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| NAME OF SPECIES: <i>Pinus sylvestris</i> L. (1)   |  |
| Synonyms: <i>Pinus densiflora</i> f. <i>sylvestriformis</i> Taken.; <i>Pinus hamata</i> (Steven) Sosn. [= <i>Pinus sylvestris</i> var. <i>hamata</i> ]; <i>Pinus nigra</i> f. <i>pygmaea</i> (Carrière) Rehder; <i>Pinus sylvestris</i> f. <i>nana</i> (Carrière) Lipa. (3) |  |
| Common Name: Scotch pine, Scot pine (1)   |  |
| A. CURRENT STATUS AND DISTRIBUTION  |  |
| I. In Wisconsin?  | 1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>   |
|   | 2. <u>Abundance</u> : There are 62 recorded occurrences in WI (1)  |
|   | 3. <u>Geographic Range</u> : Recorded from 28 counties spread across WI (1).   |
|   | 4. <u>Habitat Invaded</u> : Most recorded occurrences are cultivated, or from disturbed sites such as roadsides and old fields. A few are recorded from woodlands, forest and prairie edges. (1)<br>Disturbed Areas <input checked="" type="checkbox"/> Undisturbed Areas <input type="checkbox"/>   |
|   | 5. <u>Historical Status and Rate of Spread in Wisconsin</u> : First recorded in Rock Co. in 1890 (1).  |
|   | 6. <u>Proportion of potential range occupied</u> : Currently limited by the need of the species to be moved across the landscape by humans.  |
| II. Invasive in Similar Climate Zones   | 1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>   |
|   | <u>Where (include trends)</u> : Scots pine is naturalized in Eastern Canada and in the states of the Northeast and in the Great Lakes. (6) (7)   |
| III. Invasive in Similar Habitat Types  | 1. Upland <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Dune <input type="checkbox"/> Prairie <input checked="" type="checkbox"/> Aquatic <input type="checkbox"/><br>Forest <input checked="" type="checkbox"/> Grassland <input type="checkbox"/> Bog <input type="checkbox"/> Fen <input type="checkbox"/> Swamp <input type="checkbox"/><br>Marsh <input type="checkbox"/> Lake <input type="checkbox"/> Stream <input type="checkbox"/> Other: <i>Pinus sylvestris</i> invades predominantly upland, relatively open areas, such as fields, old fields, and lakeshores. It has also been reported from several forest/woodland habitats, including mostly relatively open woodlands, but also deciduous forests, mixed forests and mature conifer stands. In addition, it is often found on roadsides or upland forest edges. (7)<br>Where it is naturalized in northern New York, Scots pine is associated with black cherry ( <i>Prunus serotina</i> ), red maple ( <i>Acer rubrum</i> ), sugar maple ( <i>A. saccharum</i> ), American beech ( <i>Fagus grandifolia</i> ), quaking aspen ( <i>Populus tremuloides</i> ), and eastern white pine ( <i>Pinus strobus</i> ). (6) |
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| IV. Habitat Effected  | 1. <u>Soil types favored or tolerated</u> : Scots pine grows best in full sun. It grows on a wide variety of soils including peat, though growth on peat usually results in stunted trees. Growth is best on well-drained soils, but is tolerant of very dry sites. Soil pH ranges from 4.0 to 7.0, but growth is best between 4.5 and 6.0. Scots pine seedling establishment occurs on bare mineral soil, and optimum seedling growth is on acidic soils. (4) (6).  |
|   | 2. <u>Conservation significance of threatened habitats</u> : <i>Pinus sylvestris</i> invades predominantly upland, relatively open areas that often have experienced previous disturbance, such as fields, old fields, and roadsides. However, in Ontario, it has been reported as invasive in bog habitats. In addition, if it is indeed exotic in England, it is invading heathland habitats. (7)<br>In North America it does invade woodlands and forests where there is a seed source, and due to its preference for dry sandy sites it may threaten barrens and savanna habitats in WI.   |

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|   | Some of the woodland and savanna habitats in WI that may be threatened are listed as G1-G2 and S1-S2. Some of the barrens and grassland habitats in WI that may be threatened are listed as G2-G3 and S1-S3 (8).   |
| V. Native Habitat   | 1. <u>List countries and native habitat types</u> : Scots pine is the most widely distributed pine in the world. (6)<br>From Asia - Turkey, Eastern Siberia, Western Siberia, Kazakhstan, Mongolia, China. And Europe - Finland; Norway; Sweden; Scotland; Austria; Czechoslovakia; Germany; Hungary; Poland; Switzerland; Belarus; Estonia; Latvia; Lithuania; Ukraine; Albania; Bulgaria; Greece; Italy; Romania; Yugoslavia; France; Spain. (3)<br>In Europe and Asia, Scots pine forms a boreal forest type with Norway spruce ( <i>Picea abies</i> ) (6).   |
| VI. Legal Classification                                  | 1. <u>Listed by government entities?</u> No  |
|   | 2. <u>Illegal to sell?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/><br>Notes: Available from nurseries and recommended for planting (see cit 4).  |
| <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"/><br>Herbaceous Perennial <input type="checkbox"/> Vine <input type="checkbox"/> Shrub <input type="checkbox"/> Tree <input checked="" type="checkbox"/>   |
|   | 2. <u>Time to Maturity</u> : Sexual maturity can be reached as early as 5 to 8 years of age; the usual range is from 10 to 15 years of age (6).  |
|   | 3. <u>Length of Seed Viability</u> : This species has only a transient seed bank (3-12 months) (7).  |
|   | 4. <u>Methods of Reproduction</u> : Asexual <input type="checkbox"/> Sexual <input checked="" type="checkbox"/><br><u>Notes</u> : Seed dispersal distances range from 164 to 328 feet (50-100 m) from the parent, though the maximum distance is greater than 0.6 mile (1 km) (6).   |
|   | 5. <u>Hybridization potential</u> : NA   |
| II. Climate   | 1. <u>Climate restrictions</u> : To Zone 2 (5).  |
|   | 2. <u>Effects of potential climate change</u> : Could limit spread at the southern edge of current range.  |
| III. Dispersal Potential                                  | 1. <u>Pathways - Please check all that apply</u> :<br><br><u>Unintentional</u> : Bird <input type="checkbox"/> Animal <input type="checkbox"/> Vehicles/Human <input type="checkbox"/><br>Wind <input checked="" type="checkbox"/> Water <input type="checkbox"/> Other: Its wind-dispersed seeds often land close to the parent tree (about 50-100 inches away), but dispersal distances of 1 km are not uncommon (7).<br><br><u>Intentional</u> : Ornamental <input checked="" type="checkbox"/> Forage/Erosion control <input checked="" type="checkbox"/><br>Medicine/Food: <input type="checkbox"/> Other: Scots pine is planted for erosion control. It is used to reforest coal mine spoils. It is also planted for shelterbelts and Christmas tree plantations (accounting for 30 percent of all trees planted for that purpose). Scots pine is used to monitor the effect of air pollution on plants. (6).<br><u>Cultivars/Varieties</u><br>'Aurea' - The light green needles of this slow-growing tree turn bright yellow in winter, adding color to a bleak landscape.<br>'Beauvronensis' - An old cultivar, this plant reliably produces a |

