

Invasives in the TRORC Region

The TRORC Region lies in east-central Vermont and is mainly comprised of the White River, Ompompanusuc River, Waits River, and Ottawaquechee River valleys, as well as smaller Connecticut River drainages from Hartland to Newbury. Species of concern for this inquiry were limited to terrestrial invasives, primarily plants with detrimental effects on agriculture, as well as a few species of insects affecting forestry (since farms own a significant amount of timberland). Several species were identified, as well as current control practices and possible future actions. Increasing resources enough to stop and reverse the spread of invasive plant species of concern in the region would likely require additional resources in the range of tenfold, or something on the order of 2 million dollars (state and local) more a year in the TRORC region.

PLANT SPECIES

Plant species of concern were wild chervil (*Anthriscus sylvestris*), garlic mustard (*Alliaria petiolata*), wild parsnip (*Pastinaca sativa*), smooth bedstraw (*Galium mollugo*), glossy buckthorn (*Frangula alnus*), honeysuckle (*Lonicera* sp.), Japanese knotweed (*Polygonum cuspidatum*), giant hogweed (*Heracleum mantegazzianum*), Japanese barberry (*Berberis thunbergii*), purple loosestrife (*Lythrum salicaria*), field bindweed (*Convolvus arvensis*), black swallow-wort (*Cynanchum louiseae*) and phragmites (*Phragmites australis*).

Each of these species is more of a concern in certain habitats or areas, nearly all do not like shade, will grow along roadsides, and are spread by mowing and maintenance practices such as moving ditch spoil. Garlic mustard, honeysuckle, and barberry are more shade tolerant, and barberry and honeysuckle can be more woodland plants spread by animals.

Most of these species are listed as official Vermont State Noxious Weeds or Federal Noxious Weeds, although such lists are not easily found or necessarily up to date. It does not appear that chervil, parsnip, or bedstraw, three of the top concerns, are listed.

<http://plants.usda.gov/java/noxious?rptType=State&statefips=50>

Noxious weeds are prohibited from sale or transport, but there is no legal requirement to remove them or even to control their spread. Hence, they are spreading.

http://agriculture.vermont.gov/sites/ag/files/pdf/plant_protection_weed_management/noxious_weeds/Amended_Weed_Rule_NoxWeedsFaq.pdf

Wild chervil (Anthriscus sylvestris)

Wild Chervil is confused with other similar looking plants, especially Queen Anne's Lace. Chervil is found mainly along road sides, but will spread into entire fields and also into the sunny understory along field edges. Some roadsides and interstate medians in the region, primarily from Woodstock toward Randolph have nearly solid chervil patches. Early mowing

when in bloom can reduce spread, but eradication is difficult without hand pulling, grazing, tilling and replanting, or herbicide. Although it will be eaten by some animals, such as goats, it does not dry well in hay. Mowing after seed set spreads the plant and mowers can carry seeds for distances. Chervil sap can cause burns to sensitive skin.

<http://www.vtinvasives.org/invasers/wild-chervil>

Garlic mustard (Alliaria petiolata)

Garlic mustard tends to grow along wet roadsides and blooms early. It is edible. Unlike many other invasives, it will grow in shade. It spreads by both seed and plant pieces so mowing is not advisable. Hand pulling is a control method, but over time it may become less dominant on its own. Herbicide would be a concern near waterways.

<http://www.vtinvasives.org/news/pull-or-not-pull-research-questions-garlic-mustard-control>

Wild parsnip (*Pastinaca sativa*)

Wild parsnip tolerates a wide variety of soils but does not do well in shade. Of significant concern is parsnip's ability to leave severe burns from its sap on unprotected skin when exposed to light. Parsnip does not create dense stands and if left alone may not overrun an area. Early mowing when in bloom can reduce spread, but eradication is difficult without hand pulling, grazing, tilling and replanting, or herbicide. Mowing after seed set spreads the plant and mowers can carry seeds for distances. There is some evidence to suggest that no mowing,

especially where goldenrod is present, may be effective at reducing parsnip. Take extreme care to avoid sap burns.

<http://www.uvm.edu/extension/?Page=news&storyID=13983&category=extension>

<http://healthvermont.gov/enviro/outdoor/wildparsnip.aspx>



Wild Parsnip

Smooth bedstraw (Galium mollugo)

A pernicious plant in hayfields, bedstraw can take over and also fouls haying gear. It seems to like fields that are more acidic or have poor soils. There are other varieties of bedstraw as well, but smooth bedstraw seems to be the main concern. Regular mowing/grazing will help avoid it becoming established, but once present concentrated grazing, tillage, or herbicide may be the only options. Seed is short lived so breaking the seed cycle is important. As with other invasives, mowing after seed set only increases the infestation.

<http://umaine.edu/publications/2278e/>

Glossy buckthorn (Frangula alnus M./Rhamnus frangula L.)

Glossy buckthorn is spreading in the region, but is generally limited to small areas or unmowed fields and does not appear to be of primary concern. It can form dense stands and its thornlike stems make handling it unpleasant. There can be confusion as glossy buckthorn is also called smooth buckthorn, and common buckthorn (*Rhamnus cathartica*) is called smooth buckthorn as well. There are also two Latin names for glossy buckthorn, but the Vermont invasives site uses *Frangula alnus*. Common buckthorn is also an issue in the region. Both plants bear fruit spread by animals.

<http://www.vtinvasives.org/invaders/glossy-buckthorn>

<http://www.ci.burnsville.mn.us/DocumentCenter/Home/View/2164>

<http://cipwg.uconn.edu/buckthorns/>



Glossy Buckthorn

Bush Honeysuckle (Lonicera sp.)

Bush honeysuckle will establish by seed from nearby plants and through animal spread in unmowed fields. As it is not grazed, once it begins to establish it will grow in pasture, like barberry. Control is similar to barberry with cutting, and then covering. Herbicides may also be effective. Burn waste plant material.

<http://www.vtinvasives.org/invaders/shrub-honeysuckles>

Japanese knotweed (Polygonum cuspidatum)

A ubiquitous plant along river edges, especially in sun, knotweed is found throughout the region as probably the most widely spread invasive. It does seed, but does not seem to infest fields like chervil and does not readily invade mown areas. Plant parts will root and spread, and floods can move plants to new areas. New plants are easily pulled, but once established it is difficult to remove. Repeated mowings several times a year may be best. Late frost will also kill above ground stems. This plant in particular is often spread by ditch maintenance or work on river banks. Its sap is not a concern and young plants are edible.

<http://www.vtinvasives.org/invaders/japanese-knotweed>

Giant hogweed (Heracleum mantegazzianum)

Hogweed is a listed federal noxious weed and a sporadic newcomer, but unwelcome. There are only a few patches in the region. The plant is similar to, but much larger

than wild parsnip. Take extreme care to avoid sap burns.

<http://www.invasivespeciesinfo.gov/plants/hogweed.shtml>

<http://vtinvasives.org/invaders/giant-hogweed>

<http://www.dec.ny.gov/animals/72766.html>

Japanese barberry (Berberis thunbergii)

Newly listed as a Vermont noxious weed, barberry infests transitional fields and will also grow in the forest understory. The plant does provide wildlife food from its berries, but its thorny nature means it cannot be grazed and is unpleasant to work around. It is widely planted as an ornamental. Small plants can be hand pulled, but bigger plants need a “weed wrench” or digging out. Burn plants after removal. Plant can also be repeatedly cut.

<http://www.vtinvasives.org/invaders/japanese-barberry-0>



Japanese Barberry

Purple loosestrife (Lythrum salicaria)

This plant is a prolific seeder and is found along wet road sides and will infest swamps, taking over. The incidence of loosestrife in fields and roadsides is limited, but growing.

<http://www.vtinvasives.org/invaders/purple-loosestrife>

Field bindweed (Convolvus arvensis)

This plant is a relative of the morning glory with a white flower in the classic trumpet shape. This deep-rooted plant thrives in drier soils and creates dense climbing mats of vegetation. Since it is perennial, mowing to preclude seeding is good, but not sufficient. Short of herbicides, repetitive tilling and cover crops can keep this plant at bay but eradication is very difficult once well-established.

<http://extension.psu.edu/pests/weeds/weed-id/field-bindweed>

http://www.colostate.edu/Dept/CoopExt/Adams/weed/bindweed_mgt.html

Black swallow-wort (Cynanchum louiseae)

Yet another nasty invader, not common in the region but present. One of the unusual aspects of swallow-wort is that it is a milkweed, and is thus one of the few invaders that can disperse over distance by wind. Despite being a milkweed, it is poisonous to Monarch butterfly larvae. Swallow-wort can quickly take over fields if not caught early. Once established, mowing is a good control if done at the

right time to prevent seed set, however the plant is perennial and so mowing will not eradicate it. Plants will spread by root pieces and so tilling would have to be combined with smother crops. Grazing is not an effective control as the plant is toxic.

<http://www.vtinvasives.org/invasiders/black-swallow-wort>

Phragmites (Phragmites australis)

Also known as Common Reed, phragmites is similar to loosestrife in that it lives in wet areas and will completely colonize wetlands, pushing out native species. Phragmites is a tall grass, but does not colonize drier fields. Control involves timed mowing. Herbicides can be used carefully but plants are often close to or in water. Dead, cured plants are a fire risk.

<http://www.vtinvasives.org/invasiders/common-reed>

INSECTS

There are three main insects that post a threat to forests in the region, but this threat is not currently attacking the area. Woolly adelgid (*Adelges tsugae*), Asian long-horned beetle (*Anoplophora glabripennis*), and emerald ash borer (*Agrilus planipennis*) are the three principal insects of concern as they threaten large amounts of timber. These are peripheral to the region at this time, but may continue to advance. Adelgid is present in southern Vermont, but Vermont does not have known ash borer infestations at this time and the border with New York is under wood quarantine to prevent transport into Vermont.

Vermont also does not have known Asian long-horned beetle infestations at this time, but it is in Massachusetts and New York. Preventing the transport of infected wood is the main activity to limit spread at this time. Ongoing monitoring is being done at known adelgid sites and with bug traps for emerald ash borer. Native wasps/hornets and Asian wasps are being looked at as predators for borer. Control methods for adelgid are being evaluated, including a fly from the Pacific Northwest. Severely cold winters have kept the adelgid populations at bay.

<http://www.vtinvasives.org/invasiders/images>

<http://beetlebusters.info/>

ORGANIZATIONS

There are several organizations or agencies that deal with invasive species, but few that have them squarely on the plate. Vermont Invasives.org <http://www.vtinvasives.org/content/about-us> is a consortium that is tackling the issue, primarily through education and coordinating monitoring.

Several state agencies have roles to play. The Agency of Agriculture, Food and Markets is the agency that lists plants officially as noxious weeds, in concert with USDA. The Department of Forest, Parks and Recreation in the Agency of Natural Resources is most concerned with tree pests.

The Vermont Agency of Transportation (VTrans) controls a large amount of highway right-of-way across the state and is probably the biggest single owner of state land compromised by multiple terrestrial invasive species, but control

and eradication are not in their mission. They do have best practices to avoid spreading invasive species while conducting normal operation and maintenance activities along state roads http://vtransoperations.vermont.gov/sites/aot_operations/files/documents/AOT-OPS_Invasive_Plants.pdf, as well as in avoiding injury from plants such as poison ivy, parsnip or hogweed. There are approximately 18,000 mowable acres in VTrans rights-of-way. To mow all 18,000 acres once annually would cost approximately \$2 million dollars. VTrans has estimated that increased mowing targeting only one invasive species (Poison Parsnip) would require six mowings per year for a cost in excess of 11.4 million dollars. To mow for all invasive species of concern could require an effort beyond these six annual mowings.

