MN NWAC Risk Assessment Worksheet (04-2011)	Common Name	*Latin Name*
	Giant Knotweed (Sakhalin knotweed, elephant ear bamboo, Mexican bamboo)	***Polygonum sachalinense* F. Schmidt *ex* Maxim** (Synonyms: *Fallopia sachalinensis, Renoutria sachalinensis*)*m*
Reviewer	**Affiliation/Organization**	**Date (mm/dd/yyyy)**
Jim Calkins	**Minnehaha Creek Watershed District** Minnesota Nursery & Landscape Association	**05/24/2011**
Updated by Monika Chandler	**Minnesota Department of Agriculture**	**07/10/2018**

There are two non-native knotweed species and their hybrid in the upper Midwest. Japanese knotweed (*Polygonum cuspidatum*) and giant knotweed (*Polygonum sachalinense*) can hybridize resulting in Bohemian knotweed (*Polygonum* x *bohemian*). Knotweeds are gynodioecious with either female or hermaphroditic plants (Beerling et al. 1994). There are differences in ploidy levels within and between taxa (Japanese 2n=44, 52, 88; giant 2n=44, 66, 102; Bohemian 2n=44, 66, 88) (Bailey and Stace 1992, Bailey et al. 1996).

Native to Asia, giant knotweed was first planted in Europe in the late 1800s as an ornamental garden plant, for forage and for streambank stabilization (Pashley et al. 2007). Both male-fertile and male-sterile plants were recorded in Britian (Pashley et al. 2007). Giant knotweed was also introduced to North America. It escaped cultivation. In their native range, knotweeds are early colonizers after volcanoes with shoots pushing through volcanic rock (Adachi et al. 1996). Similarly, shoots can grow through pavement and building foundations necessitating costly removal and repairs.

Giant knotweed is a herbaceous perennials with shrub like forms that can exceed 13 ft tall. Multiple, hollow shoots form a clump that resembles bamboo. Shoots die back to the ground after hard frost and new stems emerge in the spring. Knotweeds are fast growing and can form dense thickets. Established plants develop a woody stalk with a vertical taproot (Pashley et al. 2007). Between fall and winter, buds form on the stock and rhizomes. Vertical shoots arise from the buds in the spring (Pashley et al. 2007)). Leaves are alternate, simple and broadly ovate with pointed tips and are heart-shaped. Plants produce flowers in white clusters in the late summer.

Box	Question	Answer	Outcome
1	Is the plant species or genotype non-native?	Yes; native to northern Japan including Sakhalin Island (Gillies et al 2016).	Go to Box 3

Box	Question	Answer	Outcome
3	Is the plant species, or a related species, documented as being a problem elsewhere?	Yes, *P. sachalinense* has been documented naturalizing in the northwest and northeast United States. It is much less common and presumed less invasive than *P. cuspidatum*. Giant knotweed produces large amounts of viable pollen (7,306 – 8,072 grains per flower) that can be a pollen source for Japanese knotweed resulting in viable seed production (Gillies et al 2016).	Go to Box 6
6	Does the plant species have the capacity to establish and survive in Minnesota?		
	A. Is the plant, or a close relative, currently established in Minnesota?	Yes, *P. sachalinense* has not been documented naturalizing in Minnesota. It is present in areas similar to Minnesota (USDA NRCS 2018). It has been observed planted in landscapes in Minnesota (J. Calkins personal experience).	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?	Yes; plants are rhizomatous and colony-forming and spread through the growth and fragmentation of rhizomes (Gillies et al 2016).	Go to Question B
	B. Are the asexual propagules – vegetative parts having the capacity to develop into new plants – effectively dispersed to new areas?	Yes; rhizomes including very small rhizome sections; dispersed by human activities and rhizome fragments from existing colonies can be deposited and establish new infestations downstream in riparian communities (Gillies et al 2016).	Go to Question I

Box	Question	Answer	Outcome
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Giant knotweed produces large amounts of viable pollen (7,306 – 8,072 grains per flower) that can be a pollen source for Japanese knotweed (*P. cuspidatum*) potentially resulting in viable seed production of the hybrid species Bohemian Knotweed (*P.* × *bohemicum*) (Gillies et al 2016). Giant knotweed is gynodioecious (pistillate or perfect flowers on separate plants) and is self-incompatible (Gaskin et al 2014). Gaskin et al found that were monotypic with almost all genetic variation among, not within, populations indicating that populations were formed by vegetative reproduction. Seed may be a long distance dispersal mode or multiple introductions of giant knotweed to nurseries or gardens may be the source of variability between populations (Gaskin et al 2014).	**This text is provided as additional information not directed through the decision tree process for this particular risk assessment.**
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	See 7C. Seed may have a larger role in dispersal than previously assumed (Urgenson et al 2009).	**This text is provided as additional information not directed through the decision tree process for this particular risk assessment.**
	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?	Similar to Japanese knotweed, but much less common; forms dense thickets that shade out and displace native vegetation and reduce nutrient quality of litter inputs (Urgenson et al 2009). Impacts of giant knotweed are not as well documented as the impacts of *P. cuspidatum*.	
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	No; plant is edible and eaten by humans and livestock.	Go to Question B

