

MN NWAC Risk Assessment Worksheet (04-2011)	Common Name	Latin Name
	Glossy Buckthorn (and Cultivars)	<i>Frangula alnus</i> Mill. Also known as <i>Rhamnus frangula</i>
Original Reviewer : Anthony Cortilet	Affiliation/Organization	Original Review: 06/03/2013
Current Reviewer: Anthony Cortilet 	MN Dept. of Agriculture	Current Review Date 07/08/2016

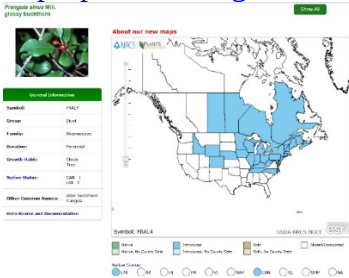
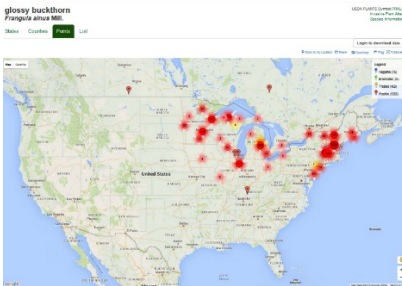
Species Description: <http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist/glossybuckthorn.aspx>

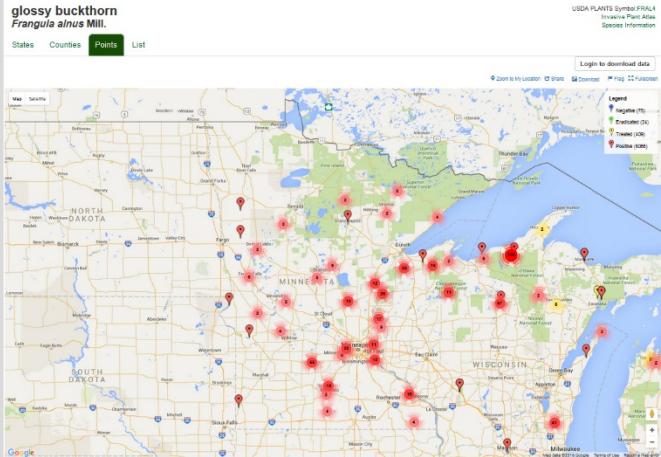
- Tall understory shrub or small tree with a spreading/branched crown. Multiple stems at the base when young; eventually develops into a singular trunk/stem as it matures.
- Main stem can be up to 10 inches in diameter with brown bark and has elongate silvery corky projections. Cut stems have orange heartwood (center/non-living) and yellow sapwood (outer/living part of stem).
- Branches contain buds and leaves that alternate along the stem. Twigs do not produce terminal thorns like common buckthorn.
- Leaves are oval, smooth, glossy, toothless, and have 8-9 veins that radiate outward from a central mid-vein. Leaves stay green late into the fall after most other trees have shed their leaf canopy, making glossy buckthorn easy to identify at this time of the year.
- Small, greenish-white, five-petaled flowers are produced in clusters near the base of the leaf stalks along the branches. Flowers consist of both male and female parts.
- Round berries are produced following fertilization and ripen in August and September. Berries contain 3 - 4 seeds, transition from green to red early in development and then red to dark purple when ripened. Berry clusters are typically a mixture of ripened and unripened fruits and are highly attractive to birds, facilitating quick spread into new areas.
- [Common buckthorn](#) looks similar except branches terminate in sharp thorns (1/4 inch), leaves are mostly opposite, egg-shaped, finely-toothed, and pointed, with 3-5 distinctive curved veins that extend from the leaf stalk to the tip. Plants are either male or female and berries tend to ripen to a dark black color, usually maturing at the same time. [Minnesota Department of Natural Resources Buckthorn Species Comparison and Identification.](#)

Risk Assessment Current Summary (2016): Glossy buckthorn is an extremely challenging plant to control successfully in Minnesota and creates many challenges for successful enforcement under the Noxious Weed Law as a Prohibited Noxious Weed. Small stands of buckthorn can be effectively controlled using multiple techniques. However, large existing stands are require a lot of time and financial resources to even attempt to control. Success is variable.

Although control and eradication is difficult at this stage of the glossy buckthorn infestation statewide, this species is considered by multiple organizations, government agencies and citizens within the state too important of a threat not to list as a noxious weed in Minnesota.

Listing as a statewide Restricted Noxious Weed will prevent sale, propagation and negligent transport of this species, but will also allow regions of the state where buckthorn is not widespread, to focus on its control and eradication. Local units of government can pass resolutions or ordinances to make the statewide Restricted category Prohibited in their jurisdictions. The Minnesota Noxious Weed Advisory Committee and The Minnesota Department of Agriculture encourage all private and public landowners to control glossey buckthorn on their properties in order to lessen the environmental degradation caused by this species.

