

MN NWAC Risk Assessment Worksheet (04-2011)	Common Name	<i>Latin Name</i>
	European Marsh Thistle	<i>Cirsium palustre</i>
Reviewer	Affiliation/Organization	Date (mm/dd/yyyy)
Ken Graeve	Minnesota Department of Transportation	09/12/2012

European Marsh Thistle is native throughout much of Europe. It is an herbaceous, facultative biennial that favors moist and seasonally flooded sites. It grows best in sun but can tolerate shade also. In North America, European Marsh Thistle is found New England, some Great Lakes States, including NE Wisconsin and the upper peninsula of Michigan, as well as Ontario and British Columbia. There are no known occurrences of it in Minnesota.

Box	Question	Answer	Outcome
1	Is the plant species or genotype non-native?	Yes Native across Europe (Flora of North America online, USDA Plants, Gravuer 2005)	Go to Box 3
2	Does the plant species pose significant human or livestock concerns or has the potential to significantly harm agricultural production?	No	
	A. Does the plant have toxic qualities that pose a significant risk to livestock, wildlife, or people?		
	B. Does the plant cause significant financial losses associated with decreased yields, reduced quality, or increased production costs?		

Box	Question	Answer	Outcome
3	Is the plant species, or a related species, documented as being a problem elsewhere?	<p>Yes</p> <p>Range:</p> <ul style="list-style-type: none"> • Abundant and spreading in MI (Voss 1957, Voss 1996, Garske and Shackleford 2012) • Rapidly spreading in British Columbia (Gucker 2009) • Although it is tracked by the Invasive Plant Atlas of New England, it does not appear to be as problematic in the northeast. For example, Mehrhoff et al. (2003) state invasive in upper Midwest, known from New Hampshire. <p>Impacts:</p> <ul style="list-style-type: none"> • Has spread into adjacent natural areas in MI, including northern white cedar swamps and shaded fens (Voss 1996) • Potential threat to moist, open habitats having acidic soils (Fraser, 2000) • Invades bogs and fens in great lakes region, and other habitats similar to those occupied by native swamp thistle. Dense stands may displace shorter native plants. Has been implicated in the degradation of sedge meadows (Gucker 2009) • Considered as a high priority weed by Ottawa National Forest in MI (Gucker 2009, Garske and Shackleford pers. comm.) • Spreads along roadsides and invades intact native plant communities, including sedge meadows (Garske and Shackleford pers. comm.) • Given low rank for ecological impact but it does invade undisturbed native plant communities that contain many rare species and are of conservation significance such as bogs, fens, and sedge meadows (Gravuer 2005) • Regulated invasive species in WI (WI DNR website) • “Professionals in the Great Lakes area (Michigan and Wisconsin) consider the species problematic (Gravuer 2005). 	Go to Box 6

Box	Question	Answer	Outcome
4	Is the plant species' life history & Growth requirements understood?	Yes. Biennial/facultative biennial/monocarpic perennial, tolerates shade but does better in partial to full sun, favors moist sites, temporarily flooded sites, does not compete well in upland sites. Grows in cold temperate climates similar to northern MN (Falinska 1997, Flora of North America online, Garske and Shackleford 2012).	
5	Gather and evaluate further information:	(Comments/Notes)	
6	Does the plant species have the capacity to establish and survive in Minnesota?	Yes	Yes, go to Box 7
	A. Is the plant, or a close relative, currently established in Minnesota?	<ul style="list-style-type: none"> No confirmed sightings in MN (Cholewa, pers comm) Numerous MN practitioners deny having seen it in MN (personal communications with Cholewa, Dana, Erkes, Greenlea, Husveth, and Mensing) 	Go to Box 7
	B. Has the plant become established in areas having a climate and growing conditions similar to those found in Minnesota?	Yes <ul style="list-style-type: none"> See box 3 “Nevertheless, potential spread into at least Minnesota, Vermont, and additional areas of Maine seems highly likely (Gravuer 2005). 	Go to Box 7
7	Does the plant species have the potential to reproduce and spread in Minnesota?	Yes, currently reproducing and spreading in UP Michigan and northern Wisconsin (see Box 3)	Yes, go to Box 8
	A. Does the plant reproduce by asexual/vegetative means?	No	Go to Box 7.C.
	B. Are the asexual propagules effectively dispersed to new areas?	No	
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	“Reviews report that a single marsh thistle plant may produce up to 2,000 seeds [41 , 56]” (Gucker 2009).	Moderate amount

