NAME OF SPECIES: *Dendroctonus ponderosae* **Common Name:** Mountain Pine Beetle	
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES NO X
II. Invasive in Similar Climate Zones	YES X NO United States: Arizona, California, Colorado, Idaho, Montana, Oregon, South Dakota, Utah, Washington, Wyoming Canada: Alberta, British Columbia, Northwest Territories, Saskatchewan Other: absent from EU
III. Invasive in Similar Habitat Types	YES X NO
IV. Habitat Affected	1. Host plants: Pines, especially ponderosa, lodgepole, whitebark, western white Scotch and limber pines but also bristlecone, jack, Scotch and pinyon pine trees.
	2. Conservation significance of threatened habitats: Can wipe out large areas of pines; kills more trees than any insect worldwide. Can increase fire hazard during red-needle phase
V. Native Habitat	1. Countries: USA, Canada, northern Mexico
	2. Hosts: • Primary: lodgepole, ponderosa, sugar pine, western white pine, limber pine, Coulter pine, foxtail pine, Whitebark pine, Pinyon pine, bristlecone pine, Scotch, jack pine • Secondary (attacked but beetle regeneration is usually unsuccessful): Douglas-fir, true firs, spruce, larch, incense cedar
VI. Legal Classification	1. Quarantined species? YES X (Europe) Not in USA On A1 quarantine list for EPPO. Very high risk to European pines such as P. contorta and P. ponderosa.
B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	1. Type of insect: *Coleoptera: Curculionidae, Scolytinae*
	2. Time to Maturity: one year in most areas. Multiple generations may occur in warmer climates. More than one year to maturation may be necessary at northernmost latitudes.
	3. Methods of Spread: strong flyers. Most common means of introduction is unseasoned sawn wood and wooden crates with bark on them. Dunnage is also high hazard because it's very difficult to monitor.
II. Climate	1. Climate restrictions: Overwinters as larvae or adults. Long periods of extremely low temperatures can cause mortality.
	2. Effects of potential climate change: • Increasing temperatures can result in increased synchrony of generations and potentially in multiple generations per year. • Increasing winter temperatures increases over-wintering survival. • Drought can further weaken trees and increase susceptibility to bark beetle attack.
III. Dispersal Potential	1.Invasion pathways: Strong flyers. Attack large homogenous pine forests where there is an abundance of single-aged host.
	2. Distinguishing characteristics that aid in its survival and/or inhibit its control: warm winter temperatures can increase over-wintering survival, high densities can overwhelm tree defenses especially if coupled with drought stress,

IV. Ability to go Undetected	HIGH MEDIUM LOW X
	Signs and symptoms: dead and dying tree tops, flagging of branches, sappy pitch tubes, galleries under bark, sawdust on main stem, presence of woodpeckers Wide spread tree mortality
C. DAMAGE POTENTIAL	
I. Competitive Ability	1. Presence of Natural Enemies: birds (esp. woodpeckers)
	2. Presence of Competitors: other bark beetles
	3. Rate of Spread: usually slow unless high beetle densities, large acreage of single aged, single species forests, and weather stress.
II. Environmental Effects	1. Alteration of ecosystem/community composition? YES X • Can alter canopy composition significantly due to large number of mature trees that are killed. • MPB vectors several species of fungi , including relatives of Dutch Elm Disease and Procerum Root Disease pathogens. MPB also carries multiple species of bacteria, mites, and nematodes. • Attack by mountain pine beetle is followed by infestation by buprestids, cerambycids, siricids, curculionids, and ambrosia beetles
	2. Alteration of ecosystem/community structure? YES X NO Kill mostly mature trees and open canopy to new tree regeneration.
	3. Alteration of ecosystem/community functions and processes? YES X NO • Results in reduced carbon sequestration. • Increases number of hazard trees. • Can create a fire hazard during red-needle phase.
D. PREVENTION AND CONTROL	
I. Detection Capability:	Pheromone traps are a good way to detect beetle populations. Numerous pitch tubes on lower part of tree indicate beetle attack.
II. Costs of Prevention :	Maintain forest health and diversity of species and ages. Reduce stand density. These measures are not overly expensive but may not work in the face of overwhelming numbers of beetles and/or drought stress.
III. Responsiveness to prevention efforts:	May work in the absence of other stresses such as severe drought and warm temperatures combined with high beetle densities.
IV. Control tactics:	Cultural: 1. Removal of infested trees to area without pine for 2 mile radius, 2. burn or chip infested portions of trees in winter, 3. peal bark off of trees after emergence, 4. Solar technique: stack infested trees, stack and cover tightly with plastic Biological: Natural enemies: Wood peckers Chemicals: for high value trees use preventive spray: Carbaryl or Pyrethroids
V. Minimum Effort:	Maintain forest health and diversity of age and species.
VI. Most Effective Control:	Silvicultural thinning to increase forest diversity and increase tree vigor.
VII. Cost of prevention or control vs. Cost of allowing invasion to occur:	Prevention is a much better and cheaper IF it works than allowing high mortality of trees.

VIII. Non-Target Effects of Control:	Insecticides are broad spectrum. Buffer within 75 ft of water
IX. Efficacy of monitoring:	Pheromone traps are a good way to detect beetle populations as is visual inspection of trees for pitch tubes.
X. Legal and landowner issues:	

F. REFERENCES USED:

Leatherman, D.A., I. Aguayo, T.M. Mehall. 2011. Mountain Pine Beetle. Fact Sheet no. 5.528. Colorado State Univ. Extension http://www.ext.colostate.edu/pubs/insect/05528.html

Mountain Pine Beetle. http://en.wikipedia.org/wiki/Mountain_pine_beetle

Shonle, Irene and Ingrid Aguayo. Spraying Trees to Protect against Mountain Pine Beetle. Colorado State Univ. Extension. http://csfs.colostate.edu/pages/documents/Thoughts_on_spraying_trees-version2_final_April_2009.pdf

Dendrotonus ponderosae EPPO quarantine pest. Data Sheets on Quarantine Pests. http://www.ufei.org/ForesTree/files/collected/ponde.pdf

Forest Health: Mountain Pine Beetle. National Park Service. US Dept of Interior. http://www.nps.gov/romo/naturescience/mtn_pine_beetle_background.htm

Mountain Pine Beetle. USDA Forest Service. http://www.fs.fed.us/rm/landscapes/Solutions/Pinebeetle

Kurz, W.A., Dymond, C.C., Stenson, G., Rampley, G.J., Carroll, A.L., Ebata, T., and Safranyik, L. 2008. Mountain pine beetle and forest carbon feedback to climate change. Nature. 452(7190): 987-990.

Safranyik, L. and Carroll, A.L. 2006. The biology and epidemiology of the mountain pine beetle in lodgepole pine forests. *In* The Mountain Pine Beetle: A Synthesis of Biology, Management, and Impacts on Lodgepole Pine. *Edited by* L. Safranyik and W.R. Wilson. Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, Victoria, British Columbia. pp. 3-66.