Box	Question	Answer	Outcome
1	Is the plant species or genotype non-native?	Yes. Glossy buckthorn is found throughout much of Europe, parts of western Asia (Middle East), and North Africa ^{1, 2, 6, 13, 14, 16, 24, 28, 29} .	Box 3
3	Is the plant species, or a related species, documented as being a problem elsewhere?	Glossy buckthorn is shown to be present in 23 states and five Canadian provinces. It is reported to be regulated in at least six US states (including MN) and is also on many other state invasive species lists. It is considered invasive in all 23 US states that it has been reported in^{1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 23, 24, 27, 28, 29}. Map from USDA Plants: http://plants.usda.gov/core/profile?symbol=FRAL4  Map from EDDMapS: https://www.eddmaps.org/distribution/viewmap.cfm?sub=3070 	Box 6
6	Does the plant species have the capacity to establish and survive in Minnesota?	Yes, Glossy buckthorn is well established in Minnesota.	

Box	Question	Answer	Outcome
	A. Is the plant, or a close relative, currently established in Minnesota?	Yes. Documented in 50 Minnesota counties. In contrast to European buckthorn, glossy buckthorn primarily invades smaller woodland habitats but is more commonly found in wetland habitats including wet prairies, marshes, fens, sedge meadows, sphagnum bogs, and tamarack swamps^{3, 11, 12, 13, 16, 18}. Map from EDDMapS: https://www.eddmaps.org/distribution/viewmap.cfm?sub=5649 	Box 7
7	Does the plant species have the potential to reproduce and spread in Minnesota?	Yes. It has been documented to be reproducing successfully and spreading in MN for several decades.	
	A. Does the plant reproduce by asexual/vegetative means?	No, glossy buckthorn reproduces by seed ^{2, 4, 5, 15, 18, 19, 24, 27, 28, 29} .	Box 7C
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes, glossy buckthorn produces many seeds protected by fruits attractive to birds. Seeds can also remain dormant in the seedbank for many years ^{2, 4, 5, 15, 18, 19, 24, 27, 28, 29} .	Box 7F

Box	Question	Answer	Outcome
	E. Is this species self-fertile?	<i>Glossy buckthorn has perfect flowers (both male and female parts), but flowers are self-incompatible</i> ¹⁰ .	<i>This text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i>
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes – Birds are known to be a huge distribution vector for glossy buckthorn spread. Water, snow, small mammals and human activity are also recorded to be responsible for spread ^{2, 4, 5, 6, 7, 8, 15, 18, 19, 24, 27, 28, 29} .	Box 7I
	I. Do natural controls exist, species native to Minnesota, that are documented to effectively prevent the spread of the plant in question?	There are no known natural controls listed in the literature for glossy buckthorn in the United States or Canada. Researchers from CABI – Switzerland, the University of Minnesota, and the Minnesota Department of Natural Resources worked together to study the potential to find a biological control insect for glossy and common buckthorn. There were no insects found that were host-specific to <i>Frangula alnus</i> and caused enough damage to the plant to reduce <i>Frangula alnus</i> populations. The research project was ended ^{3, 14, 34, 35} .	Box 8
8	Does the plant species pose significant human or livestock concerns or has the potential to significantly harm agricultural production, native ecosystems, or managed landscapes?	Yes – glossy buckthorn is thought to be a serious threat to native ecosystems and managed landscapes. It has also been linked to agriculture as an overwintering host to the soybean aphid and as an alternate host for alfalfa mosaic virus and crown rust (<i>Puccinia coronata</i> Corda var. <i>avenae</i>), which causes oat rust disease ^{20, 25, 33} .	
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	A recent research study showed the high presence of the chemical emodin – contained in the leaves and berries of buckthorn – increased embryo mortality in western chorus frog populations ^{26, 32} . However, the overall literature does not support the idea that glossy buckthorn is toxic and poses a significant direct risk to livestock, wildlife and people. It does pose a serious threat to native ecosystems and could have a significant impact on the future of native forest habitats ^{4, 5, 7, 8, 9, 10, 11, 12, 15, 17, 18, 19, 27, 28, 29} .	8B

Box	Question	Answer	Outcome
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?	Many research studies have described and analyzed the detrimental impact that glossy buckthorn causes in forested habitats, but financial losses have not been well documented at this time^{4, 5, 7, 8, 9, 10, 11, 12, 15, 17, 18, 19, 27, 28, 29}. Has been documented to be an alternate host of soybean aphid in the upper Midwest which has significantly increased production costs for soybean producers^{20, 21, 22, 33}. The native alder-leaved buckthorn, <i>Rhamnus alnifolia</i>, has also been shown to serve as an overwintering host for soybean aphid, however its range in Minnesota is not as similar to the soybean growing region of the state^{3, 20, 21, 22, 30, 33}. Glossy buckthorn is a possible alternate host for alfalfa mosaic virus and oat crown rust (<i>Puccinia coronata</i> f. sp. <i>avenae</i>) in the U.S. and Minnesota. The latter is one of the most widespread and damaging diseases of oat in the country and can reduce grain yields by 10 to 40%^{2, 25}.	Box 9
	C. Can the plant aggressively displace native species through competition (including allelopathic effects)?	<i>Yes – Glossy buckthorn infestations are well documented in the research literature to greatly reduce forest biodiversity. Buckthorn infestations have been shown to significantly alter native forest soils, altering natural succession, and creating a more suitable environment for increased buckthorn production and spread</i>^{1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 23, 24, 27, 28, 29}. <i>Buckthorn leaves are full of a toxin called emodin that discourages herbivory, increases seed transport through the digestive system, and plays a role in preventing the successful establishment of other plants in the immediate area. Research is being conducted on impacts emodin has on the environment after falling from the tree. Studies have shown emodin can impair certain amphibians such as frogs to successfully produce offspring</i>^{5, 7, 8, 26, 32}. <i>Some studies have shown that buckthorn exudates from the fruits creates allelopathy toward seed germination in certain species</i>^{7, 26, 21}.	<i>This text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i>