Box	Question	Answer	Outcome
	D. If this species produces low numbers of viable seeds, does it have a high level of seed/seedling vigor or do the seeds remain viable for an extended period?	<ul style="list-style-type: none"> • “Although many have studied marsh thistle seed bank dynamics and attempted to determine the longevity and persistence of seed in the soil, findings and conclusions from these studies disagree. Some suggest a short-lived seed bank [50], while others suggest a persistent seed bank [46,63]” (Gucker 2009). • Increasing depth of burial increased the survival of buried marsh thistle seed in the Netherlands. In a field experiment, 4% of marsh thistle seeds survived 27 months of burial at 2- to 5-inch (5-10 cm) depths, and 40% of seeds survived the same amount of time at 6- to 8-inch (15-20 cm) depths [75] (Gucker 2009). • During field studies in Tullgarn, Sweden, germination percentages for marsh thistle were very low; 0.2% to 0.4% germination in one meadow population and 9% to 17% germination in another meadow population [48] (Gucker 2009). 	Go to Box 7.F.
	E. Is this species self-fertile?	Yes, but seed production is lower in self-pollinated plants (Gucker 2009)	
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes, short distances by wind, longer distances by animals, very long distances by vehicles and logging equipment (Gucker 2009)	Go to Box 7.I.
	G. Can the species hybridize with native species (or other introduced species) and produce viable seed and fertile offspring in the absence of human intervention?	<ul style="list-style-type: none"> • “Spontaneous hybrids between <i>C. palustre</i> and <i>C. arvense</i> have been reported from England and other European countries (W. A. Sledge 1975) and can be expected wherever these species grow together in North America” (Flora of North America online). • There is a very old reference to a hybrid between <i>C. palustre</i> and <i>C. arvense</i> is listed as <i>C. x celakovskianum</i> (K.Knaf) listed by the International Plant Names Index • No further information on hybridization could be found. 	

Box	Question	Answer	Outcome
	H. If the species is a woody (trees, shrubs, and woody vines) is the juvenile period less than or equal to 5 years for tree species or 3 years for shrubs and vines?	Not Applicable	
	I. Do natural controls exist, species native to Minnesota, that are documented to effectively prevent the spread of the plant in question?	No	Go to Box 8
8	Does the plant species pose significant human or livestock concerns or has the potential to significantly harm agricultural production, native ecosystems, or managed landscapes?	Yes – <i>Cirsium palustre</i> has the potential to harm native ecosystems and could be a nuisance on some grazing lands	Yes, Go to Box 9
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	<ul style="list-style-type: none"> • No toxicity • Could possibly inhibit grazing due to spiny nature, same as other thistles 	Go to 8.B
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?	Possible nuisance on low-lying grazing lands, but probably not resulting in significant financial losses	Go to 8.C

Box	Question	Answer	Outcome
	<p>C. Can the plant aggressively displace native species through competition (including allelopathic effects)?</p>	<p>Yes</p> <ul style="list-style-type: none"> • Although several sources suggest that marsh thistle may spread rapidly and negatively impact native vegetation, detailed study and documentation were lacking as of 2009. In its North American range, marsh thistle is described as "rapidly expanding", spreading "invasively" through wetlands, and sometimes forming "impenetrable spiny stands" that replace native species [17]. In 2003 on Michigan's Ottawa National Forest, marsh thistle was listed among the Forest's moderate priority weeds [67], but by 2005, marsh thistle was listed as a high priority and was reported from more than 87 Forest sites [66]. In other parts of Michigan, marsh thistle has been described as "aggressive". Marsh thistle occupies miles of ditch banks, and populations have spread into adjacent natural areas, which include northern whitecedar swamps and shaded fens [79]. In the Great Lakes region, marsh thistle commonly invades bogs and fens, which are often conservation priorities. Habitats invaded by marsh thistle are similar to habitats occupied by native swamp thistle. Dense marsh thistle stands, which may be more than 7 feet (2 m) tall, likely displace shorter native plants as well as swamp thistle. In British Columbia, marsh thistle has been "implicated in the degradation of sedge meadows" (review by [56]). (Gucker 2009) • Forms dense stands in native plant communities, although the long term quantitative monitoring to formally document displacement of native species and reductions in native biodiversity have not been conducted, visual observations do indicate that it is displacing native species, and professional land managers are working to keep it out of high quality native plant communities (Garske and Shackelford 2012) • invasively spreads through wetland communities, forming impenetrable spiny stands as it displaces native species.(Flora of North America online) • Jack Greenlee, Botanist with the US Forest Service, reports to have seen it in the UP around sedge dominated lake edges where it was scattered and widespread but did not 	<p>Go to Box 9</p>

Box	Question	Answer	Outcome
	D. Can the plant hybridize with native species resulting in a modified gene pool and potentially negative impacts on native populations?	Possibly (See Box 8.D.)	
	E. Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?	Possibly <ul style="list-style-type: none"> • See Box 8.C. • Dense thistle stands invading sedge meadow likely change the fine fuel composition and thus alter fire regime • Reductions in native biodiversity are difficult to quantify but appear likely based on descriptions of infestations (see Box 8.C.) 	
	F. Does the plant have the potential to introduce or harbor another pest or serve as an alternate host?		
9	Does the plant species have clearly defined benefits that outweigh associated negative impacts?	No	Go to Box 10
	A. Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?	No	

