NAME OF SPECIES: Cirsium arvense (L.) Scop.	
Synonyms: C. incanum (Gmel.) Fisch.; C. setosum (Willd.) Besser ex M. Bieb; C. arvense (L.) Scop. forma albiflorum (E.L. Rand & Redfield) Ralph Hoffm.; C. arvense (L.) Scop. var. argenteum (Vest.) Fiori; C. arvense (L.) Scop. var. horridum Wimm & Grab.; C. arvense (L.) Scop. var. integrifolium Wimm & Grab.; C. arvense (L.) Scop. var. mite Wimm & Grab.; C. arvense (L.) Scop. var. vestitum Wimm & Grab.; Carduus arvense (L.) Robson; Cnicus arvensis (L.) Roth; Cnicus (L.) Roth forma albiflorum E.L. Rand & Redfield. (1)	
Common Name: Canada Thistle, Creeping Thistle, Field Thistle, Californian Thistle.	
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES ☒ NO ☐
	2. Abundance: Widely distributed and abundant throughout Wisconsin (1), especially in Northeast WI.
	3. Geographic Range: Herbarium records exist from 58 counties in Wisconsin (1).
	4. Habitat Invaded: Invades highly disturbed sites and newly restored sites with bare ground. Disturbed Areas ☒ Undisturbed Areas ☒
	5. Historical Status and Rate of Spread in Wisconsin: C. arvense was not reported west of the Allegheny mountains until 1835 (2).
	6. Proportion of potential range occupied: Widespread control efforts in agriculture and natural areas management may be slowing the rate of expansion of this species- could be much more abundant without past controls.
II. Invasive in Similar Climate Zones	1. YES ☒ NO ☐ Where (include trends): Europe, North Africa, South Africa, South America, Asia Minor, Asia, Japan, New Zealand and Australia (2).
III. Invasive in Similar Habitat Types	1. Upland ☒ Wetland ☐ Dune ☐ Prairie ☒ Aquatic ☐ Forest ☒ Grassland ☒ Bog ☐ Fen ☐ Swamp ☐ Marsh ☐ Lake ☐ Stream ☐ Other: Disturbed sites such as agricultural land, roadsides, railway embankments, ditch spoil banks, pastures, gardens, fencerows, areas around ponds and wetlands with frequent prolonged drawdowns, abandoned fields.
IV. Habitat Effected	1. Soil types favored (e.g. sand, silt, clay, or combinations thereof, pH): Prefers exposed, aerated soil (pH 5.8 - 7) but can subsist in temporarily wet soils (3). Can thrive in a variety of soil textural classes, including clay loam, sandy loam, sandy clay, and sand (2). Shade tolerant in any moist to wet soils and floodplains.
	2. Conservation significance of threatened habitats: Usually problematic on degraded sites and disturbed natural areas.
V. Native Habitat	1. List countries and native habitat types: Native to southeastern Europe and the eastern Mediterranean region (2).
VI. Legal Classification	1. Listed by government entities? Yes. Noxious in AD, AZ, AR, CA, CO, DE, HI, ID, IL, IN, IA, KS, KY, MD, MI, MN, MO, MT. Regulated in OH, SD, OR, CT. 1 of only 3 noxious weeds in WI. (7).

	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: Can potentially flower in the first growing season under ideal growing conditions.
	3. Length of Seed Viability: Seeds can remain viable in dry soil for up to 20 years, viability declines rapidly after 4 months in water (3).
	4. Methods of Reproduction: Asexual ☒ Sexual ☒ Please note abundance of propagules and and other important information: Cirsium arvense is dioecious, and sexual reproduction and seed production requires introductions of both male and female plants (2). Average annual seed produced per plant is estimated at 1,530, but some plants have the potential to produce up to 5,300 seeds under ideal growing conditions (3). However, Royer and Dickinson (4) arrived at a much larger estimate of 40,000 seeds per plant per year (differences may reflect ecotypic differentiation). Seed size varies among different genotypes, ranging from 298,000 to 677,000 seeds per pound (3). Most seed is dispersed near the parent plant, but Bostock and Benton (5) reported 0.2% of seeds were dispersed at distances greater than 1 km from the parent plant. Maximum germination rate occurs at 30 degrees C. Germination rates are as high as 95%, but this varies among different ecotypes. 90% of seeds germinate within one year of dispersal. Optimal pH for germination is 5.8 to 7.0 (3). Also spread by root fragments.
	5. Hybridization potential: In Europe, C. arvense hybridizes with nine other species of Cirsium. In North America, it has only been reported to hybridize with Cirsium hookerianum Nutt., although C. arvense is sympatric with several species of Cirsium (2).
II. Climate	1. Climate restrictions: Day light affects flowering capability (3).
	2. Effects of potential climate change: N/A
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: Runoff in drainage ditches, seeds can be dispersed as a contaminant in hay and straw bales, and in animal dung (6). soil movement with roots.
	2. Distinguishing characteristics that aid in its survival and/or inhibit its control: Extensive deep root system. Lateral roots growth up to 6 meters per growing season and taproots can penetrate as deep as 6.75 meters (3). 90% of seeds germinate within one year of dispersal.
IV. Ability to go Undetected	1. HIGH ☐ MEDIUM ☐ LOW ☒

