

Woodlands Management Plan for Troy Gardens: Invasive Species Control

Final Project GEO 339

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Overview of Woodlands:

Woodlands are areas with large trees and shrubs and a shady ground floor. They differ from forests by having a lower density of trees, and by allowing some sunlight penetration (Wisconsin Woodlands Assistance, 2009). The most common woodlands in Wisconsin are oak and maple. Maple woodlands, like the one found in Troy Gardens, are mostly comprised of sugar maple trees. They also contain basswood, ironwood, white ash, and slippery elm, as well as a variety of wildflowers and shrubs (Sorensen, 2008). Mature woodlands offer ideal habitats for wildlife, protect watersheds and soils, remove pollutants from the air, and are aesthetically pleasing (Wisconsin Woodlands Assistance, 2009). Since these woodlands take up to 40 years to develop and are becoming increasingly rare, they should be preserved whenever possible.

Troy Gardens Woodlands:

Troy Gardens is home to three wooded areas: The Maple Lane sits on the south-west corner of the property, and is roughly a half acre in size; The Troy Community Forest is located directly west of the Maple Lane on property owned by the Mendota Mental Health Institute, and is 1.75 acres in size; And, the largest wooded area, the Railroad Corridor, runs east-west through the middle of the Gardens, taking up slightly more than two and a half acres (Sorensen, 2008).

The Maple Lane:

The Maple Lane was originally used as a corridor to a train platform, and historically had maple trees planted alongside its border (Sorensen, 2008). Many of these old trees are still growing, and they have played a significant role in the decision to make the lane into a maple woodlands. Following a design developed in 2004 by Ziegler Design Associates, species of plants native to

Wisconsin's woodlands were planted alongside the old maples and the many sugar maple samplings in the area (Sorensen, 2008). The resulting space provides a shady and tranquil retreat from the rest of the Gardens.

The Troy Community Forest:

Across from the Maple Lane, the Troy Community Forest fosters a forest-like atmosphere and features trails and an outdoor learning space. This area is managed by Troy Gardens through a partnership between Community GroundWorks and the Mendota Mental Health Institute—the land's proprietor (Sorensen, 2008). Many exotic trees have been planted in this area including, European larch and Norway spruce. There are also green ash and maple samplings.

The Old Railroad Corridor:

The Old Railroad Corridor that runs through the center of Troy Gardens is a dense, unmanaged woodlands containing a mixture of over grown native and invasive trees and shrubs. A strait path runs directly through this wooded area, but the density of the trees and shrubs on either side make entry to the woodlands difficult. Tree and shrub density have also made it difficult to cut-in trails. Nonetheless, this area has been useful to Troy Gardens as an example of a woodlands where no intervention has been made (Sorensen, 2008).

Invasive Plants & Restoration Management Plan*:

Invasive plants can drastically alter native ecosystems. They compete with native flora for sunlight, land, moisture and nutrients, which alters healthy population dynamics, biogeochemical cycles, ecological niches, and interdependencies. Further, exotic species, which are intrinsically invasive, typically lack both effective native predators and proper niches, increasing devastation to ecosystems.

To help minimize the impact of invasive flora in native ecosystems such as in Wisconsin's woodlands, it is important to follow an effective management plan. Based upon successful strategies used in woodlands similar in size and scope to the three main wooded areas at Troy Gardens, a management strategy including 6 main components will be most effective. These include: (1) Assign maintenance of cleared areas to volunteers. Without outside help, maintenance of invasive flora will be extremely difficult. Moreover, it would be wise to assign comparatively more volunteers to invasive management during the growing season relative to non-growing seasons, as this is when they have the potential to cause the most interference. (2) Focus on removing fruiting individuals and reproducing satellite populations – this will reduce the chances of seed dispersal through animals. Also, by removing remote, satellite populations you have a greater chance of eradicating those populations permanently. (3) Expand management to wetter habitats during winter. Invasive flora continues to out-compete native plants during the wintertime, so managing wet habitats (where new plant life often begins) is a key way to prevent further spread and protect native plant species and crops during the subsequent growing season. (4) Couple stem removal in heavily wooded areas during the fall with prompt restoration of native communities – just removing invasive flora isn't enough, it is necessary to restore native communities quickly to prevent repopulation

of invasive species. (5) Continue managing and expanding management records. The more information and data you have about managing invasives, the more prepared you'll be to handle new populations of invasives. (6) Catch new invasive species early. Quick interventions to remove new invasive species will both make management easier and help to prevent further spread.

Lastly, a few weekly maintenance programs such as mowing and weed whipping borders and edges during the growing season should be executed in order to further prevent invasive species spread into the garden, farm and prairie. Also, canopy pruning in concert with selective removal of invasives during the wintertime will foster growth of native plant species by giving them a photosynthetic advantage over non-native flora.

Common Invasive Trees and Shrubs in Troy Gardens' Woodlands:

There are three dominant invasive species in Troy Gardens' Wooded areas. They include, honeysuckle, buckthorn, and garlic mustard. The largest overall infestation of these invasive species is in the Old Railroad Corridor, where they dominate the shady under-story below treetops. Because this wooded area has been left unmanaged there are thick groves of buckthorn and honeysuckle, and garlic mustard has out-competed most native plants on the ground.

The Troy Community Forest has been partially managed by Troy Gardens and has sporadic, but thick groves of buckthorn and honeysuckle. Most striking in this wooded area is the huge population of both first year and seasoned garlic mustard.

The Maple Lane has been the greatest priority for invasive species management by Troy Gardens. In this wooded area there are some small groves of buckthorn and honeysuckle, and small regions where garlic covers the ground, but native species dominate the landscape. As this area's populations of buckthorn, honeysuckle and garlic mustard grow increasingly sparse, more time and energy can be spent managing the other two wooded areas. When the time is right, the successful techniques used to manage the Maple Lane will serve as an excellent approach to managing invasives in the Troy Community Forest and the Old Railroad Corridor.

Background on Invasive Species & Useful, Chemical-Free Techniques for Removal:

Honeysuckle:

In the Midwest there are several varieties of exotic honeysuckle. Generally, these shrubs can be identified by their oval leaves with pointed tips, and their production of red, orange or yellow berries. Though honeysuckle has been planted throughout North America as an ornamental shrub, its early spring leaf and fast growth have enabled its spread into native woodlands (Czarapata, 2005). These shrubs choke out native species, forcing small animals such as birds to nest on their low hung branches. Consequently, rates of predation for small animals in honeysuckle infested woodlands increase, threatening their survival (Czarapata, 2005).

Removal:

Removal of honeysuckle is most effective in the fall and winter. In spring and summer birds are nesting in the honeysuckle and the shrubs are producing berries. Removal during these seasons could compromise local bird populations and also result in the unnecessary dispersal of honeysuckle seeds.

The most effective non-chemical methods for removing honeysuckle are to either cut or entirely remove the bushes during the fall and winter, when they are not flowering or producing berries. When hand pulling is not practical, bush clippers can be used for cutting and a weed-wrench can be used to help remove plants including their roots. There is also evidence that increasing shade around honeysuckle bushes during the growing season (spring-summer) helps to reduce their growth and spread (Miller, 2003).

Garlic Mustard:

Garlic mustard is an erect, biennial herb that thrives in shaded environments. The plant emerges in April having no flowers during the *first* year; instead, it shows anywhere between 3 and 8 rounded or kidney-shaped clusters of scallop edged leaves. During the *second* year, garlic mustard will flower from April to June, blooming a small, white, 4 petal flower (Czarapata, 2005).

Removal:

First year garlic mustard is most effectively removed by pulling after a rain when the ground is its softest, making it more likely that most (if not all) the root will come out. Second year plants should be watched closely in the month of May, and cut as close to the ground as possible as soon as the plants begin to flower. Garlic mustard tends to keep its foliage longer than other species, so pulling both first and second year plants during December is also recommended if the ground is not frozen.

Early spring cutting of garlic mustard prior to flowering can instigate re-sprouting. It is also inadvisable to cut the plant after it goes to seed, because that can also increase the problem. So, cutting or weed-whipping the plant during flowering is recommended and has proven to be 99% effective (Wisconsin DNR, 2009). Generally, it is important to remove the plants that are producing seeds first, pulling from the least to the most infested areas. It is equally important, following removal, to clean shoes, pockets, cuffs, and equipment because garlic mustard has very small seeds that can be transported in clothing, shoes, and mud (Czarapata, 2005). It only takes a few seeds to produce a large infestation in a few seasons. Furthermore, pulling and disposal of this weed needs to be done for 8 or more years until the garlic mustard is depleted indefinitely.

Buckthorn:

Buckthorn is native to Eurasia and was first introduced into the U.S. in the 1880s (Czarapata, 2005). It is a deciduous shrub or tree that has the potential to grow as tall (and wide) as 8 meters. Buckthorn is readily identifiable because of its distinctive physical characteristics. Leaves are oval-shaped and often glossy and typically hold their green two to three weeks longer than native trees and shrubs (Czarapata, 2005). Because of its prevalence, density and tolerance of various soil conditions removal or eradication of Buckthorn is challenging.

Removal:

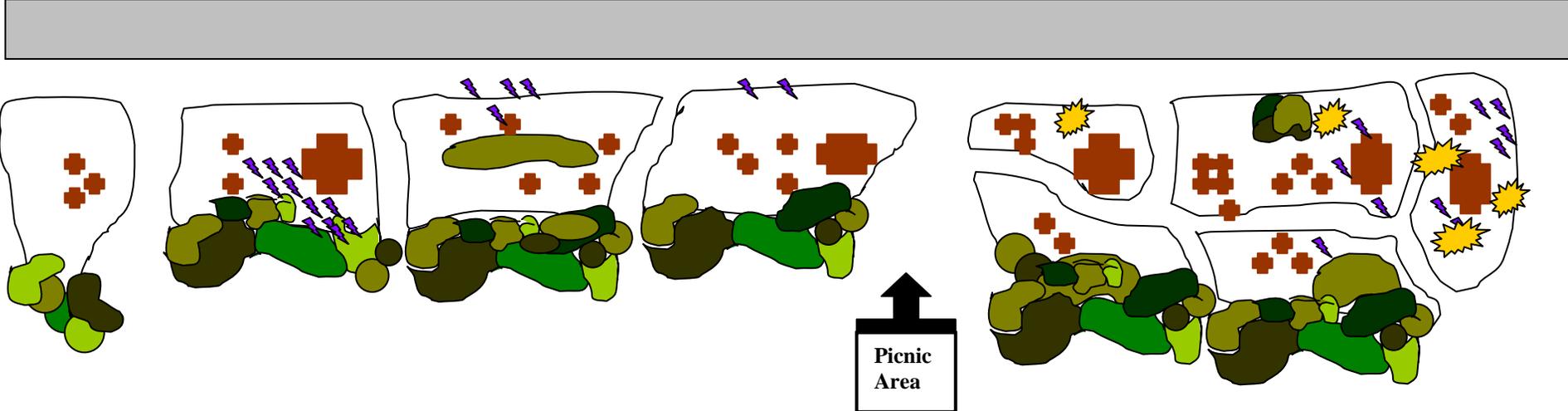
For buckthorn stands containing individual plants $\frac{3}{8}$ of an inch in diameter or less, hand pulling may be the most effective method of removal. Though it can be physically taxing, it is best to uproot plants, regardless of their size, in order to eradicate future growth in that area. To help with the removal of large plants it is useful to soak the soil around the trunk for several days before pulling (The City of Orono, 2009). If removal is not feasible, frequent pruning and/or shearing can help to reduce flowers and berries, limiting the further spread of this species.

