NAME OF SPECIES: Polygonum cuspidatum Siebold & Zucc. (1). Other sources use the name Fallopia japonica var japonica (Houtt.) Ronse Decraene (6).		
Synonyms: Fallopia japonica (Houtt.) Ronse Decr.; Pleuropterus cuspidatus (Siebold & Zucc.) H.Gross; Pleuropterus zuccarinii (Small) Small; Polygonum cuspidatum Siebold & Zucc. var. compactum (Hook.f.) L.H.Bailey; Polygonum zuccarinii Small; Reynoutria japonica Houtt.; Tiniaria japonica (Houtt.) Hedberg (1)		
Common Name: Japanese knotweed, Mexican bamboo (1). Crimson beauty, donkey rhubarb, German sausage, Japanese bamboo, Japanese fleece flower, Japanese polygonum, kontiki bamboo, peashooter plant, reynoutria fleece flower, sally rhubarb (6).		
A. CURRENT STATUS AND DISTRIBUTION		
I. In Wisconsin?	1. YES ☒	NO ☐
	2. Abundance: 52 recorded occurrences in WI (1), however this species is under-reported.	
	3. Geographic Range: Vouchered in 23 WI counties, in northern, eastern and southern WI (1).	
	4. Habitat Invaded: Roadsides, old farms, lakeshores, gardens, rivers edge, railroad and power line right of ways; marsh edge, forest edge(1). Grasslands (2). Disturbed Areas ☒ Undisturbed Areas ☒	
	5. Historical Status and Rate of Spread in Wisconsin: First recorded in WI in 1940.	
	6. Proportion of potential range occupied: Very small % of WI waterways currently infested. Only a few reported. Potential for expansion is likely very high	
II. Invasive in Similar Climate Zones	1. YES ☒ NO ☐ Where (include trends): Found in most of the eastern half of the U.S. and Canada and along the West Coast (Alaska and British Columbia to California); also found in some areas in the interior West of the U.S. (7). Extremely invasive in British Isles.	
III. Invasive in Similar Habitat Types	1. Upland ☒ Wetland ☒ Dune ☐ Prairie ☐ Aquatic ☐ Forest ☒ Grassland ☒ Bog ☐ Fen ☐ Swamp ☐ Marsh ☒ Lake ☒ Stream ☒ Other: Coastland, streambanks, sandbars, islands, disturbed areas, riparian zones, urban areas, water courses, wetlands (6). Japanese knotweed in the eastern U.S. is predominantly a plant of urban and suburban yards and vacant lots, roadsides, and riparian areas. It is closely associated with moist or seasonally wet, well drained soils on stream banks and floodplains. In western Pennsylvania it occupies hundreds of hectares of wetlands, stream banks, and hillsides. In Great Britain and New England it invades stream banks for miles, where it extends from the waters edge to the top of the bank and beyond.	
IV. Habitat Effected	1. Soil types favored or tolerated: In the U.S.A., Japanese knotweed can tolerate a wide range of conditions, including full shade, high temperatures, high salinity, high moisture, and drought. It grows in a variety of soil types, such as silt, loam, and sand, with pH ranging from 4.2 to 8.5, soil organic matter 2.3- 24.6%, and wide ranges of potassium, sodium, calcium, magnesium, and phosphorus. (9). Its	

