



Vermont's Resilient Right-of-Ways Project

2015-2020

Vermont Urban & Community Forestry Program, VT Department of Forests, Parks & Recreation

Project Leads: Elise Schadler & Joanne Garton, VT Urban & Community Forestry Program & Karl Honkonen, USDA Forest Service/State & Private Forestry- grant monitor

Project Goal

The goal of this project was to develop a collaborative and integrated approach to advance green stormwater infrastructure (GSI) in roadside environments, targeted at communities in the Lake Champlain basin that have the greatest need to manage stormwater runoff from developed urban centers and rural back roads.

Deliverable	Activities
Project Kick-Off	Convened partners to review project goals, deliverables, and roles.
Prioritize Needs	Analyzed data, including GIS to produce urban and rural priority maps and identify 20 high-priority municipal partners.
Update Technical Resources	<p>Updated technical resources, including:</p> <ul style="list-style-type: none"> • <i>VT Green Streets Guide</i> (replaced old VT Landscape Guide for Roadways) • <i>VT Resilient Right-of-Ways Guide</i> (replaced old VT Better Back Roads Manual) • <i>VT Better Roads Manual</i> (updated through the project) • New protocol and tool to assess rural roadside vegetation developed
Outreach	Delivered state, regional, and local presentations
Assessments	<p>Conducted green infrastructure assessments and tailored specific technical support for:</p> <ul style="list-style-type: none"> • 10 priority urban communities • 10 priority rural communities
Plans	Developed resilient right-of-way vegetation plans for the 10 partner communities and developed a package of materials to support local adoption of GSI for 10 urban communities.
Training	Conducted training to transfer knowledge and skills for University of Vermont interns, Regional Planning Commission staff, municipal staff, and key community partners.

Project Partner	Role
Vermont Agency of Commerce & Community Development	Green Streets Guide content, feedback, and review.
Vermont Agency of Transportation	Green Streets Guide & Resilient ROW Guide content, feedback, and review. Advised on rural assessments.
Vermont Department of Environmental Conservation	Green Streets Guide & Resilient ROW Guide content, feedback, and review. Advised on rural assessments. Funding for Green Streets Guide.
Agency of Natural Resources GIS Team	Assisted in rural assessment data collection and mapping.
University of Vermont	Provided interns, expertise, and outreach assistance
Vermont League of Cities and Towns	Contracted to assist with urban municipal partnerships
Greenleaf Design	Contracted to assist with urban municipal partnerships
Watershed Consulting LLC	Contracted to conduct outreach on Green Streets Guide, advised on urban municipal partnerships
Dubois & King, Inc.	Contracted to develop Green Streets Guide



Project Focus: Urban Environments

The Vermont Green Streets Guide and 10 Municipal Partnerships

Context

- **Vermont Clean Water Act (2015)**
 - General Permit for stormwater runoff from impervious surfaces required as of 12/1/20
 - Agency of Natural Resources regulates all existing parcels with 3+ acres of impervious surfaces
 - Agency of Natural Resources regulates new development/expansion of existing impervious surfaces greater than 1 acre
- VT has several **MS4 communities** that need to comply with the Lake Champlain TMDL
- New statewide **municipal road stormwater standards**
- **Reforestation credits** were written into the stormwater manual: active reforestation, passive reforestation, and single tree credits available.





Vermont

Green Streets Guide

*A Resource For Planning And Building Green
Infrastructure Within Our Communities*

First Edition • June 2018

PLANT **LIVE** GROW

The Guide is intended to be a springboard to action and includes:

1. Planning considerations to advance Green Street design along streets and in parking lots.
2. Guidelines for selecting the appropriate application for the right site.
3. Implementation and maintenance strategies that make Green Street design more achievable.
4. Examples of Green Streets throughout the state, highlighting their successes and challenges.

Webpage and accompanying videos to highlight each chapter are available at:

vtcommunityforestry.org/Green_Streets_Guide

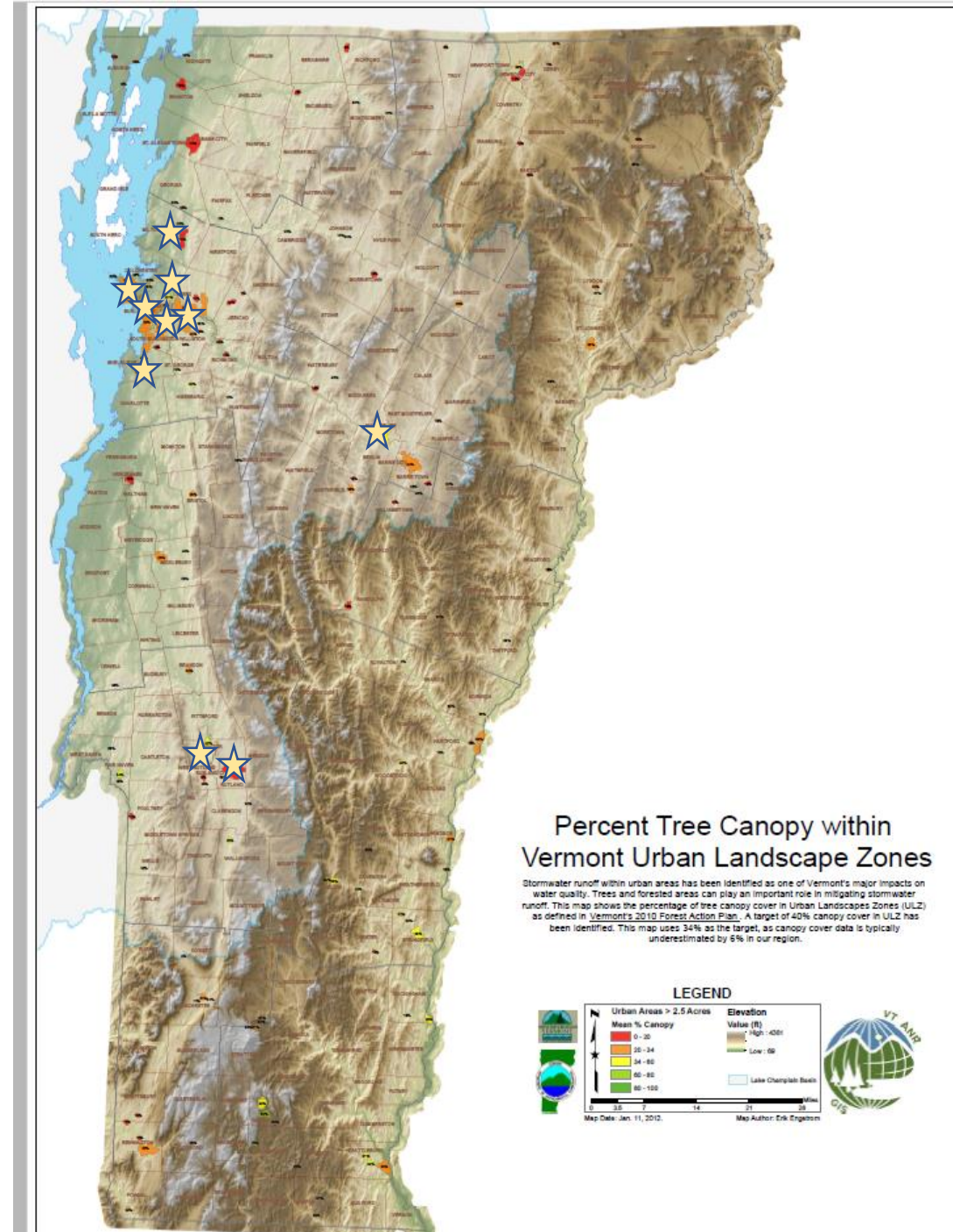
Green Streets Guide Outreach & Training

- VT Arbor Day Conference
- UCF Advisory Council & Partners
- Project Webinars
- Watershed Consulting contract to conduct trainings for key audiences distribute over 300 hard copies of the guide:
 - 2 virtual trainings (during pandemic)
 - Watersheds United Vermont Annual Conference
 - Vermont League of Cities and Town's annual Planning & Zoning Forum
 - Vermont Regional Planning Commissions Transportation Planners meeting



Technical Assistance: 10 Urban Municipal Partnerships to support GSI

- **The Team**
 - Elise Schadler & Danielle Fitzko (VT UCF)
 - Milly Archer, Water Resources Coordinator, Vermont League of Cities and Towns
 - Holly Greenleaf, Greenleaf Design/UVM Graduate Student
 - Becky Tharp, Green Stormwater Infrastructure Coordinator (*left mid-2017*)
- **Prioritized municipalities** in Lake Champlain Basin by population, impervious surface cover, existing canopy cover, and local capacity to accept support
- **Developed MOU**
- Municipalities received at a minimum:
 - 3+ suites of **photo simulations** to show what GSI could look like at specific municipal sites.
 - Review of and/or suggested language to strengthen existing and new **ordinances, public works specifications, and stormwater plans.**
 - Several meetings with our team and a final presentation of deliverables.
- Partner Municipalities: **Milton, Shelburne, Williston, Burlington, Rutland City, West Rutland, Colchester, Essex Town/Essex Village, Winooski, and Montpelier**



Examples of Photo Simulations:
Shelburne Existing



Examples of Photo Simulations:
Shelburne Potential



Examples of Photo Simulations:
Williston Existing



Examples of Photo Simulations:
Williston Potential



Examples of Photo Simulations:
Williston Existing



Examples of Photo Simulations:
Williston Potential



Examples of Photo Simulations:
Rutland Existing



Examples of Photo Simulations:
Rutland Potential



Examples of Photo Simulations:
West Rutland Existing



Examples of Photo Simulations:
West Rutland Potential



Examples of Photo Simulations:
Colchester Existing



Lakeshore Property

STORMWATER SOLUTIONS

RAINGARDENS...

S L O W I T (STORMWATER),
REDUCING EROSION,
S P R E A D I T O U T,
RETAINED IN THE BOWL-
SHAPED GARDEN,

& S I N K I T,

FILTERING IT THROUGH
PLANT ROOTS & SOIL,
RECHARGING GROUND-
WATER,

& PROTECTING
LAKE HEALTH

GUTTER WITH
DOWNSPOUT
DISCONNECTION
TO RAIN
GARDEN

PONDING AREA
ADDED SANDY
SOIL MEDIA
FOR INFILTRATION
GRAVEL LAYER

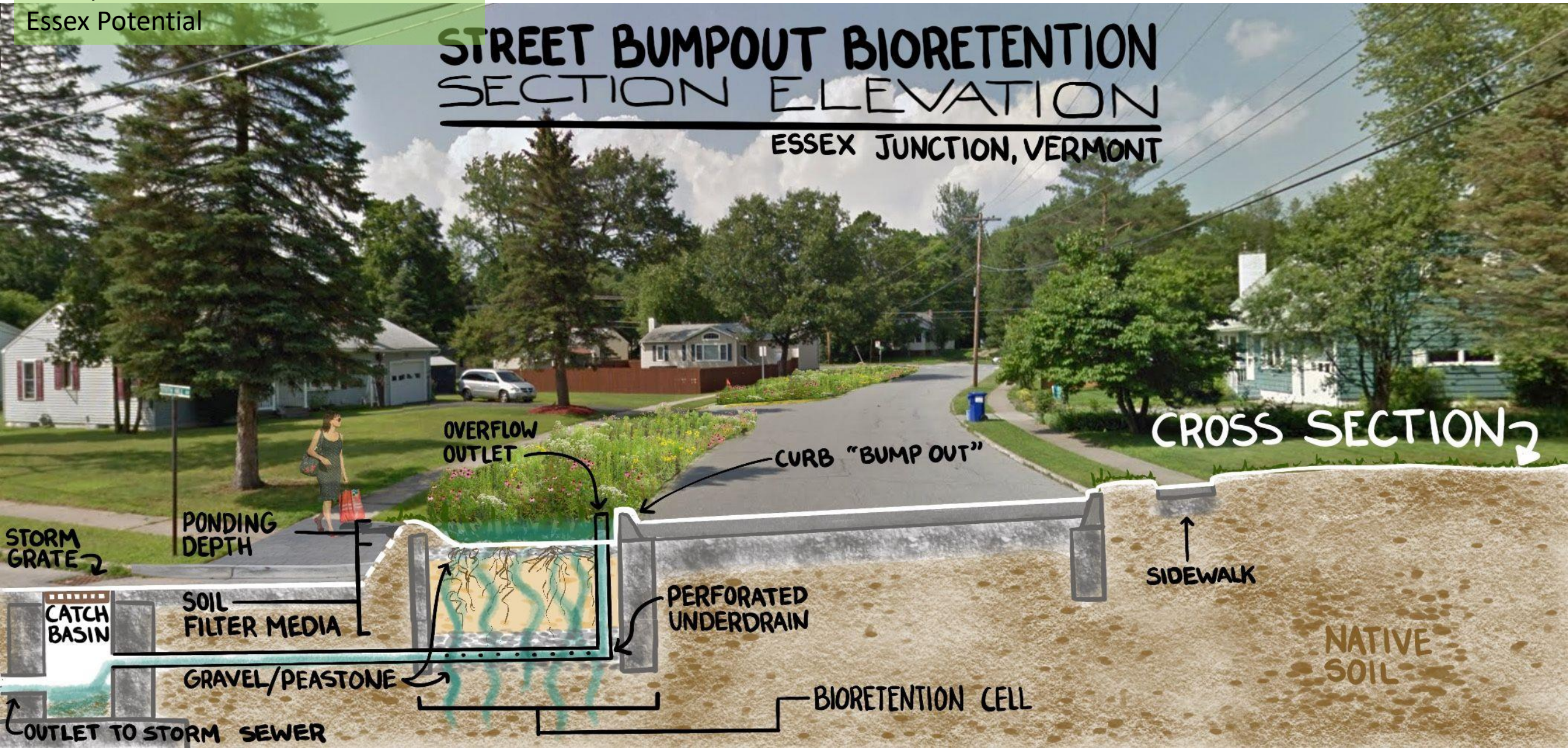


Examples of Photo Simulations:
Essex Existing




Examples of Photo Simulations:
Essex Potential

STREET BUMPOUT BIORETENTION SECTION ELEVATION ESSEX JUNCTION, VERMONT



Lessons Learned from Urban Project Focus

- Maintenance of GSI is a concern and impediment to implementing in municipalities.
 - Towns vary greatly in awareness, readiness, and buy-in for GSI.
 - Internal municipal capacity building was our focus.
 - Connecting municipalities with partner expertise, connecting municipal staff with each other was a focus.
 - Moving forward with increased interest, more demonstration projects, more awareness about maintenance, and more expertise.
- 

A photograph of a dirt road winding through a dense forest of tall, leafy trees. The road is in the foreground, curving to the left. The trees are tall and have thick trunks, with a canopy of green leaves overhead. The lighting is bright, suggesting a sunny day. The overall scene is a lush, green rural environment.

Project Focus: Rural Environments

Resilient Right-of-Ways: A Guide to Community Stewardship of Vermont Backroads
and 10 Municipal Partnerships

Summary

The goal of the rural project focus was to develop guidance surrounding the many (and often conflicting) interests in trees and other vegetation in rural right-of-ways along Vermont's backroads.

Staff and interns collected data about common roadside scenarios in ten case study municipalities, created guidance plans for those ten communities including action items for municipal road crews, conservation commissions, tree wardens, and select boards, and generated the new Resilient Right-of-Ways Guide.

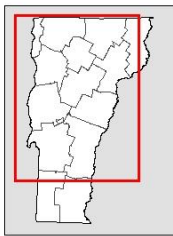
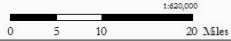
Select towns for Participation in Rural Road Resilient Right-of-Ways project



Vermont Department of Forests, Parks & Recreation

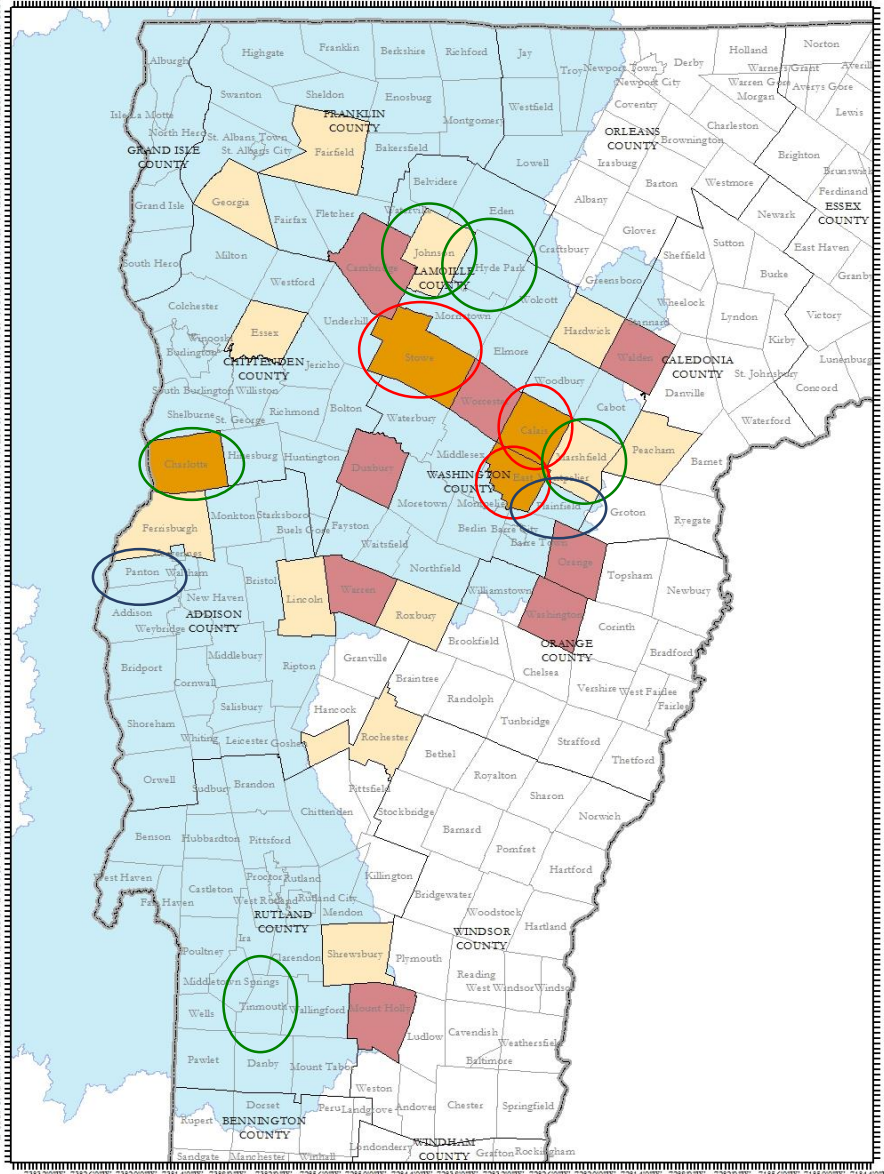
Cartographer: Joanne Gilman 1/29/2018

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Legend

- Lake Champlain Basin
- Active Towns
- Tier 1 Towns
- Tier 2 Towns



Municipalities with adverse water quality reports within the Lake Champlain basin were identified as priorities. Selection was then based on local capacity and rural nature.