Woodland Management Calendar

January	February	March
		Early spring is a good time to look for honeysuckle infestation as leaf development happens one to two weeks before native plants.
April	May	June
Honeysuckle can be pulled in April before it starts flowering and producing berries.	Garlic Mustard needs to be cut as close to the ground as possible just as it begins to flower in May.	June is a good month to pull Buckthorn, especially after a rain when the ground is soft.
July	August	September
		If planting native seeds is part of your management plan, early fall is a good time to spread them. This gives invasives more competition in the spring.
October	November	December
Cutting remaining Honeysuckle as close to the ground as possible in October will help prevent resprouting in the spring.	Cutting remaining Buckthorn as close to the ground as possible in November will help prevent resprouting in the spring.	Since 1st year Garlic Mustard stays green long after most plants have died in the fall, December is a good time to check for new infestations. If possible, new infestations should be pulled to prevent seeding in spring.

Locations of Honeysuckle, Buckthorn, and Garlic Mustard in Troy Gardens' Woodlands:

Troy Gardens Woodlands Management Plan
Location of Invasive Plants in Maple Woods



Key:

- Trees: Brown 
- Bushes: Green 
- Garlic Mustard: Yellow 
- Honeysuckle: Red 
- Buckthorn: Purple 

Key:

Trees: Brown



Bushes: Green

Garlic Mustard: Yellow



Honeysuckle: Red

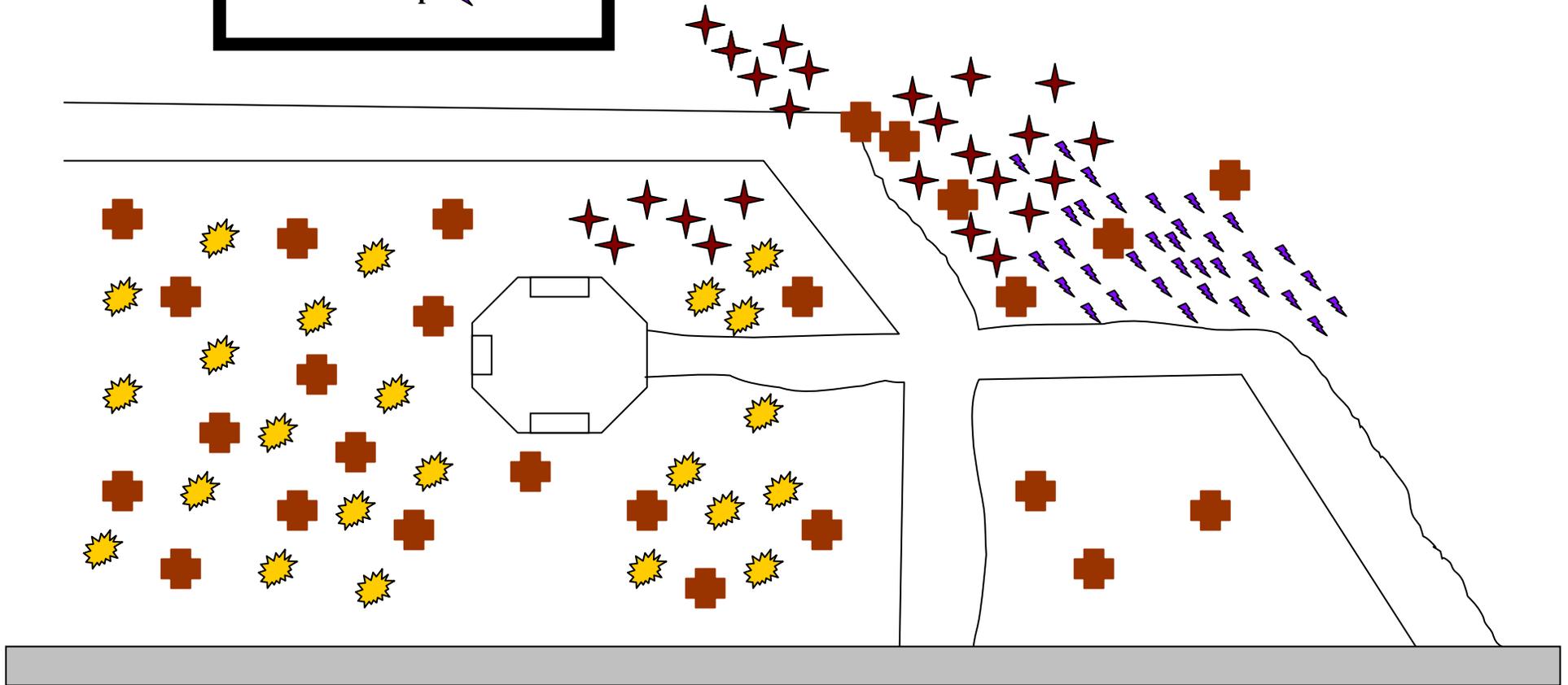


Buckthorn: Purple

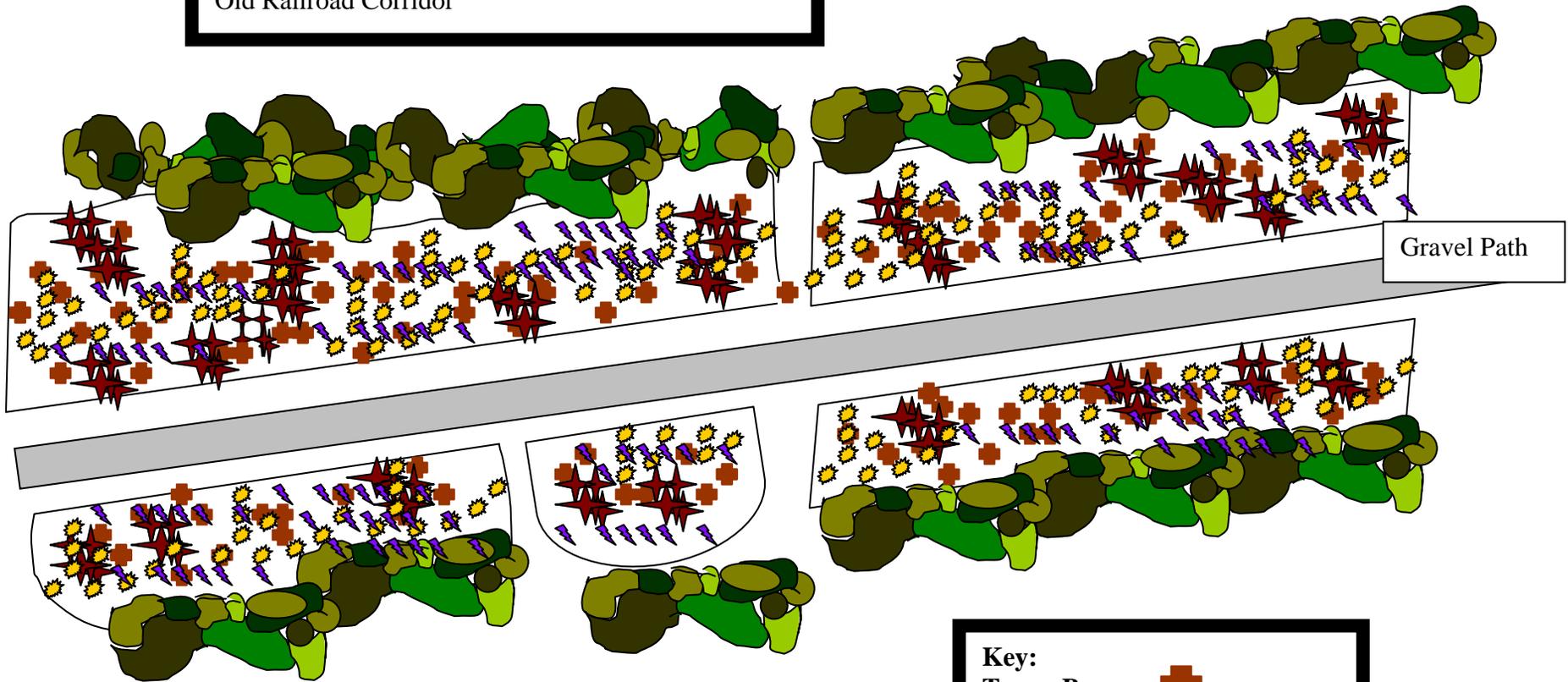


Troy Gardens Woodlands Management Plan

Location of Invasive Plants in the Troy Community Forest



Troy Gardens Woodlands Management Plan
Old Railroad Corridor



Key:
Trees: Brown 
Bushes: Green 
Garlic Mustard: Yellow 
Honeysuckle: Red 
Buckthorn: Purple 

**Appendix: Tool Kit for Managing Troy Gardens' Woodlands
Invasive Species ID Sheets**

Honeysuckle

Identification:

Medium-sized shrub 6'-15' tall with egg shaped leaves.

Removal: Small plants can be pulled out by the roots. Larger plants can be pulled out using a weed-wrench or cut as close to the ground as possible, giving native species a chance to grow.



Honeysuckle shrub



Egg-shaped leaves and red berries (July)