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|                              | <p>compact, dense mound of needles. It is slow-growing and very broad in habit.</p> <p>'Fastigiata' (also listed as f. fastigiata) - This is a strictly columnar form that may reach 25' tall and only a few feet wide. It is among the most fastigiate conifers available, but has a tendency to break up under winter ice and snow loads. It may benefit from being tied together. The needles are blue-green. 'Spaan's Fastigiate' is a slower-growing fastigiate form that is less susceptible to breaking up under snow and ice.</p> <p>'Hillside Creeper' - A groundcover form, this plant grows vigorously to form an undulating carpet of medium green needles. 'Albyn Prostrata' is a similar form with thick, shiny green needles.</p> <p>'Pumila' - Forming a large upright shrub with a broadly rounded habit, this selection is useful as a hedge or focal point. The needles are blue-green.</p> <p>'Watereri' - This is a popular cultivar that typically reaches about 10' tall with a dense pyramidal growth habit. The needles are a steely blue color. (5)</p> <p>2. <u>Distinguishing characteristics that aid in its survival and/or inhibit its control:</u> <i>P. sylvestris</i> can attain reproductive maturity in 5 years, which is fairly rapid compared to other trees and has been mentioned as a factor contributing to its spread. It also appears to have some resprouting ability, and in some situations high seed abundance or abundant reproduction. (7).</p> |
| IV. Ability to go Undetected | 1. HIGH <input type="checkbox"/> MEDIUM <input checked="" type="checkbox"/> LOW <input type="checkbox"/>  |
| <b>C. DAMAGE POTENTIAL</b>   |   |
| I. Competitive Ability       | <p>1. <u>Presence of Natural Enemies:</u> Damaging insect species on Scots pine include pine root collar weevil, pine root tip weevil, European pine sawfly, and others. Scleroderris canker has become a serious problem in Scots pine plantations in many areas. Other diseases include Lophodermum needlecast, brown spot needle disease, and western gall rust (6).</p> <p>2. <u>Competition with native species:</u> Impacts on white pine (<i>Pinus strobus</i>) have been noted; where Scotch pine and white pine compete for establishment in a freshly disturbed area, the more aggressive early growth of Scotch pine gives it a competitive advantage, often allowing it to dominate the white pine. (7)</p> <p>3. Rate of Spread:<br/>         -changes in relative dominance over time:<br/>         -change in acreage over time:<br/>         HIGH(1-3 yrs) <input type="checkbox"/> MEDIUM (4-6 yrs) <input type="checkbox"/> LOW (7-10 yrs) <input checked="" type="checkbox"/><br/>         Notes: It has been planted across the country for at least 130 years and has escaped and naturalized in the northeastern and lake states. The naturalized range is likely stable due to its long history of use. (7) I have observed seedling invasion of the Lake Michigan sand dunes. (9)</p>   |
| II. Environmental Effects    | <p>1. <u>Alteration of ecosystem/community composition?</u><br/>         YES <input checked="" type="checkbox"/> NO <input type="checkbox"/><br/>         Notes: The more aggressive early growth of Scotch pine gives it a competitive advantage over white pine. Scotch pine trees also</p>   |

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|  | generate significant litter and seedlings can form dense mats in some areas, which may affect regeneration or growth of other community components. (7)  |
|  | 2. <u>Alteration of ecosystem/community structure?</u><br>YES <input checked="" type="checkbox"/> NO <input type="checkbox"/><br>Notes: This species is a large pine tree that predominantly invades relatively open areas. By converting previously open habitats to woodlands, it can cause substantial structural changes. (7)  |
|  | 3. <u>Alteration of ecosystem/community functions and processes?</u><br>YES <input checked="" type="checkbox"/> NO <input type="checkbox"/><br>Notes: Pinus sylvestris trees generate significant litter. Because this species often invades open habitats which did not previously contain pine trees, this addition of litter likely alters nutrient cycling to some extent. (7) |
|  | 4. <u>Allelopathic properties?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/><br>Notes:   |

#### D. SOCIO-ECONOMIC Effects

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| I. Positive aspects of the species to the economy/society:                            | Notes: • Food additives: flavoring<br>• Environmental: agroforestry; ornamental<br>• Materials: gum/resin; lipids; wood<br>• Medicines: folklore - cough, tumor<br>• Social: religious/secular (used as a Christmas tree) (3)<br>The pine grosbeak feeds on the terminal and lateral buds of Scots pine. Porcupines consume the bark, and girdle small trees. White-tailed deer will browse Scots pine [10]. Moose browse it in Scandinavia and Russia (6). |
| II. Potential socio-economic effects of requiring controls:<br>Positive:<br>Negative: | Notes: An important Christmas tree crop in Wisconsin and important to the economy of the "sand country". In addition, it is a valued landscape plant along with its numerous cultivars.   |
| III. Direct and indirect socio-economic effects of plant:                             | Notes: Currently, none identified.  |
| IV. Increased cost to sectors caused by the plant:                                    | Notes: NA   |
| V. Effects on human health:   | Notes: NA   |
| VI. Potential socio-economic effects of restricting use:<br>Positive:<br>Negative:    | Notes: Those green industry businesses that are invested in this species will be negatively effected, especially the Christmas tree industry.   |

#### E. CONTROL AND PREVENTION

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| I. Costs of Prevention (including education; please be as specific as possible): | Notes:  |
| II. Responsiveness to prevention efforts:  | Notes:  |
| III. Effective Control tactics:  | Mechanical <input checked="" type="checkbox"/> Biological <input type="checkbox"/> Chemical <input checked="" type="checkbox"/><br>Times and uses: Recommended control methods include girdling and shearing-herbiciding. In girdling, the bark and phloem layer is removed from a 10 cm band around trunk. Additional investment |

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|   | may be required if bark redevelops. In shearing and herbiciding, stems are cut with shears or a chain saw and herbicide is then applied with a squirt bottle. (7) |
| IV. Minimum Effort:   | Notes: To be effective, monitoring and follow-up treatments for both methods noted above must be continued for at least 2 years. (7)                              |
| V. Costs of Control:  | Notes:  |
| VI. Cost of prevention or control vs. Cost of allowing invasion to occur: | Notes: Prevention is cheaper than control.  |
| VII. Non-Target Effects of Control:                                       | Notes: Both girdling and shearing-herbiciding are fairly selective methods, so impacts on native should be low. (7)   |
| VIII. Efficacy of monitoring:   | Notes: Due to the relatively slow spread of Scots pine, monitoring for this species in habitats of concerns will be most effective.                               |
| IX. Legal and landowner issues:   | Notes:  |

#### F. REFERENCES USED:

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

| Number | Reference  |
|--------|--|
| 1      | Wisconsin State Herbarium. 2007. WISFLORA: Wisconsin Vascular Plant Species ( <a href="http://www.botany.wisc.edu/wisflora/">http://www.botany.wisc.edu/wisflora/</a> ). Dept. Botany, Univ. Wisconsin, Madison, WI 53706-1381 USA.  |
| 2      | USDA, NRCS. 2007. The PLANTS Database ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> , 23 April 2007). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.  |
| 3      | USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?28552">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?28552</a> (23 April 2007)   |
| 4      | Urban Programs Resources Network, University of Illinois Extension. <a href="http://www.urbanext.uiuc.edu/treeselector/index_tree.cfm?id=84">http://www.urbanext.uiuc.edu/treeselector/index_tree.cfm?id=84</a>  |
| 5      | University of Connecticut Plant Database. <a href="http://www.hort.uconn.edu/plants/p/pinsyl/pinsyl1.html">http://www.hort.uconn.edu/plants/p/pinsyl/pinsyl1.html</a>  |
| 6      | Sullivan, Janet. 1993. <i>Pinus sylvestris</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <a href="http://www.fs.fed.us/database/feis/">http://www.fs.fed.us/database/feis/</a> [2007, April 23]. |
| 7      | NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available <a href="http://www.natureserve.org/explorer">http://www.natureserve.org/explorer</a> . (Accessed: April 23, 2007).  |
| 8      | WDNR Natural Heritage Inventory Working List. <a href="http://www.dnr.state.wi.us/org/land/er/wlist/">http://www.dnr.state.wi.us/org/land/er/wlist/</a>  |
| 9      | Ed Hasselkus, UW Emeritus Horticulture Professor. Comments on Invasive Plant Classification 2007.  |

**Author(s), Draft number, and date completed:** Mariquita Sheehan, 1<sup>st</sup> Draft, 23 April 2007

**Reviewer(s) and date reviewed:** Mike Engle , 8-27-07

**Approved and Completed Date:** Thomas Boos, 9-10-07