NAME OF SPECIES: *Carduus acanthoides L.*	
Synonyms: N/A	
Common Name: Plumeless Thistle, Spiny Plumeless Thistle	
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES ☒ NO ☐
	2. Abundance: Widespread distribution in southern and central Wisconsin, where it is locally abundant (1).
	3. Geographic Range: Found in 16 counties in Wisconsin (1).
	4. Habitat Invaded: Dry, open or partially shaded areas. Disturbed Areas ☒ Undisturbed Areas ☐
	5. Historical Status and Rate of Spread in Wisconsin: Earliest herbarium specimen was collected in 1937 in Iowa County (1).
	6. Proportion of potential range occupied: Could potentially expand into additional open areas
II. Invasive in Similar Climate Zones	1. YES ☒ NO ☐ Where (include trends): Invasive throughout the United States (2).
III. Invasive in Similar Habitat Types	1. Upland ☒ Wetland ☐ Dune ☒ Prairie ☒ Aquatic ☐ Forest ☒ Grassland ☒ Bog ☐ Fen ☐ Swamp ☐ Marsh ☐ Lake ☐ Stream ☐ Other: Disturbed sites, glade communities, buffer zones, restorations, abandoned agricultural land, dumps, fencerows, pastures, canopy gaps and open spaces in high quality natural areas.
IV. Habitat Effected	1. Soil types favored (e.g. sand, silt, clay, or combinations thereof, pH): Most common in well-drained or sandy, fertile soils with neutral or slightly acidic pH (3).
	2. Conservation significance of threatened habitats: Prairie and grassland communities provide ecosystem services (carbon sequestration) and habitat for arthropods and birds, and other wildlife.
V. Native Habitat	1. List countries and native habitat types: Southern Europe and western Asia (4).
VI. Legal Classification	1. Listed by government entities? Yes. Noxious in AZ, MN, AR, MD, NE, WV, WY, CA, CO, IA, NC, WA. Regulated in OR, SD.
	2. Illegal to sell? YES ☒ NO ☐ Notes:
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: Typically 2 growing seasons, but C. acanthoides can act as a winter annual under ideal growing conditions (3).
	3. Length of Seed Viability: Seeds persist in the seed bank for several years.
	4. Methods of Reproduction: Asexual ☐ Sexual ☒ Please note abundance of propagules and and other important information: Early flowering genotypes can produce more than 1500 seeds per head; late flowering genotypes as few as 25 seeds per head (3) (5) (6). Seeds are dispersed 1 - 3 weeks after flowering (3).

	5. Hybridization potential: High. Carduus X orthocephalus Wallr. is a hybrid between C. acanthoides L. and C nutans L. (1) (7) (8). Hybrids are more aggressive than C. acanthoides (8).
II. Climate	1. Climate restrictions: requires cold period to induce reproductive stage
	2. Effects of potential climate change: Unknown
III. Dispersal Potential	1. Pathways - Please check all that apply: Intentional: Ornamental ☐ Forage/Erosion control ☐ Medicine/Food: Other: Unintentional: Bird ☐ Animal ☐ Vehicles/Human ☒ Wind ☒ Water ☐ Other: Mower decks, impurity in hay and straw.
	2. Distinguishing characteristics that aid in its survival and/or inhibit its control: Prolific seeder.
IV. Ability to go Undetected	1. HIGH ☐ MEDIUM ☐ LOW ☒
C. DAMAGE POTENTIAL	
I. Competitive Ability	1. Presence of Natural Enemies: NA
	2. Competition with native species: NA
	3. Rate of Spread: HIGH(1-3 yrs) ☒ MEDIUM (4-6 yrs) ☐ LOW (7-10 yrs) ☐ Notes: Mower decks enhance the rate (and distance) of spread.
II. Environmental Effects	1. Alteration of ecosystem/community composition? YES ☒ NO ☐ Notes: Reduces native species density and diversity.
	2. Alteration of ecosystem/community structure? YES ☒ NO ☐ Notes: Can form monotypic vegetation stands.
	3. Alteration of ecosystem/community functions and processes? YES ☒ NO ☐ Notes: Fire will not push through heavy infestations. May distract pollinators from native species (2).
	4. Allelopathic properties? YES ☐ NO ☐ Notes: Possibly. Closely related sympatric congener C. nutans exhibits allelopathic effects.
D. SOCIO-ECONOMIC Effects	
I. Positive aspects of the species to the economy/society:	Notes: None.
II. Potential socio-economic effects of restricting use:	Notes: N/A
III. Direct and indirect effects :	Notes: degrades pastures
IV. Increased cost to a sector:	Notes: Negatively impacts livestock production and reduces land values.
V. Effects on human health:	Notes: Thistles have spines on leaves and stems.