Box	Question	Answer	Outcome
	B. Is the plant an introduced species and can its spread be effectively and easily prevented or controlled, or its negative impacts minimized through carefully designed and executed management practices?	<p>Yes</p> <ul style="list-style-type: none"> • Cirsium palustre is an introduced species. <p>No</p> <ul style="list-style-type: none"> • Eradication is difficult due to seed bank and “rosette bank” (staggered bolting due to the plants tendency to act like a monocarpic perennial rather than an obligatory perennial) (Garske and Shackleford, pers comm) • Ottawa NF staff have given up on containment and are focusing on keeping it out of 3 high priority natural areas, the spread continues throughout UP and northern Wisconsin (Garske and Shackleford, pers comm) • Considered worse than either Canada Thistle or Bull Thistle (Garske and Shackleford, pers comm) 	
	C. Is the plant native to Minnesota?	No	
	D. Is a non-invasive, alternative plant material commercially available that could serve the same purpose as the plant of concern?	Not applicable	
	E. Does the plant benefit Minnesota to a greater extent than the negative impacts identified at Box #8?	No	

Box	Question	Answer	Outcome
10	Should the plant species be enforced as a noxious weed to prevent introduction &/or dispersal; designate as prohibited or restricted?	<p>The major uncertainty regarding listing is whether <i>Cirsium palustre</i> has the potential to be a mere nuisance that colonizes disturbed sites but generally decreases in density as perennial vegetation becomes established (as do most non-native biennial thistles), or whether it poses a serious ecological threat with the potential to displace native species and reduce biodiversity in intact native plant communities. Some practitioners in Michigan and British Columbia feel that the latter is true (Frazer 2000, Garske and Shackleford 2012), but it is difficult to make this determination without intensive quantitative monitoring. However, this type of monitoring has not been available for many invasive species that are considered for listing.</p> <p>The apparent absence from MN but imminent threat from WI points toward listing as a prohibited noxious weed for the sake of benefiting from the efficiencies of prevention. For this reason it is recommended that <i>Cirsium palustre</i> be listed on the Prohibited: Eradicate list.</p>	Yes. Regulate as a Prohibited noxious weed in the Eradicate category.
	A. Is the plant currently established in Minnesota?	<p>No</p> <ul style="list-style-type: none"> • Not documented in MN (Cholewa, Dana, Erkes, Gerdes, Greenlee, Husveth, Mensing, Zager) • Rapidly expanding and moving westward in northern Wisconsin (Garske and Shackleford pers comm, Gucker 2009) 	List the plant as a Prohibited/Eradicate noxious weed
	B. Does the plant pose a serious human health threat?	No	

Box	Question	Answer	Outcome
	C. Can the plant be reliably eradicated (entire plant) or controlled (top growth only to prevent pollen dispersal and seed production as appropriate) on a statewide basis using existing practices and available resources?	<p>Yes</p> <ul style="list-style-type: none"> • Biennial thistles infestations can be eradicated through mechanical removal or commonly used herbicides if combined with diligent follow-up control and monitoring • Management is complicated by the species' strong resprouting abilities, but is usually successful after a few years of persistence (Gravuer 2005). • If it is true that <i>Cirsium palustre</i> is not yet present in MN, effective early detection and rapid response has the potential to successfully prevent establishment in MN 	List the plant as a Prohibited/Eradicate noxious weed
11	Should the plant species be allowed in Minnesota via a species-specific management plan; designate as specially regulated?	No	
Final Results of Risk Assessment			
	Review Entity	Comments	Outcome
	NWAC Listing Subcommittee	-Not known to be in MN at this time, but reputable sources have claimed to see it right across the border in NW WI. - Some discussion about how this compares with other biennial thistles - Thoughts to list this species now to get the word out on it and re-evaluate in 3 years.	Suggest regulation on the Prohibited-Eradicate list
	NWAC Full-group		No Regulation at this time.
	MDA Commissioner		No Regulation at this time.
File #	MDARA00016MARTHS_1_18_2013		

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(List any literature, websites, and other publications)

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Photos of European Marsh Thistle from UP Michigan. Note that Ian Shackleford and Steve Garske state that for each flowering plant in these photos there are dozens to hundreds of rosettes that cannot be seen in the photo. (Garske and Shackleford, personal communication).



European Swamp Thistle spreading along a roadside. (Photo by Ian Shackleford)



European Swamp Thistle infestation along an old forest road. (Photo by Ian Shackleford)



European Swamp Thistle invading an undisturbed sedge meadow (Photo by Ian Shackelford)

Flora of North America Range Map

