

Results of Initial Research on Land-based Exotic Invasive Plants

assembled by Noreen Bryan

In the last couple weeks I have been doing some research to collect essential information for developing a management approach for invasive land-based plants in Calais. I was looking for answers to the following questions:

- What land-based plants are considered invasive by the state of Vermont? Does the state track the location of invasive land-based plants? What data bases are used for this purpose?
- Which of these plants exist in Calais?
- What are the state laws and regulations regarding these plants?
- Given that there are many invasive species in Calais, how should they be prioritized for eradication and/or removal?
- Should a management plan for invasive land-based plants in Calais be created? Are there templates for creating a management plan? Is there information from the state or other towns that document their efforts and their successes and failures? What are the protocols and guidance for using herbicides?
- When land-based invasive plants are located on private property or public rights-of-way, how should access and authority be obtained for their eradication or management?
- Does the existing state data in iNaturalist provide any indications about the spread of these plants?
- Is there funding or grants to help with eradication and/or management of land-based invasive plants?

First, a little background: The Calais Lakes and Streams Committee (CLSC) has been working with the state on aquatic invasive species for more than twenty years. The state concentrated more effort, earlier on aquatic invasive species as compared to land-based invasives. Further, responsibility for land-based vs aquatic invasive species is held by different government agencies. The Agency for Natural Resources (ANR) is responsible for aquatic invasives species. They have created a Vermont Invasive Patrollers (VIP) program that is based on volunteers surveying lakes and ponds for invasive species after they have received training by state biologists. The goal is to detect invasive species early when the possibility of eradication is greatest. The only pond in Calais with an aquatic invasive species is North Montpelier Pond, which has had Eurasian milfoil since the 1980s. So far, the other lakes and ponds are invasives free. The great concern is that they will become infested through human activities, such as taking a boat contaminated with an invasive species and releasing the species by launching it to an invasive-free pond.

The Vermont organizations responsible for land-based invasive species, namely plants and pests (e.g. emerald ash bore), are the Agency of Agriculture, Food & Markets and the Department of Forests, Parks & Recreation.

Because aquatic invasive species are managed differently by different government organizations than the land-based invasives, it makes sense to separate discussions and plans accordingly. This follows the approach used by the state on its website for Vermont Invasive Species. Go to: <https://vtinvasives.org/> I suggest that the Conservation Commission follow this same approach.

Research progress so far: After spending a number of hours researching the internet to answer the questions above, I still had many issues that I could not resolve and I sought the help of state scientists through the VT Invasives website. Last week I had an informative conversation with Kathy Decker, licensed forester and forest protection program manager, of the Department of Forests, et al. She was very helpful. This is still a work in progress. However, I think that the information below, even though not complete, is worthy of review by the members of the Conservation Commission in preparation for a discussion of invasives at the March meeting of the Conservation Commission.

- **What land-based plants are considered invasive by the state of Vermont? Does the state track the location of invasive land-based plants? What data bases are used for this purpose?**

For land-based invasive plants, there are several lists published by the state of Vermont, namely the Noxious Weeds lists, the Field Guide to 12 Invasive Plants common in Vermont, the gallery of invasive land-based plants and pests on the VT Invasive website, Noxious and Nuisance Plants in the VT Shoreland Protection Act and others. Kathy helped clarify the responsibility and uses of these lists. The Noxious Weeds lists, Class A (plants currently not in Vermont) and Class B (plants that exist in Vermont) are the only official lists that have policy and regulations attached to them. The Noxious Weeds lists are maintained by the Agency for Agriculture, Food & Markets. The list is supposed to be updated annually by Vermont Invasive Exotic Plant Advisory Committee appointed by the secretary. Other state organizations, such as the Department of Forests, Parks & Recreation, recognize that there are many invasive plants that are threatening or exist in Vermont which have yet to be put on the Noxious Weeds lists. A more complete list is shown in the gallery of terrestrial plants and pests that is included in the gallery on the VT Invasive Species website (<https://vtinvasives.org/>). As of this writing there are 48 terrestrial invasive plants listed on the website and only 20 on the Class B Noxious Weeds list. A comparison of the plants included on the four lists of invasive land-based plants is provided in Appendix A.

Further, Kathy indicated that the state maintains other watch lists, but she didn't think that these were made public. She will look into these lists and let me know what they are and their availability.

