NAME OF SPECIES: Lythrum salicaria L.	
Synonyms: L. salicaria L. var. vulgare DC.; L. salicaria L. var gracilior Turcz.; L. salicaria L. var. tomentosum (Mill.) DC. (1)	
Common Name: Purple Loosestrife, Spiked Loosestrife.	
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES ☒ NO ☐
	2. Abundance: Widely distributed in Wisconsin (1).
	3. Geographic Range: Present in all 72 counties.
	4. Habitat Invaded: Wetlands. Disturbed Areas ☒ Undisturbed Areas ☒
	5. Historical Status and Rate of Spread in Wisconsin: Originally introduced to the eastern United States around 1814 as a contaminant in ship ballast (2). Spread westward along canals and shipping waterways in the 1800s (2). The plant was reported in Wisconsin in the 1920's and may have been present earlier.
	6. Proportion of potential range occupied: Realized (2).
II. Invasive in Similar Climate Zones	1. YES ☒ NO ☐ Where (include trends): Eurasia. Present in all Midwestern states. Records show it moved across the northeastern states into the Midwest, often traveling long distances viz mechanized trasportation, especially shipping.
III. Invasive in Similar Habitat Types	1. Upland ☐ Wetland ☒ Dune ☐ Prairie ☒ Aquatic ☐ Forest ☐ Grassland ☐ Bog ☒ Fen ☒ Swamp ☐ Marsh ☒ Lake ☒ Stream ☒ Other: Roadside ditches, agricultural drainage ditches, river banks, and edges of reservoirs, waste ground, disturbed areas associated with highway construction and maintenance, and bareground patches in high-quality natural wetlands.
IV. Habitat Effected	1. Soil types favored (e.g. sand, silt, clay, or combinations thereof, pH): Hydrologically-disturbed wetlands. can tolerate fresh to brackish water (10).
	2. Conservation significance of threatened habitats: Wetlands provide billions of dollars annually in ecosystems services. Simplified and homogenized systems do not exhibit congruent magnitude of nutrient and carbon sequestration and retention.
V. Native Habitat	1. List countries and native habitat types: Eurasian wetlands (2).
VI. Legal Classification	1. Listed by government entities? Yes. Noxious in AZ, MN, OH, AK, ID, MO, NE, NV, ND, PA, SD, UT, WY, CA, OR, CO, IA, MT, NM, NC, WA, TX. Regulated in CT, FL, SC, TN, WI, IN, MA, MI (3).
	2. Illegal to sell? YES ☒ NO ☐ Notes:

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: Two growing seasons. May flower and set seed first year.
	3. Length of Seed Viability: Seeds can germinate in saline roadside snowmelt (5). Seeds remain viable at least 3 years, probably many more years at lower rates of germination.
	4.Methods of Reproduction: Asexual ☒ Sexual ☒ Please note abundance of propagules and and other important information: L. salicaria is a prolofic seeder. A single plant can produce 300,000 seeds (4), with an average of 114 seeds per capsule (2). Dense monospecific stands (with up to 80,000 stems per acre) have the potential to produce 24 billion seeds per acre (4). Clippings from mowing can resprout vegetatively (4). Up to 2,700,000 possible resprouts per plant are possible.
	5. Hybridization potential: Extremely high in North America (where several other congenic species are sympartic) but hybridization does not occur in Europe (where it is the only member of the Lythrum identity present in abundance) (2). L. salicaria x L. virgatum hybrids are known, and L. salicaria x L. alatum hybrids may be common, and commercially sold as the ornamental varieties 'Morden Gleam', 'Mordern Rose', and 'Robert' (2). Introgressive hybrids between L. salicaria ecotypes and between L. salicaria x L. alatum hybrids are probably also common due to repeated introductions of different germplasms of this species over the previous 200 years (2). L. salicaria x L. alatum hybrids exhibit a high rate of seed dormancy (6).
II. Climate	1. Climate restrictions: Seems to be restricted to temperate climates, between the 40th and 50th parallels, west of the 100th meridian (2).
	2. Effects of potential climate change: L. salicaria may expand its northward range as a result of global warming. Increased variability in rainfall events may result in greater variations in water levels and exposed open habitat increasing germination rates.
III. Dispersal Potential	1. Pathways - Please check all that apply: Intentional: Ornamental ☒ Forage/Erosion control ☐ Medicine/Food: Introduced for medicinal qualities (2). Other: Bee apiary plant (2). Unintentional: Bird ☒ Animal ☒ Vehicles/Human ☒ Wind ☒ Water ☒ Other: Mud attached to humans, animals, or boats.
	2. Distinguishing characteristics that aid in its survival and/or inhibit its control: Can resprout from clippings after mowing. Flooding dislodges L. salicaria from the active seed bank and floodwaters can carry seeds to adjacent locales (4). Capable of arenchyma production when stems are submersed (2). Introgressive populations have an increased tendancy to self-pollinate and possess novel traits that may make them resistant to biological control agents (2). Newly germinated seedlings re-float from below water, increasing dispersal by water.
IV. Ability to go Undetected	1. HIGH ☐ MEDIUM ☐ LOW ☒ Plants kept from flowering by insect predators may be easily missed.

