



# Picking Our Battles

A Guide to Planning  
Successful Invasive Plant  
Management Projects



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## A Guide to Planning Successful Invasive Plant Management Projects

Version 1.1, September 2015.

### Landscape Scale Invasive Plant Prioritization Strategy

Developed by the New Hampshire Fish and Game Department and NH Natural Heritage Bureau Invasive Plant Working Group based on input from over 120 community members, natural resource managers, and academics.

Reviewed by members of the NH State Invasive Species Committee, The NH Aquatic Resources Mitigation Fund Program, and the NH Coastal Watershed Invasive Plant Partnership.

### GIS Modeling

By Katie Callahan, NH Fish and Game Department and the NH Office of Information Technology.

### Town Customized Strategies

Designed by Rachel Stevens and compiled by Nicole Andrews, Great Bay National Estuarine Research Reserve and New Hampshire Fish and Game Department.

### “Most Wanted” Species Lists

Developed by Doug Cygan, NH Department of Agriculture and Bill Nichols, NH Natural Heritage Bureau.

Reviewed by members of Antioch University of New England, Audubon Society of NH, Great Bay National Estuarine Research Reserve, Natural Resources Conservation Service, NH Botany Club, NH Department of Agriculture, NH Fish and Game Department, NH Department of Transportation, The Nature Conservancy, New England Wildflower Society, Piscataqua Regional Estuaries Partnership, Society for Protection of NH Forests, University of NH Cooperative Extension, University of New Hampshire Department of Natural Resources and the Environment, US Forest Service, and US Fish and Wildlife Service.

### This Document

Written by Rachel Stevens, Great Bay National Estuarine Research Reserve and New Hampshire Fish and Game Department with Bill Nichols, NH Natural Heritage Bureau, Denyce Gagne, NH Fish and Game Department, Doug Cygan, NH Department of Agriculture and Ellen Snyder, UNH Cooperative Extension. Photos and graphics by Rachel Stevens unless otherwise noted.



## Table of Contents

1. A Need for the “Big Picture”
2. Invasive Plants
3. Planning Successful Invasive Plant Management Projects
4. *Priority Areas for Invasive Plant Management Maps in Action:*  
Examples from New Hampshire Communities
5. For More Information

*Only by working together on shared invasive plant “battles” across differing land ownerships, can we effectively protect our native plants and wildlife habitat.*



NH Surfrider photo

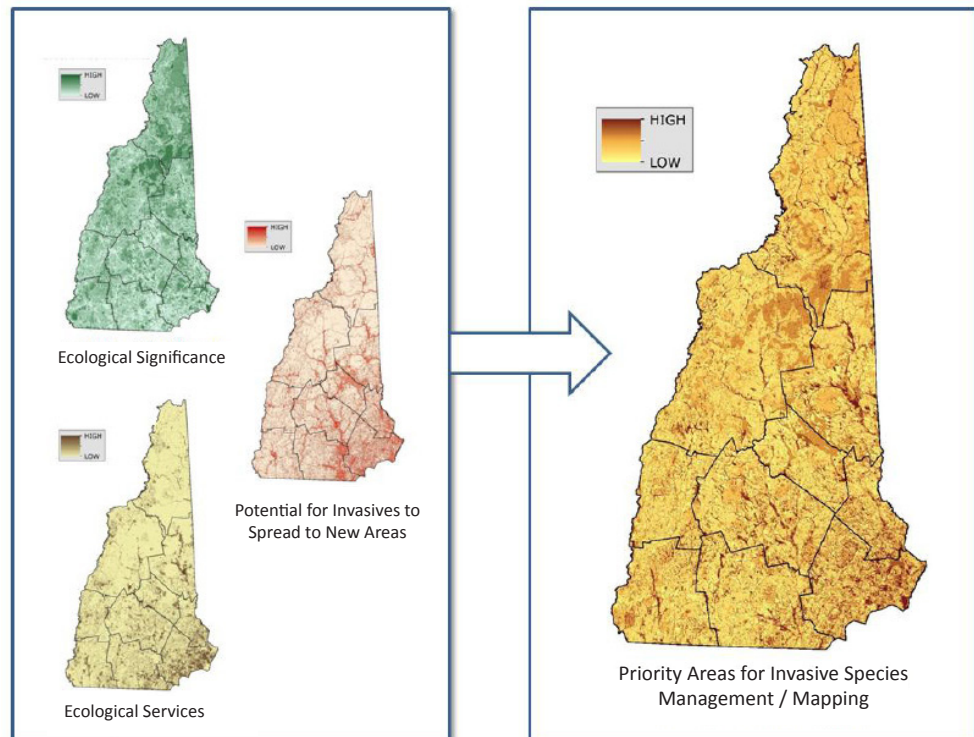
## 1. A Need for the “Big Picture”

Invasive plants can cause significant ecological and economic harm and are changing the face of America. They impact wildlife by choking out natural habitats such as freshwater wetlands, causing loss of available food, or altering habitat structure or function. They out-compete native plants and destroy important natural communities such as floodplain forest. Invasive plants cause widespread impact to our fish, wildlife, endemic plants and natural communities. They are a major threat to native biodiversity, second only to habitat destruction.

The importance of minimizing spread of invasive plants means they are a common focus of restoration projects. However, our challenge is the majority of these projects take place at a relatively small scale, commonly in areas of single, or few, ownerships. Invasive plants span property boundaries and, once a species is established in a region, a restoration or management project will always be subject to reinfestation from surrounding areas unless a landscape scale strategic approach is taken to prioritizing control projects.

**Taking a large scale approach and prioritizing shared invasive plant “battles” will allow restoration projects to be more effective in the long-term and maximize the efficient use of resources.**

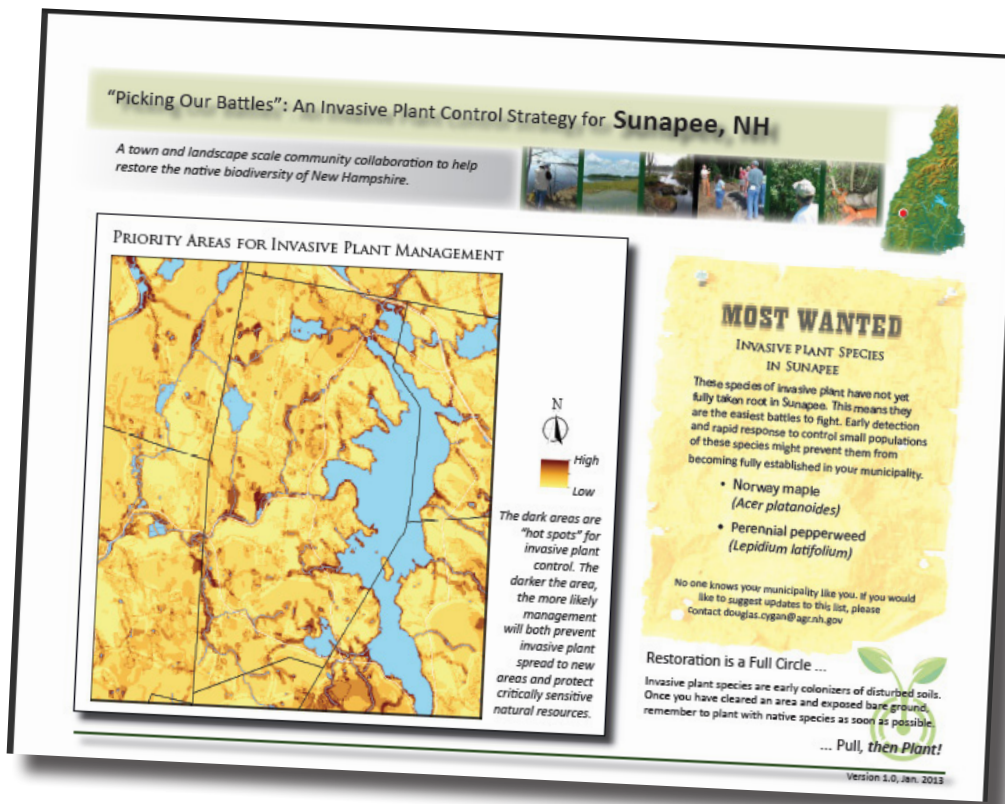
The New Hampshire Fish and Game Department and NH Natural Heritage Bureau teamed up with over 120 community members, natural resource managers, and academics to develop a statewide *Priority Areas for Invasive Plant Management Map* for the control of upland and wetland invasive plant species based on the ecological significance of an area, the ecological services provided, and the potential for invasive plant species to spread to new areas. Extensive community input was solicited to make this strategy relevant to as many end-users as possible.



The state-wide prioritization model and layers that were used to create it. The darker an area, the more important it is to control any invasive plants located there.

This statewide project has been used to develop a customized invasive plant control strategy for each New Hampshire municipality. These strategies contain a map showing priority areas where invasive plant removal will have the most immediate impact and most effectively protect our native natural resources in the long-term. They also show a customized “early detection” list of plant species just coming into each community. Focusing on control of these species may prevent them becoming fully established and stop their spread to neighboring towns. Consideration of the landscape scale is particularly important in the face of climate change as alterations in species ranges are likely.

*Invasive plants know no boundaries. They can easily reestablish from surrounding areas unless a landscape-scale strategic approach is taken to prioritizing control projects.*



An example customized invasive plant control strategy for Sunapee, NH.

We hope this guide is useful to Conservation Commission members, watershed groups, and natural resource managers; anyone who may spearhead getting an invasive plant project going on the ground. This guide is intended as a support document to the customized town strategies found at [wildnh.com/invasives](http://wildnh.com/invasives). We hope to show how these strategies can be used to prioritize invasive plant management projects and translate into the most effective on the ground *action!*

A need for the “big picture” is clear. Only by working together on shared invasive plant “battles”, across differing land ownerships and political boundaries, can we effectively protect our native plants and wildlife habitat in the long-term.

## 2. Invasive Plants

A plant species is termed “invasive” when it is not native to the region and is likely to cause economic or environmental harm. Many of our ornamental garden plants, such as New Hampshire’s state flower the purple lilac, are not originally from the state, but do not spread or become an ecosystem burden, so are not termed “invasive”. Even though invasive species comprise less than two percent of New Hampshire’s plant species, their economic and environmental impact can be considerable.

A plant does not have to come from another country to be considered invasive. It can be any plant introduced outside its historical range that out-competes native species. For example, smooth cordgrass (*Spartina alterniflora*), a dominant native plant in salt marshes, is incredibly important on the east coast. The ecological services it provides include filtering nutrients and pollution, buffering against flooding, and reducing shoreline erosion. Ironically, it is considered an invasive species on the west coast. In Washington State it has become notorious as it converts valued mudflat to marsh and alters the habitat of rare animals such as the clapper rail.



Even young Japanese knotweed shoots can push through inches thick asphalt.

### Getting Ahead

Invasive plants use a diverse array of strategies to out-compete native species. They may monopolize light, moisture, nutrients, soil or space. Some invasive plants even poison their competitors; garlic mustard (*Alliaria petiolata*) produces compounds that seep into the soil and actively prevent other plants from growing. Oriental bittersweet (*Celastrus orbiculatus*) is a woody perennial vine that can physically bring the tree it is clambering up crashing to the ground. Looking around New Hampshire in early spring, the first fresh green growth you see bursting forth on woody plants is likely to be that of an invasive plant. They leaf out early to extend their growing season and further out-compete their native cohabitants. Invasive plants can have creative mechanisms to spread to new areas and seeds that can stay viable in the soil ready to germinate even after 50 years or more. Tenacious Japanese knotweed (*Fallopia japonica*) can send out underground runners up to 60 feet before resurfacing to start a new colony. Its shoots can even push up through inches deep asphalt!



Oriental bittersweet can strangle native trees and literally bring them crashing to the ground.

