

Ohio Invasive Plant Assessment Protocol

Botanical Name: *Frangula alnus*
 Common Name: Glossy Buckthorn, Rhamnus frangu
 Family Name: Rhamnaceae
 Assessment conducted by: OIPC Team

Step I Outcome: **Invasive**
 Step II Score: **61**
 Step II Outcome: **Invasive**

Score

Notes

References

Step I

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

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.

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.

Regions 1,2,3,4, but details about size of the populations are lacking.

1,2

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
 Unknown

Species observed outside of cultivation. Species is a fast growing plant that will form dense stands which crowd out native species, inhibits tree regeneration, and can alter ecosystem processes.

1,2,3,4,8

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
 Unknown

IN, PA, MI

5,6,7

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.

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

4

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.)
- plant is naturalized in four regions in Ohio (4 pts.)
- plant is naturalized in five regions in Ohio (5 pts.)
- Information unknown (U)

5

1,2=> regions 1,3,4. A. Mastalerz (in prep) has observed it in region 5 in Burnet Woods, Cincinnati, OH.

1,2

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)

5

IN, PA, MI

5,6,7

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)

0

3=> stump resprouts, but no vegetational reproduction

3

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

9=> Prolific seed production. 16=> "Glossy buckthorn adults and seedlings and winterberry seedlings were more widely distributed across seven community types than adults and seedlings of the other

9,16

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

Sources all state that seed set for this plant is "prolific" but only 9 gives estimate of 430-1560 offspring/yr. 9=>also states that seed production is variable due to climate conditions - dry summers reduce vigor. 11=> reproduction is highest in younger individual >2 yrs old. 15=> cultivars such as 'Fine Line' have lower fruit production than wild-type but may still be high enough to be of concern.

3,4,7,8,9,11,15

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

4 months

4,7,9

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)

5

dispersed by birds

3,4,9

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

9

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

11=> "was 96 times more abundant in disturbed areas (gaps) than in undisturbed forest." 17=> "physiological stress associated with wet soils may restrict establishment of R. frangula, explaining in part its patchy invasion patterns in Allegheny High Plateau riparian savannas."

3,4,7,8,9,11,17

Step II: Ecological Importance

11. Impact on Ecosystem Processes

- no known effect on ecosystem-level processes (0 pts.)

3=> "Where glossy buckthorn becomes established, it can form a dense homogenous monoculture, outcompete native shrubs, and alter other ecosystem processes"; further, sp inhibits tree regeneration. 8=> "buckthorn aggressively invades North American forests where it often forms dense thickets in the understory, reducing native herbaceous abundance and inhibiting tree regeneration"

- 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.)

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.)

13. Impact on Native Animals

- no known negative impact on animals (0 pts.)

- documented direct or indirect negative effects on animal taxa (3 pts.)

14. Impact on Native Plants

- no known negative effects on native plants (0 pts.)

6

...maintain and minimize tree regeneration (Taft and Solecki 1990; Sinclair and Catling 1999; Frappier et al. 2003a, 2004; Fagan and Peart 2004)." 13=> In prairie fens in MI, "F. alnus-invaded areas had significantly greater percent soil organic matter, fewer vegetative hummocks/m2, and lower mean coefficient of plant conservatism. We propose that F. alnus may be facilitating its own invasion of fen habitats and that resulting hummock degradation may pose a long-lasting detriment to fen biodiversity." and other effects include: "lower soil pH, fewer vegetative hummocks, less light availability, lower plant coefficient of conservatism, less total plant cover, and lower graminoid relative abundance in invaded versus uninvaded areas." 13=> may also alter nitrogen cycling. 14=> in a prairie fen following removal of buckthorn, "a diverse community of mobile generalist pollinators rapidly re-colonizes restored areas of prairie fen, while the plant community may take longer to fully recover."

3,4,7,8,13,14

3

, Ohio Natural Heritage

0

3=> proposes that by reducing the diversity of shrubs in the area, migrating birds will be adversely affected because different shrubs provide food at different times through out the summer.

3

Buckthorn can outcompete and crowd out native plant species. inhibit tree

- 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.)

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.)

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.)

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.)

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

* 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,

- not found in any natural habitats in Ohio (0 pts.)

- only found in 1 broad category (1 pt.)

6

regeneration. 12=> "Buckthorn reduced the growth and survival of saplings of all species, and altered the relative abundance of seedlings in favor of shade-tolerant species."

3,4,7,8,12

0

No evidence

4

11=> in NH, stem density varied from 722 (in large gaps) to 4,380 stems/ha, "was 96 times more abundant in disturbed areas (gaps) than in undisturbed forest." 16=> in WI, mean adult cover was 25.7%.

3,4,7,8,9,11,16

1

Buckthorn outcompetes and crowds out native vegetation, forms dense monotypic stands, but there is evidence (8) that suggests species will be unable to compete in late successional forests - so as forests move to low-light and low-nutrient habitats, buckthorn will eventually lose out.

3,4,7,8

3=> forests, swamps. 4=> Glossy buckthorn typically invades wetlands including swamps, bogs, fens and wet meadows but also occurs in upland

- 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.)

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

4

habitats such as woodland edges, old fields and roadsides. 7=> found in pastures, fence rows, roadsides, wetlands, and woodland edges. 9=>wetlands, forest, old pastures. 10=> in the Oak Openings in Ohio. 13=> in a prairie fen in MI. 17=> invades both wetland and upland sites.

3,4,7,10,13,27

Total Score:

61

Number of Unknowns:

0

Outcome:

Invasive