2017-2019

- East Montpelier
- Calais
- Stowe

2018 -2019

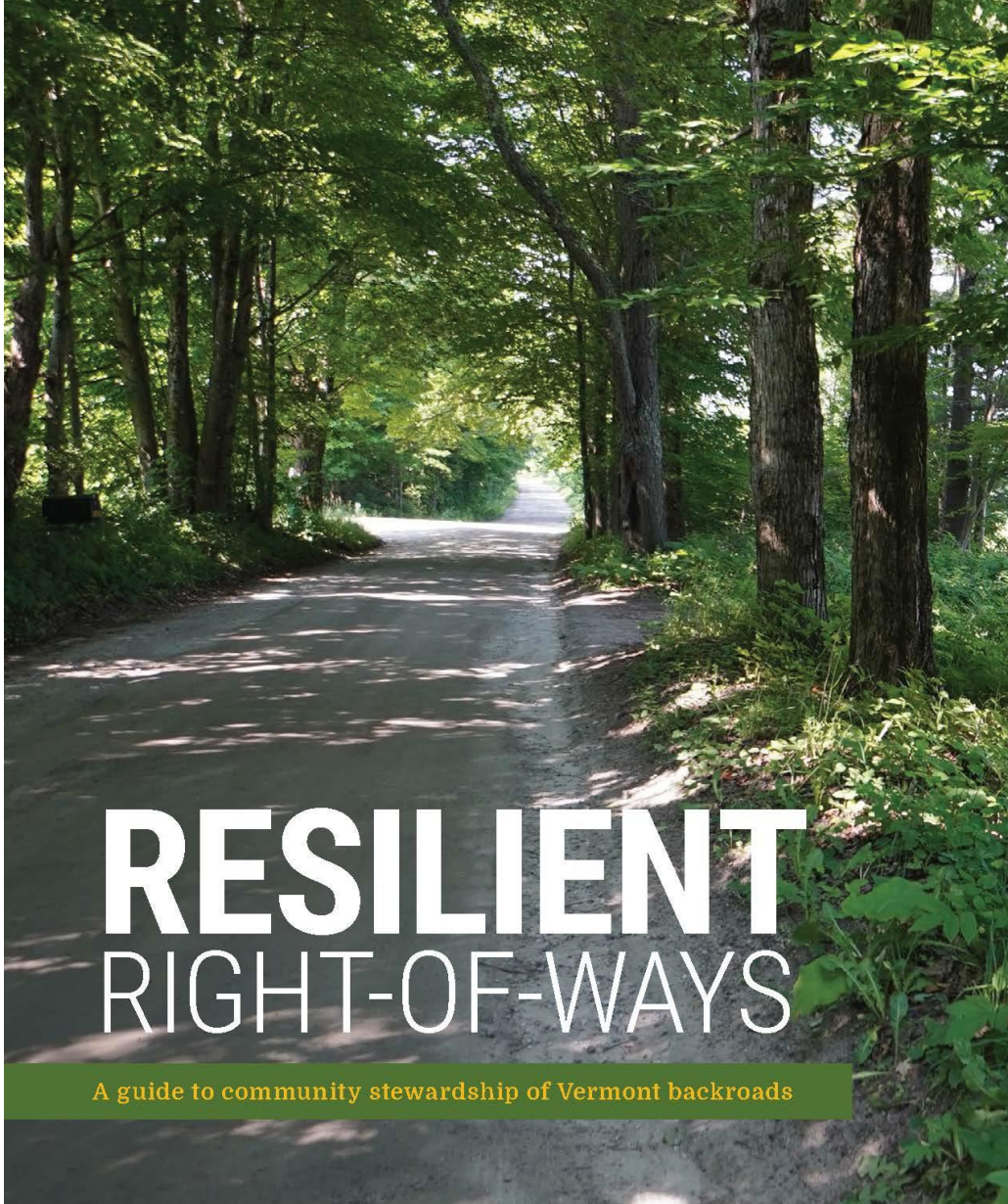
with summer intern

- Charlotte
- Tinmouth
- Hyde Park
- Johnson
- Marshfield

2019-2020

- Plainfield
- Panton





RESILIENT RIGHT-OF-WAYS

A guide to community stewardship of Vermont backroads

PLANT LIVE GROW



VERMONT URBAN & COMMUNITY
FORESTRY PROGRAM



VERMONT URBAN &
COMMUNITY FORESTRY

Cultivating connections to grow trees in our communities

News Programs Places Resources Our Team

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Resilient Right-of-Ways

The Resilient Right-of-Ways project lead towns in a collaborative and integrated approach to advance forests, individual trees, and other vegetation in roadside environments as part of a larger ecosystem of roadside vegetation. Funded by the US Forest Service, the project extended to both rural and urban communities and produced the following overarching guiding resources.

[Resilient Right-of-Ways Guide](#)

[Vermont Green Streets](#)

[Roadside Vegetation Action Plans](#)

Resilient Right-of-Ways: A Tale of Urban Forestry in a Small-Town State

By Jeanne Barton, Resilient Right-of-Ways Project Coordinator and Elise Schaefer, Technical Assistance Coordinator, Vermont Urban & Community Forestry Program
Photographs courtesy of the Vermont Urban & Community Forestry Program

In a state with only nine cities and thousands of free rugger, Vermont's image does not struggle to be green. Over 4.5 million acres (1.8 million ha) of the state (and Vermont is only 6.1 million acres/2.5 million ha) are covered by forests—forests that sequester and store carbon, provide wildlife habitat, clean surface water, and create healthy soil. Vermont trees support our forest economy, fuel fall foliage tourism, sweeten our meals with maple syrup, and provide our refuge. In part, people come to Vermont to see its forests; many stay in Vermont to call them home.

As such, the six staff that compose the entire Vermont Urban & Community Forestry (UCF) Program may seem too few to properly represent the enthusiasm of the Green Mountain State. Delivering educational, technical, and financial support to town-appointed tree wardens, volunteer tree and town forest committees, and the state's handful of city arborists, Vermont's UCF team supports healthy and recovery green space design at the level a town can engage. It connects people to trees, brings green infrastructure to gray streets, and empowers citizens to care for their public spaces.

But by both necessity and design, Vermont UCF spreads its wings farther than urban streets. It is small and ramble, meeting Vermonters where they are, whether in farm fields, mountainous roads, lake edges, town forests, or village parks. Yes, urban and community forests are city trees. But in Vermont, they're also of public trees. They are the trees that take up no more than a passing glance on a commute home. They are the trees that line our farm fields.

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Read more about right-of-way vegetation and its place in Vermont's Urban & Community Forestry program in this City Trees article, [Resilient Right-of-Ways: A Tale of Urban Forestry in a Small-Town State](#).

The guide is organized into two sections, first:

Elements of the Vermont Backroad

1. Manageable Vegetation Width
2. Historic and culturally significant trees
3. Roadside Ash Impact
4. Overhead Utilities
5. Invasive Plant Species
6. Hedgerow Locations
7. Tree Health and Mechanical Damage
8. Agriculture in the Right-of-Way
9. Young Forest
10. Mature forest



and second;

Processes for Backroad Stewardship

1. Know your partners and understand their goals
2. Support diverse and native roadside trees and plants
3. Prepare for emerald ash borer
4. Address hazard trees with the tree warden
5. Develop a tree ordinance or policy
6. Develop a roadside mowing policy
7. Understand the role of trees in updated stormwater regulations
8. Maintain backroads and ditches to specifications
9. Create and maintain a public relations plan
10. Keep abreast of funding opportunities



Hyde Park, VT Vegetation Width Along Unpaved Roads



Vermont Department of
Forests, Parks & Recreation

1:63,655

Cartographer: Elizabeth.Bannar

Date: 10/2/2018

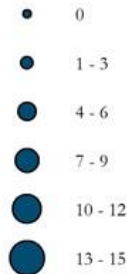
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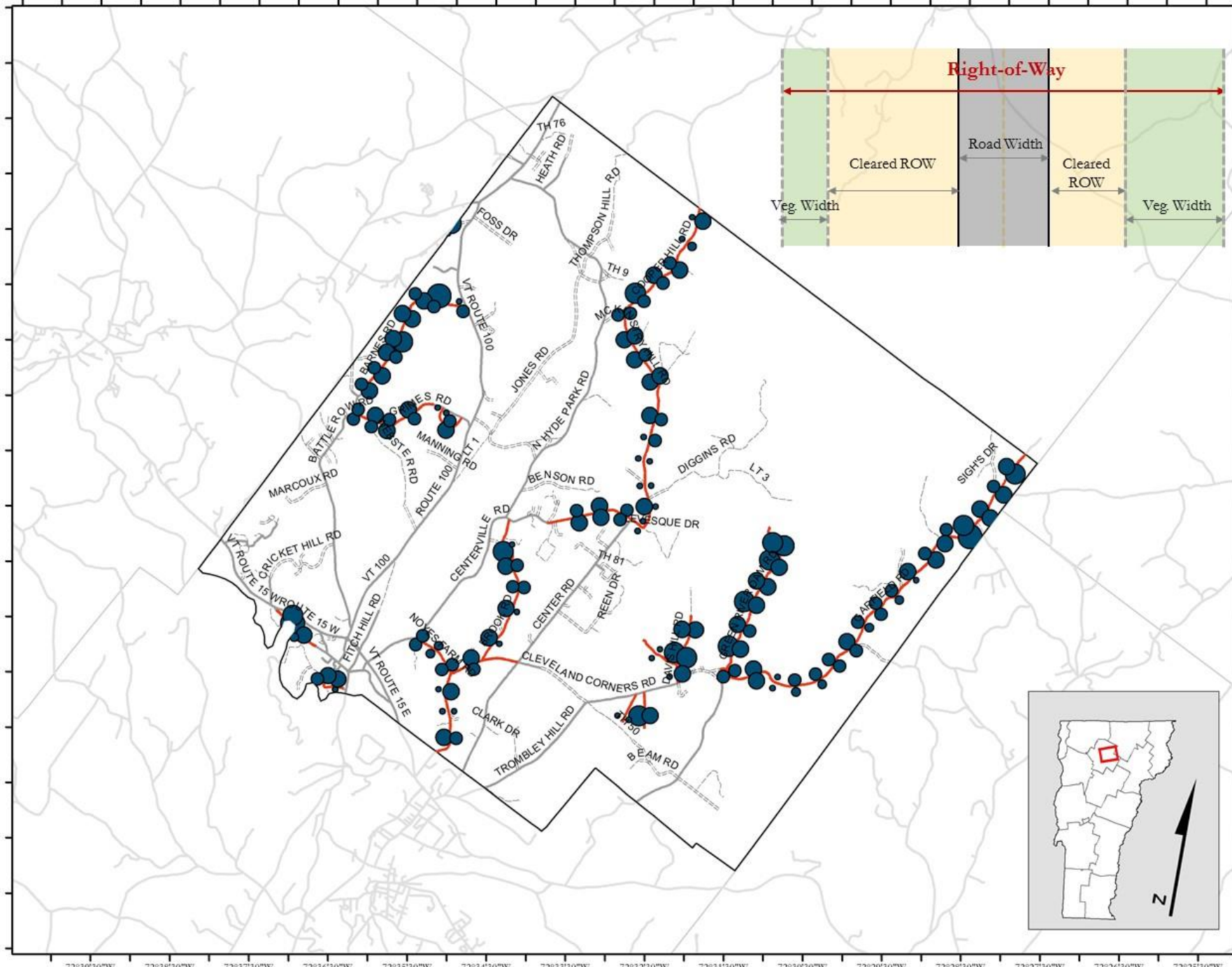
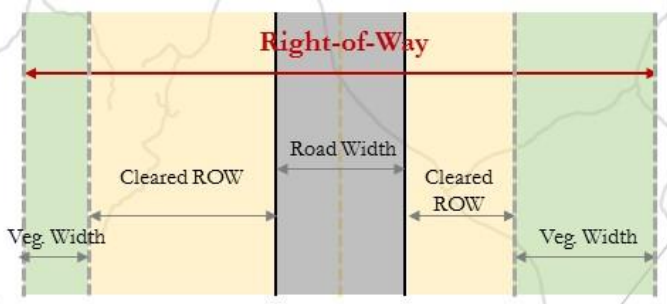
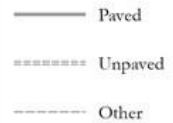
Legend

— 2018 Inventory Roads

Vegetation Width (ft)



Road Surface



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.

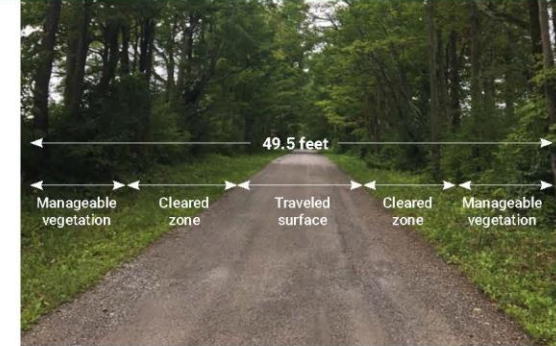
Planning for the health and resilience of the corridor of vegetation within the town right-of-ways involves challenges not found in other types of land management plans. Manageable vegetation width can be roughly calculated in the field through a four-step process.

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

→ **EQUATION:**

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



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.





Tree Health and Mechanical Damage

Resilient Right-of-Ways Project Data Stowe, VT

6. Overstroy Health & Mechanical Damage



Vermont Department of
Forests, Parks & Recreation
1:50,000

Cartographer: Elizabeth Bannar
Date: 1/28/2019

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0 0.25 0.5 1 Miles

Legend

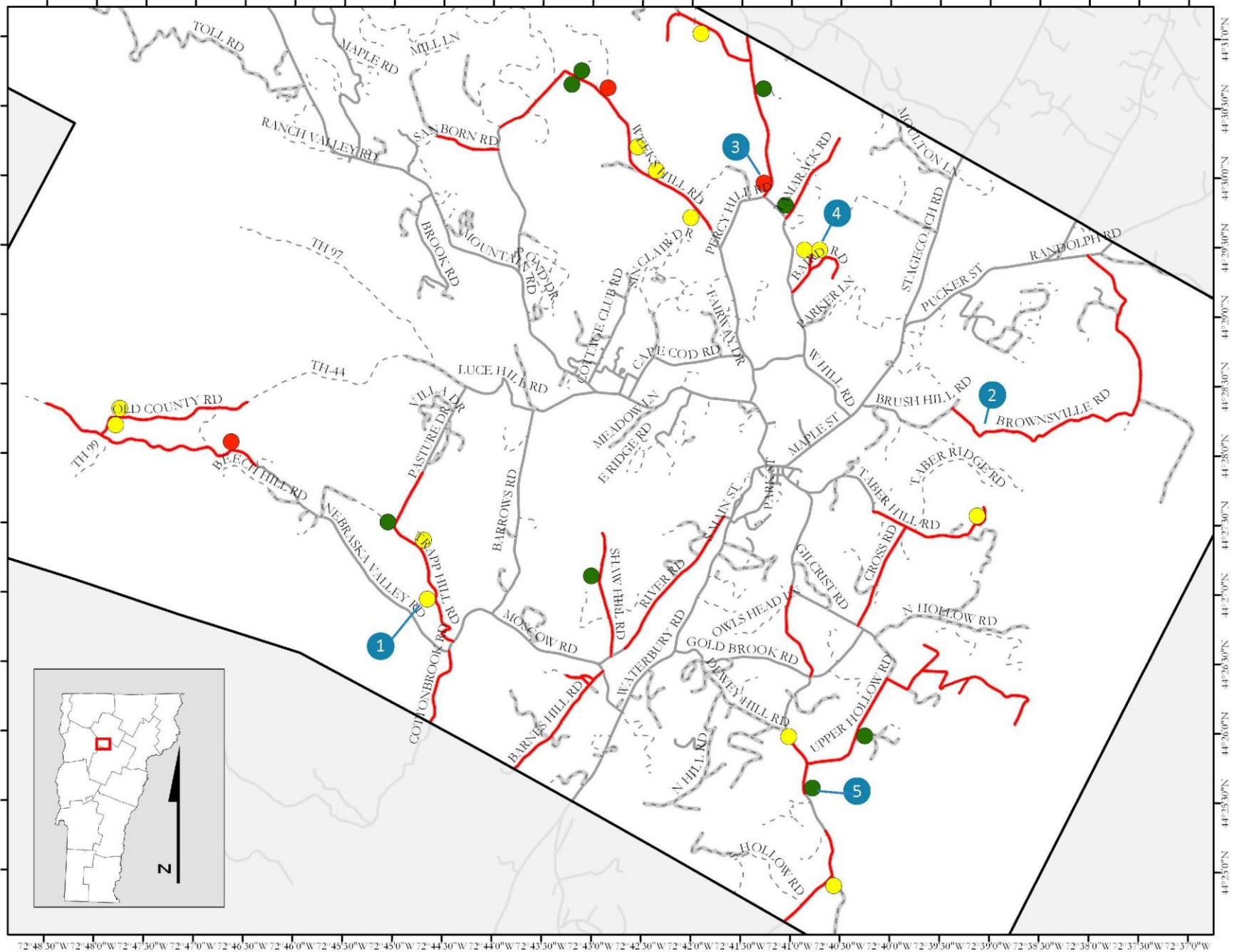
— 2018 Inventory Roads

Health & Damage

- Fair health, low damage
- Poor health, low damage
- Fair health, high damage
- Poor health, high damage
- Poor health, no damage

Road Surface

- Paved
- - - Unpaved
- - - Other



Resilient Right-of-Ways Project Data Stowe, VT

6. Overstory Health & Mechanical Damage

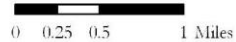


Vermont Department of
Forests, Parks & Recreation

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Cartographer: Elizabeth Bannar
Date: 1/28/2019

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Legend

— 2018 Inventory Roads

Health & Damage

- Fair health, low damage
- Poor health, low damage
- Fair health, high damage
- Poor health, high damage
- Poor health, no damage

Road Surface

— Paved

RESOURCES

Tree Characteristics: The Vermont Tree Inventory Guide (p.16-18). Created by the Vermont Urban & Community Forestry Program.
http://vtcommunityforestry.org/sites/default/files/pictures/vt_inventory_guide_2014_0.pdf

Municipal Roads General Permit (MRGP): A Guide for Lakeshore Roads. Lake Wise Program, Vermont Department of Environmental Conservation.
https://dec.vermont.gov/sites/dec/files/wsm/lakes/Lakewise/docs/lp_MRGP_GuidelinesForLakeRoads.pdf.

WHAT

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 be in decline because of their age, surrounding soil conditions, disease, or pests. However, some roadside trees decline because of repeated damage from equipment strikes by mowers and plows or from acute damage inflicted during ditching, a vehicle collision, or branch clearing with a raised flail mower. Any trees with documented fair or poor overstory health that also exhibit mechanical damage may be particularly susceptible to breaking or falling.

HOW

Overstory health of trees within the right-of-way was assessed visually in the field using reference guides such as [The Vermont Tree Inventory Guide](#) (p. 16-18). The level of mechanical damage to trees within the right-of-way was also assessed visually in the field. This map displays co-locations rated with “fair” or “poor” overstory health and “high” or “low” mechanical damage.

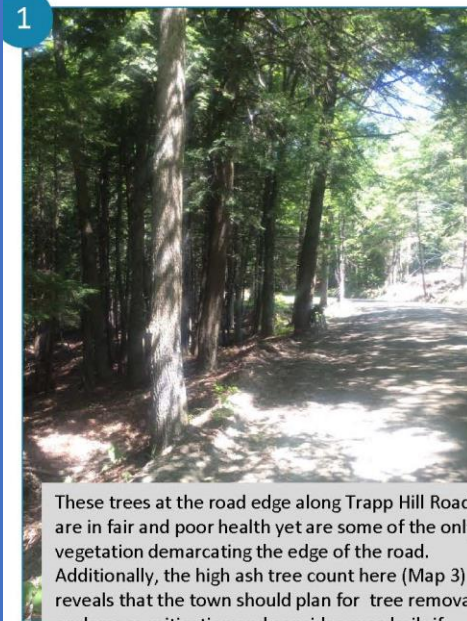
WHY

Identifying locations exhibiting 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, allowing towns to prioritize replanting, interplanting, or forest regeneration.
- Determine if future road construction sites should also involve roadside forest management.

RECOMMENDATIONS

- Note roads where the road foreman expresses concerns about using the plow or grader. Work with the tree warden, conservation commission, and/or neighboring landowners to address tree preservation or removal.
- Where roadside trees border lakes and ponds, consult the [Municipal Roads General Permit: A Guide for Lakeshore Roads](#) to understand best practices for managing vegetation along lakeshores and important exemptions to the Municipal Roads General Permit.
- Where road-tree conflicts occur on steep banks, review the [Bank Stabilization Section](#) in the [Vermont Better Roads Manual](#) (p. 36 – 45).



These trees at the road edge along Trapp Hill Road are in fair and poor health yet are some of the only vegetation demarcating the edge of the road. Additionally, the high ash tree count here (Map 3) reveals that the town should plan for tree removal or damage mitigation and consider guardrails if trees are repeatedly damaged by vehicle strikes.



Despite the majority of canopy being in good health, several trees along the downhill edge of Brownsville Road are severely damaged by equipment or vehicle impacts.



These rural road street trees are in poor health but show no outward signs of damage to the trunks. However, disease, compaction, or other recent changes to the roadside land use may have impacted the health of these trees, some of which are ash.



Wide right-of-way clearing has created a clear zone of bare soil and little manageable vegetation width (Map 2). Neighboring trees have been impacted by widening and possibly previous road construction.



Tree roots damaged by ditching can lead to undermined slopes and tree decline. These trees in fair health and with low levels of mechanical damage from previous roadwork should be monitored yearly.

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](#).¹ Consider doing this in concert with the yearly evaluation of historic tree health with the tree warden and road foreman (page 1).

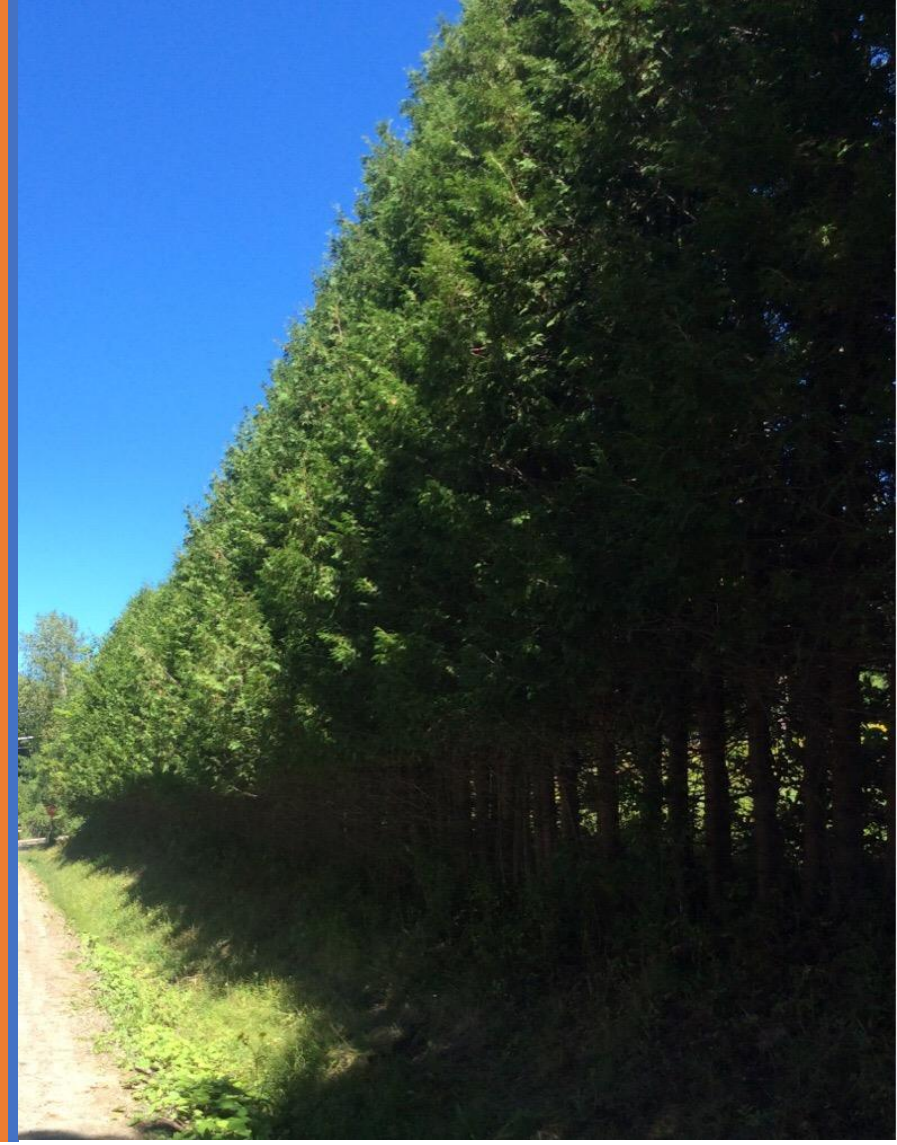
Note roads where the road foreman expresses concern about using the plow or grader and locations where trees are wounded. Work with the tree warden, conservation commission, and neighboring landowners to address tree preservation or removal at these locations.

Where roadside trees border lakes and ponds, consult the [Municipal Roads General Permit: A Guide for Lakeshore Roads](#)² 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](#).³

Resources

1. Vermont Urban & Community Forestry, *The Vermont Tree Inventory Guide* (2014), p. 16–18, 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.
3. Vermont Agency of Transportation, *Vermont Better Roads Manual* (January 2019), p. 36–45, bit.ly/VT_BetterRoadsManual.



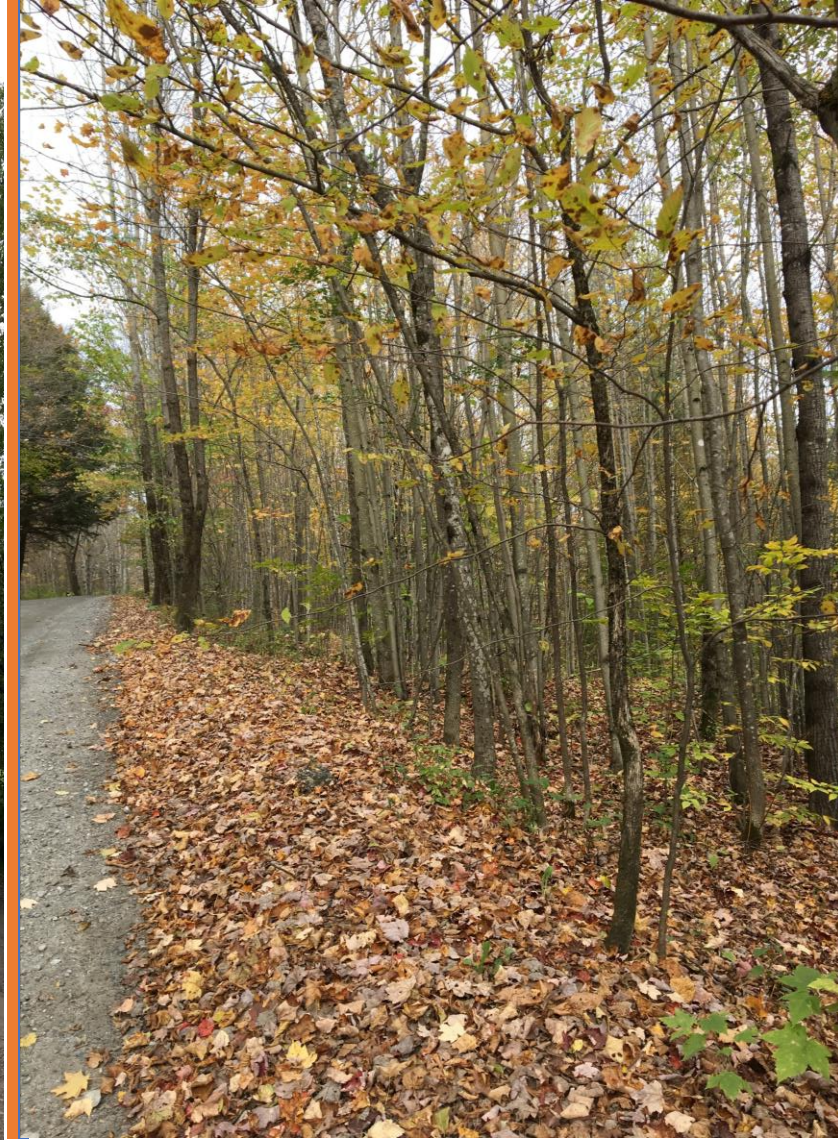
Agriculture and Hedgerows



Ash Trees and the impact of emerald ash borer



Utilities



Young forest



Mature forest & tree preservation



Invasive Plants

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.

Name	Apr	May	Jun	Jul	Aug	Sep	Oct
Japanese barberry (<i>Berberis thunbergii</i>) and common barberry (<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.							
Common buckthorn (<i>Rhamnus cathartica</i>) and glossy buckthorn (<i>Frangula alnus</i>)	Leaf out						
		Flowering			Seed production		
		Hand cut or mow					
Shrub honeysuckle (<i>Lonicera</i> spp.)	Leaf out						
		Flowering			Seed production		
		Mow					
Dame's rocket (<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.						
Garlic mustard (<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.							
Multiflora rose (<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.							
Wild chervil (<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.							
Wild parsnip (a.k.a. poison parsnip) (<i>Pastinaca sativa</i>)	Leaf out						
		Flowering	Seed production				
		Mow					
Common reed (<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.							
Japanese knotweed (<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.						



Calais, Vermont is managing invasive plants through community science-based data collection; creating nuanced roadside mowing schedules.

Resilient Right-of-Ways Project Data East Montpelier, VT

10. Invasive Plant Species (data source: iNaturalist)



Vermont Department of
Forests, Parks & Recreation
1:48,000

Cartographer: Elizabeth Banar
Date: 12/13/2018

This map is for illustrative purposes only. The accuracy of the data layers shown on this map are limited by the accuracy of the source materials. No warranty as to the accuracy or the usefulness of the data is expressed or implied.



Legend

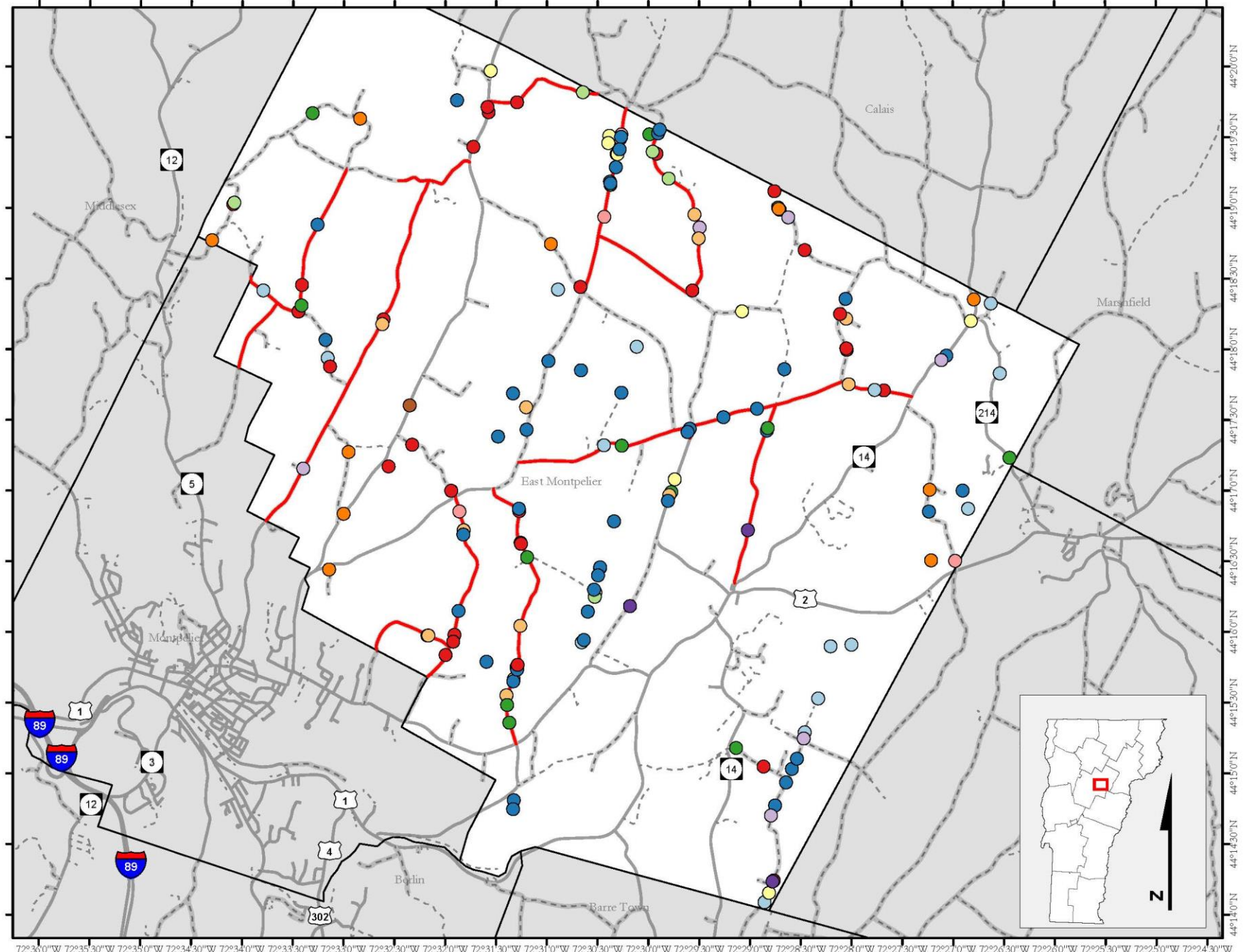
— Inventory Roads

Invasive Plant Species

- Barberry, spp.
- Common buckthorn
- Common cowparsnip
- Cow Parsley
- Garlic mustard
- Goutweed
- Honeysuckle, spp.
- Japanese knotweed
- Loosetrife, spp.
- Multiflora rose
- Poison ivy
- Wild parsnip

Road Surface

- Paved
- Unpaved
- - - Other



72°36'0"W 72°35'30"W 72°35'0"W 72°34'30"W 72°34'0"W 72°33'30"W 72°33'0"W 72°32'30"W 72°32'0"W 72°31'30"W 72°31'0"W 72°30'30"W 72°30'0"W 72°29'30"W 72°29'0"W 72°28'30"W 72°28'0"W 72°27'30"W 72°27'0"W 72°26'30"W 72°26'0"W 72°25'30"W 72°25'0"W 72°24'30"W

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](#)¹ 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.

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 damage² 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,³ 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*,⁴ released by The Nature Conservancy, and guidance from the [Roadside Vegetation Management Unit](#)⁵ 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.

³ "Pesticide Programs," Vermont Agency of Agriculture, Food and Markets, bit.ly/VT_PesticidePrograms.

⁴ The Nature Conservancy, *Best Management Practices for Roadside Invasive Plants*, bit.ly/TNC_RoadsideInvasives.

⁵ "Roadside Vegetation Management Unit," Vermont Agency of Transportation, 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](#)¹ 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](#)² 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](#)³ 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.


¹ "Pesticide Permits," Vermont Agency of Agriculture, bit.ly/Vermont_PesticidePermits.

² "Applicator Types & Resources," Vermont Agency of Agriculture, bit.ly/Vermont_PesticideApplicatorTypes.

³ "Right of Way & Utilities," Vermont Agency of Transportation, bit.ly/VTrans_ROW.

Lessons Learned from Rural Project Focus

- Competing interests and multiple focus areas require many partners to work together and communicate clearly about backroad vegetation expectations.
- Every municipality has different capacity to plan and budget for right-of-way tree care. Some want to plan for healthy forest succession; others authorize clear-cutting of the right-of-way to eliminate tree care needs.
- The impact of emerald ash borer on roadside ash is causing communities to look more carefully at the roadside forests that they manage.
- Municipalities need process guidance as much as technical guidance. Volunteers are often making recommendations that selectboards and municipal staff do not have time to research or address.



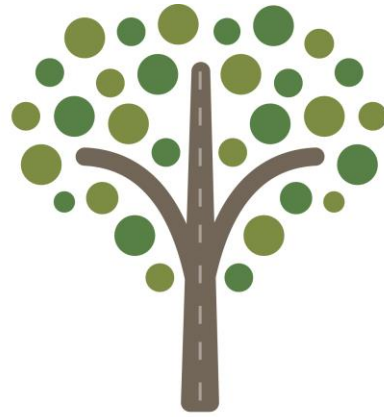
Lessons
Learned
from Rural
Project
Focus

Learn more about the Resilient Right-of-Ways
Project at
vtcommunityforestry.org/resilientROW

Download the guide at
vtcommunityforestry.org/resilientROWguide



Vermont's Resilient Right-of-Ways Project



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