



MN NWAC Risk Assessment Worksheet (04-2011) 	Common Name Amur honeysuckle	Latin Name <i>Lonicera maackii</i> (Rupr.) Herder
	Reviewer Laura Van Riper Tim Power	Affiliation/Organization Minnesota Department of Natural Resources Minnesota Nursery and Landscape Association

Box	Question	Answer	Outcome
1	Is the plant species or genotype non-native?	Yes. Native to Eurasia.	Go to Box 3.

Box	Question	Answer	Outcome
3	Is the plant species, or a related species, documented as being a problem elsewhere?	<p>Yes. Naturalized in states in the eastern and midwest United States (Allan et al. 2010, Boyce et al. 2014, Deering and Vankat 1999, Goodell and McKinney 2010).</p>  <p>Regulated as noxious/invasive in CT, MA, and VT. USDA Plants accessed 3-26-14. http://plants.usda.gov/core/profile?symbol=LOMA6 Prohibited/Restricted in Wisconsin NR40.</p>	Go to Box 6.
6	Does the plant species have the capacity to establish and survive in Minnesota?	Yes.	
	A. Is the plant, or a close relative, currently established in Minnesota?	<p>Not clear. A planted specimen has been observed to survive in St. Paul, Minnesota (personal communication, Jim Calkins 4-30-2014). Schumacher's Nursery, Heron Lake, MN, successfully grows about 25 plants per year for sales to Soil and Water Conservation Districts (SWCD's) (personal communication, Tim Power, 6-30-14). There are no Minnesota records in USDA Plants accessed 3-26-14. http://plants.usda.gov/core/profile?symbol=LOMA6</p>	Go to 6B.
	B. Has the plant become established in areas having a climate and growing conditions similar to those found in Minnesota?	<p>Plant is established in Wisconsin (USDA Plants accessed 3-26-14. http://plants.usda.gov/core/profile?symbol=LOMA6). Cold hardy to USDA Zone 2 (http://www.ag.ndsu.edu/trees/handbook/th-3-27.pdf).</p>	Go to Box 7.

Box	Question	Answer	Outcome
7	Does the plant species have the potential to reproduce and spread in Minnesota?	Yes.	Go to Box 8.
	A. Does the plant reproduce by asexual/vegetative means?	“Amur honeysuckle will sprout from adventitious buds on the root crown in response to stem damage” in Munger 2005. Schumacher’s Nursery produces 1-year plants from hardwood cuttings in Heron Lake, MN (personal communication, Tim Power, 6-30-14)	Go to 7B
	B. Are the asexual propagules effectively dispersed to new areas?	Not likely.	Go to 7C
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes. “Estimates of annual fruit production for Amur honeysuckle and European fly honeysuckle in southwestern Ohio ranged from 0 to 1.2 million berries per plant, and approximately 400 million berries ha ⁻¹ [Ingold, James L.; Craycraft, Mary Jo. 1983. Avian frugivory on honeysuckle (Lonicera) in southwestern Ohio in fall. Ohio Journal of Science. 3: 256-258. [48343].” in Munger 2005	Go to 7F
	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?	<i>“It appears the potential for bush honeysuckles to form seed banks is low, but more research is needed to confirm this assertion and to determine interspecific differences. According to Luken and Mattimiro, seeds of Amur honeysuckle are "not long-lived in the soil." in Munger 2005</i>	<i>Blue text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i>
	E. Is this species self-fertile?	<i>Reports vary. Wisconsin risk assessment says it is self-fertile (Wisconsin DNR 2007). Goodell et al. 2010 say “pollinator visitation is required for seed production in L. maackii and that outcrossing improves seed production over selfing by a factor of 5” (Goodell et al. 2010). Other sources say self-incompatible (Deering and Vankat 1999).</i>	<i>Blue text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i>

