



# Cumberland Town Forest Invasive Species Management Plan



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Prepared For  
The Town of Cumberland and the  
Lands and Conservation  
Commission  
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## Executive Summary

The Cumberland Town Forest was donated in 1891 by Elizabeth Drowne. The land encompasses mature forest, recreational trails, ball fields, and a former landfill. It is also the home of the Town of Cumberland's municipal offices. The property has seen the establishment of several softwood plantations since the early 20<sup>th</sup> century with harvests occurring in the 1960's and 1990's (Braunscheidel et al., 2011, p.22).



Red pine plantation near head of trail photo J. Anderson 5/2013

Over the past decade, invasive species have become prevalent throughout the forest and are present in high densities in the eastern and southern sections. In a number of areas within the forest, invasive species have become the dominant understory reducing regeneration of desirable species and severely impacting the ecological value of the habitat. In 2011, a forest management plan was developed by Integrated Forest Management (IFM) which documented the current inventory of timber stands and included recommendations for management over the next ten years. The plan also included an Integrated Pest Management Plan as an appendix. This goal of this document is threefold: to further document location and type of invasive species present through GIS mapping, provide control measures that can be implemented both through forestry best management practices and by Conservation Commission members and volunteers, and to prioritize management efforts to create a long-term sustainable approach to controlling invasive species within the Cumberland Town Forest and on other Town lands and parks.

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## 1.0 Goals and Objectives

Town officials and the Lands and Conservation Commission have identified the conservation and restoration of the Cumberland Town Forest as a priority for the welfare of the community and preservation of important natural habitats. The area is known to host threatened species such as the New England Cottontail (*Sylvilagus transitionalis*) and the Wood Turtle (*Clemmys insculpta*). It also includes unfragmented forestland which provides significant deer wintering areas and wetland types that support inland wading bird and waterfowl habitat. Furthermore, a 2006 survey of residents found that 22% of respondents utilized the forest trails and 65% supported funding to improve access (Town of Cumberland, 2011, p. 93). In recent years there have been increased observations of invasive plants and concern is rising that proactive management is necessary before further native habitat is lost and forest regeneration of desirable species is replaced by invasive species.

The primary objectives for management of invasive plant species are identified as:

1. Restore native habitats and maximize biodiversity
2. Design long-term control methods compatible with current forest management
3. Improve trail access

This management plan provides protocols for implementing invasive species control measures on the Cumberland Town Forest, and will describe the following:

1. Which invasive plant species should be targeted
2. What management practices are acceptable
3. When they should be implemented
4. Who can be authorized to implement the management practices

This management plan is a living document and should be revisited and revised periodically to reflect the dynamic nature of invasive species and the state of knowledge of best management practices (BMPs). Land managers should include or reference these protocols in ongoing management strategies, and provide a current inventory and list of management actions related to invasive plant control within the forest to the project partners on an annual basis.



## 2.0 Site Description

### 2.1 Overview

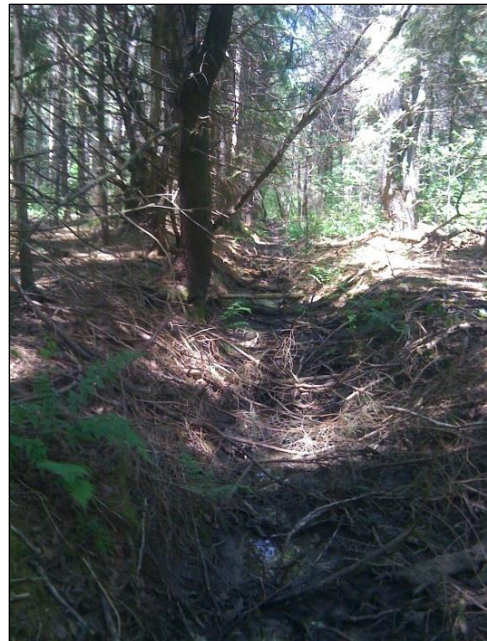
The Cumberland Town Forest is located in Cumberland, Maine and is situated accessed from Tuttle and Drowne Road. It totals approximately 96 acres and is a mix of forest, wetland and commercial and municipal landuses. A recreational trail loops the outer boundaries of the forest and is accessible from the town offices parking lot (Figure 1). The Lands and Conservation Commission is responsible for the maintenance of the trails and is involved in decision making regarding forest management and compatible uses.

The site also is home to a ~14 acre capped landfill with extensive wetlands surrounding it. A snowmobile trail passes through the center of the forest which connects to a network of trails traveling throughout the region. Two ball fields are situated on the northern edge with municipal offices and residential apartments located on opposite ends of the fields. Construction of residential units is currently ongoing on the southwestern border which is accessed by Downe Road.

Two unnamed streams are located on the property, with a number of bridges leading trail users across the streams and wet areas. An old, open field drain is located on the western section. This once provided drainage to make the land more suitable for pasture or agricultural uses.