## Impacts on Wildlife - and Us

Native birds and fish are impacted by invasive plants as the habitats and ecological processes to which they have adapted are disrupted. Invasive plant growth can deprive wildlife of essential food sources such as pollen, nectar, and seeds. They can also directly alter habitat structure. The field of research investigating invasive plant impacts on wildlife is young, but significant detrimental links have already been documented. Examples include:

- Purple loosestrife (*Lythrum salicaria*) inhabits wetlands and may grow so densely it physically blocks the passage of turtles and fish. Estimated to be spreading nationwide at a rate of 285,000 acres per year, loosestrife has been documented to crowd out at least 44 species of native plants that offer higher quality nutrition for wildlife.
- Common buckthorn (*Rhamnus cathartica*) contains a chemical compound called anthroquinone which is metabolized into emodin when eaten by wildlife. Emodin can be toxic to amphibian embryos, disrupting their development and preventing hatching. It can also cause diarrhea in birds which will energetically stress neotropical migrant species even further as they travel vast distances between their breeding and wintering grounds.
- Studies have found that eggs and young of birds, such as the American robin, in nests built in buckthorn and shrub honeysuckles (*Lonicera* spp.) are more likely to be predated than those built in native shrubs or trees.
- Invasive black swallowwort (*Cynanchum louiseae*) is causing a reduction in the number of monarch butterflies. It is closely related to the monarch's host plant species, milkweed, so adult butterflies lay their eggs on it. However, swallowwort does not provide the food source milkweed does and the monarch larvae don't survive to become adults.



Purple loosestrife has pretty flowers but can choke out entire wetlands impacting turtle and fish species.



*We hope this guide is useful to Conservation Commission members, watershed groups and natural resource managers. That is, anyone who may spearhead getting an invasive plant project on the ground.*

- Connections have even been found between invasive plant presence and human health. In parts of Connecticut, Japanese barberry (*Berberis thunbergii*) has become the dominant understory shrub in forest environments. Deer ticks can be vectors of lyme disease and have been found in higher densities in areas of dense barberry compared to areas with little to no barberry suggesting managing this species can have a positive effect on public health.

### Its Not Always Black and White

Although invasive plants cause extensive ecological damage, some shrubby species have actually helped certain wildlife survive. New Hampshire is more than eighty percent forested and, while areas of shrubland are uncommon, they can provide important habitat for species such as the American woodcock, golden-winged warbler and ruffed grouse as they provide dense impenetrable thickets, a fortified escape from predators, and berries for food that are not found in other areas.

One species of particular note is the New England cottontail. Their range has declined by 86 percent during the past 50 years. It is only found in the Merrimack Valley and Seacoast regions of New Hampshire and is listed as state endangered. A recent survey of New

England cottontail and snowshoe hare habitat in southern Maine found that 75 percent of occupied sites had invasive species present, commonly multiflora rose (*Rosa multiflora*). If you plan an extensive invasive plant project that includes shrubby species in the south east part of the state, please contact your local Cooperative Extension office for advice. Ideally, invasive shrubs would be replaced with native alternatives in habitats important to uncommon wildlife species.





### 3. Planning Successful Invasive Plant Management Projects

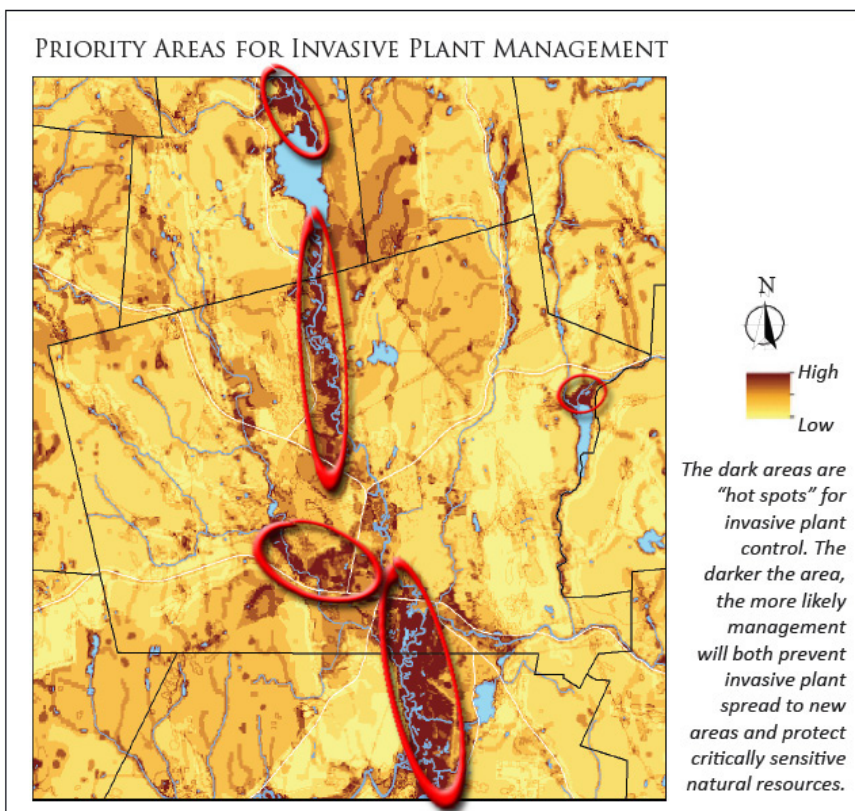
#### A. Identify

##### i. Where to Start Work: Finding Priority Areas for Invasive Plant Management

###### Project Area

The project area to work within is determined by you. It could be as large as an entire watershed or as small as a single flower bed. You could choose to work within a political boundary such as a municipality, county, wildlife refuge, area of conservation land, town forest or schoolyard. Alternatively, you may choose to work within a natural boundary such as a watershed, mountain range, or particular habitat type such as floodplain forest or wetlands throughout a region.

Within your project area, use the *Priority Areas for Invasive Plant Management Maps* to determine where to begin. The darker an area, the more likely doing invasive control work in that location will help prevent the spread of invasives to new areas, protect critically sensitive natural resources, and preserve landscape features that provide ecological services to people.



Circled areas are "hot spots" for invasive plant control in Keene, NH. These are a good place to start looking for invasive plants.

*Use the "Priority Areas for Invasive Plant Management Maps" to determine where to start work.*

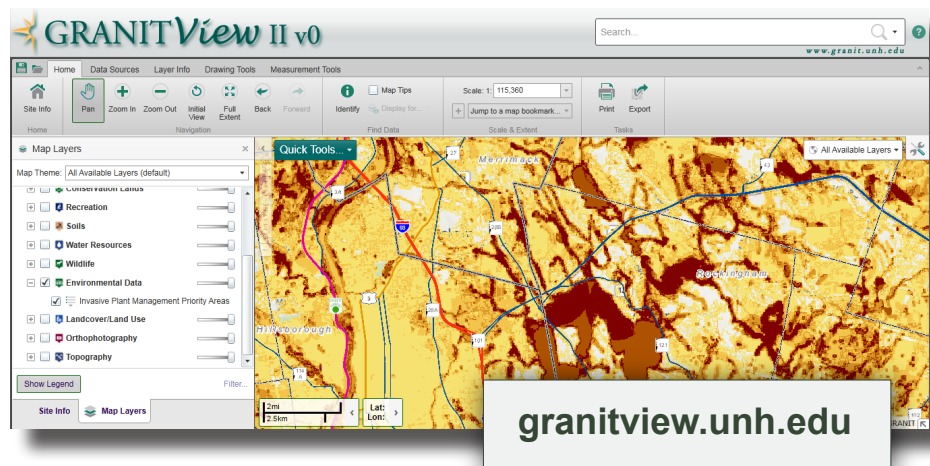
- IDENTIFY
- PRIORITIZE
- ACT
- SUCCEED

## Where to Find Prioritization Maps

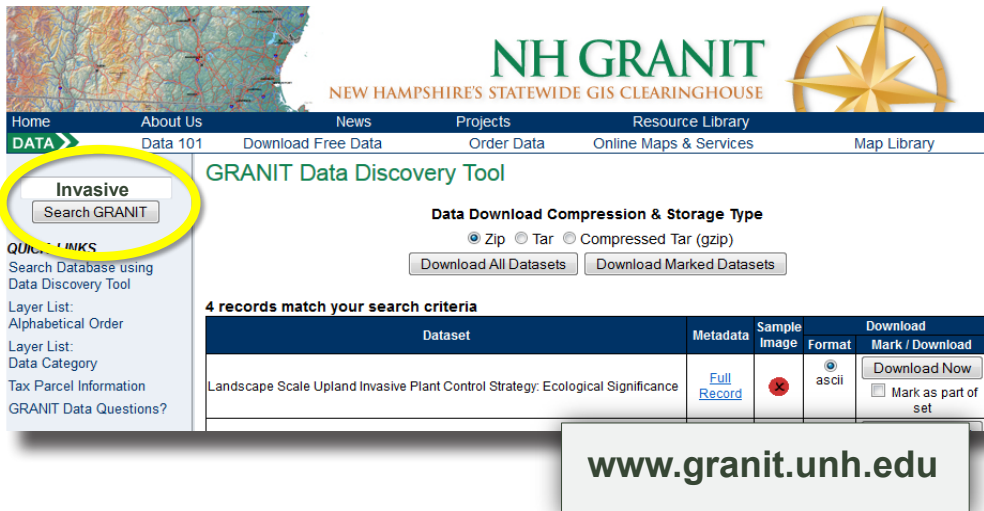
*Priority Areas for Invasive Plant Management Maps* are available for download at the municipal scale at [wildnh.com/invasives](http://wildnh.com/invasives). This scale was chosen since many on the ground invasive plant projects are spearheaded by Conservation Commissions. These maps are part of a simple two page strategy that also shows a customized “early detection” list of plant species just coming into each community. Focusing on control of these species may prevent them becoming fully established and stop their spread to neighboring areas.



You can view the *Priority Areas for Invasive Plant Management Maps* dynamically using the online interactive tool “GRANITView II”, available at [granitview.unh.edu](http://granitview.unh.edu). In the “Map Layers” dialogue box simply click the “Environmental Data” layer and the “Invasive Plant Management Priority Areas” layer appears. This tool allows you to view the maps at any scale you choose and add roads, conservation lands, or other features of interest. You can save the maps you create, print them, and share them with other people. You can bring in customized geospatial data and use the “Drawing Tools” menu to add your own features. A really good option is to add invasive plant location information you have collected in the field to help with planning your control strategy.



If you have access to GIS software, you can download the *Priority Areas for Invasive Plant Management Map* data at [www.granit.unh.edu](http://www.granit.unh.edu). The overall prioritization map, along with each of its three composite layers, can be downloaded. All data sets are distributed as “ascii” files that can be converted to raster format using standard ArcMap tools. To download, use the search term “invasive” in the GRANIT data download tool.



*The darker an area, the more likely invasive plant removal will protect critically sensitive natural resources and prevent spread of invasives to new areas.*

## ii. Presence of Invasive Plants: Getting to Know What's on the Ground

### Identifying the Problem

Education is one of the best tools for fighting invasive species. Learning how to identify a few common species is a great first step. Also, to map invasive plants we need to be able to identify them with a high degree of certainty. One of the best resources to do this is the NH Guide to Upland Invasive Species published by the Department of Agriculture and available for download at [agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf](http://agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf).

### Mistaken Identity

While some invasive plants are easily recognized, others are difficult to distinguish from similar looking native species. For example, invasive purple loosestrife is similar in appearance to tall fireweed (*Chamerion angustifolium*). Both are about the same height and have a beautiful spike of clustered magenta flowers.

Even the same plant species has been found to have native and non-native forms. *Phragmites* is thought to be the most widely distributed flowering plant in the world. Historically in New England, a native form was restricted to the upper edge of salt marshes, growing naturally with other species. However, in the last century, a non-native form began to create expansive monocultures. In the last decade, genetic testing confirmed two genetic lineages of *Phragmites australis* in New England, one native (subspecies *americanus*) and one from



A great identification guide, tailored specifically to New Hampshire.

- IDENTIFY
- PRIORITIZE
- ACT
- SUCCEED



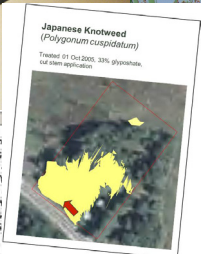
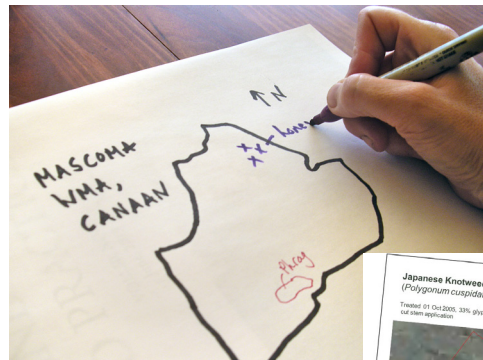
Europe (subspecies *australis*). Since they look similar, the native form, a state-endangered taxon in New Hampshire, could be mistakenly managed under the belief it is the non-native invasive form. The rare native is now estimated to compose much less than one percent of *Phragmites* occurring in New England. The only known population in New Hampshire can be seen along the boardwalk at Great Bay Discovery Center in Greenland.

Native *Phragmites* is a rare species.

### Mapping

Depending on the resources available, it is likely you will only be able to map a portion of the full extent of invasive plant species in the region you are working within. If this is the case, a good place to start is to locate “hot spots” for control by finding the darkest regions on the *Priority Areas for Invasive Plant Management Map* and beginning your search there. The darker the area, the more likely invasive control work will help prevent the spread of invasives to new areas, protect critically sensitive natural resources, and preserve landscape features that provide ecological services to people.

Effective prioritization decisions can be made using whatever format your mapping takes. You can choose to sketch with pencil or paper, use point locations collected with a simple Global Positioning System (GPS), collect detailed population location and information such as percent cover using a GPS with a data dictionary, use one of several apps for your mobile smart device, or upload your data into a reporting tool such as IMAP-Invasives, or EDDMapS. Increased mapping detail better informs your ability to develop a strategic and efficient approach to tackling invasive plants in an area.



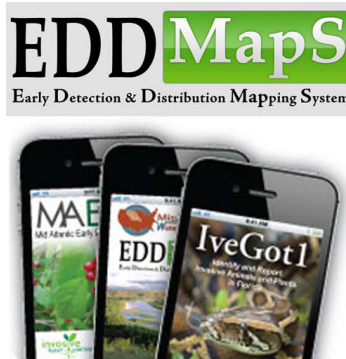
A	B	C	D	E	F	G
2	Stocks	Diversey, Hillsdale	Chittenden	Montpelier	Districts	P
3	Honeyuckle, Morrow	2006 EDGE-roadside	Forest	Less than 20	Single patch	6
4	Honeyuckle, Morrow	2006 EDGE-roadside	Culture trails	Single point	Single plant	1
5	Honeyuckle, Tetona	2006 INESC-Arroyal Isthmus	Other (barren)	Single point	Single plant	1
6	HS, Yellow Flag	2006 INESC-Arroyal Isthmus	Other (barren)	Less than 20	Single patch	1
7	Honeyuckle, Tetona	2006 INESC-Arroyal Isthmus	Other (barren)	Less than 20	Single patch	2
8	Rose, Marlboro	2006 INESC-Arroyal Isthmus	Other (barren)	Less than 20	Single patch	6
9	Rose, Marlboro	2006 INESC-Arroyal Isthmus	Other (barren)	Less than 20	Single patch	6
10	Honeyuckle, Shroy B	2006 INESC-Arroyal Isthmus	Other (barren)	Less than 20	Single patch	1
11	Burialton, Glossy	2006 EDGE-Upland/wetland		Less than 20	Single patch	1
12	Honeyuckle, Shroy B	2006 EDGE-Upland/wetland		Single point	Single plant	1.5%
13	Honeyuckle, Shroy B	2006 WILLO-Straat wetland	Barren	Single point	Single plant	1.5%
14	Honeyuckle, Shroy B	2006 WILLO-Straat wetland	Lowest	Single point	Single plant	Less than 1%
15	Teas, Marlboro	2006 WILLO-Straat wetland	Barren	Less than 20	Single patch	Less than 1%
16	Burlington, Glossy	2006 WILLO-Straat wetland	Barren	Single point	Single plant	1.5%
17	Anthony, Glossy	2006 WILLO-Straat wetland	Lowest	Single point	Single plant	1.2%
18	Honeyuckle, Shroy B	2006 WILLO-Straat wetland	Lowest	Single point	Single plant	1.7%
19	Honeyuckle, Shroy B	2006 FOREST-Oak	Other (barren)	Less than 20	Single patch	1.5%
20	Chey, Warren	2006 FOREST-Oak	Other (barren)	Single point	Single plant	0.25%
21	Honeyuckle, Shroy B	2006 FOREST-Oak	Other (barren)	Less than 20	Single patch	1.5%
22	Maple, Haver	2006 INESC-Arroyal Isthmus	Other (barren)	Less than 20	Multiple patches	8-25%

Mapping the distribution of invasive plants in your project area can be as simple or complex as you'd like to make it.

## Shared Data Collection

The more we can enter invasive species information into a single shared data base, the more comprehensive our knowledge about invasive species in New Hampshire will become. The greater our knowledge, the more effective our decision making can be. This is particularly important in the context of climate change as the more mapping information we have, the more likely we will be able to track fine-scale changes in a species range and potentially respond with management action preventing establishment in new areas.

One free online tool that's easy to use is called EDDMapS, an acronym for **E**arly **D**etection and **D**istribution **M**apping **S**ystem. It was developed, and is supported by, the University of Georgia's Center for Invasive Species and Ecosystem Health. It contains information about invasive plant locations throughout the nation and is endorsed by the US Fish and Wildlife Service, the National Park Service and the US Forest Service. It contains extensive data collected by the Invasive Plant Network of New England (IPANE) and by NH's Department of Agriculture State Invasive Species Coordinator. When a plant location, entered by any person, expands the known range of an invasive species, or is unique in some other way, an alarm is automatically sent to NH's Department of Agriculture State Invasive Species Coordinator and they follow up with a site visit. If you are interested in uploading the mapping information you collect into a communal data base check out [eddmaps.org](http://eddmaps.org). And yes, there *is* an app for that!



*The more we collect invasive plant information into a single data base, the more comprehensive our knowledge and the more effective our decision making about invasive species in NH will be.*

### iii. Your Management Goal

The goal of your invasive plant project could be general, such as “remove all invasive plants throughout the project area”, or more targeted. Examples of targeted goals include removing one specific invasive plant species throughout an area, managing invasives in all habitats of the same type such as wetlands or pine barrens, or managing in a specific area to maintain recreation access. It is important to decide on a goal up front so you can keep track of your project success and know when you have met your target state. Starting with a few projects, and maintaining their success before beginning a new project, is the key to making an ecological difference in the landscape over the long-term.

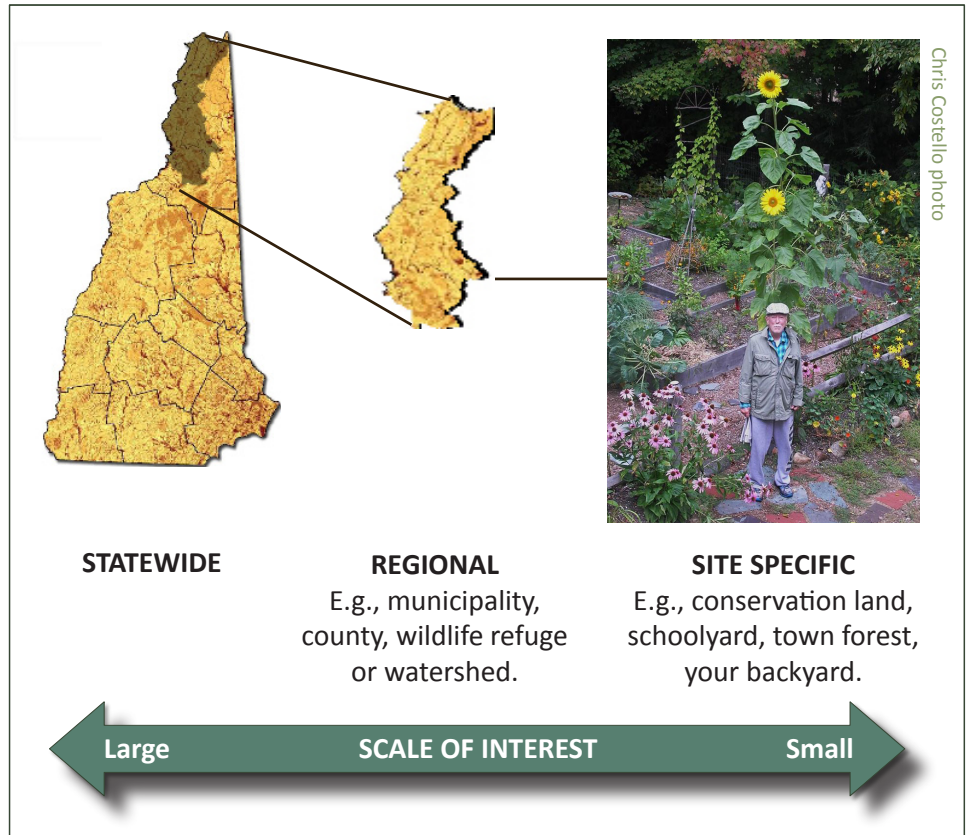
## B. Prioritize...

### i. Multiple Scale Strategies

Several strategies to prioritize invasive plant projects can operate on multiple scales. These include:

- Early detection and rapid response
- Protect priority habitats first
- Start at the headwaters and work downstream
- Start with small populations, or deal with “spot fires”

- **IDENTIFY**
- **PRIORITIZE**
- **ACT**
- **SUCCEED**



Several strategies can function at many different scales depending on the management goal of your invasive plant project.

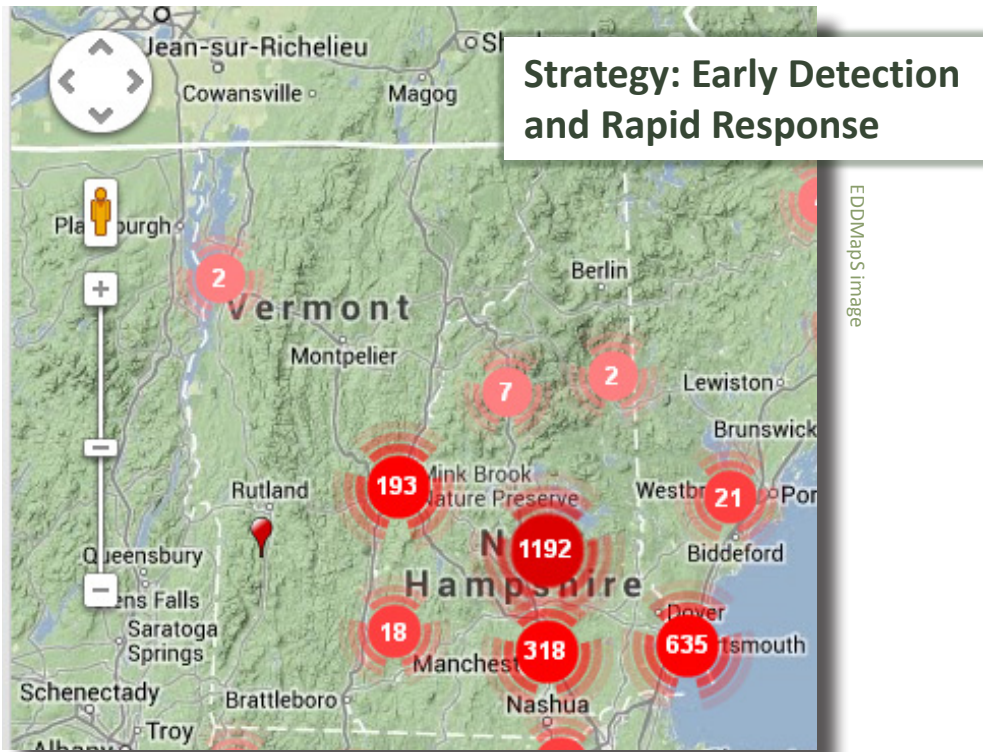
### Early Detection and Rapid Response

Early detection and rapid response to try and prevent, or slow, a new invasive species coming into an area is the single most important strategy when planning invasive plant management projects. It is much easier to remove a few plants of an “early detection species” to stop it becoming established than to tackle a species that has firmly taken root throughout an area.

Early detection can operate over multiple scales. For example, perennial pepperweed (*Lepidium latifolium*) is an early detection species for the state. Currently it is only found in a few areas of the Seacoast and one site in Franconia Notch. Staff of the New Hampshire Coastal Program and Department of Agriculture patrol potential pepperweed locations and carefully remove any plants they find. This not only prevents this species from becoming fully established in NH, it also prevents its expansion northeast into Maine.

From a statewide perspective, a plant species may be common, but it can remain rare or absent in certain regions. For example, autumn olive (*Elaeagnus umbellata*) is well established in central and southeast New Hampshire, but has yet to become prevalent in the White Mountains and Great North Woods. In these regions it is still an early detection species. Focusing on trying to remove any autumn olive plants found from the White Mountains northwards would be one of the most important invasive plant “battles” to pick in these regions. The more people, groups, and towns work on the common goal of removing newly establishing autumn olive plants, the more likely it is that this species will be prevented from taking root in northern New Hampshire.

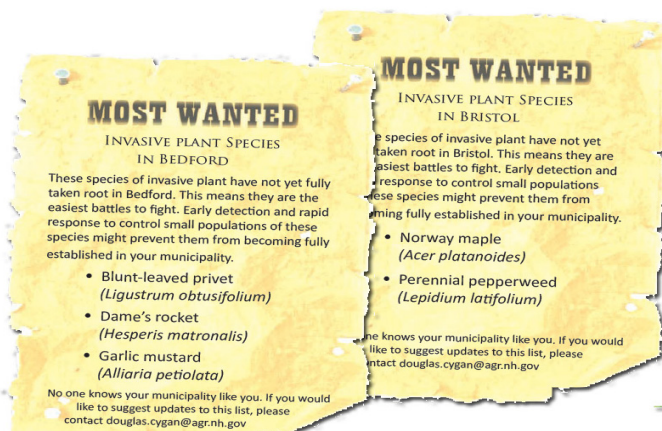




Numbers represent location and populations of autumn olive in New Hampshire. Although common in the southern part of the state, autumn olive remains an early detection species for the White Mountains northward.

Early detection can take place at any scale. Even if a plant species is common in surrounding areas, if it is not present in the project area you decide to work within, then focusing on preventing it from moving in is the most important battle to pick. This is true in any area, from as large as a continent to as small as a single flower bed in a backyard.

Since early detection is such an effective approach, each community's customized invasive plant control strategy, found at [wildnh.com/invasives](http://wildnh.com/invasives), has a "MOST WANTED" list of the top three or four invasive plant species that are either newly entering, or about to enter, its borders. Focusing efforts on getting rid of these species will proactively prevent a much bigger problem.



Customized "early detection species" lists are available for each NH community.

*Early detection and rapid response to prevent a species establishing in a new area is the single most important strategy when planning invasive plant management projects.*

- IDENTIFY
- PRIORITIZE
- ACT
- SUCCEED

## CASE STUDY

### Hanover: A Showcase for Grass “Roots” Organization

Garlic mustard produces compounds that limit the growth of other plants, and it spreads quickly so it can rapidly form an understory monoculture. In 2010, the Biodiversity Committee, a subcommittee of Hanover’s Conservation Commission, determined that garlic mustard should be a focus of control efforts. Their work is a showcase for on-the-ground communication and invasive plant management. They have searched for and mapped, all the garlic mustard populations they could find, alerting homeowners and neighborhoods of its presence and teaching how to identify it.

In 2011, the Biodiversity Committee started to organize volunteer work parties to hand-pull garlic mustard. They have kept track of the number of bags removed from each site, and decided that the larger populations need to be treated with an herbicide. Garlic mustard seeds remain viable and ready to produce new plants for up to ten years. Therefore the Committee has made a commitment to continuing control over the next several years. They have mobilized community members, developed a website, and reached out to neighboring towns.

The battle against garlic mustard in Hanover is an ongoing effort but is a well-organized example of how a “battle has been picked” and efforts have been focused to try and make a lasting impact protecting native biodiversity.

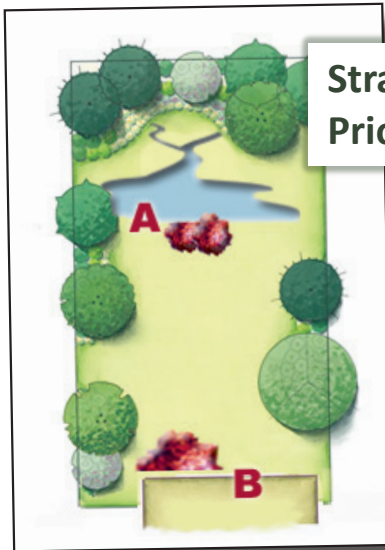
*Working in the Real World*

### Protect Priority Habitats First

Selecting habitats of priority within your project area is a good place to start targeting invasive plant management efforts. It could be a habitat relatively uncommon in New Hampshire, for example pine barrens or salt marshes, or it could be an area you are just particularly fond of, such as the wetlands or a meadow on your property.

The NH Natural Heritage Bureau maintains a list of exemplary natural communities for each town, along with rare plants and animals, online at [nhdfi.org/library/pdf/Natural%20Heritage/Townlist.pdf](http://nhdfi.org/library/pdf/Natural%20Heritage/Townlist.pdf). They advise prioritizing areas that support globally rare natural communities or species, followed by high quality examples of common communities and state rare plants and animals, and finally areas that are particularly rich in biodiversity.





**Strategy: Protect Priority Habitats First**

Selecting habitats that are a priority to you is a good place to start managing invasive plants. In this example, a homeowner decided to start with population “A” which is located next to a wetland and leave population “B”, which is next to the house, until later.

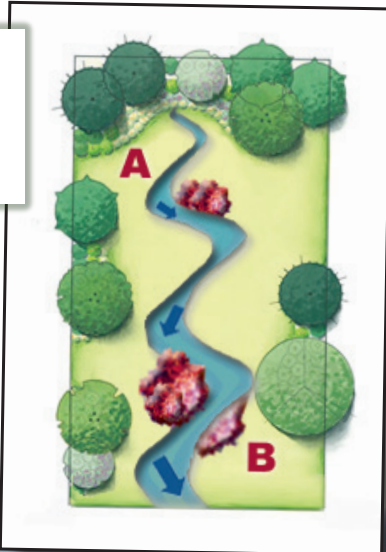
*The NH Natural Heritage Bureau maintains a publicly available list of rare plants and animals that have been documented in each community.*

**Start at the Headwaters and Work Downstream**

Starting at the headwaters prevents reinfestation from upstream populations of the same species. This is particularly true in areas that are prone to flooding and high bank erosion. This is just as important a strategy for a major river such as the Androscoggin, Connecticut, Merrimack, or Saco as it is for a small order stream that drains from a beaver impoundment.

**Strategy: Start at the Headwaters and Work Downstream**

Starting invasive plant management with the upstream population “A” before “B” prevents reinfestation from upstream..

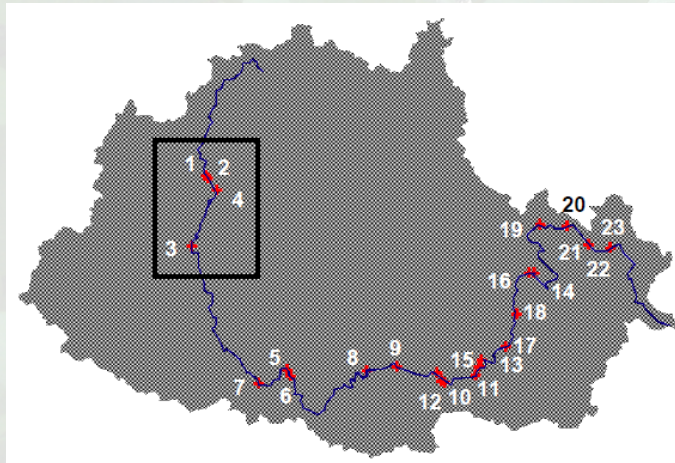


- IDENTIFY
- **PRIORITIZE**
- ACT
- SUCCEED

## CASE STUDY

### The Lamprey River Knotweed Project

In 2007, the Lamprey River Watershed Association coordinated a “Stream Walk” that mapped 23 stands of Japanese knotweed along the entire 47 mile length of the Lamprey River. Working with the Lamprey River Advisory Committee and National Park Service, they developed a management prioritization model based on distance from headwaters, proximity to dams, surrounding land use, parcel size, and distance to roads. Outreach to public and private landowners allowed them to start control of the 4 stands of knotweed of highest priority. The Natural Resource Conservation Service has continued this work and these stands are no longer a source of stem fragments that could wash down stream to start new areas of knotweed infestation.

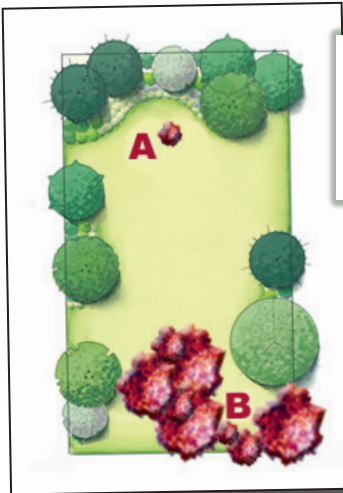


*Working in the Real World!*

### Start with Small Populations, or Deal with “Spot Fires”

In an area that has multiple sized populations of invasive plants, it often makes sense to start with the smallest first. The smaller a population, usually the less effort is needed for eradication. Early removal also prevents its growth into a large population that is more challenging to manage.

In some cases, an invasive plant population may be expansive and too challenging to control with the resources currently available. In this situation, it likely makes sense to draw a ring around the core infestation and focus on managing newly establishing populations, or spot fires, at the periphery until resources are available to tackle the core patch fully over a committed number of years. When you do decide to tackle an extensive population, start on the outside of a large stand and work in towards the middle.



### Strategy: Start with Small Populations, or Deal With “Spot Fires”

Starting with small populations is more likely to result in early success.

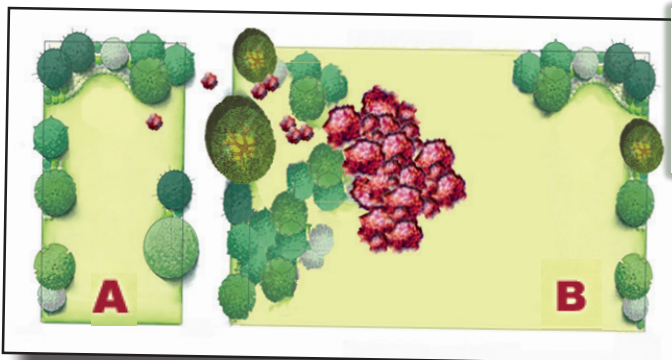
*Developing a management approach based on invasive plant distribution will lead to greater success.*

#### i. Site Specific Strategies

- Consider proximity to other populations of the same species
- Prioritize areas of disturbance
- Consider plant distribution pattern

#### Consider Proximity to Other Populations of the Same Species

Invasive plant management is commonly done on a property of single ownership. However, it is important to be aware of populations of the same species on surrounding properties that may be close enough to potentially reinfest a successful invasive plant management project on your land. If such populations exist, consider reaching out to the neighboring owner(s) and see if they are interested in beginning management on their property too. This will allow effective invasive plant control on your land to remain sustainable for a much longer period.



