NAME OF SPECIES: *Coronilla varia* L.		
Synonyms: *Securigera varia* (L.) Lassen (1)		
Common Name: crown-vetch, axseed, purple crown-vetch, trailing crown-vetch, Varia crownvetch, (2)(3)	**Cultivars?** YES ☒ NO ☐	
A. CURRENT STATUS AND DISTRIBUTION		
I. In Wisconsin?	1. YES ☒	NO ☐
	2. Abundance: Widespread through Wisconsin, primarily along roads and other transportation corridors (1). Adjacent grasslands	
	3. Geographic Range: Crown vetch has been documented in 50 counties; it is probably undervouchered and likely to be established in nearly every county.	
	4. Habitat Invaded: Disturbed Areas ☒ Undisturbed Areas ☐	
	5. Historical Status and Rate of Spread in Wisconsin: Crown vetch has been introduced widely along roadsides and other rights-of-way since the 1950s (4). It was first collected in Iowa County in 1946 from a profuse roadside population, followed by collections in Dane, Green, and Rock counties in the 1950s, all in the south-central region (1). In the 1960s county records occurred in Crawford, Fond du Lac, Richland, Sheboygan, Waushara, indicating expansion into southwestern and northeastern areas (1). By the 1970s it was found in every region of the state (1). Roadside planting was discontinued for state highways in the late 1990s, but is occasionally still used.	
	6. Proportion of potential range occupied: <50%	
II. Invasive in Similar Climate Zones	1. YES ☒ NO ☐ Where (include trends): It has naturalized throughout North America and is found in all Midwestern states except ND (5).	
III. Invasive in Which Habitat Types	1. Upland ☒ Wetland ☐ Dune ☐ Prairie ☒ Aquatic ☐ Forest ☒ Grassland ☒ Bog ☒ Fen ☒ Swamp ☒ Marsh ☐ Lake ☐ Stream ☒ Other: Drainage ditches, floodplains, forest edges, gravel bars in waterways, rights-of-way, riverbanks, waste areas (4, 6, 7).	
IV. Habitat Affected	1. Soil types favored or tolerated: Prefers loamy, sandy, or gravelly-rocky soils, but can tolerate silty or clayey condition (4). It can grow in nutrient poor or saline conditions, as well as acidic to slightly basic soils (5.0-7.5 pH) (4) (8).	
	2. Conservation significance of threatened habitats: Crown vetch can invade prairie and barrens habitats ranging from wet to dry (GNR-G2-G3, SU-S2-S3). It is especially problematic in sandy habitats where it can facilitate the invasion of other non-native species (9).	
V. Native Range and Habitat	1. List countries and native habitat types: Central and eastern Europe, from Austria to the Ukraine, into the Caucasus region of Asia (2).	
VI. Legal Classification	1. Listed by government entities? No.	
	2. Illegal to sell? YES ☐ NO ☒ Notes: While considered invasive in some states, it is not regulated (5).	

