NAME OF SPECIES: *Populus alba* L.		
Synonyms: *Populus alba* var. *bolleana* (Lauche) Ed. Otto; *P. alba* var. *croatica* Wesm.; *P. alba* var. *nivea* Aiton; *P. alba* var. *pyramidalis* Bunge		
Common Name: White poplar, European white poplar, silver poplar	**Cultivars?** YES ☒ NO ☐	
A. CURRENT STATUS AND DISTRIBUTION		
I. In Wisconsin?	1. YES ☒	NO ☐
	2. Abundance: There have been over 50 reports of *Populus alba L.* in the state of Wisconsin, but there are likely many more unreported occurrences (16). It is locally abundant.	
	3. Geographic Range: Widespread throughout the state with a relatively higher concentration of populations in southern Wisconsin (15). Extensive populations are also reported in several central counties as well as occupying extensive areas of both the northeast and the northwest (11).	
	4. Habitat Invaded: In WI, this species often invades roadsides, agricultural fields, and forest edges (2, 6). It most often escapes on highly disturbed areas (5). The species is reportedly more likely to encroach on open areas, and there is a low occurrence of it invading natural areas (16). Most populations are vegetative expansions of planted trees. Commonly planted in older cemeteries. Disturbed Areas ☒ Undisturbed Areas ☒	
	5. Historical Status and Rate of Spread in Wisconsin: First introduced to the New England states as early as 1748. By 1876, there were reports of the species in Michigan and by the end of the 1800's, it was reported in the vast majority of the contiguous U.S., including all of the states in the Great Lakes region (6, 12).	
	6. Proportion of potential range occupied: Already widespread throughout WI as well as its generalized range in the U.S. (7).	
II. Invasive in Similar Climate Zones	1. YES ☒	NO ☐
	Where (include trends): Widely spread in the Eastern United States, particularly in the New England states and the Midwest, as well as Canada. It is documented in 47 states in the U.S. (excluding Alaska, Hawaii, and Arizona) in addition to occupying a number of Canadian provinces (12).	
III. Invasive in Which Habitat Types	1. Upland ☒ Wetland ☒ Dune ☐ Prairie ☒ Aquatic ☐ Forest ☒ Grassland ☒ Bog ☐ Fen ☐ Swamp ☐ Marsh ☐ Lake ☐ Stream ☐ Other: In its North American range, this species proliferates in floodplain woodlands, open disturbed areas, roadsides, fields, meadows, and savannas (2, 7, 12)	
IV. Habitat Affected	1. Soil types favored or tolerated: Highly adaptable to nearly all soil types, ranging from fine to coarse textures (6, 9). *Populus alba L.* grows well in nearly all soil consistencies, including sandy soils and clay (10). Additionally, the species is tolerant of a wide range of soil moisture and is particularly resistant to high salinity (1). The preferred pH ranges from 4.9-7.0 (9).	
	2. Conservation significance of threatened habitats:	

V. Native Range and Habitat	1. List countries and native habitat types: Native to central, southern and eastern Europe, the Mediterranean islands, temperate Asia, and North Africa. In western and central Europe, *Populus alba L.* occurs in riparian, forest-steppe and coastal habitats (12).
VI. Legal Classification	1. Listed by government entities? Not listed on the U.S. federal noxious weed list (3). It has been declared as a potentially invasive and banned species in the state of Connecticut (11).
	2. Illegal to sell? YES ☐ NO ☒ Notes: Yes in CT.
B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	1. Type of plant: Annual ☐ Biennial ☐ Monocarpic Perennial ☐ Herbaceous Perennial ☐ Vine ☐ Shrub ☐ Tree ☒ clonal
	2. Time to Maturity: Time to reach sexual maturity typically ranges between 5-7 years (12, 17).
	3. Length of Seed Viability: The seeds of *Populus alba L.* and its hybrids are reportedly very short-lived (12). Although field experiments are lacking, white poplar and hybrid seeds are reportedly very short-lived (England Forestry Commission Booklet). A review reports that seed bank longevity is low for *Salicaceae*. (12)
	4. Methods of Reproduction: Asexual ☒ Sexual ☒ Notes: Produces large seed crops of small seeds adorned with cottony fluff that is easily carried by wind (2, 6). Trees are dioecious (male and female components on separate trees) (7). However, seed germination does not appear common in the U.S.; the predominant mode of reproduction is asexual root suckering (6). Root suckers arise from adventitious buds from the lateral root system, enabling development of a dense colony from a single tree (6). Fragmentation is another method of vegetative regeneration by which clonal growth occurs; these clones sprout from twig or root pieces partially buried in sand or silt (12).
	5. Hybridization potential: White poplar hybridizes readily with a variety of aspen species, most significantly the European aspen *(Populus tremula)*, quaking aspen *(Populus tremuloides)*, bigtooth aspen *(Populus gradidentat)* and Chinese aspen *(Populus adenopoda)*. The resultant hybrids are considered vigorous competitors to the native parent species (2, 12).
II. Climate	1. Climate restrictions: Occurs in areas as far north as USDA hardiness zone 3 (12). It is most commonly found in northern U.S. habitats and appears to prefer low elevations with moderate temperatures and sufficient moisture, typically annual precipitation in the range of 24-55 in. (9, 12). High sunlight level has been observed to be a survival requirement (2).
	2. Effects of potential climate change: Due to its high adaptability to various climate conditions, the species is also able to occupy upland and/or dry habitats; it has been documented to grow in temperate continental climates with annual precipitation as low as 20-22 in. (12). In addition to a certain degree of resistance to drought, *Populus alba L.* is resilient following brief episodes of flooding (12). However, extremely low winter temperatures have been reported to damage or kill trees (12).

III. Dispersal Potential	1. <u>Pathways - Please check all that apply</u>: <u>Unintentional</u>: Bird ☐ Animal ☐ Vehicles/Human ☐ Wind ☒ Water ☐ Other: <u>Intentional</u>: Ornamental ☒ Forage/Erosion control ☐ Medicine/Food: source of Salicin Other: farmstead windbreaks, landscaping, nursery stock and pulpwood (9, 10).
	2. <u>Distinguishing characteristics that aid in its survival and/or inhibit its control</u>: Particularly resistant to a wide range of soil types, moisture levels and salinity. Trees are seemingly unaffected by air pollution, roadside salt, and various other environmental stresses. In contrast to other poplar species, *Populus alba L.* is notably resistant to cankers and fire (1, 9). The most significant barrier to effective control is the rapid root suckering and regeneration that occurs in response to damage, which can revive broken or cut trees by vegetative means (6).
IV. Ability to go Undetected	1. HIGH ☐ MEDIUM ☐ LOW ☒ In middle age the bark develops dark gray lenticels with a distinctive diamond shape; these become furrowed and ridged with further age (1). The leaves are easily identified from the white, tomentose underside, which is covered with a dense layer of woolly and reflective hair, and the shiny, dark green topside (5).
C. DAMAGE POTENTIAL	
I. Competitive Ability	1. <u>Presence of Natural Enemies</u>: Susceptible to stem and branch cankers which weaken the wood and typically kill the tree within the next four years (10, 14). Leaf spots are another fungal enemy and are caused primarily by the Marssonina (*M. populi*) and Septoria fungi (*S. populicola, S. populi. S. musiva*) (10, 14). Leaf rust, from fungi of the *Melampsora* family, is an obligate parasite of living cells and therefore does not kill infected cells (14). Also prevalent are insect infestations of the poplar borer (*Saperda calcarata*) and the carpenter worm (*Prionoxystus robiniae*), which cause deformed growth and premature tree death (10, 13).
	2. <u>Competition with native species</u>: Rapid cloning allows a single tree to proliferate into an entire population that occupies large areas and depletes local soil, nutrient, and water resources (2, 6). High sunlight requirement also creates vertical competition with other species; species growing beneath *P. alba* are often unable to survive due to low levels of available sunlight (6).
	2. 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: The rates of growth and clonal reproduction are rapid, but the generation of new populations by seed spread is slow if at all.
II. Environmental Effects	1. <u>Alteration of ecosystem/community composition?</u> YES ☒ NO ☐ Notes: Can become dense and predominate over native species, interfering with natural community succession by sequestering available moisture, nutrients, sunlight, and space (2, 6). *P. alba*

