Ohio Invasive Plant Assessment Protocol

Botanical Name:	*Epilobium hirsutum*		
Common Name:	Hairy willow herb, codlins and cream	Step I Outcome:	**Continue**
Family Name:	Onagraceae	Step II Score:	**45**
Posted Date:	7/20/16	Step II Outcome:	**Invasive**
Initial assessment conducted by:	Katelyn Morgan		

Step I

Directions: Place an "X" in the Score column next to the selected answer to each of the four questions.

		Score	Notes	References
1. Is this plant known to occur in the state and listed as "noxious" on any federal or Ohio Department of Agriculture plant list?	Yes. *Place on invasive plant list, no further investigation needed.* ***STOP***			
	No. *Continue on to question 2.*	No		
2. Has this plant demonstrated widespread dispersion and establishment (i.e. high numbers of individuals forming dense stands) in natural areas across two or more regions in Ohio?[a]	Yes. *Place on invasive plant list, no further investigation needed.* ***STOP***			
	No. *Continue on to question 3.*	No	Regions 2,3 (at least in 1970)	4
3. Does this plant form self-replicating populations outside of cultivation in Ohio and is it documented to alter the composition, structure, or normal processes or functions of a natural ecosystem?	Yes			
	No	No		
	Unknown			
4. Is the plant listed as invasive in an adjoining state or a nearby state east of the Mississippi within the USDA Plant Hardiness zones 5-6?[b,c]	Yes			
	No	No		
	Unknown			

If the answer was yes for both questions 3 and 4, the plant is placed on the invasive plant list and no further research is needed. Stop here. If the answer is no for both questions 3 and 4, the plant is not considered invasive and no further investigation is warranted. Otherwise, proceed to Step II.

Step II: Invasion Status

Directions: Place the appropriate numerical score (or "U") in the Score column next to the selected answer to each of these 18 questions.

	Score	Notes	References
1. Current Invasion in Ohio			
- plant is not found in natural areas (**0 pts.**)			
- plant is found in natural areas but only because it persist from previous planting in that location (e.g. old home sites) (**0 pts.**)			
- plant is only expanding from sites of previous planting (**1 pt.**)	3		3
- plant occurs in natural areas away from site of planting (**3 pts.**)			
- Information unknown (**U**)			
2. State Distribution[a]			
- plant is not naturalized in any region of Ohio (**0 pts.**)			
- plant is naturalized in only one region in Ohio (**1 pt.**)			
- plant is naturalized in two regions in Ohio (**2 pts.**)			
- plant is naturalized in three regions in Ohio (**3 pts.**)	2	1,4,5: Regions 2 and 3. 4: Species was introduced into northwestern OH sometime before the 1930's along Lake Erie in a swamp near Conneaut in Ashtabula County.	1,4,5
- plant is naturalized in four regions in Ohio (**4 pts.**)			
- plant is naturalized in five regions in Ohio (**5 pts.**)			
- Information unknown (**U**)			
3. Regional/US Distribution			
- plant is not considered to be a problem in any other state (**0 pts.**)			

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	Score	Notes	References
- plant has been reported as a widespread problem in another non-neighboring state within the USDA Plant Hardiness Zones 5-6 (**1 pt.**) - plant has been reported to be a widespread problem in 1-2 adjoining states (**3 pts.**) - plant has been reported to be a widespread problem in 3 or more adjoining states (**5 pts.**) - plant has been reported to be a widespread problem in similar habitat outside the US (**1 pt.**) - Information unknown (**U**)	3	PA [not on lists in MI and iN although species is common around Great Lakes]	2
Step II: Biological Characters			
4. Vegetative Reproduction - no vegetative reproduction (**0 pts.**) - reproduces readily within the original site (**1 pt.**) - has runners or spreading rhizomes that root easily (**3 pts.**) - fragments easily and fragments can be easily dispersed (**4 pts.**) - has runners or spreading rhizomes that root easily AND fragments easily and fragments can be easily dispersed (**5 pts.**) - Information unknown (**U**)	3	3: "Hairy willow-herb reproduces by wind dispersed seeds as well as vegetatively by thick rhizomes". 4: "Reproduction is by flowers, short rootstalks or subterranean stolons and be seeds dispersed by wind." 7: Full description of vegetative propagation.	3,4,7,8
5. Sexual Reproduction - no sexual reproduction (**0 pts.**) - infrequent sexual reproduction (**1 pt.**) - frequent sexual reproduction, but high variation among years in seed production (**3 pts.**) - frequent sexual reproduction (one or more events per year) (**5 pts.**) - Information unknown (**U**)	5	"Hairy willow-herb reproduces by wind dispersed seeds as well as vegetatively by thick rhizomes"	3,4,6,8,9,10
6. Number of Viable Seeds or Propagules per Plant - few (0-10) (**1 pt.**) - moderate (11-1,000) (**3 pts.**) - prolific (>1,000) (**5 pts.**) - Information unknown (**U**)	5	7: Seeds have viability of several years, plants produce more than 300 capsules with 260 seeds per capsule.	7
7. Flowering Period - one month or less per year (**0 pts.**) - two months (**1 pt.**) - three to five months (**2 pts.**) - longer than five months (**3 pts.**) - Information unknown (**U**)	2	6: Late June to September (in OH); 3: July to August (in WA)	3,6
8. Dispersal Ability - low potential for long-distance seed/propagule dispersal (>1km) (**0 pts.**) - medium potential for long-distance seed/propagule dispersal (**3 pts.**) - high potential for long-distance seed/propagule dispersal (**5 pts.**)	5	Wind dispersal. 10: "The hairy seeds of Epilobium hirsutum are particularly adapted to wind	3,4,7,10

