

# RESILIENT RIGHT-OF-WAYS

*A guide to community stewardship of Vermont backroads*

PLANT **LIVE** GROW



VERMONT URBAN & COMMUNITY  
FORESTRY PROGRAM



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# Acknowledgments

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# Introduction



Rural roadsides are public places, managed through town-owned right-of-way easements on neighboring land. At times, right-of-way vegetation can be indistinguishable from neighboring forests or fields. In other places, the transition is stark: young beech trees may end abruptly at a private lawn, or a cleared roadside ditch may border private mature maple trees.

While many of us never picture picnicking in these roadside bands of trees, shrubs, grasses, or even wetlands, we look at them all the time. Driving, bicycling, or walking by, we take in views of what our Vermont countryside can be: thick tunnels of trees, historic vistas, open farmland, or emerging forests. The character of a local road is decided by the community; together, we change and manage our roadsides to reflect expanding neighborhoods, more stringent safety and environmental regulations, ever-shifting budgetary priorities and constraints, and the effects of forest pests, invasive plants, and storms.

In most towns, road management involves dozens of stakeholders: the road foreman, road crews, selectboard members, conservation commission members, homeowners and landowners, farmers, outdoor enthusiasts, truck and school bus drivers, and new residents wishing to build, to name a few. As such, it is no surprise that each town handles its municipal right-of-ways differently. Conflicting priorities can lead to knee-jerk reactions from road crews, contractors, or private landowners; identifying these conflicts and frequently revisiting local priorities and town-wide progress on roadside vegetation can promote compromise and create long-term management strategies that benefit all town residents.

There are tens of miles of unpaved road in even the smallest Vermont towns, often maintained by one- to four-person road crews. Town highway budgets are constrained by competing needs and, sometimes, shrinking populations. Yet it is still important to plan for community stewardship of rural roadsides, weighing the daily decisions that road crews must make against long-term goals identified by landowners and residents. Ultimately, some roads may lose their tight, shaded, and rural character in favor of meeting clean water regulations and providing safe passage for motorists. Other roads, however, can retain or restore healthy trees and other vegetation to slow erosion, improve stormwater infiltration, and perhaps most visibly, grow local character. No one solution will work in all places, but creating guidelines and expectations for the individual elements and general processes that govern our backroads ensures a plan that all, or at least most, residents can support.

Managing roadside vegetation requires a thoughtful, cooperative, and integrated approach. Given the budgetary constraints and multifaceted nature of right-of-way management, towns should view roadside vegetation growth and management as an ongoing process and use a step-by-step methodology to identify and act upon each priority. Through targeted and well-planned tree removal, appropriate planting and pruning, judiciously scheduled mowing, and timely communication with right-of-way partners such as utility companies, farmers, and the general public, towns can treat right-of-way vegetation as an important piece of municipal infrastructure and public space.

Like any community process, timing is everything, and some roadside vegetation initiatives may take decades to come to fruition. Good communication among town selectboard members, road crews, and residents encourages a long-term vision for municipal roads that incorporates short-term changes or setbacks. With this planning, communication, and overarching vision, towns have the capacity to grow utility, beauty, safety, and resilience along their roadsides.



*Municipal right-of-ways cross all types of landscapes, from forests and farm fields to riversides, lakeshores, front lawns, and community spaces.*

## About the Resilient Right-of-Ways project

The Vermont Urban & Community Forestry Program created the [Resilient Right-of-Ways](#) project to identify key programmatic, environmental, and policy-driven factors that affect the growth and management of trees, shrubs, and plants within urban and rural municipal right-of-ways. With funding from the United States Forest Service, Resilient Right-of-Ways has been the umbrella for case studies in ten rural and ten urban communities to identify the processes, values, budgets, and partners that impact how roads and their surrounding vegetation are maintained. Field assessments, research, outreach, and technical workshops yielded a body of observations and recommendations that can serve small Vermont municipalities looking for best practices to manage roadside vegetation.

Urban communities wishing to design, plan, and build Green Streets in Vermont climates can reference the [Vermont Green Streets Guide](#)<sup>1</sup> and its accompanying resources and suite of [instructional presentations](#).<sup>2</sup>



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1. Vermont Urban & Community Forestry, *Vermont Green Streets Guide* (2018), [bit.ly/VT\\_GreenStreetsGuide](https://bit.ly/VT_GreenStreetsGuide).

2. "Vermont Green Streets Guide," Vermont Urban & Community Forestry, [vtcommunityforestry.org/Green\\_Streets\\_Guide](https://vtcommunityforestry.org/Green_Streets_Guide).



*The future of majestic roadside tree canopy starts with young roadside tree plantings.*

## About this guide

This guide is the culmination of a collaborative approach to better understand and care for forests, individual trees, and other vegetation along Vermont backroads. Informed by 200 miles of rural roadside assessments and input from over 60 local volunteers and municipally focused professionals, this guide will give you the information you need to choose your community's priorities and plan of action for your backroads. Use this guide to plan for site-specific tree and forest management that increases roadside resilience in the face of frequent disturbances, such as road construction and vegetation clearing, and long-term constraints, such as budget limitations, changing regulations, and increasing forest pests

and disease. Topics are covered in one or two pages that can be easily printed or shared as individual stewardship actions or municipal goals.

This guide is broken into two sections:

### **The Elements of Vermont Backroads**

Certain physical elements along Vermont backroads govern what we see as road users and how we manage road maintenance, safe passage, and our rural landscape. Use this section of the guide to identify pieces of the landscape that require inventory, prescribed forest management techniques, or site-specific problems or opportunities addressed through targeted partnerships and technical assistance.

### **Process Recommendations for Backroads Stewardship**

So much of road maintenance is guided by the overarching processes that a town develops to meet its roadside maintenance goals within its budget. Use this section of the guide to recognize the broad policy and funding initiatives that towns can undertake to build long-term management strategies for rural road vegetation and right-of-way corridors.

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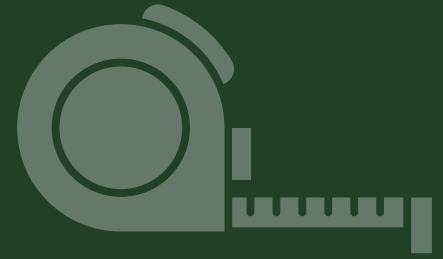
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Additionally, visit our website, [vtcommunityforestry.org](http://vtcommunityforestry.org), for resources about urban and community forestry in action.



# Manageable vegetation width



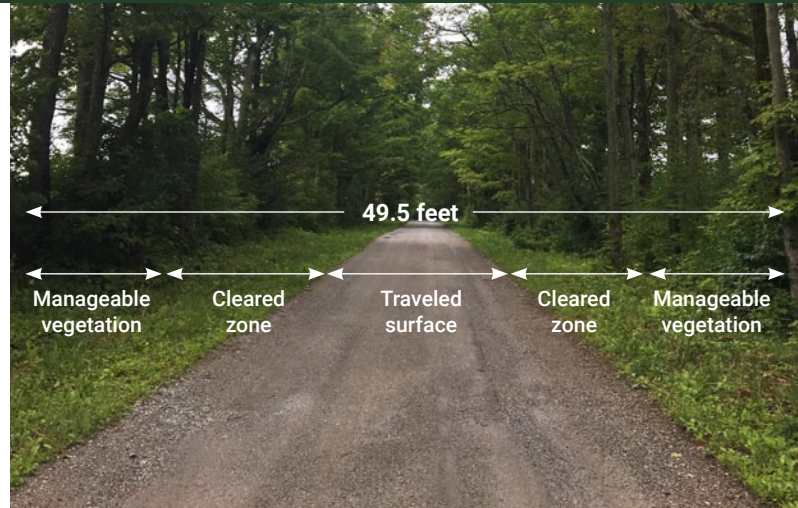
In most towns, the right-of-way spans 49.5 feet, or 24.75 feet in each direction from the centerline of the road.

The traveled width of an unpaved road and the cleared zone adjacent to the road can vary depending on topography, road erosion, road entrenchment, or neighboring land features. As such, the actual width of vegetation that the town can manage alongside its roads is often what is left over after the town has utilized the right-of-way land for the traveled road and its associated infrastructure.

Planning for the health and resilience of the corridor of vegetation within the town right-of-ways involves challenges not found in other types of land management plans. Manageable vegetation width can be roughly calculated in the field through a four-step process.

1. Measure the road width from traveled edge to traveled edge using a 25-foot tape measure.
2. Measure the cleared zone of the right-of-way (whether mowed, ditched, or bare) from the traveled road edge to the extent of the clearing.
3. Divide the right-of-way width in half (usually  $49.5 \text{ feet} \div 2 = 24.75 \text{ feet}$ ).
4. On each side of the road, subtract half of the road width and the width of the cleared zone from the value calculated in step 3. This remaining number is the width of the vegetation strip managed within the town's right-of-way on one side of the road. See equation below.

Measuring the width of the road, the width of the cleared zone on each side, and calculating the



*The typical municipal right-of-way spans 49.5 feet. All right-of-ways include a traveled surface; most also include a cleared zone that is mowed or hardscaped, and a zone of manageable trees, shrubs, or grasses that extend to the border with privately managed land.*

manageable vegetation width on each side of a rural road tells us:

- where opportunities exist to perform recommended forestry practices on significant swaths of publicly managed roadside forest in conjunction with neighboring public or private land uses.
- where wide roads and ditches or cleared zones are impacting right-of-way vegetation, allowing the town to evaluate if these road widths are necessary or desired.
- where forest regeneration or replanting may be helpful to demarcate road edges, improve tree canopy, or increase a desired aesthetic (more trees, more fields, or selected trees) along designated scenic routes.

**→ EQUATION:**

**Manageable vegetation width = (right-of-way width  $\div$  2) - (road width  $\div$  2) - cleared zone width**

# Historic and culturally significant shade trees

Historic trees in the right-of-way are distinctly older and usually larger than surrounding trees.

They may have been intentionally planted by a community or private landowner. Often consistently spaced along a roadside, historic trees can be surrounded by mowed grass, herbaceous cover, bare soil, or a forest of young trees, shrubs, and edge species. Young trees planted by a municipality in town centers or in other public places may also be considered culturally significant, one day growing into historic shade trees themselves.

Identifying the presence and health of historic trees along town roads tells us:

- where roads may have a culturally important history.
- where large trees may be in decline and pose a safety risk to road users.
- where people may already be accustomed to seeing tree canopy over the road and value its presence.

## Recommendations

**Note culturally important historic and shade trees on a map and explain their relevance.** The tree warden, tree board, conservation commission, or other community members can identify these [trees or landscapes](#).<sup>1</sup>

**Evaluate the health of the historic trees during a yearly road survey** conducted jointly by the tree warden and the road foreman. Record observations on paper, with a GPS-enabled device, or by flagging trees that need maintenance or require removal. Create a reasonable plan to address pruning or removal of risk trees, understanding the budgetary and equipment constraints of the town.

If the historic tree is in the utility company right-of-way, **contact the utility company to learn more about the pruning and clearing rotation** along this road



*Historic sugar maple trees line this rural road. The age and location of the trees are culturally and ecologically important, yet their declining condition may create risk for road users.*



**ABOVE LEFT** *The next generation of historic and culturally important trees are already planted on this residential road. Like urban street trees, these trees should be protected from damage from mowers or weedwhackers, watered (particularly when young), and pruned to support vigorous and long-lasting canopy that does not interfere with the traveled road.*

**ABOVE RIGHT** *Locals know these ash trees as cultural markers in the landscape. Towns can identify any historic or culturally important roadside trees in need of pruning, treatment, or protection, and create a budget for their care.*

and advise them of any considerations from the town, such as the desire to cable, brace, or prune this tree or treat it with pesticides to ensure its longevity.

**Review tree care best practices**, including [pruning](#).<sup>2</sup> Make sure that your road crew, contracted mowers, and contracted tree care specialists understand these best practices, too. Find out if neighboring landowners want any wood resulting from pruning or tree removal.

**Consider thinning trees and shrubs around healthy young trees** to promote regeneration and to select for the next generation of tree canopy. If trees are in decline, identify the best young tree species present that can grow into the future roadside canopy. Selectively thin competing trees or shrubs.

**Plant**<sup>3</sup> **new trees between existing historic trees, particularly along roadsides without emerging forest.** Sometimes called *interplanting*, this technique will grow a new generation of intentionally managed and culturally significant trees. Work with your tree warden to plan plantings in your community.

## Resources

1. Vermont Forests, Parks & Recreation, *Stonewalls & Cellarholes: A Guide for Landowners on Historic Features and Landscapes in Vermont's Forests* (1994), [bit.ly/StonewallsAndCellarholes](https://bit.ly/StonewallsAndCellarholes).
2. "Pruning," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_Pruning](https://bit.ly/VTUCF_Pruning).
3. Vermont Urban & Community Forestry, *Protecting the Investment: Tree Planting and Establishment*, [bit.ly/VTUCF\\_TreePlanting](https://bit.ly/VTUCF_TreePlanting).

# Roadside ash impact



Ash tree health is currently threatened by the arrival of emerald ash borer, a non-native and invasive insect that attacks all species of ash trees.

Once infested, most ash trees will die within three to five years, posing a risk to all road users. Many towns have started a roadside ash tree inventory that tallies and locates ash trees that would affect the road if they were to break or fall.

Identifying the presence of ash trees that may affect the road helps us:

- understand how ash trees are distributed on the landscape surrounding survey roads.
- estimate how many ash trees the town will need to manage as emerald ash borers infest ash trees.
- identify opportunities for replanting or forest regeneration after ash trees die or are removed.

## Recommendations

**Conduct an [ash tree inventory](#)**<sup>1</sup> to determine the location, distribution, and size of ash trees along rural roads. Determine if these ash trees are in the public right-of-way, the utility right-of-way, or on private land.

**Create a town-wide emerald ash borer management plan** using [municipal ash tree management strategies](#).<sup>2</sup> Plan to use ash wood locally to slow the spread of emerald ash borer through movement of infested wood.

**Ensure that anyone managing municipal trees is trained in the safety risks** posed by brittle and infested ash trees. See [emerald ash borer management](#)<sup>3</sup> resources listed by Vermont Urban & Community Forestry.

**Anticipate the death or removal of roadside ash trees**, particularly where planting in the right-of-way itself is challenging. Consider targeted planting efforts coordinated with neighboring landowners to improve roadside canopy, reduce



*The wood of ash trees removed from the right-of-way is usually left for the landowner, although some wood is picked up unofficially by those wanting firewood. Transport of untreated ash wood is a prime vector of emerald ash borer spread.*



**ABOVE LEFT** Large ash trees line a rural road. Both the municipality and the landowner will feel the impact of dead or downed trees along this property.

**ABOVE RIGHT** inventorying the diameter, condition, and location of roadside ash trees enables towns to plan for the decline and death of trees in the public right-of-way.

road erosion, protect water quality, and increase landowner privacy, particularly where right-of-way vegetation is bordered by agricultural fields or lawn.

**Note the timing of invasive plant flowering and seed set** when planning any tree removal work. Monitor ash removal sites for invasive plants that often thrive on disturbed soil and with the increased sunlight resulting from the new canopy breaks.

**Slow the spread<sup>4</sup> of emerald ash borer** by following state recommendations when moving or processing ash wood.

**Ensure that private homeowners and landowners understand the costs, risks, and benefits of managing roadside ash trees proactively** through chemical treatment or tree removal. Share [resources for homeowners<sup>5</sup>](#) interested in learning more about ash tree management on their property.

## Resources

1. "Ash Tree Inventories," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_AshTreeInventories](https://bit.ly/VTUCF_AshTreeInventories).
2. Vermont Urban & Community Forestry, *Municipal Ash Management Strategies in Response to Emerald Ash Borer*, [bit.ly/VTUCF\\_MunicipalAsh](https://bit.ly/VTUCF_MunicipalAsh).
3. "Emerald Ash Borer Management," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_EAB](https://bit.ly/VTUCF_EAB).
4. "Slow the Spread of EAB," Vermont Invasives, [bit.ly/VT\\_SlowTheSpread](https://bit.ly/VT_SlowTheSpread).
5. "Resources for Homeowners, Emerald Ash Borer in Vermont," Vermont Invasives, [bit.ly/EABinVermont](https://bit.ly/EABinVermont).

# Overhead utilities



Utility companies play a large role in determining the health and composition of roadside vegetation.

Understanding where your utility companies work and how they schedule their roadside pruning and clearing rotations will help town residents plan for changes in the structure



of roadside fields and forests over time. Additionally, towns and private landowners may find unique opportunities to partner with utility companies to plant small trees, shrubs, grasses, or crops within the guidelines of the vegetation management plans of the companies.

Identifying the presence or impact of overhead utilities within the right-of-way tells us:

- where landowners can be alerted to the practices implemented by the utility company servicing their road.
- where landowners may see an increased number of ash tree removals as utility companies manage for emerald ash borer and the decline of ash trees.
- where the town may rely on the utility company for assistance in cutting trees that are showing signs of decline or decay.
- where private landowners mowing under utility lines may adjust practices to promote low-growing plants and shrubs that may help filter stormwater runoff, increase plant diversity, delineate the road edge, and increase visual interest along roadsides.
- where there are roads not impacted by overhead utilities, offering more opportunity for established forestry practices.

*Line clearing drastically changed the appearance and purpose of this roadside hedgerow. Planning for low-growing vegetation beneath the power line ensures homeowner privacy and reduces conflicts between utility line placement and trees.*



ABOVE LEFT *Japanese knotweed, dead elm trees, and ash trees surround this utility corridor between a road and a river. Any tree work done to remove elm or ash should consider the likely spread of Japanese knotweed fragments via road or tree felling equipment.*

ABOVE RIGHT *Cyclic clearing of utility line vegetation creates dense and even-aged regeneration beneath an overhead line.*



## Recommendations

**Work with the local utility companies to understand their clearing rotation.** Identify where town and utility company priorities overlap and where to follow [cooperative management strategies](#).<sup>1</sup>

**Understand the utility company's approach to managing invasive plants,** particularly Japanese knotweed (*Fallopia japonica*) and other fast-growing plants that can obscure sight lines and signs.

**Ensure that preserved trees near utility lines are structurally sound and that sight lines remain clear** as the understory becomes dense.

**Promote vegetated buffers of grasses** and revegetate disturbed areas with native seed mixtures.

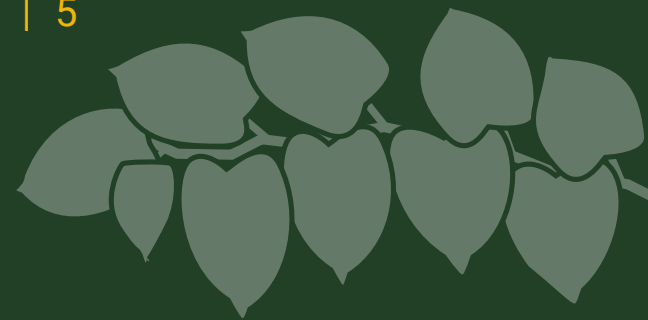
**Keep yourself and your equipment at least 10 feet away from overhead utility lines.** Treat all power lines as energized. Never cut or prune trees within 10 feet of an overhead utility and never attempt to remove trees or limbs from a utility line. Consult the Green Mountain Power [Safety Tips](#)<sup>2</sup> for more information or contact your local utility company.

**Call 888-DIG-SAFE at least 48 hours before you excavate or dig holes.** Dig Safe is a free and legally required service that alerts you to any underground utilities in the area.

## Resources

1. Polanin, Nicholas and Mark Vodak, *Trees & Utilities: Cooperative Management Strategies for Success* (2002), [bit.ly/Rutgers\\_TreesAndUtilities](http://bit.ly/Rutgers_TreesAndUtilities).
2. "Safety Tips," Green Mountain Power, [bit.ly/GMP\\_SafetyTips](http://bit.ly/GMP_SafetyTips).

# Invasive plant species



The consistent disturbance of the roadside edge provides ample space for invasive species to take root, flower, and spread.

Additionally, road construction equipment, mowers, car tires, and even pedestrians and bicyclists can easily carry the seeds or root fragments of invasive plants down the road.

Because the roadsides are public spaces, no one person may feel entirely responsible for the management and control of these roadside plants. Because of this, slowing the spread of invasive roadside plants requires persistent effort and consistent monitoring, management, and public outreach.

Identifying the location and [species of common invasive plants](#)<sup>1</sup> along rural roads tells us:

- where towns should implement specific treatment practices.
- how to educate landowners about the spread of invasive species, including from and to their private property.
- how to help road crews identify new infestations of invasive plants, particularly if the small plants can be treated.
- where to exercise extreme caution when performing roadwork, ditching, or mowing in order to stop the spread of invasive plant seeds or roots via movement of equipment or soil.



*These are all plant species that are invasive in Vermont. Top, Japanese knotweed (Fallopia japonica); bottom right, wild chervil (Anthriscus sylvestris); bottom left, wild parsnip (Pastinaca sativa).*

## Recommendations

Follow all best management practices related to roadside invasive plants, making sure to clean equipment before and after roadside work. [Best Management Practices for Roadside Invasive Plants](#),<sup>2</sup> from the Nature





More invasives. From left, common buckthorn or European buckthorn (*Rhamnus cathartica*), bush Honeysuckle (*Lonicera* spp.), and Japanese barberry (*Berberis thunbergii*).

Conservancy, describes how to reduce the spread of invasive plant fragments or seeds when grading, ditching, laying culverts, transporting equipment, mowing, and handling soil known to contain invasive plants.

**Plan to treat isolated existing patches of invasive species** in roadside ditches by mechanical or chemical means as appropriate.

**Preserve trees and shrubs that provide shade on roadsides.** Invasive plants, like many plants, are less likely to thrive in shady areas.

**Know where invasive species are along town roads, and where they aren't.**

Mow first in areas without invasive species, then mow areas with known infestations (although do not mow knotweed or purple loosestrife). Follow best practices to keep mowing and ditching equipment clear of invasive plant fragments and seeds.

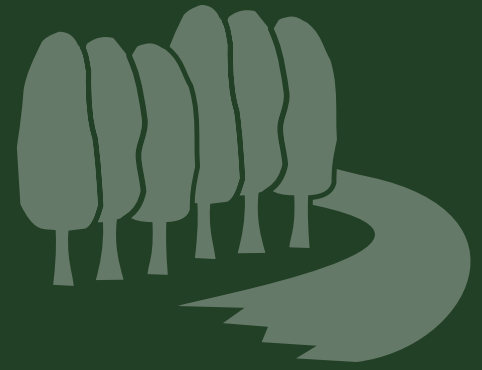
**Do not mow invasive plants after seeds have set.** Knowing when invasive plants bloom will let towns use mowing to their advantage to reduce the spread of invasive seeds. See Phenology and Management Calendar of 12 Common Roadside Invasive Plant Species in Vermont on page 30.

**Partner with private landowners to prevent and manage invasive plant species** regionally using integrated [best management practices](#).<sup>3</sup>

## Resources

1. "Gallery of Terrestrial Invasive Plants," Vermont Invasives, [bit.ly/VT\\_InvasivePlants](https://bit.ly/VT_InvasivePlants).
2. The Nature Conservancy, *Best Management Practices for Roadside Invasive Plants*, [bit.ly/TNC\\_RoadsideInvasives](https://bit.ly/TNC_RoadsideInvasives).
3. Vermont Invasives, *Forestry Best Management Practices*, [bit.ly/InvasiveBMPs](https://bit.ly/InvasiveBMPs).

# Hedgerow locations



In the context of rural roads, hedgerows are identified as narrow strips of trees and shrubs that border a road on one side and a field, lawn, or body of water on the other.

Hedgerow trees and plants create defining characteristics of the road's environment, demarcate the road edge, provide canopy cover for small mammals and birds, create windbreaks and shade, filter stormwater, and provide beauty and aesthetic qualities unique to Vermont backroads. Many homeowners also benefit from the privacy provided by hedgerow trees.

Identifying the presence of hedgerows helps us:

- highlight areas where landowners may be particularly sensitive to roadside tree cutting.
- highlight areas where hedgerows bordering agricultural fields may conflict with the goals of the farmer.
- evaluate where wildlife may be traveling through otherwise unforested landscapes.
- address whether scenic views are being impeded by hedgerows.



## Recommendations

**Identify where ash trees make up a large portion of the trees in a hedgerow.**

Consider targeted [planting](#)<sup>1</sup> or interplanting (the planting of future shade or ornamental trees between historic or declining trees in these areas) to mitigate canopy loss when ash trees die.

**Identify areas where historic trees are in decline and where interplanting can create a new generation** of intentionally managed shade trees.

**Identify landowners who may be willing to monitor for invasive species** in hedgerows bordering their property.

*Hedgerow trees grow in strips of manageable vegetation often less than 15 feet wide. Overstory and understory trees, shrubs, and tall grasses obscure both neighboring agricultural land and views to the mountains. Many hedgerows grow unintentionally; both the landowner and the town can plan for the ecological and social benefits they may provide.*



This cedar hedgerow was likely planted by the landowner to create privacy and act as a living fence. Any roadwork that damages or removes these trees would be highly noticeable.

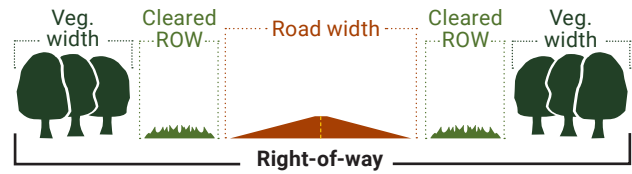
**Identify where hedgerow trees and shrubs may have grown unintentionally.** The town may note where scenic views are now obscured by hedgerows and consider selective thinning to promote healthy canopy trees and retain or renew scenic views. Utilize the expertise of the tree warden or another forester to plan for targeted and thoughtful tree pruning or removal.

To mitigate road erosion while retaining important historic or hedgerow trees, **utilize best management practices outlined in the *Better Roads Manual*<sup>2</sup>** to direct surface runoff from the road through outlets or ditching that extends into the existing travel lane. Recommendations about construction of turnouts are included in the *Better Roads Manual* on page 33.

## Resources

1. Vermont Urban & Community Forestry, *Protecting the Investment: Tree Planting and Establishment*, [bit.ly/VTUCF\\_TreePlanting](http://bit.ly/VTUCF_TreePlanting).
2. Vermont Agency of Transportation, *Vermont Better Roads Manual* (January 2019), [bit.ly/VT\\_BetterRoadsManual](http://bit.ly/VT_BetterRoadsManual).

## Average road width, cleared zone, and vegetation width



The tables below outline basic statistics taken from field assessments performed in five participating case study towns in the Rural Roads Resilient Right-of-Ways project. Measurements were collected to the nearest foot. Averages and ranges of these widths establish the breadth of possibilities of road and roadside land uses. However, the mode value, or the most frequently observed value during field surveys, reveals normal practices in a town.

### ROAD WIDTH: distance between edges of traveled way

Assessed Roads	Average (ft)	Minimum (ft)	Maximum (ft)	Most frequent value (ft)
Town 1	21.4	16	33	22
Town 2	20.4	9	29	19
Town 3	18.0	10	29	18
Town 4	21.6	7	31	25
Town 5	17.7	9	24	22

### CLEARED ZONE: distance from edge of traveled way to outside edge of frequently mowed, stone-lined, or bare roadside area

Assessed Roads	Average (ft)	Minimum (ft)	Maximum (ft)	Most frequent value (ft)
Town 1	8.5	0	17	7
Town 2	8.0	0	20	8
Town 3	8.0	0	18	7
Town 4	7.0	0	18	6
Town 5	9.7	2	20	8

### MANAGEABLE VEGETATION WIDTH: distance between the edge of a frequently mowed, stone-lined, or bare roadside area to the outside edge of the right-of-way

Assessed Roads	Average (ft)	Minimum (ft)	Maximum (ft)	Most frequent value (ft)
Town 1	5.7	0	15	0
Town 2	6.6	0	20	6
Town 3	7.8	0	17	8
Town 4	6.9	0	19	8
Town 5	6.4	0	15	8

# Tree health and mechanical damage



Yearly visual examination of the health of overstory trees in the right-of-way is an efficient and low-tech field method to help towns form their roadside forest management priorities.

Trees may decline because of their age, surrounding soil conditions, disease, or pests. However, some roadside trees decline because of repeated damage from strikes by mowers and plows or from acute damage inflicted during ditching, a vehicle collision, or branch clearing with a raised flail mower. Trees in fair or poor condition, particularly those with cankers or damage to the trunk or limbs, may be particularly susceptible to breaking or falling.

Identifying locations that exhibit declining tree health and notable mechanical damage helps us:

- describe sample locations where roadside forest management can be proactive, promoting healthy canopy trees and reducing possible risk posed by dead or dying trees.
- identify locations where road-tree conflicts exist, then determine if road crews should use narrower or alternate road maintenance equipment, or if a tree should be removed.
- identify where trees may be in decline due to environmental stressors such as compacted soil or fungal pathogens, allowing towns to prioritize replanting, interplanting, or forest regeneration.
- determine if future road construction sites should also involve roadside forest management.



*Repeated impacts from vehicles or machinery have damaged this roadside tree.*



**ABOVE** Although standing dead trunks create wildlife habitat, they also pose risk for road users. Trees removed from the right-of-way should be cut to less than four inches in height to eliminate damage to vehicles pulled off the road.

**CENTER** Damaged mature trees line a sunken roadbed that prevents stormwater sheet flow runoff. Reduce mowing beneath mature trees, plant shade-tolerant wildflowers or grasses, plant seedlings between mature trees to establish the next generation of roadside canopy, construct stone turnouts to direct water away from the road, or raise the roadbed to allow for sheet flow to either side of the road.

**FAR RIGHT** A canker weakens a roadside tree, creating risk for road users, particularly if the tree is hit by a vehicle or road machinery.



## Recommendations

**Assess the overstory health of trees in the right-of-way** using a reference guide such as “Tree Characteristics” in [The Vermont Tree Inventory Guide](#).<sup>1</sup> Consider doing this in concert with the yearly evaluation of historic tree health with the tree warden and road foreman (page 1).

**Note roads where the road foreman expresses concern about using the plow or grader and locations where trees are wounded.** Work with the tree warden, conservation commission, and neighboring landowners to address tree preservation or removal at these locations.

**Where roadside trees border lakes and ponds, consult the [Municipal Roads General Permit: A Guide for Lakeshore Roads](#)**<sup>2</sup> to understand best practices for managing vegetation along lakeshores and important exemptions to certain conditions outlined in the Municipal Roads General Permit.

**Where road-tree conflicts occur on steep banks, review the “Bank Stabilization” section** in the [Vermont Better Roads Manual](#).<sup>3</sup>

## Resources

1. Vermont Urban & Community Forestry, *The Vermont Tree Inventory Guide* (2014), p. 16–18, [bit.ly/VTUCF\\_TreeInventoryGuide](https://bit.ly/VTUCF_TreeInventoryGuide).
2. Lake Wise Program, Vermont Department of Environmental Conservation, *Municipal Roads General Permit (MRGP): A Guide for Lakeshore Roads*, [bit.ly/MRGP\\_LakeshoreRoads](https://bit.ly/MRGP_LakeshoreRoads).
3. Vermont Agency of Transportation, *Vermont Better Roads Manual* (January 2019), p. 36–45, [bit.ly/VT\\_BetterRoadsManual](https://bit.ly/VT_BetterRoadsManual).

# Agriculture in the right-of-way



Along many Vermont backroads, corn, hay, or even livestock sometimes extends to within a few feet of the road.

Likely a result of a historical precedent or a handshake agreement between the landowner and the town, this land use in the right-of-way may not always be beneficial to a municipality. Trees or perennial shrubs in the town's right of way can improve road conditions, water quality, and traffic patterns for all road users. However, operating farms have many requests, restrictions, and expectations that should be addressed by both the landowner and the town before any changes are proposed. Landowners should be aware that many shade trees in the right-of-way should not be removed without approval of the tree warden and, if necessary, a public hearing held by the tree warden.

Identifying agriculture in the right-of-way helps us:

- identify if this is a common practice in a town.
- consider how different forms of agriculture (corn, hay, livestock) affect the right-of-way and identify any proposed changes to best practices.
- note where conflicts over the presence or absence of roadside trees may arise based on contiguous land uses.



*The harvest of corn on land adjacent to the right-of-way leaves this road open to snowdrift. The town can consider leaving corn to act as a living snow fence.*

## Recommendations

**Consult the road crew** to understand advantages or disadvantages posed by agriculture in the right-of-way in your town. Similarly, **consult landowners** if the town would like to propose changes in the right-of-way or establish best practices for vegetation in the town right-of-way.

When mowing the cleared zone, particularly if the cleared zone includes hay fields, **consider leaving vegetation at a height of six inches or more.** These tall grasses act as a natural buffer between the road and the agricultural field,



ABOVE LEFT Sun exposure and broad viewscales may limit the willingness of a town or landowner to plant roadside trees or establish a buffer zone between the road and fields.

ABOVE RIGHT Animal grazing continues to the border of the right-of-way and private land, leaving little to no room for robust right-of-way vegetation.

infiltrating stormwater runoff, slowing its velocity, and filtering some of the sediment and pollutants in the runoff before it reaches the field.

Current [Required Agricultural Practices](#)<sup>1</sup> issued by the State of Vermont require **10-foot-wide, non-tillable vegetated buffers between agriculture and ditches**. This buffer helps filter and slow stormwater runoff before it reaches ditches. Consider a 10-foot buffer between all roads and agricultural fields to allow a place for upgradient stormwater to slow between land uses.

If snow drift is a problem on roads adjacent to agriculture fields, **consider designing a living snow fence**<sup>2</sup> in conjunction with the landowner.

**Understand the seasonal changes in the right-of-way** and how planted vegetation height will change throughout the year.

Snow fences immediately adjacent to the road (i.e., within the municipal right-of-way) can result in **snow deposits on the road itself**.

**Living snow fences work best when planted at least 100 feet from the centerline of the road**. However, this distance places the snow fence on private property. Chapter 6 in the [Best Practices Handbook for Roadside Vegetation Management](#)<sup>3</sup> outlines how the Minnesota Department of Transportation has worked with private landowners to leave standing corn rows to act as snow fences for town roads.

## Resources

1. "Required Agricultural Practices," Vermont Agency of Agriculture, Food and Markets, [bit.ly/VT\\_RAPs](https://bit.ly/VT_RAPs).
2. "Living Snow Fences Control Blowing and Drifting Snow," Minnesota Department of Transportation, [bit.ly/LivingSnowFences](https://bit.ly/LivingSnowFences).
3. Johnson, Ann M., P.E. and Minnesota Local Road Research Board, *Best Practices Handbook for Roadside Vegetation Management*, [bit.ly/MinnesotaRoadsides](https://bit.ly/MinnesotaRoadsides).

# Young forest



Many of our roadsides were pasture only a generation ago. As such, some roadside forests can be crowded with small and young trees, many of which are not tolerant of shade and have short life spans.

“Pioneer species” such as American elm, gray and white birch, pin cherry, and poplar require early maintenance and proactive management to avoid broken branches and stems.

Often, these species reach out over the road or die prematurely, falling into the road during storm events. When done properly, selective tree removal can prevent future downed trees while encouraging growth of remaining long-lived trees such as sugar maples, red oaks, or beech. Additionally, thinning trees when they are small and young is less expensive and requires less large equipment and expertise than felling large trees that already present risk.



*Gray birch, a short-lived pioneer tree species on cleared land, often requires repeated maintenance to prevent broken branches.*

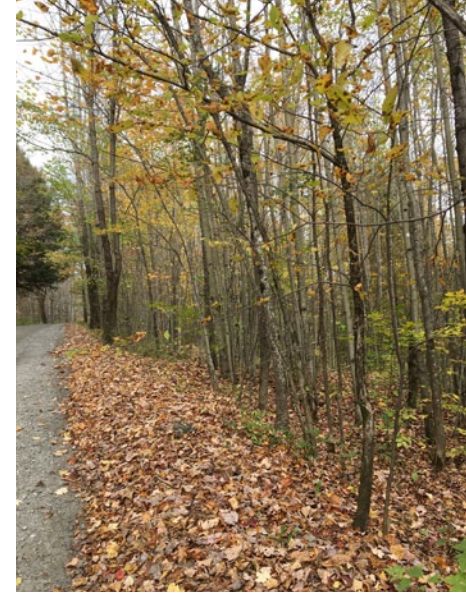
Identifying locations that may benefit from tree thinning, removal of high-risk and short-lived trees, or thinning of select understory trees helps us:

- identify species of trees that can become weak within a short time frame (years) and select for long-lived and shade tolerant species that grow into mature roadside canopy trees.
- learn where previous roadside tree clearing has created ongoing tree maintenance issues.
- plan for thoughtful tree removal during road construction.

## Recommendations

Learn about how **established silvicultural practices** like selective thinning (also called [treescaping](#),<sup>1</sup> described on pages 11–13 in the *Roadside Vegetation Management Manual for Rural Road Crews* by Harry Chandler and the Vermont Woodlands Association) can benefit our roadside forests.





**ABOVE LEFT** Hedgerows of young trees block wind, provide canopy cover, and create privacy for neighboring landowners. Careful thinning of select trees can maintain privacy while supporting growth of healthy, disease-resistant trees away from road edges.

**ABOVE RIGHT** Crowded young trees along rural roads are a common scenario in New England. Neighboring landowners and municipalities can selectively remove some trees and preserve others that will provide long-lived roadside canopy.

Consult a forester to identify **young roadside forests where the removal of some trees may release other trees from competition**. Ensure that released trees do not block a clear line of sight for drivers utilizing the road at the posted speed limit.

**Identify trees that are obscuring scenic views**. Consider if removal of these trees may benefit nearby trees that are not obscuring views, reduce complexity in future road construction or maintenance, or improve the experience of road users.

**Note the location of species prone to breaking** (e.g., birch, aspen) and **areas of shade-intolerant or diseased or infested trees** (e.g., black cherry or pin cherry, elm or ash) growing into the right-of-way, particularly along steep road curves. Monitor their health and create a plan for their removal, particularly in preparation for or after [storm events](#).<sup>2</sup>

**Identify immature tree canopy dominated by small, thin beech trees** (often called “beech thickets”). Work with the neighboring landowner and a forester to look for beech trees resistant to beech bark disease and identify techniques to manage these thickets to promote mature canopy trees.

**Consider creating a municipal tree ordinance or policy**<sup>3</sup> that specifies which trees require a public hearing for removal, particularly with regard to tree diameter, health, species, and placement on the road. At present, state statutes lack clarity regarding rights and responsibilities surrounding tree removals in some areas.

## Resources

1. Chandler, Harry and Vermont Woodlands Association, *The Roadside Vegetation Management Manual for Rural Road Crews* (2000), p. 11–13, [bit.ly/RoadsideVegetationManual](#).
2. “When a Storm Hits,” Arbor Day Foundation, [bit.ly/WhenASTormHits](#).
3. Vermont Urban & Community Forestry, *Tree Ordinances and Policies*, [bit.ly/VTUCF\\_TreeOrdinance](#).

# Mature forest



Many of Vermont's roads travel through developed forests of multiage trees, understory saplings and shrubs, herbaceous cover, and water features.

Preserving trees, shrubs, or other herbaceous vegetation can reduce soil erosion, demarcate the edge of the road, create visual interest and beauty, and provide privacy for homeowners. In particular, preserved [tree canopy](#)<sup>1</sup> helps intercept rainfall that would otherwise damage road surfaces, provides shade that reduces road dust on hot days, promotes infiltration of rainwater into the soil, and reduces pollutants in stormwater.

Identifying where trees and herbaceous cover should be preserved helps us:

- plan to protect trees during future road construction events, particularly near steep slopes or water bodies.
- reduce disturbance of roadside soil, preserve topsoil, and maintain stable forested environments where tree removals are not needed.
- balance the need to remove trees in some areas with the ability to preserve trees and forests in other roadside locations.
- identify opportunities to promote regeneration of vegetation through reduced mowing width, selective tree removal, or other forestry practices that encourage tree growth.



*Softwood trees grow vertically on a roadside slope.*

## Recommendations

In developed forests with an established understory, **avoid cutting trees that do not pose a risk to travelers.** Note where roadside vegetation, including mature trees, is stabilizing steep slopes. If only the branches of a tree are blocking or obscuring road use, consider pruning instead of whole tree removal.

**Have a forester evaluate whether a tree lean occurred recently** (and may pose a risk of falling) or if it occurred many years ago and has been self-corrected. Remember that hardwood trees are *phototropic* and can lean naturally to grow toward the light. Softwood trees are *geotropic* and grow straight up, leaning only when tilted at ground level.



**ABOVE LEFT** *Roadside ditch construction created a bare backslope prone to erosion. Road crews can consider reducing the angle of the backslope, hydroseeding the bare soil, or planting live stakes in the backslope to reduce soil erosion. Outsloping the road so that runoff flows into vegetation downhill will also reduce the need for ditching on the upslope side and help preserve trees.*

**ABOVE CENTER** *A thin strip of right-of-way vegetation separates this road from a pond, filtering stormwater runoff and delineating the edge of the road. Preserving these trees may ensure bank stabilization.*

**ABOVE RIGHT** *A sunken roadbed and soil berm prevent stormwater sheet flow runoff. Towns can construct stone turnouts to direct stormwater off the road surface, establish herbaceous vegetation along bare slopes, or raise the roadbed to direct surface water runoff as sheet flow.*

**Preserve herbaceous buffer along roads in heavily forested areas.** Do not increase the width of the cleared zone without specific reason. Consider hydroseeding or planting [live stakes](#)<sup>2</sup> on bare soil that borders ditches.

Consider **raising the road surface of inverted roads** (sometimes called “dugways”) where stormwater runoff is blocked by a bare berm or slope that cannot be removed. Roads level with surrounding forest allow for sheet flow of stormwater off the road, reducing the risk of road erosion and slowing road runoff.

**Review the best practices of road maintenance through wet areas** as outlined in the *Vermont Better Roads Manual*, particularly where [bank stabilization](#)<sup>3</sup> is needed between the base of a slope and a wet area.

**Retain buffer zones**<sup>4</sup> **between roads and sensitive areas** such as streams, wetlands, and lakes. The [Vermont Rivers Program](#)<sup>5</sup> recommends a 50-foot-wide buffer of native woody vegetation surrounding streams.

**Identify places where a landowner may be open to planting or promoting more vegetation** on private land adjacent to the right-of-way. Consult with Vermont Urban & Community Forestry staff for examples of public-private collaboration for roadside planting.

## Resources

1. Vermont Urban & Community Forestry, *Trees and Stormwater*, [bit.ly/VTUCF\\_TreesAndStormwater](https://bit.ly/VTUCF_TreesAndStormwater).
2. Vermont Agency of Transportation, *Vermont Better Roads Manual* (January 2019), p. 41, [bit.ly/VT\\_BetterRoadsManual](https://bit.ly/VT_BetterRoadsManual).
- 3 & 4. Ibid, p. 36 and p. 45.
5. “River Corridor Protection,” Vermont Department of Environmental Conservation, [bit.ly/VT\\_RiverCorridors](https://bit.ly/VT_RiverCorridors).

# Know your partners and understand their goals

Partnerships between town officials, municipal staff, utility companies, and individual volunteers form the backbone of municipal rural road stewardship. Understanding the many groups involved in right-of-way tree care and vegetation management will maximize the expertise available to the town and encourage partnerships when problems arise.



## Tree Warden

Each Vermont town is required by state law to designate a tree warden, who makes decisions regarding the care, protection, and removal of municipally owned and managed trees. Many tree wardens are trained arborists, foresters, or natural resource professionals who take on the role of the tree warden as a volunteer. Others are already municipal employees within public works departments, parks departments, or highway departments. Learn more about [Vermont's tree wardens](#)<sup>1</sup> or read the [Vermont Tree Warden Statutes](#),<sup>2</sup> which outline the position's duties in full.

## Road Commissioner, Road Foreman, Road Crew

Road crews in Vermont are managed by a road foreman who oversees all municipal highway (road) operations. Additionally, some towns also employ an elected or appointed road commissioner who reports to the town selectboard on the progress,

needs, and requests of the road crew. Road commissioners and road foremen ultimately carry out the directives of the selectboard but are often asked to use their professional judgement to complete a job. Road crews are responsible for the safe passage of motorists on all municipal roads and bridges and some state roads; by default, road crews often take on tree or brush clearing or other tree care duties when no other tree care professional has been hired. Understand the expectations and expertise of your town's road crew as it pertains to tree care, brush hogging, mowing, and invasive plant mitigation.

## Selectboard and Town Staff

The selectboard of a town has supervisory powers over town matters not carried out by officers. Included in these responsibilities is its authority to appoint a road foreman or road commissioner and approve expenditures that build, maintain, and discontinue municipal roads. Additionally, the selectboard must appoint a town tree warden, who is not a member of the selectboard itself. Learn more about the duties of selectboards with regards to town highways as outlined fully in [V.S.A. Title 19 §](#)

1. "Vermont Tree Wardens," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_TreeWardens](https://bit.ly/VTUCF_TreeWardens).  
 2. Vermont Tree Warden Statutes, V.S.A. Title 24 § 2502–§ 2512, [bit.ly/VT\\_TreeWardenStatutes](https://bit.ly/VT_TreeWardenStatutes).

304<sup>3</sup> and described in the [Handbook for Vermont Selectboards](#)<sup>4</sup> published by the Vermont League of Cities & Towns. Other town staff, including the town manager or administrator, often play an active role in town highway goals and facilitating funding requirements.

## Utility Companies

Many Vermont towns are serviced by multiple utility companies, some of which partner with communication companies. Review the vegetation management plans of your local utility companies and understand their approach to clearing rotations, desirable and undesirable tree species, control of invasive plants, and ash tree management in response to emerald ash borer. Additionally, note if your town has provided any guidance about the work of utility companies with regard to the scenic quality and land values outlined in the town plan. Legislation surrounding the responsibilities of utility companies as they pertain to public roads and publicly managed trees is outlined in [V.S.A. Title 30 § 2506](#).<sup>5</sup>

## Conservation Commission

A conservation commission acts as an advisory council to the selectboard regarding natural resource planning and management. Tree care and vegetation management in public ways and places are often addressed by conservation commission members. They may also manage grant money that funds management of town lands that have environmental, cultural, or scenic importance.

## Tree Board or Committee

Some towns choose to create a tree board that is separate from the conservation commission. Tree board missions vary by town but all generally strive to promote public health and welfare by preserving, planting, and maintaining healthy

community trees. The duties of a tree board are outlined specifically in a city or town's code of ordinances and more broadly in [V.S.A. Title 24 Chapter 67: Parks And Shade Trees](#).<sup>6</sup>

## Regional Planning Commissions and Municipal Planning Commissions

Every Vermont town is served by one of 11 regional planning commissions (RPCs) that link local, state, and federal government programs. RPCs have federal and state statutory responsibilities in many areas of governance including in transportation issues, environmental regulations, land use planning, and economic development. Pertaining to road maintenance, RPCs aid towns with road erosion inventories, help secure funding through the Municipal Grant in Aid Program to implement best management practices that reduce erosion on roads, provide mapping expertise for natural resource inventories, and work in concert with municipal planning commissions to include language regarding public tree care and forest integrity in updated town plans. Contact the [Vermont Association of Planning & Development Agencies](#)<sup>7</sup> to learn more about your town's RPC.

## Citizen Scientists and Other Volunteers

Enthusiastic and knowledgeable town volunteers may inform a community's management of trees and other vegetation through donated time and expertise. Citizen scientists use digital platforms or paper maps to log the presence of native and non-native species, including their phenology (seasonal changes) and spread or disappearance in town. Other volunteers plant trees, pull invasive plants, clean up roadsides, and apply for grant funding to help a town further its mission to grow healthy trees and resilient roadside vegetation.

3. Town Highways, V.S.A. Title 19 § 301–§ 318, [bit.ly/Statutes\\_TownHighways](#).

4. Vermont League of Cities and Towns, *Handbook for Vermont Selectboards* (2011), [bit.ly/VLCT\\_SelectboardHandbook](#).

5. Telecommunications and Electric Wires And Poles Along Highways, Railroad Tracks, And Cemeteries; Transportation Board and Selectboard Role, V.S.A. Title 30 § 2501–§ 2530, [bit.ly/Statutes\\_UilitiesAndTrees](#).

6. Parks and Shade Trees, V.S.A. Title 24 § 2501–§ 2512, [bit.ly/Statutes\\_ParksAndShadeTrees](#).

7. "Resources," Vermont Association of Planning & Development Agencies (VAPDA), [vapda.org/resources](#).

# Support diverse and native roadside trees and plants

Stressed by vehicular traffic, snowplows, mowers, road maintenance equipment, pedestrians, bicyclists, and litter, vegetation in the right-of-way is in a state of perpetual disturbance.

Additionally, roadside ecology is generally altered from the original condition of the landscape, resulting in engineered topography and nonstandard plant communities. Restoring roadsides to their most natural state, particularly after construction, promotes greater longevity of native plant species and resilience during typical disturbances.

Establishing sustainable, multiage, and diverse roadside vegetation takes thoughtful planning, appropriate expertise, and patience. Consider that

most forest management plans span decades — roadside forestry practices, although more intensely scrutinized and frequently disturbed, must also adopt long-term goals and extended monitoring plans. Many Vermont backroads are forested and will revegetate themselves with common tree species (a process called “forest regeneration”). However, some right-of-ways that border wetlands, fields, or agricultural areas may benefit from bush and native grass planting to prevent erosion or from tree planting to create roadside canopy.



## Recommendations

**Be intentional about vegetation clearing.** Understand that any vegetation regrowth will be all the same age (called “even-age”) and, at least initially, will lack the structural diversity that keeps roadsides forests healthy.

**Plan for safety of wildlife and people utilizing the right-of-way.** Roadsides can provide strips of habitat for some species, although generally as temporary cover or food sources rather than as breeding or nesting sites. Some species continue to thrive in the edge habitat created by roadside vegetation, but large mammals that browse on some roadside trees like birch (*Betula* spp.), poplar (*Populus* spp.) or willow (*Salix* spp.) may generate risk for both road users and themselves.

**Establish a pruning<sup>1</sup> and maintenance schedule for existing trees.** When done correctly, roadside pruning reduces the number of branches that could fall, reduce sight lines along roads, or grow into

1. “Pruning,” Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_Pruning](https://bit.ly/VTUCF_Pruning).

utility lines, while maintaining or even improving tree health. Do not prune trees with a flail mower or boom arm mower – this will cause long-term damage to trees.

**Establish a systematic annual planting schedule.** Start small to monitor progress and understand that planting efforts require site preparation, material purchases, monitoring, and possibly replacement of species that die. Ensure that planting efforts do not conflict with planned road construction.

**Take note of existing native plants common in your region.** Ask your town’s active citizen scientists to record their tree and plant observations on [iNaturalist](https://www.inaturalist.org).<sup>2</sup> This will help other town residents and road crews recognize changes in the roadside landscape and provide information about species that may revegetate disturbed sites.

**Cover and stabilize bare and disturbed soil with seed, mulch, hydroseeding, or stone lining.** The [Municipal Roads General Permit](#)<sup>3</sup> requires soil stabilization within five days of the completion of a project.

**Establish native vegetation where possible, including where invasive plants have been removed.**

**Consult with neighboring towns to find out if planting or seeding initiatives can be shared.** By combining resources, towns may achieve an economy of scale that makes costs and logistics more palatable.

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2. iNaturalist, [inaturalist.org](https://www.inaturalist.org).

3. Vermont Department of Environmental Conservation, *Vermont Pollutant Discharge Elimination System General Permit 3-9040 for Stormwater Discharges from Municipal Roads*, [bit.ly/VT\\_MRGP](https://bit.ly/VT_MRGP).

## Roadside grasses



Roadside grasses play an important role in stabilizing banks that do not require hardscaping. Road crews look for grasses that germinate quickly, are tolerant of salt and other disturbances, and do not require frequent mowing. The Vermont Agency of Transportation recommends several seed mixtures for roadside planting, many of which can be applied with a hydroseeder. Low-grow and fine fescue mixes often work well next to the road; however, many contain no native species.

As preliminary guidance, towns may consider using the Sand and Gravel Sites Conservation Mix or the Wet Area Mix suited to these conditions and described in the [Vermont](#)

[Agency of Transportation Technical Landscape Manual](#),<sup>1</sup> both of which contain some native species. Pay close attention to the amount of fertilizer and tackifier a site may need for seeds to successfully germinate, particularly on steep slopes. Seed mixes can be purchased through Vermont-based companies such as Lawes Agricultural Service, L.D. Oliver Seed Company, or Northeast Agriculture Sales. Seed mix labels should include the percentage of pure live seed (PLS) to inform consumers of the wide variety of germination rates and

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1. Vermont Agency of Transportation, “Seed Mixes,” in *Technical Landscape Manual*, page 2-47, [bit.ly/VTransLandscape](https://bit.ly/VTransLandscape).

percentage of seed by weight among the many native grass mixes.

Alternatively, towns may consider native seed mixes with no fescue. These native grasses may thrive beyond the immediate cleared zone beside the road. Native seed mixes are sold by companies such as Vermont Wetland Plants or New England Wetland Plants, or by national companies with northeast-specific seed varieties such as Roundstone Native Seed or Ernst Seeds. The Vermont Agency of Transportation is currently developing pollinator-friendly seed mixes for steep slopes and ditches prone to both flash floods and dry soils.

# Prepare for emerald ash borer and manage ash tree health



Emerald ash borer (EAB), an invasive beetle that infests all species of ash in North America, was first detected in Vermont in February of 2018.

The insect is confirmed in multiple locations statewide and is likely present in much broader areas than have currently been noted.

Once present, EAB may kill 99% of ash trees that are not chemically treated. Ash trees infested with EAB become brittle and break in unpredictable ways. Ash trees along public roads can pose a safety risk to road crews or tree professionals charged with removing them and to all road users who may be impacted by dying or dead trees. All Vermont towns are encouraged to prepare for and manage the impacts of EAB and the loss of ash trees.

At present, the [Vermont Tree Warden Statutes](#)<sup>1</sup> do not allow for the removal of any healthy ash trees under the purview of the tree warden without a public hearing. Municipal ash trees that do not show signs of infestation and pose no risk to people or property are not automatically eligible for removal as hazard or risk trees. The Vermont Tree Warden Statutes may be [revised](#)<sup>2</sup> to include preemptive management strategies of trees threatened by EAB or other forest pests; at the time of this printing, amendments to the statutes have not passed through the legislature.

1. Vermont Tree Warden Statutes, V.S.A. Title 24 § 2502–§ 2512, [bit.ly/VT\\_TreeWardenStatutes](http://bit.ly/VT_TreeWardenStatutes).

2. "Proposed Tree Warden Statutes Amendments," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_TreeWardenAmendments](http://bit.ly/VTUCF_TreeWardenAmendments).

## Recommendations

**Plan for the arrival and impact of emerald ash borer.** Ensure that the town selectboard, tree warden, and any conservation or park committees have access to the most recent information on EAB in Vermont. Visit the Vermont Invasives' "[Emerald Ash Borer in Vermont](#)" [webpage](#)<sup>1</sup> for updates on all confirmed EAB detections, designated infested areas, and best practices to slow the spread of EAB.

**Consider a regional approach to EAB preparedness and management.** Some Vermont towns have already combined resources and expertise to raise awareness about EAB, plan for roadside ash inventories, and share ash tree management approaches. In 2013, concerned citizens in and near

1. "Emerald Ash Borer in Vermont," Vermont Invasives, [bit.ly/EABinVermont](http://bit.ly/EABinVermont).



Lamoille County formed the [Regional Invasive Insect Preparedness Team \(RIIPT\)](#).<sup>2</sup> Using money awarded through Vermont Urban & Community Forestry's Caring for Canopy grants, RIIPT prepared four educational and fun public service announcements. It continues to provide outreach and expertise.

**Complete a roadside ash tree inventory and EAB management plan.** Prioritize roads for management based on traffic counts, density and condition of ash trees, and proximity of ash trees to the road. Understand that the town may not have permission to prune or remove all ash trees that may impact the right-of-way.

**Review Vermont Urban & Community Forestry's other [online resources](#)**<sup>3</sup> regarding EAB management.



2. "Regional Invasive Insect Preparedness Team: A Collaborative Approach to Invasive Insects," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_RIIPT](https://bit.ly/VTUCF_RIIPT).

3. "Emerald Ash Borer Management," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_EAB](https://bit.ly/VTUCF_EAB).

## Roadside ash tree inventories



Vermont Urban & Community Forestry supports ash tree inventories along roadsides, in town centers or village greens, and on any other high-use municipally owned or managed property. An inventory facilitates realistic management of emerald ash borer by assessing impact to publicly managed places, prioritizing tree removals, identifying trees best suited for treatment with pesticides, and planning budgets necessary for tree treatment or removal.

Using a GPS-enabled smart device and the free Collector for ArcGIS application, town volunteers or staff collect data on the size, location, and

condition of ash trees that may impact the right-of-way or town property when infested, decaying, or dead. Trees are categorized by management type (municipal right-of-way, utility right-of-way, or private) and noted as priority removal trees if they meet town-defined conditions such as poor tree health, large size, or excessive lean over the road.

Contact the Vermont Urban & Community Forestry Program for more information on [ash tree inventory](#)<sup>1</sup> options.

1. "Ash Tree Inventories," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_AshTreeInventories](https://bit.ly/VTUCF_AshTreeInventories).

*Collecting data during an ash tree inventory using a smart device.*

# Address hazard trees with the tree warden



The town tree warden serves as an advocate for trees in the town’s public places and right-of-ways and as a resource for citizens wanting to know more about public safety concerns as related to roadside vegetation.

The Vermont Tree Warden Statutes specify that tree wardens can authorize the removal of hazardous, infested, or infected shade or ornamental trees in public places (including the right-of-way) without a public hearing. Removal of other shade or ornamental trees requires a public hearing during which neighboring landowners and interested parties can voice their support or concerns. Selectboards or road commissioners may authorize removal of those

roadside trees outside of the residential part of town and deemed not under the jurisdiction of the tree warden. Recognize, however, that the “residential part of town” is not defined in state statute. Additionally, for a tree to be considered a *hazard* tree by the tree warden and be removed without a public hearing, the tree itself must be a hazard, not its placement. If a roadside tree is close to the road edge but not damaged, infested, or infected, it cannot be deemed a hazard tree by the tree warden.

## Recommendations

**Know the [Vermont Tree Warden Statutes](#).**<sup>1</sup> Last amended in 1969, these statutes outline the role and responsibilities of the tree warden when declaring and managing infested or damaged trees. Stay up to date on any [amendments](#)<sup>2</sup> to the statutes. And follow the [Guidelines for Public Hearings for Tree Removals](#).<sup>3</sup>

**Learn to identify structural defects in weak and damaged trees.** [Tree risk management](#)<sup>4</sup> is a routine part of urban tree management but should also apply to rural roads.

**Retain an updated map of hazard trees** as identified by the road foreman and tree warden during a yearly roadside tree survey. This could be done on paper or electronically – Vermont Urban & Community Forestry can help with electronic resources.

**Be prepared for storm damage.**<sup>5</sup> Ensure that hazards presented by storm-damaged trees are managed by practitioners who are trained to work with trees in poor condition.

**Ensure that qualified line clearance arborists prune or remove trees within 10 feet of a utility line.** They are usually certified by the [Electrical Hazards Awareness Program](#).<sup>6</sup> No one without this certification should work near utility lines.

1. Vermont Tree Warden Statutes, V.S.A. Title 24 § 2502–§ 2512, [bit.ly/VT\\_TreeWardenStatutes](http://bit.ly/VT_TreeWardenStatutes).

2. “Proposed Tree Warden Statutes Amendments,” Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_TreeWardenAmendments](http://bit.ly/VTUCF_TreeWardenAmendments).

3. Vermont Urban & Community Forestry, *Guidelines for Public Hearings for Tree Removal*, [bit.ly/VTUCF\\_PublicHearing](http://bit.ly/VTUCF_PublicHearing).

4. “Tree Risk Management,” Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_TreeRisk](http://bit.ly/VTUCF_TreeRisk).

5. “Storm Damage,” Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_StormDamage](http://bit.ly/VTUCF_StormDamage).

6. “Electrical Hazards Awareness Program,” Tree Care Industry Association, [bit.ly/TCIA\\_EHAP](http://bit.ly/TCIA_EHAP).

# Develop a tree ordinance or policy



Well-developed and active tree ordinances and policies are effective tools to aid towns in attaining and supporting healthy community trees.

A *policy* is a general statement of principles, while an *ordinance* is an adopted decree that has legal authority. A policy is easier to change than an ordinance but is less enforceable. When thoughtfully crafted, tree ordinances define ambiguous terms with language that reflects the goals and perspectives of each town. They clarify processes regarding tree planting, removal, and maintenance that act as a reference for the entire town, often reducing conflicts. They can also address management of specific tree species, including invasive species.

No municipal body can remove or plant trees on private property outside of the right-of-way without

the jurisdiction to do so. A tree ordinance or policy can provide that authority. Some communities have enacted tree ordinances that give the municipality the authority to request that the landowner remove a hazard tree that could affect the public right-of-way. Such an element of an ordinance can also specify that if the landowner does not remove the tree in a certain amount of time — for example, within 60 days — the municipality can remove the tree and seek payment from the landowner. Like any situation regarding private property and public safety, the town can work with the landowner to assess the level of risk posed by trees on private property and reach a mutually agreeable decision before taking any legal action.

## Recommendations

**Identify the right-of-way widths in your town** by checking with the town clerk or road foreman. This will inform which roadside trees are managed by the town.

**Know when a public hearing is necessary**<sup>1</sup> for tree removal.

**Review the Vermont Tree Warden Statutes**.<sup>2</sup> Understand which trees are governed by the tree warden and when a public hearing is required before removal of a tree.

**Learn more about tree ordinances and policies**<sup>3</sup> and review sample ordinances and policies from other towns. Engage your town tree warden, tree board, road crew, or selectboard to discuss if a tree policy or ordinance will clarify the intent of the town regarding the care of its roadside vegetation.

**Utilize the *Guide to Tree Ordinances and Policies for Vermont Municipalities***<sup>4</sup> to draft your town's legislative language.

1. Vermont Urban & Community Forestry, *Guidelines for Public Hearings for Tree Removals*, [bit.ly/VTUCF\\_PublicHearing](https://bit.ly/VTUCF_PublicHearing).

2. Vermont Tree Warden Statutes, V.S.A. Title 24 § 2502–§ 2512, [bit.ly/VT\\_TreeWardenStatutes](https://bit.ly/VT_TreeWardenStatutes).

3. "Public Policy," Vermont Urban & Community Forestry, [bit.ly/VTUF\\_PublicPolicy](https://bit.ly/VTUF_PublicPolicy).

4. Vermont Urban & Community Forestry, *Guide to Tree Ordinances and Policies for Vermont Municipalities*, [bit.ly/VTUCF\\_TreeOrdinanceGuide](https://bit.ly/VTUCF_TreeOrdinanceGuide).

# Develop a roadside mowing policy



With Vermont’s warm and lush summers comes expansive plant growth. Many Vermont roadsides, if left undisturbed, will grow green and spill into the roadways.

Road crews and subcontractors routinely mow the right-of-way to delineate the edge of the road and the size and shape of the shoulder and ditch. In the process, they create a place for vehicles to safely pull off the road and room to store snow.

However, roadside construction, maintenance, and mowing carries invasive plant seeds and fragments to other road segments and onto private property. Becoming aware of the most

common roadside invasive plants in your region allows towns to learn where, when, and how to perform roadside mowing that reduces invasive plant spread. Develop a mowing policy in tandem with updated and improved mowing procedures to minimize the labor and cost involved in mowing, increase safety, manage snow drift, and reduce the spread of invasive plant species that degrade native ecosystems.

## Recommendations

**Plan mowing widths based on safety requirements and the width of mowing machinery.** Wide mowed right-of-ways require multiple passes on the mower, adding expense and disturbing native vegetation. Along Vermont backroads, mowed zones next to the traveled surface of the road are often a minimum of five feet wide.

**Clean mowing equipment often.** Note which road segments currently exhibit few or no invasive plant species and make sure that all mowing equipment is thoroughly cleaned before mowing, digging, or ditching in these locations.

**Know that it is illegal to buy, sell, or transport invasive plants or plant fragments on the Vermont list.** Towns should create management plans that address the movement of invasive plants or plant fragments during roadside construction, prioritizing prevention of new infestations through soil or plant movement. Contact the Agency of Agriculture for guidance on management activities and creating a management plan for [invasive and noxious weeds](#)<sup>1</sup> along municipal roads.

**Determine if any roadsides should not be mowed and designate these areas with clear signs.** No-mow contingencies may be due to steeply sloping roadsides, the proximity of a wetland or other water

1. "Invasive & Noxious Weeds in Vermont," Vermont Agency of Agriculture, Food and Markets, [bit.ly/VT\\_NoxiousWeeds](https://bit.ly/VT_NoxiousWeeds).

body, or the presence of invasive species easily spread by mowing. Avoid mowing backslopes of ditches.

**Consider mowing more than once a season to maintain sight lines while reducing the spread of invasive plant seeds or fragments.** After mowing, many invasive plants will grow and flower again in the same season – be sure the mow before this subsequent round of flowering goes to seed.

**Allow vegetation to be 10–12 inches high by the end of the growing season** to [protect native plants from winter damage](#)<sup>2</sup> as outlined on page 17 of the *Best Practices Handbook for Roadside Vegetation Management* by the Minnesota Local Roads Research Board.

**Learn about pesticide safety and application in Vermont**,<sup>3</sup> particularly in the right-of-way. Any pesticide use must be administered by a certified pesticide applicator who holds a Category 6 license for Right-of-Way Vegetation Management.

**For more information on reducing the spread of invasive plants along roadsides**, see [Best Management Practices for Roadside Invasive Plants](#),<sup>4</sup> released by The Nature Conservancy, and guidance from the [Roadside Vegetation Management Unit](#)<sup>5</sup> at the Vermont Agency of Transportation.

**Do not mow invasive plants after seeds have set.** Knowing when invasive plants bloom will let you use mowing to your advantage to reduce the spread of invasive seeds. Learn more about mitigating common roadside invasive plants on page 30.

2. Minnesota Local Road Research Board, *Best Practices Handbook for Roadside Vegetation Management*, [bit.ly/MinnesotaRoadsides](http://bit.ly/MinnesotaRoadsides).

3. "Pesticide Programs," Vermont Agency of Agriculture, Food and Markets, [bit.ly/VT\\_PesticidePrograms](http://bit.ly/VT_PesticidePrograms).

4. The Nature Conservancy, *Best Management Practices for Roadside Invasive Plants*, [bit.ly/TNC\\_RoadsideInvasives](http://bit.ly/TNC_RoadsideInvasives).

5. "Roadside Vegetation Management Unit," Vermont Agency of Transportation, [bit.ly/AOT\\_VegManagement](http://bit.ly/AOT_VegManagement).

## Understanding herbicide treatment in the right-of-way

Selective herbicide treatment can be an effective way to control invasive plant populations. Towns considering herbicide application in the municipal right-of-way must follow a two-step process outlined by the Vermont Agency of Agriculture.

Apply for a right-of-way [pesticide permit](#)<sup>1</sup> reviewed by Agency of Agriculture staff under advice from the Vermont Pesticide Advisory Council. Provide the project location, work date range, and name of the proposed herbicide. To add context to the permit application, include any municipally approved integrated roadside vegetation management

plan. Permits are valid for one year; towns must reapply for a permit to continue, change, or expand a scope of work in the same defined area during a subsequent year.

Ensure that herbicide application in the right-of-way is completed by a contractor or town employee who has passed the Vermont Core Pesticide Applicator Certification exam and the Category 6 Right-of-Way Vegetation Management exam. [Learn more](#)<sup>2</sup> about the necessary study guides, exam schedule, and fees from the Pesticide Program in the Vermont Agency of Agriculture.

The Vermont Agency of Transportation holds permits for pesticide application along state road right-of-ways. Contact the [Right of Way & Utilities Program](#)<sup>3</sup> with the Agency of Transportation Highway Division for more information about the processes and plans involved in use of pesticides in these locations.

Any questions regarding pesticide application and the relevant certifications should be directed to the Vermont Agency of Agriculture, (802) 828-2430 or [AGR.Helpdesk@vermont.gov](mailto:AGR.Helpdesk@vermont.gov).

1. "Pesticide Permits," Vermont Agency of Agriculture, [bit.ly/Vermont\\_PesticidePermits](http://bit.ly/Vermont_PesticidePermits).

2. "Applicator Types & Resources," Vermont Agency of Agriculture, [bit.ly/Vermont\\_PesticideApplicatorTypes](http://bit.ly/Vermont_PesticideApplicatorTypes).

3. "Right of Way & Utilities," Vermont Agency of Transportation, [bit.ly/VTrans\\_ROW](http://bit.ly/VTrans_ROW).

# Phenology\* and management calendar of 12 common roadside invasive plant species in Vermont

\*Phenology = cyclical phases of plant or animal life based on climate; varies by microclimate (latitude, elevation, orientation)

Compiled with help from the Vermont Chapter of the Nature Conservancy Wise on Weeds Treatment Sheets and the Vermont Department Forests, Parks & Recreation's "12 Invasive Plants Commonly Found in Vermont." Learn more about invasive plants at [VTinvasives.org](http://VTinvasives.org).

Name	Apr	May	Jun	Jul	Aug	Sep	Oct	
<b>Japanese barberry</b> ( <i>Berberis thunbergii</i> ) and <b>common barberry</b> ( <i>Berberis vulgaris</i> )	Leaf out							
	Flowering			Seed production				
	Hand cut or mow							
Manual removal of barberry can be very effective. Cutting or mowing slows the spread but will not eradicate it. A foliar herbicide application or direct flame weeding is usually required.								
<b>Common buckthorn</b> ( <i>Rhamnus cathartica</i> ) and <b>glossy buckthorn</b> ( <i>Frangula alnus</i> )	Leaf out							
	Flowering			Seed production				
	Hand cut or mow							
<b>Shrub honeysuckle</b> ( <i>Lonicera</i> spp.)	Leaf out							
	Flowering			Seed production				
	Mow							
<b>Dame's rocket</b> ( <i>Hesperis matronalis</i> )	Leaf out							
	Flowering		Seed production					
	Mowing reduces seed development but the plant can reflower. Mow 2–5 times annually before the plant reflowers to reduce population.							
<b>Garlic mustard</b> ( <i>Alliaria petiolata</i> )	Leaf out: January–December (basal rosettes stay green year round)							
	Flowering		Seed production					
	Mow							
Mowing is not recommended. Hand pulling or use of foliar herbicide before seed set is effective.								
<b>Multiflora rose</b> ( <i>Rosa multiflora</i> )	Leaf out							
	Flowering			Seed production				
	Mow							
Repeated mowing 3–6 times per growing season for 2–4 years can control multiflora rose infestations. Young plants can be pulled by hand.								
<b>Wild chervil</b> ( <i>Anthriscus sylvestris</i> )	Leaf out							
	Flowering			Seed production				
	Mow							
Wild chervil can flower multiple times in one season. Repeated mowing before seed set helps control infestations.								
<b>Wild parsnip</b> (a.k.a. poison parsnip) ( <i>Pastinaca sativa</i> )	Leaf out							
	Flowering			Seed production				
	Mow							
<b>Common reed</b> ( <i>Phragmites australis</i> )	Leaf out							
						Flowering		Seed
	Mow							
Common reed is easily spread by movement of underground stolon fragments during construction or roadwork. Clean equipment of plant fragments after mowing.								
<b>Japanese knotweed</b> ( <i>Fallopia japonica</i> )	Leaf out							
						Flower & seed production		
	Mowing is not recommended because transported plant or root fragments will resprout. If mowing or cutting does occur to improve sight lines or during ditching, move from unaffected areas into infested areas, clean mowing equipment before moving work sites, and dispose of these plants in already infested areas or by stockpiling plants on an impervious surface.							

# Understand the role of trees in updated stormwater regulations



Road-related erosion is recognized as a nonpoint source of sediment and phosphorus pollution in Vermont’s waterways.

To comply with the Municipal Road General Permit issued in 2018, municipalities are completing road erosion inventories that outline multiyear strategies to correct erosion patterns along roads that are hydrologically connected to streams, ponds, and other water bodies. While stone-lined ditches and other hardscaping are effective tools for mitigating sediment and phosphorus transportation, trees and other vegetation play a large role in controlling erosion and protecting water quality.

Deciduous tree canopy cover can reduce rainfall intensity by 15%–21%<sup>1</sup> and coniferous canopy by

21%–52%.<sup>2</sup> On rural roads, this canopy can diminish the impact of water droplets on dusty roads and the erosive power of running surface water during rainfall. Additionally, tree and plant root systems reinforce the shear strength of soil and extract water from the soil for plant growth, reducing soil erosion and its causes. Ensuring that road shoulders are lower than the traveled lane allows stormwater to flow into neighboring vegetated land instead of down the road. However, towns will need to carefully note where ditching is the required method for stormwater control, even at the expense of existing vegetation.

1. Trimble & Weitzman, *Effect of a Hardwood Forest Canopy on Rainfall Intensities* (1954), referenced in USDA Forest Service, *Give Me the Numbers: How Trees and Urban Forests Really Affect Stormwater Runoff*, [bit.ly/USDA\\_TreesAndStormwater](https://bit.ly/USDA_TreesAndStormwater).

2. Keim and Skaugset, *Modeling Effects of Forest Canopies on Slope Stability* (2003), referenced in USDA Forest Service, *Give Me the Numbers: How Trees and Urban Forests Really Affect Stormwater Runoff*, [bit.ly/USDA\\_TreesAndStormwater](https://bit.ly/USDA_TreesAndStormwater).

## Recommendations

Refer to the **Municipal Roads Program**<sup>1</sup> for information on the **Municipal Roads General Permit**,<sup>2</sup> reporting requirements, and funding assistance.

**Understand where waivers in the permit preclude the removal of trees** or other vegetation. These include areas where roadside construction would impact significant environmental and historic resources (including historic landscapes) or landscapes or vegetation within 250 feet of a lakeshore.

1. “Municipal Roads Program,” Vermont Department of Environmental Conservation, [bit.ly/VermontMunicipalRoads](https://bit.ly/VermontMunicipalRoads).

2. Vermont Department of Environmental Conservation, *Vermont Pollutant Discharge Elimination System General Permit 3-9040 for Stormwater Discharges from Municipal Roads*, [bit.ly/VT\\_MRGP](https://bit.ly/VT_MRGP).

Review the updated recommendations in the [Vermont Better Roads Manual](#)<sup>3</sup> and look for places where clean water goals can be met through carefully balanced construction and vegetation preservation. Techniques include stone turnouts (as pictured below in the *Vermont Better Roads Manual*), the filling of incision ditches with gravel and stone armor (also pictured below), the installation of dry wells or French drains to capture or transport runoff, or the use of [bioretention areas](#).<sup>4</sup>

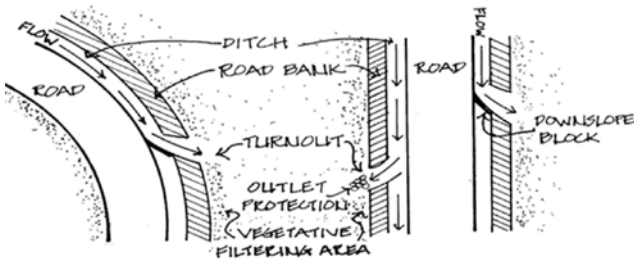
Review updated [Town Road and Bridge Standards](#)<sup>5</sup> that outline construction standards that towns can adopt to reduce stormwater runoff and improve the resiliency of town roads.

3. Vermont Agency of Transportation, *Vermont Better Roads Manual* (January 2019), [bit.ly/VT\\_BetterRoadsManual](http://bit.ly/VT_BetterRoadsManual).

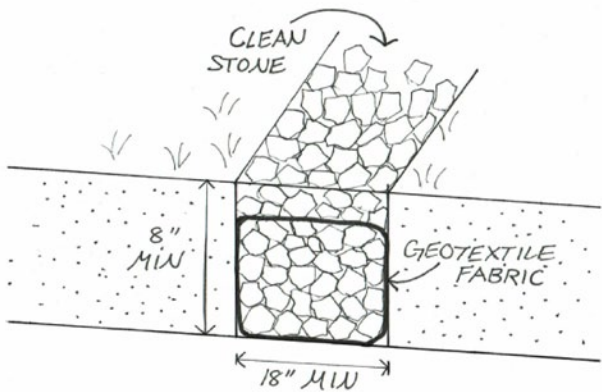
4. Winooski NRCD, UVM Extension, and Lake Champlain Sea Grant, *The Vermont Rain Garden Manual*, [bit.ly/VT\\_RainGardenManual](http://bit.ly/VT_RainGardenManual).

5. Town Road and Bridge Standards, Municipality of \_\_\_\_, Vermont (fillable form) (2019), Vermont Agency of Transportation, [bit.ly/VT\\_RoadAndBridge](http://bit.ly/VT_RoadAndBridge).

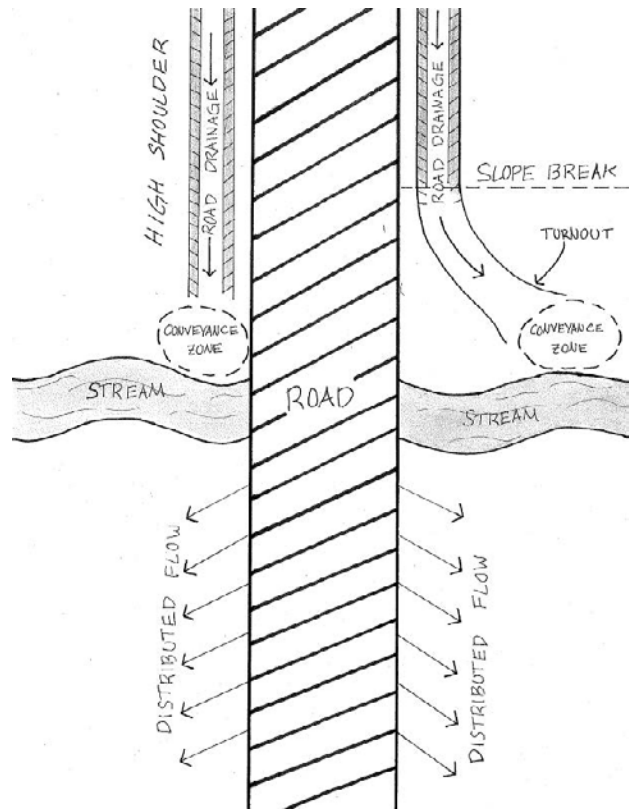
## Stormwater management in the right-of-way



Stone turnouts direct water away from road edges into existing forest cover or other vegetation. All drawings from the [Vermont Better Roads Manual](#) (2019).



Infiltration trenches catch runoff before water travels down the road. They should be installed with a vegetated filter strip to reduce clogging of the trench.



The Municipal Roads General Permit requires that road drainage be disconnected from a waterbody via distributed drainage into a grass or forested area or into a stabilized conveyance zone.



# Maintain backroads and ditches to specifications

From rural farmhouse properties to pockets of deep woods, Vermont’s unpaved roads take us through the unique areas of the state that make it so attractive.

While the view from the road changes around each bend, many of the elements of a good road should not. The crown, slope, radius of curves, mowed or cleared zone width, and even speed limits are based on the landscape of the road, the topography it covers, and the traffic it receives.



## Recommendations

Refer to the [Vermont Better Roads Manual](#)<sup>1</sup> for best practices regarding road construction and maintenance. Another useful resource is the [Gravel Road Maintenance Manual](#)<sup>2</sup> published by the Kennebec County Soil and Water Conservation District and the Maine Department of Environmental Protection.

**When possible, design ditches on only one side of the road** to reduce impact of tree removal. Mature trees provide more stormwater reduction (20 cubic feet per tree) than newly planted trees (10 cubic feet per tree).<sup>3</sup>

**Ensure that clearing work occurs when invasive plants are not in seed** and that soil containing invasive plant fragments is not moved to a site free of invasive plants (see Phenology and Management Calendar of 12 Common Roadside Invasive Plant Species on page 30).

**Avoid clearing the backslope, or uphill slope next to a ditch.** Plant roots in this soil keep the slope in place. To widen a ditch, push the travel lane further to the opposite side of the road where possible or reduce the travel lane width. If a backslope is disturbed during ditch maintenance or construction, seed backslopes with a hydroseeder and tackifier to promote immediate vegetative cover.

**Avoid putting stone fill on ditch side slopes that are above the flow line** where the slopes can be stabilized with vegetation instead.

1. Vermont Agency of Transportation, *Vermont Better Roads Manual* (January 2019), [bit.ly/VT\\_BetterRoadsManual](http://bit.ly/VT_BetterRoadsManual).

2. Kennebec County Soil and Water Conservation District and the Maine Department of Environmental Protection, *Gravel Road Maintenance Manual: A Guide for Landowners on Camp and Other Gravel Roads* (April 2016), [bit.ly/Maine\\_GravelRoads](http://bit.ly/Maine_GravelRoads).

3. Stone Environmental, *Stormwater Management Benefits of Trees* (2014), [bit.ly/VT\\_TreesAndStormwater](http://bit.ly/VT_TreesAndStormwater).

**Remove grader berms.** These mounds of gravel, dirt, leaves, and sticks are left behind after the grader passes and ultimately impede the flow of stormwater into naturally vegetated areas.

**Consult the [Vermont State Design Standards](#)<sup>4</sup>** for minimum widths of lanes and shoulders for rural local roads, including the table pictured below, adapted from the standards. Consider carefully if or why a backroad should have a width greater than the minimum before proceeding to widen a road.

4. Vermont Agency of Transportation, *Vermont State Design Standards* (1997), [bit.ly/VT\\_RoadStandards](http://bit.ly/VT_RoadStandards).

## Minimum width of lanes and shoulders for rural local roads

Design Traffic Volume	ADT <sup>(a)</sup> 0–25	ADT 25–50	ADT 50–100	ADT 100–400	ADT 400–1500	ADT 1500–2000	ADT 2000+
Design Speed	Width of Lane / Shoulder (ft)						
25 mph	7 / 0	8 / 0	9 / 0	9 / 2	9 / 2	10 / 3	11 / 3
30 mph	7 / 0	8 / 0	9 / 0	9 / 2	9 / 2	10 / 3	11 / 3
35 mph	7 / 0	8 / 0	9 / 0	9 / 2	9 / 2	10 / 3	11 / 3
40 mph	7 / 0	8 / 0	9 / 2	9 / 2	9 / 2	10 / 3	11 / 3
45 mph	—	—	9 / 2	9 / 2	9 / 2	10 / 3	11 / 3
50 mph	—	—	9 / 2	9 / 2	10 / 2	10 / 3	11 / 3

**Note:** ADT = Average Daily Traffic: the average number of vehicles passing a specific point in both directions during a 24-hour period. (a) = Minimum width of 8/0 wherever there is guard rail. Vermont Agency of Transportation, *Vermont State Design Standards* (1997), [bit.ly/VT\\_RoadStandards](http://bit.ly/VT_RoadStandards).

# Create and maintain a public relations plan for roadside vegetation management

Although the road foreman, road crew, and town selectboard make many of the decisions regarding road and roadside vegetation maintenance, all people in a town can play a role in deciding how funds are used to manage and maintain their town roads.



Raising public awareness about roadside maintenance will help road crews interact positively with the public while conducting roadwork, mowing, pruning, tree clearing, or erosion control.

A successful public relations plan will also outline appropriate channels for submitting and responding

to complaints from adjacent landowners and road users. Additionally, a public relations plan should outline how road crews, town officials, and local residents should respond to a crisis such as downed trees, a fuel spill, or a road washout.

## Recommendations

**Consider the audiences of a public relations plan** for municipal roads and roadside vegetation. Include homeowners and landowners, school districts, municipal property managers, and local volunteer commissions and planning entities.

**Outline appropriate channels for submitting and responding to complaints** from adjacent landowners and road users. [Public hearings](#)<sup>1</sup> surrounding tree removal are one method to manage expectations about roadside canopy.

**Identify media channels that can communicate short-term and reactive actions** such as tree care during a [storm response](#),<sup>2</sup> repairs of road washouts, or corrective actions after a fuel spill.

**Identify media channels for outreach regarding long-term and proactive initiatives** such as invasive plant management, ash tree management, and monitoring for emerald ash borer in municipally managed spaces.

**Identify any local, regional, or national scenic byways** and clarify any notification process required when road or roadside management actions are planned.

1. Vermont Urban & Community Forestry, *Guidelines for Public Hearings for Tree Removals*, [bit.ly/VTUCF\\_PublicHearing](http://bit.ly/VTUCF_PublicHearing).

2. "Storms," Vermont Urban & Community Forestry, [bit.ly/VTUCF\\_Storms](http://bit.ly/VTUCF_Storms).

# Keep abreast of funding opportunities



Towns can fund water quality improvements, vegetation planning, and community place-making initiatives with grant funding.

Below is a list of key grants that may be available to municipalities, particularly if they have a roadside vegetation plan already in place. To stay current on grant opportunities connected to clean water and stormwater, subscribe to the [Clean Water Grant Opportunities newsletter](#).<sup>1</sup>

1. Subscription form for the Vermont Clean Water Grant Opportunities newsletter, Vermont Department of Environmental Conservation, [bit.ly/VT\\_CleanWaterGrants](http://bit.ly/VT_CleanWaterGrants).

## Relevant grants to support municipalities' roadside vegetation management, road erosion control, and water quality initiatives

VERMONT AGENCY OF NATURAL RESOURCES		
GRANT PROGRAM	DESCRIPTION	LEARN MORE
<b>Caring for Canopy</b>	Supports the development of sustainable urban and community forestry programs at the local level. Grants are currently focused on emerald ash borer municipal planning.	<a href="http://vtcommunityforestry.org/programs/financial-assistance">vtcommunityforestry.org/programs/financial-assistance</a>
<b>Vermont Watershed Grant</b>	Supports water-related projects that protect or restore fish and wildlife habitats, protect or restore water quality and shorelines, reduce phosphorus loading and/or sedimentation, enhance recreational use and enjoyment, identify and protect historic and cultural resources, educate people about watershed resources, or monitor fish and wildlife populations and/or water quality.	<a href="http://vtfishandwildlife.com/get-involved/apply-for-a-grant/watershed-grant">vtfishandwildlife.com/get-involved/apply-for-a-grant/watershed-grant</a>
<b>Clean Water Initiative Program Grant Opportunities</b>	Supports clean water improvement projects, administered by statewide partner(s), including stormwater management and natural resources restoration projects.	<a href="http://dec.vermont.gov/water-investment/cwi/grants/opportunities">dec.vermont.gov/water-investment/cwi/grants/opportunities</a>
<b>Municipal Roads Grants in Aid</b>	Administered by Regional Planning Commissions, funds support implementation of best management practices on municipal roads to meet requirements of the Municipal Roads General Permit.	<a href="http://vapda.org/gia">vapda.org/gia</a>

VERMONT AGENCY OF TRANSPORTATION		
GRANT PROGRAM	DESCRIPTION	LEARN MORE
<b>Municipal Highway and Stormwater Mitigation</b>	Supports environmental mitigation activities, including stormwater and water pollution prevention, management, and control related to highway construction or highway runoff.	<a href="https://vtrans.vermont.gov/highway/Municipal-Highway-and-Stormwater-Mitigation-Program">vtrans.vermont.gov/highway/Municipal-Highway-and-Stormwater-Mitigation-Program</a>
<b>Better Roads</b>	Funds municipal roadway improvements that benefit water quality: <ul style="list-style-type: none"> <li>• Inventories of roadway erosion and/or stormwater management issues and capital budget planning (Category A)</li> <li>• Correction of road-related erosion and/or construction of stormwater management projects (Category B)</li> <li>• Correction of streambank and/or slope-related problems (Category C)</li> <li>• Roadway structures and culvert upgrades (Category D)</li> </ul>	<a href="https://vtrans.vermont.gov/highway/better-roads">vtrans.vermont.gov/highway/better-roads</a>
<b>Transportation Alternatives Program</b>	Supports environmental mitigation activities such as stormwater and water pollution prevention, management, and control related to highway construction or highway runoff	<a href="https://vtrans.vermont.gov/highway/local-projects/transport-alt">vtrans.vermont.gov/highway/local-projects/transport-alt</a>
VERMONT AGENCY OF COMMERCE AND COMMUNITY DEVELOPMENT		
GRANT PROGRAM	DESCRIPTION	LEARN MORE
<b>Municipal Planning Grant</b>	Encourages and supports planning and revitalization for local municipalities in Vermont. Since 1998, the MPG program has provided over \$12 million to 234 cities and towns across Vermont to help breathe new life into communities, plan for future growth and development, and improve the quality of life.	<a href="https://accd.vermont.gov/community-development/funding-incentives/municipal-planning-grant">accd.vermont.gov/community-development/funding-incentives/municipal-planning-grant</a>
<b>Downtown Transportation Fund</b>	Funds transportation-related capital improvements within or serving a designated downtown district. Past projects include parking facilities, pedestrian and streetscape improvements, and utility relocation. New this year: the DTF has clean water funds to support green stormwater infrastructure improvements in coordination with the transportation project.	<a href="https://accd.vermont.gov/community-development/funding-incentives/downtown-transportation-fund">accd.vermont.gov/community-development/funding-incentives/downtown-transportation-fund</a>
<b>Better Connections</b>	A partnership between ACCD and AOT, this grant supports and guides local investments in transportation options through a wide array of planning activities, including downtown and village center master plans, corridor plans, and innovative guidelines and bylaws. For a complete list of current and past projects, visit the program's <a href="#">story map</a> .	<a href="https://vtrans.vermont.gov/planning/projects-programs/better-connections">vtrans.vermont.gov/planning/projects-programs/better-connections</a>
OTHER GRANTING ORGANIZATIONS		
GRANT PROGRAM	DESCRIPTION	LEARN MORE
<b>Vermont Community Foundation</b>	The scope of grants managed by the Vermont Community Foundation varies by location. See its <a href="#">website</a> for current available grants.	<a href="https://vermontcf.org/NonprofitsGrants/AvailableGrants.aspx">vermontcf.org/NonprofitsGrants/AvailableGrants.aspx</a>

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VERMONT URBAN & COMMUNITY  
FORESTRY PROGRAM

For more information on the Resilient Right-of-Ways project or  
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**Visit [vtcommunityforestry.org](http://vtcommunityforestry.org) for resources  
about urban and community forestry in action.**