	engages in interference competition where it grows along forest edges by discouraging the proliferation of other tree and shrub species (2, 6).
	2. Alteration of ecosystem/community structure? YES ☒ NO ☐ Notes: Due to its rapid growth and spread, as well as resource sequestering, *P. alba* interferes with natural community succession, particularly in disturbed areas (2, 6). *Populus alba L.* easily out-competes other tree and shrub species in fields and near forest edges by shading out access to sunlight (6, 12).
	3. Alteration of ecosystem/community functions and processes? YES ☒ NO ☐ Notes: Clonal, so similar to other Populus sp, however, less shade tolerant.
	4. Allelopathic properties? YES ☐ NO ☒ Notes:
D. SOCIO-ECONOMIC EFFECTS	
I. Positive aspects of the species to the economy/society:	Notes: Introduced to communities and roadsides as a rapidly growing, space-filling and ornamental tree (1). Its uses also include lumber, pulpwood, and nursery stock (9). Based on the 2011 WNA Economic Impact Survey, the following information was reported for this plant. Out of the 204 nurseries responding, 2 reported selling this plant. 2 reported it comprised <1% of their gross plant sales. 0 reported it comprised 1 – 2.9% of their gross plant sales. The estimated total dollar amount contributed to Wisconsin's economy by this plant is $18,750 (1 actual grower). It ranks 37th among the 63 taxa surveyed. The estimated wholesale value of plants in production is $5,500. The majority of respondents said it took 2 to 3 years to produce this plant. The trend for the 2011 season was to remain unchanged (18).
II. Potential Socio-Economic Effects of Requiring Controls:	Positive: Negative: Requiring control of *P. alba* would necessitate removal of expansive colonies natural, rural, and urban areas as well as private lands (?).
III. Direct and indirect Socio-Economic Effects of Plant :	Notes:
IV. Increased Costs to Sectors Caused by the Plant::	Notes: Because of its frail wood, damaged and broken trees following wind storms, fungal infections and/or insect infestations require removal from urban areas, roadsides, and fields (?).
V. Effects on human health:	Notes: Not toxic to humans.
VI. Potential socio-economic effects of restricting use:	Positive: Less planting will result in less populations. Negative: Loss of nursery and lumber sales; loss of tree species commonly used for highway beautification (?).
E. CONTROL AND PREVENTION	
I. Costs of Prevention (please be	Notes:

as specific as possible):	
II. Responsiveness to prevention efforts:	Notes:
III. Effective Control tactics: (provide only basic info)	Mechanical ☒ Biological ☐ Chemical ☒ Times and uses: No control tactic is entirely effective; most require persistent follow-up to prevent re-sprouting. <u>Mechanical:</u> Seedlings can be removed at a young age. It is important to fully remove the root system to avoid re-growth from fragments remaining in the soil. Removal is best achieved following a rain when the soil is loose, facilitating complete eradication (6). Additionally, trees can be cut; this requires a series of cutting as successive root suckering is initiated. After being cut numerous times, the root's reserves can be depleted to a level at which recovery is not achieved (6). Girdling can help remove mature trees by severing the conducting tissues. Cut approximately six inches above the ground and deeply into the wood to ensure impeded conductance. For enhanced effectiveness of girdling, apply herbicide to the wound (6). The site should be monitored as this may induce root-suckering. A final method that can help combat spread of *P. alba* is repeated burning (8). <u>Chemical:</u> Herbicide application can be combined with girdling. Basal bark treatment can be used. Other useful chemicals include glyphosate and triclopyr (6).
IV. Costs of Control:	Notes: Trees controlled by either mechanical or chemical methods easily re-sprout, requiring thorough, repeated application of control to ensure effective control of spread (6).
V. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes:
VI. Non-Target Effects of Control:	Notes: Chemical controls often exhibit negative effects on other non-target species located within the range of the application site; chemicals can also be carried by water and/or wind to other surrounding species. The use of glyphosate should be carefully restricted due to its non-selective eradication of plants near the area of application. Triclopyr does not harm grasses, but will kill broadleaf plants other than the target species (6).
VII. Efficacy of monitoring:	Notes: Easy to see resprouts. Important to monitor for several years.
VIII. Legal and landowner issues:	Notes: Restricted listing would not require controls but would educate landowners to invasiveness.
F. HYBRIDS AND CULTIVARS AND VARIETIES	
I. Known hybrids? YES ☒ NO ☐	Name of hybrid: Gray poplar (*Populus* x *canescens*), Heimburger's poplar (*Populus* x *heimburgeri*), and Roulwau's poplar (*Populus* x *rouleauiana*)

	Names of hybrid cultivars:
II. Species cultivars and varieties	Names of cultivars, varieties and any information about the invasive behaviors of each: *Populus alba f. pyramidalis* (Bolleana poplar), *P. alba* "globosa," *P. alba* "richardii" (distinctive for its yellow leaves)," *P. alba* "nivea" and *P.* alba "raket" Of the respondents to the nursery survey, one grower reported growing Siouxland and Lombardi and the other grower may be growing the species. There seems to be taxonomic confusion among growers as to which taxon they're growing. (18)
	Notes: Subordinate taxa: P. alba var. subintegerrima;

G. REFERENCES USED:

☒ UW Herbarium (Madison or Stevens Point)
☐ WI DNR
☐ Bugwood (Element Stewardship Abstracts)
☐ Native Plant Conservation Alliance
☒ IPANE
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