C. DAMAGE POTENTIAL	
I. Competitive Ability	1. Presence of Natural Enemies: 80 species of native insects found in Canada feed on C. arvense, but none causes lethality (8). Of the three European insects that have been studied for biocontrol, Urophora cardui L. is the most promising control agent (2). Pseudomonas syringae pv. tagetis or PST, is a bacterium that could significantly reduce Canada thistle populations. (12).
	2. Competition with native species: Effctive competitor for light, moisture, and nutrients. My have allelopathic properties that aid it competition (3). Outcome of competition appears to be species-specific (2). Worse then all other thistles. Carpets ground with rosettes.
	3. Rate of Spread: HIGH(1-3 yrs) ☒ MEDIUM (4-6 yrs) ☐ LOW (7-10 yrs) ☐ Notes: Aggressive clonal expansion.
II. Environmental Effects	1. Alteration of ecosystem/community composition? YES ☒ NO ☐ Notes: Thistle invasions reduce species richness and change species composition.
	2. Alteration of ecosystem/community structure? YES ☒ NO ☐ Notes: Thistles reduce community stem density.
	3. Alteration of ecosystem/community functions and processes? YES ☒ NO ☐ Notes: Fuel connectivity in solid thistle patches is often insufficient to carry a fire. Pollinating insects are sometimes drawn away from native species to visit C. arvense (9).
	4. Allelopathic properties? YES ☒ NO ☐ Notes: Aqueous extracts from C. arvense inhibit growth of neighboring species. Leaf leachate has an inhibitory effect on adjacent crop plants. However, a specific allelopathic chemical has not yet been isolated (3).
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: Better overall control would result eventually in less herbicide use in agriculture, increased crop yields, increased quality of pasture lands. C. arvense also serves as an alternate host for insects and disease vectors that attack crops. No negative effects are anticipated from restricting use.
III. Direct and indirect effects :	Notes: Thistles decrease crop yields and necessitate the use of herbicides in some agricultural practices and CRP lands. The presence of thistles in grazing pastures shifts and intensifies grazing pressure on palatable species. Thistles are also an annoyance to outdoor recreationists.
IV. Increased cost to a sector:	Notes: N/A
V. Effects on human health:	Notes: Stems and leaves have spines.
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: Unknown? This species is widely distributed and ubiqutous in agricultural landscapes, making prevention difficult.

F. REFERENCES USED:

III. Effective Control tactics:	Mechanical ☒ Biological ☒ Chemical ☒ Times and uses: Burning, mowing, tilling, and herbicide applications are most effective in June, when root carbohydrate reserves are minimal. However, sites dominated by cool-season grasses should be burned in May rather than June. (3). Mowing done several times a year, should be repeated for several consecutive growing seasons (10). Chemical control is most effective if herbicides translocate to root buds. Herbicide translocation to root buds during bud to early flower stages is greater during the rosette growth stage (5 - 25 cm tall). A 0.5% (a.i.) solution of clopyralid or aminopyralid are extremely effective selective control options. Most potential biocontrol insects appear to be polyphagous for many Cirsium species, including native thistles.
IV. Minimum Effort:	Notes: As long as a site does not remain disturbed, significant suppression can usually be achieved with herbicides in two growing seasons, unless there is a significant Cirsium seed bank present.
V. Costs of Control:	Notes: Variable and site-specific.
VI. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: Invasions cost tens of millions of dollars in direct crop loss annually (3).
VII. Non-Target Effects of Control:	Notes: Control often requires the use of herbicides and additives. In Colorado, biocontrol insects were reportedly attacking native thistles (11).
VIII. Efficacy of monitoring:	Notes: Since herbicides are more effective on C. arvense rosettes, early intervention will assist in success.
IX. Legal and landowner issues:	Notes: Classified as a noxious weed in Wisconsin (7). Landowners are technically required to comply with control, but this is rarely enforced.

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

Number	Reference
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11	Jensen, M.N. 2002. Weed-Eating Insects Munch Wrong Plants. Ecological Restoration 20(2):141-142.
12	UW-Madison Agronomy. Jerry Doll. Published as Research Brief #65 July, 2003. http://www.cias.wisc.edu/archives/2003/07/01/biological_control_of_canada_thistle_more_work_needed/index.php

Author(s), Draft number, and date completed: Craig A. Annen, April 13, 2007.

Reviewer(s) and date reviewed: Jerry Doll, August 21, 2007.

Approved and Completed Date: