

INVASIVE PLANT MANAGEMENT PLAN

FOR THE

TOWN OF ENFIELD, NEW HAMPSHIRE

April 13, 2023

Prepared for:



TOWN OF
ENFIELD
New Hampshire

Prepared by:

**DuBois
& King** inc.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

PART 1. ASSESSMENT OF NON-NATIVE INVASIVE SPECIES IN ENFIELD

INTRODUCTION.....	1
Project Purpose.....	1
Community Background.....	2
What Are Invasive Plants?.....	3
METHODS.....	5
Field Inventory & Mapping.....	5
Prioritization & Ranking.....	7
RESULTS & DISCUSSION.....	7
Town-owned parcels.....	8
Rights-of-way.....	8
Cemeteries.....	8
CONCLUSIONS.....	9

PART 2. MANAGEMENT PLANNING MATERIALS

MANAGEMENT SCHEDULING.....	10
TYPES OF INVASIVE SPECIES CONTROL	10
BEST MANAGEMENT PRACTICES.....	11
REFERENCES.....	16

APPENDIX I. Invasive Species Descriptions and Tips for Control

APPENDIX II. Ecological Assessment of High Priority Parcels

APPENDIX III. Maps of Invasive Species on High Priority Parcels

APPENDIX IV. Maps of Priority Right-of-Way Areas for Invasive Species Control

LIST OF FIGURES

Map 1. Study Area

Table 1. Prohibited Invasive Species Abundance

Table 2. Watch List Invasive Species Abundance

Table 3. Town Parcel Invasive Plant Inventory Results and Prioritization for Control

EXECUTIVE SUMMARY

The Town of Enfield supports abundant water resources, large tracts of protected land, and diverse recreational assets. However, non-native invasive plant species are taking a toll on the town's landscapes. Economic and environmental impacts of these invasive plants can include infrastructure damage due to soil erosion, degradation of recreation areas such as along trails and at lakeshores, increased crop and livestock management challenges, and an overall loss of wild animal and plant diversity.

Based on extensive field survey work and documented analysis, this Invasive Plant Management Plan provides a coordinated, prioritized strategy for limiting and reducing invasive land plants on town-owned parcels, and within rights-of-way along town-owned roads. The plan has four goals:

- Prevention
- Detection and prioritized response
- Effective control
- Restoration

Complete eradication of invasive plants is not a reasonable goal of any town-wide program, given the aggressive nature of these plants, and that their spread is a wider, regional, issue. That said, it is possible to effectively prevent the spread of invasive plant species into new areas, and to remove some populations before they become larger.

The first critical step in this work is to establish a clear baseline of the existing conditions. Therefore, in the summer and early fall of 2022, the project team from DuBois & King surveyed about 400 acres of town-owned parcels, and about 66 miles of the rights-of-way along town-owned roads. The team identified 36 separate invasive plant species, and over 3,500 individual plants or plant groupings. This document is complemented by an associated GIS dataset and mapping of this work, with spatial and other fine-grained details for all surveyed invasive plant locations.

The GIS data, maps, tables, and detailed site analyses and recommendations in this plan are tools that will be utilized in the next phase of this project: implementation. Working with the DuBois & King team, Enfield will select a private company of licensed professionals to undertake the hands-on invasive plant control work prioritized herein, which is focused on efficiently, and effectively, benefiting, and rejuvenating, the town's ecological, economic, recreational, and aesthetic assets.

For example, the George Pond Access, while itself a small parcel, is at the northern limits of a 434-acre Prime Wetland, and supports a diversity of natural communities. Fortunately, the invasive plants that were documented at this location are highly accessible, and removing them will help to preserve the integrity of the Prime Wetland, as well as the aesthetic and recreational attributes of George Pond. As such, this plan identifies the George Pond Access as a High Priority location for invasive plant control. Mascoma Lakeside Park is similarly prioritized, as it is an accessible and attractive, and also ecologically important, community resource. With wise investment, strategic targeting of efforts, and continued diligence on its lands, Enfield can feel confident that it will achieve significant and worthwhile results in these and other locations throughout the town.

While the mapping and control of existing invasive plant populations is vital, the project team was happy to find many areas of lakeside shoreline, wetland, and interior forest habitat in Enfield that are still ecologically thriving, with few or no invasive plants. A small cobble berm at the shores of Mascoma Lake even supports a population of the state-endangered sandbar willow. Every effort should be made to maintain these areas in this healthy condition.

Also, over its 20 days of surveying, the project team spoke with many community members, curious about the work, that have the interest and energy to support invasive plant control efforts on town lands, as well as on their own properties. As this interest and energy, as well as work on private lands, will be critical to achieving long-term positive impacts, this plan offers suggestions for continued and effective public engagement and education.

The DuBois & King team is pleased to provide the Town of Enfield with this Invasive Plant Management Plan, and looks forward to working with the town to support its successful implementation.

PART 1. ASSESSMENT OF NON-NATIVE INVASIVE SPECIES IN ENFIELD

INTRODUCTION

Enfield's green spaces, waterways, and road corridors are a shared resource that connect Enfield's people—to their past, present, and future. However, non-native invasive plants dominate portions of these spaces, leading to a loss of native biodiversity and other significant ecological and economic threats. Dense infestations of invasives can even limit public access for recreation, from the trails at Bicknell Brook Conservation Area to the shores of Mascoma Lake. This plan is intended to be the basis for discussion with town staff and key stakeholders on a wise and appropriate path towards protecting and enhancing its natural resources.

Invasive plants can be extremely difficult to control or eradicate once established, and the corresponding adverse effects can be irreversible. The town has made excellent progress with specific targeted species, such as limiting the spread of Eurasian Milfoil in Mascoma Lake. However, Enfield does not currently have an integrated town-wide management approach for dealing with invasive plants. The approach used to address other invasive species such as Japanese knotweed (*Reynoutria japonica*) has often been site-specific, typically undertaken by private property owners or as focused initiatives by stewardship groups.

A big-picture, action-oriented approach to invasive plant management is needed in order to prioritize control projects within the town. Therefore, this project pairs landscape-scale analysis with boots-on-the-ground ecological assessment to prioritize locations where the town can focus its resources and maximize results.

Based on discussions with residents that the project team had over the course of town-wide field inventories, Enfield contains numerous valuable ecosystems and public assets that are worth conserving. They form a physical legacy for future generations, and in undertaking the work discussed in this plan, the community will also be handing down a rich legacy of sound land stewardship.

PROJECT PURPOSE

Beginning in the summer of 2022, the Town of Enfield began a comprehensive invasive plant inventory of its town-owned lands as part of a five-year project to develop and implement a comprehensive, effective, and feasible Invasive Plant Management Plan.

Though a comprehensive inventory of the entire town was beyond the scope of this project, our goal was to inventory and map invasive species on all town-owned parcels and roadside rights-of-way in Enfield. Inventoried parcels ranged from highly disturbed areas to pristine tracts of forest and Prime Wetland, and roadsides ranged from significant collectors such as Lockhaven Road to remote, Class 6 roads such as Mud Pond Road. By sampling from a variety of landscapes and land use types across Enfield, we sought to capture the diversity of invasive plant species present within the town, as well as lend insight into their abundance and distribution.

This Invasive Plant Management Plan has been prepared to meet the purpose of the New Hampshire Department of Agriculture's Chapter Agr 3800, Invasive Species, to prevent and control the spread of invasive plant species, to minimize the adverse environmental and economic effects of invasive species, and to protect the public from potential health problems attributed to invasive species.

Further, this plan outlines a vision for preserving and enhancing the functions and values of intact natural communities, rare species, and other important natural features within Enfield. While complete eradication of invasive plants across Enfield is not a stated or realistic goal, this plan is designed to limit the spread of these species to the maximum extent practicable. To this end, this project seeks to:

1. Inventory invasive plants on Enfield's town-owned lands and within rights-of-way, in order to develop a baseline for control efforts;
2. Prioritize areas for invasive plant control efforts based on context and/or significance of natural features;
3. Identify appropriate strategies for controlling and/or limiting the spread of invasive plant species within these areas (e.g., mechanical digging or cutting, or herbicide application);
4. Control/Remove - Recommend control methods and develop removal plans;
5. Renew - Restore select treatment sites to a native ecological state following the removal of invasive species; and
6. Promote Stewardship - Educate, inform, and provide outreach to town staff, volunteers, and the public in order to provide long-term support for successful invasive plant control efforts and foster greater understanding of the value of invasive species control.

This plan is a living document, and should be revisited and revised periodically to reflect the dynamic nature of invasive plants and the state of knowledge of best management practices (BMPs). Community leaders and interested community members should help to revise this plan based on evolving knowledge, particularly of "what works in Enfield," with refinement based on prioritized objectives and successful implementation strategies.

* * *

"We have allowed alien plants to replace natives all over the country. Our native animals and plants cannot adapt to this gross and completely unnatural manipulation of their environment in time to negate the consequences. Their only hope for a sustainable future is for us to intervene to right the wrongs that we have perpetrated."

— Douglas W. Tallamy, *Bringing Nature Home: How Native Plants Sustain Wildlife in Our Gardens*

COMMUNITY BACKGROUND

Enfield contains 43.1 square miles and a variety of landcover types, from open, grassy ski slopes to the mature second-growth forests of the Henry Laramie Wildlife Management Area. Elevation in the town

ranges from 751 feet above sea level at Mascoma Lake to over 2,000 feet near Halfmile Pond. This variation in topography, elevation, and landcover sets the stage for a diversity of ecosystems and habitat types.

Enfield boasts a remarkable network of waterways, lakes, ponds, and wetlands. There are five Prime Wetlands and numerous smaller wetlands mapped throughout the town. These wetlands and the town's numerous surface streams are essential to the healthy functioning of the watershed for ecological benefits such as wildlife habitat, as well as flood risk management, pollution control, and public enjoyment and recreation. Most of the town is in the Mascoma River Watershed, along with portions of at least 10 other communities. Many of Enfield's riparian areas and wetland complexes are mapped as Wildlife Corridors and Highest Ranked Wildlife Habitat by New Hampshire's 2020 Wildlife Action Plan.



Wire Sedge-Sweet Gale Fen, an uncommon wetland type, at George Pond

The town also includes large tracts of contiguous forest, some of which are mapped by the state as Prioritized Habitat Blocks. These areas provide habitat for species that require interior forest conditions such as wide-ranging bobcat and interior-nesting wood thrush. The presence of large forest blocks is notable, and fortunate, because invasive species tend to colonize disturbed forest edges, and are generally less abundant in the mature forest interior.

The 2021 Natural Resources Inventory prepared by the Enfield Conservation Commission includes more good information about the town's diverse natural features, particularly related to how land use and land development patterns intersect with wildlife stewardship efforts.

WHAT ARE INVASIVE PLANTS?

Invasive plants are non-native species whose introduction to an area may cause harm to its environment. Invasive plants often out-compete native plants and contribute to the decline of native plant species diversity. Generally, these species have aggressive reproductive strategies and efficient dispersal methods. For example, Japanese knotweed spreads readily by small vegetative propagules; in this way, it has colonized many stretches of the shores of the Mascoma River. Along with reducing the aesthetic value of some rivershore areas— where the knotweed hedges obstruct views of the water from the adjacent upland— this species likely increases soil erosion along the Mascoma River, as it roots more shallowly than native riparian plants.



One of many extensive stands of invasive Japanese knotweed along Enfield's roadways.

The shift to invasive species dominance may also adversely impact the health of animal populations, as many of these plants do not provide the nutritional support or habitat that these animals have evolved to require. The aggressive growth of these species can have negative effects on forest regeneration (following timber harvest, disease, fire, etc.), increase the cost of agriculture via the need for eradication, and threaten recreational experiences, such as by rendering hiking trails impassable, or disrupting views.

Invasive plants alter the physical structure of an area, with potentially harmful effects on humans as well as wildlife. For example, while deer ticks transmit Lyme Disease to humans, infected tick eggs and larvae are primarily spread by rodents such as the white-footed mouse and voles. In areas where densely growing invasive plants create a barrier to raptors, rodent activity has been found to increase (Dutra et al. 2011). In turn, this can increase the incidence in tick presence and the contraction of Lyme Disease in humans. Japanese barberry (*Berberis thunbergii*) in particular has also been studied for its ability to create a more humid environment for ticks, allowing them to stay active longer and find host mammals (Williams et al. 2017).

Though the spread of invasive species is considered a major threat to biodiversity, these species are not intrinsically bad. Most invasive plants in the United States were deliberately introduced, often for the very horticultural features that make them so adaptable in the landscape: they are hardy under a variety of conditions, they tend not to be eaten heavily by native insects, in the case of trees they provide abundant shade, they flower (and therefore seed!) profusely, they spread quickly to fill out a garden plot. It is humans' decisions regarding species introductions and land use that have led to the spread of these species, so it is fitting that we take responsibility for their ongoing management.

METHODS

FIELD INVENTORY AND MAPPING

During the 2022 growing season, the project team surveyed approximately 66 miles of rights-of-way along town owned roads, and approximately 400 acres of town-owned property across 33 parcels (Figure 1). Surveys were conducted by foot over the course of twenty days. Invasive species were mapped as point and polygon features using a handheld Trimble Geo7x GPS.

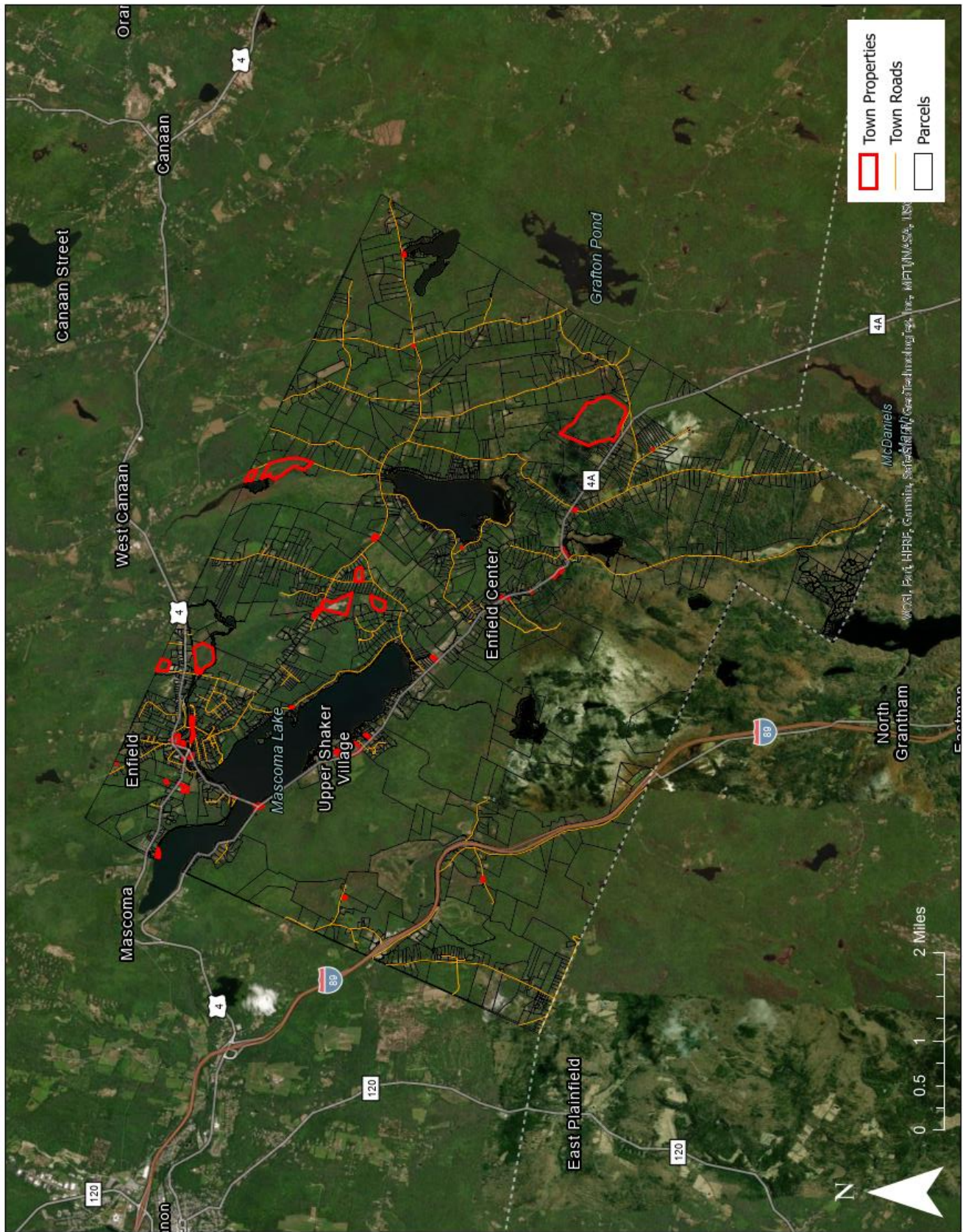
Invasive plants included in our GPS mapping efforts were limited to those listed on the New Hampshire Prohibited Invasive Species List in Chapter Agr 3800 of the New Hampshire Administrative Code, as well as those species listed on the NH Invasive Plant Species Watch List developed by the New Hampshire Invasive Species Committee.



*Project Lead and Field Naturalist/Wetland Scientist Grace Glynn, MS
at Bicknell Brook Conservation Area*

Though comprehensive aquatic NNIS surveys by boat were beyond the scope of this study, aquatic NNIS were noted and mapped when encountered along shorelines. Information on aquatic NNIS in Enfield can be found in presentation materials prepared by Amy Smagula of the New Hampshire Department of Environmental Services and posted on the Mascoma Lake Association's website. The Mascoma Lake Association is also active in eradicating invasive plants in that waterbody, patrolling its waters in the S.S. Milfoil.

A full-page map of the project study area is included on the following page.



Map 1. Study Area showing the 33 town parcels and 66 miles of town roads surveyed for invasive plants

MANAGEMENT PLANNING METHODOLOGY: PRIORITIZATION PROCEDURE

To prioritize town-owned parcels for control of NNIS, the project team reviewed *Prioritizing Areas for Invasive Plant Management Mapping*, a model created by the NH Fish & Game Department and the NH Natural Heritage Bureau (2015). This mapping strategy visualizes priority areas based on the ecological significance of an area, the ecological services provided, and the potential for NNIS to spread to new areas.

The project team also considered the following factors, based on results of our field inventory:

- Presence of rare species, rare natural communities, or high quality examples of common natural communities;
- Culturally important land uses (recreational lands, residential development, agricultural land, scenic viewsheds, etc.);
- Educational/outreach potential;
- Physical accessibility for implementation of control measures;
- Presence of Prohibited invasive species; and
- The likelihood of the plant causing serious environmental, aesthetic, or economic harm if uncontrolled.

RESULTS & DISCUSSION

A total of 36 non-native invasive plant species (NNIS) were observed and mapped across town-owned lands in Enfield. Of the 36 species observed, 17 are listed by state statute as Prohibited and 19 are listed by the New Hampshire Invasive Species Committee as Watch List species of concern. Overall, we mapped approximately 3,716 individual plants, though it was not possible to count the exact number of individuals of clonal species such as Japanese knotweed and coltsfoot. Overall, the most abundant NNIS were coltsfoot (*Tussilago farfara*), glossy buckthorn (*Frangula alnus*), Morrow's honeysuckle (*Lonicera morrowii*), climbing nightshade (*Solanum dulcamara*), and multiflora rose (*Rosa multiflora*). A summary of findings and recommended control methods can be found in Table 1 (Prohibited species) and Table 2 (Watch List species) below. Detailed descriptions of each invasive species observed, as well as more detailed notes on recommended controls, can be found in Appendix I of this document.

Town-owned Parcels

NNIS were mapped on 24 out of the 33 inventoried town-owned parcels. The most common NNIS in wetland areas were glossy buckthorn and purple loosestrife (*Lythrum salicaria*). Invasive species were generally less common in forested parcels; invasives commonly mapped in forested upland areas included Japanese barberry, broad-leaved helleborine (*Epipactis helleborine*), and Morrow's honeysuckle. Rare and/or high quality wetland natural communities were observed on numerous town-owned parcels and are described in Appendix II. In addition, a population of the state endangered sandbar willow (*Salix exigua* ssp. *interior*), a species previously unknown from Grafton County, was identified on one town-owned parcel. Seven parcels were identified as high priority areas for NNIS control based on our inventory results, as detailed in Table 3; invasive plant populations on high priority parcels are shown on maps in Appendix III.

TABLE 1. PROHIBITED INVASIVE SPECIES ABUNDANCE

Scientific Name	Common Name	# of Individuals Mapped	# of Populations Mapped	Impacts*	Recommended Control** M= Mechanical C= Chemical	Time of Year	Notes
<i>Acer platanoides</i>	Norway maple	9	3	Biodiversity loss/soil alteration	M: Pull seedlings C: Glyphosate	M: Spring after Leaf-Out C: Fall	
<i>Alliaria petiolata</i>	Garlic mustard	47	5	Biodiversity loss/soil alteration	M: Hand Pull/Cutting C: Glyphosate	M: Before Flowering C: June	Difficult to eradicate; long-term seed viability
<i>Berberis thunbergii</i>	Japanese barberry	60	15	Public health threat	M: Hand Pull/Dig C: Glyphosate, Triclopyr	M: Spring C: Late Summer	
<i>Berberis vulgaris</i>	European barberry	2	2	Public health threat	M: Hand Pull/Dig C: Glyphosate, Triclopyr	M: Spring C: Late Summer	
<i>Celastrus orbiculatus</i>	Oriental bittersweet	1	1	Biodiversity loss; habitat alteration	M: pull small, gap cut large C: Gap cut and paint Tricolpyr	M: Late Summer C: Late Summer	Soil viability of seed: 1+ years
<i>Eleagnus umbellata</i>	Autumn olive	9	15	Biodiversity loss	M: Dig or Cut C: Systemic: foliar, cut stem	M: Any C: Summer	Fruit edible
<i>Euonymus alatus</i>	Burning bush	23	8	Biodiversity loss	M: Pull or dig C: Glyphosate	M: Any C: Summer, Fall	
<i>Frangula alnus</i>	Glossy buckthorn	531	49	Loss of recreation access	M: Pull or Dig C: Triclopyr cut and paint	M: Any C: Late Summer, Fall	
<i>Ligustrum vulgare</i>	Common privet	2	2	Habitat alteration	M: Dig C: Glyphosate cut, paint, wait	M: Any C: Late Summer	
<i>Lonicera tatarica</i>	Tatarian honeysuckle	26	10	Biodiversity loss	M: Pull or Dig C: Glyphosate, Triclopyr	M: Moist Soil C: Fall	
<i>Lonicera morrowii</i>	Morrow's honeysuckle	462	33	Biodiversity loss	M: Pull or Dig C: Glyphosate, Triclopyr	M: Moist Soil C: Fall	
<i>Lysimachia nummularia</i>	Moneywort	5	5	Biodiversity loss/Habitat alteration	M: Pull C: Glyphosate ok for wetlands	M: Any C: Summer	Clonal, mat-forming; rarely produces seed
<i>Lythrum salicaria</i>	Purple loosestrife	182	12	Habitat alteration	M: Pull seedlings C: Glyphosate ok for wetlands	M: Spring C: Soon after flowering	Prohibited exotic aquatic weed per Env-Wq 1303.02
<i>Phragmites australis</i>	Common reed	12	6	Habitat alteration/loss of recreation access	M: Pulling, frequent mowing C: Glyphosate ok for wetlands	M: Any, growing season cuts C: Midsummer-Fall	Prohibited exotic aquatic weed per Env-Wq 1303.02
<i>Reynoutria japonica</i>	Japanese knotweed	137	38	Water quality	M: Full removal or repeat cuts C: Glyphosate foliar	M: Any and all C: Soon after flowering	Clonal; spreads primarily by propagules; difficult to eradicate
<i>Rhamnus cathartica</i>	Common buckthorn	23	9	Biodiversity loss	M: Full removal or cut C: Glyphosate cut and paint	M: Any C: Late Fall	
<i>Rosa multiflora</i>	Multiflora rose	209	24	Public health threat	M: Pull, brush hog cut C: Systemic after cut & knee high	M: Any, growing season cuts C: Summer	Soil viability of seed: 20 years

* Impacts considered in the context of Enfield

** see this plan's Invasive Plant Information pages for more detail



TABLE 2. WATCH LIST INVASIVE SPECIES ABUNDANCE

Scientific Name	Common Name	# of Individuals Mapped	# of Populations Mapped	Impacts*	Recommended Control** M= Mechanical C= Chemical	Time of Year	Notes
<i>Aegopodium podagraria</i>	Bishop's goutweed	124	7	Can become dominant in floodplain forests	M: Mow/trim, black plastic C: Systemic foliar application	M: Leaf out, late spring C: Active growing season	Soil viability of seed: short, 1-2 years
<i>Artemisia vulgaris</i>	Common wormwood	21	22	Pollen causes hay fever	M: Mow 3+ times per year C: Picloram, clopyralid repeated	M: Growing season C: Fall	Spreads mostly by rhizomes; likely spread by movement of root propagules by mowing
<i>Barbarea vulgaris</i>	Garden yellow-rocket	1	1	Unknown	M: Pull by hand C: Systemic foliar application	M: Before seeding C: Before seeding	
<i>Centaurea jacea</i>	Brown knapweed	1	1	Biodiversity loss	M: Pull by hand, black plastic C: Clopyralid, picloram	M: Growing season C: Before seeding	
<i>Chelidonium majus</i>	Greater celandine	6	3	Biodiversity loss	M: Pull by hand C: Systemic foliar application	M: Before seeding C: Before seeding	Sap can irritate skin
<i>Cicerbita muralis</i>	Wall lettuce	11	1	Biodiversity loss	M: Pull by hand C: None	M: Before seeding C: N/A	Milky sap can irritate skin. Pull for 3 years to deplete seed bank
<i>Cirsium arvense</i>	Canada thistle	12	4	Biodiversity loss	M: Black plastic, repeat pulling C: Glyphosate	M: Any C: Late Summer, Fall	
<i>Cirsium vulgare</i>	Bull thistle	4	3	Biodiversity loss	M: Black plastic, repeat pulling C: Glyphosate	M: Any C: Late Summer, Fall	
<i>Epipactis helleborine</i>	Broad-leaved helleborine	49	12	Unknown	M: Pull by hand C: None	M: Any C: N/A	
<i>Glechoma hederacea</i>	Gill-over-the-ground	3	3	Habitat alteration	M: Pull by hand C: Systemic foliar application	M: Spring C: During flowering, after frost	
<i>Hylotelephium telephium</i>	Purple orpine	96	19	Unknown	M: Pull by hand C: None	M: Before seeding C: N/A	
<i>Pastinaca sativa</i>	Wild parsnip	1	1	Biodiversity loss, particularly in meadows	M: Pull by hand, Mowing C: Glyphosate	M: Before seeding C: Early spring/late fall above 50°	Sap can severely burn skin; protect skin and eyes during control efforts
<i>Phalaris arundinacea</i>	Reed canarygrass	29	20	Biodiversity loss, particularly in meadows	M: Pull/dig, black plastic, repeat mow C: Glyphosate ok for wetlands	M: Any, growing season mow C: Early spring	Clonal
<i>Robinia pseudoacacia</i>	Black locust	187	28	Soil alteration; biodiversity loss	M: None C: Triclopyr cut and paint	M: N/A C: Winter dormancy	
<i>Rosa rugosa</i>	Beach rose	4	1	Biodiversity loss, particular on lakeshores	M: Dig C: Glyphosate cut and paint	M: Any C: Winter dormancy	Fruits, seeds, and rhizomes can float and be transported by water
<i>Rumex acetosella</i>	Sheep dock	1	1	Unknown	M: Pull by hand C: Dicamba, triclopyr	M: Any C: Before seeding	
<i>Solanum dulcamara</i>	Climbing nightshade	216	38	Habitat alteration; public health threat	M: Pull or dig C: Clopyralid, triclopyr	M: Before fruiting C: Summer	Wear gloves when handling; poisonous to humans, pets, and livestock
<i>Tussilago farfara</i>	Coltsfoot	1,190	53	Unknown	M: Pull or dig small areas C: Glyphosate	M: Before fruiting C: Summer	Clonal, herbaceous perennial
<i>Vinca minor</i>	Lesser periwinkle	20	9	Habitat alteration	M: Dig C: Mow + glyphosate	M: Any C: Spring	

* Impacts considered in the context of Enfield

** see this plan's Invasive Plant Information pages for more detail



TABLE 3. TOWN PARCEL INVASIVE PLANT INVENTORY RESULTS AND PRIORITIZATION FOR CONTROL

Place Name	Size (acres)	Use Type	Priority Species for Control	NH Priority Areas for Invasive Species Management Ranking	Notes
Lakeside Park	3.25	Park & Recreation	burning bush, common buckthorn, multiflora rose, Morrow's honeysuckle, glossy buckthorn, Japanese knotweed, purple loosestrife	High	Good potential for volunteer efforts and public education; knotweed limited to one small patch near water; parcel highly visible to public
Huse Park & Enfield Community Building	5.8	Park & Recreation	common buckthorn, glossy buckthorn, Japanese barberry, Japanese knotweed, Morrow's honeysuckle, multiflora rose, Norway maple	Medium	Knotweed impeding river view and access; potential for volunteer efforts and public outreach
Johnston Drive Waterfront	17	Park & Recreation	beach rose, glossy buckthorn, Japanese knotweed, multiflora rose	High	Knotweed limited to one small polygon abutting the rail trail
Suki's Marsh	12	Conservation-Focus	Moneywort, glossy buckthorn	Medium	Wetland along Shaker Hill Rd is a headwaters wetland; focus control efforts in this area
Spectacle Pond Access	0.3	Boat Launch/Water Access	Common reed	High	Common reed spreading into mowed right-of-way
George Pond Access	1.8	Boat Launch/Water Access	Glossy buckthorn	Medium	Hydrologic connectivity to Mascoma Lake. Control invasives along Rt. 4A in order to protect wetland
Geise Police Facility and Whitney Hall	30	Municipal Function	burning bush, common buckthorn, glossy buckthorn, Japanese barberry, Japanese knotweed, Morrow's honeysuckle, multiflora rose, purple loosestrife	Medium	Knotweed stands are isolated; good candidates for control
Union Street Frog Pond	13	Conservation-Focus	Japanese knotweed, multiflora rose, Norway maple, moneywort, common buckthorn, Tatarian honeysuckle	High	Large knotweed stand near road; high-quality wetland habitat in center of parcel
Mud Pond Conservation Land	46	Conservation-Focus	Glossy buckthorn, Japanese barberry, Morrow's honeysuckle	High	Difficult access may impede control efforts
Bicknell Brook Conservation Land	157	Conservation-Focus	Glossy buckthorn	High (wetland); Low (upland)	Monitor upland forest--which is currently free of invasives--for future invasions
Mascoma Boat Launch / Shakoma Beach Parking	2	Boat Launch/Water Access	Glossy buckthorn, Japanese barberry, Morrow's honeysuckle, purple loosestrife	High	Lakeshore in good condition and dominated by sweetgale, alder, and buttonbush; control for purple loosestrife recommended
Depot Street Station	0.6	Municipal Function	Garlic mustard, glossy buckthorn, multiflora rose, moneywort	Medium	Spread along bike trail may pose difficulty in long-term garlic mustard control
Blacksmith Alley	0.2	Municipal Function	Japanese knotweed	Medium	Knotweed control may improve river access and aesthetics
Pine Dr. Sewer Pump Station	0.1	Municipal Function	Morrow's honeysuckle, multiflora rose	High	
McConnell Well Access/Pump Station	34	Municipal Function	Glossy buckthorn, purple loosestrife	High	Difficult access may impede control efforts
Downtown River Parking Lot	0.2	Municipal Function	Glossy buckthorn, Japanese knotweed, Norway maple	Medium	Knotweed limited to small patch; good candidate for control
DPW Shedd Street Facility	29	Municipal Function	Japanese knotweed	Medium	Knotweed currently somewhat contained
Public Works Facility	28	Municipal Function	Autumn olive, coltsfoot, garlic mustard, Japanese knotweed, glossy buckthorn, Morrow's honeysuckle	Low	Recommend controlling invasive species in vicinity of any fill that will be used elsewhere in the town
Maple Street Storage Building	0.04	Municipal Function	Morrow's honeysuckle	Low	
Shaker Recreation Park	15	Park & Recreation	None	Medium	
Veteran's Memorial Park	0.2	Park & Recreation	None	Medium	
Transfer Station	20	Municipal Function	Common reed, glossy buckthorn, Japanese knotweed, Morrow's honeysuckle	Medium	Wetland area is high in watershed; control of common reed recommended. Control of invasives along road--which cuts through wetland--recommended
Enfield Center Town Hall	0.23	Municipal Function	None	Low	
Enfield Center Fire Station	0.23	Municipal Function	None	Low	
Lakeview Cemetery	2.2	Cemetery	Morrow's honeysuckle	Medium	
Montcalm Cemetery	2.2	Cemetery	None	Medium	
Lockehaven Cemetery	1.2	Cemetery	None	Low	
George Hill Cemetery	0.5	Cemetery	None	Low	
Purmort Cemetery	0.5	Cemetery	None	Low	
Union Cemetery	0.4	Cemetery	Moneywort, Morrow's honeysuckle	Low	
Follensbee Cemetery	0.3	Cemetery	None	Medium	
Enfield Center Cemetery	0.1	Cemetery	None	Medium	
Adams Cemetery	0.05	Cemetery	None	Low	

HIGH PRIORITY

MEDIUM PRIORITY

LOW PRIORITY



Rights-of-way

Invasive species were present on nearly all road edges inventoried, with the exception of some entirely mowed road edges adjacent to mowed lawns, such as the right-of-way along Birch Lane. The most common invasive species mapped on roadsides, by far, was coltsfoot. Though abundant, this low-growing species was often contained to the mowed right-of-way, and may not have substantial impacts on surrounding areas. Glossy buckthorn was also very common along roadsides, including prolific seedlings.

Many NNIS populations extended off of the right-of-way, continuing onto adjacent private parcels. These populations will be difficult to control without partnership with these adjacent private landowners. Such a partnership would be valuable in areas where landowners are in close proximity to areas of ecological significance (such as parcels along Bog Road, which is in close proximity to a Prime Wetland that sits high in the watershed, ultimately draining into Mascoma Lake). High priority areas for control efforts along rights-of-way are shown in the maps in Appendix IV.

Cemeteries

Invasive species were minimal in the nine cemeteries inventoried, which range in size from the 0.05 acre ($\pm 2,200$ square foot) Adams Cemetery on George Hill Road to the 2.2 acre ($\pm 96,000$ square foot) Lakeview and Montcalm cemeteries on Route 4 and Route 4A respectively. Most of these cemeteries are largely open and devoid of vegetation beyond a mowed or trimmed surface layer of turf grass, mosses, and other ground-hugging herbaceous perennials surrounding the monuments and markers.

At Union Cemetery, this perennial "carpet" included a significant amount of the Watch List species sheep dock (*Rumex acetosella*), which thrives in mowed, sunny areas, as well as the Prohibited species moneywort (*Lysimachia nummularia*). The cemetery edge included 15 individuals of the Watch List species purple orpine (*Hylotelephium telephium*) and two Morrow's honeysuckle. At Lakeview Cemetery, two Morrow's honeysuckle shrubs were mapped along the western edge of the parcel.



Mature sugar maples at Lockehaven Cemetery

Lakeview Cemetery also has a scattered collection of well-maintained younger cedar trees (*Juniperus* sp.) and flowering ornamental trees and large shrubs.

Lockehaven Cemetery is notable for its older sugar maples (*Acer saccharum*), which add to this cemetery's historic character. (As suggested in Part 2 of this document, the town should consider planting young trees at Lockehaven Cemetery to replace these sugar maples, which will have to be removed as

they become increasingly structurally unstable with greater age.) Montcalm Cemetery also has a few older deciduous trees, primarily sugar maples.

These cemeteries have a greater number of shrubs and trees around their less-maintained edges, just outside of the areas delineated by fences or walls. Maintaining the central open portions of these cemeteries as-is, with perennial groundcovers along with specimen shrubs and trees, should continue to limit the number and spread of invasive plants at these town-owned cemetery properties.