New growth sprouting from old shrub

Garlic Mustard

Identification:

First year – Scallop edged leaves rising 2”-4”
Second year – 12”-48” tall with white flowers in May

Leaves and stems emit odor of onion or garlic when crushed

Removal: As the plants begin to flower in May, cut stalks as close to the ground as possible



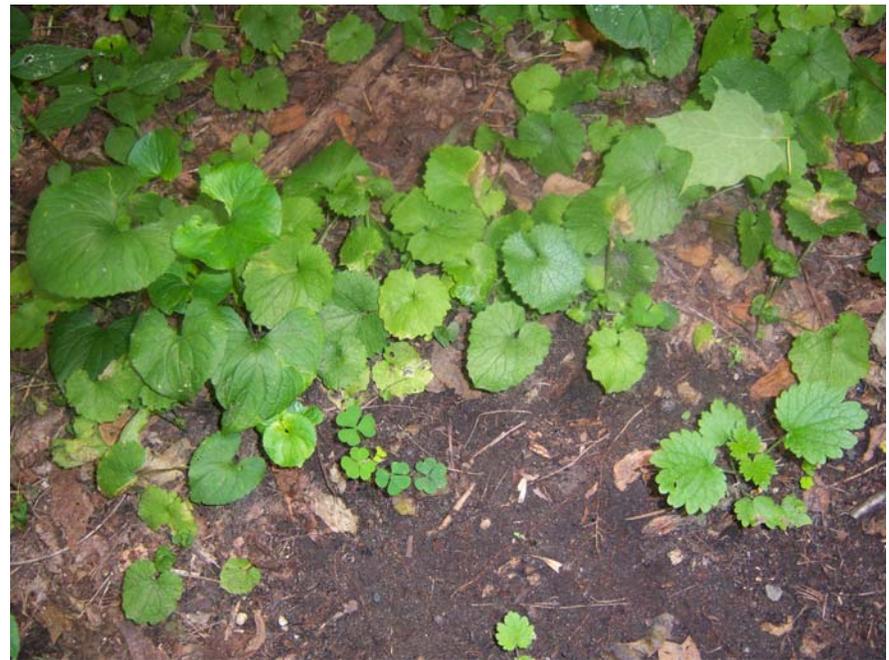
First year rosettes



First year covering forest floor



Second year plant



Garlic mustard in middle with look alikes on the left and bottom right

Buckthorn

Identification:

A tall shrub or small tree reaching 20-25 feet in height and 10 inches in diameter. Bark is gray with elongate lighter lenticels. Leaves are smooth, oval shaped and often glossy.

Removal: Small plants can be pulled out by the roots. Larger plants can be cut as close to the ground as possible giving native species a chance to grow.



Small seedling



Gray bark with lenticels



Glossy oval-shaped leaves

References:

*We would like to thank UW-Madison graduated student Ian Chistider for his incite on invasive species management.

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