	distribution appears to be limited by light and it is found primarily inopen sites.
	2. Conservation significance of threatened habitats: Often found in disturbed sites and waste places but also a serious concern in high quality riparian areas and wetlands (7).
V. Native Habitat	1. List countries and native habitat types: The Japanese knotweed species is a native of Japan, N. China, Taiwan and Korea, although it is a specific Japanese type that has been introduced to the West (5). Japanese knotweed is frequently found on sunny bare ground, slopes, and along railroads and roads. It is an important primary colonizer of volcanic slopes, where soil sulphur levels are high and pH is low. (8).
VI. Legal Classification	1. Listed by government entities? Noxious in AL, CA, VT, WA. Regulated in CT, MA, NH, OR. (3).
	2. Illegal to sell? YES ☒ NO ☐ Notes: (3)
B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	1. Type of plant: Annual ☐ Biennial ☐ Monocarpic Perennial ☐ Herbaceous Perennial ☒ Vine ☐ Shrub ☐ Tree ☐
	2. Time to Maturity: Flowers in late summer into fall (9). There are male and female clones.
	3. Length of Seed Viability: Some inconclusive discussion in the literature - possibly 2 years. (9). Seed viability is generally quite low.
	4. Methods of Reproduction: Asexual ☒ Sexual ☒ Notes: Reproduction is primarily by vegetative regeneration of rhizomes and fresh stems. The rhizome system may extend from a parent plant up to 7 meters laterally and to a depth of 3 meters. Very small fragments of rhizome (as little as 0.7 g) give rise to new plants. Fresh stems produce shoots and roots when buried in a soil medium or floated in water. Stems in water may produce rooted plants within 6 days. (5) In England it is believed that all plants are female and basically genetically identical (5). In its native range, Japanese knotweed appears to reproduce mainly by seed and the plant is capable of high seed production. Vegetative reproduction is the predominant means of spread of Japanese knotweed in the U.S. but reproduction by seed potentially contributes to the spread and invasiveness of this species. (9)
	5. Hybridization potential: There is a hybrid between Japanese Knotweed and Giant Knotweed (Polygonum sachalinense); the resulting hybrid Bohemian knotweed (P. x bohemica) is fertile. (5) (7) (8) P. japonica also hybridizes with P. baldschuanicum. In the United States, hybrids morphologically similar to those between P. japonica and P. baldschuanicum have been grown from seeds collected in the field, but seedling establishment has not been observed in the wild. Fortunately, these crosses form a plant with reduced vigor rather than conferring the benefits of both parents, but backcrossing could result in P. japonica regaining the advantages of sexual reproduction. (10)

II. Climate	1. <u>Climate restrictions</u>: Both late frosts and summer droughts can limit the knotweed spread in both southerly and northerly directions by reducing the ability of the plant to build sufficient reserves to survive the winter. Japanese knotweed is very sensitive to late spring or early fall frosts that kill the growing tips. (9).
	2. <u>Effects of potential climate change</u>: Longer growing season will allow the plant to move further north; however drought would limit the spread.
III. Dispersal Potential	1. <u>Pathways - Please check all that apply</u>: <u>Unintentional</u>: Bird ☐ Animal ☐ Vehicles/Human ☒ Wind ☒ Water ☒ Other: Discarded cuttings and escapees from gardens are common routes of dispersal from urban areas. Sometimes ill advised control attempts can cause spread of root propagules/stem material. Through transportation of contaminated soils, vehicles and construction equipment. (5) The commonest mode of dispersal in both the U.K. and North America is by water transportation of plant fragments. (9) <u>Intentional</u>: Ornamental ☒ Forage/Erosion control ☒ Medicine/Food: ☒ Other: Japanese knotweed is a popular ornamental worldwide and also used to obscure waste areas, garbage dumps, etc. Sometimes used in coastal areas to stabilize soil. The newly emerged shoots are edible and beekeepers plant it for its abundant nectar source. (6)
	2. <u>Distinguishing characteristics that aid in its survival and/or inhibit its control</u>: The extensive underground rhizome system sustains the plant even when top growth is removed. (5) The plant spreads primarily by vegetative means with the help of its long, stout rhizomes. Rhizomes can regenerate from small fragments and have even been observed to regenerate from internode tissue. Longer distance dispersal can occur when rhizome fragments are washed downstream by the current and deposited on banks. (6) Rhizomes can regenerate when buried up to 1 m deep in the soil. They have also been observed growing through two inches of asphalt, and in other harsh conditions such as cinder dumps and railway ballast. There is also the possibility that the rhizomes are clonally integrated, which allows scarce resources to be shared across the landscape and facilitate spread. (9)
IV. Ability to go Undetected	1. HIGH ☐ MEDIUM ☐ LOW ☒
C. DAMAGE POTENTIAL	
I. Competitive Ability	1. <u>Presence of Natural Enemies</u>: The apparently specific leaf-feeding chrysomelid beetle Gallerucida nigromaculata Baly seems to play a role in the natural control of P. cuspidatum and may be a promising candidate for biological control of P. cuspidatum in Europe. In Japan, P. japonica also is attacked by a suite of fungal pathogens in the field, including Puccinia polygoni-weyrichii. (10)