CONCLUSIONS

Complete eradication of invasive plants is not a reasonable goal of this control program, given the aggressive nature of most invasive plants once they become established– none of these species are brand new to our area, or exist only in Enfield. Rather, the goal of the control efforts is to prevent the introduction and spread of invasive plant species into new areas not previously colonized, and to eradicate relatively small populations in sensitive or otherwise highly valued locations before they become larger. Therefore, this plan aims to minimize the long-term workload associated with invasive plant control by prioritizing areas for control and monitoring. Management recommendations are summarized below:

- Focus control efforts on new infestations, beginning with those that are the fastest growing, cause the most damage, and occur near uninfested natural areas, such as small, isolated stands of Japanese knotweed.
- Focus control efforts on invasive species that have only just begun to appear on town lands, such as Oriental bittersweet. Monitor for seedlings for at least five years.
- Prioritize control of Prohibited plants and place less of a priority on Watch List plants. Monitor Watch List species, as over time it is likely that some Watch List plants will be "upgraded" to Prohibited status.
- Focus control efforts on priority parcels (see Table 3).
- Strategically focus control efforts on priority areas of the rights-of-way, as shown in Appendix IV, rather than attempting to eradicate invasive species on roadsides contiguous to already-infested areas.
- Educate and support landowners willing to control invasives on their private properties, especially on parcels adjacent to ecologically important areas.
- Follow BMPs for mowing and ditching along road rights-of-way.
- Replant with site-appropriate native plants, to help prevent new infestations where invasives have been removed, and to improve the overall ecological health of Enfield's natural places. Part II of this document includes lists of native plants to consider for replanting at various sites (along roadsides, in meadows, near water, etc.).
- Avoid or minimize fragmentation of interior forest blocks and wildlife corridors in future planning and land development activity.
- Consider a holistic, watershed-level approach for future control efforts of species commonly transported along waterways, such as Japanese knotweed.

PART II: MANAGEMENT PLANNING MATERIALS

MANAGEMENT IMPLEMENTATION AND SCHEDULE

The time to begin managing invasive plants is before they arrive in a particular location. Once they get a foothold, the best chance at controlling them is to start management as soon as possible, saving considerable time and money in the future. This plan prioritizes the control or eradication of invasive plants that have already become established in the area, and outlines practices to prevent the introduction of new invasive plants.

The schedule for the recommended control method(s) will depend on the types of controls recommended and the species identified. For example, cultural controls and mechanical removal of certain plants can be performed at almost any time of the year when plant species are identifiable (although ideally before they set seed), while herbicide applications may require that work be done at certain times during the growing season in order to be most effective.

For locations where invasive plant controls are implemented, monitoring performed in subsequent years will serve to assess the effectiveness of the work. Because viable root systems, spreading rhizomes and seeds persist in the soil for many years, large populations of invasive plants will almost certainly achieve more effective control with repeated manual removal efforts and/or herbicide applications over multiple growing seasons.

TYPES OF INVASIVE SPECIES CONTROL

There are four primary invasive plant control methods: cultural, mechanical, chemical, and biological.

These control methods may be combined to provide a more effective control strategy. The most effective general approach for controlling invasive species within the project area will be a combination of cultural methods (i.e., prevention of invasive species introduction and spread), mechanical removal, and the careful, targeted application of chemical herbicides in selected locations.

Cultural Control - Cultural controls are important methods to reduce the spread of invasive plants to areas not previously colonized. Methods such as immediate seeding with an approved, native seed mix and mulching disturbed soils can be effective at minimizing the opportunities for the establishment of invasive plant species. Additional cultural controls such as vehicle washing, isolation of excavated soils, and personal vehicle inspections as a consequence of public engagement are also effective in limiting the spread of invasive plants.

As many invasive plants thrive on recently disturbed land, broader cultural control efforts include working collaboratively with private property owners, within the context of adopted bylaws, to focus development activity so as to maintain larger contiguous tracts of undisturbed land.

Mechanical Control - Mechanical control measures such as digging, pulling, and cutting individual plants may be effective in controlling isolated invasive plants or small stands of plants. These methods are often

necessary in sensitive natural resource areas such as wetlands, streams, protected wildlife habitats, etc., where chemical control is not permitted or ecologically appropriate. However, such techniques may be labor-intensive and may be impractical in areas with dense infestations of invasive plants such as Japanese Knotweed (*Reynoutria japonica*).

Mechanical control in small areas may also include using thick plastic sheeting to either heat the soil or block direct sunlight for long enough that the plants and seed bank underneath is killed or substantially degraded, allowing for easier removal and/or replanting with native species.

Chemical Control - Chemical control (herbicides) is a common option used for controlling invasive species. If used selectively and in limited areas by properly licensed individuals, herbicides can be applied in an environmentally beneficial manner to provide effective control while adhering to applicable state and federal herbicide application regulations. In addition, herbicide applications often provide the most cost-effective method for controlling dense infestations of invasive plants.

The type of herbicide(s) to be used, method of application, and schedule for application will be determined based on the locations of the targeted areas and the particular invasive plant to be controlled.

The use of surfactants, which help to break down the waxy cuticle of leaves and increase the herbicide's effectiveness, are generally discouraged near waterways and wetlands, as well as drainage swales, except on a limited basis where the surfactant product, or herbicide/surfactant pre-mix, has been explicitly approved for such use.

Herbicide applications shall be performed according to applicable laws and regulations put forth by the New Hampshire Department of Agriculture, Markets & Food, Division of Pesticide Control, as well as NHDES and the U.S. Environmental Protection Agency. For example, any volunteers that may be applying herbicides (pesticides) on town properties shall be properly licensed, with the town designated as the "firm" of record. The town itself shall also have a supervisory applicator license holder as well. Contact the New Hampshire Department of Agriculture, Markets & Food, Division of Pesticide Control with any questions about this critical licensure process: www.agriculture.nh.gov/divisions/pesticide-control/licensing.htm

Biological Control - Biological controls can be effective in controlling some invasive plants under certain conditions. For example, loosestrife beetles (*Galerucella californiensis* and *Galerucella pusilla*), which are native to Europe and Asia, may be useful in controlling populations of purple loosestrife (*Lythrum salicaria*). However, adverse impacts to non-target species are sometimes an unintended consequence of biological controls. Therefore, this plan does not include recommendations for the biological control of any of the inventoried invasive plants.

BEST PRACTICE: MOWING IN THE RIGHTS-OF-WAY

Adjust and customize right-of-way mowing to prevent spreading seed, and when possible, to prevent seed set in established patches. In other words, don't spread the species by mowing. In general, this means

mowing the rights-of-way during the month of July, to the extent possible given personnel and equipment availability. Keep a close eye on all your roadways and identify newly-occurring individual plants and very small new patches of these invasives. Eliminate/eradicate those newly-occurring individual plants and very small new patches using methods appropriate for the species. Sustain this program on a continuing basis. Unless resources are available to accomplish all of these priority control tasks, aggressive and more costly control of well-established populations should only be conducted if it can be justified for specific localities.

See also the New Hampshire Department of Transportation (NH DOT) 2008 *Best Management Practices for Roadside Invasive Plants*.

BEST PRACTICE: REPLANTING WITH NATIVES

As noted above, "cultural controls" for invasive plant management reduce the spread of invasive species to areas not previously colonized. This strategy also includes replanting where invasive plants have been removed, with locally-sourced plants that are native to the area. There are many good guides to planting with native plants in New Hampshire and New England, including:

- *Deer-Resistant Native Plants for the Northeast*, by Ruth Rogers Clausen and Gregory D. Tepper
- *Native Plants of the Northeast, A Guide for Gardening and Conservation*, by Donald J. Leopold
- *The Northeast Native Plant Primer: 235 Plants for an Earth-Friendly Garden*, by Uli Lorimer
- *Native Plant Gardening for Birds, Bees & Butterflies: Northeast*, by Jaret C. Daniels
- The UNH Extension Website: extension.unh.edu

The above resources focus on the importance of native plants in strengthening the evolved relationships among plants and animals, particularly the pollinator species on which our food systems are dependent. For Enfield and other public agencies with limited budgets and personnel, it is also important to consider how these plants will be maintained: Do they require regular pruning? Are they likely to require supplemental watering during dry spells? How well will they handle the bump of a soccer ball, and the trampling kids running after it? Critically, are they more likely than other plants to be browsed by deer, so that they'll have to be replaced in a few years?

All plants require some care, particularly at the time of planting and as they get established. However, based on the above considerations, the following lists of native groundcovers, shrubs and small trees are relatively low maintenance in the long term, and appropriate for planting on Enfield's public lands and along its rights-of-way. The plants on this list:

- require little pruning (unless encroaching into roads or paths, or have dead limbs that might fall);
- are adapted to the local climate;
- are hardy during times of stress such as drought;
- are reasonably tough (less fragile);
- are relatively deer-browse resistant; and/or
- Are non-poisonous, if a few leaves or berries are ingested by children or pets.

Note that many of the location categories below overlap. For example, an unmowed roadside may also be at a forest edge, or a meadow planting area may also be next to a parking lot or recreation facility.

Plants for unmowed road rights-of-way, including ditches

Little Bluestem, *Schizachyrium scoparium*
Purple Lovegrass, *Eragrostis spectabilis*
Virginia Creeper, *Parthenocissus inserta* or *Parthenocissus quinquefolia*
Virgin's Bower, *Clematis virginiana*
Teaberry or Wintergreen, *Gaultheria procumbens*
Sweetfern, *Comptonia peregrina*
Carolina Rose, *Rosa carolina*
Golden Groundsel, *Packera aurea*
Lowbush Blueberry, *Vaccinium angustifolium*
Smooth Arrowwood, *Viburnum dentatum*
Bush Honeysuckle, *Diervilla lonicera*
White Meadowsweet, *Spiraea alba*

Plants for next to parking lots

Little Bluestem, *Schizachyrium scoparium*
Bush Honeysuckle, *Diervilla lonicera*
Shrubby Cinquefoil, *Potentilla fruticosa*
White Meadowsweet, *Spiraea alba*
Switch Panicgrass, *Panicum virgatum*
Smooth Arrowwood, *Viburnum dentatum*
Sweetfern, *Comptonia peregrina*

Plants for near active recreation facilities

Purple Lovegrass, *Eragrostis spectabilis*
Switch Panicgrass, *Panicum virgatum*
Little Bluestem, *Schizachyrium scoparium*
Sweetfern, *Comptonia peregrina*
Oakleaf Hydrangea, *Hydrangea quercifolia*
Black-eyed Susan, *Rudbeckia hirta*
Small Bayberry, *Morella caroliniensis*
Common Witch-hazel, *Hamamelis virginiana*

Plants for the water's edge

Blue Iris, *Iris versicolor*
Atlantic Azalea, *Rhododendron atlanticum*
Rhodora, *Rhododendron canadense*
Speckled Alder, *Alnus incana*
Small Bayberry, *Morella caroliniensis*
Gray Dogwood, *Swida racemosa*

Red-osier Dogwood, *Swida sericea*
Pussy Willow, *Salix discolor*
Sweet Gale, *Myrica gale*
Winterberry Holly, *Ilex verticillata*
Red Elderberry, *Sambucus racemosa*
Shadbush, *Amelanchier canadensis* or *Amelanchier laevis*
Spicebush, *Lindera benzoin*
Common Witch-hazel, *Hamamelis virginiana*

Plants for meadows (such as at Lakeside Park)

Wild Strawberry, *Fragaria virginiana*
Kalm's St. John's Wort, *Hypericum kalmianum*
Small Bayberry, *Morella caroliniensis*
New Jersey Tea, *Ceanothus americanus*
Common Milkweed, *Asclepias syriaca*
Swamp Milkweed, *Asclepias incarnata*
New England Aster, *Symphyotrichum novae-angliae* (and many other native Asters)
Horizontal Juniper, *Juniperus horizontalis*
Common Juniper, *Juniperus communis*
Shrubby Cinquefoil, *Potentilla fruticosa*
Black Chokeberry, *Aronia melanocarpa*
Shadbush, *Amelanchier canadensis* or *Amelanchier laevis*
American Cranberrybush Viburnum, *Viburnum opulus* var. *americanum*
White Meadowsweet, *Spiraea alba*

Plants for woodlands and woodland edges

Bush Honeysuckle, *Diervilla lonicera*
Red Elderberry, *Sambucus racemosa*
American Hazelnut, *Corylus americana* or *Corylus cornuta*
Shadbush, *Amelanchier canadensis* or *Amelanchier laevis*
Nannyberry Viburnum, *Viburnum lentago*
Flowering Raspberry, *Rubus odoratus*
Winterberry Holly, *Ilex verticillata*
Spicebush, *Lindera benzoin*
Common Witch-hazel, *Hamamelis virginiana*

As with any planting scheme, it is important to take a "right plant - right place" approach. This approach includes practices such as:

- Planting sun-loving plants in the sun, and shade-loving plants in the shade. Same goes for water.
- Giving the plants plenty of room to grow to healthy maturity, whether along a road or next to a soccer field, a parking lot, or a building.
- Making sure that clear sight lines are maintained at intersections, where there is pedestrian activity, or for other public safety and security purposes where good visibility is required.

- Be aware of subsurface obstructions, whether pipes and conduit, or bedrock.
- For plants that attract many bees, locate them away from where many people gather!

Area nurseries are a good source for more information and planting guidance, as well as a good source for plant material that should be suited to local conditions and particular planting locations. Ideally, this plant material has also been grown locally, utilizing seed or other parent material (e.g., rootstocks) that have also been sourced or grown locally. This helps to support and sustain local ecotypes (genetically and geographically distinct varieties).

BEST PRACTICE: CEMETERY TREES

Enfield manages many cemeteries, from the larger Lakeview Cemetery and Montcalm Cemetery, to the very small Adams Cemetery along George Hill Road. The project team noted that most of these cemeteries have relatively little vegetation, other than mown grasses and groundcovers. This makes sense, as this type of landscape is relatively easy to care for. Lakeview Cemetery has a mix of younger and less mature trees, and larger shrubs that are attractively maintained.

However, it was also observed that within, and surrounding, these cemeteries are many larger trees that have reached maturity. Lockhaven Cemetery in particular has a number of beautiful but aged sugar maples. Some of these trees may have been young when the first monuments were installed.

While the focus of this plan is on invasive plant management, it is worth noting under the larger scope of land stewardship, while they are generally in decline and may live for only a few more decades, these mature trees add a great deal to the character of these places. With this in mind, when these trees inevitably have to be removed, so that their structural failure does not damage monuments or potentially cause injury, it would be good if their replacements are already in the ground and growing. Furthermore, non-native invasive species are more likely to gain a foothold when the shade of these canopy trees is lost.

Therefore, Enfield should consider planting young trees, such as sugar maples and other native trees in Lockhaven Cemetery, in any available locations, so that the next generation of beautiful trees is gaining stature when their elders pass on.

BEST PRACTICE: COMMUNITY ENGAGEMENT AND EDUCATION

- Centralized Resources (e.g., Town Website, UNH Extension)
- Workshops and Demonstrations for invasive plant identification and safe and successful control
- Volunteer Event Days
- Empowering "what's possible" on private properties, with a defined "Yard, Path and Node" management approach

[Jan 2023 Note: This section will be expanded as additional recommendations and outreach strategies will be discussed with the town.]

SUPPORTING PLAN MATERIALS

A shapefile including all invasive species location data collected during field inventory has been provided along with this plan. Information on population size is included in the Attributes.

Detailed species descriptions and control tips can be found in Appendix I.

An ecological assessment of high priority parcels can be found in Appendix II.

Maps of priority parcels for control are included in Appendix III.

Maps of priority ROW areas for control are included in Appendix IV.

REFERENCES

Dutra, H.P., Barnet, K., Reinhardt, J.R., Marquis, R.J., Orrock, J.L. Invasive plant species alters consumer behavior by providing refuge from predation. *Oecologia*. 166(3), 649-657 (2011).

Enfield New Hampshire Conservation Commission. 2021. *Natural Resources Inventory Enfield New Hampshire 2021*.

New Hampshire Fish and Game Department and NH Natural Heritage Bureau Invasive Plant Working Group. Version 1.1, September 2015. *Picking our Battles: A Strategic Plan for Invasive Plant Management*.

Sperduto, D.D. and William F. Nichols. 2011. *Natural Communities of New Hampshire*. 2nd Ed. NH Natural Heritage Bureau, Concord, NH. Pub. UNH Cooperative Extension, Durham, NH

Williams, S.C., Linske, M.A., and Ward, J.S. Long-Term Effects of *Berberis thunbergii* (Ranunculales: Berberidaceae) Management on *Ixodes scapularis* (Acari: Ixodidae) Abundance and *Borellia burgdorferi* (Spirochaetales: Spirochaetaceae) Prevalence in Connecticut, USA. *Environmental Entomology* 46(6), 1329-1339 (2017).

APPENDIX I: INVASIVE SPECIES DESCRIPTIONS

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Includes Prohibited and Watch List Species

The information herein has been collated or adapted from the following sources:

1. NH DOT, Best Management Practices for the Control of Invasive and Noxious Plant Species, 2018. www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/documents/FINAL-ENV1Manual1-InvasiveSpecies.pdf
2. New Hampshire Department of Agriculture, www.agriculture.nh.gov/divisions/plant-industry/invasive-plants.htm
3. Vermont Invasives, www.vtinvasives.org
4. Windham County, Vermont, Natural Resources Conservation District, <https://windhamcountynrcd.org>
5. Maine Natural Areas Program, www.maine.gov/dacf/mnap/features/invasive_plants/invasives.htm
6. University of Connecticut Extension, author Donna Ellis. news.extension.uconn.edu/2017/04/21/controlling-oriental-bittersweet/
7. New York Invasive Species Information Clearinghouse, www.https://nyis.info
8. Lower Hudson Partnership for Regional Invasive Species Management, www.lhprism.org
9. Pennsylvania Department of Conservation and Natural Resources, Invasive Plant Fact Sheets. www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/Pages/default.aspx
10. Invasive Plants of Ohio, www.oipc.info
11. Maryland Department of Natural Resources, dnr.maryland.gov/Invasives/pages/default.aspx
12. North Carolina Extension Gardener Plant Toolbox, plants.ces.ncsu.edu
13. Michigan Invasive Species, www.michigan.gov/invasives
14. Wisconsin Department of Natural Resources, dnr.wisconsin.gov/topic/Invasives
15. Minnesota Department of Natural Resources, www.dnr.state.mn.us/invasives/terrestrial/index.html
16. Missouri Department of Conservation Field Guide, mdc.mo.gov/discover-nature/field-guide
17. Washington State Noxious Weed Control Board, www.nwcb.wa.gov
18. Center for Invasive Species and Ecosystem Health, www.invasive.org
19. United States Geological Survey, Nonindigenous Aquatic Species (NAS) System, nas.er.usgs.gov
20. National Park Service, www.nps.gov
21. Global Invasive Species Database, www.iucngisd.org/gisd

Note: The following pages describe plant control methods, particularly using herbicides, that should be undertaken in accordance with their use instructions and all applicable regulations, and with due care.

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Plants listed: (P = Prohibited per NH Agr 3800; WL = NHISC Watch List)

1. *Acer platanoides* Norway maple - P
2. *Aegopodium podagraria*, bishop's goutweed - WL
3. *Alliaria petiolata*, garlic mustard - P
4. *Artemisia vulgaris*, common wormwood - WL
5. *Barbarea vulgaris*, golden yellow-rocket - WL
6. *Berberis thunbergii*, *Berberis vulgaris*, barberry: Japanese and European - P
7. *Celastrus orbiculatus*, Oriental bittersweet - P
8. *Centaurea jacea*, brown knapweed - WL
9. *Chelidonium majus*, greater celandine - WL
10. *Cicerbita muralis*, wall lettuce - WL
11. *Cirsium arvense*, *Cirsium vulgare*, thistles: Canada and bull - WL
12. *Eleagnus umbellata*, autumn olive - P
13. *Epipactis helleborine*, broad-leaved helleborine - WL
14. *Euonymus alatus*, burning bush - P
15. *Frangula alnus*, glossy buckthorn - P
16. *Glechoma hederacea*, gill-over-the-ground - WL
17. *Hylotelephium telephium*, purple orpine - WL
18. *Ligustrum vulgare*, common privet - P
19. *Lonicera tatarica* & *Lonicera morrowii*, honeysuckles: tatarian and morrow's - P
20. *Lysimachia nummularia*, moneywort - P
21. *Lythrum salicaria*, purple loosestrife - P
22. *Pastinaca sativa*, wild parsnip - WL
23. *Phalaris arundinacea*, reed canarygrass - WL
24. *Phragmites australis*, common reed - P
25. *Reynoutria japonica*, Japanese knotweed - P
26. *Rhamnus cathartica*, common buckthorn - P
27. *Robinia pseudoacacia*, black locust - WL
28. *Rosa multiflora*, multiflora rose - P
29. *Rosa rugosa*, beach rose - WL
30. *Rumex acetosella*, sheep dock - WL
31. *Solanum dulcamara*, climbing nightshade - WL
32. *Tussilago farfara*, coltsfoot - WL
33. *Vinca minor*, Periwinkle/Myrtle - WL

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

***Acer platanoides*, Norway maple (Prohibited)**

Norway maple is a large deciduous tree that can grow up to approximately 40-60 feet in height. It is tolerant of many different growing environments, and has been a popular tree to plant on lawns and along streets because of their hardiness and shade-producing canopy. However, they are also prolific seed producers and are now invading forests and forest edges.

The dense canopy of Norway maples, and a relatively short winter dormancy requirement for seedlings, this plant can out-shade and outcompete native trees that occupy similar niches, such as Sugar Maple. A shallow root system makes growing difficult for other native shrubs and wildflowers in the understory.

Mechanical Control

Seedlings of Norway maple can be pulled from moist soil before they get too large. Other types of manual removal include digging out saplings and root systems or cutting down large trees. Girdling the trees by removing the bark layer (including the cambium) can also be performed, but is most effective in the spring. Leftover stumps can be ground out or new growth that develops from old stumps can be cut in future years.

Chemical Control

Some chemical herbicides, such as glyphosate or triclopyr may be useful for control.



Norway maple leaves
brickfieldspark.org



Milky sap in base of leaf stem (petiole)
canadiantreetours.com

***Aegopodium podagraria*, bishop's goutweed (Watch List)**

Bishop's goutweed is an aggressive herbaceous perennial that forms dense patches by means of its long, branching rhizomes. Its toothed, sometimes irregularly lobed leaves are divided into three groups of three leaflets. Foliage of the "wild" type is medium green in color; a commonly planted variegated form has bluish-green leaves with creamy white edges. Small, white, five-petaled flowers arranged in flat-topped clusters are produced in mid-summer, and held above the ground on a leafy stem up to about three feet tall.

Bishop's goutweed was apparently first brought to North America as an ornamental during the early stages of European settlement and was well established in the U.S. by the mid 1800s. It is found in old

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

gardens and flowerbeds, around shrubs and other plantings, and in a variety of other disturbed habitats such as felled forests, abandoned fields, and pastures. It thrives especially well in shaded areas, although seedlings generally need recently disturbed soil and rather bright light in order to survive.

Bishop's goutweed apparently does not form a long-lived seed bank, and the seeds generally germinate the year after ripening. Establishment of goutweed seedlings in the shade is rare. The primary vector for dispersal to new areas is humans. Most bishop's goutweed colonies spread to neighboring natural areas from intentional plantings, or by the dumping of yard waste that includes discarded rhizomes.

Mechanical Control

Small patches of bishop's goutweed can be eliminated by careful and persistent hand-pulling or digging up of entire plants along with their (rhizomes). Pulled plants can be piled up and allowed to dry for a few days before bagging and disposing of them.

Where appropriate, frequent short mowing may control or slow the spread of bishop's goutweed in lawns, along roadsides, and other areas.

Preventing bishop's goutweed from photosynthesizing in early spring (at the time of leaf-out) can control the plant by depleting its carbohydrate reserves. Cover the patch with black plastic sheeting when the leaves start to emerge from the ground in the spring, and leave it in place through the summer. Or, cut all plants once they've fully leafed out in later spring, using a mower or weed-whacker, and then cover the area with plastic.

Chemical Control

The systemic herbicide glyphosate may be useful. Herbicide should be applied while the plant is actively growing, in the spring through mid-summer.



***Alliaria petiolata*, garlic mustard (Prohibited)**

This species is frequently found in moist, shaded soil of river floodplains, forests, edges and openings, especially in disturbed areas. Garlic mustard is associated with calcareous soils and does not tolerate high acidity.

Garlic mustard was likely introduced into the United States by early European settlers for culinary or medicinal purposes. It was first recorded in Long Island, New York in 1868.

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Garlic mustard is a cool season biennial herb with triangular to heart-shaped leaves. Leaves give off an odor of garlic when crushed. First-year plants appear as a rosette of leaves that remain green through winter, maturing the following spring. Button-like clusters of white flowers give way to erect, slender pods by May. Dead stalks of dry, brown seed pods hold viable seeds throughout the summer.

Garlic mustard plants develop rapidly, each individual producing thousands of seeds that scatter nearby.

Because white-tailed deer find garlic mustard distasteful, they further its expansion by eliminating native competition, as well as by exposing the soil and seedbed through trampling.



Garlic mustard year 2 leaves and flowers
phytoimages.siu.edu



Garlic mustard year 1 basal leaves
weedwise.conservationdistrict.org

Highly shade-tolerant, garlic mustard is capable of invading high-quality, mature forests. To the detriment of spring wildflowers, garlic mustard quickly forms monocultures by monopolizing resources. Its allelopathic compounds inhibit seed germination of other species.

Mechanical Control

Because garlic mustard seeds can remain viable in the soil for five years or more, effective management is a long-term commitment. The goal of management is to prevent further seed production and stop or slow the development of pioneering colonies. For small infestations, hand pulling is extremely effective. Larger infestations may be controlled by cutting. This should be done when the plant is in flower, before it sets seed. All plant material should be removed from the site following treatment, since seeds can still develop on cut stems.

Chemical Control

For heavy infestations, where the risk to non-target species is minimal, the systemic herbicide glyphosate may be useful. Herbicide can be applied at any time of the year, including winter (to kill overwintering rosettes) as long as the temperature remains above 50° F, and rain is not expected for at least eight hours. Chemical control is best done in late fall when most native plants are dormant.

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

***Artemisia vulgaris*, common wormwood (Watch List)**

An herbaceous perennial native to northeastern Asia, common wormwood (also frequently called mugwort) grows two to five feet in height, has gray-green leaves, and inconspicuous flowers blooming in late summer. All parts of the plant are aromatic when crushed.



Common wormwood plants
calphotos.berkeley.edu

Common wormwood primarily spreads aggressively via an extensive rhizome system and can form large stands that displace native species. Sexual reproduction is possible; the plant does produce plenty of viable seed each year, and although these seeds lack a specific dispersal mechanism, they can be distributed via agricultural products, such as hay, small animals, wind, water, and soil, where they remain viable for three to four years.

This plant is considered a problematic weed of nurseries, orchards, sports fields, forest edges, and roadsides. Common wormwood is wind-pollinated, and therefore produces a lot of pollen that can be distributed over long distances, causing severe allergic symptoms in humans. Common wormwood is difficult to eradicate because its rootstock overwinters in the ground and it has a large seed bank.

Mechanical Control

Mechanical control is difficult. Pulling by hand is an ineffective method of control and may even stimulate increased growth due to rhizome fragmentation. Common wormwood is also highly tolerant of mowing, although at least three mowings per year for at least two years can decrease infestation size. For greatest effectiveness, mowing works best in conjunction with chemical control. If mowing is utilized as a management method, it must be completed before fall seed set.

Chemical Control

Common wormwood is tolerant to a variety of herbicides and generally requires repeat applications to achieve suppression or control. Higher rates of control can be achieved with picloram and clopyralid as opposed to glyphosate.



Common wormwood closeup of top
naturalalchemy.com

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Sequential mowing coupled with sequential herbicide treatments will provide the highest rate of control. Plants should be mowed at least twice prior to foliar applications, and at least two applications will be necessary during the first year of control, ideally beginning in late spring. For very small infestations, cutting and spot spraying or careful hand pulling (making sure to extract as much of the rhizome as possible) will eventually achieve eradication.

***Barbarea vulgaris*, golden yellow-rocket (Watch List)**



Golden yellow-rocket
missouriplants.com

Golden yellow-rocket can be a winter annual or biennial and reproduces from seed. Seeds germinate in the spring or fall. Young leaves are round or egg-shaped and on short stalks. The first year of development ends as a basal rosette of foliage, with lobed lower leaves. The flowering stems are produced during the second year, and can eventually exceed two feet in height, with yellow clusters. The fruiting stalk remains all summer if not mowed.



Golden yellow-rocket basal leaves
wildflowers.clockwork-orrey.com

A native of Europe and Asia in the mustard family that is widely naturalized in North America, it has been here so long that there are historic records of the Cherokee using it medicinally. It occurs in cultivated and fallow fields and pastures, on stream banks, along roadsides and railroads, in waste places, and in a variety of open, disturbed areas. Golden yellow-rocket can be a problem in turf, nursery production or in the landscape.

Mechanical Control

Golden yellow-rocket produces a tap root, but can be hand removed when small.

Chemical Control

Herbicides such as glyphosate are effective against golden yellow-rocket.

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

***Berberis thunbergii*, *Berberis vulgaris*, barberry: Japanese and European (Prohibited)**

Japanese barberry was introduced into the United States as an ornamental plant in 1875. It was promoted as a substitute for European barberry, which was found to be a host for the black stem grain rust. Japanese barberry is still widely planted for landscaping and hedges, European barberry much less so, though both are considered invasive in New Hampshire.

Barberry is shade tolerant, drought resistant and adaptable to a variety of wooded habitats, wetlands and disturbed areas.

Barberry produces a large number of seeds that have a high germination rate. Seeds are dispersed by birds and small mammals, which feed on the berries. Barberry can spread vegetatively by rooting from branches touching the ground.

Barberry forms dense stands in natural habitats including forests, open woodlands, wetlands and meadows. Once established, it displaces native plants and reduces wildlife habitat and forage, increasing pressure on natives by white-tailed deer. It has been found to alter the pH and biological activity of soil. Barberry is also a human health hazard, not only because it has sharp spines, but also because it acts as a nursery for deer ticks, which can transmit Lyme disease.

Mechanical Control

Barberry is easy to identify in spring because it is one of the first shrubs to leaf out. Using thick gloves (due to the thorns), small plants can be pulled by hand, while larger plants should be dug up. Be sure to remove the entire root system and to bag and dispose of any plant material, including fallen fruits. Mowing or cutting is not advisable, except to make removal easier.

Chemical Control

Systemic herbicides, such as glyphosate and triclopyr, are effective in managing invasive barberry. Herbicide can be applied as a basal bark or cut stump application. Late summer during fruiting may be the best time to apply herbicide, but early spring applications may avoid non-target impacts. Large thickets of barberry can be controlled with foliar spray applications. Triclopyr only targets broadleaf species, but glyphosate is non-selective.



***Celastrus orbiculatus*, Oriental bittersweet (Prohibited)**

Oriental bittersweet is a perennial, woody vine that can ascend to the tops of canopy trees or sprawl horizontally across fields. The light brown stems grow 2-4 inches in diameter and grow up to 59 feet in length. Leaves are alternate and rounded and scalloped/toothed along the edges, often with pointed tips. The white to greenish flowers they produce tend to bloom in clusters from May to June. The red berry fruits ripen in September and remain on the vine through most of the winter.



Seedlings not in the immediate area of mature vines can be distinguished from those of American bittersweet as leaves unfold in the spring.

Oriental bittersweet is native to temperate east Asia, and it was introduced to the US in the mid-1800s for ornamental use. It is widespread in the Northeast, in forests, forest edges, shrublands, meadows, fencelines, waste areas with exposed soil, and along the edges of roads and lawns. It does best in sunny places, but can persist in the shady understory as well.



Oriental bittersweet can harm or discourage other plants by shading, girdling, and breakage, and when it climbs high into trees the extra weight can increase damage and blowdowns from wind, snow, and ice storms.

Mechanical Control

Easily hand pulled (remove all roots) during the first year or two of growth. Remove all roots.

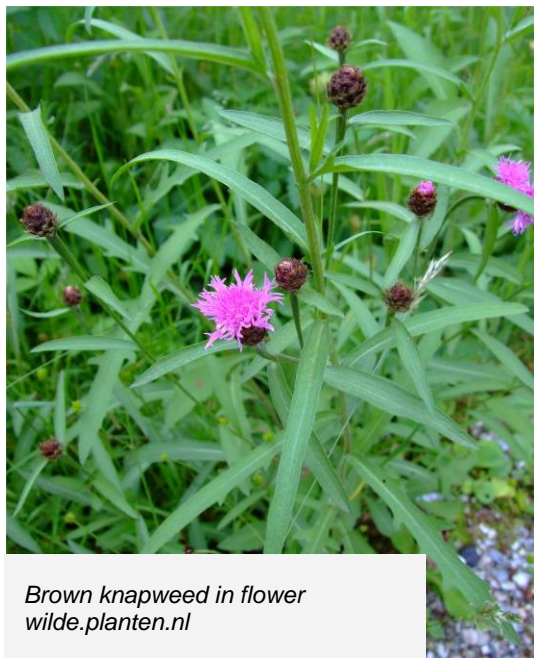
For larger vines up trees, gap cut out a several inch section of the vine in later summer, before fruits mature. There is less sprouting with a late summer cut, as compared with spring or fall, and it depletes stored carbohydrates. The vine will eventually die above the gap cut.

In the field, mow at least every other week. Less frequent mowing, such as 2-3 times per year, will only stimulate root sprouting.

Chemical Control

A chemical control option is the “cut and paint” method, which should also be done in late summer before the fruits mature. Make the same gap cut described above, and within 20 to 30 minutes, paint a concentrated herbicide like triclopyr (effective with woody invasives) to the lower cut surface.

***Centaurea jacea*, brown knapweed (Watch List)**



*Brown knapweed in flower
wilde.planten.nl*

Brown knapweed is a short-lived perennial belonging to the daisy family. It forms a basal rosette of unlobed leaves that eventually produce multiple flowering spikes one to four feet tall displaying summer-blooming, thistle-like flowers that are lavender-pink in color.

Although the species requires moisture at germination, it does not tolerate consistently moist conditions well and is a much better competitor on dry sites. Brown knapweed will not colonize closed canopy environments, having high light requirements. It can invade grasslands, open woods, meadows, pastures, woodland clearings, and cut areas of forest, crowding out native plants or forage.

Although no sources are certain when brown knapweed was first introduced from Europe to North America, the species was likely a contaminant of forage seed, or introduced deliberately as a forage plant itself.

Mechanical Control

Consistent pulling by hand is effective against brown knapweed, so long as all of the taproot is removed, so this is useful only for small populations. Mulching with black plastic is also effective at controlling small areas of brown knapweed.

Clopyralid and picloram are effective against brown knapweed when applied during active growth. Glyphosate is also effective against brown knapweed, but is not selective, and the slender form of brown knapweed can make it very difficult to avoid non-target plants.

Easily hand pulled (remove all roots) during the first year or two of growth. Remove all roots.

For larger vines up trees, gap cut out a several inch section of the vine in later summer, before fruits mature. There is less sprouting with a late summer cut, as compared with spring or fall, and it depletes stored carbohydrates. The vine will eventually die above the gap cut.

In the field, mow at least every other week. Less frequent mowing, such as 2-3 times per year, will only stimulate root sprouting.

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Chemical Control

A chemical control option is the “cut and paint” method, which should also be done in late summer before the fruits mature. Make the same gap cut described above, and within 20 to 30 minutes, paint a concentrated herbicide like triclopyr (effective with woody invasives) to the lower cut surface.

***Chelidonium majus*, greater celandine (Watch List)**

Greater celandine was probably introduced into New England by European settlers as an herbal remedy for skin diseases. It was reported to be in herb gardens as early as 1672. From these gardens, it escaped and spread across the landscape.

Greater celandine is a brittle, herbaceous perennial with ribbed stems and pubescent branches. Its leaves are deeply lobed. Both branches and leaves exude a yellow-orange sap if broken. From May to June, bright yellow, four-petaled flowers appear, which are followed by lumpy, linear seed capsules.

Greater celandine is a prolific seed producer. The small black seeds attract ant workers searching for food. The ants help to disperse the seeds, which easily germinate.

This plant could become abundant in minimally managed situations, a potential problem for native herbaceous species. Greater celandine is poisonous to mammals, including humans. Its sap is a skin irritant.

Mechanical Control

Preventing the plant from flowering or going to seed is essential. Greater celandine has a shallow root system and can be easily uprooted. It is effectively removed by hand. Be aware that the sap may cause skin irritation.

Chemical Control

Chemical control should be administered before seed set. Seedlings are quite sensitive to herbicide applications.



Greater celandine, flowers and seed pods
florafinder.org

***Cicerbita muralis*, wall lettuce (Watch List)**

Wall lettuce is a slender, glabrous, herbaceous plant. It is annual to biennial depending on the habitat. Stems are erect, 2-3 feet tall, branched above and may one or more stems from a fibrous root. The stem surface is glabrous, often glaucous, and exudes milky juice when broken.

Wall Lettuce reproduces exclusively by seed. A plant may produce up to 500 seeds in shaded sites and up to 11,500 seeds in open sites. Wall lettuce can grow in deep shade and full sun. It is adapted to a range of soil conditions. It readily invades disturbed habitats.



Mechanical Control

Wall Lettuce is easy to pull. Wear gloves, since the milky sap can irritate some people's skin. Pull gently and firmly by the base of the stem and it should pop out; or use a trowel if you need leverage. If the plant has a flower or wispy seed heads, pull them off and put them in a plastic bag for disposal; the rest of the plant can be composted, left on the ground to dry, or placed in a black plastic bag or a tarp to prevent re-growth.

Chemical Control

No recommendation; mechanical control is easily performed.

***Cirsium arvense*, *Cirsium vulgare*, thistles: Canada and bull (Watch List)**

Canada thistle and bull thistle were probably introduced into the United States from Europe by accident in the early 1600s. They are now found in all 50 states, and considered among the most tenacious and economically devastating agricultural weeds. They are becoming increasingly recognized as a problem in natural areas.

Canada thistle and bull thistle can be difficult to differentiate, as they both have notorious spiked leaves. If the thistle has rhizomes— or roots that extend out from one plant to grow another plant nearby— then it is likely a Canada thistle. If it does not have rhizomes but has a taproot and



Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

has spiny wings up the length of its stem that is needle-shaped, then it is a bull thistle. Bull thistles have also been described to be larger and “meaner-looking” than the Canada thistle.

Canada thistle is thought to have been brought over by the French to Canada during the 1800s as an alternative feed option for pigs and other livestock. It was initially native to eastern Europe and western Asia. It can most commonly be found in agricultural areas and along roadways where there are high levels of disturbance. In these areas, native thistles are often mistaken for invasive thistles and removed, which opens up a niche for the invasive thistles to inhabit. Bull thistle has a similar history, however, its introduction to the U.S. is less



*Bull thistle leaves and flowers
idfg.idaho*

certain. It likely wasn't used as feed stock, because while it is edible, its larger thorns can injure the mouths of livestock, leading to infection.



Their success in distribution can mainly be attributed to its diverse methods of dispersal, using both wind and animal transportation. The seeds can travel miles on the wind due to their light-weight nature and sail-like heads. They are also a food-source for small birds and can be ingested by herbivorous mammals while they are feeding on the leaves. Canada thistle was also found to be allelopathic, which means that it secretes chemicals from its roots that are toxic to surrounding plants, giving it an advantage. Thistles are notorious for draining nutrients from the soil around them, so they can be very damaging to pastures and crops. They

also use large amounts of water, so they can make soil dry and increase erosion potential.

Mechanical Control

For light infestations, black plastic sheeting can be used to smother these thistles. Repeated and frequent pulling or hand-cutting will eventually starve underground stems. This should be performed at least three times each season.

Hand-pulling Canada thistles is made more difficult by their large taproots. Bull thistles can be hand-pulled when they are mature and flowering, but since they grow very large, they may require herbicide or machinery to be effectively removed.

Chemical Control

In areas interspersed with desirable native plants, targeted application of a systemic herbicide, such as glyphosate, works well. For extensive infestations in disturbed areas, a broad application may be more

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

effective. Repeated applications are usually necessary in order to exhaust the seed bank. Herbicide treatment is best done in late summer or fall when plants are in the rosette stage. Varying the type of herbicide used will prevent clone colonies from becoming resistant.

***Eleagnus uelmellata*, autumn olive (Prohibited)**

Autumn olive is a deciduous shrub or small tree that grows to a height of 30 feet. Stems, buds, and leaves have a dense covering of silvery to rusty scales. At three years of age, plants typically begin to flower and fruit.

Autumn olive is native to China and Japan, and was introduced to North America in 1830. Until recently, the USDA Natural Resources Conservation Service recommended autumn olive for wildlife planting and windbreaks.

Autumn olive has nitrogen-fixing root nodules, which allows it to adapt to many poor soil types including bare mineral substrates. The plant grows in various open to semi-shaded habitats including old fields, grasslands, and woodlands, roadsides and open disturbed sites. It aggressively outcompetes native plants and shrubs, growing rapidly and re-sprouting quickly after cutting or burning. Its many fruits are primarily distributed by birds.

Mechanical Control

Manual removal of seedlings and saplings with their roots is most effective when soil is moist. Any remaining exposed roots should be cut off below ground level and buried. It can be minimally controlled with repeated mowing, but it resprouts vigorously and should be kept at brush height with regular mowing. Mechanical equipment such as bobcats can be used to completely remove adult shrubs/trees in large populations, but this is most effective when used in combination with herbicide application to any of the remaining stumps.

Chemical Control

Selective herbicide application is the most effective control method for this and other woody invasive plants, especially those that have extensive root systems like autumn olive. Herbicides can be applied to the foliage (during the growing season), cut stems, or bark at the base of stems/trunks. Systemic herbicides such as glyphosate are effective for foliar treatment, while triclopyr can be used for cut-stem or



Autumn olive
discoverlife.com



Autumn olive leaves and flowers
gobotany.nativeplanttrust.org

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

basal bark treatment. To be most effective, most herbicides require a penetrating or sticking agent. For shrubs that do not have to be removed, exposing more than 50% of the cambium by cutting into the bark with a saw or ax close to ground level and applying herbicide to the exposed areas is also effective.

***Epipactis helleborine*, broad-leaved helleborine (Watch List)**

Broad-leaved helleborine is a perennial forb in the Orchid family that grows to be one to three feet tall. Several stems appear and are covered with sparse wooly hair. It has many (3 to 30), alternate, clasping, oval-elliptical leaves with prominent parallel veins. Its green-purple nodding flowers bloom July to August.

Mechanical Control

Hand pulling is effective in controlling this species.

Chemical Control

No recommendation; mechanical control is easily performed.



Broad-leaved helleborine
minnesotawildflowers.info

***Euonymus alatus*, burning bush (Prohibited)**

Burning bush, also commonly known as winged euonymus, was introduced into the United States in 1860 for use as an ornamental shrub. Its attractive, bright red fall foliage and desirable form has made this shrub a popular ornamental and an easy go-to plant used by landscape designers. As a result, it is commonly planted along interstate highways, as hedges and in foundation plantings.

Burning bush is a fast growing, deciduous shrub that may reach five to 15 feet in height. Its green stems usually have prominent, corky wings. Elliptic leaves with finely serrated margins are arranged in opposite formation and turn a brilliant purplish-red to scarlet in the fall. Flowers are small and yellowish-green, becoming fruits that split to expose four red-orange seeds in late fall.

This shrub is a prodigious seed producer. Many germinate where they fall, close to the mother plant, creating a dense bed of seedlings. Others are carried by birds, allowing infestations to spread rapidly.



Burning bush
invasive.org

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Burning bush easily outcompetes native plants with its large, dense silhouette. Lacking pests and tolerant of deep shade, this shrub can force itself into moist forested sites, creating large thickets that displace native herbs and shrubs. This displacement has negative consequences for both aquatic and terrestrial ecosystems.



Burning bush leaves and flowers
gobotany.nativeplanttrust.org

Mechanical Control

Seedlings, up to two feet tall, can be easily hand-pulled, especially when the soil is moist. Larger plants must be dug out with a spading fork, pulled with a weed wrench, or cut. The stump must be ground out or the re-growth clipped; be sure to remove a majority of the root system.

Chemical Control

Glyphosate can be applied as a foliar spray or painted on cut stumps.

***Frangula alnus*, glossy buckthorn (Prohibited)**

Glossy buckthorn is a shrub or small tree growing to a height of 10 to 25 feet. The bark is gray or brown with closely spaced, white lenticels. The simple, alternate leaves are papery and dark green with a shiny upper surface and a dull, hairy or smooth lower surface. Pale yellow flowers emerge in small clusters from the leaf axils throughout the growing season. The round fruit is red to dark purple.



Glossy buckthorn
invasive.org

This plant was first introduced into the United States in the mid 1800s as an ornamental. It has been used for hedges and wildlife habitat.

Glossy buckthorn is particularly aggressive in wet areas, rapidly producing a dense shade that eliminates native

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

plants. It also engages in species-specific allelopathy, changing the structure of native plant communities.

Glossy buckthorn spreads by seed, recruiting birds that eat its prolific berries. Seeds may also be spread by water since fresh fruit can float for over two weeks. Dispersal may be significant in areas that receive frequent and extensive fall and winter flooding.



Glossy buckthorn leaves and fruit
theoec.org

Mechanical Control

If only a few seedlings are present, hand pulling can be effective if the roots are removed. Small populations of saplings can be removed by digging or the use of a weed wrench. In any location where saplings/seedlings are mechanically removed, monitor the site for new seedlings or re-sprouts from missed root fragments. Repeated cutting or mowing can be successful as long as the plants are cut or mowed consistently for multiple growing seasons.

Chemical Control

For larger populations and larger diameter individuals, foliar or basal bark treatments with glyphosate or triclopyr can be used and are most effective in late Summer or Fall. Brush applications on recently cut stumps will also achieve good results.

***Glechoma hederacea*, gill-over-the-ground (Watch List)**

Gill-over-the-ground is an evergreen, creeping, herbaceous perennial in the mint family that is native to Europe and Asia. It usually grows to one foot or less, branching frequently and forming a low-growing mat of heart shaped, scallop-edged, leaves across the ground. It is often found on roadsides, lawns, shady spots, waste places, and thickets. In early spring and summer, a stem grows upright to produce blue-purple flowers. After blooming, the upright stem arches down and creeps along the surface, for up to 30 inches, to form new roots at its nodes.

Gill-over-the-ground was brought to the United States from its native Europe likely for both food and medicinal reasons, first documented in New England in



Gill-over-the-ground
naturespot.org.uk

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

1672. Until the widespread use of hops in the 17th century, creeping Charlie was used regularly in beer and was known commonly as "ale ivy."

Due to its evergreen hardiness, it is sometimes a welcome and attractive groundcover on otherwise bare ground. However, it spreads aggressively and larger populations are difficult to destroy without resorting to herbicides.

Mechanical Control

Control of smaller populations can often be accomplished by hand-pulling. Plants pulled early in the season, and when the soil is moist to get the entire plant with its roots, are much easier to manage.

Chemical Control

Large infestations can be effectively controlled using any of several general use herbicides such as glyphosate, 2,4-D, dicamba, and mecoprop. In lawn areas, fall applications of fertilizer containing 2,4-D in lawn areas may be effective. Spot applications of 2,4-D in combination with dicamba and mecoprop can be used when plants are flowering or after the first hard frost in fall.

***Hylotelephium telephium*, purple orpine (Watch List)**

Purple orpine is a succulent perennial, with clustered, erect stems to over 2 ft tall, often red-tinged, with thick light-green leaves.

The species is originally from Europe to Asia, but has been widely introduced elsewhere, particularly North America. It can be found growing in fields, around hedges, and on gravelly soils such as along roadsides.



Purple orpine
gobotany.nativeplanttrust.org

Mechanical Control

Hand pulling is effective in controlling this species.

Chemical Control

No recommendation; mechanical control is easily performed.

***Ligustrum vulgare*, common privet (Prohibited)**

Common privet is a semi-evergreen shrub that often forms dense thickets, often found in low-lying forests, fencerows and hedgerows, old fields and rights-of-way. They show a preference for disturbed soils, but is Tolerant of a wide range of soils, except wet ones.

Common privet was originally imported from Europe for use in landscaping around 1860, and is still often used for easily pruned hedges.

Privets mainly spread to new areas via their seeds. Oftentimes, these are distributed by birds, which have eaten the fruit. Once introduced to an area, privet can regenerate from root and stump sprouts, making it difficult to eradicate. Privets can form dense thickets, which reduce light and moisture availability for native shrubs and wildflowers.

Mechanical Control

With smaller populations, hand removal can be used. However, fragments of root that are left behind in the ground can resprout.

Chemical Control

Larger areas can be treated with herbicides such as glyphosate. Herbicide can be applied to the leaves, or painted on cut stems or stumps. Once the herbicide is applied, disturbances to the privet should be avoided for approximately one year, in order for the herbicide to travel through the root system.



Common privet
forestryimages.org

***Lonicera tatarica*, *Lonicera morrowii*, honeysuckles: tatarian and morrow's (Prohibited)**

Tatarian and Morrow's Honeysuckle are vigorous, densely-branched, rounded, deciduous shrubs that typically grow to eight to twelve feet tall with branches arching at the top. They can be found in a variety of habitats including forests, wetlands and disturbed habitats like farm fence rows, roadsides and rights-of-way. They spread both vegetatively through runners



Tatarian honeysuckle leaves and berries
florafinder.org

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

and roots as well as by seeds. Birds and other wildlife readily consume the fruits.

These plants have historically been planted as an ornamental, for wildlife habitat and for erosion control, especially on farms.

Mechanical Control

For small patches, repeated pulling of the entire plant and root system may be effective, especially when the soil is moist. Mowing is NOT recommended, as it stimulates growth and leads to denser mats of vegetation.

Chemical Control

There are several systemic herbicides that will work on honeysuckles, including glyphosate and triclopyr. Regardless of the chosen control method, repeated monitoring and sprout removal may be necessary.

Tatarian honeysuckle flowers
en.wikipedia.org



Morrow's honeysuckle leaves and berries
invasive.org



Morrow's honeysuckle flowers
gobotany.newenglandwild.org

***Lysimachia nummularia*, moneywort (Prohibited)**

This herbaceous, low-growing perennial plant is part of the primrose family. It has ever-green to semi-evergreen leaves. The creeping stems can grow up to two feet long and form a mat-like growth. Leaves are opposite and oval in shape, resembling coins, hence its name. Small yellow flowers with small dark red spots bloom from June to August, but may not bloom at all.

This plant goes by many common names including creeping Jenny, creeping Charlie, creeping Joan, running Jenny,



Moneywort
florafinder.org

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

wandering Jenny and wandering sailor. It was introduced from Europe and southwest Asia as an ornamental ground cover.

This plant spreads vegetatively by its creeping stems, as well as by small seeds that are located within capsular fruits. These fruits are likely dispersed by flood waters and stormwater runoff. The extent to which this plant's seeds are spread by animals is not fully known, but it is likely.

Dense mats of this plant may take over habitat for more desirable native plant species.

Mechanical Control

The plant can be hand pulled, but all stems and stem fragments should be removed to prevent the stems from re-rooting. Planting native grasses can help to shade out this plant. Mowing is not effective since Moneywort grows so close to the ground.

Chemical Control

Several herbicides are effective in controlling moneywort. Because this plant usually grows in or near wetlands, make sure that the herbicide is approved for use in wetlands. Rodeo is one such herbicide that may be effective.

***Lythrum salicaria*, purple loosestrife (Prohibited)**

Purple loosestrife is a perennial herb with square, woody stems, which may grow anywhere from four to 10 feet high, depending on conditions. Its lance-shaped leaves occur in opposite or whorled arrangements. Magenta-colored flower spikes are present throughout much of the summer.



Purple loosestrife
wildflowers.clockwork-orrey.com

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Purple loosestrife was intentionally introduced into North America in the early 1800s as an ornamental, as well as accidentally by way of discarded ship ballast. It is now banned as a noxious weed in most states.



Purple loosestrife flowers
shop.garten-jan.de

With an extended flowering season, from June to September, and an unusually high number of flowering stems, each purple loosestrife plant is capable of producing two to three million seeds per year. Research has shown that cultivars, advertised as sterile, are capable of producing viable seed. This plant can also reproduce vegetatively by underground stems at a rate of one foot per year.

An enthusiastic invader of wetlands, purple loosestrife outcompetes native plants, including some federally endangered orchids, forming dense homogeneous stands.

These monocultures reduce habitat for waterfowl, clog waterways, disrupt nutrient cycling and collect debris, eventually displacing the entire wetland.

Early detection and prevention are the best approaches to managing purple loosestrife. Monitoring watersheds yearly to identify new infestations is critical, and can be most easily conducted in late July and August when the plant is in full bloom. Clean seed and plant parts from animals, equipment and clothing before entering wetland areas. Prevent nearby infestations from going to seed. Use native competitors as barriers.

Mechanical Control

Hand-pulling is only effective for seedlings with small roots. Mowing is not recommended, but may reduce the production of seeds. Flooding kills seedlings; established plants must be inundated for weeks. Unfortunately, this also kills desirable vegetation. The site may need to be replanted with native, competitive vegetation.

Chemical Control

Glyphosate is effective against purple loosestrife. Be sure to use an herbicide permitted for wetland use. Herbicides can be applied directly to cut stems to reduce collateral damage.

***Pastinaca sativa*, wild parsnip (Watch List)**

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Wild parsnip is a biennial/perennial herb that looks and smells similar to cultivated parsnip and can grow up to four feet in height. Leaves are alternate, compound and branched with jagged teeth. Some stems are hollow. Flowering occurs from May to June, when hundreds of yellow flowers develop. Flowers are arranged in an umbel.



Wild parsnip is closely related to carrot and parsley, and was introduced to the United States by early colonists as a food source. It was in cultivation in Virginia by 1609. The edible root of this cultivated form becomes sweeter after winter frost and was used as a sweetener in Europe before cane sugar was introduced. The escaped/invasive form is less palatable. Plant chemicals are known to reduce weight gain and fertility in livestock that eat wild parsnip.

Wild parsnip spreads primarily in disturbed areas, where it can form dense stands. It does not compete well in established grasslands but can invade along the edge, in degraded patches and also in prairie restorations. The primary goals for control are to prevent seed production, deplete the seed bank and prevent the arrival of new seeds from nearby populations.



Wild parsnip basal leaves and stem
all-creatures.org

The sap from wild parsnip stems and leaves contains a photosensitive chemical that can cause photodermatitis. After exposure to ultraviolet radiation from sunlight the affected skin may redden or blister like a severe sunburn within 48 hours, and the affected areas may remain discolored for two years. The effect is enhanced when skin is moistened by humidity or perspiration. Therefore, gloves and other protective clothing should always be worn when working with this Wild Parsnip.

Mechanical Control

Hand pulling over repeated years can be an effective control technique for small populations, as long as soil conditions allow for the removal of the tap root. If the root is not removed, it can re-sprout. Pulling should occur before seeds have ripened or it will facilitate dispersal.

Soil disturbance by hand pulling can also stimulate germination. Deliberate stimulation in this way may expedite depletion of the seed bank, speeding up long-term control. However, follow-up treatment of seedlings should be planned for at least four years.

Mowing over repeated years can be an effective control technique in sites where mowing does not harm other, desirable plants. It does not kill the plant, but it reduces seed production. Mowing should occur

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

after the emergence of flower heads, but before seeds enlarge. If mowing occurs too late, seeds will be dispersed. Four to five years of mowing before new seeds are produced usually provides adequate control.

Chemical Control

Glyphosate can provide effective control of wild parsnip. It should be applied as a foliar spray in the early spring and late fall to rosettes when native plants are dormant or senesced, but when temperatures are above 50 degrees. It can also be applied to bolting and flowering plants but should be done well before seeds ripen. Fall treatment will not control seedlings that emerge in the spring. Dry conditions may inhibit translocation of herbicide to roots.

Glyphosate should be used with a vegetable oil-based, multi-purpose adjuvant on upland sites or a wetland-approved, non-ionic surfactant in wetlands. Only aquatic formulations should be used in wetlands or when contact with surface waters is anticipated.

***Phalaris arundinacea*, reed canarygrass (Watch List)**

Reed canarygrass is large and coarse, reaching up to nine feet in height. Its flat, blue-green leaves are roughly textured. In June and July, large flower plumes are produced, which are green with a purplish tinge, eventually becoming light tan in color. The stems do not remain standing through the winter.

Both Eurasian and native ecotypes of reed canarygrass are thought to exist in the United States. Invasive populations may be descendants of non-native cultivars or ecotypes, although this is not clear. Aggressive strains have been



planted throughout the United States since the 1800s for forage and erosion control.

Although it produces few viable seeds, which are wind, water, animal and machine-dispersed, reed canarygrass manages to colonize new sites quite easily. Once established in a wetland, it spreads aggressively by way of rhizomes.

Reed canarygrass forms large, monotypic stands that harbor few other plant species and are little use to most native wildlife. It constricts waterways by promoting silt deposition, yet may also encourage erosion of soil

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

beneath its dense mats in places where water flows rapidly. Over time, it builds up a tremendous seed bank that will erupt when sites are treated for this invasive.

Mechanical Control

Small patches may be effectively dug up or hand pulled. They may also be covered by black plastic for at least one growing season. Be watchful of rhizomes spreading beyond the edge of the plastic. Mowing twice yearly (early to mid-June and early October) can help control dense stands. Disrupting the roots every two to three weeks weakens established plants and depletes the seed bank.

Chemical Control

In small populations, glyphosate can be applied directly to cut stems to avoid collateral damage to native plants nearby. Herbicide is best applied in early spring when most native species are dormant. Before applying herbicide, remove dead leaves from the previous year to maximize growing shoot exposure. Use a formulation of glyphosate designed for wetlands.

***Phragmites australis*, common reed (Prohibited)**

Common reed is a tall perennial grass that can reach 15 feet in height, and often found in or near wetlands and similar wet areas. A dense network of roots and rhizomes reach three feet underground. In July and late August, feathery pink plumes, or the dried plumes over the winter, are distinctive markers of this plant.

While there is also a native common reed of the same species, the invasive Common Reed is an introduction of a separate "genotype" from Europe that likely came to the United States in ships' ballast in the late 18th or early 19th centuries.

Common reed can rapidly take over wetland communities, crowding out native plants and altering wildlife habitat. Colonization of new sites is typically via wind-dispersed seeds, which are produced in abundance. Fragments of rhizomes may be washed to new locations along rivers and shorelines or transported by heavy machinery. Within an area that is already colonized, common reed spreads horizontally by sending out quickly growing rhizome runners.



Common reed (phragmites)
plantsandgarden.co.uk



Common reed inflorescence
invasive.org

Mechanical Control

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

If the population is small (less than 20 individuals), it may be possible to hand-dig the population. Extreme care should be taken to ensure that the rhizome system is removed intact and all new off-sprouts are found and removed. All plant material and rhizome should be bagged and removed from the site.

If possible given conditions, Mowing often (6-8 times during the growing season) where feasible is the most widely used method of stressing phragmites and encouraging native plants.

Chemical Control

Glyphosate (the formulation approved by the U.S. Environmental Protection Agency for use in wetlands is sold under trade names such as Rodeo, Aquaneat, and Aquastar) is a broad spectrum aquatic herbicide that is virtually non-toxic to mammals, birds, and fish when used according to instructions. All herbicides must include a non-ionic surfactant which allows the herbicides to adhere to the plants leaves, stalks and rhizomes for effective control. The use of a surfactant ensures that the herbicide is absorbed by the plant stems and leaves. Enough herbicide should be applied to wet the plant but avoid runoff.

Common reed can be treated successfully when plants are actively growing and are at mid- to full-bloom (late July through October but before a killing frost).

Common reed will die within 6-8 weeks and should then be burned or mowed where safely done so. Dead phragmites cane should be left on site to prevent spread by seed during removal to adjoining areas. In heavily infested areas some regrowth may occur from unconnected rhizomes. In addition, seedling growth may occur. For best results, the same area should be sprayed in two successive years, then spot-treated in succeeding years to prevent reestablishment.

***Reynoutria japonica*, Japanese knotweed (Prohibited)**

See the following information from the New Hampshire Department of Agriculture, Markets & Food:

<https://www.agriculture.nh.gov/publications-forms/documents/japanese-knotweed.pdf>

<https://www.agriculture.nh.gov/publications-forms/documents/japanese-knotweed-control.pdf>

<https://www.agriculture.nh.gov/publications-forms/documents/japanese-knotweed-bmps.pdf>

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Superficially resembling bamboo, its jointed, hollow stem has many red or purple nodes where the leaves are attached. The stems are otherwise smooth, bright green, and often covered with darker spots or streaks. Portions of the stem bearing leaves appear to zigzag from node to node and form dense thickets.

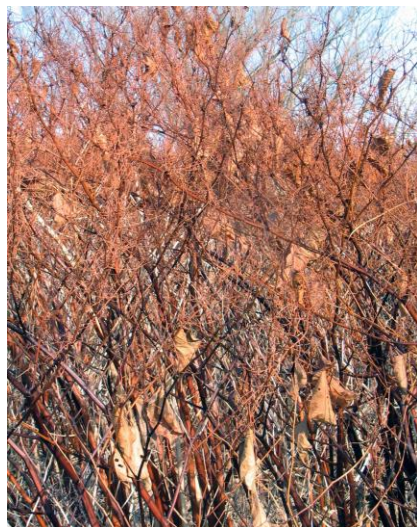
Growing up to 11 feet tall, Japanese knotweed can spread horizontally via an extensive network of underground rhizomes, along which many shoots will sprout. Many alternately arranged, spade- or heart-



Japanese knotweed in flower
cbtnfc-ori.org

shaped leaves emerge from nodes along the stem. Japanese knotweed leaves can be up to six inches long and have a squared leaf base. In late summer, white or pale green flower clusters sprout from the nodes. The fingerlike clusters are three to four inches long and consist of several dozen five-petaled, aromatic flowers.

An herbaceous perennial member of the buckwheat family, Japanese knotweed was introduced from East Asia in the late 1800s as an ornamental, and to stabilize streambanks.



Knotweed is a highly successful invader of wetlands, stream corridors, forest edges, and drainage ditches across the country.

Controlling invasive knotweed species typically takes a number of years and monitoring the site for regrowth is critical. Care must be taken not to produce new plants. All plant material should be removed and properly disposed of as new plants can sprout from very small fragments.

Mechanical Control

Grubbing out small clumps when discovered can prevent new colonies from establishing, but is time-consuming. Rhizomes and fragments left in the ground, or nearby, can regenerate and spread infestations. The entire root system must be removed since re-sprouting can occur from rhizomes. Frequent, repeated cutting of plants over many years can eventually kill the plant.

Covering plants with a thick landscape fabric for up to five years may provide control. Fabric should be installed after cutting plants back to the ground, provide some give in the fabric so new stem growth won't puncture through, monitor fabric and flatten knotweed growth under it, keep fabric cleared of debris, and repair any holes.

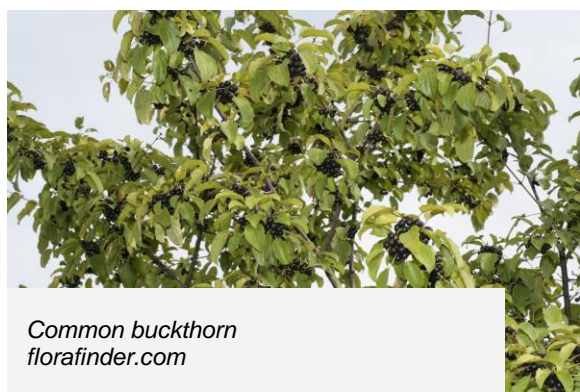
Chemical Control

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Just after flowering (early to mid September) an herbicide application of a glyphosate based product should be applied as a foliar spray. Apply to thoroughly wet all foliage, but not to the point of runoff.

***Rhamnus cathartica*, common buckthorn (Prohibited)**

Common buckthorn is a shrub or small tree growing up to 22 feet high. Twigs are often tipped with a



Common buckthorn
florafinder.com

spine. Cutting the stems reveals distinctive yellow sapwood and pink to orange heartwood. The glossy, dark green leaves remain late into fall, and are broadly oval with up-curved veins and toothed margins. In spring, dense clusters of yellow-green flowers emerge from stems near the bases of leaf stalks. Small black fruits appear in fall.



Common buckthorn leaves and fruit
florafinder.com

Common buckthorn was introduced into North America as an ornamental shrub in the mid-1800s. Prized for its hardiness and ability to thrive in a variety of soil and light conditions, common buckthorn was planted extensively for use in hedges, farm windbreaks and for wildlife habitat.

The plentiful fruit, which produce a laxative effect, are eaten by birds and small mammals, allowing for long-range dispersal. Most of the fruit falls directly beneath the parent, creating a dense understory of seedlings characteristic of buckthorn stands. Common buckthorn forms dense, even-aged thickets, which crowd out native shrubs and herbs and prevent woody plant

regeneration. Invasive shrubs like common buckthorn are population sinks for nesting songbirds due to higher predation rates.

Mechanical Control

Seedlings less than three feet tall can usually be pulled by hand, but individuals with a large base diameter are best dealt with by cutting. The resulting stump should be dug out or treated with herbicide. Girdling is also effective. Be sure to remove and dispose of any ripened fruit.

Chemical Control

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Herbicide applications may be done early in the season just after the trees have leafed out, but those conducted in the fall or early winter appear to be most effective. Use a systemic herbicide, such as glyphosate, in order to destroy the root system. Brush applications on recently cut stumps, in addition to the basal bark method, often achieve good results.

***Robinia pseudoacacia*, black locust (Watch List)**

Black locust is a large deciduous tree that, while native to parts of the United States such as the southern Appalachians and the Ozarks, has spread to and become invasive in other parts of the country, including New Hampshire.



Black locust leaves and inflorescences
cal-ipc.org

Trees grow from 40 to 100 feet in height. They grow upright in forests, but develop an open growth form in more open areas. Leaves are pinnately compound with seven to 21 small, round leaflets per leaf. A pair of long, stipular spines is found at the base of most leaves. Flowering occurs in the spring, when flowers develop in eight inch long clusters. The showy, fragrant, white to yellow

flowers give way to a smooth, thin seed pod that is 2 to 4 inches in length. The bark of black locust is light brown, rough, and becomes very furrowed with age.

Black locust typically produces abundant amounts of wind-carried seeds but a very thick seed coat lowers successful germination. Despite this, this tree's ability to reproduce vegetatively, particularly through root suckering and stump sprouting, has enabled it to expand its distribution rapidly.



Mechanical Control

Mechanical control is often very labor intensive and costly. Although extreme, on disturbed lands, the most effective option to rid the site of black locust may be to bulldoze the surface. Unfortunately, removing all vegetation will likely result in high rates of soil erosion. However, if reproductively mature trees are also present, mowing of small seedlings can promote seed germination probably by scarifying the thick seed coats of previously dropped seeds. Roots that remain after top removal by mechanical methods often result in suckers and sprouts with increased vigor.

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Chemical Control

Controlling black locust with chemical techniques alone is a common practice, probably because it can be less labor intensive than a combination of mechanical and chemical methods. When this tree has an extensive root system over a broad area, widespread chemical application may be most feasible.

Glyphosate, triclopyr diluted with water, or fosamine ammonium can be utilized as foliar sprays late in the growing season. Foliar sprays work best on thick patches under five feet high or small isolated plants since every branch and stem needs to be treated. This technique is not recommended for high quality natural areas. Glyphosate in particular should not be sprayed on such sites since it is a nonselective herbicide.

Combination Mechanical/Chemical Control

Due to the unsuccessfulness of mechanical methods alone, a common method of black locust control involves both mechanical and chemical treatment. First, cutting or girdling a tree and then applying herbicide such as triclopyr on the stump appears to be a viable option. This method, when completed carefully, is feasible for use in high quality restored or natural systems since it is selective to the target tree. Application during the winter dormant season will reduce adverse impacts on surrounding vegetation.



Bark of mature black locust
gobotany.nativeplanttrust.org

***Rosa multiflora*, multiflora rose (Prohibited)**

Multiflora rose is a dense, thorny shrub, reaching up to 15 feet in height, with arching stems (called canes) that can ramble up trees. Its leaves are pinnately compound, divided into seven to nine leaflets, and finely serrated. Clusters of fragrant white to pink flowers appear in May or June. Small bright red hips (the fruit) develop during the summer and remain on the plant through winter.

Multiflora rose was originally introduced into the United States from east Asia in 1866 as rootstock for ornamental roses. It was also planted as a living fence, for erosion control, and to provide food and cover for wildlife. Like other shrubs with attractive flowers, multiflora rose persists in our landscape partly due to an unwillingness to remove plants perceived to have aesthetic value or value to pollinators and other wildlife. However, the dense, monocultural thickets created by multiflora rose degrade natural environments and reduce native plant and wildlife diversity.



Multiflora rose at Enfield recreation fields
Photo by author

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire



*Multiflora rose leaves, flowers and thorns
invasive.org*



Multiflora rose spreads through seed, root sprouting, and layering. Layering occurs when a cane comes in contact with the soil, produces roots, and becomes functionally independent from the parent plant. The hips are available to birds almost continuously, as the previous year's fruits are commonly found alongside current year's flowers. Once deposited in a new location via bird droppings, the seeds can remain viable in the soil for up to 20 years, germinating when competing vegetation is disturbed. Though the first year or two of growth is usually quite slow, there is often an explosion of growth following this brief period of establishment, and the plant will reproduce aggressively as well as expand via layering.

This shrub thrives on poor growing sites. It prefers full sun to moderate shade and is often found in abandoned fields, hedgerows, forest edges, and along roadsides. It can also survive in the shade of a mature forest. Its leaves are also rarely consumed by native invertebrates and the leaf litter it creates

can shift the chemical composition of the decomposing leaf litter, further enhancing this shrub's dominance, particularly in riparian areas.

Because its seeds are dispersed by birds, new invasions can and will occur, but spot removal of isolated individuals, before they multiply, is a useful first-step control strategy.

Mechanical Control

The efficacy of and methods for mechanically controlling multiflora rose depend on the intensity of invasion and age of the population. Small populations of young plants are not difficult to pull, taking care to use protection against the thorns. Be sure to pull the entire root system to prevent resprouting. Similarly, using a brush mower to cut larger infestations will temporarily set back the population and stress the plants, but it will not eliminate them and resprouting will result.

All mechanical methods need to be either followed up with herbicide applications or repeated throughout the season as new growth emerges for multiple years until the stored energy within the root system is exhausted and the thicket dies. Even after the adult plants die, the seed bank will still need to be addressed, necessitating a long-term management plan.

Chemical Control

Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Herbicides are commonly used to control multiflora rose, especially in large infestations. Initially mowing or otherwise cutting large infestations is a good preparation step before herbicide applications; it stresses the plants, results in less overall plant area to treat, and makes the thicket much easier to navigate for a foliar application. After mowing, wait for knee-level regrowth before treating with herbicide. Formulations containing glyphosate, triclopyr, and metsulfuron-methyl are all effective against beach rose. While foliar sprays can be done anytime during the growing season, all of these chemicals will also harm non-target herbaceous plants and trees if applied to their leaves, so care should be taken to avoid overspray.

Multiflora rose is easy to find year-round due to its vibrant green stems. Basal bark and cut stem treatments can be made anytime the weather permits.

***Rosa rugosa*, beach rose (Watch List)**



Beach rose is a perennial, deciduous shrub that grows up to seven feet tall, with pinnately compound, oval leaflets, each toothed and one to two inches long. Leaves are heavily veined, and appear wrinkled, hence the name "rugose" (wrinkled). Flowers are fragrant, showy, five-petaled, two-inches wide, usually dark pink (occasionally white or light pink). The plant starts to bloom in June. Fruit are one inch across, round, red, "hips." Stems have many straight prickles.

Beach rose is a native of eastern Russia, Korea, Japan, and northern China. It has been introduced around the world for ornamental purposes, and is particularly invasive in coastal regions due to its hardiness in sandy soil and salt spray tolerance.

Mechanical Control

The most efficient method for removing the species is to dig it up. All rhizomes and roots have been removed. Note that cutting alone will have an adverse effect, as this can rejuvenate the shrub.

Chemical Control

Digging up the plants can also be combined with application of herbicides such as glyphosate, ideally using a "cut and paint" method to minimize adverse impacts to adjacent native plants.



***Rumex acetosella*, sheep dock (Watch List)**

Sheep dock is an herbaceous perennial herb with a rosette of basal leaves and occasional flowering stalks. The stalks are slender and upright with reddish ridges. The stems branch at the top and the plant reaches a height of 18 inches. It blooms from April to October and produces either red female flowers or yellowish-green male flowers. The flowers turn into small pinkish fruits.

Sheep dock prefers full or partial sunlight, drier conditions, acid and



Sheep dock basal leaves
minnesotawildflowers.info

sandy soil, but also thrives on loam or clay loam soil at disturbed sites.

Blueberry farmers are familiar with the plant, as it thrives in the same acidic soil conditions under which blueberries are cultivated. It is quite aggressive and considered difficult to manage or eradicate because of its creeping rhizome roots.



Sheep dock
gobotany.nativeplanttrust.org

The leaves have a lemony, tangy or nicely tart flavor. However, they contain significant amounts of oxalic acid, which can be toxic to the kidneys if a sufficiently large quantity of leaves is eaten.

Mechanical Control

Hand pulling of plants can be effective when the infestation is small and does not yet have extensive roots and rhizome systems. Caution must be used to prevent the spread of root and rhizome fragments which can resprout.

Chemical Control

Achieved with readily available general herbicides such as dicamba or triclopyr. As Sheep dock prefers acidic soils, control can be increased when combined with liming to increase soil pH.

***Solanum dulcamara*, climbing nightshade (Watch List)**

Climbing nightshade is a perennial vine or scrambling shrub with slender stems that can reach up to seven feet either erect or clambering. Leaves are dark-green to purplish, petiolate, alternate, 3-lobed and up to about three inches long. Flowering occurs in May to November, when purple flowers with bright yellow stamens develop. Mature fruits are red, shiny, round or egg-shaped, about one-half inch long.



Climbing nightshade leaves and flowers
weedalogue.com



Climbing nightshade mature fruit
gobotany.nativeplanttrust.org

This plant is a native of Eurasia, but it has been introduced to many parts of the United States and Canada. It may be found in swamps, moist woods, edges of ponds, marshes, riverbanks, thickets, roadsides, and disturbed areas.

Climbing nightshade invades thickets, fence rows, pond margins, low woods and roadsides. It is native to Eurasia. All parts of the plants are toxic. Always wear gloves and protective clothing when handling this plant.

Mechanical Control

Climbing nightshade may be controlled by manually digging up the roots. This method is most effective when the plants are young and the soil is moist. All parts of the roots should be removed to prevent regrowth. Gloves should be worn when handling this species to prevent skin irritation.

Mowing is not a practical method for control because this species can resprout from the

suckering roots and rhizomes. However it may be useful when manually removing the root system. If mowing is the only option, it must be done several times during the growing season to be effective.

Another option would be to cover the cut plants with a heavy geotextile cloth for two years to prevent photosynthesis and regrowth.

Chemical Control

Larger infestations may require the use of an herbicide. The herbicide clopyralid is effective.

Triclopyr is also effectively taken up in the woody stems, roots, and leaves of Climbing Nightshade. It is also less likely to harm nearby grasses, sedges, rushes, cattails, lilies, and irises.

***Tussilago farfara*, coltsfoot (Watch List)**

Coltsfoot is a rhizomatous perennial, growing up to 20 inches, which can form extensive colonies. Plants first send up flowering stems in the spring, each with a single yellow flowerhead. Just before or after flowers have formed seeds, basal leaves on long petioles grow from the rhizomes, with somewhat roundish leaf blades (the shape giving the plant its name) that are more or less white-wooly on the undersides.

A native of Europe, this plant is believed to be brought to this country by early settlers for its medicinal properties. It is still used by herbalists as part of non-tobacco "folk smoke" non-tobacco smoking mix.

Coltsfoot prefers newly-disturbed open areas for establishment. Disturbed locations such as roadsides, trails, pond and river edges, including areas that have undergone invasive plant removal, may be more vulnerable to invasion.

Early detection is key when controlling European coltsfoot as populations can be difficult to control once they establish. Medium to large infestations may need chemical control for management. Also, make sure to clean shoes, clothing, and equipment when leaving infestations to prevent spreading seeds and rhizome fragments to new locations.

Mechanical Control

Young plants and very small infestations may be able to be carefully dug out of the ground. All rhizome fragments will have to be carefully removed, as a fragment with even one node can form a new plant. Rhizomes are brittle and easily break off in the soil so this method may have limited success. Since fragments left in the soil may quickly resprout, the area will need to be visited multiple times each growing season to check and remove any resprouts. Rhizomes should be bagged and put in the trash.

Experiments have shown that European coltsfoot is resistant to burying. Also the rhizome depth can also make it difficult to control plants with stubble cultivation, plowing, or hoeing as these methods may not reach the entire rhizome system.

Chemical Control



Invasive Plant Species Descriptions & Control Tips for Enfield, New Hampshire

Coltsfoot can be effectively controlled using any of several readily available general use herbicides such as glyphosate. Treat in summer when the leaves of coltsfoot are fully developed. However, greater care and caution needs to be taken if the infestation is along a drainage swale or waterway.

***Vinca minor*, lesser periwinkle (Watch List)**



Lesser periwinkle
brc.ac.uk

Lesser periwinkle are evergreen vines that tend to trail along the ground for up to three feet. Violet to blue pinwheel-shaped flowers bloom from April to May (sometimes later). Leaves are opposite, around an inch long and dark green, although some varieties have variegated leaves.

This ornamental ground cover was introduced from Europe into the U.S. in the 1700s. It is still commonly sold in the nursery trade and



planted by gardeners. It is found around old homesite plantings, spreading into open fields and dense canopied forests.

Plants primarily spread vegetatively by rhizomes, although rhizome fragments and occasionally seeds can be spread by animals such as birds and rodents.

This plant can form thick mats and extensive infestations under even dense, dark canopies. It has the ability to take over an understory, removing habitat for native vegetation.

Mechanical Control

Periwinkle can be removed by digging up the plants, but all roots must be removed to prevent re-sprouting. Runners may also be mown close to the ground.

Chemical Control

Spring mowing can be followed up with a foliar application of a glyphosate herbicide to the regrowth.

APPENDIX II: ECOLOGICAL ASSESSMENT OF PRIORITY PARCELS

An Ecological Assessment of High Priority Parcels for NNIS Control in Enfield, NH

George Pond Access

This narrow parcel abutting Route 4A represents the northern limits of a 434-acre Prime Wetland. This wetland complex– the largest Prime Wetland in Enfield– is mapped by NH Department of Environmental Services as a Forested/Scrub-Shrub wetland with extensive areas of open peatland. Though small, the town's parcel supports a diversity of natural communities, including a narrow example of Wire Sedge-Sweet Gale Fen dominated by wire sedge (*Carex lasiocarpa*), swollen-beaked sedge (*Carex utriculata*), meadowsweet (*Spiraea alba*), Virginia marsh St. John's wort (*Triadenum virginicum*), sweet gale (*Myrica gale*), and leatherleaf (*Chamaedaphne calyculata*). In semi-permanently flooded areas, areas of Emergent Marsh are dominated by pickerelweed (*Pontedaria cordata*), common spikesedge (*Eleocharis palustris*), rushes (*Juncus* spp.), water parsnip (*Sium suave*), and three-way sedge (*Dulichium arundinaceum*). Areas of open, shallow, quiet water support Aquatic Bed communities dominated by American white water lily (*Nymphaea odorata*), bullhead pond lily (*Nuphar variegata*), and greater bladderwort (*Utricularia vulgaris*). This diversity of wetland types likely supports a variety of wetland bird species including marsh wren, Virginia rail, pied-billed grebe, and numerous waterfowl. The wetland is mapped by NH DES as performing several other important functions, including Carbon Sequestration, Surface Water Detention, Nutrient Transformation, and Other Wildlife Habitat.

Because this wetland exhibits high ecological integrity and is connected to a large Prime Wetland, this parcel is a high priority for NNIS management. As shown in the map of this parcel in Appendix III, invasive species are mainly limited to drier areas near the road and include patches of reed canary grass and scattered glossy buckthorn. When allowed to produce mature fruit, these plants are likely spreading into the larger wetland complex and ultimately into Mascoma Lake. This may result in lower species diversity in areas of uncommon wetland natural communities.

Johnston Drive Waterfront

This newly-acquired town land consists of 17 acres on the northern shores of Mascoma Lake. The parcels abut the rail trail to the north and include several abandoned structures. Much of the land is maintained as mowed and open, with a narrow vegetated buffer along the shoreline dominated by sweetgale, multiflora rose, and speckled alder. Beach rose and glossy buckthorn are common in unmowed areas. Where the shoreline extends south into Mascoma Lake, a small cobble berm supports a population of the state-endangered sandbar willow (*Salix exigua* spp. *interior*). This small, colonial population–the only record of this species on Mascoma Lake–makes this shoreline a high priority for NNIS management, as beach rose, multiflora rose, and glossy false buckthorn pose threats to the integrity of this rare species. If foot travel increases along the shoreline in the future, this may pose an additional threat to the sandbar willow and the unique cobble berm supporting it.

Though plantings in the vicinity of the sandbar willow are not recommended, planting native shrubs elsewhere along the waterfront may help to prevent spread and re-establishment of invasive plants on these parcels.

Mascoma Lakeside Park

This highly-accessible parcel contains over 1,000 ft of lakefront. Though some of the lakefront area consists of a thicket of multiflora rose and Morrow's honeysuckle, it also supports numerous native shrubs, including speckled alder, buttonbush, silky dogwood, and willows. In wetter, slightly sloping areas near the lake, small examples of Red Maple-Lake Sedge Swamp are present. These areas are dominated by lake sedge (*Carex lacustris*) and Joe pye weed (*Eutrochium maculatum*), with scattered white turtlehead (*Chelone glabra*) and blue vervain (*Verbena hastata*) and a sparse canopy of red maple (*Acer rubrum*) and silver maple (*Acer saccharinum*). Invasive purple loosestrife (*Lythrum salicaria*) is scattered throughout these communities. However, the dense cover of native lake sedge appears to be suppressing the growth of other invasive species.

Northeast of the pavilion, a sandy, upland meadow is maintained as open through occasional brush hogging. This area contains a fairly high diversity of native upland species, including native goldenrods (*Solidago* spp.), little bluestem (*Schizachyrium scoparium*), red oak (*Quercus rubra*) saplings, and common ground-nut (*Apios americana*). Morrow's honeysuckle, multiflora rose, burning bush (*Euonymus alatus*), Japanese barberry, and glossy buckthorn are scattered throughout this area. Continued brush hogging of this area is one potential control method for these invasive species. Periodic brush-hogging of this upland area would also allow the native meadow species to persist, supporting structural and species diversity to the parcel. Ideally, brush hogging would occur in late fall after native plants have set seed.

Northeast of this meadow area, a small wetland depression and potential vernal pool is dominated by sensitive fern and silky dogwood. Scattered glossy buckthorn is present within this wetland and has apparently been suppressed through mowing or brush-hogging in the past. Numerous small glossy buckthorn seedlings were observed around the edges of this wetland depression and along the adjacent bike path.

Huse Park & Enfield Community Building

This parcel is largely mowed, with invasive Japanese barberry, Norway maple, glossy buckthorn, and multiflora rose along the field edges. Japanese knotweed forms a thicket on the rockier, steeper banks of the Mascoma River. However, east of the knotweed stand, the riverside supports a low-lying, periodically-flooded marsh dominated by a diversity of native species including false nettle (*Boehmeria cylindrica*), blue vervain, Joe pye weed, sedges, silky dogwood, and cardinal flower (*Lobelia cardinalis*). Because it is a floodplain adjacent to a Tier 3 stream, this wetland is considered a Priority Resource Area by the state of New Hampshire. A PRA is a jurisdictional area protected under state wetland law, RSA 482-A. This ecologically important area of the rivershore provides open wetland habitat for wildlife as well as flood storage during high water.

Invasive species monitoring and control in this PRA wetland will ensure that its functions and values are protected. Control of the scattered glossy buckthorn currently present in the wetland is recommended. Expansion of the adjacent knotweed stand into the PRA should be monitored and controlled if needed.

Suki's Marsh

This parcel is well buffered to the east and consists mainly of mature Hemlock Forest and Hemlock-Northern Hardwood Forest dominated by hemlock, red oak, white ash, paper birch, and red maple. Upland areas are characterized by a dense canopy and steep topography. The only non-native species noted in the forested upland was a single broad-leaved helleborine (*Epipactis helleborine*), a non-native orchid listed as a Watch List species. Maintaining the dense canopy in this forest will reduce the likelihood of non-native invasive species gaining a foothold in this area in the future.

A large population of glossy buckthorn is located in the Prime Wetland that runs along Shaker Hill Rd on the western edge of the parcel. A small population of moneywort (*Lysimachia nummularia*) was also observed in a forested portion of this wetland. The majority of the wetland can be classified as Cattail Marsh and is dominated by broad-leaved cattail (*Typha latifolia*) and other native herbaceous species. This wetland is a state-designated Priority Resource Area, and its connectivity to intact, mature forest increases its value as wildlife habitat.

Spectacle Pond Access

This small parcel sits at the north end of Spectacle Pond, which drains north into a large wetland complex and Gulf Brook and then into the Indian River. Because it is a headwaters area with a mainly intact shoreline supporting a diversity of native plants, this is a priority area for invasive species control. As shown on the map in Appendix III, a stand of common reed (*Phragmites australis*)—a Prohibited aquatic invasive species—is present in the vicinity of Lockehaven Rd and the boat launch. It is likely that seeds are spreading from this population to lower portions of the watershed, and this population is a particular priority because boats are entering and exiting the pond in close proximity to the plants.

The ecological integrity of Spectacle Pond's shoreline is also potentially threatened by populations of Japanese knotweed along Lockehaven Rd. Control of knotweed populations in the vicinity of this parcel is recommended and is likely to succeed because these populations are small and newly-established.

APPENDIX III: MAPS OF INVASIVE SPECIES ON HIGH PRIORITY PARCELS



Geise Police Facility & Whitney Hall Invasive Species Map Enfield, NH

Prohibited Species

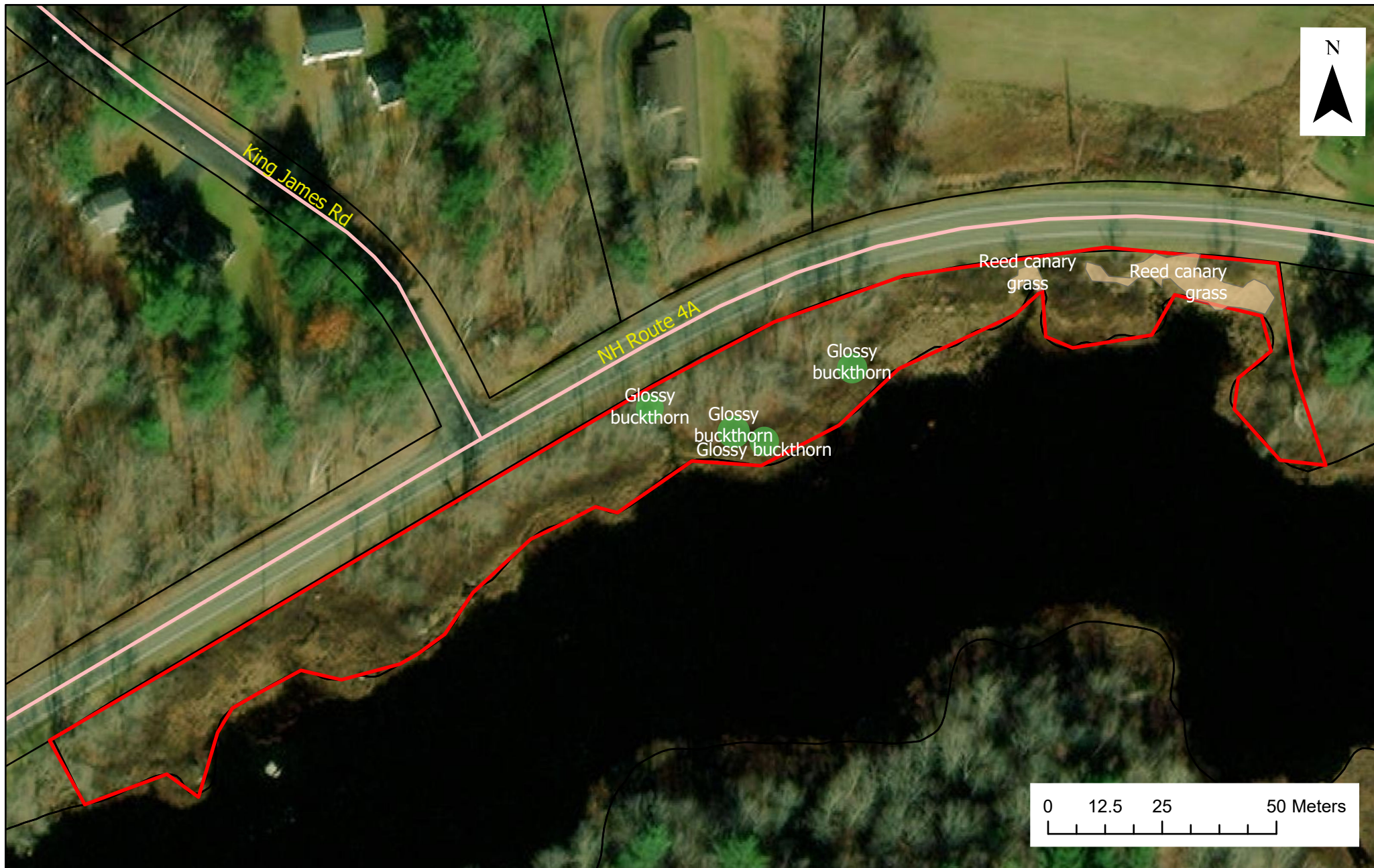
- Common buckthorn
- Glossy buckthorn
- Japanese barberry
- Japanese knotweed
- Morrow's honeysuckle

Watch List Species

- Multiflora rose
- Purple loosestrife
- European barberry
- Black locust

Map Features

- Climbing nightshade
- Town Properties
- Roads
- Parcels



George Pond Access Invasive Species Map
Enfield, NH

Prohibited Species

Glossy buckthorn

Watch List Species

Reed canary grass

Town Properties

Roads

Parcels



Huse Park Invasive Species Map Enfield, NH

Prohibited Species

- Common buckthorn
- Glossy buckthorn
- Japanese barberry
- Japanese knotweed

Morrow's honeysuckle

- Multiflora rose
- Purple loosestrife
- Norway maple

Watch List Species

- Climbing nightshade
- Town Properties
- Roads
- Parcels



Johnston Drive Waterfront Invasive Species Map
Enfield, NH

- | | | |
|---------------------------|---------------------------|------------------------|
| Watch List Species | Prohibited Species | Town Properties |
| Coltsfoot | Glossy buckthorn | Roads |
| Beach rose | Japanese knotweed | Parcels |
| | Multiflora rose | |



Lakeside Park Invasive Species Map Enfield, NH

Prohibited Species

- Glossy buckthorn
- Morrow's honeysuckle
- Multiflora rose
- Purple loosestrife

Watch List Species

- Black locust
- Canada thistle
- Climbing nightshade
- Coltsfoot

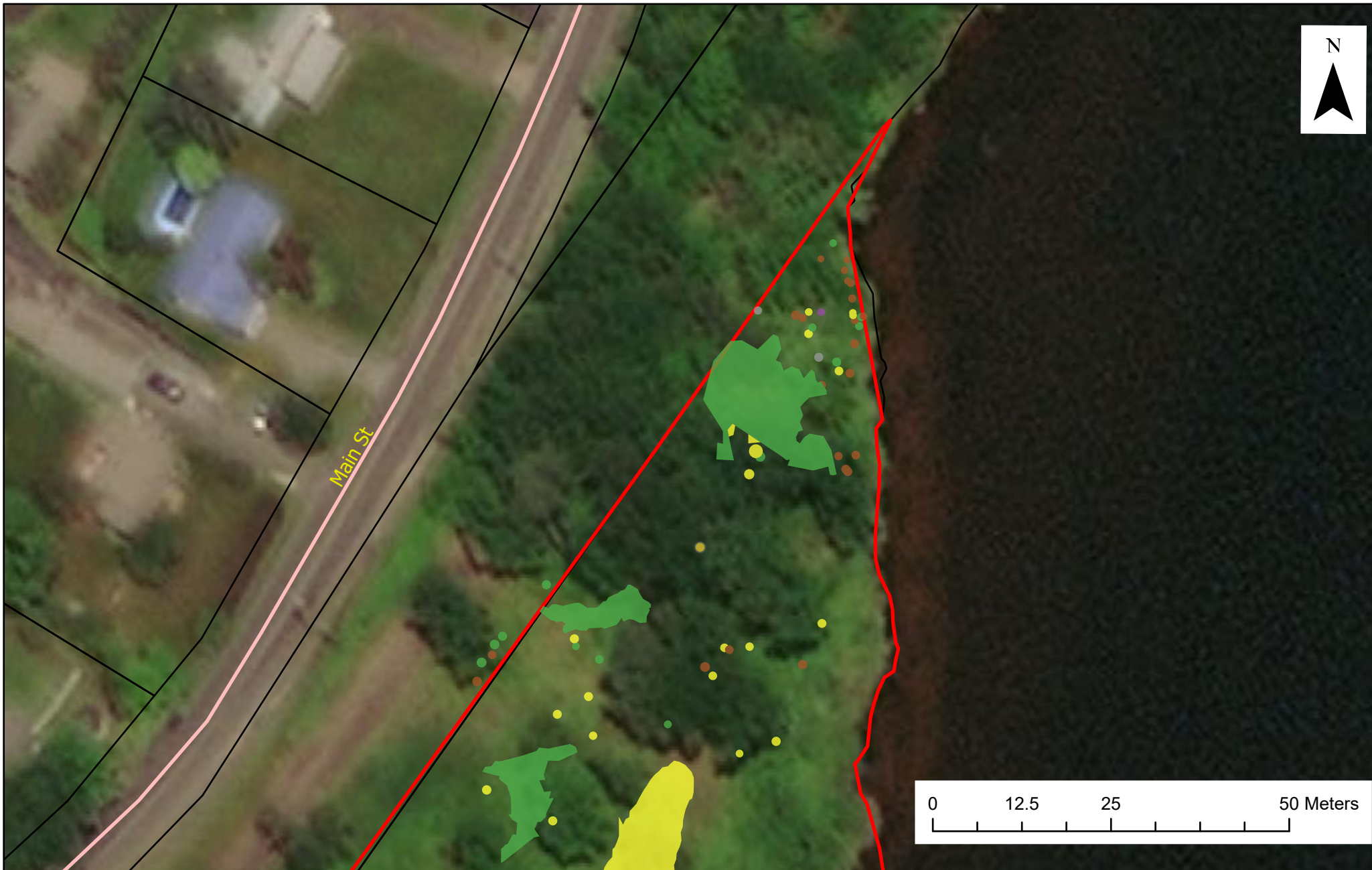
Legend

- Reed canary grass
- Town Properties
- Roads
- Parcels



Lakeside Park Invasive Species Map Enfield, NH

- | | | |
|--|---|---|
| Prohibited Species | Morrow's honeysuckle | Purple orpine |
| Burning bush | Multiflora rose | Town Properties |
| Common buckthorn | Purple loosestrife | Roads |
| Glossy buckthorn | Watch List Species | Parcels |
| Japanese barberry | Black locust | |
| Japanese knotweed | | |



Lakeside Park Invasive Species Map Enfield, NH

Prohibited Species

- Glossy buckthorn
- Japanese barberry
- Morrow's honeysuckle

Multiflora rose

- Tatarian honeysuckle
- Watch List Species
- Purple orpine

Town Properties

- Roads
- Parcels



Spectacle Pond Access Invasive Species Map
Enfield, NH

- | | |
|---|--|
| Prohibited Species | Town Properties |
| Japanese knotweed | Roads |
| Common reed | Parcels |



Suki's Marsh Invasive Species Map
Enfield, NH

- | | |
|---|--|
| Prohibited Species | Town Properties |
| Glossy buckthorn | Roads |
| Moneywort | Parcels |
| Watch List Species | |
| Broad-leaved helleborine | |

APPENDIX IV: MAPS OF PRIORITY ROW AREAS FOR INVASIVE SPECIES CONTROL



VCGI, Maxar, Microsoft

Legend

N



DuBois & King inc.

Priority Right-of-Way Areas for NNIS Control
Grafton Pond Rd
Enfield, NH

Watch List Species

Species

- Black locust
- Coltsfoot

Prohibited Species

Species

- Glossy buckthorn
- Japanese knotweed

- Purple loosestrife
- Roads
- Town Properties
- Parcels



Legend

N



DuBois
King
INC.

- Roads
- Town Properties
- Parcels

Watch List Species

Species

- Coltsfoot

Prohibited Species

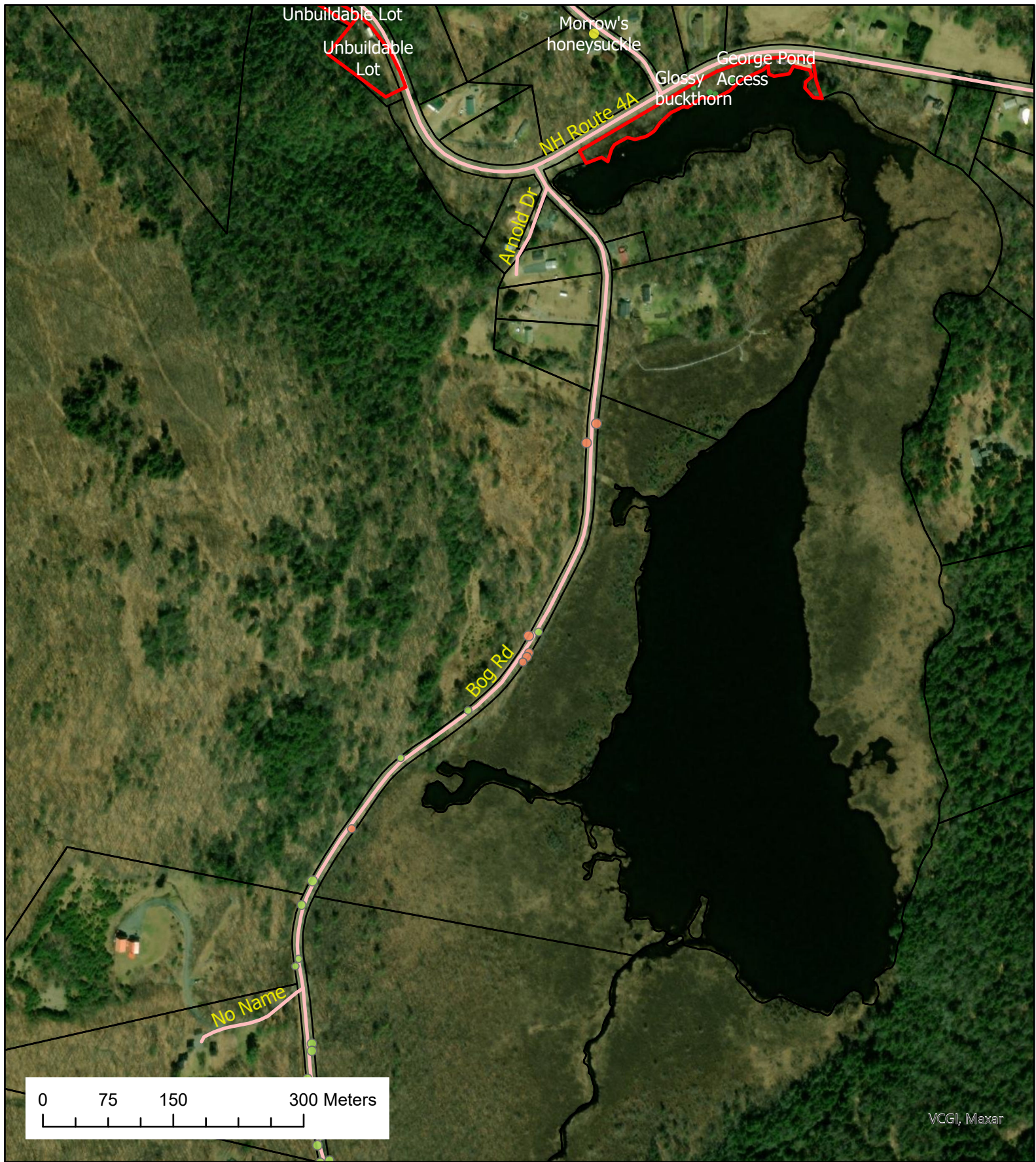
Species

- Glossy buckthorn

Priority Right-of-Way Areas for NNIS Control

Grafton Pond Rd

Enfield, NH

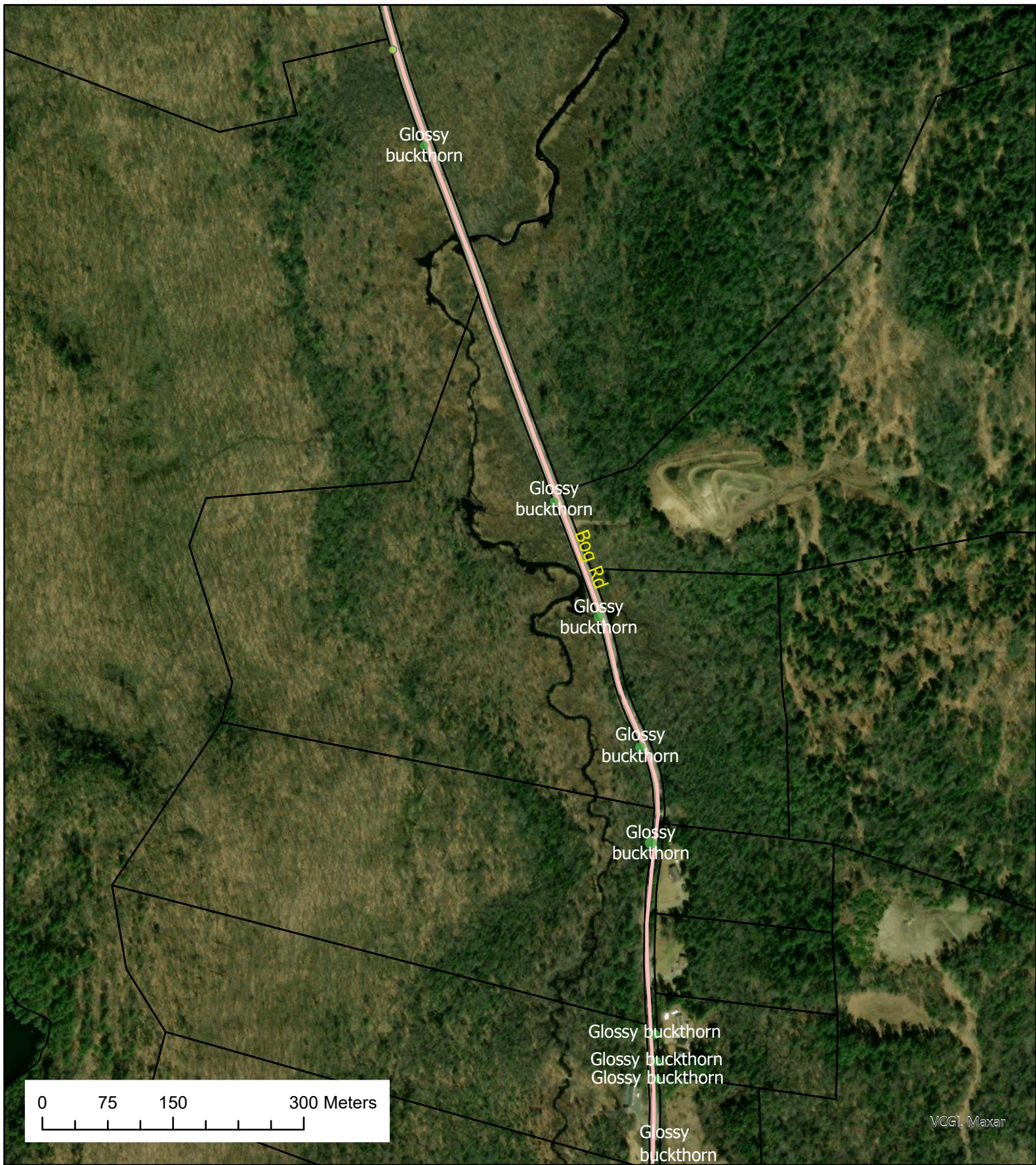


Priority Right-of-Way Areas for NNIS Control
 Bog Rd
 Enfield, NH

- | | |
|----------------------|-------------------|
| Parcels | Species |
| Town Properties | Black locust |
| Glossy buckthorn | Coltsfoot |
| Morrow's honeysuckle | Reed canary grass |



VCGL, Maxar



Priority Right-of-Way Areas for NNIS Control
Bog Rd South
Enfield, NH

Parcels

Species

Glossy buckthorn

Species

Coltsfoot

N





Priority Right-of-Way Areas for NNIS Control Lockehaven & Crystal Lake Rd Enfield, NH

Watch List Species Species

- Black locust
- Climbing nightshade
- Coltsfoot
- Purple orpine

Prohibited Species Species

- Common buckthorn
- Glossy buckthorn
- Morrow's honeysuckle
- Multiflora rose

Tatarian honeysuckle

Roads

Roads

Parcels

Parcels

N



DuBois
& King
INC.

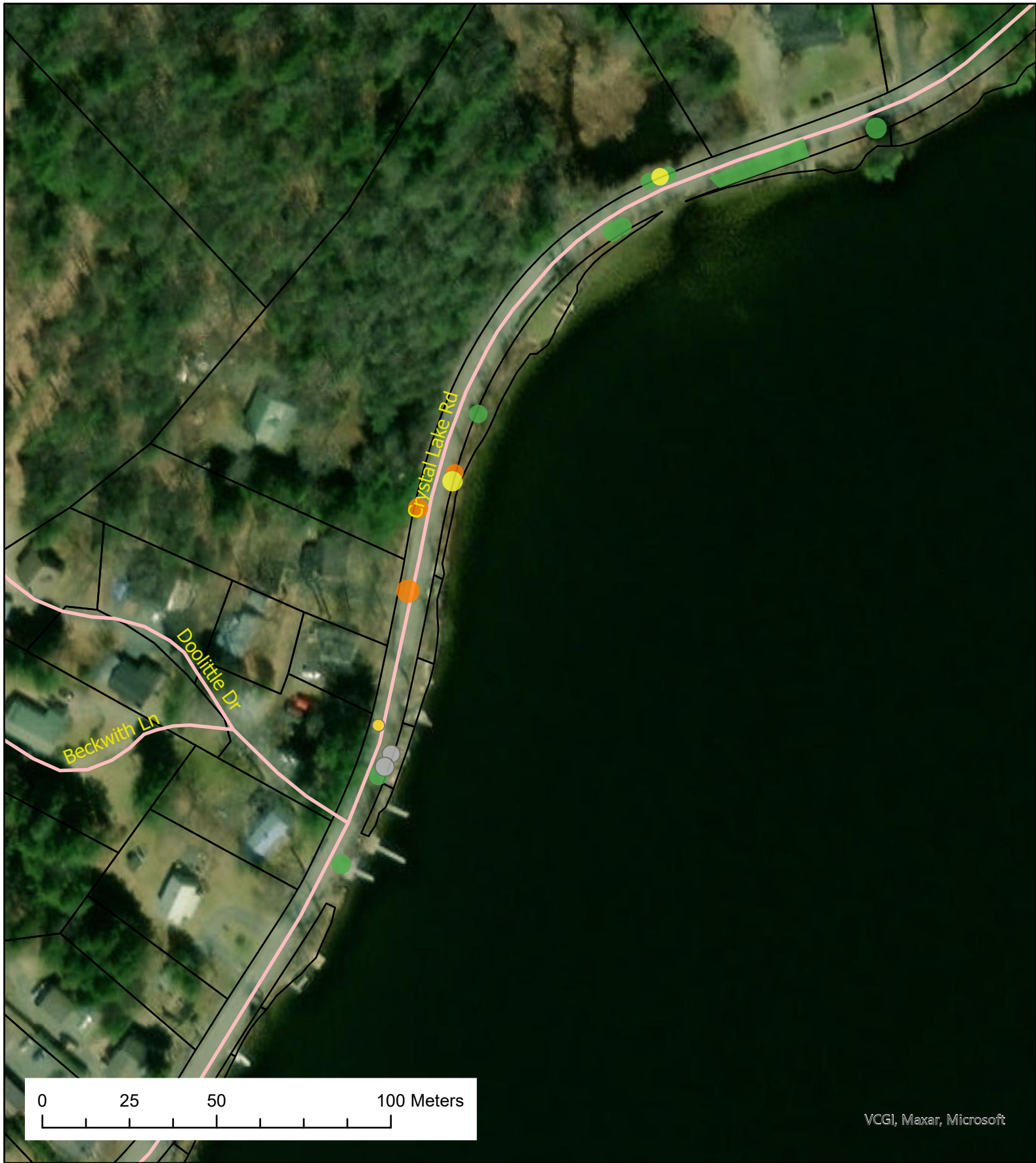


Priority Right-of-Way Areas for NNIS Control
Crystal Lake Rd North
Enfield, NH

- | | |
|----------------------|---------------------|
| Parcels | Bittersweet |
| Species | Species |
| Glossy buckthorn | Climbing nightshade |
| Morrow's honeysuckle | Coltsfoot |
| Purple loosestrife | Purple orpine |



VCGI, Maxar, Microsoft



Priority Right-of-Way Areas for NNIS Control
Crystal Lake Rd
Enfield, NH

Parcels

Species

- Glossy buckthorn
- Japanese knotweed

Morrow's honeysuckle

Species

- Purple orpine
- Beach rose



VCGI, Maxar, Microsoft



Priority Right-of-Way Areas for NNIS Control
Crystal Lake Rd South
Enfield, NH

Parcels

Species

- Glossy buckthorn
- Japanese knotweed

Multiflora rose

Species

- Black locust
- Climbing nightshade

N