### Strategy: Consider Proximity to Other Populations

- IDENTIFY
- **PRIORITIZE**
- ACT
- SUCCEED

Starting work on your property “A” may only make sense if surrounding landowners on property “B” also want to participate.

## Prioritize Areas of Disturbance

Invasive plants are early colonizers of disturbed soils, so being proactive and trying to manage populations before a timber harvest, construction project, or other disturbance takes place can be very effective strategy. A timber harvest exposes the forest floor to additional light so any seeds present are likely to grow vigorously. Forest regrowth dominated by invasives rather than native species is likely to have economic, in addition to ecological, impact.

As construction machinery moves soil around a site, seeds and fragments of invasive plant can be moved to previously uninfested parts of the property and start new populations. Machinery can be the source for invasive plant colonies starting in completely new areas if not washed thoroughly before leaving a site. This is also a reason to prioritize management of invasives located in mowed areas.

Disturbance can have natural as well as human-related origins. Floodplain forests are particularly subject to infestation by invasive plants as flood events can wash seeds and stem fragments from upstream banks and carry them to into these adjacent areas.



**Strategy: Prioritize Areas of Disturbance**



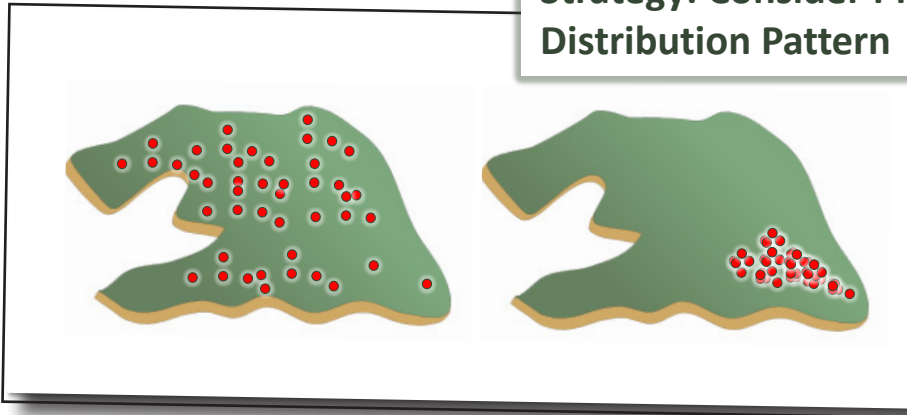
Invasive plants are early colonizers of disturbed soils.

## Consider Plant Distribution Pattern

A population of an invasive plant species that is sparsely distributed throughout a large area will take much more time to get to than one that is densely clumped together. This will increase the volunteer time needed to complete a project and is a substantial part of the cost when hiring a commercial applicator. For this reason it may make sense to start with the clumped species first.

Both common barberry (*Berberis vulgaris*) and bush honeysuckle species can be removed mechanically by pulling them from the soil and digging out any root fragments. However, in southern New Hampshire a barberry population would be much more costly to control than an equal number of honeysuckle bushes. Barberry is spread by birds eating its seeds, so is commonly found as single or few plants spread throughout an entire forest compared to honeysuckles which are usually found in clumps, often radiating out from an old cellar hole.

### Strategy: Consider Plant Distribution Pattern



Much less time is spent traveling to populations that are clumped than the same number of plants that are widely distributed across a property.

## ii. Plant Life History Traits

An invasive plants' seed bank duration, mechanism of spread to new areas, germination success, and shade tolerance are some of the key factors that combine to determine how difficult it will be to manage. Depending on the invasive plant species present within the project area you select, you may choose to focus first on species that are easiest to control.

The distance over which a population can spread to new areas depends on its mechanism of reproduction. A species such as Norway maple (*Acer platanoides*) that spreads by wind can start new populations over a much greater distance than one that such as *Phragmites* which spreads primarily via underground rhizome. In general, the size of a single population is inversely proportional to the distance that species tends to spread to new areas. A slowly expanding species is likely to form large dense stands, while local populations of widely spread wind or animal dispersed species are likely to be quite small. Consideration of the length of time a plant's seeds remain viable is a key factor when planning invasive plant management projects. Any plant you remove will have dispersed seeds in the surrounding soil. Unless you commit to monitoring your project area for new growth for the number of years seeds may remain viable, it is likely some will sprout and your project area will eventually become infested again. The length of time this follow up treatment is needed varies by species. Bush honeysuckles produce seeds prolifically, but they remain viable only for a short time. In contrast, garlic mustard seeds can remain viable for up to 10 years, so having a plan to keep checking back for a decade is the only way to be sure any population has been eradicated for good.

*It is important to consider invasive plant life history traits when deciding where it is best to start work.*

- IDENTIFY
- **PRIORITIZE**
- ACT
- SUCCEED

Shade tolerance and the habitat in which an invasive plant population is growing is also a factor to consider when prioritizing which species to tackle first. New Hampshire is over eighty percent forested so any invasive plant that thrives in forest habitat has the potential to become widespread. Since Norway maple and burning bush (*Euonymus alatus*) are shade tolerant they can grow rapidly under forest canopy. Neither species is in New Hampshire in great numbers yet. We may be able to prevent burning bush from forming the dense understory monocultures it does in many parts of southern New England and Norway maple from becoming widespread if as many people as possible focus on removing these species.

## C. On the Ground Action...

### i. The Right Techniques for the Job

Once you have determined your project area to work within, and the extent of your invasive plant distribution, the right tool(s) for the job may range from a good pair of work gloves to hiring a licensed pesticide applicator. Mechanical and chemical controls are the most common options and may be used individually or combined. The right technique for a particular circumstance is informed by the invasive plant needed to be managed along with keeping in mind the impact the control measure may have on sensitive plants and animals in the project area.

#### Mechanical Treatments

Mechanical treatments are often the best approach when dealing with a small population of invasive plants, or if you have a large group of volunteers willing to lend a hand. Some species, such as garlic mustard and perennial pepperweed, are easily pulled by hand or with a weed wrench but this causes soil disturbance so restoring the site with native plants is prudent. Pulled plants with roots intact must be properly disposed of to avoid a new infestation or reinfestation. Pile bagged herbaceous plants and woody shrubs on a non-pervious surface, such as asphalt or black plastic, to bake in the sun for several weeks before disposing in the trash, or hang pulled plants on other vegetation in the forest interior so roots no longer touch the soil and will dry



out. Seedlings and herbaceous plants may be suffocated by securing plastic sheeting over and beyond the extent of the infestation for two years or more. This method is not discriminatory, so will kill both native and non-native plants and restoration of the site by planting native groundcover will be necessary when the plastic is removed. Cutting or mowing certain species can be effective as long as you have the resources to mow several times a year for up to five years. If you choose this method, don't be discouraged as plants will initially send up more shoots but, as long as you continue to mow, they will weaken and eventually die. If you abandon mowing once started, and do not replace it with another form of treatment, you may make the problem worse. It is always important to check out the way a particular species can spread. Mowing or cutting Japanese knotweed should be avoided as just a 1/16" stem fragment can start a whole new colony.

Girdling by cutting through the bark all the way around a trunk is a useful tool for mature trees but, depending on the species, may result in stump sprouts which are difficult to control. This method is often best used in conjunction with chemical treatment.

## Chemical Treatments

Chemical controls may be the only effective method when dealing with very large or mature invasive populations. When working on a property you do not own, you must hold a pesticide applicator license, or hire a licensed applicator. The use of chemicals may require a permit if you are near a water source or on public property. Consult town ordinances and the Department of Agriculture, Division of Pesticides to determine any special consideration for the use of herbicides. Always read and follow the label when using herbicides on your own property.



Foliar spray treatments are the most commonly used application of herbicides and are effective on most species. Early spring and late fall are often the best time to spray to avoid damage to native plants because invasive plants typically leaf out earlier and hold their leaves longer than native plants. However, a plant must be fully leafed out for a foliar spray to be most effective.

The cut stump method is a highly effective combination of mechanical and chemical control. A woody plant is cut and the herbicide applied to the stump. A higher concentration of chemical is used in this method but because it is direct, there is less overall chemical applied to the environment and virtually no damage to surrounding native plants. This method is effective on any invasive woody shrub or tree.

Invasive species management can require a significant commitment of time and money and should only be undertaken if follow up monitoring can take place. Although some species can be removed with a one time management action, many will resprout or have seeds that remain viable for decades. This means continued treatment to remove any new growth will be needed to ensure the project is successful in the long-term. If left unchecked, the young plants may eventually grow to cover the area that had initially been successfully cleared.

*The right tool  
for the job may  
range from a  
good pair of  
work gloves to a  
licensed pesticide  
applicator.*

- IDENTIFY
- PRIORITIZE
- **ACT**
- SUCCEED

## ii. Commit to a Multiple Year Effort

When you select a project, consideration of land ownership(s) underlying invasive populations is important. You want to be sure you can “start what you finished” and will have access to the area for as many years as the project will take. For this reason, projects are often located on your own property or publicly accessible or conservation land.



Paul Stevens photo

Starting with a few projects, and maintaining their success before starting work in a new area, is the key to making an ecological difference in the landscape over the long-term.

When deciding to begin an invasive plant project it is important to take the long view. Some species take years of management before they are fully eradicated.

## iii. Remove then Restore

Invasive plants are often interspersed with native species that will naturally grow and fill in the gaps when invasives are removed. However, when invasive plants dominate, their removal may leave behind a disturbed site void of most vegetation. Invasive plants are often early colonizers of disturbed soils. Once you have cleared an area and exposed bare ground, plant it with native species as soon as possible. If the project is going to take several years, a temporary ground cover such as winter rye might be used until the project is complete and native plants can be established for the long-term.

To determine native plant species appropriate for your site, take a look at your surroundings and the native plants already growing in the area. If the site is in a mature forest, plant shade tolerant species such as sugar maple (*Acer saccharum*) or white oak (*Quercus alba*); if you are in a wet area, select plants that do well in wet soils such as highbush blueberry (*Vaccinium corymbosum*) and red maple (*Acer rubrum*). In some cases, a native species can be chosen to replace the structure of the invasive plant. For example, Virginia rose (*Rosa virginiana*) has a similar branch structure to multiflora rose (*Rosa multiflora*). If erosion is a concern, you might consider planting a local conservation seed mix to quickly stabilize the site and then follow up by planting slower-growing shrubs for long-term restoration.

To protect your investment, be certain that any follow up control of invasives, such as herbicide treatments, will not impact your newly bedded plants. If deer browse is a problem, choose species that are unpalatable or protect stems with tubing. Consult with nursery staff regarding planting location and methods, the best time of year to plant, and any watering or fertilization needs for the plant species you choose.

The New England Wildflower Society has published a list of native alternatives to invasive plants species at [newenglandwild.org/docs/docs/invalt2.pdf](http://newenglandwild.org/docs/docs/invalt2.pdf) and a number of similar guides may be found online. Visit [wildlife.state.nh.us/habitat/backyard.html](http://wildlife.state.nh.us/habitat/backyard.html) for guidance on creating a backyard wildlife sanctuary. The New Hampshire State Nursery at [nhnursery.com](http://nhnursery.com) is a good source of native plants propagated locally and they offer packages geared toward providing wildlife food and cover.





## Tools for Free Loan



“Weed Wrenches” are specialized tools used for manual removal of woody-stemmed invasive plants such as glossy buckthorn, autumn olive, multiflora rose or honeysuckles. If you live in one of the forty-two communities in NH’s Great Bay watershed, Great Bay National Estuarine Research Reserve has forty wrenches available for free loan to conservation groups and community members. They also have mattocks for grubbing out roots and “planting bars” to help with restoration planting, particularly good for bare root seedlings.

All tools are housed at Great Bay Discovery Center in Greenland and are available for pick up on a first-come, first-served basis. To become eligible to use the tools, just complete a brief online survey at [greatbay.org/programs/Tool-loan-program](http://greatbay.org/programs/Tool-loan-program).



*Some invasive plant species take a long time before being successfully controlled so committing to a multi-year effort is important.*

- IDENTIFY
- PRIORITIZE
- **ACT**
- SUCCEED



#### iv. Working Together to Make a Difference

Working to put an invasive plant project together can be rewarding and fun. Whether you are a private land owner, conservation group or a community taking care of public lands, there are lots of people and organizations out there to help!

If volunteers are the backbone of your project, The Stewardship Network, New England is available to provide support. This University of New Hampshire



Cooperative Extension program operates throughout New Hampshire and beyond. You can post your event on their online calendar and they will help recruit volunteers. They also put on trainings and give advice on how best to run a people-powered work day. Since garlic mustard is an early detection species in much of New Hampshire, The Stewardship Network coordinates a challenge to see who can collect the most bags.

Cooperative Extension County Extension Foresters have a fantastic wealth of knowledge and are experts in advising how to deal with invasive species. If your property is 10 acres or more, they can visit free of charge and suggest the best way to approach invasive species concerns in your circumstance. Extension Foresters support professional natural resource specialists and can connect you with a licensed forester who can be hired to plan and oversee invasives management on your property. They assist communities with managing public lands, can help with natural resource identification, and offer public education workshops.



UNH Cooperative Extension photo

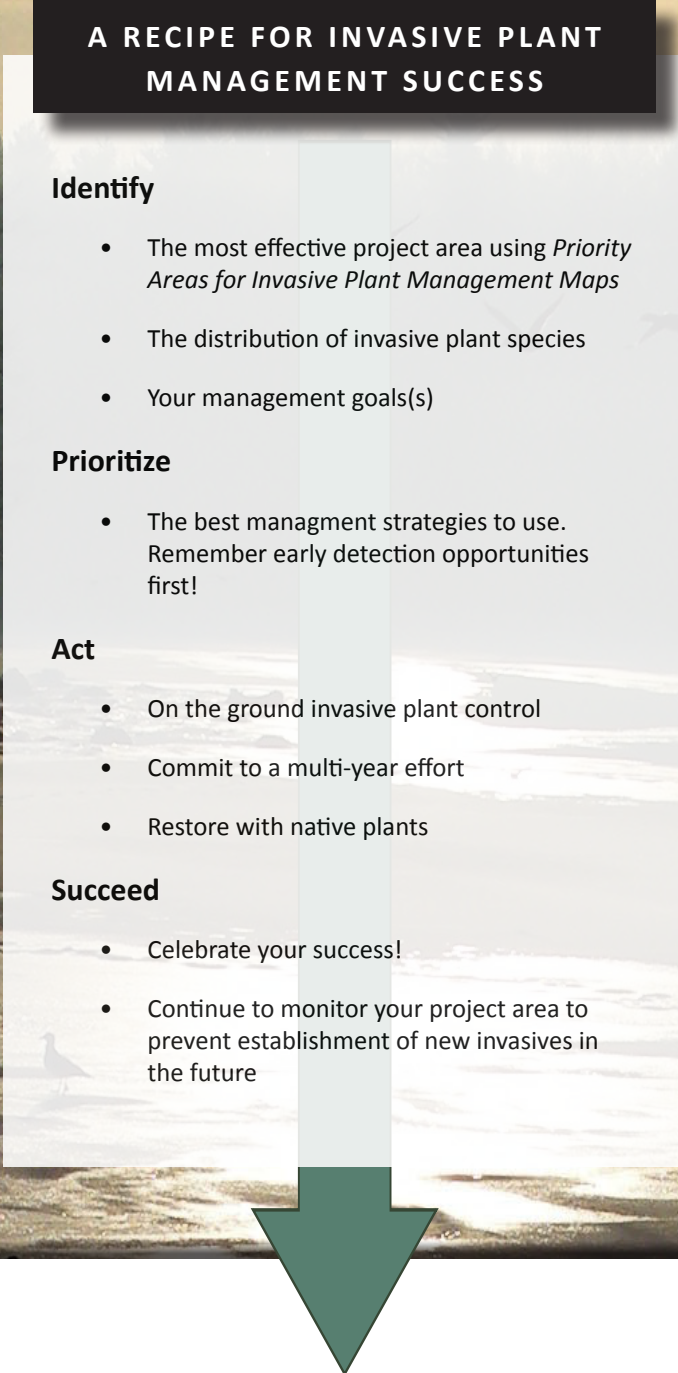
County Extension Foresters are a wealth of knowledge about invasive plants and their management.

The New Hampshire Department of Agriculture has an Invasive Species Coordinator who gives talks about invasive plants and can share guidance on invasive species identification and management options.

The Natural Resources Conservation Service and New Hampshire's County Conservation Districts are also available to give technical advice for invasive plant management projects and sometimes may be able to provide partial funding. For updates on the current programs that are being offered, contact your local office listed in back of this publication.



## D. Putting it all Together: A Recipe for Success



**A RECIPE FOR INVASIVE PLANT MANAGEMENT SUCCESS**

**Identify**

- The most effective project area using *Priority Areas for Invasive Plant Management Maps*
- The distribution of invasive plant species
- Your management goals(s)

**Prioritize**

- The best management strategies to use. Remember early detection opportunities first!

**Act**

- On the ground invasive plant control
- Commit to a multi-year effort
- Restore with native plants

**Succeed**

- Celebrate your success!
- Continue to monitor your project area to prevent establishment of new invasives in the future

**Enhance Long-term Restoration Success of Invasive Plant Management Projects**

*Working on invasive plant projects can be rewarding and fun. There are lots of people and organizations out there to help.*

- IDENTIFY
- PRIORITIZE
- ACT
- SUCCEED

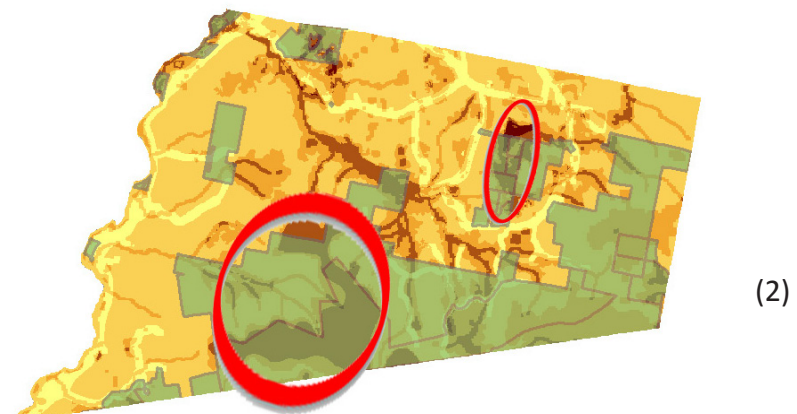
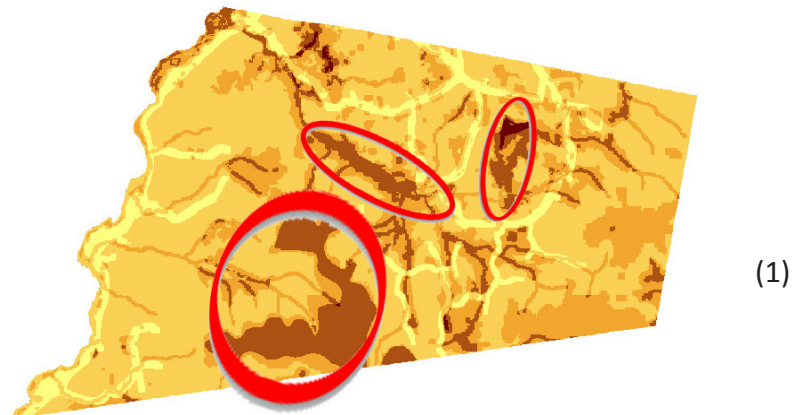
## 4. *Priority Areas for Invasive Plant Management Maps* In Action: Examples from New Hampshire Communities

### A. Deciding Where to Start Looking for Invasive Plants

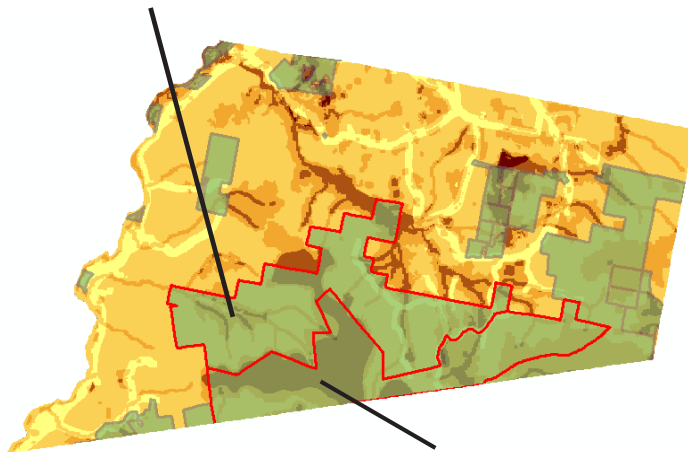
If little is known about the distribution of invasive plants in a region, the *Priority Areas for Invasive Plant Management Maps* can be used to narrow the potential project area down to a scale that matches available time and resources. The darker an area on these maps, the more likely doing invasive control work in that location will help prevent the spread of invasives to new areas, protect critically sensitive natural resources, and preserve landscape features that provide ecological services to people.

#### Columbia: Targeting the Most Effective Project Area(s)

The town of Columbia is over 60 square miles, or 39,000 acres in size, so trying to map invasive plant locations comprehensively could quickly become overwhelming. The *Priority Areas for Invasive Plant Management Map* shows there are three particularly large “hot spots” for control in this community (1). Two of these are located primarily on land that is protected in some way (2). Tax maps show one of these hot spots covers multiple parcels, so coordinating with several landowners will likely be more complex than starting to look for opportunities to manage invasive plants within the largest hot spot which lies

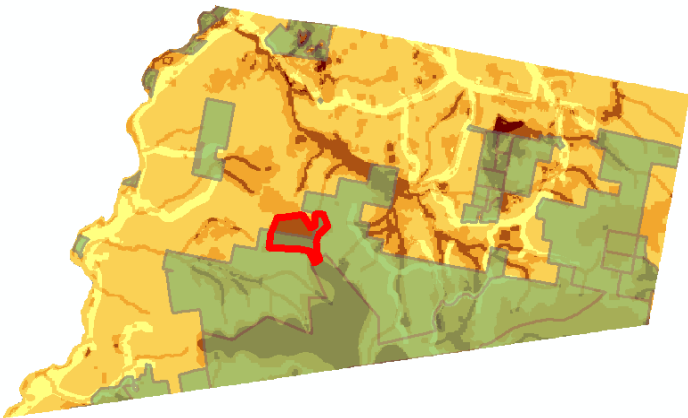


Bunnell Working Forest



(3)

Vickie Bunnell Preserve



(4)

Use the *Priority Areas for Invasive Plant Management Map* to target the most effective location to start invasive plant management. A hypothetical example from Columbia. Green areas are protected land.

within just two parcels (3). Since this area is still quite large, about 2,000 acres, it may be chosen to further focus the initial project area. The parcel highlighted is a working forest while the rest of the “hot spot” is on a preserve. The working forest may be chosen first to start looking for invasive plant management opportunities (4). This portion of the “hot spot” covers about 350 acres and there is more likely to be machinery and active management activity there, resulting in invasives potentially spreading to new areas. As invasive plant management becomes successful in the initial project area, or more resources become available, the project area could be expanded to the part of the “hot spot” located on the preserve, and in time to other areas where invasive plant control is likely to be particularly impactful.

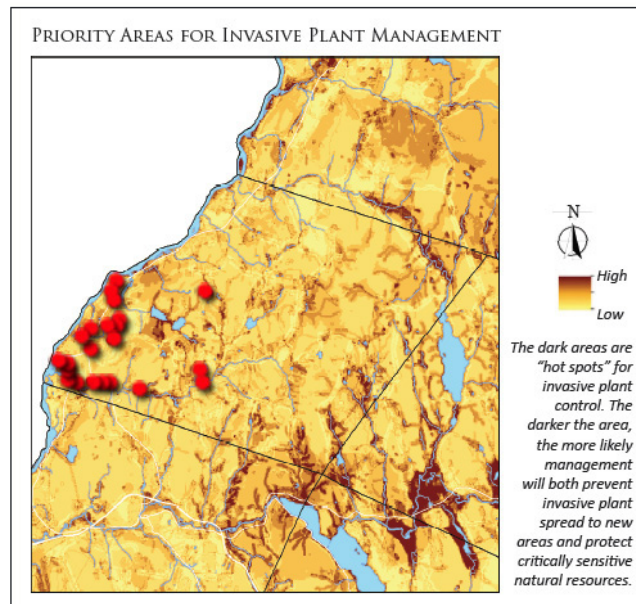
Just as this example identifies “hot spots” to start work based on large tracts of conservation land, *Priority Areas for Invasive Plant Management Maps* can also be used to focus on the most effective location for an initial project area in other large regions where it is not possible to manage all invasives present at one time. Another example could be to identify initial project areas along a long length of transmission line corridor before the vegetation is mowed, or to identify places to begin management within a specific habitat such as floodplain forest along the Connecticut River.

*Your project area is determined by you. It could be as large as a watershed or as small as a single flower bed.*

## B. Using *Priority Areas for Invasive Plant Management Maps* with Pre-existing Plant Location Information

### Hanover: Tackling an Invasive Plant before it “Takes Root” throughout a Region

Removing populations of invasive plant species that are just beginning to expand into an area is a very efficient way to approach invasive plant management and should always be a priority. In Hanover, garlic mustard is an example of this type of early detection species. If resources were limited, the *Priority Areas for Invasive Plant Management Map* shows the most south-westerly populations of garlic mustard in town are located in the highest priority areas so these would be a good place to start. However, in this real world example, Hanover’s well organized Biodiversity Committee has gathered the resources to try and manage all populations of this early detection species at once.



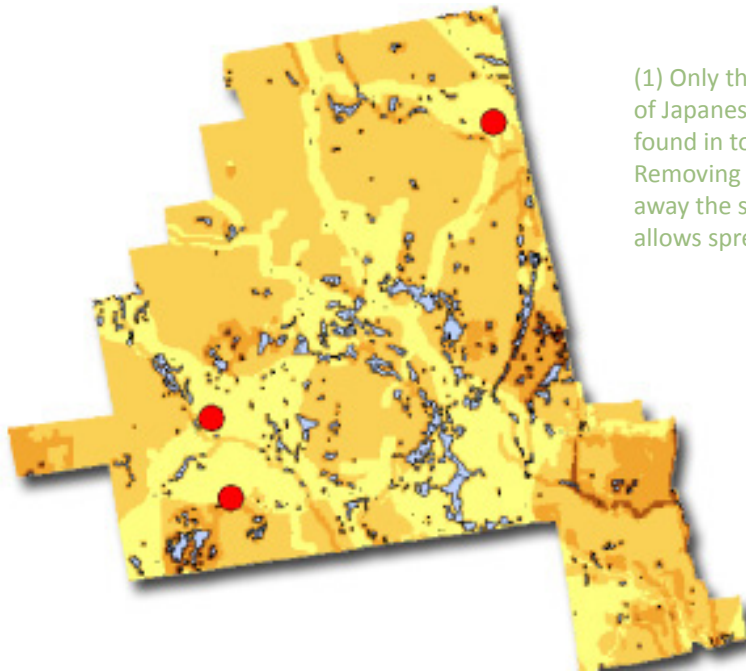
If resources were limited, the most south westerly populations of garlic mustard in Hanover are located in the highest priority “hot spots” for control, so would be a good place to start control efforts. In this case, Hanover’s well organized Biodiversity Committee has gathered the resources to try and manage all populations of this early detection species at once.

### Lyndeborough: Prioritization Based on Severity of Infestation

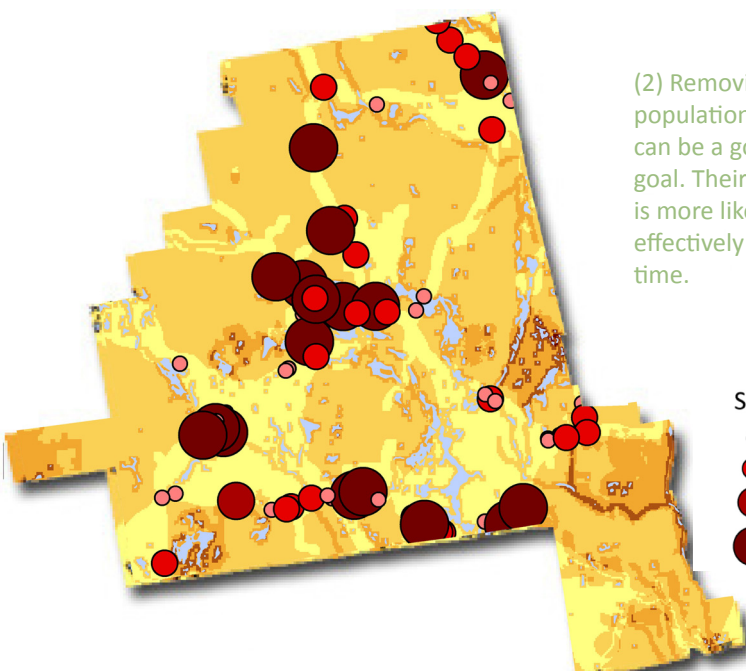
Lyndeborough’s Conservation Commission hired an ecological consultant to prepare a town-wide natural resources inventory that was completed in 2009. A rapid survey of invasive plant presence was included in this report. The survey was not intended to be a comprehensive accounting of all invasive plants, but an initial first look. The consultant drove roads at 10-15 mph documenting locations and degrees of infestation for eight invasive plant species. The severity of each infestation was recorded subjectively as “minor”, “moderate”, “major”, or “severe”.

Even with a limited amount of invasive plant distribution information, the *Priority Areas for Invasive Plant Management Map* can be used in several ways to guide where to begin management. A total of seventy one populations were mapped. Of these, only three were

Japanese barberry so these populations might be good targets for beginning the management project (1). Since this species is currently sparsely distributed in town, removing just three populations would take away the seed source that allows spread to new areas. Within Lyndeborough, there are very few “hot spots” for invasive plant management so focusing on severity of infestation could be the next place to start. Of the seventy-one populations mapped, twenty-six were noted to be minor in severity (2). Selecting these, or some sub-set of these, might be a good next effort for management as the less expansive size is more likely to be managed effectively in a shorter period of time.



(1) Only three populations of Japanese barberry were found in town (shown in red). Removing these would take away the seed source that allows spread to new areas.



(2) Removing minor populations of invasive plants can be a good management goal. Their less expansive size is more likely to be dealt with effectively in a short period of time.

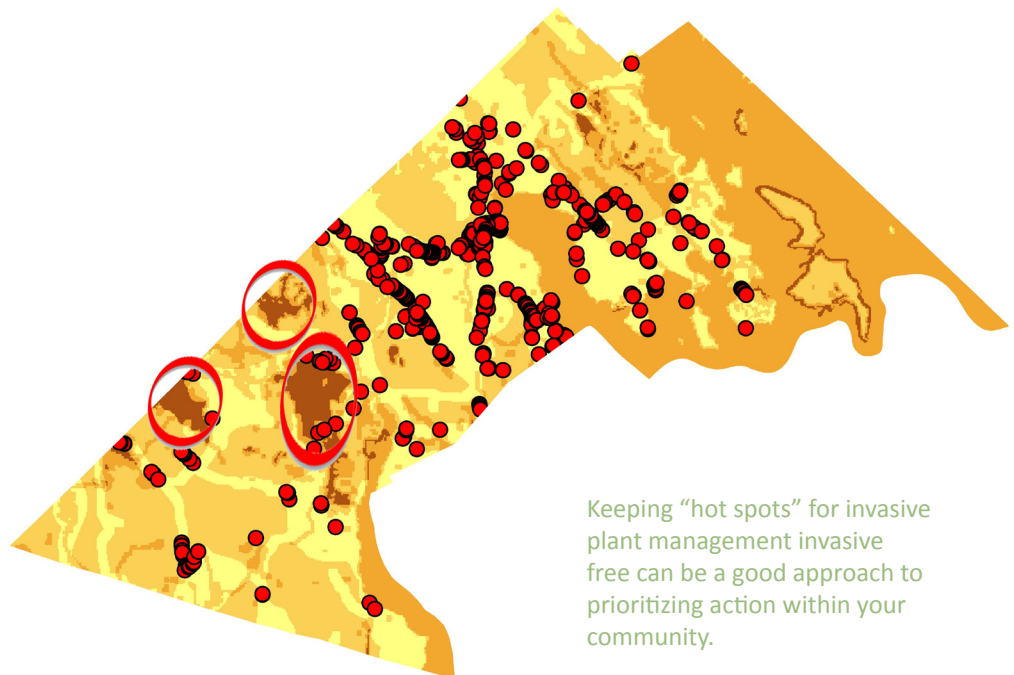
- Severity of Infestation
- Minor
  - Moderate
  - Severe
  - Major

*Even a limited amount of invasive plant distribution information can be used to guide where to start work.*

## Meredith: Keeping “Hot Spots” for Invasive Plant Control Uninfested

Another rapid assessment roadside survey was completed in Meredith in 2008. The town teamed with the NH Department of Agriculture’s Invasive Species Coordinator to collect invasive plant data via windshield survey. This method does not require permission to survey private property and data collection is quick and fairly comprehensive. In this case, it took just a week to record the location of over one thousand invasive plant populations.

*The Priority Areas for Invasive Plant Management Map* identifies three large “hot spots” for management in town, the interiors of which are without any known invasive populations. A good next step would be to try and explore these interior areas in more detail by foot to see if they really are free of invasive plants or if there were just no populations visible from the road. If they truly are invasive free, then starting to manage the populations on their periphery would be a good management goal. This action would remove seed sources in close proximity to these “hot spots” that would likely allow spread into currently uninfested areas.