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?	No; no documentation found and unlikely to become established in agricultural systems.	Go to Question C
	C. Can the plant aggressively displace native species through competition (including allelopathic effects)?	Yes; colonies can outcompete and displace native grasses, forbs, shrubs, and young trees (Urgenson et al 2009); *P*olygonum *x bohemica* has been shown to have allelopathic effects which may influence its ability to outcompete natives (Murrell et al 2011); particularly problematic in riparian systems (Urgenson et al 2009).	Go to Box 9
9	The plant has clearly defined benefits that outweigh associated negative impacts?	No. Benefits are similar to those for Japanese knotweed (*P. cuspidatum*); see risk assessment for Japanese knotweed.	
	A. Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?	No. The species is present in Minnesota landscapes (J. Calkins). There is no documentation that giant knotweed is currently grown or sold locally in Minnesota could be found. In a 2017 Noxious Weed Advisory Committee survey of nursery certificate holders and Minnesota Nursery Landscape Association Members, nobody responded that they sell this plant and 75% responded that the species is invasive and 71% responded that it should be regulated.	Go to Box 10
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; present in Minnesota landscapes (J. Calkins personal experience).	Go to Question B
	B. Does the plant pose a serious human health threat?	No.	Go to Question C.

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?	Yes; small populations can be removed manually (grubbing) and large populations can be controlled with appropriate and repeated herbicide application applications (Clements et al 2016); soil steaming and biocontrols involving a leafspot fungus (*Mycosphaerella polygoni-cuspidati*) and a Japanese psyllid (*Aphalara itadori*) may be possible (Clements et al 2016). Giant knotweed is difficult to manage due to its extensive rhizome system where many of the rhizome buds can be dormant making them weak sinks for herbicides (Clements et al 2016). The most effective treatment is foliar application of imazapyr during the late summer before a killing frost (Clements et al 2016). Glyphosate is an option for treating near water and synthetic auxins such as aminopyralid can be applied to foliage in early summer to reduce growth (Clements et al 2016).	Enforce control as a noxious weed – List the plant as a Prohibited/Control Noxious Weed. Eradication may be feasible for giant knotweed but species identification for enforcement would be challenging.

Final Results of Risk Assessment		
2011		
Review Entity	**Comments**	**Outcome**
NWAC Listing Subcommittee	May 24, 2011 - Giant knotweed (*Polygonum sachalinense*) is present in Minnesota landscapes; requiring eradication and may be met with resistance or simple non-compliance - Not thought to be a good candidate enforcement as a Prohibited Noxious Weed because it is a very hard species to control or eradicate and it would be difficult for landowners to comply with the law.	List giant knotweed as a Specially Regulated Plant or as a Prohibited/Eradicate or Prohibited/Control Noxious Weed

NWAC Full Committee	11/30/2011 - Tony and Tim will work in 2012 to determine if MNLA would be in favor of providing information at the time of sale indicating that "This plant is listed under the MN Noxious Weed Law as a Specially Regulated Plant. Planting in a riparian area, wetland, stream side, lake shore, or other landscape subjected to flooding or high water is prohibited". 5/10/2013 – Tim reported that MNLA would be supportive of the Specially Regulated category where the regulation would be that anyone selling or transferring this species to another person must include information with the plant materials stating it is not advisable to plant in a designated flood plain as defined by MN DNR. 12/18/2013 - The official regulation/management plan being recommended: "***Any person, corporation, business or other retail entity distributing giant knotweed for sale within the state, must have information directly affixed to the plant or container packaging that it is being sold with, indicating that it is unadvisable to plant this species within 100 feet of a water body or its designated flood plain as defined by Minnesota Statute 103F.111, Subdivision 4***."	11/30/2011 – Voted to be placed on the Specially Regulated Plants List - Pending discussions with MNLA in 2012 12/18/2013 – Vote 13 – 0 to recommend to the commissioner as a Specially Regulated Plant with the agreed upon management plan.
MDA Commissioner	2/24/2014	Approved as a Specially Regulated Plant and approved the recommended management plan.
2018		
Review Entity	**Comments**	**Outcome**
NWAC Listing Subcommittee	07/11/18	Prohibited Control
NWAC Full Committee	Vote was 15:1 in favor of Prohibited Control.	Prohibited Control
MDA Commissioner	Commissioner order was signed on 03/03/19.	Prohibited Control

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