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Step II

	Score	Notes	References
- Information unknown (**U**)	5	particularly adapted to wind dispersal, ensuring the arrival of some in suitable wet habitats."	3,4,7,10
9. Generation Time - long juvenile period (>5 or more years for trees, 3 or more years for other growth forms) (**0 pts.**) - short juvenile period (<5 years for trees, <3 years for other forms) (**3 pts.**) - Information unknown (**U**)	3	10: "seedlings developed into small rhizomatous plants by the end of the first growing season, although they did not flower"	7,10
10. Establishment - unable to invade natural areas (**0 pts.**) - can only colonize certain habitat stages (e.g. early successional habitats) (**1 pt.**) - aggressively colonizes and establishes in edge habitats (**3 pts.**) - aggressively colonizes and establishes in intact and healthy natural areas (**6 pts.**) - Information unknown (**U**)	6	7: Is aggressive once established (in Britain, it can form large monospecific stands that outcompete other species, but may persist as scattered individuals in other areas). 8: can form "form highly competitive morphogenetic entities" with the right daylength. 10: "Epilobium hirsutum can germinate and grow in low temperatures and short days and in these circumstances by virtue of its growth form and pattern of vegetative reproduction it rapidly exploits available space."	4,7,8,10
Step II: Ecological Importance			
11. Impact on Ecosystem Processes - no known effect on ecosystem-level processes (**0 pts.**) - moderate effects on ecosystem-level processes (e.g., changes in nutrient cycling)(**3 pts.**) - causes long-term, substantial alterations in the ecosystem (e.g., changing fire regime of an area, changing hydrology of wetlands) (**6 pts.**)	0		3
12. Impact on Rare Organisms - no known negative impact on Ohio State-listed or federal-listed plants or animals (**0 pts.**) - negatively impacts listed species, such as through displacement or interbreeding (**3 pts.**)	0		3
13. Impact on Native Animals - no known negative impact on animals (**0 pts.**) - documented direct or indirect negative effects on animal taxa (**3 pts.**)	0		
14. Impact on Native Plants			

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	Score	Notes	References
- no known negative effects on native plants (**0 pts.**) - negatively impacts some native plants (increasing their mortality and/or recruitment of certain taxa) (**3 pts.**) - impacts native plants to such an extent that community structure is greatly altered (**6 pts.**)	3	Can form clumps that crowd out other plant species.	7
15. Hybridization - no known instances of hybridization with other plant species (**0 pts.**) - can hybridize with native Ohio plants or commercially-available species, but seeds are inviable (**1 pt.**) - can hybridize with native Ohio plants or commercially-available species, producing viable seed (**3 pts.**)	0		
16. Population Density - occurs only as small, sporadic populations or individuals (**1 pt.**) - typically forms small, monospecific patches (**3 pts.**) - is a dominant plant in area where population occurs (absolute cover 15-50%) (**4 pts.**) - forms an extensive, monospecific stand (absolute cover >50%) (**5 pts.**)	3	For WA and CO	3,5
17. Role in Succession in Natural Areas - successional information is unknown (**0 pts.**) - is an early successional species that temporarily invades a disturbed site but does not persist as the site matures (**0 pts.**) - readily invades disturbed sites and persists, but does not interfere with succession (**1 pt.**) - readily invades disturbed sites, persists and interferes with succession of native plants (**4 pts.**)	1	For WA and CO	3,5
18. Number of Habitats Invaded ***Forestlands:*** Floodplain forest, hemlock-hardwood forest, mixed mesophytic forest, beech-maple forest, oak-maple forest, oak-hickory forest. ***Grasslands:*** Alvar*, beach-dune community*, bur oak savanna*, slough-grass-bluejoint prairie*, sand barren*, big bluestem prairie, little bluestem prairie (xeric limestone prairie*+), post oak opening*+ ***Wetlands:*** Bog*, fen*, twigrush-wiregrass wet prairie*, marsh, buttonbush swamp, mixed shrub swamp, hemlock-hardwood swamp*, maple-ash-oak swamp, white pine-red maple swamp* * Considered a rare plant community in Ohio by ODW's Biodiversity Database Program. + = xeric limestone prairies or cedar glades and post oak openings are unique to the Interior Low Plateau Region of Adams, Highland and Pike counties, and are not included in Schneider and Cochrane (1997). - not found in any natural habitats in Ohio (**0 pts.**) - only found in 1 broad category (**1 pt.**) - found in 2 broad categories or 2 rare habitat types (**3 pts.**) - found in 3 broad categories or 3 rare habitat types (**4 pts.**)		3,5: Wet habitats (same locations as *Lythrum salicaria*). 4: wide variety of habitats in North America (river, creek and	

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- found in 4 or more rare habitat types (**5 pts.**)	1	North America (river, creek and stream banks, drainage ditches, canals, edges of ponds and lakes wet meadows and pastures, railroad tracks, marshes, swamp edges - especially where fires have burned. 6: wet ditches, shores and gravel bars in streams and marshes. 7: Usually confined to base-rich fens. 8:confined to "silted banks of rivers, dykes, marshes and fens"	3,4,5,6,7,8

Total Score: **45**

Number of Unknowns: **0**

Outcome: **Invasive**

Total Points	Assessment Decision
4 or more U	Insufficient Data
0-34	Not Known to be Invasive
35-44	Pending Further Review
45-80	Invasive