	2. <u>Competition with native species</u>: Japanese knotweed will form dense monocultures in open areas and riparian zones. The jumble of dead stems and leaf litter from the knotweed decompose very slowly and form a deep organic layer, which prevents native plants from emerging. This reduces species diversity and alters habitat for wildlife. (5) (6) In Alaska it reduces the food supply for juvenile salmon in the spring. (7)
	3. Rate of Spread: -changes in relative dominance over time: -change in acreage over time: HIGH(1-3 yrs) ☒ MEDIUM (4-6 yrs) ☐ LOW (7-10 yrs) ☐ Notes: Japanese knotweed was introduced to North America in the late 19th century. It rapidly spread to become a problem weed. (10). Clones expand their size rapidly, especially on streambanks.
II. Environmental Effects	1. <u>Alteration of ecosystem/community composition?</u> YES ☒ NO ☐ Notes: This plant's early emergence in the spring, combined with extremely vigorous growth, allows it to shade out other vegetation and prevent regeneration. Forms nearly pure (monospecific) stands and has displaced native flora in many riparian areas, e.g., along streambanks in western Pennsylvania. (7)
	2. <u>Alteration of ecosystem/community structure?</u> YES ☒ NO ☐ Notes: Forms dense, tall thickets, up to 10 feet in height; can become even taller in the Pacific Northwest, reaching 15 feet by June. Thickets can be so dense that human access to waterways can be severely impeded. (7)
	3. <u>Alteration of ecosystem/community functions and processes?</u> YES ☒ NO ☐ Notes: Over the winter, the standing dead stems of this plant may create a fire hazard. This material decomposes very slowly, and can form a deep soil organic layer. Thickets can clog waterways causing local flooding and altering fish habitat. The mass of dead stems may make the area more vulnerable to erosion as well as to flooding. Flooding in turn spreads the plant by distributing stem and root pieces that can establish new colonies. (7) It is not well understood in what situations knotweed increases or decreases bank erosion thus affecting turbidity and other parameters of stream water quality. When a large flood occurred on the St. Austell River in Cornwall, U.K., it was noticed that the largest Japanese knotweed infestations along that river were where the most scouring and the most deposition had occurred. It is unclear, however, whether scoured areas provided favorable habitat for knotweed colonization or knotweed-colonized areas eroded faster. Hard data are needed on the impact of Japanese knotweed on erosion and deposition processes. (9)
	4. <u>Allelopathic properties?</u> YES ☒ NO ☐ Notes: (9)

D. SOCIO-ECONOMIC Effects	
I. Positive aspects of the species to the economy/society:	Notes: Used for a wide range of medicinal conditions: Abscess; Alexiteric; Aperient; Appendicitis; Arthritis; Bite(Snake); Boil; Bruise; Burn; Cancer; Diuretic; Dysmenorrhea; Ecchymosis; Fever; Gonadotrophic; Gonorrhea; Gout; Hepatitis; Jaundice; Medicine; Metroxenia; Poison; Preventitive(Epidemic); Puerperium; Purgative; Refrigerant; Regeneration; Rheumatism; Swelling; and Trauma (4). The sprouts and leaves can also be eaten. Because of its high productivity, Japanese knotweed has been studied as a possible source of renewable energy. (9). Planted as an ornamental, generally many years ago. Not common in commmerce now. A cultivar of the species is available commerically with a potential to spread by seed.
II. Potential socio-economic effects of requiring controls: Positive: Negative:	Notes: Controls on Riparian areas would greatly reduce spread where most important. Very expensive to control populations.
III. Direct and indirect socio-economic effects of plant:	Notes: • Damage to paving and tarmac areas • Damage to flood defense structures • Damage to archaeological sites • Reduction of biodiversity through out-shading native vegetation • Restriction of access to riverbanks for anglers, bank inspection and amenity use • Reduction in land values • Increased risk of flooding through dead stems washed into river and stream channels • Increased risk of soil erosion and bank instability following removal of established stands in riparian areas • Accumulation of litter in well established stands • Aesthetically displeasing • Expensive to treat (5)
IV. Increased cost to sectors caused by the plant:	Notes: noted above
V. Effects on human health:	Notes:
VI. Potential socio-economic effects of restricting use: Positive: Negative:	Notes: Nurseries may have to discontinue growing or selling it. Restricting sales should reduce its usage, especially for bank stablization and ornamental uses.
E. CONTROL AND PREVENTION	
I. Costs of Prevention (including education; please be as specific as possible):	Notes: Too widespread to prevent everywhere. Early detection on riparian areas should be very cost effective.
II. Responsiveness to prevention efforts:	Notes:
III. Effective Control tactics:	Mechanical ☒ Biological ☒ Chemical ☒ Times and uses: Mechanical control methods such as cutting, mowing and pulling can be effective over a long time scale but needs to be consistent for many years, and the disposal of material

	must be done with care. It can be effective for small, initial populations or environmentally sensitive areas where herbicides cannot be used. Chemical: Several methods can be used. Most require multiple treatments. Mowing and spraying resprouts is frequently used. Fall spraying, cut stem treatment and herbicide injections are still used (6) The genetic uniformity of Japanese knotweed makes it a good candidate for biocontrol. Early work on biocontrol in the U.K. and U.S. has yielded promising results. Some pathogenic fungi have been identified. Herbivorous insects are also under consideration as potential biocontrol agents. (9). Northwoods CWMA has been involved in a major effort to eradicate species.
IV. Minimum Effort:	Notes: Large established patches will almost certainly require foliar herbicidal treatments over two or more years. Mechanical methods like cutting must be done assiduously over at least 3 consecutive field seasons. Injections of herbicide into the stems may control patches in only 1-2 treatments, although this is a labor-intensive process involving treating each stem. A combination of treatments over several years may be needed. (7) To be effective, Japanese knotweed control probably will need to be undertaken on a watershed-wide basis.(10)
V. Costs of Control:	Notes: The costs of the Japanese knotweed invasion in the United Kingdom are likely to be in the tens of millions of dollars per year. The main quantifiable cost is that of herbicidal treatment, which is often quoted in the United Kingdom at around $1.60/m2 for a year of repeated spraying of glyphosate. This does not include the costs of revegetation after herbicide treatment, which would be much greater. (10)
VI. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: It has been estimated that the presence of Japanese knotweed on a development site adds 10% to the total budget, in order to cover removal and legal disposal of the topsoil contaminated with viable root material. Further costs include repairs of flood control structures and the replacement of cracked paving and asphalt through which the plant has grown. For example, one supermarket in the United Kingdom had to spend more than $600,000 to resurface a new parking lot through which knotweed was growing. As is often the case the social cost is impossible to quantify, but a knotweed invasion can affect regional redevelopment plans and damage the tourism industry through obstruction of roadside vistas and reduced access to rivers. Costs in the United States are expected to be comparable through direct damage to structures, and indirect damage associated with increased flooding and reduced amenity value of land occupied by Japanese knotweed. Additionally, P. japonica has recently been found as a crop weed in Missouri, adding agricultural losses as a potential cost attributable to this weed. (10)
VII. Non-Target Effects of Control:	Notes: Foliar herbicide application has a high risk of drift and is especially deleterious (and sometimes restricted) in riparian and wetland areas because of the risk to aquatic organisms. However, the stem-injection method and other direct-application methods

	will presumably be feasible in many of these situations and do not have this drawback. (7)
VIII. Efficacy of monitoring:	Notes: Critical to continue monitoring after controls up and down the stream from infestations.
IX. Legal and landowner issues:	Notes: You may need an outreach program to reach landowners that may have knotweed on their property. You almost certainly will need to educate those property owners and others so that they fully realize the threat knotweed poses. (11)

F. REFERENCES USED:

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☐ WI DNR
☐ TNC
☐ Native Plant Conservation Alliance
☐ IPANE
☒ USDA Plants

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