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	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	<p>Yes.</p> <p>“Several sources indicate bush honeysuckle seeds are dispersed primarily by frugivorous birds [7,80,93,126,186]. Bartuszevige and Gorchov [12] showed that a wide variety of bird species consumed Amur honeysuckle fruit in southwestern Ohio. They also confirmed that American robins dispersed viable Amur honeysuckle seed, usually into woodlot edge and fencerow habitats. White-tailed deer may also consume and disperse viable seeds of Tatarian honeysuckle, Morrow's honeysuckle, Bell's honeysuckle, and Amur honeysuckle [180]. Barnes [7] suggests that "many, if not most" fruits fall near the parent plant” from Munger 2005.</p> <p>Trent Schumacher of Schumacher’s Nursery, Heron Lake, MN reports that he has not seen Amur honeysuckle naturalize in the prairie regions of Minnesota where he hunts and fishes. He also reports that Amur honeysuckle is a less-vigorous grower in his nursery than are the tatarica hybrids and cultivars he grows (personal communication, Tim Power, 6-30-14)</p>	Go to 7I.
	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?		
	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?	<i>Juvenile period is 3 to 8 years (Munger 2005).</i>	<i>Blue text is provided as additional information not directed through the decision tree process for this particular risk assessment.</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?	<p>No controls native to Minnesota exist.</p> <p>“Although not purposely introduced for the purposes of biological control, <i>Hyadaphis tataricae</i> is a nonnative aphid that feeds on a variety of bush honeysuckles in North America (for an analysis of taxa-specific susceptibility see Herman and Chaput [72]) [183,184]. <i>H. tataricae</i> feeding results in dwarfing and folding of terminal leaves, stunted terminal growth, and development of "witches brooms" [23,24,107,183]. This lowers plant vigor and may prevent flowering and fruit development [23,24,184]. Voegtlin and Stoetzel [184] indicate that it is not expected to provide widespread, effective control of bush honeysuckles. However, according to U.S. Geological Survey Northern Prairie Wildlife Research Center [23,24], <i>H. tataricae</i> is still expanding its North American range and "may eventually reach levels that will provide control." from Munger 2005.</p> <p>There is a honeysuckle leaf blight that has been observed causing decline of Amur honeysuckle in Kentucky (Boyce et. al 2014).</p>	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?	Not clear. Dense infestations of Amur honeysuckle can increase the incidence of tick borne diseases to humans (Allan et al. 2005).	Go to 8B.
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?	Dense infestations of Amur honeysuckle can suppress regeneration of native tree seedlings. This could have a negative financial impact on the Forestry industry. “It is likely that interference from dense bush honeysuckle populations can suppress advance regeneration of native tree seedlings. Yost and others [200] studied vegetation of an urban woodland in New York containing abundant Amur honeysuckle. Their survey revealed a significant negative correlation ($r=-0.21$, $p<0.05$) between tree seedling density and Amur honeysuckle cover.” from Munger 2005.	Go to Box 9.

Box	Question	Answer	Outcome
	<p>C. Can the plant aggressively displace native species through competition (including allelopathic effects)?</p>	<p><i>“Collier and others [29] compared native vegetation growing under Amur honeysuckle crowns with plants growing outside Amur honeysuckle influence, in hardwood forest stands near Oxford, in southwestern Ohio. Eighty-six percent of herb species had lower abundance beneath Amur honeysuckle crowns. Hutchinson and Vankat [78] found herbaceous cover was inversely related to Amur honeysuckle cover ($r^2=0.494$, $p<0.0001$) in southwestern Ohio hardwood forests.” from Munger 2005.</i></p> <p><i>“Gould and Gorchov [57] examined the effect of Amur honeysuckle presence on survival to reproductive age, and fecundity, of 3 native forest understory annual forbs. These were stickywilly (<i>Galium aparine</i>), an early-season shade-intolerant, pale touch-me-not (<i>Impatiens pallida</i>), a mid-season semishade-tolerant, and Canadian clearweed (<i>Pilea pumila</i>), a late-season shade-tolerant. Forbs were outplanted into treatment plots where Amur honeysuckle was either a) present, b) removed, or c) previously absent. Resident herb and seedling competitors were removed from all treatment plots at 6-10 day intervals throughout the experiment, and large mammalian herbivores were excluded. Survival of stickywilly and pale touch-me-not was significantly greater ($p<0.05$) in removal plots than in present plots at 1 of 2 sites. Fecundity of all 3 species (# seeds per surviving individual) was significantly greater ($p<0.05$) in removal plots than in present plots at both sites. Fecundity of pale touch-me-not and Canadian clearweed was also significantly greater ($p<0.05$) in absent plots than in present plots (absent plots were only feasible at 1 site). Survival of the shade-tolerant species Canadian clearweed was not affected by Amur honeysuckle presence, but fecundity was reduced. While speculative, this may be interpreted as a relatively less severe impact of Amur honeysuckle invasion on shade tolerant herb-layer species, compared with more shade intolerant species.</i></p> <p><i>Miller and Gorchov [119] studied the effects of Amur honeysuckle presence on growth, reproduction and survival of 3 native forest understory perennial forbs over 5 growing seasons. Species studied included narrowleaf wild leek (<i>Allium burdickii</i>), a spring ephemeral, and the full-season species rue anemone (<i>Thalictrum thalictroides</i>) and downy yellow violet (<i>Viola pubescens</i> var.</i></p>	<p><i>Blue text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i></p>

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		<p><i>pubescens</i>). They found Amur honeysuckle presence generally reduced growth and reproduction of target species, but not their survival. These effects appeared cumulative, often manifesting only after several years of treatment. They surmised the lack of treatment effect on forb survival may indicate perennial herbs are less impacted by Amur honeysuckle presence than are some annual forest understory forbs [57] and tree seedlings [55], although exclusion of browsing mammals may also have contributed to sustained survival in this experiment. They also caution that despite no demonstrable impact on survival in this study, reductions in growth and reproduction of individual perennial herbs by invasive shrubs, such as was demonstrated here with Amur honeysuckle, will likely reduce population sizes over time.</p> <p>These results could be viewed within the context that Amur honeysuckle is simply filling a functional niche often filled by native shrubs, and is not really impacting native plant diversity in any novel way. Miller and Gorchov [119] and Gould and Gorchov [57] considered the possibility that native shrubs may also suppress herb-layer vegetation, although native shrubs were described as "very sparse" at these sites. In contrast, Amur honeysuckle density at one site was 0.7 shrubs m⁻². Collier and others [29] asserted that native shrubs are generally uncommon in southwestern Ohio forests, citing Braun (1916, 1950) and Vankat (personal observation). Assuming their assertion is correct, observed negative impacts of Amur honeysuckle on native flora in otherwise shrub depauperate forests may be altering species composition and understory structure in ways that diverge from historic conditions. More research is needed that examines the comparative effects of bush honeysuckles vs. native shrubs in suppressing herbs and woody seedlings within various eastern North American forest types.</p> <p>Some evidence indicates that where native shrubs and invasive bush honeysuckles co-occur, bush honeysuckles may be stronger competitors. Medley [112] studied distribution of Amur honeysuckle in a 13 acre (5.2 ha) sugar maple- and white ash-dominated deciduous forest in southwestern Ohio. Amur honeysuckle was the most important woody understory species, based on its mean density (3361 individuals ha⁻¹), frequency (95% of sample points),</p>	

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		<p><i>and basal area (1.89 m² ha⁻¹). Instances of high species richness (>10 spp. per plot) of native woody plants and high basal areas (>1 m² ha⁻¹) of the most common native shrubs northern spicebush and blackhaw corresponded with Amur honeysuckle basal areas <4 m² ha⁻¹. When Amur honeysuckle basal areas were >5 m² ha⁻¹, woody plant species diversity and basal areas of common native shrubs were generally lower (≤ 10 spp. per plot, and <1 m² ha⁻¹, respectively). Barnes [7] determined that Bell's honeysuckle is generally a stronger competitor than the native shrub gray dogwood where they co-occur in southern Wisconsin. Although no mechanisms for this apparent competitive advantage were directly determined, emphasis was placed on differences in leaf phenology.” from Munger 2005.</i></p> <p><i>“Trisel [168] found herbivory on Amur honeysuckle leaves was substantially less than for many native trees and shrubs in southwestern Ohio. This indicates that, as bush honeysuckles become increasingly dominant within a habitat, native species may encounter a corresponding increase in herbivory, which may contribute to their displacement. Laboratory and greenhouse experiments also indicate Amur honeysuckle may have allelopathic effects on herbs and woody seedlings, but more research is needed to distinguish between resource competition and allelopathy in the field [125,168]. There are also suggestions that bush honeysuckle invasion could have ecosystem level effects. According to Luken and Thieret [97], net primary production of dense open-grown Amur honeysuckle thickets (up to 1350 g m⁻² yr⁻¹ in northern Kentucky) may have large impacts on carbon and nutrient budgets of invaded sites.” from Munger 2005.</i></p>	
	<p>D. Can the plant hybridize with native species resulting in a modified gene pool and potentially negative impacts on native populations?</p>	<p><i>No evidence of this. There are concerns about its potential to hybridize with other non-native honeysuckles, but no reports of this were found for L. maackii.</i></p>	<p><i>Blue text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i></p>

Box	Question	Answer	Outcome
	E. Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?	<i>Potential to add a dense shrub layer to forests that did not have one. “Amur honeysuckle density at one site was 0.7 shrubs m⁻². Collier and others [29] asserted that native shrubs are generally uncommon in southwestern Ohio forests, citing Braun (1916, 1950) and Vankat (personal observation). Assuming their assertion is correct, observed negative impacts of Amur honeysuckle on native flora in otherwise shrub depauperate forests may be altering species composition and understory structure in ways that diverge from historic conditions. More research is needed that examines the comparative effects of bush honeysuckles vs. native shrubs in suppressing herbs and woody seedlings within various eastern North American forest types.” from Munger 2005.</i>	<i>Blue text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i>
	F. Does the plant have the potential to introduce or harbor another pest or serve as an alternate host?	<i>No evidence of this.</i>	<i>Blue text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i>
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?	<p>Yes. Schumacher’s Nursery, Heron lake, MN produces about 25 plants per year for sale to Soil and Water Conservation Districts in Minnesota, Iowa, South Dakota, and North Dakota (personal communication, Tim Power, 6-30-14)</p> <p>Amur honeysuckle seeds can be purchased on the internet from on-line sellers in other states on websites such as ebay and etsy.</p> <p>Plant is not native to Minnesota.</p>	Go to Box 9B.