At the local level, town road crews are a critical component of control, mainly through timely roadside mowing and proper ditch spoil disposal. However, each additional mowing of a town's highways can cost several thousand dollars. Town crew mowing can be directed to be timed to local conditions, resulting in better control. Some towns contract roadside mowing, and thus they may get mowed after seed set, and outside mowers may bring in seed on their machinery.

The Stewardship Network in New Hampshire <http://newengland.stewardshipnetwork.org/about-us> is expanding their coverage area to more of New England and could be another partner in fighting invasives in Vermont.

CONCLUSIONS

All invasives are spreading, though at different rates. Knotweed is widely established and not spreading into new areas much, whereas chervil is very actively spreading, mainly along roadways. Given current trends, it can be expected that invasive species will continue to establish themselves in wider areas, making future eradication efforts more difficult.

Control involves both stopping spread and then eradication. Stopping spread is much easier and can be done with much less resources, mainly through persistent mowing/grazing at the right time, hand pulling individual outliers, and making sure that mowing machinery is cleaned. Removal of invasives, once established, is a multi-year effort and very expensive. Herbicides are effective, but other methods, such as grazing, may be just as effective with less side effects to the environment.

There are many additional invasive plants, that this report does not cover, as well as more to our south that are not presently a problem in Vermont, but will likely need attention in the future as growing zones continue to shift northward.

Road budgets are under strain and so mowing is likely decreasing, and when taking place, mainly taking place in mid-summer. This is most effective to keep lands open, but also very effective at spreading seed. To decrease spread it would be better to not mow at all, or to mow at least three times, at careful intervals timed to hit flowering of target species. However, multiple mowings come at considerable expense and also have

their own issues as they impact grassland birds and other species. If this is not practical, then mowing should at least not exacerbate the situation, and instead only mow in non-infested areas. Contract mowers and town crews should ensure that mowing machinery is thoroughly cleaned to avoid seeding new areas.

Hand pulling or concentrated grazing can be very effective, but are labor intensive, and grazing within rights of way may be impractical due to concerns over animal/vehicle collisions. Also grazing and mowing for hay may be decreasing in some areas as farms decline, leading to increased opportunity for invasives. Some invasive plant species are not suitable for grazing.

Increasing resources enough to stop and reverse the spread of invasive plant species of concern in the region would likely require additional resources in the range of tenfold, or something on the order of 2 million dollars (state and local) more a year in the TRORC region.

Given that these resources are highly unlikely to be available, holding actions to keep the situation from degrading will be most effective, with spot eradication in outlying, small or newly established trouble spots. Targeted actions to “hold the line” would be good, but involve first finding the line, as the extent of invasives is poorly known, if at all. Finding the boundaries of areas that are relatively clean of invasives, on a species by species basis, would be a first critical step in creating such firebreaks and targeting limited eradication efforts. The maps found at

<http://www.nrs.fs.fed.us/fia/maps/Invasi>

[ve-maps/default.asp](http://plants.usda.gov/java/noxious?rptType=State&statefips=50) are seriously out of date and/or inaccurate. The maps that can be found through the individual species’ links at

<http://plants.usda.gov/java/noxious?rptType=State&statefips=50> are better. Small areas of invasives, if quickly identified and treated, can avoid these areas blooming into a wide infestation.

As for insects, the situation is better known and more closely monitored. Restrictions are in place that will help limit spread.

Education and training have great ability to limit additional spread, but much more needs to be done so that invasives are more widely recognized, control methods understood, and laws followed. For example, moving invasive-contaminated ditch spoil by town crews to areas other than a specific site for receiving such soil is potentially illegal, and is definitely a bad idea. Contractors and landscapers also routinely move fill, or equipment, contaminated with invasives plant species. More needs to be done to ensure all are knowledgeable and to enforce against activities that spread invasives. A central site for information on the species of concern is found in the VTinvasives.org site, which is a very good beginning. However, this site needs additional species added and more on control methods. The related noxious weeds list, and associated rule, need to be more easily found and contain links to control and identification. Wild chervil and parsnip need to be added to the state noxious list.

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