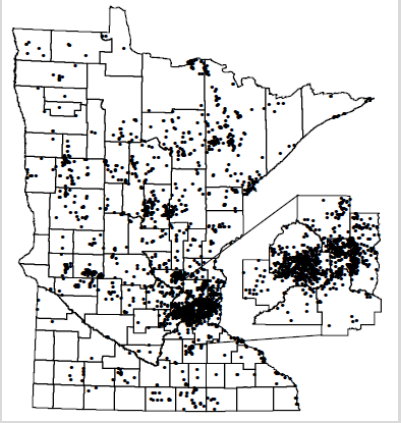
MN NWAC Risk Assessment Worksheet (04-2011)	Common Name	*Latin Name*
 Photo: J.Rendall, MN DNR	**Purple loosestrife** **(European wand loosestrife)**	***Lythrum salicaria* L.** **(*Lythrum virgatum* L.)**
Reviewer	**Affiliation/Organization**	**Date (mm/dd/yyyy)**
Laura Van Riper	**Minnesota Department of Natural Resources**	**08/13/2013**

Note: *Lythrum virgatum* L. (European want loosestrife), is accepted by the Integrated Taxonomic Information System (www.itis.gov) and USDA Plants (http://plants.usda.gov/java/profile?symbol=LYVI3) (both accessed 3-22-2013) as a distinct species from *Lythrum salicaria* (purple loosestrife). However, *L. salicaria* and *L. virgatum* interbreed freely, differ in few diagnostic characteristics, are difficult for inspectors to distinguish when plants are vegetative, and were previously considered by many taxonomists to be the same (Rendall 1989, Anderson and Ascher 1993, Lindgren and Clay 1993). Therefore, while the data in the risk assessment relates to *L. salicaria* unless otherwise noted, the results of this risk assessment will apply to both *L. salicaria* and *L. virgatum*.

Box	Question	Answer	Outcome
1	Is the plant species or genotype non-native?	Yes. Non-native to Minnesota. Native to Europe and Asia (Thompson et al. 1987).	Go to Box 3
3	Is the plant species, or a related species, documented as being a problem elsewhere?	Yes. Listed as a noxious weed in 33 states (http://plants.usda.gov/java/profile?symbol=LYSA2).	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, it is recorded in most counties in Minnesota.  Recorded purple loosestrife populations in Minnesota as of December 2012 (Invasive Species Program 2012).	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?	Significant clonal growth has not been found (Thompson et al. 1987), but there is localized clonal growth with annual shoots produced each spring from overwintering, spreading root buds (Mal et al. 1992). If pieces of the root crown are spread to new sites (such as through movement of soil), the plants could establish.	Yes, Go to 7B No, Go to 7C
	B. Are the asexual propagules effectively dispersed to new areas?	If pieces of the root crown are spread to new sites (such as through movement of soil), the plants could establish. The spread of purple loosestrife is primarily by seeds and germinated seedlings (Thompson et al. 1987, Skinner et al. 1994).	Yes, Go to 7I No, Go to 7C
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes. Seed production of 2.7 million seeds per plant has been reported (Thompson et al. 1987). Welling and Becker (1990) reported an extensive seed bank of 410,000 seeds/m^2 in the top 5 cm of soil.	Go to 7F

Box	Question	Answer	Outcome
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes. Means of dispersal likely largely by floating seedlings and ungerminated seeds. Also likely to spread in mud adhering to wildlife, livestock, treads of vehicles, equipment, and other activities that move soil. May spread by ingestion of seeds by birds. (Thompson et a. 1987) Seeds may also spread by wind (Mal et al. 1992), particularly during the winter.	Go to 7I
	I. Do natural controls exist, species native to Minnesota, that are documented to effectively prevent the spread of the plant in question?	No, there are not native controls. Surveys conducted in the northeastern US found 59 species of phytophagus insects on purple loosestrife, but none reduced populations or caused appreciable damage (Hight 1990). There are now widely distributed introduced (non-native) biocontrol insects (*Galerucella calmariensis* and *Galerucella pusilla* that are providing some control (Invasive Species Program 2012).	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?	Listed below are studies related to the impacts of purple loosestrife. In addition to these studies, there are review papers that question these studies and propose that the data on purple loosestrife is inconclusive (Hager and McCoy 1998, Farnswoth and Ellis 2001, Lavoie 2010).	Yes, go to Box 9. No, then no regulation.
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	No information found on purple loosestrife as a risk to livestock or people. Blossey et al. (2001) cite a number of studies relating to reduction of high quality bird habitat due to purple loosestrife (Rawinski and Maleki 1984, Whitt et al. 1999, Hickey 1997, Hickey and Malecki 1997, Lor 2000). Studies have found a reduction in the development and survival rate of American toad (*Bufo americanus*) tadpoles due to purple loosestrife (Maerz et al 2005, Brown et al 2006). Lavoie (2010) (Table 3) cites 10 studies of impacts of purple loosestrife on bird species; 4 showed negative impacts, 1 showed positive impact, and 5 had no impact.	

