OAK OPENINGS REGION BEST MANAGEMENT PRACTICES

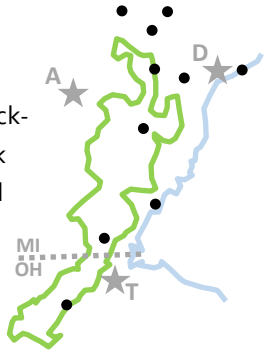
GLOSSY BUCKTHORN

Frangula alnus

CONTROL

This Best Management Practice (BMP) document provides guidance for managing Glossy Buckthorn in the Oak Openings Region of Northwest Ohio and Southeast Michigan. This BMP was developed by the Green Ribbon Initiative and its partners and uses available research and local experience to recommend environmentally safe control practices.

INTRODUCTION AND IMPACTS— Glossy Buckthorn (*Frangula alnus*) is native to Eurasia and Northern Africa and was first brought to North America in the 1800s as an ornamental. It has been used regularly for fencerows and wildlife habitat. Although its commercial sale is now banned in many places, Glossy Buckthorn (or "G. Buckthorn") is already widely distributed in North America and is found throughout OH and MI.



The Midwest Invasive Species Information Network (MISIN) has over 280 reports of Glossy Buckthorn (black dots) in or within 5 miles of the Oak Openings Region (OOR, green line). Dr. Richard Becker at the University of Toledo used remote sensing to map G. Buckthorn in the OOR. His study documents its presence in many of the region's natural areas. G. Buckthorn has demonstrated the ability to establish and spread in both healthy and disturbed habitats of the OOR (see habitat section).

Glossy Buckthorn has many characteristics that contribute to its classification as an invasive, pest species. It produces abundant fruit and spreads rapidly; it limits the light and nutrients available to native species. G. Buckthorn may also suppress native growth through allelopathy (the release of germination or growth inhibiting compounds into the soil).

Through its inhibition of native plants, Glossy Buckthorn severely degrades the quality of the habitats in which it becomes established. G. Buckthorn also alters soil pH, lowers the water table, and increases decomposition rates. Birds nesting in G. Buckthorn experience higher predation rates than those nesting in native shrubs. Additionally, G. Buckthorn hosts several agricultural pathogens.

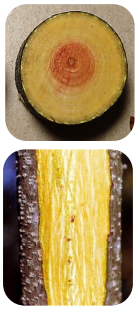
SIMILAR SPECIES—Glossy Buckthorn is similar in appearance and habit to Common Buckthorn (*Rhamnus cathartica*), another invasive species in the OOR. Common Buckthorn has toothed leaf margins and greenish, four-petaled flowers. It has terminal thorns and has 3-5 paired leaf veins, rather than 8-9. Common Buckthorn can be treated with the same control methods outlined here.

G. Buckthorn also resembles Alder-leaved Buckthorn (*Rhamnus alnifolia,* a native). This buckthorn **does not exceed 3' tall**, has leaves with rounded teeth, 6-7 pairs of veins, and has petal-less flowers with 5 sepals. The leaves of *R. alnifolia* are also alternate; in contrast, G. Buckthorn is sub-opposite (or somewhat paired) nearing the branch tips, and leaf margins are usually entire (no teeth).

In the OOR, native dogwoods (*Cornus* spp.), plums/cherries (*Prunus* spp.), serviceberries (*Amelanchier* spp.) and nannyberry (*Viburnum lentago*) may be mistaken for G. Buckthorn. None of these species have G. Buckthorn's characteristic yellow sapwood.

HABITAT—Glossy Buckthorn prefers moist to wet soils and aggressively invades wetland habitats like bogs, fens, sedge meadows, streambanks and lake edges. However, G. Buckthorn cannot survive permanent inundation. It prefers sunny sites but tolerates some shading. G. Buckthorn can be found in alkaline to acidic soils and can survive in upland environments, including forest understories. In the OOR, CBT has been found on sand dunes, upland and swamp forests, within and/or at the edges of floodplains and streams, near vernal pools and ponds, and along roads and ditches.

IDENTIFICATION—Habit: Deciduous multi-stemmed shrub, becoming a single-trunked tree with age. Grows up to 25' tall, with a spreading, loosely-branched crown. Can be up to 10" in diameter.



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Leaves: Simple, with smooth margins. Ovate , slightly wavy, and 1-4.5" long by 1-2.5" wide. Veins are prominent, paired (8-9 pairs), and parallel. Alternate arrangement, but somewhat paired or sub-opposite nearing the branch tips. Hairless. Dark green and glossy. Leaves turn yellow in fall.

Stems: Bark is brown and shiny with prominent lenticels. Turns gray with age. Thornless. Yellow sapwood and pink-orange heartwood. Acrid smell when broken.

Flowers: Small (diameter < 6 mm) and star-shaped, with five petals. Greenish-white and clustered in the leaf axils. Perfect flowers.

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Fruits: Pea-sized and round. Ripen from green to red to dark purple. Contain emodin, which has a laxative effect. 2-4 seeds per fruit.

Seeds: Light brown; 4-5 mm long. Grooved on one side; beaked.

