MN NWAC Risk Assessment Worksheet (04-2011)	Common Name	*Latin Name*
	Narrowleaf Bittercress	***Cardamine impatiens* L.**
Original Reviewer: Monika Chandler	**Affiliation/Organization: MN Dept of Ag**	**Original Review: 05/18/11**
Current Reviewer: Emilie Justen 	**Minnesota Department of Agriculture**	**08/10/16**

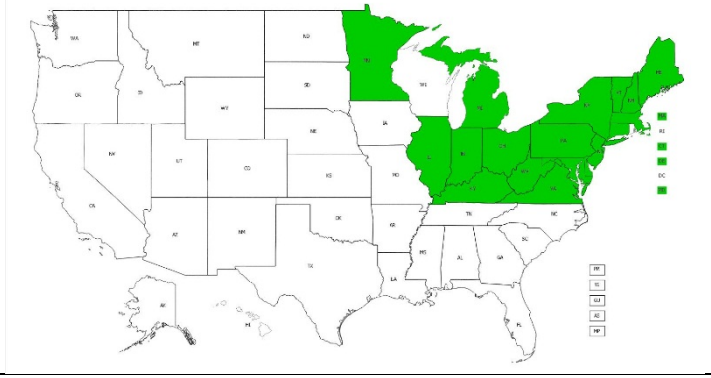
Species Description: http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist/bittercress.aspx

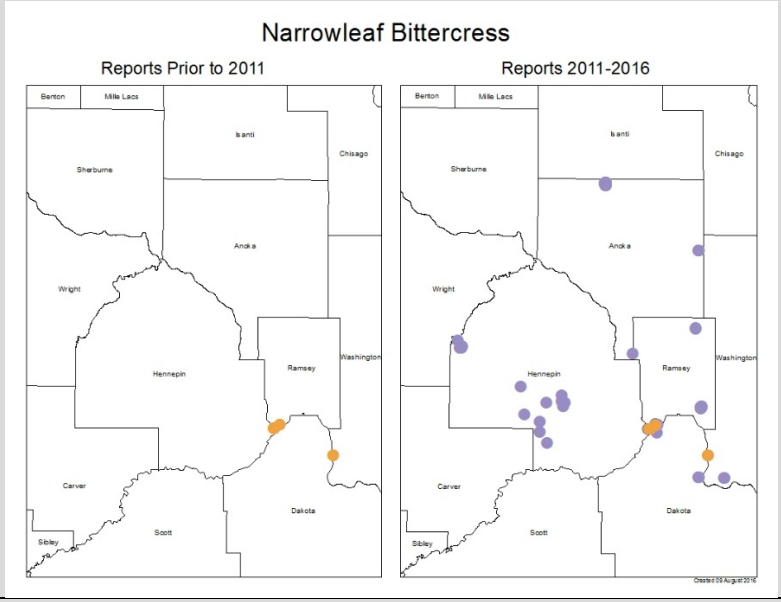
- Narrowleaf bittercress is an annual or biennial forb that has a height of 6- 31 inches.
- First year plants form a rosette and rarely flower. More commonly, the basal leaves of the rosette die over winter and the plant bolts and flowers the second year on an erect stem.
- The rosettes have 3- 11 leaflets with rounded lobes. In contrast, bolted plants have 6- 20 sharply toothed leaflets.
- Multiple small flowers with 4 white petals produce slender seedpods (siliques) from May to September. Narrowleaf bittercress reproduces exclusively by seed and a single plant can produce up to 5,500 seeds.

Risk Assessment Current Summary (2016): Reports of narrowleaf bittercress have increased since 2011. Additionally, WI has listed it as Prohibited and MD added it as a weed of concern. Land managers in Minnesota are actively treating infestations.

Listing as a Prohibited Control will keep the species from spreading to other areas in Minnesota.

Box	Question	Answer	Outcome
1	Is the plant species or genotype non-native?	Yes, it is native to Eurasia (USDA, 2011).	Go to box 2.
2	Does the plant species pose significant human or livestock concerns or has the potential to significantly harm agricultural production?		

Box	Question	Answer	Outcome
	A. Does the plant have toxic qualities that pose a significant risk to livestock, wildlife, or people?	No	Go to question B.
	B. Does the plant cause significant financial losses associated with decreased yields, reduced quality, or increased production costs?	No	Go to box 3.
3	Is the plant species, or a related species, documented as being a problem elsewhere?	Yes. It is a noxious weed in CT and MA. It is prohibited in WI (Wisconsin Department of Natural Resources, 2016). It is considered invasive in IN (Indiana Invasive Species Council, 2016), NJ (Glen and Barringer, 2004), and PA (Pennsylvania Department of Conservation and Natural Resources, 2016). It is a species of concern in MD (Maryland Invasive Species of Concern, 2016). EDDMapS distribution of Narrowleaf Bittercress by state: https://www.eddmaps.org/distribution/usstate.cfm?sub=11539 	Go to box 4.
4	Is the plant species' life history & Growth requirements understood?	Yes. It is an annual or biennial forb that spreads by seed and prefers patchy shade or forest edges.	Go to box 6.
6	Does the plant species have the capacity to establish and survive in Minnesota?		

Box	Question	Answer	Outcome
	A. Is the plant, or a close relative, currently established in Minnesota?	Yes, there are multiple documented infestations. EDDMapS reports 2011-2016: 	Go to question B.
	B. Has the plant become established in areas having a climate and growing conditions similar to those found in Minnesota?	Yes.	Go to box 7.
7	Does the plant species have the potential to reproduce and spread in Minnesota?		
	A. Does the plant reproduce by asexual/vegetative means?	No.	Go to question C.
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes and the species is self-compatible (Glen and Barringer, 2004).	Go to question F.
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes. Seeds can germinate in water so rivers and streams are considered a method of long-range dispersal (Glen and Barringer, 2004). Humans and wildlife can also move seed inadvertently.	Go to question I.

Box	Question	Answer	Outcome
	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?		
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	No.	Go to question B.
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?	No.	Go to question C.
	C. Can the plant aggressively displace native species through competition (including allelopathic effects)?	Yes (Glen and Barringer, 2004). *Cardamine impatiens* has been observed to be highly invasive in MN and outcompete other vegetation in natural areas.	Go to box 9.
9	Does the plant species have clearly defined benefits that outweigh associated negative impacts?		
	A. Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?	No.	Go to question C.
	C. Is the plant native to Minnesota?	No.	Go to box 10.

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?		
	A. Is the plant currently established in Minnesota?	Yes, at multiple sites in several counties.	Go to question B.
	B. Does the plant pose a serious human health threat?	No.	Go to question C.
	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?	Yes. Observation indicate that appropriate applications of Garlon 4 (active ingredient is triclopyr) controls *C. impatiens* (personal communication, K. Farber, 05/17/11).	List as a prohibited/eradicate noxious weed (eradication possible and reasonable) or prohibited/control noxious weed (eradication not possible or reasonable)

Final Results of Risk Assessment

	Review Entity	Comments	Outcome
	NWAC Listing Subcommittee **2011**	Recommend to list as a Prohibited Control Species or Species of Concern.	Possible Prohibited Control or Species of Concern
	NWAC Full-group **2011**	NWAC voted to list as a Prohibited Control Species	List as a Prohibited Control Species
	MDA Commissioner **2011**	Approved NWAC's recommendation (12/05/11).	Listed as a Prohibited Control Species
	NWAC Listing Subcommittee Review **2016**	Recommend narrowleaf bittercress remain as Prohibited Control Species	Prohibited Control Species
	NWAC Full-group **2016**	Voted 14 – 0 to accept Listing Subcommittee recommendation.	Prohibited Control Species
	MDA Commissioner **2016**	Accepted NWAC's recommendation (02/06/2017)	**Prohibited Noxious Weed – Control List**

Box	Question	Answer	Outcome
	File #	**MDARA00003NLBT_11_30_2011**	

References:

Glen, S.D. and K. Barringer. 2004. *Cardamine impatiens* L. (Brassicaceae) in New Jersey. *Journal of the Torrey Botanical Society* 131(3):257-260.

Indiana Invasive Species Council. Official IISC Invasive Plant List. (https://www.entm.purdue.edu/iisc/invasiveplants.php 09 August 2016).

Maryland Invasive Species of Concern. http://www.mdinvasivesp.org/species/terrestrial_plants/Narrowleaf_Bittercress.html 09 August 2016.

Pennsylvania Department of Conservation and Natural Resources. DCNR Invasive Plants. (http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_20026634.pdf 09 August 2016).

USDA, NRCS. 2011. The PLANTS Database (http://plants.usda.gov, 09 August 2016). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Wisconsin Department of Natural Resources. Regulated Invasive Plants list. (http://dnr.wi.gov/topic/Invasives/speciesNR40list.asp?filterBy=Category&filterVal=Plants&addFilter=Classification 09 August 2016).

Notes about *Cardamine impatiens* distribution:

North American distribution and detection in Minnesota

Narrowleaf bittercress is reported in the northeastern United States and New Brunswick and Ontario in Canada, but was not reported in Minnesota until 2008. It was found at the Riverside Park site in St. Paul Park by Connie Fortin with Fortin Consulting, a private company restoring the park to native vegetation. In 2008, Fortin Consulting sent narrowleaf bittercress samples to the Minnesota Department of Natural Resources (DNR) for a definitive identification. Only a few plants were observed by Fortin Consulting staff in 2008. By May 2009, there was a population explosion of narrowleaf bittercress. Mature, flowering plants were hand-pulled and removed by a National Park Service invasive species crew. In June 2009, large patches of seedlings and rosettes were observed throughout approximately eight acres. Narrowleaf bittercress has been observed, but not documented on adjacent private land. Connie Fortin and DNR staff also found small infestations of

narrowleaf bittercress at Afton, Fort Snelling, Great River Bluffs, and William O'Brien State Parks and Big Willow Park in Minnetonka. Adam Robbins and Nathan Johnson with St. Paul Parks and Recreation found a small infestation of narrowleaf bittercress at Crosby Farm/Hidden Falls Park in St. Paul and reported the infestation to the Ramsey County Cooperative Weed Management Area. All plants were hand-pulled from Crosby Farm/Hidden Falls Park and Big Willow Park sites. Some plants may remain at the state park sites and adjacent areas.

Given the wide distribution of this species, eradication may not be a realistic goal.