### 2.2 Classification

The landscape is typical of a Pine-Oak Forest. This landscape type is a closed canopy forest where mixtures of oak and white pine dominate. Red maple and paper birch can be common in younger stands with several other shrubs. The herb layer is somewhat sparse and features bracken fern, lowbush blueberry, and various herbaceous species (Maine Natural Areas Program, 2010). The community provides nesting habitat for a large number of bird species such as the wood thrush, scarlet tanager, ovenbird, and pine warbler. In areas with

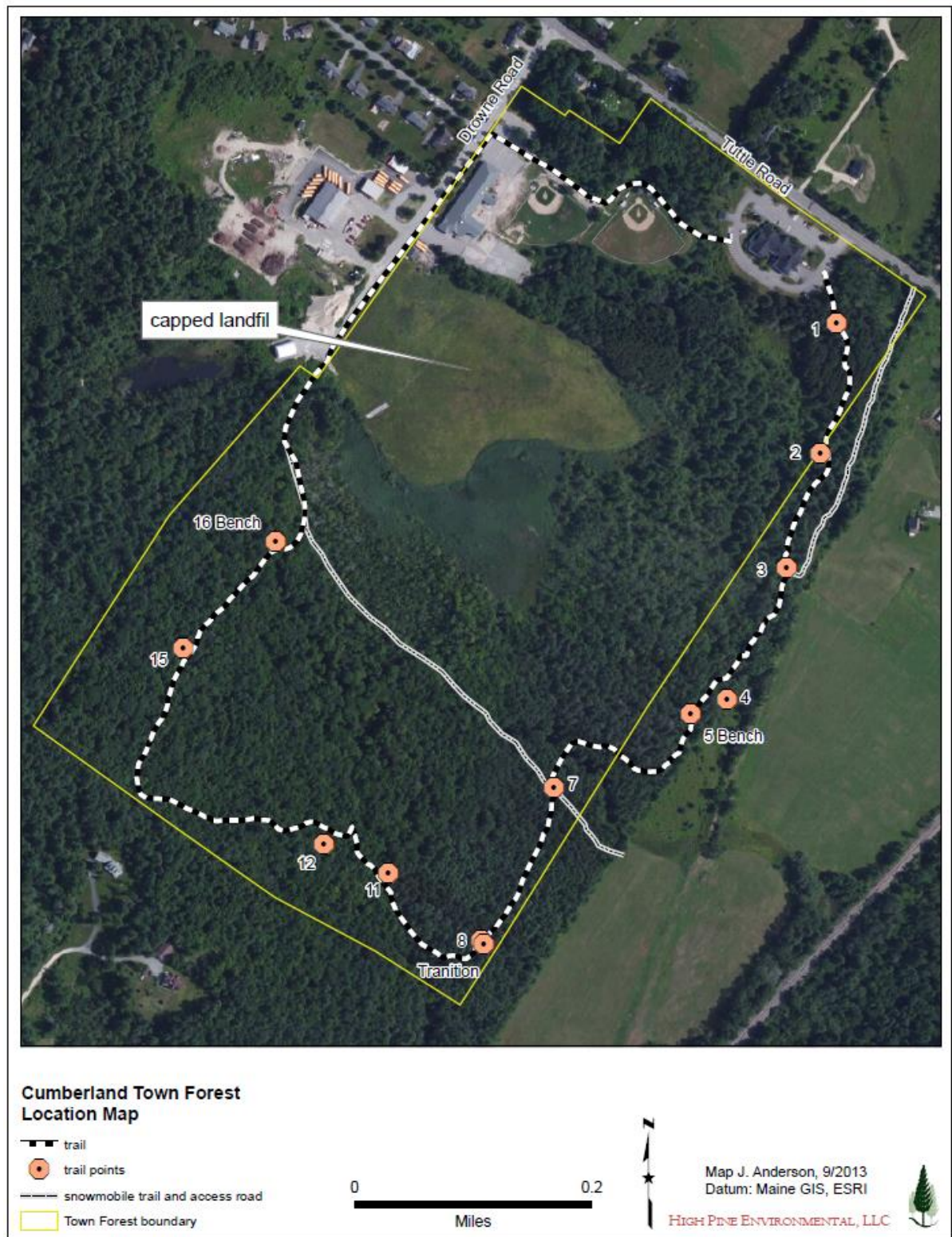


Old drainage canal indicating historic pasture and agriculture use

*photo J. Anderson 5/2013*

mature stands, as noted in the southwestern sections, these communities offer excellent potential sites for cavity nesters.

**Figure 1. Location of the Cumberland Town Forest**



## 2.3 Exemplary Natural Communities and Threatened or Endangered Plants and Animals

The site has been assessed by the Maine Natural Area Program for the 2011 forest management plan and was found to contain no rare, threatened and/or endangered plants, no rare and/or exemplary communities, significant wildlife habitat, or wild brook trout habitat. The region is recognized by the Maine Department of Inland Fisheries and Wildlife as habitat for New England Cottontail (*Sylvilagus transitionalis*). A follow-up interview with Kelly Boland, biologist with the U.S. Fish & Wildlife Service, indicated that no known populations currently inhabit the area but they had been documented there in the past 10 years (K. Boland, personal communication, July 29, 2001).

## 3.0 Invasive Plant Species

The State of Maine has established a list of twenty-four invasive plant species identified through the Maine Natural Areas Program and found at:

<http://www.maine.gov/doc/nrimc/mnap/features/invsheets.htm>

Eleven of the species on the state list have been documented within the Cumberland Town Forest (Table 1). Distribution of these plants were mapped using a handheld GPS receiver in the field during May and June 2013 through a series of field visits throughout the extent of the forest. These observations are found in Figure 2.

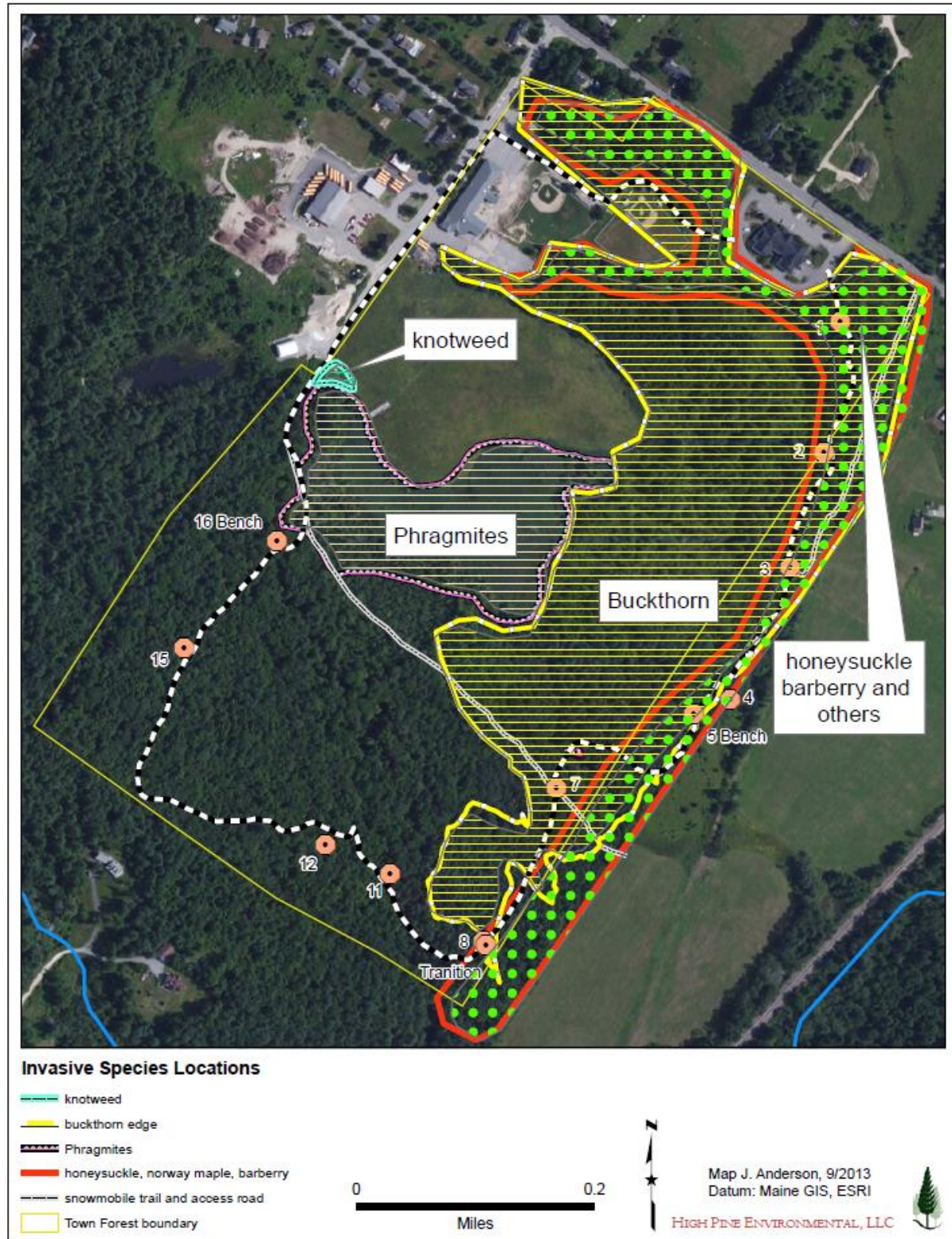
These species represent a great threat to the ecologic makeup of the forest. These plants are known to spread rapidly, forming monocultures that out-compete native species in relatively short time spans. Additionally, some can alter hydraulic regimes through dense mats of rhizomes and biomass of dead stems and leaves while others can change soil pH or release toxins that restrict native seed regeneration.

**Table 1. List of documented invasive plant species found in the Cumberland Town Forest**

Scientific Name	Common Name
<i>Phragmites australis</i>	Common reed
<i>Lythrum salicaria</i>	Purple loosestrife
<i>Polygonum cuspidatum</i>	Japanese Knotweed
<i>Berberis thunbergii</i>	Japanese barberry
<i>Celastrus orbiculata</i>	Asiatic bittersweet
<i>Lonicera</i> spp.	Honeysuckle species
<i>Rosa multiflora</i>	Multiflora rose
<i>Elaeagnus umbellata</i>	Autumn Olive
<i>Frangula alnus</i>	Glossy buckthorn
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Acer platanoides</i>	Norway maple



Figure 2. Invasive Species Type, Location, and Spread





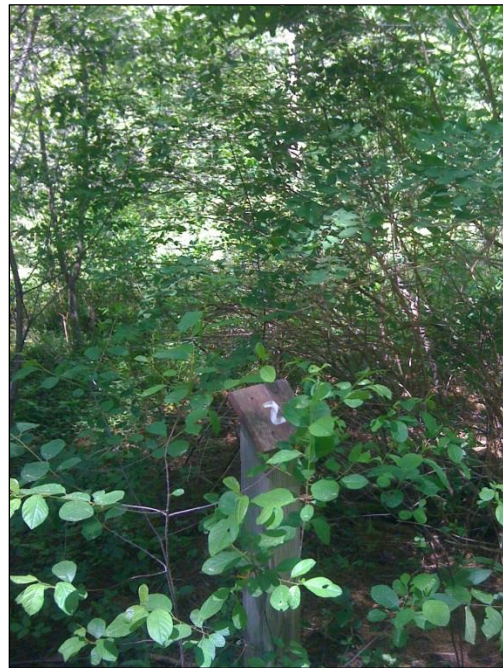
### 3.1 Threats

Not all invasive species found within the Town Forest present equal threats. The three invasive species that pose the greatest risks to the Town Forest are the buckthorns (common and glossy), Japanese knotweed, and Phragmites. These species are able to spread rapidly, tolerate varying conditions, and are extremely difficult to eradicate once established. While the Japanese knotweed is confined to the capped landfill area, Phragmites completely dominates the adjacent wetland and buckthorn is widespread throughout the forest and particularly dense in the eastern and southern sections. Other species such as honeysuckle, oriental bittersweet, and Japanese barberry that are intertwined with buckthorn are at much lower densities and can be controlled using the same management strategy. While complete removal of invasive plant species is highly unlikely, a broad range of management techniques can help to reduce their geographic extent and dominance over several treatment periods. With steady work each year, many patches can be reduced or eliminated, further spread can be checked, new infestations can be prevented, and native species will be allowed to compete.

### 3.2 Common and Glossy Buckthorn (*Frangula alnus*, *Rhamnus cathartica*)

One of the most densely populated species prevalent throughout the forest that poses the greatest overall risk is the presence of both common and glossy buckthorn. This species is extremely persistent and able to withstand a multitude of conditions from shady areas with hydric soil to upland dry and sunny sites. Buckthorn management is one of the toughest challenges facing urban forests. Unfortunately, there is no quick fix for dense buckthorn infestations which are found in the Town Forest. Buckthorn management is a long-term and often costly endeavor. There are several attributes of buckthorn that make it especially difficult to control:

- Buckthorn fruit is readily spread by birds
- Seeds may persist in the soil for up to 6



Glossy buckthorn at Station 2 along the trail. This area is very dense with buckthorn the major understory species.

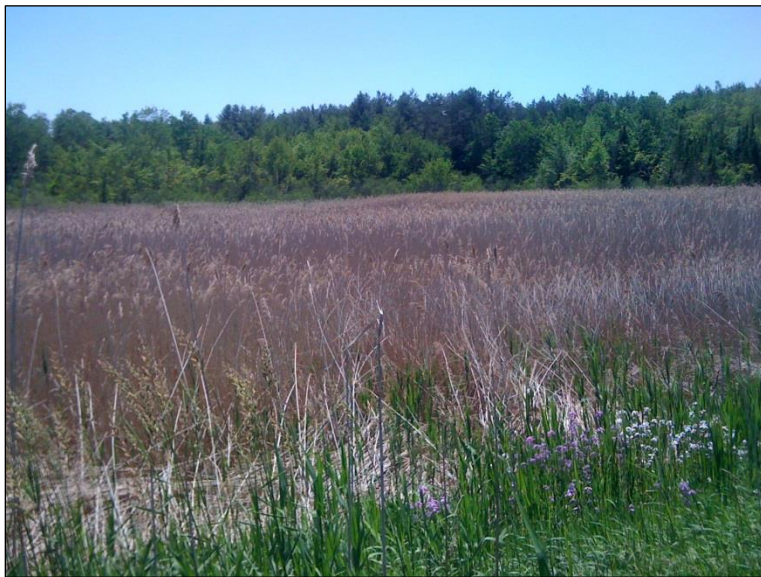
photo J. Anderson 5/2013

years before germinating

- Leaves out early in spring and stays green in fall longer than other trees and shrubs, outcompeting native plants for light, space and nutrients
- Has chemicals in its roots, leaves, and fruit that inhibit the growth of other plants (allelopathic)
- Vigorous trees are difficult to kill even with herbicides
- Creates a monoculture as it invades an area decreasing diversity of plant communities
- Causes diarrhea in birds jeopardizing migration

### 3.3 Phragmites (*Phragmites australis*)

Phragmites is a tall, perennial, rhizomatous grass that often grows in dense monotypic stands effectively out-competing other vegetation (Blossey, 2002). Also known by the name common reed, it ranges in height from 5 to 15 feet. It is found throughout temperate regions of North America and is most abundant along the Atlantic Coast and in freshwater and brackish tidal wetlands of the northeastern



Phragmites as a complete monoculture in the wetlands adjacent to the capped landfill. A satellite population exists near Station 7.

*photo J. Anderson 5/2013*

United States as far south as North Carolina. It occurs in all eastern states and populations are expanding. The Town Forest population is extensive and exists as complete monoculture in the wetlands adjacent to the capped landfill. The population is expanding west of the snowmobile trail with a satellite population located on the eastern boundary near the old railway bed and snowmobile trail.

The primary method for colony expansion occurs by rhizomes in wet organic soils and rhizomes and stolons in sandy soils. Aerial stems grow from nodes in the rhizomes and aerial stems that are knocked over can take root and produce new shoots at the nodes along the stem.

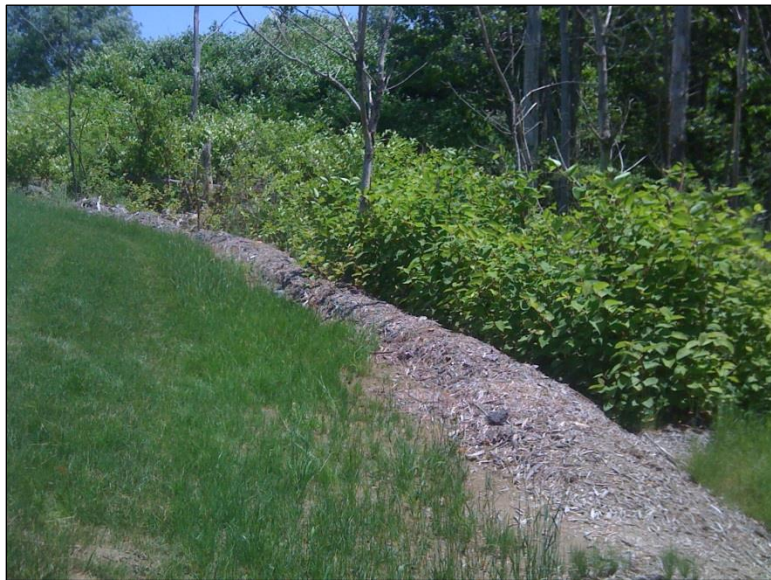
Rootstalks, often exceeding 20 feet in length, interlock and form a dense network that can

withstand damage stalks and leaves. The underground network of rhizomes has an expansion rate of 3 feet per year, but in optimal conditions can spread up to 30 feet in one season (University of Maine, 2001).

- Thrives along freshwater and brackish waters where there has been disturbance
- Displaces short grass nesters and inland and wading waterfowl
- Creates a monoculture
- Dead stems are a fire hazard

### 3.4 Japanese Knotweed (*Polygonum cuspidatum*)

Japanese knotweed is a perennial herb that forms dense thickets up to ten feet in height. Populations may be so dense that virtually all other plant species are shaded out and large colonies commonly exist as monocultures, significantly altering natural habitat (University of Maine, 2001).



Knotweed growing along the edge of the capped landfill in proximity to Downe Road. *photo J. Anderson 5/2013*

Reproduction from rhizomes and even small fragments enables the plant to be easily

transferred to new sites by flowing water or brought on site in fill material. Once established, it is difficult to remove. Common traits include:

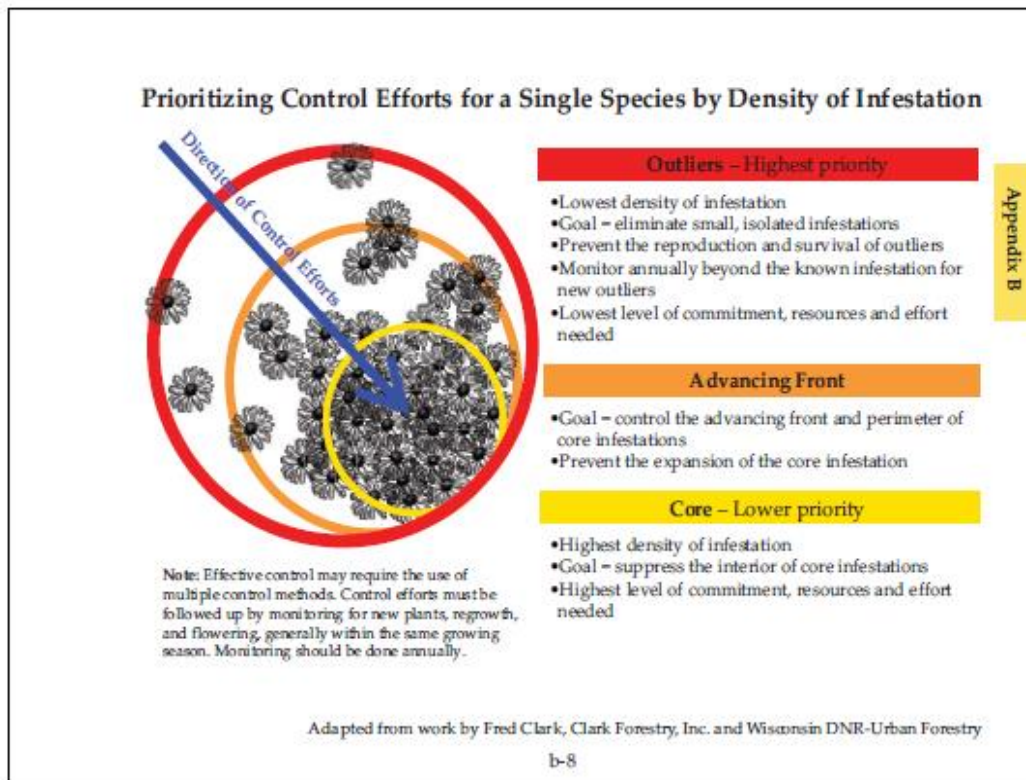
- Bamboo-like stems
- Vegetative spread
- Dense monocultures
- Shade tolerant
- Can survive repeated cuttings



## 4.0 Options for Invasive Species Control Strategies

There are many methods used by invasive plant specialists to eliminate or minimize the spread of undesirable species. The following section outlines the weed management plan. It includes:

- An outline of methods
- A timeline of seasonal activities that identifies when activities will take place, lists needed equipment, and staffing and/or volunteer needs
- A species by species summary of management options



An excellent example of how to prioritize efforts when dealing with species such as buckthorn at high densities.

It can be easier, safer, more cost effective, and more ecologically beneficial to manage certain species (such as buckthorn) than others. In addition, there are a number of techniques for controlling invasive species, with some being more effective than others. It is important to make management decisions based on the ability to control one or more species, the techniques available at a specific site, and concerns for impact to native species and safety of trail users. It is also critical to keep in mind that invasive species management needs to become an ongoing management task. Integrated Vegetation Management (IVM) will be implemented to provide the most effective strategy incorporating hand cutting and pulling, mowing, foliar, cut stem and stem basal herbicide applications. Herbicides will be applied selectively in an effort to control only the target species so that desirable native species have an opportunity to compete with invasive species.

#### **Integrated Vegetation Management (IVM)**

*IVM is a systematic method that utilizes all available strategies to manage invasive plant species including mechanical, biological, cultural and chemical treatment methods. IVM prevents the spread of invasive plants through proper knowledge of weed species, accurate inventory and mapping, specific design of control methods and strategies, implementation, and evaluation and/or modification of strategies to achieve desired goals.*

### **4.1 Invasive Management Techniques**

#### **4.1.2 Mechanical/Manual Treatment Methods**

- Pull Manually pull entire plant, including roots
- Cut/Saw Cut stem with hand or power tools. Can be used alone or in combination with application of systemic herbicide.
- Mowing Use of brush mowers and large mechanical machines (hydro ax, brontosaurus brush mower)

#### **4.1.3 Chemical Treatment Methods**

- Low-Volume Foliar Backpack Applicators walk established transects over the entire area directing herbicide and water tank mixture to the foliage of invasive plants. Herbicide and water tank mixture are to be registered for use by the Federal EPA and State of Maine and

include an anti-drift agent and surfactant to keep spray directed on target species. No applications will be made to, or be allowed to enter standing or flowing water.

- **Cut-Surface Treatment** Applicators will use this method to effectively treat target species that are either in the Shoreland Zone or wetlands, to close in proximity to native species to avoid overspray and harm to control resprouting in the case of honeysuckle, buckthorn and bittersweet.
- **Basal Bark Treatment** Applicators will use the basal application method to selectively treat individual woody plants. This method also for a longer application period; basal applications are effective from February to November. Basal treatments are an herbicide with oil which is applied to the lower 15 inches of a tree trunk or brush stem to the ground line. This method is especially effective when treating species such as buckthorn by minimizing disturbance and controlling resprouting.

**Table 2 List of Herbicides Considered for Use**

Chemical Name	Examples of Brand Names	Target Use	Target Species
<i>triclopyr</i>	Garlon3A® Garlon 4®	Cut stem and/or basal bark treatment; foliar spot spray. Broad-leaf selective	oriental bittersweet, buckthorns
<i>glyphosate</i>	Roundup®, Accord®	Cut stem and/or basal bark treatment; foliar spray. Non-selective	honeysuckle, barberry, Norway maple, buckthorns
<i>glyphosate (aquatic formulation)</i>	Rodeo®; Accord®	Cut stem; application near open water. Non-selective	honeysuckle, barberry, Norway maple, buckthorns

**Table 3 Herbicide Concentrations and Application Timing (always follow label)**

Species	Timing	Methodology	Chemical
Buckthorn	Fall/ Spring	Basal Bark Treatment	20% triclopyr
	Summer/Fall	foliar	2% glyphosate
	Spring/Summer	foliar	3-4% triclopyr
Honeysuckle	Fall/Summer	Cut-Surface	50% glyphosate
	Summer/Fall	Foliar	3% glyphosate
Bittersweet	Summer/Fall	Cut-Surface	50% triclopyr
	Summer	foliar	3% triclopyr
Norway Maple	Fall	Cut-Surface	50% glyphosate
Barberry	Spring/Fall	Foliar	2% glyphosate



