

<b>NAME OF SPECIES:</b> <i>Alnus glutinosa</i>	
<b>Synonyms:</b> <i>Alnus alnus</i> (L.) Britton, <i>Alnus vulgaris</i> Hill, <i>Betula alnus</i> L. var. <i>glutinosa</i> L.	
<b>Common Name:</b> Black alder, European alder	<b>Cultivars?</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
<b>A. CURRENT STATUS AND DISTRIBUTION</b>	
I. In Wisconsin?	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
	2. <u>Abundance:</u> Widely scattered populations
	3. <u>Geographic Range:</u> Marathon, Sheboygan, Racine, Walworth and Dane counties
	4. <u>Habitat Invaded:</u> Disturbed Areas <input checked="" type="checkbox"/> Undisturbed Areas <input checked="" type="checkbox"/> A respondent to the nursery survey reported that it "only escapes on pond edges or irrigated sites." (8)
	5. <u>Historical Status and Rate of Spread in Wisconsin:</u> Herbarium records date to 1926 in Wisconsin (Walworth county). Rate of spread is low in Wisconsin. (1)
	6. <u>Proportion of potential range occupied:</u> Can occupy a much larger habitat than it currently does in Wisconsin.
II. Invasive in Similar Climate Zones	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> <u>Where (include trends):</u> Has gradually spread from the NE part of the US where it has been cultivated since colonial times. Has been reported as far west as Kansas and as far south as Tennessee. (2)
III. Invasive in Which Habitat Types	1. Upland <input checked="" type="checkbox"/> Wetland <input checked="" type="checkbox"/> Dune <input type="checkbox"/> Prairie <input checked="" type="checkbox"/> Aquatic <input checked="" type="checkbox"/> Forest <input checked="" type="checkbox"/> Grassland <input checked="" type="checkbox"/> Bog <input checked="" type="checkbox"/> Fen <input checked="" type="checkbox"/> Swamp <input checked="" type="checkbox"/> Marsh <input checked="" type="checkbox"/> Lake <input checked="" type="checkbox"/> Stream <input checked="" type="checkbox"/> Other: Prefers to grow in low-lying lands, but can tolerate a wide variety of habitats.
IV. Habitat Affected	1. <u>Soil types favored or tolerated:</u> It prefers wet soils with full sunlight. It is adaptable to poor or dry soils with pH from 5.5 to 7. (2)
	2. <u>Conservation significance of threatened habitats:</u> Its ability to be dispersed by water, and its ability to form monospecific stands, makes it a threat to native wetland habitats. (2)
V. Native Range and Habitat	1. <u>List countries and native habitat types:</u> Native origins in Europe, western Asia, northern Africa. It is commonly found along stream banks, rivers, ponds or other wetlands. It grows in early successional forest, forest edges, floodplain forest, forest wetlands, shrub wetland, roadsides, yards or gardens. (2) Can withstand winter temperatures to -49C (7).
VI. Legal Classification	1. <u>Listed by government entities?</u> It is reported invasive in IL, IN, MI, NY, PA, and WI but is not listed as restricted or prohibited by WNDR. It is included on the Mid-Atlantic Exotic Pest Plant Council Plant List. It is also found in KY, but not considered an invasive species.
	2. <u>Illegal to sell?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Notes:
<b>B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS</b>	
I. Life History	1. <u>Type of plant:</u> Annual <input type="checkbox"/> Biennial <input type="checkbox"/> Monocarpic Perennial <input type="checkbox"/> Herbaceous Perennial <input type="checkbox"/> Vine <input type="checkbox"/> Shrub <input type="checkbox"/> Tree <input checked="" type="checkbox"/>
	2. <u>Time to Maturity:</u> about 2.5 years until tree can reproduce and seeds can germinate (4)

	<p>3. <u>Length of Seed Viability</u>: Very few alder seeds remain viable beyond the first germination season. Germination begins within 10 to 20 days after sowing and is essentially complete two weeks later. Seeds can survive, although not thrive, under flooding conditions. (4)</p> <p>4. Methods of Reproduction: Asexual <input checked="" type="checkbox"/> Sexual <input checked="" type="checkbox"/>  <u>Notes</u>: Seeds are able to be transported aquatically. Stumps are able to sprout readily. (4) Average number of seeds per catkin is 60; average number of pistillate catkins per tree of a moderate crop is 4000 for up to 240,000 seeds per tree (7).</p> <p>5. <u>Hybridization potential</u>: Readily hybridizes with other species of alder. (4)</p>
II. Climate	<p>1. <u>Climate restrictions</u>: The species does not extend into regions where the mean daily temperature is above freezing for less than 6 months of the year. Hardy to winter temperatures of -54° C (-65° F) (4)</p> <p>2. <u>Effects of potential climate change</u>:</p>
III. Dispersal Potential	<p>1. <u>Pathways</u> - Please check all that apply:</p> <p><u>Unintentional</u>: Bird <input checked="" type="checkbox"/> Animal <input type="checkbox"/> Vehicles/Human <input type="checkbox"/>  Wind <input checked="" type="checkbox"/> Water <input checked="" type="checkbox"/> Other: Seeds may occasionally blow across frozen snow, but dispersal is primarily by water. Seeds contain an air bladder and can float for over 12 months. Saplings rarely found more than 20-30 meters from parent tree when water transport is precluded (7).</p> <p><u>Intentional</u>: Ornamental <input checked="" type="checkbox"/> Forage/Erosion control <input checked="" type="checkbox"/>  Medicine/Food: Other: Occasionally cultivated as an ornamental tree throughout eastern North America. Also utilized for erosion control (7).</p> <p>2. <u>Distinguishing characteristics that aid in its survival and/or inhibit its control</u>: European Alder is adapted to all soil textures. Hardy to very cold temperatures. (6)</p>
IV. Ability to go Undetected	<p>1. HIGH <input type="checkbox"/> MEDIUM <input type="checkbox"/> LOW <input checked="" type="checkbox"/></p>
<b>C. DAMAGE POTENTIAL</b>	
I. Competitive Ability	<p>1. <u>Presence of Natural Enemies</u>: Phomopsis alnea (Fungi), Japanese beetle, European alder leaf miner (Fenusa dohrnii)</p> <p>2. <u>Competition with native species</u>: It inhabits early successional forest, edge, floodplain forest, forest wetland, roadside, and shrub wetland. Has the ability to create monospecific stands. (5)</p> <p>2. Rate of Spread:  -changes in relative dominance over time:  -change in acreage over time:  HIGH(1-3 yrs) <input type="checkbox"/> MEDIUM (4-6 yrs) <input type="checkbox"/> LOW (7-10 yrs) <input checked="" type="checkbox"/>  Notes: European alder seeds have no wings; therefore, despite their small size they are usually not spread more than 30 to 60 in (100 to 200 ft) by the wind, although they may occasionally be blown much farther over the top of crusted snow and can spread</p>