C. DAMAGE POTENTIAL	
I. Competitive Ability	1. Presence of Natural Enemies: No natural enemies are native to North America. Several authors, including Galatowitsch et al. (2) concluded that one reason for L. salicaria's aggressive spread and robust growth form in North America is release from environmental constraints and subsequent increased evolutionary fitness associated with growing in the absence of its natural enemies (Increased Evolutionary Fitness Hypothesis). More than 120 phytophagous insects from Eurasia have potential for biological control (7), and three of these are used in L. salicaria management: Galerucella calmariensis, G. pusilla, Nanophyes marmoratus, and Hylobius transverovittatus (2). Some native Lepidopteran larvae and Altica litigata are known to become locally abundant on the plant..
	2. Competition with native species: Intense.
	3. Rate of Spread: HIGH(1-3 yrs) ☐ MEDIUM (4-6 yrs) ☒ LOW (7-10 yrs) ☒ Notes: Remains localized after introduction or escape for a lag time of 20 to 40 years, afterwhich aggressive spread from the source population ensues (2).
II. Environmental Effects	1. Alteration of ecosystem/community composition? YES ☒ NO ☐ Notes: L. salicaria decreases species richness and diversity (2).
	2. Alteration of ecosystem/community structure? YES ☒ NO ☐ Notes: L. salicaria is taller than native species it replaces (2).
	3. Alteration of ecosystem/community functions and processes? YES ☒ NO ☐ Notes: L. salicaria monocultures provide little food or shelter for native wildlife (4).
	4. Allelopathic properties? YES ☐ NO ☒ Notes: Accumulation of tannins in still water surrounding the plant may decrease amphibian reproduction.
D. SOCIO-ECONOMIC Effects	
I. Positive aspects of the species to the economy/society:	Notes: Ornamental plant, but its use is restricted or regulated in several states (3).
II. Potential socio-economic effects of restricting use:	Notes: Nurseries will have to produce and promote alternative species.
III. Direct and indirect effects :	Notes: Decreased sales of horticultural varieties.
IV. Increased cost to a sector:	Notes: N/A
V. Effects on human health:	Notes: None.

E. CONTROL AND PREVENTION	
I. Costs of Prevention (including education; please be as specific as possible):	Notes: N/A
II. Responsiveness to prevention efforts:	Notes: Depends on the degree of infestation and length of time between introduction and initiation of control efforts. Abundant and persistent seed banks of established L. salicaria stands may necessitate multiple-year treatments (2). Weed shifts can occur when large-scale control programs are implemented. Generally, L. salicaria stands are invaded by Phalaris arundinacea L. (or increasingly, Phragmites australis). Biocontrol agents of L. salicaria are unaffected by Phalaris control treatments (burning, herbiciding, and mowing) (8).
III. Effective Control tactics:	Mechanical ☒ Biological ☒ Chemical ☒ Times and uses: Hand pulling is effective on small infestations, but must be done before flowering (pulling after flowering can induce seed shattering) and pulled plants need to be removed from the site and burned to prevent post-pulling seed development and maturation and because L. salicaria fragments are totipotent (4). Spot treatments with glyphosate herbicide before flowering. Complete coverage is not required to effect chemical control with glyphosate (4). Cutting then subsequently flooding the area so the stalks are completely submerged is effective, but can spread seed bank to adjacent locales (4). Biological control agents are effective, but populations of biocontrol agents oscillate with populations of their host plant and repeated introductions may be necessary.
IV. Minimum Effort:	Notes: Four growing seasons (4). Biocontrol may be established in one year on some populations.
V. Costs of Control:	Notes: Multiple-year financial commitment is often required.
VI. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: Thompson et al. (9) estimates L. salicaria invasions cost approximately $45 million dollars annually in the eastern United States. In the long run, it is probably more cost effective to attempt to eradicate L. salicaria than to "leave it be". Biocontrol is much less expensive than chemical/mechanical costs above. Some method of control should be started as soon as possible.
VII. Non-Target Effects of Control:	Notes: Control may require the use of herbicides and additives. Some cross-over feeding on Lythrum alatum may reduce this plant's populations.
VIII. Efficacy of monitoring:	Notes: Early detection and intervention can greatly reduce the time and resources that must be invested into controlling established L. salicaria stands.
IX. Legal and landowner issues:	Notes: Permits and/or licenses may be required to control this species on public lands or over open water.

F. REFERENCES USED:

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

Number	Reference
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6	Anderson, N.O. and P.D. Ascher. 1994. Self Incompatibility (SI) in Distylous Lythrum alatum, Winged Loosestrife. HortScience 29:497.
7	Batra, S.W.T., D. Schroeder, P.E. Boldt, and W. Mendl. 1986. Insects Associated with Purple Loosestrife (Lythrum salicaria L.) in Europe. Entomological Society Proceedings 88:748-759.
8	McEvoy, P.B. and M. Schat. 2000. Effects of Flooding, Tilling, Fire, Herbicide, and Mowing on Reed Canarygrass (Phalaris arundinacea) and Biological Control of Purple Loosestrife (Lythrum salicaria) at Baskett Slough, NWR. Unpublished Report.
9	Thompson, D.Q., R.L. Stukey, and E.B. Thompson. 1987. Spread, Impact, and Control of Purple Loosestrife (Lythrum salicaria) in North American Wetlands. U.S. Fish and Wildlife Service, Fish and Wildlife Research No. 2, U.S. Department of the Interior, Washington, D.C. 55pp.
10	Non Native Fresh Water Plants: Purple Loosestrife. Washington State Dept. of Ecology. http://www.ecy.wa.gov/PROGRAMS/WQ/plants/weeds/aqua009.html

Author(s), Draft number, and date completed: Craig A. Annen, draft 1, June 30, 2007.

Reviewer(s) and date reviewed: Brock Woods, September 18, 2007.

Approved and Completed Date: