, and hydrological alterations. High investment into seed production enhances its spread over long distances, but short-distance expansion and displacement of native species occurs at a slower rate than T. x glauca (1).
II. Environmental Effects	1. Alteration of ecosystem/community composition? YES ☒ NO ☐ Notes: Relationships between cat-tail invasions and declines in species density, richness, and diversity have been extensively documented.
	2. Alteration of ecosystem/community structure? YES ☒ NO ☐ Notes: Rapid clonal growth following a disturbance can close off open water, eliminating habitat heterogeneity and species diversity. Cat-tails can accelerate hydroseral succession in lake and pond margins, and in shallow ponds and oxbows.
	3. Alteration of ecosystem/community functions and processes? YES ☒ NO ☐ Notes: Ecosystem service capacity is reduced in monotypic vegetation stands.
	4. Allelopathic properties? YES ☒ NO ☐ Notes: Typha litter inhibits seed germination.
D. SOCIO-ECONOMIC Effects	
I. Positive aspects of the species to the economy/society:	Notes: Stabilizes shore lines from wave action, erosion, and ice heaving. Reduces salinity in soils. Filters nutrients in aquatic systems, but probably not as effeciently as a diverse native species community. Food source, substrate, and cover for muskrats, and occassionally ducks and deer.
II. Potential socio-economic effects of restricting use:	Notes: Hunting and trapping communities may not react positively to cat-tail removal.
III. Direct and indirect effects :	Notes: N/A
IV. Increased cost to a sector:	Notes: N/A
V. Effects on human health:	Notes: None known.

F. REFERENCES USED:

E. CONTROL AND PREVENTION	
I. Costs of Prevention (including education; please be as specific as possible):	Notes:
II. Responsiveness to prevention efforts:	Notes: Invasions are concordant with disturbance (4). Control appears to be most effective when background disturbances (nutrient and stormwater inputs, sedimentation, hydrological alterations) are abated prior to administering treatments. Control and suppression are most effective when treatments are coupled to water level manipulations.
III. Effective Control tactics:	Mechanical ☒ Biological ☒ Chemical ☒ Times and uses: Coupling mowing and muskrat grazing to flooding is effective. Typha are not shade tolerant, and tarping for 6 months can reduce the diameter of scattered stands in high-quality natural areas. Starch reserves in Typha rhizomes are at a minimum in late spring. Herbicide applications (with glyphosate, amitrole-T, amino-triazole, or MCPA) at flowering, or mid-late summer or autumn (5) (7) (12). Herbicide applications are more effective on mature leaves as opposed to regrowth (e.g., following mowing), and should be followed up with flooding.
IV. Minimum Effort:	Notes: Mow aboveground stems then flood 3 - 5 inches above cut stems for two consecutive growing seasons. Muskrat grazing (stocking rate = 10 muskrats/acre) can provide biological control so long as water levels are raised to favor muskrat winter survival (5).
V. Costs of Control:	Notes:
VI. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: N/A
VII. Non-Target Effects of Control:	Notes: Control may require the use of herbicides and additives. Use of prescribed fire may result in peat fires.
VIII. Efficacy of monitoring:	Notes: It can be difficult to taxonomically distinguish among T. angustifolia, T. latifolia, T. x glauca, and their introgressive hybrids.
IX. Legal and landowner issues:	Notes: DNR approval and permitting may be required for control in some wetland projects.

☒ UW Herbarium
☐ WI DNR
☒ TNC
☐ Native Plant Conservation Alliance
☐ IPANE
☒ USDA Plants

Number	Reference
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Reviewer(s) and date reviewed: Galen Smith, September 20, 2007.

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