Box	Question	Answer	Outcome
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?	When purple loosestrife is present in pastures it has been found to reduce the forage value to livestock (Thompson et al. 1987). No reports of significant financial losses to crops were found.	
	C. Can the plant aggressively displace native species through competition (including allelopathic effects)?	Yes. Blossey et al. (2001) cite a number of studies relating to displacement of native species and reduction in plant biodiversity, including: • Reduction in native plant species (Gabor et al. 1996) • Domination of seed bank (Welling and Becker 1990) • Superior competitive ability of purple loosestrife (Weiher et al. 1996) • Replacement of cattail (*Typha*) (Mal et al. 1996, Mal et al. 1997, Weiher et al. 1996, Weihe and Neely 1997) • Reduction in pollination and seed set of native plant *Lythrum alatum* (Brown 1999) Lavoie (2010) (Table 3) cites 20 studies of impacts of purple loosestrife on plant species; 8 showed negative impacts, 7 had no impact, 4 had null or negative impacts, and 1 had null or positive impacts.	

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?	*Lythrum alatum* (winged loosestrife) is native to Minnesota. Anderson and Ascher (1993) note that: "Despite ploidy differences, purple loosestrife *(4x* and *6x)* and *L. alatum (2x)* will intercross in natural settings (Levin, 1970)" and "Cultivars derived from interspecific hybridization between purple loosestrife and *L. alatum* (Table 1)—e.g., 'Columbia Pink', 'Morden Gleam', dwarf forms of 'Robert', and 'Morden Rose'— could serve as hybrid bridges for the transfer of evolutionarily adaptive traits from North American species into weedy Eurasian taxa."	
	E. Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?	Blossey et al. (2001) cite a number of studies relating to alteration of wetland function, including: • Changes in decomposition rates and timing (Barlocher and Biddiscombe 1996, Emery and Perry 1996, Grout et al. 1997) • Changes in porewater cheminstry (reduced P) (Templer et al. 1998) Lavoie (2010) (Table 3) cites 10 studies of impacts of purple loosestrife on ecosystem processes; 4 showed negative impacts, 2 had no impact, and 4did not clearly state the impacts.	
	F. Does the plant have the potential to introduce or harbor another pest or serve as an alternate host?	No reports of this were found.	
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. *Lythrum salicaria* and *Lythrum virgatum* are prohibited noxious weeds on the control list and therefore producing or selling plants is prohibited.	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 (Invasive Species Program 2012).	Go to Box 10B.
	B. Does the plant pose a serious human health threat?	No.	Go to Box 10C.

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?	Plant cannot be reliably eradicated (entire plant) on a statewide basis using existing practices and available resource. Plant can be controlled (reduction of seed production) by biological control insects. Biocontrol insects reduce populations of purple loosestrife, but do not prevent all seed production. If more complete control of seed production is required than is provided by biocontrol insects (such as mowing or herbicide), then the plant cannot be reliably controlled on a statewide basis using existing practices and available resources. Biological control: Four species of insects, two leaf-eating beetles, *Galerucella calmariensis* and *G. pusilla*; a root-boring weevil, *Hylobius transversovittatus*; and a flower-feeding weevil, *Nanophyes marmoratus*, have been released as potential biological controls for loosestrife in Minnesota (Invasive Species Program 2012). The *Galerucella* species are widely distributed in the state (Invasive Species Program 2012). Biological control may be the main way by which purple loosestrife could be controlled on a statewide basis. The questions to consider are whether biocontrol agents are already widely established in the state and the efficacy of those biocontrol agents. If biocontrol agents are considered to be widely distributed and effective, then perhaps the Restricted Noxious Weed category (prevent transport and sale that can cause new introduction) is sufficient.	Yes (control feasible), but eradication not feasible, then the recommendation is Prohibited Noxious Weed Control list with biocontrol as an acceptable method of control. OR No (control not feasible on a statewide basis), then the recommendation is Restricted Noxious Weed. OR New case: The plant has had an extensive, active biological program and the biocontrol insects are considered widely distributed in Minnesota and effective at reducing populations. Therefore, the recommendation is to make purple loosestrife a restricted noxious weed to prevent new introductions, but expect that the widely distributed biocontrol insects will provide control.

Box	Question	Answer	Outcome
Final Results of Risk Assessment			
	Review Entity	**Comments**	**Outcome**
	NWAC Listing Subcommittee	First review – 06/20/2013, Final Review 08/12/2013 This species was discussed in great length as to the validity of continued listing as a Prohibited Noxious Weed. Although counties and townships commented that not many enforcement issues occur for purple loosestrife on private lands, it still remains an issue in wet ditches and private lands adjoining public waterways. The issue of biological control agents was discussed and there was concern that moving to the Restricted List would decrease the efficacy of the biocontrol program statewide. That said, the recommendation went through to the full committee to consider reclassifying as a Restricted Noxious Weed.	List as a Restricted Noxious Weed
	NWAC Full-group	Reviewed 12/28/2013. Many members of the group voiced concern over reclassification of this species. Successful biocontrol releases and the advent of cost efficient and more effective herbicides. Several member representatives mentioned that they felt both biological controls and herbicide treatments effectively manage purple loosestrife when and where it becomes problematic.	Vote 3 - 9 to rejecting the Listing Subcommittee's recommendation and to continue listing as a Prohibited-Control Species
	MDA Commissioner	Reviewed 02_24/2014	Accepted NWAC's Recommendation to remain as a Prohibited-Control species
	File # MDARA00030PULOS_2_24_2014	**Prohibited-Control Noxious Weed**	

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