### C. Deciding Where to Start When Invasive Plants are *Everywhere!*

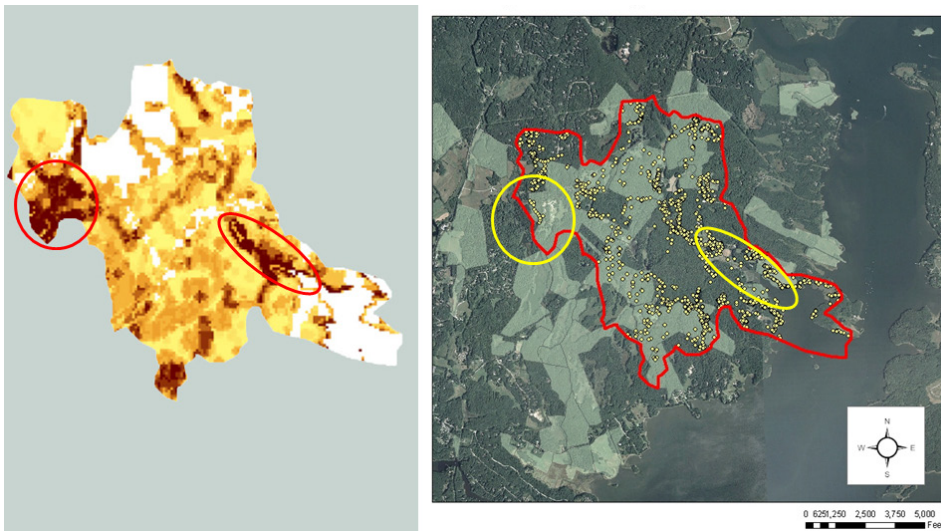
#### Newmarket and Durham: Early Detection within a Sea of Invasive Plants

In 2005 and 2006, NH Fish and Game Department and Great Bay National Estuarine Research Reserve staff worked with conservation organizations and private land owners to map invasive plants throughout a 3,000 acre watershed that spans the



border of Newmarket and Durham. They managed to survey 92 percent of the entire watershed, getting close to a complete inventory of the invasive plants present. Over 1,500 populations were identified, so deciding where to start could quickly become overwhelming.

The Seacoast is the part of New Hampshire first settled by European colonists who brought with them several species of non-native plants, some of which became invasive. It is also the southern portion of the state where invasive plant species commonly first expand their range into New Hampshire. The number of invasive species present, and extent of range expansion, is likely to increase as climate changes.



Invasive plant populations are shown in yellow. Even though purple loosestrife is common throughout Newmarket and Durham, there is only one small population in the large “hot spot” highlighted to the east. This would be of great priority to control.

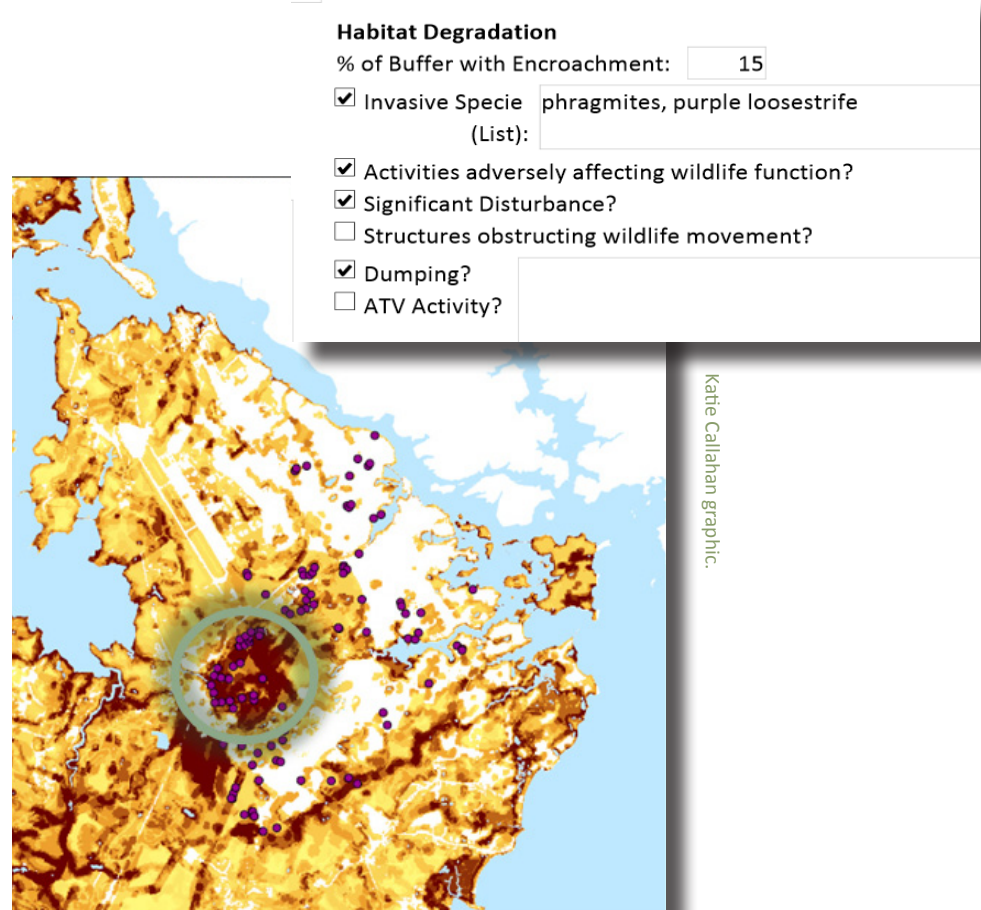
The *Priority Areas for Invasive Plant Management Maps* can help decipher where to start work in a well thought out way, even in areas more heavily impacted by invasive plants. In this example, there are several “hot spots” where invasive plant management would be particularly effective, and two of these are especially large. Overlaying the invasive plant mapping data on these “hot spots” shows five different species of plants are present. Even though purple loosestrife is common throughout Newmarket and Durham, there is only one small population in the “hot spot” highlighted to the east so this would be of great priority to control. A single purple loosestrife flower can produce over 2,000 seeds annually so this plant may quickly choke out a wetland, impacting turtles and other wildlife along with any rare plants or communities present. Removal of this small population at an early stage would be relatively easy and prevent significant future ecological damage.

This watershed has been a focus of land conservation as it is part of one of the largest unfragmented blocks of forest in the region. A next step might be to prioritize management based on invasive species ecology and remove burning bush and Norway maple from within the two large “hot spots” due to their shade tolerance and consequent ability to take over a forest’s understory.

*The Priority Areas for Invasive Plant Management Maps can help decipher where to start work even in areas heavily impacted by invasive plants.*

## Portsmouth: Keep Major Infestations from Spreading

In 2009, Portsmouth hired an ecological consulting company to complete an assessment of the conservation value and public access potential of ninety-one undeveloped properties within the city. Invasive plant information was collected using a simple data sheet and GPS point data. No information was recorded about the extent or density of any population.



Invasive plant population point data are shown in purple. A clear strategy would be to focus on “spot fires” establishing from the densely occupied area highlighted.

Overlaying even the simplest invasive plant location data on the *Priority Areas for Invasive Plant Management Maps* can lead to more effective decision-making and, consequently, stewardship of our natural resources. Although the darker areas on the *Priority Areas for Invasive Plant Management Maps* are usually the best starting point for management, in Portsmouth’s case it was found that one of the largest “hot spots” for management was absolutely riddled with invasive plants. The density of invasive populations is so great that it is likely to be impossible to eradicate invasive plants in this area and it would certainly take thousands of dollars and many years to make any significant difference. A clear strategy would be to focus on “spot fires”; new populations establishing from this major source, and prevent further spread to surrounding areas.

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## Many Ways to “Pick Our Battles”

These planning scenarios use real data from New Hampshire communities but are just examples of how a well thought out and resource-efficient plan for managing invasive plants might be developed. In each circumstance there are multiple ways to do this. The best approach will depend on specific project goals, distribution and abundance of invasive plant species in that location, and logistical factors such as land ownership or ability to access a property. The key is to use the *Priority Areas for Invasive Plant Management Maps* to help decide where to focus efforts, and most importantly, once a population has been selected for management, keep following up with treatment until it has been eradicated or controlled to the extent planned for. “Picking Our Battles” by starting with a few carefully planned projects and maintaining their success before beginning work in a new area is key to being effective stewards and making an ecological difference in the landscape over the long-term.



Beth Heckman photo.

Well planned invasive species management projects help to protect New Hampshire’s plants and wildlife habitat for everyone to enjoy.

*“Picking Our Battles” by starting with a few carefully planned projects and maintaining their success before beginning work in a new area is key.*



## 5. For More information

### Web Resources

#### Priority Areas for Invasive Species Management Maps

Download customized strategies for each community in New Hampshire including maps and early detection species lists at [wildnh.com/invasives](http://wildnh.com/invasives).

Create your own interactive maps using UNH's web mapping application at [granitviewii.unh.edu](http://granitviewii.unh.edu). Click the "Environmental Data" layer to display the Priority Areas for Invasive Species Management Maps.

Download the map layer to use with Geographic Information System software at [www.granit.unh.edu](http://www.granit.unh.edu). Use the phrase "invasive plants" in the data dictionary search tool.

Find a summary of this guide and other tips at [nhinvasives.org](http://nhinvasives.org).

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#### Other Resources for Managing Invasive Plants and Creating Native Habitat

Learn to identify upland invasive plant species in New Hampshire at [agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf](http://agriculture.nh.gov/publications-forms/documents/upland-invasive-species.pdf)

View locations of invasive plants, or upload your own data at [eddmaps.org](http://eddmaps.org)

Find native substitutes for invasive species at [www.newenglandwild.org/docs/docs/invalt2.pdf](http://www.newenglandwild.org/docs/docs/invalt2.pdf)

Check out the inventory of native tree and shrub seedlings grown at the New Hampshire State Forest Nursery at [nhnursery.com](http://nhnursery.com)

Get tips for creating wildlife habitat at [wildlife.state.nh.us/habitat/management.html](http://wildlife.state.nh.us/habitat/management.html)



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## Finding Help in Your Region

### UNH Cooperative Extension Educators, Forest Resources –County Offices

Belknap County  
64 Court Street  
Laconia, NH 03246  
603 527-5475

Hillsborough County  
329 Mast Rd., Suite 101  
Goffstown, NH 03045  
603 641-6060

Carroll County  
73 Main Street, PO Box 1480  
Conway, NH 03818  
603 447-3834

Merrimack County  
315 Daniel Webster Highway  
Boscawen, NH 03303  
603 796-2151

Cheshire County  
33 West Street  
Keene, NH 03431-1513  
603 352-4550

Rockingham County  
113 North Road,  
Brentwood, NH 03833  
603 679-5616

Coos County  
629A Main Street  
Lancaster, NH 03584-9612  
603 788-4961

Strafford County  
259 County Farm Road, Unit 5  
Dover, NH 03820  
603 749-4445

Grafton County  
3855 Dartmouth College Hwy, Box 5  
No. Haverhill, NH 03774  
603 787-6944

Sullivan County  
24 Main Street  
Newport, NH 03773  
603 863-9200

### Field Service Centers and County Conservation Districts

Rockingham County  
110 North Road  
Brentwood, New Hampshire 03833  
603 679-2790

Belknap County Conservation District  
2 Airport Road, Mailbox #1  
Gilford, NH 03249  
603 527-5880

The Concord Field Service Center  
10 Ferry Street,  
Box 211  
Concord, New Hampshire 03301  
603 223-6023

Lancaster Field Service Center  
4 Mayberry Lane  
Lancaster,  
New Hampshire 03584  
603 788-4651

Conway Field Service Center  
The Grindle Center  
73 Main Street, P.O. Box 533  
Conway, New Hampshire 03818  
603 447-2771

Milford Field Service Center  
Chappell Professional Center  
#468 Route 13  
South Milford, New Hampshire 03055  
603 673-2409

Strafford County Conservation District  
264 County Farm Road  
Dover, New Hampshire 03820  
603 749-3037

Sullivan County Conservation District  
95 County Farm Road  
Unity, New Hampshire 03743  
603 542-4891

Epping Field Service Center  
629 Calef Highway, Suite 203  
Epping, New Hampshire 03042  
603 679-1587

Walpole Field Service Center  
11 Industrial Park Drive  
Walpole, New Hampshire 03608  
603 756-2988



For updates and more information visit

[wildnh.com/invasives](http://wildnh.com/invasives)