## 5.0 Recommended Invasive Species Management

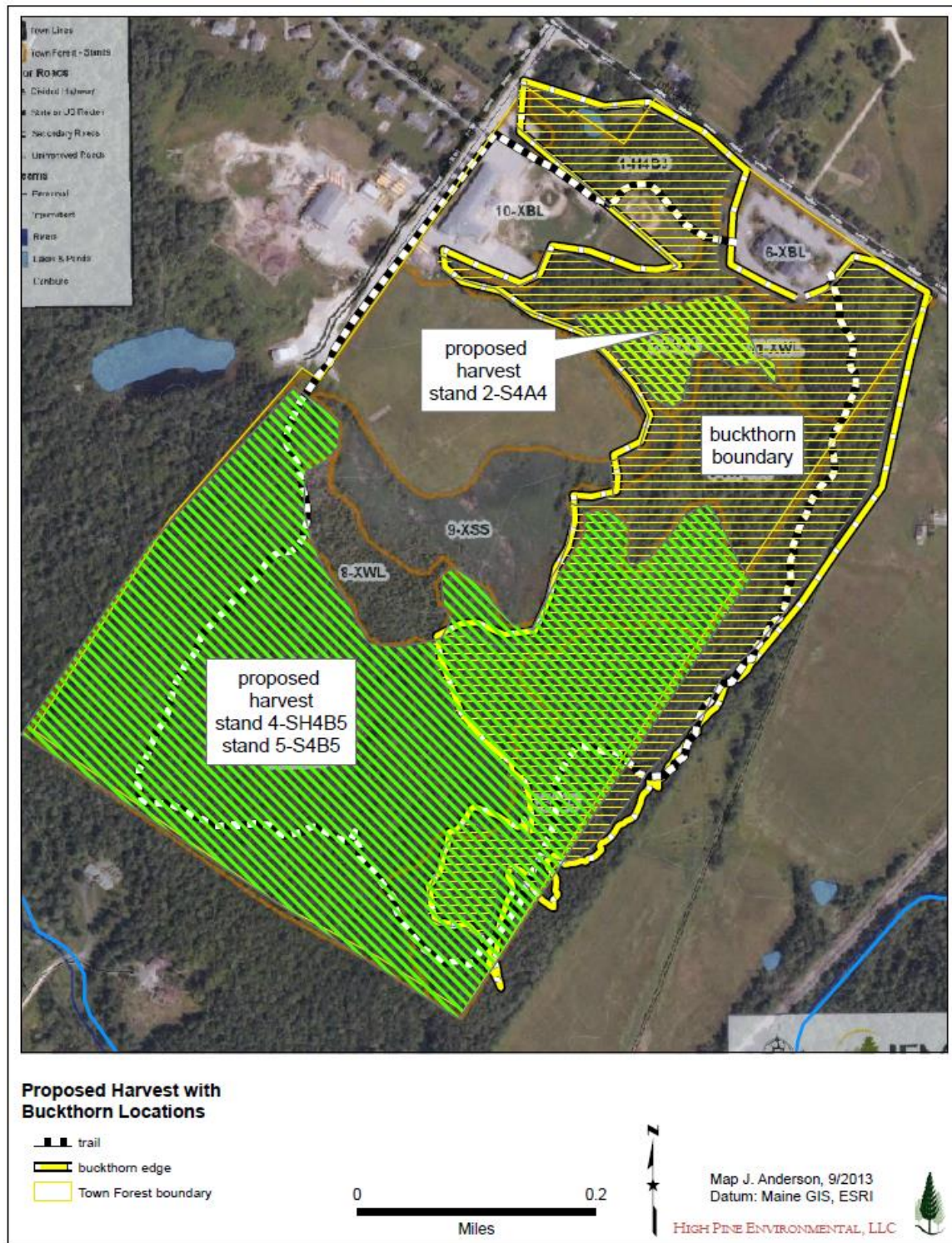
Based on the identified ecological, recreational, and forest harvest priorities within the project area and the realities of invasive plant control (available resources, cost, and known techniques for plant control), the following the control actions are recommended:

1. In the proposed forest harvest stands for Winter 2013-14, follow the recommendations as outlined in Appendix 7 of the IMF forest management plan. This will cover a large portion of the outer forest and areas of high density for buckthorn (see Appendix A of this plan for the plan)
2. For other areas of the forest, particularly the trail sections (head of trail, sitting areas, and focal points such as red pine stand in the beginning section) I recommend utilizing a mix of mechanical (pulling and cutting) with herbicide treatments that can be administered by the Lands and Conservation Commission Board members. Members may want to employ a licensed applicator for herbicide treatments, especially if near sensitive areas such as streams and riparian sections.
3. Lands and Conservation Commission members should develop a monitoring regime to walk the trails and especially those areas that are relatively free of invasive species such as in the western outer areas and employ Early Detection/Rapid Response techniques to quickly identify and control new populations before they become established.
4. Hire a licensed applicator to control the knotweed population and outliers of the Phragmites that is creeping into the forest wetlands. Work to contain the Phragmites within the main wetland next to the capped landfill using foliar applications of an aquatic approved herbicide.

Due to the nature of these particular invasive plants, cutting alone is not recommended considering the high resprout rate, seed bank present, but rather the commitment to a long-term program that aims to contains and reduce the number and densities of invasive species currently contained within the Cumberland Town Forest. Treatment will need to occur over several seasons and need to be continually monitored and adjusted accordingly. In areas of harvest, disturbance of soils and newly created openings are ideal opportunities for buckthorn and other invasive species to become established. It is critical that there be regular monitoring of these areas to assess the need for control. See Figure 3 for areas of the proposed harvest and how they overlap with buckthorn locations.