B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	1. Type of plant: Annual ☐ Biennial ☐ Monocarpic Perennial ☐ Herbaceous Perennial ☐ Vine ☒ Shrub ☐ Tree ☐
	2. Time to Maturity: 1-2 years
	3. Length of Seed Viability: >15 yrs (11)
	4. Methods of Reproduction: Asexual ☒ Sexual ☒ Notes: Produces large seed crops (20-120 seeds/head) that generally germinate in the fall and do not require cold stratification (4)(12)(13). It can spread through rhizome sprouts (4).
	5. Hybridization potential: None documented
II. Climate	1. Climate restrictions: Prefers at least 46 cm annual precipitation (4). It can tolerate up to 165 cm of precipitation and is drought-hardy, but it cannot withstand flooded or anaerobic conditions (4). Crown vetch prefers open sunny conditions but can grow in partial shade and survive temperatures as low as -33C (4).
	2. Effects of potential climate change: Potential habitat may increase if open communities become more widespread.
III. Dispersal Potential	1. Pathways - Please check all that apply: Unintentional: Bird ☐ Animal ☐ Vehicles/Human ☐ Wind ☐ Water ☐ Other: Unknown, though animals are suspected in long distance dispersal (14). Intentional: Ornamental ☒ Forage/Erosion control ☒ Medicine/Food: Other: Cover crop, green manure, mine reclamation (4).
	2. Distinguishing characteristics that aid in its survival and/or inhibit its control: Its sprawling growth habit makes it difficult to control in areas where other species are present (7). Able to expand rapidly via rhizomes that extend up to 10 feet (10). The seed bank can persist more than 15 years (11).
IV. Ability to go Undetected	1. HIGH ☒ MEDIUM ☒ LOW ☐
C. DAMAGE POTENTIAL	
I. Competitive Ability	1. Presence of Natural Enemies:
	2. Competition with native species: It can climb over and smother shrubs and small trees and outshade native herbaceous vegetation (4). Cool-season grasses, particularly switchgrass (*Panicum virgatum*) may compete well (4). Extant native vegetation can colonize small isolate patches after crown vetch has been reduced or eliminated (4). Crown vetch can be a serious management threat to natural areas due to rapid vegetative spreading by creeping roots (17).
	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: One plant may grow to completely cover 70-100ft^2 within 4 years (10)(14). Crown vetch has rhizomes that can grow up to 10 ft from a single plant within one year. One crown vetch plant can cover an area of 75-100 feet within 3-4 years (17).
II. Environmental Effects	1. Alteration of ecosystem/community composition? YES ☒ NO ☐ Notes: Reduces plant diversity (4).
	2. Alteration of ecosystem/community structure? YES ☒ NO ☐ Notes: It can cover and eventually eliminate some woody vegetation and can create dense, fairly impenetrable stands (4).
	3. Alteration of ecosystem/community functions and processes? YES ☒ NO ☐ Notes: Crown vetch can enhance soil fertility and increase fuel loads, changing nutrient conditions and fire behavior (4). Also, by outcompeting most native plants, it changes wildlife habitat by providing forage to deer and elk, cover to small mammals, and host plants to some lepidopteran insects (4). This species has a low basal density and shades out other vegetation. Rills form under the canopy during significant runoff. Sod forming vegetation is more beneficial for stabilization (8).
	4. Allelopathic properties? YES ☐ NO ☒ Notes:
D. SOCIO-ECONOMIC EFFECTS	
I. Positive aspects of the species to the economy/society:	Notes: Enriches soil through nitrogen-fization (companion plant for grasses) and provides high quality non-bloating forage for ruminatn livestock (4)(8). Commonly used for erosion control, but not very effective (8). Also used in mine reclamation (8). Provides some nectar for honeybees (6)(13). It has some medicinal uses and can also be used as an insecticide (12). It is commonly used for wildlife food plots. Deer feed on it and it provides cover for some ground nesting birds and small mammals. Crown vetch has frequently been used for hillside or slopes where mowing is difficult or impossible (17). Several seed producers in WI grow and sell crown vetch see, although demand has decreased since DOT discontinued use on state highways. A 2007 estimate was that the value of the seed crop in WI was $150,000 (8). 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 $403. It ranks 56th among the 63 taxa surveyed. The estimated wholesale value of plants in production is $1,000. The majority of respondents said it took <6 months or 1 to 2 years to produce this plant. The trend for the 2011 season was to remain unchanged or to phase out (18).