Box	Question	Answer	Outcome
	D. Can the plant hybridize with native species resulting in a modified gene pool and potentially negative impacts on native populations?		
	E. Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?		
	F. Does the plant have the potential to introduce or harbor another pest or serve as an alternate host?	<i>Has been documented to be an alternate host of soybean aphid in the upper Midwest which has significantly increased production costs for soybean producers^{20, 21, 22, 33}. The native alder-leaved buckthorn, <i>Rhamnus alnifolia</i>, has also been shown to serve as an overwintering host for soybean aphid, however its range in Minnesota is not as similar to the soybean growing region of the state^{3, 20, 21, 22, 30, 33}.</i> <i>Glossy buckthorn is a possible alternate host for alfalfa mosaic virus and oat crown rust (<i>Puccinia coronata</i> f. sp. <i>avenae</i>) in the U.S. and Minnesota. The latter is one of the most widespread and damaging diseases of oat in the country and can reduce grain yields by 10 to 40%^{2, 25}.</i>	<i>This text is provided as additional information not directed through the decision tree process for this particular risk assessment.</i>
9	Does the plant species have clearly defined benefits that outweigh associated negative impacts?	None that would outweigh the negatives. Buckthorns were thought to be beneficial as wildlife cover, windbreaks and as food in transition areas between wetlands, forests and grasslands and the berries are sought after by small mammals and birds in the early to mid-20 th century.	
	A. Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?	No – was sold in Minnesota until becoming a Restricted Noxious Species in 1999 ^{MDA Data} .	Box 10

Box	Question	Answer	Outcome
10	Should the plant species be enforced as a noxious weed to prevent introduction &/or dispersal; designate as prohibited or restricted?	Yes.	
	A. Is the plant currently established in Minnesota?	Yes – see Box 6	10B
	B. Does the plant pose a serious human health threat?	No – Glossy buckthorn does not pose a serious threat to humans.	10C
	C. Can the plant be reliably eradicated (entire plant) or controlled (top growth only to prevent pollen dispersal and seed production as appropriate) on a statewide basis using existing practices and available resources?	No – Glossy buckthorn is hard to control for multiple reasons. It is a forest species which makes traditional large-scale herbicide application unfeasible on large stands. Seed banks continue to produce buckthorn seedlings following treatments requiring long-term management that requires a large commitment of time and financial resources by landowners. Recruitment of seeds from neighboring sources through birds and mammals is problematic in areas being reclaimed or restored of buckthorns. Birds serve as a long distance vector of spread ^{1, 2, 3, 4, 5, 6, 7, 9, 11, 12, 13, 15, 16, 17, 18, 19, 23, 24, 27, 28, 29} .	List as a Restricted Noxious Weed.
Final Results of Risk Assessment			
	Review Entity	Comments	Outcome
	NWAC Listing Subcommittee	First review – 06/20/2013, Final Review 08/12/2013	Keep as a Restricted NW
	NWAC Full-group	Reviewed – 12/18/13	Vote 13 – 0 to remain as a Restricted Noxious Weed
	MDA Commissioner	Reviewed – 2/24/2014 - Approved NWAC Recommendation	RESTRICTED NOXIOUS WEED

Box	Question	Answer	Outcome
	NWAC Listing Subcommittee re-review 2016	Glossy buckthorn is too widespread in Minnesota to allow successful enforcement under the Noxious Weed Law as a Prohibited Noxious Weed. Small stands of buckthorn can be effectively controlled using multiple techniques. However, large existing stands require a lot of time and financial resources to even attempt to control. Success is variable. Although control and eradication is difficult at this stage of the glossy buckthorn infestation statewide, this species is considered by multiple organizations, government agencies and citizens within the state too important of a threat not to list as a noxious weed in Minnesota. Listing as a statewide Restricted Noxious Weed will prevent sale, propagation and negligent transport of this species, but will also allow regions of the state where buckthorn is not widespread, to focus on its control and eradication. Local units of government can pass resolutions or ordinances to make the statewide Restricted category Prohibited in their jurisdictions.	Restricted Noxious Weed
	NWAC Full Group 2016	NWAC voted 14 – 0 to accept the listing subcommittee recommendation.	Restricted Noxious Weed
	MDA Commissioner 2016	Accepted NWAC's recommendation (02/06/2017).	Restricted Noxious Weed.
	FILE # MDARA00024GLSBU_2_24_2014	Restricted Noxious Weed	

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