Regarding data bases of the location and density of land-based invasive plants, Kathy indicated that the state does collect data on these. This information is collected by both the Agency for Ag, et al and the Dept of Forests, et al. However, the

state does not have one consolidated data base or even several different data bases. Kathy was scheduling a meeting with other state reps about creating a consolidated data base of invasive species for Vermont. At this point, INaturalist is the best data base accessible to the public.

- **Which of these plants exist in Calais?**

Using the INaturalist data based I began researching the number of observations of land-based invasive plants reported in Calais focusing on the shorter list of the 12 common invasive plants found in Vermont. In doing this, I was interested, not only in observations in Calais, but in the presence and density of these plants in surrounding towns as a way to better understand the likelihood that new invasive plants or greater density of existing invasive plants would be spread. A summary of the reporting for each of these plants is contained in Appendix B to this point paper. If you are interested in seeing the detailed information in the INaturalist data base, the web address is provided for each plant. The goal is to complete this information for all the plants on the Noxious Weeds list B or the greater list in the gallery of plants on VT invasive web.

- **What are the state laws and regulations regarding these plants?**

From Kathy Decker I learned, that VT rules and regulations apply to the Noxious Weeds lists, only. All other lists are unofficial and not subject to state action.

In short, the state regulations are contained in the Noxious Weed Quarantine 3 from the Agency of Agriculture, Food & Marketing, which states:

“Section V: Prohibitions

(A) The movement, sale, possession, cultivation, and / or distribution of Class A Noxious Weeds designated in Appendix A of this rule is prohibited.

(B) The sale, movement, and / or distribution of Class B Noxious Weeds designated in Appendix A of this rule is prohibited.”

If you want to read the complete text of the regulation, go to:

https://agriculture.vermont.gov/sites/agriculture/files/documents/PHARM/Plant_Pest/NoxiousWeedsQuarantine.pdf

Kathy said that the Agency for Agriculture does annual inspections of nurseries and other commercial sellers of plants to be sure that Noxious Weeds are not being sold. Further, they look for the presence of invasive pests on nursery stock.

- **Given that there are many invasive species in Calais, how should they be prioritized for eradication and/or removal?**

So far, the information that I have found has some recommendations but leaves many questions unanswered. For example, if resources are limited would it be better to focus on small infestations of phragmites or garlic mustard?

The information on prioritizing efforts contained on the VT Invasives website is:

“How will you prioritize your efforts? Consider the following order: 1) Early detection of invasive species; 2) Control of small, isolated populations; 3) Protection of high-quality areas with few invasive species; 4) Management of high-use areas that may be a source of further infestations; 5) Ability to manage a particular species. For example, in Richmond’s Floodplain Forest Restoration Project, it was determined to be impossible to manage goutweed without killing the Ostrich fern. Therefore, it was listed as ‘low priority’.”

- **Should a management plan for invasive land-based plants in Calais be created? Are there templates for creating a management plan? Is there information from the state or other towns that document their efforts and their successes and failures? What are the protocols and guidance for using herbicides?**

The Vt Invasive website has templates for creating management plans.

Further, from my conversation with Kathy Decker I learned that the state does not have staff to take on eradication and management of invasive species except on state-owned property. There is one exception. If an invasive species that is currently not known to be in Vermont is reported to have been found at a location in Vermont, the Dept of Forests, et al will send a state scientist to verify the species.

Kathy said that she will assemble information about volunteer groups in the state that are working on managing/eradicating invasive species.

- **When land-based invasive plants are located on private property or public rights-of-way, how should access and authority be obtained for their eradication or management?**

In my conversation with Kathy Decker we talked about the procedures for removing invasives or using herbicides to eradicate them from public rights-of-way and private property. Kathy indicated that new, simpler procedures were created in 2023. She will get me state contacts for both removal and herbicide use.

- **Does the existing state data in INaturalist provide any indications about the spread of land-based invasive plants?**

In my review of the observations for the 12 common invasive land-based plants in Vermont, it showed that their locations tend to be dense along roadways, such as I-89. Populations centers, such as Burlington and Montpelier have more dense infestations of invasives. Kathy agreed with these observations. Travelers on roads and road crews are spreading invasive species. VT Trans has a manual of Best Management Practices for state road employees.

(<https://vtrans.vermont.gov/sites/aot/files/operations/documents/techservices/Invasive%20BMP.PDF>)

However, each town is responsible to have policies and procedures for its own road crew. In the past the Dept of Forests et al has had workshops for road crews. Kathy indicated that the dirt and gravel used by road crews is a major source of invasive species. When the dirt/gravel is applied to roads, it spreads invasive species. Currently, at the state level, the source of dirt/gravel is inspected to assure that it is free of invasives and thereby approved for use by road crews.

- **Is there funding or grants to help with eradication and/or management of land-based invasive plants?**

Information on the web is not very informative. I have asked Kathy for help with identifying funding/grants and am waiting for her response.

Appendix A - Comparison of Invasive lists of Non-Aquatic, LAND-BASED plants

January 2024

Lists from VT Agency of Agriculture, Food and Markets, VT Dept of Forest, Parks & Recreation, VT Agency of Natural Resources (VT Shoreland Protection Act) and VT Invasives Website

Common Name	Latin Name	VT Class B Noxious Weeds¹ (VT Agency of Agriculture, Food and Markets)	Field Guide- 12 Invasive Plants commonly in VT (VT Dept of Forest, Parks & Recreation) ²	Noxious and Nuisance Plants- VT Shoreland Act (VT Agency of Natural Resources) ³	VT Invasives Website (VT Agency of Agriculture, Food and Markets AND VT Dept of Forest, Parks & Recreation)
Amur maple	<i>Acer grinnala</i>	X		X	X
Autumn olive	<i>Elaeagnus umbellata</i>		X		X
Barberry, common	<i>Berberis vulgaris</i>	X		X	X
Barberry, japanese	<i>Berberis thunbergii</i>	X	X	X	X
Black Locust	<i>Robinia pseudoacacia</i>				X
Border privet	<i>Ligustrum obtusifolium</i>				X
Buckthorn, common	<i>Rhamnus carthartica</i>	X	X	X	X
Buckthorn, glossy	<i>Rhamnus frangula</i>	X		X	X
Burning bush	<i>Euonymous alata</i>	X	X	X	
Butterbur sweet-coltfoot	<i>Petasites hybridus</i>				X
Cow-parsnip-American	<i>Heracleum maximum</i>			X	

¹ "Class B Noxious Weed" means any noxious weed that is not native to the state, is of limited distribution statewide, and poses a serious threat to the State, or any other designated noxious weed being managed to reduce its occurrence and impact in the State, including those on the Federal Noxious Weed List (7 C.F.R. 360.200).

² The guide has helpful information on plant identification, seed viability, prioritization logic, etc.

³ The species listed in this column may be removed from the Shoreland (i.e. area from shoreline to 250 ft)without requiring a Shoreland Permit or Registration.

Cow-parsnip-European	Heracleum sphondylium			x	
Cypress spurge	Euphorbia cyparissias				x
Dames Rocket	Hesperis matronalis				x
European Alder	Alnus glutinosa				x
European spindle tree	Euonymus europaeus				x
False indigo	Amorpha fruticosa				x
False spiraea	Sorbaria sorbifolia				x
Flowering rush	Butomus umbellatus	x		x	
Frogbit	Hydrocharis morsus-ranae	x			
Garlic mustard	Alliaria petiolata	x	x	x	x
Giant hogweed	Heracleum mantegazzianum			x	x
Goutweed	Aegopodium podagraria	x		x	x
Himalayan Balsam	Impatiens glandulifera				x
Honeysuckle	Lonicera japonica,	x	x	x	x
Honeysuckle, dwarf shrub	Lonicera xylosteum				x
Honeysuckle, shrub	Lonicera sp-msackii, morrowii, tartarica	x			x
Japanese Hop	Humulus japonicus				x
Japenses stiltgrass	Microstegium vimineum				x
Knotweed, japanese	Fallopia japonica	x	x	x	x
Knotweed, giant	Fallopia sachalinensis				x
Loosestrife, purple	Lythrum salicaria	x	x	x	x
Loosestrife, garden	Lysimachia vulgaris				x
Mile-a-minute vine	Persicaria perfoliata				x
Multi-flora rose	Rosa multiflora		x		x
Narrow-leaf bitter-cress	Cardamine impatiens				x
Norway maple	Acer platanoides	x		x	x

Oriental bittersweet	Celastrus orbiculatus	x	x	x	x
Phragmites	Phragmites australis	x	x	x	x
Poison Ivy	Toxicodendron radicans, rydbergii			x x	
Poison sumac	Toxicodendron vernix			x	
Porcelainberry	Ampelopsis glandulosa				x
Princess tree	Paulownia tomentosa				x
Reed canary grass	Phalaris arundinacea				x
Reed manna grass	Glyceria mazima				x
Russian olive					x
Spotted knapweed	Centaurea stoebe				x
Stinging Nettle	Urtica dioica			x	
Swallowwort, black	Cynanchum louiseae	x			x
Swallowwort, pale	Vincetoxicum rossicum				x
Tree of heaven	Ailanthus altissima	x		x	x
Wall lettuce	Mycelis muralis				x
White poplar	Populus alba				x
Wild chervil	Anthriscus sylvestris			x	x
Wild parsnip (poison?)	Pastinaca sativa		x	x	x
Wood nettle	Laportea canadensis			x	
Yellow flag iris	Iris pseudacorus	x		x	x
	Total plants in list	20	12	28	48

