



## INVASIVE PLANT MANAGEMENT PLAN AND EQUIPMENT LIST FOR LANDOWNERS

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**Note:** The findings and conclusions in this document are those of the author and do not necessarily represent the views of the Alpena-Montmorency Conservation District or other agencies or organizations.

### INTRODUCTION

This document details a list of necessary equipment and briefly describes the process of invasive species management in order to develop an invasive plant management program on private lands. It focuses on managing for glossy buckthorn (*Frangula alnus*), an invasive, woody shrub. Glossy buckthorn can be found on a range of sites in Michigan, including farm fields, forest edges, and wetland edges. Glossy buckthorn is more common in mesic and hydric conditions than in xeric conditions.

A species native to Eurasia, glossy buckthorn was introduced to North America in the late nineteenth century (Voss 1985). Glossy buckthorn leaves are 0.5 – 2.8 inches long, alternate, simple, ovate and deeply veined (Figures 1 and 2, below). The tops of the leaves are light to dark green, with a slight gloss and a lighter green below; identification of FRAL is easiest in the fall because it retains foliage longer than native plant species (Heidorn 1990). Flowering occurs from May to June. Fruit forms in drupes in July and last through September (Barnes 1981). Initially, the berries are yellow-green, but ripen to red, then to black. The bark of glossy buckthorn ranges from reddish-green in younger plants to a darker grey-green in more mature plants. When cut, glossy buckthorn can be differentiated from other shrubs by its distinctive yellow sapwood. The entire shrub may grow up to 22 feet, with many stems branching from the base. In older shrubs, base stems can be as large as 10 inches in diameter (Heidorn 1990). Glossy buckthorn's rapid growth and ability to grow densely were characteristics originally thought to be ideal for use as hedgerows and for other landscaping purposes.

Figures 1 and 2 (from the internet): Glossy buckthorn leaves with fruit in August or September and a mature plant with large crown due to growing in sunny site.





- *Passive Treatment:* Glossy buckthorn is not well suited for passive management as it can grow in both shaded and sunny conditions. It also produces many seeds and over time can dominate a site, crowding out native species.
- *Mechanical treatment:* Hand-pulling is slow-moving and time-consuming, but can be useful for spot-treatments. On the other hand, mowing covers a large area quickly. Mowing needs to be done repeatedly on a long-term basis to be effective and linked to chemical treatment. One must always retreat a site to deal with resprouts and seedlings.
- *Chemical treatment:* Research on effectiveness of managing glossy buckthorn via chemical treatments was conducted in the eastern Upper Peninsula. Results indicated that stump treatments resulted in vigorous sprouting, and that future management should focus on foliar spraying using ~2.5% active ingredient (a.i.) glyphosate (*Rodeo*) from late July through September (Nagel et. al. 2008). Follow-up work by Corace et al. (2008) indicated that ~1.5% a.i. *Rodeo* solution worked as well. However, to increase the number of “tools” that can be used in invasive plant management, DiAllesandro (2012) conducted a study that showed that ~2.5% a.i. solution of *Garlon 3A* can be highly effective. Although some hand pulling and fire treatments have been done in the past, neither is highly effective at managing glossy buckthorn at large scales. In addition, herbicide application should not take place in windy or rainy conditions. Spraying can be done prior to rain as long as there are a few hours (4-5 hrs) for the herbicide to be absorbed before the rain starts.

Herbicide application can be on the ground or from the bed of a truck or ATV. Spraying from the ground using hand-pumps or backpack sprayers is more thorough since it is easier to spot and thoroughly spray the plant, but it takes more time. The time-saving option is to spray plants from the bed of the truck or ATV using the handgun of the power sprayer- this may be the most effective method at some sites.

#### **EQUIPMENT LIST**

Photos and links to websites have been provided for reference in the list below. Approximate costs of equipment are included, as well. An initial outlay of \$500-\$1,000 would yield most equipment, minus 12-volt battery and vehicles.

*Personal Protective Equipment (PPE):* The pesticide label will have the minimum amount of personal protective equipment recommended when utilizing the product. Usually gloves, long pants, and closed-toed shoes are sufficient, but this list includes extra clothing if wished to be utilized.

Need:

- Long pants
- Closed-toed shoes
- Latex gloves- Protection when spraying herbicide.
- Leather work gloves- For cutting and hand- pulling invasive plants.

Additional:

- Jumpsuit/coveralls- \$39.97 For protecting skin and clothing from herbicide and dye spray-drift. <http://www.homedepot.com/p/Walls-Twill-Non-Insulated-42-in-Regular-Long-Sleeve-Coverall-in-Gray-5515/100507819>
- Protective eyeglasses
- Rubber boots (if spraying in wet areas)



Coveralls

*Herbicide Application:* Spraying can be done using hand-pumps or a backpack sprayer, or with a vehicle. When utilizing a truck or ATV a larger, 12-V battery-powered holding tank can be used. Most of the links below are from [www.forestrysuppliers.com](http://www.forestrysuppliers.com). Images are at the end of this section.

- Hand pump (2.25 gallon)- \$45.75 [http://www.forestry-suppliers.com/product\\_pages/Products.asp?mi=18541&itemnum=13384](http://www.forestry-suppliers.com/product_pages/Products.asp?mi=18541&itemnum=13384)
- Backpack sprayer (3 gallon)- \$87.50 [http://www.forestry-suppliers.com/product\\_pages/Products.asp?mi=18431&itemnum=13193](http://www.forestry-suppliers.com/product_pages/Products.asp?mi=18431&itemnum=13193)
- Power sprayer/ holding tank (such as *Fimco 25-Gallon Sprayer with Spray Gun*)- \$180 Includes tank, hose, handgun, etc. The battery is the only thing that needs to be purchased separately. [http://www.forestry-suppliers.com/product\\_pages/Products.asp?mi=18662&itemnum=14003](http://www.forestry-suppliers.com/product_pages/Products.asp?mi=18662&itemnum=14003)
- Battery (12-Volt Deep Cycle such as *Everstart Maxx-29 Marine* battery)- \$99.97 For power sprayer. <http://www.walmart.com/ip/EverStart-Maxx-Group-Size-29-Marine-Battery/20531539>
- Herbicide (such as 2.5 gallon *Rodeo Broad Spectrum Aquatic Herbicide*)- \$82.00 for one container. \$75.00 each for 2 or more containers purchased. [http://www.forestry-suppliers.com/product\\_pages/Products.asp?mi=50821](http://www.forestry-suppliers.com/product_pages/Products.asp?mi=50821)
- Dye (such as 2.5 gallon *Blazon Blue Spray Pattern Indicator*)- \$132.50 Mixed in with herbicide so that applicator is able to see where he/she has sprayed. [http://www.forestry-suppliers.com/product\\_pages/Products.asp?mi=18951](http://www.forestry-suppliers.com/product_pages/Products.asp?mi=18951)
- Spray Adjuvant (such as *Cide-Kick II Spray Adjuvant for Herbicides*)- \$34.95 Used to help the herbicide stick to and penetrate the plant, very advantageous when spraying spotted knapweed since it has very thin, lobed leaves with low surface area. [http://www.forestry-suppliers.com/product\\_pages/Products.asp?mi=18911&itemnum=17132](http://www.forestry-suppliers.com/product_pages/Products.asp?mi=18911&itemnum=17132)
- Ratchet straps/ tie-downs- \$19.75 If necessary or desired for preventing power sprayer/holding tank from shifting in the back of a truck. [http://forestry-suppliers.com/product\\_pages/Products.asp?mi=62761&itemnum=94672](http://forestry-suppliers.com/product_pages/Products.asp?mi=62761&itemnum=94672)
- Measuring pitcher (*Accu-Pour 64 oz*)- \$8.95 For making herbicide mixture. [http://forestry-suppliers.com/product\\_pages/Products.asp?mi=74051&itemnum=54055](http://forestry-suppliers.com/product_pages/Products.asp?mi=74051&itemnum=54055)



Hand Pump



Backpack Sprayer



Power Sprayer



Herbicide



Dye



Adjuvant

*Tools:* Can be used for larger plants with deep roots or thick woody stems. Tools are sometimes used in combination with herbicide application.

- Shovel- \$20 Useful when a plant has roots too deep to hand-pull and herbicides are not being applied. When digging up invasive species it is important to remove the entire plant including all roots.
- Swede/ Brush Axe- \$47.50 Convenient to use in combination with herbicide application of tall plants such as glossy buckthorn. If the spraying does not give good foliar coverage, the swede can be used to cut a gash into the stem which herbicide can then be applied to. <http://www.forestry-suppliers.com/search.asp?cat=134>
- Brush Cutters/Loppers (with long handles)- \$32.97 To cut the woody stems of species such as glossy buckthorn. Once the stem has been removed, herbicide should be applied to the stump to insure no re-sprouting occurs. <http://www.homedepot.com/p/Fiskars-Bypass-Lopper-91416966J/202319441>



Swede/Brush Axe



Brush Cutters/Loppers

## HERBICIDE PREPARATION AND APPLICATION

- Put on all PPE.
- Load 25-gallon power spray/holding tank into back of a pickup truck if necessary.
- To mix a *Rodeo* 2.25% a.i. herbicide solution or a 1.85% a.i. herbicide solution for *Garlon 3A* (25 gallons total), follow detailed safety instructions on the herbicide labels. Fill 25-gallon tank with 20 gallons of water and then add 1 gallon of concentrated *Rodeo* or *Garlon 3A*. Add 1 cup of *Cide-Kick II* (surfactant). Add a splash of blue dye to mixture. Once the herbicide, surfactant, and dye have been added, finish filling tank with water to the 25 gallon mark.
- Measuring devices and any empty pesticide containers must be triple-rinsed with water before storing or disposing (containers cannot be recycled).
- Fill hand-pumps or backpack sprayers from the herbicide mixture in the 25-gallon tank if necessary using the hand-gun (turn face away when opening pumps/sprayers as the pressure release can cause spray mist).
- Walk with hand pumps or backpack sprayer, or have one person slowly drive vehicle along the edge of the road and have another person in the bed spraying with the power sprayer. A good rule of thumb is to spray enough that 60% of the plant is covered in herbicide to ensure death. The desirable spray pattern is mid-way between a fine mist and a single stream, resulting in medium-to-large droplets and good coverage. Spraying should begin at the top of a plant and work its way down as spray from above may catch on lower leaves.
- Store herbicides in a cool, dry place. Take off or dispose of all PPE as appropriate.

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