

<b>NAME OF SPECIES:</b> <i>Centaurea biebersteinii</i> DC.	
Synonyms: <i>Centaurea maculosa</i> auct. non Lam.; <i>Centaurea stoebe</i> L. ssp. <i>micranthos</i> (Gugler) Hayek; <i>Acosta maculosa</i> auct. non Holub.	
Common Name: Spotted Knapweed	
<b>A. CURRENT STATUS AND DISTRIBUTION</b>	
I. In Wisconsin?	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
	2. <u>Abundance</u> : Widespread distribution in Wisconsin (1)
	3. <u>Geographic Range</u> : Found in 50 counties in Wisconsin (1).
	4. <u>Habitat Invaded</u> : Dry Prairie, Sand Barren, Oak Savanna, Dune. Disturbed Areas <input checked="" type="checkbox"/> Undisturbed Areas <input checked="" type="checkbox"/>
	5. <u>Historical Status and Rate of Spread in Wisconsin</u> : Earliest herbarium specimen was collected in 1925 in Iowa County (1).
	6. <u>Proportion of potential range occupied</u> : Presently expanding.
II. Invasive in Similar Climate Zones	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
	<u>Where (include trends)</u> : Invasive across the continental United States (2). Originally introduced to the Pacific Northwest in the 1890s as a contaminant in imported pasture hay and in ballast sand. Has since spread rapidly eastward (3).
III. Invasive in Similar Habitat Types	1. Upland <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Dune <input checked="" type="checkbox"/> Prairie <input checked="" type="checkbox"/> Aquatic <input type="checkbox"/> Forest <input type="checkbox"/> Grassland <input checked="" type="checkbox"/> Bog <input type="checkbox"/> Fen <input type="checkbox"/> Swamp <input type="checkbox"/> Marsh <input type="checkbox"/> Lake <input type="checkbox"/> Stream <input type="checkbox"/> Other: Railroad rights-of-way, roadsides CRP grasslands, pastures, disturbed sites.
IV. Habitat Effected	1. <u>Soil types favored (e.g. sand, silt, clay, or combinations thereof, pH)</u> : Inceptisol soils are particularly susceptible to invasion (3). <i>C. biebersteinii</i> is best adapted to well-drained, light-textured soils that receive summer rainfall (TNC).
	2. <u>Conservation significance of threatened habitats</u> : Prairie, savanna and barrens communities provide ecosystem services (carbon sequestration) and habitat. A very small percentage (<1%) of native prairies and savannas remain. On dunes knapweed is impacting several more species.
V. Native Habitat	1. <u>List countries and native habitat types</u> : Europe, Asia Minor (3).
VI. Legal Classification	1. <u>Listed by government entities?</u> Yes. Noxious in AZ, CA, NM, CO, ID, NE, NV, ND, UT, WY, MT, WA. Regulated in CT, MA, OR, SD (2).
	2. <u>Illegal to sell?</u> YES <input type="checkbox"/> NO <input type="checkbox"/> Notes: In some states listed above.
<b>B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS</b>	
I. Life History	1. <u>Type of plant</u> : Annual <input type="checkbox"/> Biennial <input checked="" type="checkbox"/> Monocarpic Perennial <input type="checkbox"/> Herbaceous Perennial <input checked="" type="checkbox"/> Vine <input type="checkbox"/> Shrub <input type="checkbox"/> Tree <input type="checkbox"/>
	2. <u>Time to Maturity</u> : Two or more growing seasons. Often found as a rosette during the first season, and flowers the second and subsequent years (3).
	3. <u>Length of Seed Viability</u> : 30% of seeds remain viable after eight years of burial (3).
	4. <u>Methods of Reproduction</u> : Asexual <input type="checkbox"/> Sexual <input checked="" type="checkbox"/> <u>Please note abundance of propagules and other important information</u> : Cross-pollinated by insects but also self-compatible (3). Mean number of seeds per seed head has been estimated at a range of 9 - 37, but variations in this number are reportedly correlated with seasonal differences in precipitation (3). Dense <i>C. biebersteinii</i> stands can yield 146,000 seeds per square meter (3).

	5. <u>Hybridization potential</u> : Possibly high. Several other congeneric species, including <i>C. diffusa</i> and <i>C. solstitialis</i> , have overlapping distributions with <i>C. biebersteinii</i> . Furthermore, these species are cross-pollinated by insects.
II. Climate	1. <u>Climate restrictions</u> : Temperate with wet summers (3). 2. <u>Effects of potential climate change</u> : May expand in range as a result of global warming.
III. Dispersal Potential	1. <u>Pathways - Please check all that apply</u> : <u>Intentional</u> : Ornamental <input type="checkbox"/> Forage/Erosion control <input type="checkbox"/> Medicine/Food: Other: <u>Unintentional</u> : Bird <input type="checkbox"/> Animal <input checked="" type="checkbox"/> Vehicles/Human <input checked="" type="checkbox"/> Wind <input type="checkbox"/> Water <input type="checkbox"/> Other: Mower decks and Transport of hay. 2. <u>Distinguishing characteristics that aid in its survival and/or inhibit its control</u> :
IV. Ability to go Undetected	1. HIGH <input type="checkbox"/> MEDIUM <input type="checkbox"/> LOW <input checked="" type="checkbox"/>
<b>C. DAMAGE POTENTIAL</b>	
I. Competitive Ability	1. <u>Presence of Natural Enemies</u> : Four biological control insects have been introduced to North America: Two gall flies ( <i>Urophora affinis</i> and <i>U. quadrifasciata</i> ), one moth ( <i>Metzneria paucipunctella</i> ), and a beetle ( <i>Shenoptera jugoslavica</i> ) (3). 2. <u>Competition with native species</u> : Extremely competitive. Intensity of competition is accelerated by grazing practices. Because <i>C. biebersteinii</i> is unpalatable, its presence shifts grazing pressure onto other species, lessening their competitive ability (3). 3. <u>Rate of Spread</u> : HIGH(1-3 yrs) <input checked="" type="checkbox"/> MEDIUM (4-6 yrs) <input checked="" type="checkbox"/> LOW (7-10 yrs) <input type="checkbox"/> Notes: Dispersal from shattering is limited to 3-12 dm of the parent plant, but rodents, livestock, vehicles and commercial hay production can accelerate its rate of spread (3).
II. Environmental Effects	1. <u>Alteration of ecosystem/community composition?</u> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Notes: Displaces native species, lowering species density and diversity (3 and references therein). 2. <u>Alteration of ecosystem/community structure?</u> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Notes: Can form monotypic vegetation stands. 3. <u>Alteration of ecosystem/community functions and processes?</u> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Notes: Decreases water storage capacity of soil and increases soil erosion (3). Also, fire will not push through heavy infestations. May distract pollinators from native species.

**F. REFERENCES USED:**

	4. <u>Allelopathic properties?</u> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Notes:
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**D. SOCIO-ECONOMIC Effects**

I. Positive aspects of the species to the economy/society:	Notes: Some beekeepers like it for the honey it produces. In MI beekeepers have been fighting the forest service to protect this species. Some tourists like the flowers 'Door county heather'.
II. Potential socio-economic effects of restricting use:	Notes: Could be accidentally transported in hay.
III. Direct and indirect effects :	Notes: Directly impacts pastures, hay production as well as natural areas.
IV. Increased cost to a sector:	Notes: Increases costs of grazing. Hay production roadside and natural areas management.
V. Effects on human health:	Notes: Hand pulling with bare hands has been reported to cause an array of health problems.

**E. CONTROL AND PREVENTION**

I. Costs of Prevention (including education; please be as specific as possible):	Notes: Too widespread to prevent state-wide. Careful management can minimize infestations.
II. Responsiveness to prevention efforts:	Notes: Clopyralid and aminopyralid are very effective.
III. Effective Control tactics:	Mechanical <input type="checkbox"/> Biological <input checked="" type="checkbox"/> Chemical <input checked="" type="checkbox"/> Times and uses: Spot or broadcast application of clopyralid or aminopyralid to plants in the rosette stage. Use a sticker-spreader to ensure adequate coverage. There are a number of species that are effective biocontrol organisms and are being studied for effectiveness in WI.
IV. Minimum Effort:	Notes: N/A
V. Costs of Control:	Notes: Variable and site-specific.
VI. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: Spreads rapidly. Preventing seed set is critical to early control efforts.
VII. Non-Target Effects of Control:	Notes: Broad-spectrum and composite/legume-specific herbicides can harm or eliminate some other desired vegetation. Mowing in mid-summer can be detrimental to nesting birds.
VIII. Efficacy of monitoring:	Notes: If detected early, <i>C. biebersteinii</i> can be eradicated. Subsequent monitoring is usually necessary.
IX. Legal and landowner issues:	Notes:

- UW Herbarium
- WI DNR
- TNC
- Native Plant Conservation Alliance