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?	No. The plant is an introduced species. Its spread cannot be easily controlled. It produces abundant seeds which can be vectored by birds. It is a woody plant so control is cost and labor intensive.	Go to Box 9C.
	C. Is the plant native to Minnesota?	No. Plant is not native to Minnesota.	Go to Box 9D.
	D. Is a non-invasive, alternative plant material commercially available that could serve the same purpose as the plant of concern?	<p>Yes.</p> <p>There are native honeysuckles than can be alternatives: <i>Diervilla lonicera</i> [dwarf bush honeysuckle; note this is not a true honeysuckle (<i>Lonicera</i>)], <i>Lonicera canadensis</i> (fly honeysuckle), <i>L. oblongifolia</i> (swamp fly honeysuckle), <i>L. villosa</i> (mountain fly honeysuckle); the three true honeysuckles (<i>Lonicera</i> sp.) are not commonly grown commercially.</p> <p>There are ornamental non-native honeysuckles (<i>Lonicera xylosteum</i> cultivars) sold that have not had their invasive potential assessed.</p> <p>Alternatives listed in MIPN Landscape Alternatives brochure (note that not all are hardy in Minnesota) http://mipn.org/MIPN%20Landscape%20Alternatives%202013.pdf: <i>Amelanchier</i> spp. (serviceberry), <i>Heptacodium miconioides</i> (seven son flower), <i>Kolkwitzia amabilis</i> (beautybush), <i>Calycanthus floridus</i> (Carolina allspice), <i>Sambucus canadensis</i> (American elderberry), <i>Sambucus pubens</i> (American red elderberry), <i>Lonicera dioica</i> (red honeysuckle), <i>Lonicera involucrata</i> (twinberry), <i>Stephanandra incise</i> (cultleaf stephanandra)</p> <p>Viburnums (<i>Viburnum</i> spp. – <i>V. acerifolium</i>, <i>V. lentago</i>, <i>V. rafinesquianum</i>, <i>V. trilobum</i>), the ninebarks (<i>Physocarpus opulifolius</i>), and the dogwoods (<i>Cornus</i> spp. – <i>C. alternifolia</i>, <i>C. racemosa</i>, <i>C. sericea</i>) can also be alternatives.</p>	Go to Box 10.

Box	Question	Answer	Outcome
	E. Does the plant benefit Minnesota to a greater extent than the negative impacts identified at Box #8?		
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?	There are potentially specimens in the planted landscape in Minnesota. There are currently no specimens planted at the Minnesota Landscape Arboretum. We do not have records of naturalized populations.	If yes, go to Box 10B.
	B. Does the plant pose a serious human health threat?	There is potential that Amur honeysuckle could increase incidents of tick-borne illness in humans. The seriousness of the threat posed by Amur honeysuckle is not clear.	If no, go to Box 10C.
	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?	There is little information on distribution of this species. The amount of Amur honeysuckle in the state is likely very small, but it has not been well studied. Amur honeysuckles are likely present in the planted landscape in people's yards. One issue may be people having difficulty distinguishing Amur honeysuckle from other similar-looking non-native honeysuckles which are more widely distributed in the state (<i>Lonicera morrowii</i> , <i>L. tatarica</i> , <i>L. x bella</i>).	If yes, then list the plant as Prohibited – Eradicate If no, then list the plant as Restricted
Final Results of Risk Assessment			
	Review Entity	Comments	Outcome
	NWAC Listing Subcommittee	The subcommittee recommended listing <i>L. maackii</i> as a restricted noxious weed. The lack of information on distribution and the difficulty for the lay person in distinguishing <i>L. maackii</i> from <i>L. tatarica</i> , <i>L. morrowii</i> , and <i>L. x bella</i> causes the committee to recommend listing all four species under the same category as restricted noxious weeds.	Restricted noxious weed
	NWAC Full-group		Restricted Noxious Weed

Box	Question	Answer	Outcome
	MDA Commissioner	Approved NWAC Recommendation	Restricted Noxious Weed
	File #: MDARA00042AMHS_8_28_2014		

References:

(List any literature, websites, and other publications)

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