Roots: Shallow and fibrous. Extent varies with site characteristics.

Glossy Buckthorn Timeline	J	F	M	A	M	J	J	A	S	O	N	D
Life History	Dormant		Germination/ Leaf Out		Flowering		Fruiting			Leaves Yellow	Dormant, Fruit Persists	
Cut and Spray	Cut					Spray before leaves change color				Cut		
Foliar Spray				Spray before leaves change color								
Stump Cut/Basal Bark/Drill+Fill/ Injection/Girdle	Treat				Treat							
Prescribed Fire				Burn								

REPRODUCTION AND DISPERSAL—Reproduction of Glossy Buckthorn is entirely by seed, though it can resprout from roots and stumps. G. Buckthorn cannot self-fertilize, but matures quickly—plants can produce fruit before they even reach 3' tall. Top-killed plants can produce fruit on resprouts within the same season. Fruit is dispersed short distances by gravity and long distances by birds, deer, and small mammals. On average, seeds can remain viable for 6 years. ***Thoroughly cleaning equipment is a critical prevention measure for G. Buckthorn in the OOR. Land managers should consider incorporating pre- and post-project cleaning into contracts.***

REPORTING—Glossy Buckthorn is identified as a Control species in the OOR. Reporting G. Buckthorn is essential for its control. G. Buckthorn is easiest to identify in the spring or fall when leaves of native vegetation are absent. Report G. Buckthorn at www.misin.msu.edu and to the county or local CWMA or CISMA.

CONTROL—The best control is integrated control. Management plans should focus on prevention of fruiting followed by chemical damage to the roots where conditions permit the use of herbicides. Annual follow-up is essential in the treatment of G. Buckthorn, and monitoring should include at least 20' surrounding the original patch.

Chemical: The following recommendations have been compiled from groups working in MI, OH, NY, and MN. It is responsibility of the applicator to ensure compliance with herbicide labels and regulations when planning chemical treatment. Follow-up treatments should take place six weeks after cutting or initial application.

Foliar Spraying—Best for large, dense populations of CBT that is short in height or as follow-up after cutting. Herbicides should be used with 0.5-1% of an appropriate non-ionic surfactant (e.g. Cygnet Plus®, LI-700, etc.) or oil-based adjuvant (e.g. SprayTech® Oil).

Stump Cut—Cut stem 2" above ground and immediately apply herbicide to the cross-section of the stump. Specify the treated area onto the cambium when brushcutting/chainsawing larger stems.

Drill and Fill—On larger G. Buckthorn, drill holes into the tree at a downward angle and fill them with a measured amount of concentrated herbicide. One hole for each inch of diameter.

Stem Injection—Inject liquid herbicide or pellets at 3-4" intervals around the stem at any height. Best for large stems, remote sites, small patches, sensitive areas, or places where spraying is prohibited.

Herbicide	Trade Names	Concentration
Glyphosate	Aquamaster®, Rodeo®, Aqua Neat®, Roundup®, Razor®, Accord®, Glypro®	Spray—2-8% Stump—25-50%
Triclopyr	Garlon 3A® or 4 Ultra®, Pathfinder®, Renovate®, Vastlan®, Ortho Brush-B-Gon®, Ferti-Lome®, Element 4®	Foliar—2-3% Basal—22-30% Injection—27% Stump—31-44%
Triclopyr + Imazapyr	Imazapyr: Arsenal®, Stalker®	Stump—15-18% Tric. + 3% Imaz.

Girdling—For mature trees only. Cut through the bark all the way around the trunk about 6" above the ground. Spray or wipe herbicide into the opening (use stump-cut concentration).

Basal Bark— Apply triclopyr with a penetrating oil (e.g. AX-IT®) to a band of bark around the stem extending 18" up from the ground. Most effective on younger stems with thin bark, 1/4-6" in diameter. Do not use when snow or water prevent application at ground level.

Mechanical: Hand pulling can be applied to G. Buckthorn seedlings only. Cutting or mowing G. Buckthorn is only effective when followed with herbicide, as G. Buckthorn resprouts vigorously. In all mechanical removal scenarios, ensure you clean your equipment and dispose of all plant material appropriately (see Disposal below).

Biological: No biological control agents have been approved for use on G. Buckthorn. However, research is ongoing. Low-intensity cattle grazing may be able to keep G. Buckthorn maintained.

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Prescribed Fire: Burning stimulates resprouting in mature plants and encourages germination of G. Buckthorn seeds, but will kill seedlings and help exhaust the seed bank. Fire should be used in conjunction with other control methods. Best in early spring. May require annual burning for 5-6 years.

Flooding: In places where flooding is possible, raising the water level during the growing season can kill G. Buckthorn.

DISPOSAL

- If no fruit is present: cut brush can be left in place. Pulled seedlings can be left on site if roots are not in contact with the soil. G. Buckthorn wood is fairly resistant to degradation, so it may take a long time to decompose if not burned.
- If fruit is present: fruit should be incinerated, or sealed in plastic bags and disposed of in a landfill.
- Due to G. Buckthorn's extensive seedbank, do not remove soil from the site unless it is being disposed of in a landfill.

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