F. REFERENCES USED:

E. CONTROL AND PREVENTION	
I. Costs of Prevention (including education; please be as specific as possible):	Notes: N/A
II. Responsiveness to prevention efforts:	Notes: If detected early, C. acanthoides can be eradicated.
III. Effective Control tactics:	Mechanical ☒ Biological ☒ Chemical ☒ Times and uses: Herbicide applications are most effective in the rosette stage. Clopyralid and aminopyralid are more effective than glyphosate, but resprouting occurs. Mowing is most effective immediately prior to anthesis. Four biocontrol agents have been tested on C. accanthoides, the beetles Urophora solstitialus L., Trichosirocalus horridus Panzer., and Rhinocyllus conicus Froelich. (9), and the fungus Puccinia carduorum (10).
IV. Minimum Effort:	Notes: Several growing seasons.
V. Costs of Control:	Notes: Variable and site-specific.
VI. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: N/A
VII. Non-Target Effects of Control:	Notes: Broad-spectrum and composite/legume-specific herbicides can harm or eliminate desired vegetation. Mowing in mid-summer can be detrimental to nesting birds.
VIII. Efficacy of monitoring:	Notes: If detected early, C. acanthoides can be eradicated. Subsequent monitoring is usually necessary.
IX. Legal and landowner issues:	Notes: Uncontrolled infestations can be a source of invasive propagules into natural areas.

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

Number	Reference
1	Wisconsin State Herbarium. 2007. WISFLORA: Wisconsin Vascular Plant Species (http://www.botany.wisc.edu/wisflora/). Dept. Botany, Univ. Wisconsin, Madison, WI 53706-1381 USA.
2	USDA, NRCS. 2007. The PLANTS Database (http://plants.usda.gov, 16 March 2007). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
3	State of California. 2007. Weed Info: Carduus (http://www.cdfa.ca.gov/phpps/ipc/weedinfo/carduus.htm.).
4	Hoffman, R.A. and S. K. Kearns. 1997. Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants. WDNR Publication Publ ER-090 97.
5	Feldman, S.R. and J.P. Lewis. 1990. Output and Dispersal of Propagules of Carduus acanthoides L. Weed Research 30(3):161-169.
6	Feldman, S.R., J.L. Vesprini, and J.P. Lewis. 1994. Survival and Establishment of Carduus acanthoides L. Weed Research 34(4):265-273.
7	Warwick, I., B.K. Thompson, and L.D. Black. 1990. Comparative Growth Response in Carduus nutans, C. acanthoides, and their F1 Hybrids. Canadian Journal of Botany 68(8):1675-1679.
8	Warwick, I. and B. K. Thompson. 1989. The Mating System in Sympatric Populations of Carduus nutans, C. acanthoides and their Hybrid Swarms. Heredity 63(3):329-337.

9	Biological Control Agent Matrix. 2007. (www.for.gov.bc.ca/hfp/publications/00199/plume.htm).
10	Berthier, Y.T., W.H. Bruckart, P. Chaboudez, and D.G. Luster. 1996. Polymorphic Restriction Patterns of Ribosomal Internal Transcribed Spacers in the Biocontrol Fungus Puccinia carduorum Correlate with Weed Host Origin. Applied and Environmental Microbiology 62(8):3037-3041.

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Approved and Completed Date: