Ohio Invasive Plant Assessment Protocol

Botanical Name: *Ranunculus ficaria (syn. Ficaria grai*
Common Name: Lesser celandine, fig buttercup, figr
Family Name: Rananculaceae
Assessment conducted by: OIPC Team

Step I Outcome: **Invasive**
Step II Score: **47**
Step II Outcome: **Invasive**

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.*	x		
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***	x	Found in 3 regions of OH (but only in a handful of counties on USDA Map -> likely outdated)	1
	No. *Continue on to question 3.*			
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		yes, it forms self-replicating pops in OH but ecosystem effects are unknown.	
	Unknown	x		
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	x		
	No		Invasive in PA,WV,WI (listed as "Lesser Threat" in KY, but not counted here)	2, 3
	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.**) - plant occurs in natural areas away from site of planting (**3 pts.**) - Information unknown (**U**)	3		
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.**)	3	In regions 2,3,5 (R. Gardner also reports it in 4, but documentation is needed)	1

- plant is naturalized in four regions in Ohio (**4 pts.**) - plant is naturalized in five regions in Ohio (**5 pts.**) - Information unknown (**U**)			but documentation is needed)	
3. Regional/US Distribution - plant is not considered to be a problem in any other state (**0 pts.**) - 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	Invasive in PA and WV (on KY's third tier list as a "lesser threat" but not counted here); also invasive in WI (but not counted as it is not an adjoining state). 7=>"Lesser celandine has been reported to be invasive in 10 states (Connecticut, Delaware, Maryland, New Jersey, Oregon, Pennsylvania, Texas, Virginia, Wisconsin, West Virginia) and the District of Columbia and is currently banned in Connecticut and Massachusetts because of its noxious-weed status."	2,3
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**)		5	Reproduces through bubils; 4=>"Bulblets on above ground stems and underground tubers are the primary methods of propagation. And the spread of those bulblets and tubers can be accelerated by such factors as animal digging and downstream flooding."; 7=>species is composed of diploid and polyploid subspecies, only polyploids produce bulbils [produced in the leaf axils], "Plants from the subspecies R. ficaria subsp. bulbilifer reproduce almost exclusively through vegetative and clonal propagation, producing mostly nonviable seeds. The remaining subspecies all produce viable seed (Metcalfe 1939)." 10=>"Tubers are the most important means of reproduction and dispersion of this weed [in Iran]." 12=>"All the subspecies can spread by tubers. Subsp. bulbilifer and subsp. ficariiformis can spread by axillary bulbils. All except subsp. bulbilifer can spread by seed."	4,7,10,12

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**)	1	7=>species produces achenes of a given size (usually diploid subspecies) but no information is provided on how many achenes per plant or how frequently this occurs. Answer of 1 pt. is conservative. 8=>subsp. bulbifer produces	7,8,11,12
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**)	3	7=>emphasis is on bulbil production but only some mention of achene (size and germination). 8=>subsp. bulbifer produces seeds in Germany (mean of 0.43 seeds per plant per season, but	7,8,12
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	Flowering time March-May	4,11,12
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.**) - Information unknown (**U**)	3	Reproduces through bubils; 4=>"Bulblets on above ground stems and underground tubers are the primary methods of propagation. And the spread of those bulblets and tubers can be accelerated by such factors as animal digging and downstream flooding." 7=>bulbils spread by gravity, unearthed and carried by animals, water, and also possibly by mowing. 7=>"...2006 in Wake County, NC, where the banks of a local stream were found infested with lesser celandine, and inspection , 1 km upstream revealed a large source population in a shaded lawn." 8=>seeds are dispersed by ants in Germany. 11-> in Europe, "mowing...increases the dispersal of bulbils and promotes the establishment of new plants in meadows compared to forests."	4,7,8,11
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	7=>"Lesser celandine's life cycle is short, with less than 30% of seedlings surviving past 400 d (Verheyen and Hermy 2004)."	7

Ste

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.**)	6	4=>"When in bloom, colonies of plants are easily spotted, dense and vigorous. Mats of foliage exclude most other vegetation. After flowering, the plant foliage dies back by early summer as the plants go dormant."; 5=> "form a dense monoculture, which native species seemingly cannot penetrate."	4
- Information unknown (**U**)			

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.**)	0	no evidence (not yet examined)	
- causes long-term, substantial alterations in the ecosystem (e.g., changing fire regime of an area, changing hydrology of wetlands) (**6 pts.**)			

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		

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	7=>"As this species occupies more of the forest floor, dense carpet-like colonies likely prevent established native species from completing their life cycle. In turn, resident wildlife populations dependent on native species for food and shelter may be negatively impacted (Swearingen 2005), although this effect has not been experimentally tested." [no points assigned to this question as this still seems anecdotal - more information needed.]; 7=>"Protoanemonin present in the fresh leaves is toxic to most mammals. It can cause sickness in livestock but rarely causes death (Taylor and Markham 1978)."	7

14. Impact on Native Plants

- 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.**)		4=>"Mats of foliage exclude most other vegetation." "In wild areas, plants may spread over time to form large colonies sometimes covering several acres of land, and in the process compete with and displace less vigorous native spring ephemerals. "; 5=>"Once established, it spreads rapidly across the forest floor to form a dense monoculture, which native species seemingly cannot penetrate." and reduces life-span and seed production of Impatiens capensis. 5=>lesser celandine is presumably allelopathic; 6=>species is allelopathic.	4,5,6
- impacts native plants to such an extent that community structure is greatly altered (**6 pts.**)	6		
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.**)	0	7=>"Marketing by the nursery industry of a wide variety of lesser celandine hybrids has likely contributed to the increase in prevalence and spread." [The issue of hybridization warrants further study but a conservative score of 0 pts has been entered here.]	7
- can hybridize with native Ohio plants or commercially-available species, producing viable seed (**3 pts.**)			
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.**)	5	4=>"When in bloom, colonies of plants are easily spotted, dense and vigorous. Mats of foliage exclude most other vegetation. After flowering, the plant foliage dies back by early summer as the plants go dormant." "In wild areas, plants may spread over time to form large colonies sometimes covering several acres of land, and in the process compete with and displace less vigorous native spring ephemerals. "; 5=> "Once established, it spreads rapidly across the forest floor to form a dense monoculture."	4,5
- forms an extensive, monospecific stand (absolute cover >50%) (**5 pts.**)			
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.**)	1	no evidence (little studied)	
- readily invades disturbed sites, persists and interferes with succession of native plants (**4 pts.**)			

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

Wetlands: Bog*, fen*, twigrush-wiregrass wet prairie*, marsh, buttonbush swamp, mixed shrub swamp, hemlock-hardwood swamp*, maple-ash-oak 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.**)
- found in 4 or more rare habitat types (**5 pts.**)

3	forests and riparian areas; 7=moist woodland habitats and "In its introduced range it should be expected primarily in disturbed or undisturbed, moist, deciduous forests and as a weed in lawns and horticultural plantings. Lesser celandine is also expected to occur in urban areas including drainage areas and ditch banks." 11=> in Germany "R. ficaria can be found in damp meadows, woods or hedge banks"	4,7,11

Total Score: **47**

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