II. Potential Socio-Economic Effects of Requiring Controls:	Positive: Controlling crown vetch can enhance rare and threatened plant communities and species. Negative: Extensive plantings as roadside stabilization, and occassional plantings as livestock forage or ornamental ground cover, would need to be removed by both private landowners and public agencies.
III. Direct and indirect Socio-Economic Effects of Plant :	Notes: May be poisonous to horses if a large volume is consumed, otherwise it provides good livestock forage, despite the presence of the toxic glycoside coronillin (4)(6)(12). Does not prevent erosion when significant surface runoff occurs and inhibits grasses that do have soil-retaining root systems (8).
IV. Increased Costs to Sectors Caused by the Plant::	Notes: Crown vetch may negatively affect only sectors involved with open natural communities, such as conservation areas containing prairies, with potential impacts on birding opportunities.
V. Effects on human health:	Notes: Some medicinal uses (12).
VI. Potential socio-economic effects of restricting use:	Positive: Reduced threats to native plant communities and sectors dependent upon them (such as tourism). Negative: Loss of income for commercial seed producers and venders, possibly $150,000 in WI (8), as well as the costs associated with using alternative species (including native vetches, tick trefoils, lupines, and other legumes) for current soil stabilization and agriculture uses (8).
E. CONTROL AND PREVENTION	
I. Costs of Prevention (please be as specific as possible):	Notes: Removal of old extension publications recommending its use (15); education to change policies of agencies and companies that manage rights-of-ways (roads, utility corridors, etc.); outreach to beekeeping, horticulture, and landscaping industries, as well as agriculture extension services, to avoid recommending or using this species and suggest alternatives (15).
II. Responsiveness to prevention efforts:	Notes: Dispersal from current populations is likely to be limited in range, so preventing intentional introductions may reduce the continued spread of this species.
III. Effective Control tactics: (provide only basic info)	Mechanical ☒ Biological ☐ Chemical ☒ Times and uses: For small populations, mow (or burn) repeatedly over several years or carefully pull or dig entire plants then remove seedlings in following years (4)(8). For larger areas, first remove standing vegetation (cut, mow, or burn), then use herbicide (2, 4-D, clopyralid, glyphosate, or triclopyr) with followup treatments as needed, and lastly establishing dense plantings of native vegetation (4). Herbicide should be applied in spring before peak flowering (4). Eradication is rarely feasible (8). Large-scale control has only a moderate chance of success, but small, newly established populations can be controlled successfully (4). Control efforts will require several years of treatment followed by monitoring a minimum of 3-5 years (4).
IV. Costs of Control:	Notes: Herbicide application may range from $50 to $200 per acre, depending on method (8).
V. Cost of prevention or control vs. Cost of allowing invasion to	Notes: This decision is site-specific. Populations are scattered throughout Wisconsin, so eradication is not a feasible statewide

occur:	strategy. However, efforts to prevent intentional introductions near dunes, pastures, prairies, savannas, and woodland edges can be successful in limiting the spread of the species. Monitoring and outreach programs can successfully facilitate control of new populations and the phasing out of crown vetch in erosion control and similar seed mixes.
VI. Non-Target Effects of Control:	Notes: Successful control efforts can result in expansion of other non-native species, such as Kentucky bluegrass (*Poa pratensis*) (16). Herbicides can damage native species.
VII. Efficacy of monitoring:	Notes: Easy to detect when flowering (13). Monitoring at least once a year over several years can effectively detect and facilitate control efforts.
VIII. Legal and landowner issues:	Notes: Requiring control will probably meet strong opposition due to its long-term, widespread, and continued use by private citizens, green industry, the agriculture sector, and government agencies.
F. HYBRIDS AND CULTIVARS AND VARIETIES	
I. Known hybrids? YES ☐ NO ☐	Name of hybrid: Names of hybrid cultivars:
II. Species cultivars and varieties	Names of cultivars, varieties and any information about the invasive behaviors of each: There are three varieties of crown vetch available. They are: 'Emerald', 'Penngift', and 'Chemung'. 'Penngift' is generally considered the more desirable variety which is often pre-inoculated (17). Web catalogs imply that the varieties are invasive as well as the straight species.
	Notes:

G. REFERENCES USED:

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☒ WI DNR
☒ Bugwood (Element Stewardship Abstracts
☐ Native Plant Conservation Alliance
☐ IPANE
☒ USDA Plants

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