<b>Table 3. Yearly Control Regimen Proposed for the Cumberland Town Forest</b>		
<b>Control Method</b>	<b>Timing/Responsibility</b>	<b>Notes</b>
<b>Winter 2013/2014</b>		
mechanical/herbicide	December 2013-February 2014, Contractor	cutting of buckthorn as part of the harvest plan, cutstem herbicide application on larger stems, basal stem applications in areas that are not cut but within the harvest deliniation
herbicide	September 2013, Contractor	foliar applications to knotweed and Phragmites
mechanical/herbicide	October 2013, Lands and Conservation Commission	buckthorn pull along selected trail areas by Lands and Conservation Commission
<b>Spring/Summer 2014</b>		
monitoring and evaluation	June 2013, Lands and Conservation Commission	evaluate treatment, document resprouting, make recommendations for further control
herbicide	June-August 2014, Contractor	follow-up foliar spot treatments for buckthorn resprouts in harvest areas
mechanical/herbicide	August-September 2014, Lands and Conservation Commission	buckthorn pull along selected trail areas by Lands and Conservation Commission
<b>Winter 2014/15</b>		
mechanical/herbicide	November-March 2015, Contractor	cutstem herbicide application on larger stems, basal stem applications on stems larger than 1"
<b>Spring/Summer 2015</b>		
monitoring and evaluation	June-July 2015, Lands and Conservation Commission	evaluate, determine is further treatment necessary or if strategy should change
herbicide	June-August 2015, Contractor	follow-up foliar spot treatments for buckthorn resprouts in harvest areas
mechanical/herbicide	August-September 2015, Lands and Conservation Commission	buckthorn pull along selected trail areas by Lands and Conservation Commission
<b>Spring/Summer 2016</b>		
monitoring and evaluation	ongoing, Lands and Conservation Commission	

Figure 3 Proposed Harvest Areas Related to Buckthorn Locations





## 5.1 Licensing and Permitting

The Maine Board of Pesticides Control requires a commercial license for any one of the following situations:

1. Application of any restricted/limited use pesticide for purposes other than producing an agricultural commodity
2. Use of any pesticide as a service for which compensation is received (examples include lawn care, pet grooming, tree & shrub care and pest control)
3. Use of any pesticide on sites open to public use. Property is considered open to use by the public when the owner permits routine access by the public, even if a fee is charged for such use. Examples range from office and apartment buildings to golf courses and other outdoor recreation facilities.
  - a. Exemptions:
    - i. Terrestrial applications done by land trust employees or volunteers when the area is closed to public access for 7 days
    - ii. There are no exemptions for aquatic or wetland applications
4. Maine State Law (38 M.R.S.A): 413.1-No person may directly or indirectly discharge or cause to be discharged any pollutant (to a water of the state) without first obtaining a license from the department.

## 5.2 Volunteer Mechanical Cutting/Pulling/Cut-Surface Treatment with Herbicide

A “buckthorn pull” is an organized event that engages volunteers to uproot buckthorn from infested areas. Volunteers can pull buckthorn seedlings (less than 1” diameter) on coordinated transects. Before clearing buckthorn shrubs, native shrubs and trees such as black cherry, hawthorn, ironwood, basswood and dogwood that can be mistaken for buckthorn should be flagged and protected. Larger stems can be cut and brush piles erected for habitat in strategic locations. An herbicide applicator follows behind applying herbicide using the cut-surface method listed above using concentrations found for cut-stem treatments in Table 3.

This type of project would be well suited to the trail head, in the red pine plantation, and also along areas such as the benches and resting places. The trail could be cleared 10’ off in both directions opening up the pathway which would aid both access and increase the viewshed.

Each year Commission members could single out two or three areas for restoration and connect these areas in subsequent years through additional projects.

## References

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## **Appendix A IFM Integrated Pest Management Plan for Proposed Harvest Areas**



## **Appendix 7**

### **Integrated Pest Management Plan (IPM)**

Field observations have confirmed the presence the following invasive upland plants:

- Japanese Barberry (*Berberis thunbergii*)
- Asiatic Bittersweet (*Celastrus orbiculata*)
- Shrubby Honeysuckle(s) (*Lonicera species*)
- Japanese Knotweed (*Fallopia japonica* or *Polygonum cuspidatum*)
- Phragmites (Common Reed) (*Phragmites australis*)
- Common buckthorn (*Rhamnus cathartica*) or glossy buckthorn (*Frangula alnus*)

Of those listed above the most established and problematic is that of common buckthorn (*Rhamnus cathartica*) or glossy buckthorn (*Frangula alnus*). Very similar to the Rines Forest infestations, this invasive shrub has completely taken over large portions of the understory, chocking out all other species. The outbreaks seem to be associated both with soil condition (wet areas) and light treatment. Given the widespread nature of this infestation a significant, multi-measure control plan should be considered at this time. Currently, there are no known biological control measures available for buckthorn control as is the case for Purple Loosestrife.

The control plan should include a means of mechanically cutting the well established stems, some of which are 20' tall. Plants this tall cannot be adequately controlled, and increases the risk of applying chemicals off target, if a chemical approach is selected.

#### **IPM Action Plan**

- Mechanically remove as much buckthorn as possible as part of harvest plan (winter 2012)
- Treat by hand those stems that were missed during harvest (summer 2013)
- Chemically treat sprouts with a quality sub-contractor (fall 2013)
- Hand pull remaining individual (summer 2014)
- Monitor and hand pull, retreat chemically as needed (ongoing)

Please note that the IPM is a living document and will be completed in conjunction with an independent vegetation control expert.