	by flowing water.
II. Environmental Effects	<p>1. <u>Alteration of ecosystem/community composition?</u>  YES <input checked="" type="checkbox"/> NO <input type="checkbox"/></p> <p>Notes: Black Alder's ability to fix nitrogen could potentially have harmful effects on native plant species in the area it colonizes. For example, certain native plant species which have adapted themselves to live in nitrogen-poor soils could be disrupted by the influx of fixed nitrogen in the soil from Black Alder. However, Alder can have beneficial effects on plants that require high nitrogen. Part of the nitrogen fixed by alders soon becomes available to other species in mixed stands, especially through mineralization of nitrogen leached from litter. In a 3-year-old Wisconsin plantation, hybrid poplars in a plantation spaced at 1.2 by 1.2 in (3.9 by 3.9 ft) grew 21 percent taller in a 1:2 mixture with European alder than when grown without alder (4.9 m versus 4.0 m; 16.0 ft versus 13.1 ft). This growth increase corresponded closely with that achieved through optimal ammonium nitrate fertilizer treatment, which stimulated a 24 percent increase. <b>(4)</b> Can form monospecific stands but these have not been observed to be so large such that they are significantly reducing the number of native species in the area (7).</p>
	<p>2. <u>Alteration of ecosystem/community structure?</u>  YES <input checked="" type="checkbox"/> NO <input type="checkbox"/></p> <p>Notes: Species has the ability to form monospecific stands. <b>(5)</b> Can increase the density of the shrub/canopy layer; not noted to be creating a new layer (7).</p>
	<p>3. <u>Alteration of ecosystem/community functions and processes?</u>  YES <input checked="" type="checkbox"/> NO <input type="checkbox"/></p> <p>Notes: See above information about nitrogen fixation; <i>A. glutinosa</i> leaves retain much more nitrogen in the leaves than other species of trees. Root system is both surface and deep taking advantage of water at multiple levels (7).</p>
	<p>4. <u>Allelopathic properties?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/></p> <p>Notes:</p>
<b>D. SOCIO-ECONOMIC EFFECTS</b>	
I. Positive aspects of the species to the economy/society:	<p>Notes: Alder may be a more promising species to grow in short-rotation, intensive-culture plantations for cattle feed. Protein yield was nearly that of alfalfa. <b>(4)</b> Also useful in urban landscaping due to its ability to grow quickly.</p> <p>Based on the 2011 WNA Economic Impact Survey, the following information was reported for this plant. Out of the 204 nurseries responding, 7 reported selling this plant. 4 reported it comprised &lt;1% of their gross plant sales. 3 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 \$121,063. It ranks 12th among the 63 taxa surveyed. The estimated wholesale value of plants in production is \$92,500. The majority of respondents said it took 3 to 5 years to produce this plant. The trend for the 2011 season was to remain unchanged (8).</p>

II. Potential Socio-Economic Effects of Requiring Controls:	Positive: Preservation of natural soil chemistry in wetlands and other areas colonized by this species. Negative: Costs of tree removal and control, loss of potential benefits the tree may provide.
III. Direct and indirect Socio-Economic Effects of Plant :	<ul style="list-style-type: none"> <li>Notes: Black alder has several beneficial uses in forestry. Alders have been recommended for afforestation of disturbed areas throughout much of the temperate world (46,52). Their tolerance of low pH and their rapid growth, abundant leaf litter production, and ability to fix atmospheric nitrogen combine to make black alder especially desirable for planting on mining spoil banks, which typically contain little organic matter and available nitrogen. (4)</li> <li>The species is a nitrogen fixer and invades systems with few or no known native nitrogen fixers, and consequently causes soil nitrogen availability to increase to levels that favor other non-native invaders at the expense of native species. (5)</li> </ul>
IV. Increased Costs to Sectors Caused by the Plant::	Notes: Cost of control, removal, and community restoration.
V. Effects on human health:	Notes: N/A
VI. Potential socio-economic effects of restricting use:	Positive: Restricting use for right of way planting or other uses would prevent planting and new potential infestations Negative: Some nurseries would need to stop selling it.
<b>E. CONTROL AND PREVENTION</b>	
I. Costs of Prevention (please be as specific as possible):	Notes: Not much is known about managing this species. (5) Education and public awareness cost is highly variable and depends on numerous factors. Among these include the cost of materials such as pamphlets, fliers, and services such as informational webpage development.
II. Responsiveness to prevention efforts:	Notes: <b>Prevention would be based on educating potential users to not plant it.</b>
III. Effective Control tactics:	Mechanical <input checked="" type="checkbox"/> Biological <input type="checkbox"/> Chemical <input checked="" type="checkbox"/> Times and uses: For mechanical control, cut tree at stump and treat with herbicides. For chemical control use 50% glyphosate solution. Follow label and state requirements.
IV. Costs of Control:	Notes: Cost of chemicals for removal, PPE for workers, equipment for tree stump removal (Sprouting from a cut trunk is possible).
V. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: No information available about managing this species at this point, so the effects of doing so are merely speculative. Management seems necessary due to the potential reduction of biodiversity in the areas black alder colonizes.
VI. Non-Target Effects of Control:	Notes:
VII. Efficacy of monitoring:	Notes:
VIII. Legal and landowner issues:	Notes:

## F. HYBRIDS AND CULTIVARS

<p>I. Known hybrids?</p> <p>YES <input checked="" type="checkbox"/> NO <input type="checkbox"/></p>	<p>Name of hybrid: <i>A. cordata</i> x, <i>A. glutinosa</i>, <i>A. glutinosa</i> x <i>A. incana</i>, <i>A. glutinosa</i> x <i>A. rubra</i>, and <i>A. glutinosa</i> x <i>A. orientalis</i>. (4)</p> <p>Names of hybrid cultivars: 'Aurea', 'Laciniata', 'Imperialis', 'Quercifolia', 'Sorbifolia', 'Incisa', 'Rubrinervia', and 'Pyramidalis'(3) Brent McCown trying to hybridize with japonica for sterility (9)</p>
<p>II. Species cultivars or varieties</p>	<p>Names of cultivars or varieties and any information about the invasive behaviors of each: A nursery survey respondent reported growing Imperialis and Laciniata (8) Invasive behavior remains the same and the ornamental cultivars differ mainly in leaf size and branching patterns. (3)</p>

### G. REFERENCES USED:

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

Number	Reference
1	Wisconsin State Herbarium. 2011. WISFLORA: Wisconsin Vascular Plant Species. Department of Botany, University of Wisconsin-Madison, WI 53706. Accessed 11-10-11. <a href="http://www.botany.wisc.edu/wisflora/">http://www.botany.wisc.edu/wisflora/</a>
2	US Forest Service, Northeastern Area. 2011. Forest Health Protection- Invasive Plants, Weeds of the Week. Accessed 11-10-11. <a href="http://na.fs.fed.us/fhp/invasive_plants/weeds/european-alder.pdf">http://na.fs.fed.us/fhp/invasive_plants/weeds/european-alder.pdf</a>
3	Steiner, Kim C. European Black Alder: Characteristics and Potential for Improvement. Pennsylvania Agricultural Experiment Station. 6818.
4	US Forest Service, Northeast Area. 2011. Publications. Accessed 11-10-11. <a href="http://na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/alnus/glutinosa.htm">http://na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/alnus/glutinosa.htm</a>
5	Natureserve. 2009. Natureserve Explorer: An Online Encyclopedia of Life. Accessed 11-10-11. <a href="http://www.natureserve.org/explorer/">http://www.natureserve.org/explorer/</a> .
6	Alaska Natural Heritage Program. 2011. Accessed 11-10-11. <a href="http://aknhp.uaa.alaska.edu/services/AKNHP.cfc?method=downloadDocumentByUsdaCode&amp;documentType=species_bio&amp;usdaCode=ALGL2">http://aknhp.uaa.alaska.edu/services/AKNHP.cfc?method=downloadDocumentByUsdaCode&amp;documentType=species_bio&amp;usdaCode=ALGL2</a>
7	Jordan, M.J., G. Moore and T.W. Weldy. 2008. Invasiveness ranking system for non-native plants of New York. Unpublished. The Nature Conservancy, Cold Spring Harbor, NY; Brooklyn Botanic Garden, Brooklyn, NY; The Nature Conservancy, Albany, NY. <a href="http://www.newyorkinvasivespecies.org/PlantAssessments/Alnus.glutinosa.NYS.pdf">http://www.newyorkinvasivespecies.org/PlantAssessments/Alnus.glutinosa.NYS.pdf</a>
8	Wiegrefe, Susan. 2011. Wisconsin Nursery Association Survey of the Economic impact of potentially invasive species in Wisconsin
9	Tree, shrub, vine species assessment group pre-screen meeting.

**Author(s), Draft number, and date completed:** Scott Lee, Draft #1, 7/29/2011

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