⁴ Poison Ivy is a plant native to Vermont. It is not an exotic invasive. The Shoreland Protection Act allows this plant to be removed from the shoreland without a permit. Hence, why it is included in this list of noxious and nuisance plants contained in the Shoreland Protection Act.

⁵ Poison Sumac is a plant native to Vermont. It is not an exotic invasive. The Shoreland Protection Act allows this plant to be removed from the shoreland without a permit. Hence, why it is included in this list of noxious and nuisance plants contained in the Shoreland Protection Act.

Common Name	Latin Name	VT Class B Noxious Weeds (VT Agency of Agriculture, Food and Markets)	Field Guide- 12 Invasive Plants commonly in VT (VT Dept of Forest, Parks & Recreation) ⁶	Noxious and Nuisance Plants-VT Shoreland Act (VT Agency of Natural Resources) ⁷	Reports from iNaturalist
Eurasian watermilfoil	<i>Potamogeton amplifolius</i>	X			1
European najad	<i>Utricularia vulgaris</i>	X			
Pondweed, curly leaf	<i>Sagittaria arifolia</i>	X			
Water Chestnut	<i>Trapa natans</i>	X			
Yellow Floating Heart	<i>Limnophyton heterophyllum</i>	X			

⁶ The guide has helpful information on plant identification, seed viability, prioritization logic, etc.

⁷ The species listed in this column may be removed from the Shoreland (i.e. area from shoreline to 250 ft)without requiring a Shoreland Permit or Registration.

**Appendix B- Invasive Terrestrial Plants in Calais and Surrounding Areas– Number of Observations in INaturalist Database- 23
January 2024**

Number of Observations in INat database	Calais			Woodbury	Worcester	Marshfield	Montpelier, East Mont, Barre, Berlin	East of Marshfield to NH border	Burlington and west of Montpelier	VT Total
	1-5	6-15	>16							
VT Dept of Forest Field Guide- 12 common invasives										
Autumn olive ⁱ	2			0	0	0	9	0	Burl-med density I-89 none	337
Barberry, japanese ⁱⁱ		14		5	2	3	~80	0	Burl- dense I-89 light	1035
Buckthorn, common ⁱⁱⁱ			26	0	0	3 or 4	>100	0	Burl- dense begins at Richmond	1954
Burning bush ^{iv}	4			4	0	0	26	sparse	Burl- med dense	500
Garlic mustard ^v		15		0	0	3	22	0	Burl- dense begins at Richmond	1491
Honeysuckle, japanese ^{vi}	0			0	0	0	0	0	0	6
Knotweed, japanese ^{vii}			30-35	12	11	~15	60-75	Much less-occasional	Burl, I-89, Dog & Mad rivers - very dense	2610
Purple loosestrife ^{viii}		15		7	0	0	35	Very sparse	Burl-very dense I-89 lots	1322
Multi-flora rose ^{ix}	0			1	3	1	15-20	none	Burl – dense 1-89 lots	860
Asiatic bittersweet ^x	1			0	0	0	9	0	Burl-dense	729

Phragmites ^{xi}		11 ^{xii}		0	1	4	25	some	Burl-dense begins at Richmond	866
Wild parsnip ^{xiii}		8		3	1	4	8	Very sparse	Burl-med dense begins Jonesville	1176

ⁱ INat map https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=64697

ⁱⁱ INat map https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=58727

ⁱⁱⁱ INat map https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=54811

Nearly all in Adamant or along Pekin Brook before Town Office. Appears to be spreading north from Montpelier

^{iv} https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=117433

^v https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=56061

^{vi} https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=77835

^{vii} https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=914922

^{viii} https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=61321

^{ix} https://www.inaturalist.org/guide_taxa/183140

^x https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=64540

^{xi} https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=64237

^{xii} INat has 11 observations, CCC roadside survey (2023) had 16 observations

^{xiii} https://www.inaturalist.org/observations?place_id=47&subview=map&taxon_id=59778