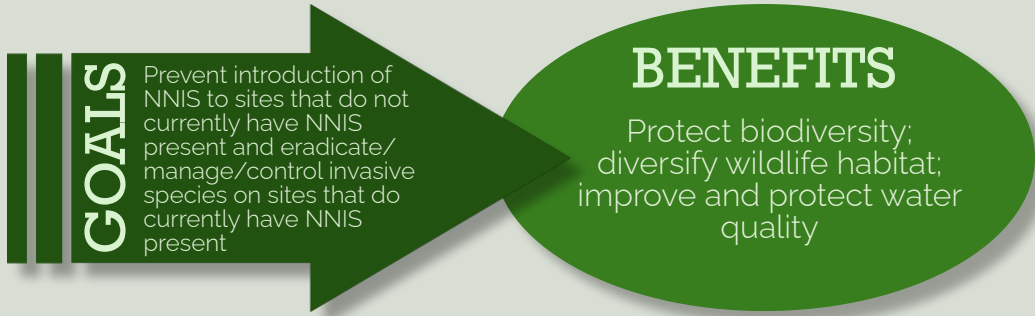


3.2 Invasive Species Control & Management

Native plant species help create a healthy ecosystem. Non-native invasive species (NNIS) compete with native species, often dominating the landscape and choking out native species. NNIS species are pervasive in our environment and represent a threat to most wetland restoration projects. On sites without NNIS present, prevention of NNIS establishment (especially when the soil is disturbed) is critical to maintain biodiversity in the restoration area. In cases where NNIS are currently established, control efforts may be integral to restoration success.



- 1 Collect Baseline Data
- 2 Develop NNIS Management Plan
- 3 Identify Disposal Location
- 4 Implement Control Measures
- 5 Monitor for Success

DEFINITIONS

Non-native invasive species (NNIS): Non-indigenous plants that threaten the diversity and survival of native species or the ecological stability of infested ecosystems.

Invasive Plants Common in Wetlands



Honeyuckles

Buckthorns

Japanese knotweed



Purple loosestrife

Multiflora rose

Common reed



Invasive Species Prevention (The site does not have NNIS)

The key to prevention is frequent, ongoing monitoring and rapid response. Identify and remove NNIS before soil disturbance, and then at least once a year for at least 5 years, making sure to remove plants before they produce new seeds.

NNIS can become established from nearby populations via wildlife seed dispersal from rhizomes (underground stems), or from human introduction.

NNIS readily become established on areas of exposed soil.

Ask work crews to clean tools and boots and power-wash equipment before entering the restoration site.

Do not use soil from a location where NNIS are found if importing soil as part of the restoration.

Use certified weed-free straw to prevent accidental introduction of NNIS if using mulch for erosion prevention.

Invasive Species Control (The site has NNIS)

NNIS Baseline Mapping

Identify the NNIS species on site and map distribution of each species.

Describe the population including # of plants, density, and what % of the restoration area is covered by the plants.

The baseline map will be used to gauge progress of the project.

NNIS Management Plan- *this plan should include:*

Realistic goals for management of NNIS.

Priorities for management, if more than one NNIS species is present.

Specific control methods that will be used for each NNIS species present. These methods vary depending on the species, its abundance, and the goals of the restoration.

Description of disposal methods for NNIS plant material. Removed plant material needs to be dealt with properly so that it does not resprout, often requiring it to be burned or bagged and disposed of in the trash.

Plan for monitoring the success of any control actions. Keep notes about each treatment and track your progress.

Timeline for all control and monitoring activities. Treatment often involves more than one year, and should be planned for.

Invasive Species Resources

- [Vermont Invasives Gallery](#)
- [Seek from iNaturalist](#)
- [Native Plant Trust GoBotany](#)
- [Vermont Agency of Natural Resources](#)



Left: Cut & drip NNIS treatment, Katie Kain, USFWS
Right: Cut stump application, Ryan Creehan, USFWS



NNIS Species

Group	Taxa	Common Name	NNIS List	Typical Habitat
Trees & Shrubs	<i>Frangula alnus</i>	Glossy buckthorn	Class B Noxious	Upland
	<i>Rhamnus cathartica</i>	Common buckthorn	Class B Noxious	Upland
	<i>Lonicera spp.</i>	Honeysuckle	Class B Noxious	Upland
	<i>Berberis spp.</i>	Barberry	Class B Noxious	Upland
	<i>Rosa multiflora</i>	Multiflora rose	Watch List	Upland
Grasses	<i>Phalaris arundinacea</i>	Reed canary grass	Watch List	Wetland
	<i>Phragmites australis</i>	Common reed	Class B Noxious	Wetland
Herbs	<i>Lythrum salicaria</i>	Purple loosestrife	Class B Noxious	Wetland
	<i>Alliaria petiolata</i>	Garlic mustard	Class B Noxious	Upland/Wetland
	<i>Hesperis matronalis</i>	Dame's-rocket	Watch List	Upland
	<i>Pastinaca sativa</i>	Wild "poison" parsnip	Watch List	Upland
	<i>Anthriscus sylvestris</i>	Wild chervil	Watch List	Upland
	<i>Fallopia japonica</i>	Japanese knotweed	Class B Noxious	Upland/Wetland
	<i>Aegopodium podagraria</i>	Goutweed	Class B Noxious	Upland/Wetland
Vines	<i>Celastrus scandens</i>	Asiatic bittersweet	Class B Noxious	Upland

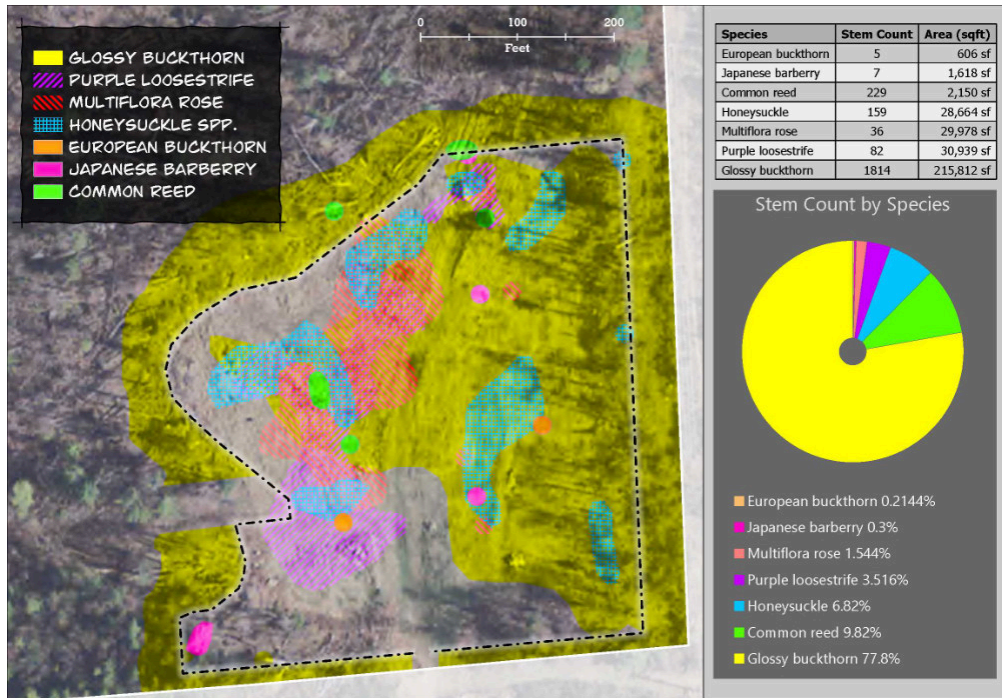
NNIS Control Methods

Method	Description	Advantages	Disadvantages	Typical Species
Hand-pulling	Manually pulling plants	Can be effective on small populations of certain species	Can be difficult to remove below-ground parts. Not realistic for mature woody individuals.	Garlic mustard, dame's rocket, seedlings of woody species
Uprooting with hand tools	Uprooting plants with shovels or "weed-wrenches"	Removes below-ground parts to prevent re-establishment; effective on small infestations of certain species	Labor-intensive; not realistic for large infestations; not realistic for mature woody individuals.	Young woody species such as honeysuckle, buckthorns, barberry, and multiflora rose
Mechanical uprooting	Uprooting plants with heavy machinery such as tractors or excavators	Removes below-ground parts to prevent re-establishment; effective on mature woody individuals	Can be expensive; danger of creating disturbed soil for NNIS establishment; not realistic for extensive infestations	Mature woody species such as honeysuckle, buckthorns, barberry, multiflora rose
Herbicide-Foliar spray	Broadcast spraying of herbicide	Can control larger infestations	Herbicide drift can create impacts on non-target organisms	Common reed, purple loosestrife, reed canary grass, buckthorns, honeysuckle, multiflora rose
Herbicide-Wipe	Manually applying herbicide to individual plants	More targeted than broadcast, reduces drift; can be used on moderate-sized infestations	Not realistic on large infestations	Common reed, purple loosestrife, buckthorns, honeysuckle
Herbicide-Cut Stump / Cut Drip	Cutting invasive plants and manually applying herbicide to plant stem or stump	More targeted than broadcast, reduces drift; can be used on moderate-sized infestations	Not realistic on large infestations	Buckthorns, honeysuckle, common reed, multiflora rose




Challenges and Solutions

- Effort and cost of management: NNIS control can be time consuming, costly and has varying success. Weigh the costs and benefits of restoring a site that has NNIS present. Minimize long-term costs by treating NNIS immediately and managing new populations before they become established.



Sample Baseline NNIS Map

- Mowing and cutting: Simply cutting or mowing invasive species is generally not a recommended control method. Poorly timed cutting or mowing can often increase the growth of NNIS. Research recommended species specific best management practices.
- Long-term management: Effective NNIS control is often only achieved by developing a long-term management plan that is specific to the site conditions, species present and status of the NNIS populations. Multiple years of control are often required to manage NNIS species. Engaging experts for planning and control effort is essential at sites with extensive NNIS.
- Likelihood of NNIS: Since there is a preponderance of NNIS on the landscape in some areas, there is a high likelihood of infestation, especially on open soils. If possible, choose sites with lower NNIS risk, and minimize opportunities for new infestations by minimizing soil disturbance.
- Established infestations: Ongoing monitoring and management of established infestations can be especially time consuming and costly. Research species-specific best management practices, and consider beginning to treat populations a year or more ahead of the main restoration work.
- Reed canary grass: This species can be an aggressive colonizer of wetlands and marginally wet fields throughout our region. Management can be a challenge since it can spread via underground stems (rhizomes) and form an abundant seedbank. The most common and reliable control method involves the use of herbicides and/or shading the grass out over time with woody species. On drier sites, a deep plow can turn the soil enough that other species can become established. Controlled burns (coordinated with local authorities) have also been used to kill or reduce the vigor of large stands of this grass. If reed canary grass is dominant on site, a phased approach to restoration may be required starting with reed canary grass control.



You cannot apply herbicides on land that you do not own. Contact a Vermont Certified Invasive Plant Control Contractor.

The Vermont Wetland Rules prohibit the use of herbicides in state-classified wetlands without approval by the Wetlands Program.

Complementary Practices:

