

Rural Road Resilient Right-of-Ways Vegetation Assessment  
Town of Calais Action Items and Recommendations  
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## Table of Contents

Introduction .....	1
List of Maps .....	2
Resilient Right-of-Ways Project Overview .....	4
Process Recommendations .....	6
1. Establish sustainable vegetation that promotes diversity of species, age, structure and density	
2. Prepare for emerald ash borer and managed ash tree health	
3. Address hazard trees with the tree warden	
4. Develop a tree ordinance or policy	
5. Develop a mowing policy for the clear zone	
6. Understand the vegetation management goals of your utility companies	
7. Understand updated stormwater regulations	
Roadside Scenarios and Opportunities for Action .....	13
1. Declining Trees and Creeping Invasive Species	
2. Wet Roadsides	
3. Roads of the Deep Woods	
Conclusion .....	19
Resilient Right-of-Ways Project Data Maps .....	20
Appendix A: Town of Calais Letter of Collaboration	
Appendix B: Town of Calais Work Plan	
Appendix C: Town of Calais Field Data Results, draft presentation	
Appendix D: Selected Resources for Tree Wardens	
Appendix E: A quick cheat sheet on roadside mowing in Calais	
Appendix F: Washington Electric Cooperative Vegetation Management Plan, July 2006	
Appendix G: Best Management Practices for Roadside Invasive Plants: The Nature Conservancy	

## Introduction

Although strange in shape and character, roadsides are our public places. Most town right-of-ways span 49.5 feet, or just under 25 feet from the center of the road in each direction. While some roads and their associated clear zones (ditched or repeatedly cleared areas next to the road) span almost the entire right-of-way width, others are narrow and forested, creating canopy from trees in 12-foot wide strips of publicly managed land.

While many of us never picture picnicking in these bands of trees, shrubs, grasses or even wetlands, we look at them all the time. Driving, bicycling, or walking by, we take in what they are, and as a community, what we have decided our roadsides should be. Some rural roadsides afford beautiful mountain views, others feature century-old maples. Many are a collection of stick-thin trees and shrubs competing for light in what used to be another New England pasture.

Management of town roads is at the discretion of individual road foremen and their partnering selectboards. As such, it is no surprise that towns handle their municipal right-of-ways differently from each other. Some prioritize safe passage at high speeds on only their main thoroughfares while keeping small, residential roads narrow and with low speed limits. Other towns recognize the increasing width of their road machinery and the corresponding infrastructure and turning radius needs the road crew requires. Roads become wider, straighter, and allow faster traffic – characteristics that some residents enjoy, and others resent.

Statewide, towns are becoming more cognizant of stormwater runoff and the role that backroads play in contributing phosphorous and sediment to streams, rivers, lakes and ponds. Backroad repairs often include (sometimes by regulation) ditching, stone work (stone-line ditches, check dams, or stone turn outs), grass-lining or hydroseeding, and culvert repair or replacement. These often come at the expense of roadside trees whose branches, roots, or trunks lie in the way of road infrastructure or are damaged beyond repair during infrastructure improvements. Towns must accept where some roads must lose their tight, shaded rural character in favor of clean water and safe passage, and advocate for roads that can effectively utilize healthy vegetation as green stormwater infrastructure to slow erosion and improve stormwater infiltration. They must also think creatively about where other roads can retain, or restore, their rural character over the long term.

Rural roadside vegetation shapes our towns. It shades our backroads, livens our landscapes, and grows character in our front yards. Planning for healthy and safe vegetation is a cyclical process – thoughtful vegetation growth and maintenance practices reduce knee-jerk reactions to road-tree conflicts and consider both seasonal changes and emergency responses. Additionally, 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.

### 1. Right-of-Way Vegetation Type

Displays all planned routes and plot locations recorded during in the Resilient Right-of-Ways field work. Vegetation in the ROW (not on adjacent private land) is each plot is categorized as:

- Mature Overstory: A tree-lined or forested roadside with overstory composed of mostly mature trees of greater than 6” diameter (at breast height, also called “DBH”).
- Immature Overstory: A tree-lined or forested roadside with overstory composed of mostly immature trees of less than 6” diameter (at breast height, also called “DBH”).
- Emerging Overstory: A shrub or sapling-lined road that exhibits stages of an early forest but does not yet exhibit canopy that shades the road.
- Wet Area: The ROW itself is a wet ditch, wetland, riparian zone or vegetated lake edge.
- Mowed: The ROW is either frequently or seasonally mowed.
- Street Trees: Intentionally planted trees are within the ROW and are surrounded by an established herbaceous layer, mowed grass, or predominantly bare ground.
- Bare: There is no, or extremely little, vegetation in the ROW and exhibits bare soil or a stone-lined ditch that occupies up the entire ROW not travelled by vehicles.

### 2. Manageable Vegetation Width

Displays the width of vegetation within the ROW that the town can manage.  
Manageable vegetation width = (ROW width/2) - (Road width/2) – clear zone.

### 3. Roadside Ash Impact

Displays the approximate number of ash trees that, when infested with, EAB, would affect the ROW when damaged or dead. Tallied ash trees are at least 4” diameter (dbh), within the assessed plot ROW, and within an adjacent area (private land) that would fall on the road if diseased or dying.

### 4. Agriculture in the Right-of-Way

Displays locations where any agriculture occurs within the ROW, including hay and corn fields, animal grazing locations, or other harvestable land uses.

### 5. Overhead Utility & Regeneration Opportunity

Displays locations where an overhead utility line is within, or affecting, the ROW vegetation. Also noted are locations where the town can consider promoting regeneration of vegetation within the guidelines of the utility company.

### 6. Hedgerow Locations

Displays locations where trees or emerging forest are part of a hedgerow, here defined as a thin strip of forest existing bordering an agricultural field, lawn, residential areas, or water body.

### 7. Softwood Cover

Displays locations where tree canopy cover over the road is greater than or less than 25% of all canopy cover.

## **8. Overstory Health & Mechanical Damage**

This map displays co-locations rated with “fair” or “poor” general ROW overstory health (as noted through visual inspection) and “high” or “low” mechanical damage (usually due to plow, mower or vehicle collisions with trees, flail mowing on branches, or excessive root damage from recent ditching). Trees in these locations are in decline and may be monitored by the town.

## **9. Historic Tree Location & Health**

Displays the location and health of historic trees within assessed plots. Historic trees were identified based on their distinctly larger size and shape than surrounding trees (or herbaceous cover) and often by their consistent spacing along roadsides. Historic tree health, rated as either “good”, “fair”, or “poor”, was based on a limited visual assessment of the trunk and canopy.

## **10. Invasive Plant Species (Data Source: naturalist)**

During field assessments, observations of invasive plant species were recorded on iNaturalist<sup>1</sup>, a citizen science data collection application. This map displays invasive plant species locations as noted by the Resilient ROW project and other iNaturalist users. It does not offer a comprehensive picture of all invasive plants.

## **11. Preservation Opportunities**

While conducting field assessments, the Resilient ROW team made recommendations regarding opportunities to preserve existing vegetation, including “No cut” recommendations where trees should remain (often for the purposes of controlling erosion on slopes) and “Preserve herbaceous buffer” where grasses, herbaceous plants, or low shrubs should not be cleared.

## **12. Planting & Regeneration Opportunities in Roadside Communities**

Displays the land use or landscape of the private land immediately adjacent to the ROW. Classification options are listed in the map legend. Overlaid on this map are recommendations made in the field for:

- planting opportunities in or near the ROW (“trees” or “other” vegetation, likely shrubs), noting that any planting out of the ROW requires dialog with, and permission from, the private landowner; and
- opportunities to promote regeneration of vegetation through reduced mowing or other forestry practices that encourage resilient tree growth.

## **13. Thinning Opportunities and Mature Short-lived Trees**

Displays locations where tree removal may encourage growth of selected trees through reduction of competition from less desirable or healthy species. Also displays location of some mature, short-lived trees (such as paper birch or poplars), informing where trees may create a risk to road safety and may be removed individually or when doing other roadwork in the area. There are likely many more mature, short-lived trees in Calais than those in the assessed plot locations.

<sup>1</sup> More on iNaturalist can be found at <https://www.inaturalist.org/>.

## Resilient Right-of-Ways Project Overview

In the summer of 2017, the town of Calais was selected as a partner community to work with the Vermont Urban & Community Forestry program as a case study town in the Rural Roads Resilient Right-of-Ways (ROW) project (See Appendix A: Letter of Collaboration). Funded by the USDA Forest Service, this project has two broad goals:

1. to connect ten Vermont communities with resources and processes that advance understanding of the role of rural roadside vegetation in supporting local environmental, economic, and cultural values; and
2. to use the collected data and feedback from towns to create updated educational material and technical assistance surrounding rural road vegetation management to be offered state wide beginning in 2019.

The town of Calais was asked to form a Resilient ROW project advisory committee made up of individuals knowledgeable about, and invested in, the future of healthy and resilient roadside vegetation communities. Members of the committee are:

Stephanie Kaplan  
Alfred Larrabee  
Neal Maker  
Jamie Moorby  
Toby Talbot  
Barbara Weedon  
Denise Wheeler

The project advisory committee met on August 2, 2017 to identify priority concerns along town roads and ask key questions about roadside vegetation best practices, threats, risks and relevant legal statutes. The resulting work plan is included in Appendix B: Work Plan. **Project field work collected data that documented common roadside vegetation scenarios in Calais, revealed where conflicting interests may arise, and led to suggestions regarding direct action that the town can take to protect, manage, or restore site-appropriate trees, shrubs, and grasses.** On February 2, 2018, the committee met again to review results of the data collection (as presented in Appendix C: Field Data Results, draft presentation). On May 16, 2018, the committee met on Lightning Ridge Road and George Road to review field recommendations with Resilient Right-of-Ways project lead Joanne Garton, Vermont Forests, Parks & Recreation, watershed forester Dave Wilcox, Vermont Department of Environmental Conservation Municipal Roads Program lead Jim Ryan, and Vermont Agency of Transport Better Roads program technician Linda Blasch. The group discussed best practices for roadside vegetation including tree selection and thinning, ditching and road erosion mitigation techniques, and assistance available to towns to meet requirements set in the Municipal Roads General Permit.

Phase I of the roadside vegetation assessments occurred in late September of 2017; phase 2 occurred in August of 2018 with the help of VT UCF intern Beth Bannar. Field routes covered approximately 23.5 miles of the 51 miles of unpaved roads in Calais. On unpaved backroads, Joanne and Beth assessed 100-foot long roadside vegetation plots on both the left and right sides of the road as travelled south-to-north and west-to-east. Data was recorded using the ESRI ArcCollector app and stored in the Agency of Natural Resources ESRI account.

Selected plots conveyed a typical representation of the roadside environment at or near that quarter-mile marker. Itemized data fields are outlined in the Town of Calais Work Plan (Appendix B).

The assessed routes are drawn in red on Maps 1 through 13. All plot locations are displayed on Map 1: Right-of-Way Vegetation Type.

# Process Recommendations

So much of road maintenance is guided by the overarching process that the town develops to meet its roadside maintenance goals within its budget. Recognize that vegetation is a pervasive part of road maintenance activities and that clarifying the processes you use to manage roadside vegetation will lead to functional, thoughtful right-of-ways.

## 1. Establish sustainable vegetation that promotes diversity of species, age, structure and density

Roadside forests are not your normal forest. Stressed by vehicle traffic, snow plows, mowers, road maintenance equipment, trash, pedestrians, and cyclists, vegetation in the ROW is in a state of perpetual disturbance.

In addition, roadsides are largely unnatural – that is, they feature engineered topography and non-standard plant communities. Restoring roadsides to their most natural state, particularly after construction, promotes greater longevity of native plant species and resilience to typical disturbances. Roadsides can be safe while also being visually interesting, ecologically integrated, and engineered to manage stormwater cleanly.

Roadside vegetation management has changed a lot in the last 30 years. What used to be a rash of herbicide treatment and a bi-annual regrading of the shoulder is now a multi-step process requiring tools including hydroseeders, straw mulch blowers, GPS, and mapping software. Towns consult licensed pesticide applicators, invasive species experts, and erosion control engineers to decide on a yearly course of action. Rural roadside right-of-ways represent over 27,000 acres of land in Vermont – management of this land is no small task.

### Recommendations

- Be intentional about vegetation clearing. Understand that any vegetation regrowth will be all of the same age (called even-age) and, at least initially, will lack the structural diversity that keeps roadsides forests healthy.
  - 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, particularly if this vegetation acts as an ecological community not common throughout the region. However, not all wildlife are welcome along rural roads. Many early successional species (birch *Betula spp.*, poplar *Populus spp.* and willow *Salix spp.*) that persist in the continuously disrupted forest edge along roadsides are actually palatable browse for wildlife such as moose. Naturally, safety concerns of road users must be balanced with the risks presented through maintaining roads in rural areas.
- Establish a systematic annual planting schedule. Many of Calais's roads are forested and will revegetate themselves (called "forest regeneration") with common tree species. However, some ROW that borders wetlands, fields, or agricultural areas may benefit from bush and native grass planting to protect soil from erosions or from tree planting to create canopy or, particularly as roadside ash trees die. 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.

- Establish a [pruning](#)<sup>2</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 utility lines while maintaining or even improving tree health. Do not prune trees with a flail mower or boom arm mower.
- Take note of existing native plants. Utilize your town's active citizen scientists and their data recorded on iNaturalist<sup>3</sup>.
- Establish native vegetation in cleared areas, including where invasive plants have been removed. Consider using native seed mixes when planting grass in disturbed roadside areas. [The Vermont Agency of Transportation Technical Landscape Manual](#)<sup>4</sup> (p. 2-47) recommends several seed mixtures, many of which can be applied with a hydroseeder. However, many contain no native species. As preliminary guidance, towns may consider using the *Sand and Gravel Sites Conservation Mix* and the *Wet Area Mix*, paying close attention to the amount of fertilizer and tackifier a site may need for seeds to successfully germinate. Contact the seed company distributor to learn more.
- Design or manage [living snow fences](#)<sup>5</sup> where seasonal changes in the ROW cause drifting snow.
  - Snow fences immediately adjacent to the road (i.e. within the municipal ROW) can serve to make the problem worse because of the leeward pattern of snow deposits.
  - 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.
  - Standing corn rows can act as a snow fence. Minnesota DOT pays farmers to leave 12-16 rows of standing corn set back at least 100 feet from the right-of-way.
- Consult with neighboring towns to find out if planting or seeding initiatives can be shared. By combining missions, town may achieve an economy of scale that makes costs and logistics more palatable.

## 2. Prepare for emerald ash borer and manage ash tree health

Emerald ash borer (EAB), an invasive beetle that eats and kills all species of ash in North America, was first detected in Vermont in February of 2018. In central Vermont, the insect has been confirmed in Montpelier, Plainfield, Orange, Berlin and Barre Town. All Vermont towns are encouraged to prepare and manage the impacts of EAB and the upcoming loss of ash trees. The close proximity of Calais to the known infestation implies a high need for Calais to plan for the insect's arrival.

<sup>2</sup> Pruning. Vermont Urban & Community Forestry Program. <https://vtcommunityforestry.org/resources/tree-care/pruning>.

<sup>3</sup> More on iNaturalist can be found at <https://www.inaturalist.org/>.

<sup>4</sup> Seed Mixes. Page 2-47. Vermont Agency of Transportation Technical Landscape Manual. <https://vtrans.vermont.gov/sites/aot/files/highway/documents/environmental/VTrans%20Technical%20Landscape%20Manual.pdf>.

<sup>5</sup> Living Snow Fences Control Blowing and Drifting Snow. Minnesota's Best Practices Handbook for Roadside Vegetation Management. <http://www.dot.state.mn.us/environment/livingsnowfence/>. The document includes engineering specifications from ESP and the New York DOT: Living Snow Fences Fact Sheet #3: Living Snow Fence Design, <https://www.esf.edu/willow/lisf/documents/3LivingSnowFenceDesign.pdf>.

A preliminary survey of ash tree counts along Calais's rural roads show that ash trees are common in roadside communities and are densely congregated in some area (for example, along George Road and West Country Road) and widely distributed in some high-traffic areas (for example, along the western portion of Lightning Ridge Road). EAB has not been detected in Calais; however, the likelihood that EAB is present in Calais remains high. Once present, EAB kills 99% of ash trees (if not chemically treated), including those along public roads.

### Recommendations

- Calais is currently within close proximity to the [known infested areas](#)<sup>6</sup> in Vermont. Parts of Calais are in the high-risk area. Calais should be preparing for action regarding EAB management.
- Complete an [ash inventory](#) and an [EAB Management Plan](#) as described on the Vermont Urban & Community Forestry website. Use [Map 3: Roadside Ash Impact](#) as a preliminary guide for your ash tree inventory.
- Apply for an [EAB Municipal Planning Grant](#)<sup>7</sup> to help you complete these inventories or plans. Applications are due January 31, 2019.
- Review the Urban & Community Forestry Program's other [on-line resources](#)<sup>8</sup> regarding EAB management.

### 3. Address hazard trees with the tree warden

Calais's current tree warden, Neal Maker, 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 when to remove, plant, or treat public trees. One of the most important duties of the tree warden in any town is to address public safety concerns resulting from roadside vegetation. Remember that 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 or infected, it cannot be deemed a hazard tree by the tree warden.

During the legislative session of 2018, Vermont Forests, Parks & Recreation participated in introducing [new legislation that would modernize Vermont's tree warden statutes](#)<sup>9</sup>. However, the draft bill did not advance as an official bill and was not considered further that year. The Tree Warden Statute amendments will go to legislative committee again this year (2019) but no changes are known at the time of writing this report. As such, the original [Vermont Tree Warden Statutes](#)<sup>10</sup> (last amended in 1969) still apply. They are included in this report in Appendix D: Selected Resources for Tree Wardens.

<sup>6</sup> Emerald Ash Borer Infested Area in Vermont, Vermont Agency of Natural Resources.

<http://vtanr.maps.arcgis.com/apps/PublicInformation/index.html?appid=cfda013ad1464b7b9103a3d7806f0cc5>

<sup>7</sup> [EAB Municipal Planning Grants](#) on the Vermont Urban & Community Forestry website:

<https://vtcommunityforestry.org/community/story/eab-municipal-planning-grants>

<sup>8</sup> [Emerald Ash Borer Management](#) on the Vermont Urban & Community Forestry Webpage:

<https://vtcommunityforestry.org/community-planning/tree-pests>

<sup>9</sup> [Proposed Tree Warden Statutes Amendments](#). Vermont Urban & Community Forestry Program.

<https://vtcommunityforestry.org/resources/vermont-tree-wardens-0/proposed-tree-warden-statutes-amendments>

<sup>10</sup> Vermont Tree Warden Statutes. Title 24, Chapter 033.

[http://vtcommunityforestry.org/sites/default/files/pictures/tree\\_warden\\_statutes-1.pdf](http://vtcommunityforestry.org/sites/default/files/pictures/tree_warden_statutes-1.pdf)

## Recommendations

- Consider a yearly “look-up drive” conducted jointly by the tree warden and the road foreman during which all trees along town roads are observed via a drive-by assessment and view into the canopy. This will give the selectboard, conservation commission, and any interested landowners time to provide input on any hazard trees identified by the tree warden. The selectboard will also be able to allocate a budget for tree removal, ensure that road crew members are properly trained, or subcontract the tree removal work.
- Retain an updated map of hazard trees as identified by the road foreman and tree warden. This could be done on paper or electronically – the Vermont Urban & Community Forestry Program can help with electronic resources if desired.
- Consult the Vermont Urban & Community Forestry Program’s [Resources for Tree Wardens](#)<sup>11</sup> webpage, including the [Guidelines for Public Hearings for Tree Removals](#).

### 4. Develop a tree ordinance or policy

Well-developed and active tree ordinances are effective tools to aid towns in attaining and supporting healthy and well-managed urban and community trees. When well-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 the number of circumstances requiring a public hearing. They can also address management of specific tree or plant species, including invasive species.

Tree wardens can remove hazardous trees in the ROW without a public hearing, but they cannot remove or plant trees on private property. 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 ROW. The 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 private property.

#### Recommendation:

- Review the existing tree warden statutes as listed in section 3.
- Learn more about [tree ordinances](#)<sup>12</sup> to determine if Calais should develop its own tree ordinance or policy. If you choose to develop a tree ordinance, utilize the [Guide to Tree Ordinances and Policies for Vermont Municipalities](#)<sup>13</sup>.

### 5. Develop a mowing policy for the clear zone

Calais is already aware of its common roadside invasive plants: buckthorn, honeysuckle, Japanese knotweed, barberry, wild chervil, garlic mustard and hogweed. In Calais, the prevalence of active agricultural fields, thin roadside hedgerows, and extensive forest edge creates a landscape prone to

<sup>11</sup> [Resources for Tree Wardens](#). Vermont Urban & Community Forestry Program.

<https://vtcommunityforestry.org/resources/vermont-tree-wardens-0/resources-tree-wardens>

<sup>12</sup> [Public Policy](#) on Vermont Urban & Community Forestry website: <https://vtcommunityforestry.org/resources/public-policy>

<sup>13</sup> [Guide to Tree Ordinances and Policies for Vermont Municipalities](#). Vermont Urban & Community Forestry Program. <https://vtcommunityforestry.org/sites/default/files/pictures/treeordinanceguide.pdf>

spreading invasive species. Roadside construction, maintenance and mowing can carry invasive plant seeds and fragments to other sections of roads. Developing a mowing policy in tandem with updated and improved mowing procedures can reduce the spread of invasive species along roadsides.

### Recommendations

- 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. Follow the invasive plant phenology calendar below to learn when invasive plants bloom in Calais.
- In particular, areas infested with wild chervil should be mowed **before the plants bolt and produce flowers (late May, early June)**. The plants are low at this time. Focus mowing on known infested areas to monitor changes over time and clean equipment before leaving infested areas. Wild chervil and poison parsnip will flower again after mowing – repeat cutting before the plant seeds again to eradicate the plant population.
- Other common invasive species (buckthorn, honeysuckle) should be cut (or mowed) **before they go to seed in mid-July**. Treatment of these species may also include use of herbicide by a licensed pesticide applicator.
- Treatment of garlic mustard (*Alliaria petiolata*) should also occur before it goes to seed beginning in late June. However, mowing is not an effective control method. Hand pulling or use of foliar herbicide in the spring (late April, early May) or use of foliar herbicide on the basal rosettes by fall are effective control methods, as is flame weeding.
- Areas infested with phragmites, Japanese knotweed or purple loosestrife **should not be mowed**. Small root fragments easily resprout in new locations. Chemical treatment is almost always required to eradicate Japanese knotweed.
- **Beware of poison ivy**. It is technically not an invasive species but is certainly problematic for road crews, walkers, and bicyclists. And, it spreads. According to iNaturalist, some incidences of poison ivy have been recorded on West County Road near Upper Curtis Pond Road, Max Gray Road in the wooded areas, and on Lightning Ridge Road near the trailhead to Chickering Bog.
- Clean mowing equipment between road segments. Note where there are currently few invasive plant species (Map 9: Invasive Plant Species) and make sure that all mowing equipment is thoroughly cleaned before mowing, digging or ditching in these locations (northern portions of North Road, Horn of the Moon Road, portions of Sodom Pond Road).
- During construction, minimize soil disturbances to avoid future weed control and inspect and wash equipment before moving to another site.
- Consider allowing vegetation to be 10-12” high by the end of the growing season to protect native plants from winter damage<sup>14</sup>.
- For more information on the management of specific invasive terrestrial plants, see the VTinvasives website at <https://vtinvasives.org/gallery-of-terrestrial-plants>.
- For more roadside mowing recommendations for Calais, see Appendix E the “Quick cheat sheet on roadside mowing in Calais” drafted specifically for the Resilient Right-of-Ways project on May 30, 2018.

<sup>14</sup> Best Practices Handbook for Roadside Vegetation Management. Minnesota Local Road Research Board. <https://www.lrrb.org/pdf/200820.pdf>

## CALENDAR OF COMMON INVASIVE PLANT SPECIES PHENOLOGY IN VERMONT

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Common barberry <i>Berberis vulgaris</i>					Flowering			Seed Production				
Common buckthorn <i>Rhamnus cathartica</i>					Flowering			Seed Production				
Dame's rocket <i>Hesperis matronalis</i>					Flower & Seed Production							
Glossy buckthorn <i>Frangula alnus</i>					Flowering			Seed Production				
Japanese barberry <i>Berberis thunbergii</i>					Flowering			Seed Production				
Japanese knotweed <i>Fallopia japonica</i>					Flower & Seed Production							
Multiflora rose <i>Rosa multiflora</i>					Flowering			Seed Production				
Shrub honeysuckle <i>Lonicera spp.</i>					Flowering			Seed Production				
Wild chervil <i>Anthriscus sylvestris</i>					Flowering			Seed Production				
Wild Parsnip <i>Pastinaca sativa</i>					Flowering			Seed Production				

### 6. Understand the vegetation management goals of your utility companies

The Calais town plan requires that utility companies do not interfere with the scenic quality and land value of towns. The town is served by two electrical utilities, Washington Electric Cooperative (WEC) and Green Mountain Power (GMP).

#### Recommendations

- Review the vegetation management plans of your local utility companies listed below. Consider if the town should enter into discussion regarding clearing practices in the right-of-way.
  - Green Mountain Power shares both a [2014 Integrated Vegetation Management Plan](#)<sup>15</sup> and a [2013 Transmission Right-of-Way Management Plan](#)<sup>16</sup>
  - Washington Electric Cooperative shared their 2006 Vegetation Management Plan with the Vermont Urban & Community Forestry Program – it is included as Appendix F. Dan Weston of WEC also noted that the cooperative is in the process of developing a plan to manage for EAB along their routes. Note that single phase primary and/or secondary conductors are cleared of trees within 15 feet of each side of the pole line center. Three phase primary conductors are cleared within 25 feet each side of the pole line.

<sup>15</sup> The link to the Green Mountain Power [2014 Integrated Vegetation Management Plan](#) is too long to print here. Use a search engine to search the specific title; you will then be able to download the document.

<sup>16</sup> Similarly, the link to the Green Mountain Power [2013 Transmission Right-of-Way Management Plan](#) is too long to print here. Use a search engine to search the specific title; you will then be able to download the document.

- According to their [website](#), the Hardwick Electric Department maintains a 15-foot cleared zone between trees and their powerlines. The utility company also removes “woody brush and small trees from beneath power lines”<sup>17</sup> on a seven-year cycle. Collaborative vegetation management in their utility ROWs is encouraged.

## 7. Understand updated stormwater regulations

Backroad erosions is recognized as a non-point source of sediment and phosphorous pollution in Vermont’s waterways. As part of the state’s all-in approach to clean water, municipalities are now required to create multi-year plans to correct drainage patterns along eroding roads that are connected to streams, ponds, and other water bodies. The new [Municipal Roads General Permit](#) outlines the steps towns must now take to identify erosion risks in their town and plan for corrective action.

However, trees and other vegetation play a role in controlling erosion and protecting water quality. The Municipal Roads General permit includes some waivers where standard permit regulations need not be met as prescribed. These include areas where roadside construction would impact significant environmental and historic resources (including historic landscapes) or landscapes or vegetation within 250 feet or a lakeshore. Review the updated recommendations in the [Better Roads Manual](#)<sup>18</sup> (January 2019) and look for places where clean water goals can be met through carefully balanced construction and vegetation preservation.

<sup>17</sup> Vegetation Management. Hardwick Electric Department. <http://www.hardwickelectric.com/vegetation>.

<sup>18</sup> Vermont Better Backroads Manual, January 2019:

<https://vtrans.vermont.gov/sites/aot/files/highway/documents/ltf/Better%20Roads%20Manual%20Final%202019.pdf>

# Roadside Scenarios and Opportunities for Action

The following locations highlight road segments where the town of Calais may consider new or targeted roadside vegetation management. The list of locations is not exclusive or exhaustive – you may find similar roadside scenarios in other parts of town or other scenarios that are not mentioned below. The three scenarios described below discuss a road with Declining Trees and Creeping Invasive Species (#1), a Wet Roadside (#2), and a Road of the Deep Woods (#3).

## 1. Declining Trees (Including Ash) & Creeping Invasive Species: Southern section of **George Road**

### Relevant maps

3. Roadside Ash Impact
8. Overstory Health & Mechanical Damage
10. Invasive Species Locations
11. Vegetation Preservation Opportunities
13. Thinning Opportunities and Mature Short-Lived Trees

### Opportunities

- Low traffic volume on this road creates more opportunities to retain critical vegetation through established forestry practices.
- The roadside already hosts a mature tree canopy in some places, particularly on the west side of the road.
- The high ash density along this section of road may act as a showcase of options for ROW vegetation management in the face of EAB and ash tree decline.
- The nature of the ROW vegetation as hedgerows on the east side of the road allows for focused efforts to control invasive species neighboring frequently or seasonally mowed areas (lawn or hay fields).

### Issues of Concern

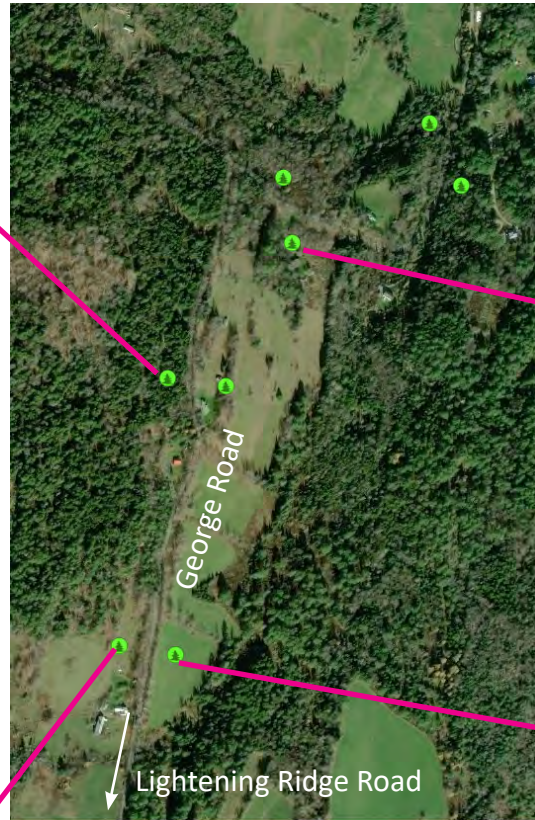
- There are high ash tree counts in vulnerable sections of forests, particularly in hedgerows.
- Mature, short-lived trees were noted in several plots on George Road, including at the sharp bend in the road where site lines and road width are diminished by existing topography and vegetation.
- Where the tree canopy is immature (largely composed of trees less than 6" in diameter), the canopy is dominated by small, thin beech. This type of forest may not lend itself well to resilient, mature trees due to the high density of beech that shade out other species.
- Invasive plants are spreading along the ditches. A patch of knotweed near the sharp bend in George Road may spread quickly. Consider invasive management along this road.
- Several instances of "Fair" overstory health and "High" mechanical damage show a decline in ROW tree health. Alfred has already cited concerns about driving road and snow maintenance equipment along George Road.

# Roadside Scenario 1: Declining Trees (Including Ash) & Creeping Invasive Species

## Southern Section of George Road



Promote canopy generation and do not cut vegetation to preserve buffer between road and uphill forested slope. Monitor for invasive species.



Root damage to existing trees combines with mature short-lived trees and some ash. Evaluate this stretch of road for hazard trees, monitor for and treat invasive plants. Promote canopy regeneration.



↑ Young beech line the ROW and private property. Removal of some beech may ensure a healthier future canopy. Sandy soils will inform future vegetation.



Manage for EAB and ash trees but preserve remaining trees to delineate the edge of the road and provide canopy cover. Partner with the landowner to perform a targeted tree planting effort to replace ash.



## Recommendations

- Follow all BMPs related to roadside invasive plants, making sure to clean equipment before and after roadside work. The “Best Management Practices for Roadside Invasive Plants” from the Nature Conservancy is included in this report in Appendix G.
- Treat existing patches of invasive species in roadside ditches.
- Monitor tree and canopy healthy by conducting yearly “look drive” during which the road foreman and tree warden evaluate tree health along this section of road.
- Stabilize exposed banks through seeding. See page 36 of the Vermont Better Roads Manual for best practices and the information on seed mix suggestions listed on page 7 of this report.
- As the town completes road work on sections of George Road, consider removing ash trees and mature short-lived trees such as paper birch. Preserve mature trees and evaluate what tree species may easily regenerate. Good candidates for removal are low-vigor trees with 50% or more of the crown destroyed or heavily damaged (especially if damage is mostly on one side), trees with leaders broken back into the trunk, or split or tipped trees.
- Where ash trees ultimately die or are removed, consider targeted planting efforts, particularly where ROW vegetation is bordered by agricultural fields or lawn.
- Where forest is dominated by beech thickets, work with the landowner and a forester to identify trees for thinning and trees for preservation.
- Create a municipal tree ordinance that specifies which trees can be removed without a hearing, particularly with regard to tree diameter, health, and placement on the road.

## 2. Wet Roadside: No. 10 Pond Road north of GAR Road

### Relevant maps

1. Right-of-Way Vegetation Types
3. Roadside Ash Impact
8. Overstory Health & Mechanical Damage
10. Invasive Species Locations
12. Planting & Regeneration Opportunities in Roadside Communities

### Opportunities

- This high-profile area may act as a showcase for other lake edge or riparian area roadside restoration practices.
- Invasive species are limited to barberry (the area is yet infested with wild chervil).
- The [Vermont Lake Wise Program](#) already offers many resources for protecting lake edges and may be able to engage in technical assistance.

### Issues of concern

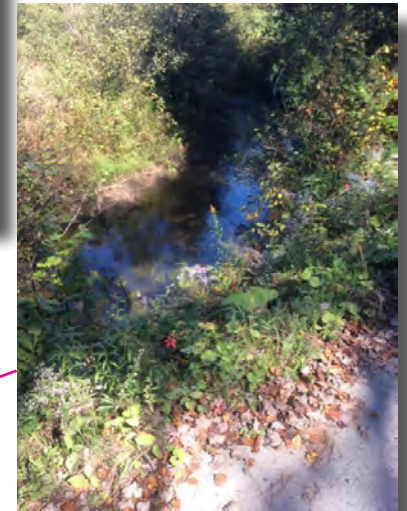
- The narrow width of roadside vegetation between the road and pond is in fair or poor health; tree trunks and limbs are damaged by road equipment on one side and lake erosion and ice movement on the other.
- Ash impact on this section of road is medium or high. Frequent traffic on this road, particularly during the summer months, may be heavily affected by infected or dead trees on both sides of the road.

# Roadside Scenario 2: Wet Roadside

## Number 10 Pond Road

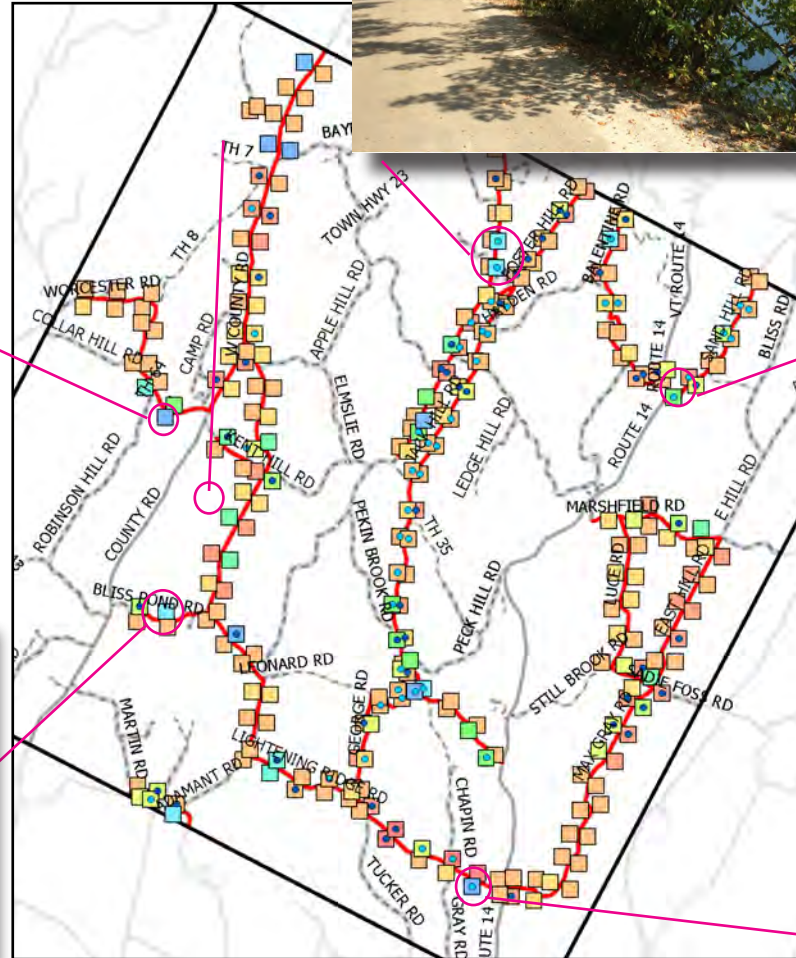


East side of Number 10 Pond Road north of GAR Road and parking area.



Road edge on Sand Hill Road.

South side of Worcester Road.



Excerpt from Map 12: Planting & Regeneration Opportunities in Roadside Communities.



North side of Bliss Pond Road.



Wet area bordering Lightning Ridge Road near Calais Elementary School. Opportunities for planting on the sloped ROW, partnering with the school.

## Recommendations

- Review the [Municipal Roads General Permit: A Guide for Lakeshore Roads](#)<sup>19</sup> to understand best practices for managing vegetation along lakeshores and important exemptions to the Municipal Roads General Permit.
- Then, review the **Bank Stabilization Section** in the [Vermont Better Roads Manual](#)<sup>20</sup> (p. 36 – 45). Consider live crib walls, vegetated rock gabions, tree revetments, and joint planting – these are techniques that utilize structural elements in conjunction with live stem or branch cuttings. The structural elements create open structures into which live cuttings are placed and provide protection from erosion and sliding.
- For further information, see Section 10-a: Soil Bioengineering/Biotechnical Erosion Control – Design Guidance. VTrans Technical Landscape Manual.
- Examine other wet roadsides in Calais, distinguishing between lakeshore edges, riparian zones, and wetlands. Incorporate best practices for vegetation management along these road sections in the town’s tree ordinance.

## 3. Roads of the Deep Woods: West County Road

### Relevant Maps

2. Manageable Vegetation Width
3. Roadside Ash Impact
11. Vegetation Preservation Opportunities

### Opportunities

- Little recent disturbance or construction has kept this stretch of road relatively free of invasive plants.
- The east (and often uphill) side of the road exhibits dense forest with lower counts, or even absence, of ash. The forest is largely a self-sustaining, rich-woods ecosystem.
- Wide manageable vegetation width and neighboring forested land ensures that forest can be self-seeding, eliminating the need to plant.
- Medium to high counts of ash trees were generally recorded on the west side of the road. The risk posed by dead ash trees is lowered here because these ash often sit on the downslope of the road cut.

### Issues of Concern

- Sand and gravel are eroding from the road and depositing at the base of the hill near the wetland area.

### Recommendations

- Do not cut along the roadside except to address hazard trees (including maturing short-lived trees). Existing vegetation will reduce slope erosion onto the road.

<sup>19</sup> 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](https://dec.vermont.gov/sites/dec/files/wsm/lakes/Lakewise/docs/lp_MRGP_GuidelinesForLakeRoads.pdf).

<sup>20</sup> Bank Stabilization. P. 36-45, Vermont Better Roads Manual, 2019.

<https://vtrans.vermont.gov/sites/aot/files/highway/documents/ltf/Better%20Roads%20Manual%20Final%202019.pdf>.

# Roadside Scenario 3: Roads of the Deep Woods

## West County Road north of Dugar Brook Road



From p. 41 Vermont Better Roads Manual, 2019.

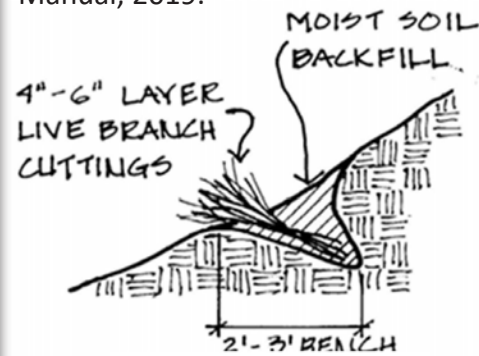
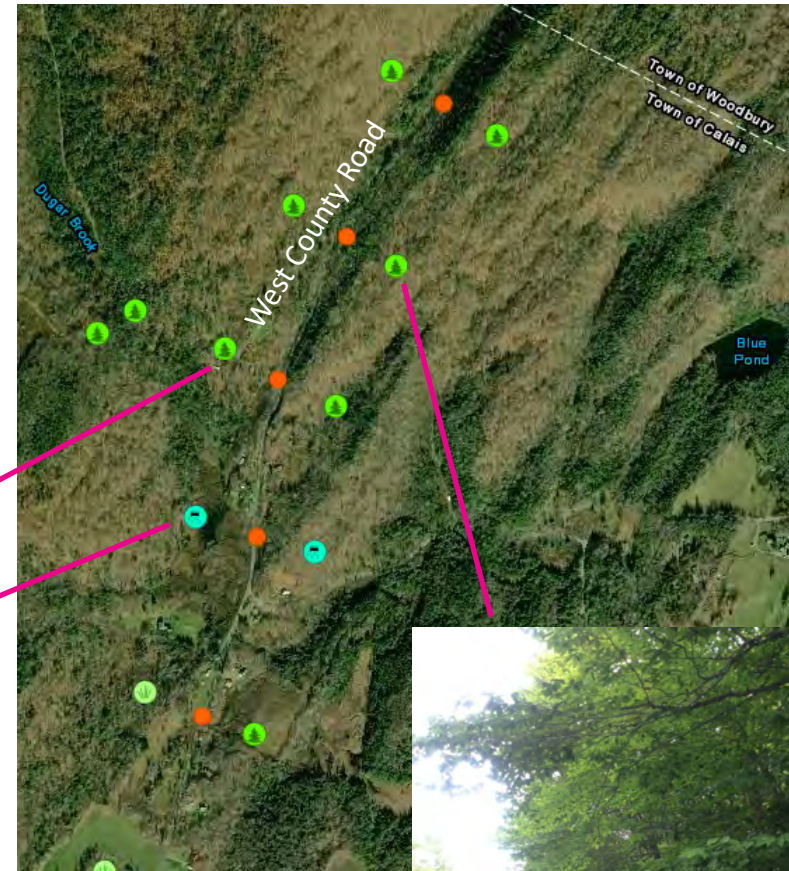
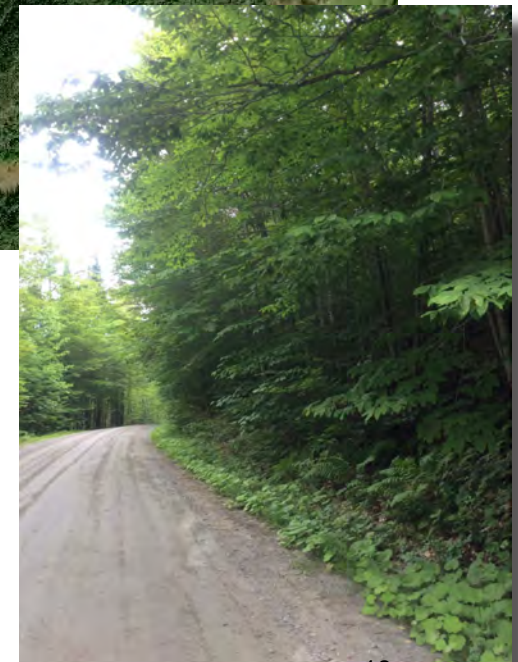


Figure 41: Brush Layering

Past roadside ditching left exposed bare soil. Monitor tree health and if trees decline, consider hydro-seeding or planting live stakes on this slope.



Deposited sand along road edge indicates uphill road erosion. With the utility company, review the best management practices for vegetation management in wetlands.



Past roadside ditching created a steep slope up to the forested hillside. Preserve trees and other vegetation despite the competing need for select thinning of some trees to improve forest health.

- Preserve trees on the west (downhill) side of the road to delineate road edge where slopes are steep. Plan for guardrail installation if trees are removed in the future.
- Preserve herbaceous buffer along the road. Do not increase the clear zone without specific reason. Consider hydroseeding or planting live stakes<sup>21</sup> on bare soil that borders ditches.
- Ensure that invasive plants do not establish themselves along this segment of road. Follow best practices to keep mowing and ditching equipment clear of invasive plant fragments and seeds.
- Review the best practices of road maintenance through wet areas. Address uphill erosion to reduce sand deposition in this wet area. Work with the local utility company to ensure that best practices are followed.

## Conclusion

Roadside vegetation management requires a thoughtful, cooperative, and integrated approach. In most towns, there are dozens of stakeholders in rural road vegetation management: road foreman, road crews, selectboard members, conservation commission members, outdoor enthusiasts, landowners, truck and school bus drivers, new residents wishing to build, and farmers, to name a few.

There are also tens of miles of unpaved road in even the smallest Vermont towns, often maintained by three- or four-person crews. Town highway budgets remain limited and towns must keep financial reserves for managing emergency weather events. Furthermore, populations in some small towns are shrinking, limiting towns' tax base to fund important infrastructure changes. Executing and building on existing rural road maintenance practices is no small job.

As such, towns should view vegetation management as an iterative process and take a step-by-step approach to identify, and act upon, roadside vegetation priorities. After reading this report and reviewing the accompanying maps, decide which action items someone in your town may wish to pioneer – like any community process, timing is everything. The Vermont Urban & Community Forestry Program and Vermont Forests, Parks & Recreation can provide resources that help you plan to accomplish your town's top priorities, one piece at a time.

For more information on any topic in this report, contact:

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 Montpelier, VT 05620  
 (802) 477-3951  
[joanne.garton@vermont.gov](mailto:joanne.garton@vermont.gov)

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

<sup>21</sup> Live Stakes. Page 41, Vermont Better Roads Manual, 2019.

<https://vtrans.vermont.gov/sites/aot/files/highway/documents/ltf/Better%20Roads%20Manual%20Final%202019.pdf>.

# Resilient Right-of-Ways Project Data Calais, VT

## 1. Right-of-Way Vegetation Types



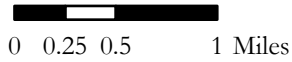
Vermont Department of  
Forests, Parks & Recreation

1:60,000

Cartographer: Elizabeth.Bannar

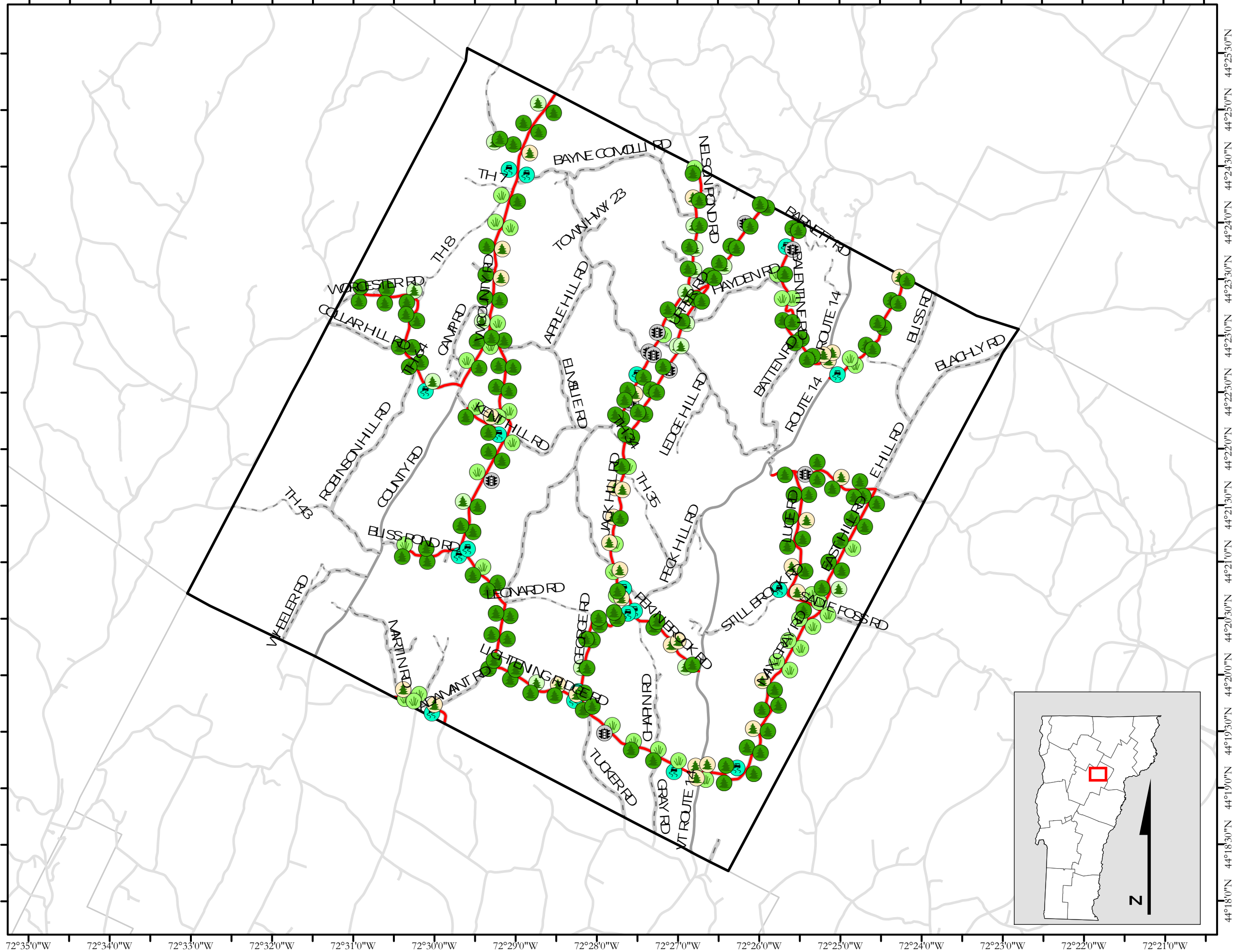
Date: 10/9/2018

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
- Type
- Emerging overstory (shrubs & saplings)
- Immature overstory ( $\leq 6''$  dbh)
- Mature overstory ( $> 6''$  dbh)
- Wet Area
- Mowed
- Street Trees
- Bare
- Road Surface
- Paved
- Unpaved
- Other



# Resilient Right-of-Ways

## Project Data Calais, VT

### 2. Managable Vegetation Width



Vermont Department of  
Forests, Parks & Recreation

1:60,000

Cartographer: Elizabeth.Bannar

Date: 10/9/2018

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

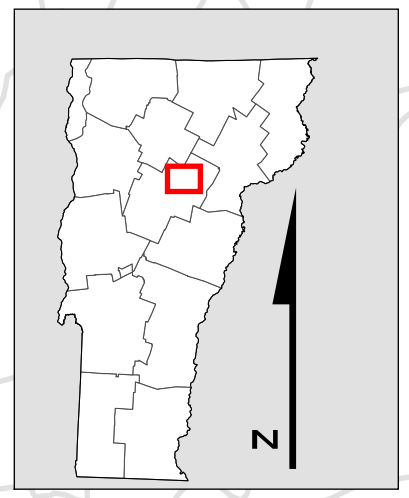
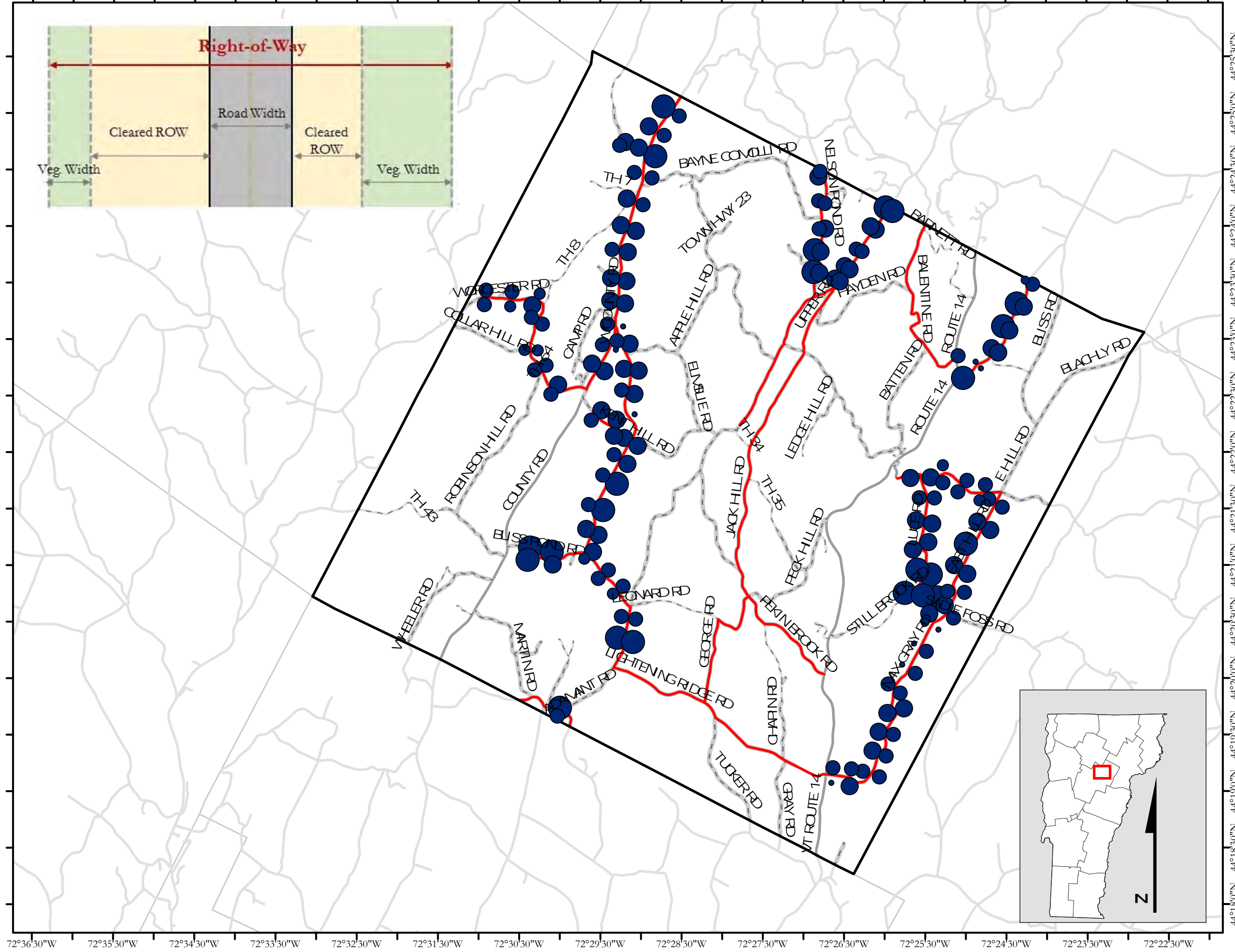
— Inventory Roads

Vegetation Width (ft)

- 0
- 1 - 3
- 4 - 6
- 7 - 9
- 10 - 12
- > 12

Road Surface

- Paved
- - - Unpaved
- · · Other



# Resilient Right-of-Ways Project Data Calais, VT

## 3. Roadside Ash Impact



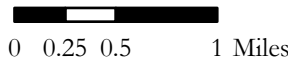
Vermont Department of  
Forests, Parks & Recreation

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Cartographer: Elizabeth.Bannar

Date: 10/9/2018

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### Legend

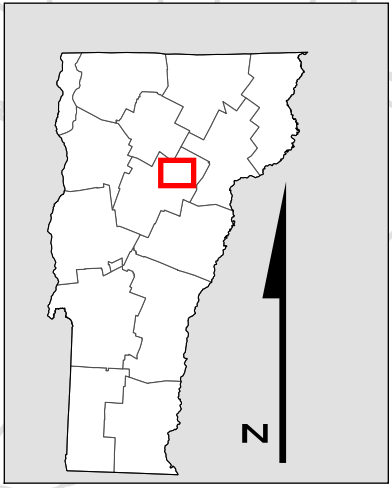
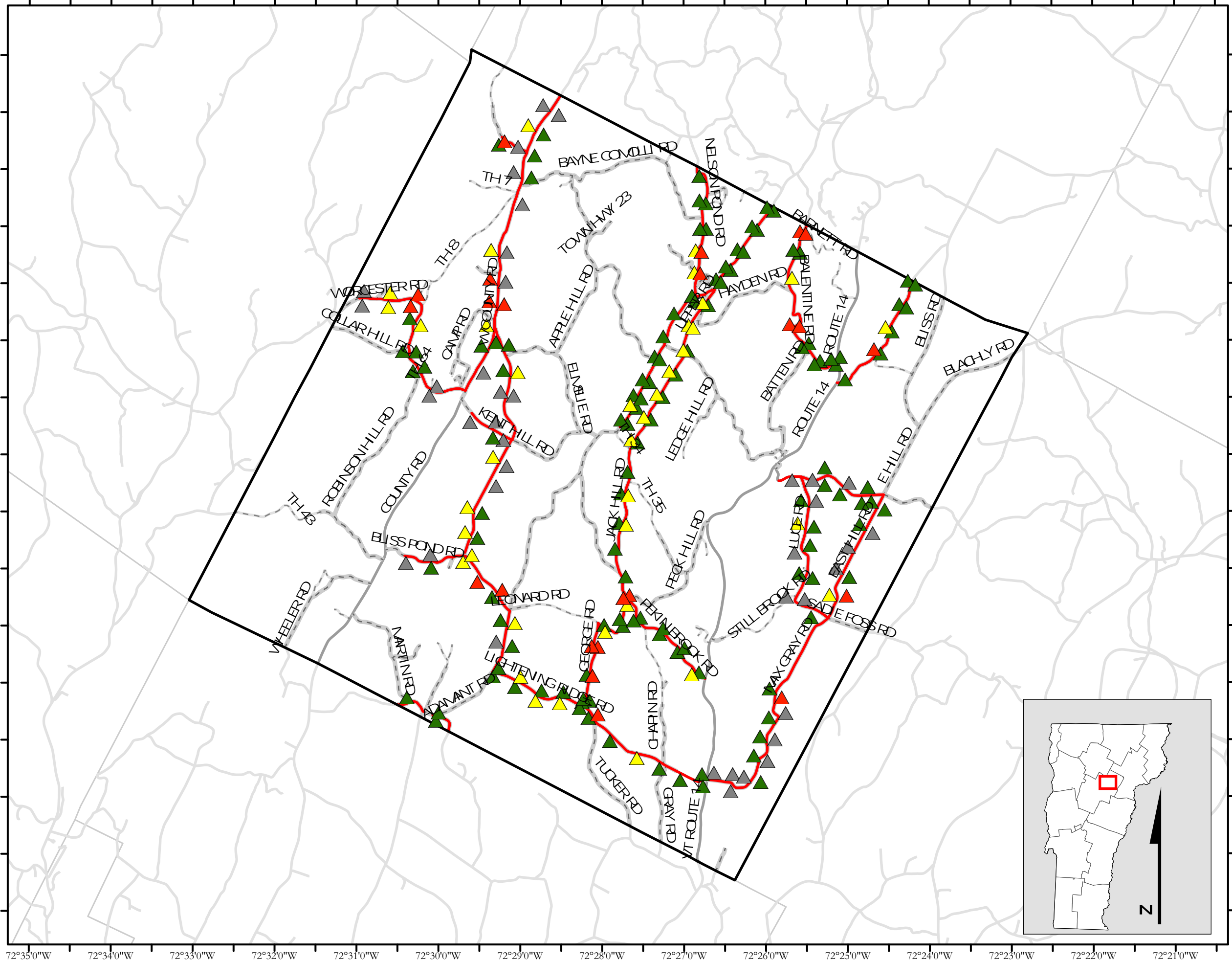
Inventory Roads

#### Roadside Ash Count Per Plot

- Low (1-2)
- Medium (3-4)
- High (5+)
- None

#### Road Surface

- Paved
- Unpaved
- Other



72°35'0"W 72°34'0"W 72°33'0"W 72°32'0"W 72°31'0"W 72°30'0"W 72°29'0"W 72°28'0"W 72°27'0"W 72°26'0"W 72°25'0"W 72°24'0"W 72°23'0"W 72°22'0"W 72°21'0"W

44°18'0"N 44°18'30"N 44°19'0"N 44°19'30"N 44°20'0"N 44°20'30"N 44°21'0"N 44°21'30"N 44°22'0"N 44°22'30"N 44°23'0"N 44°23'30"N 44°24'0"N 44°24'30"N 44°25'0"N



# Resilient Right-of-Ways Project Data Calais, VT

## 4. Agriculture in the Right-of-Way



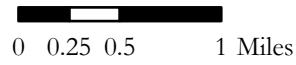
Vermont Department of  
Forests, Parks & Recreation

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Cartographer: Elizabeth.Bannar

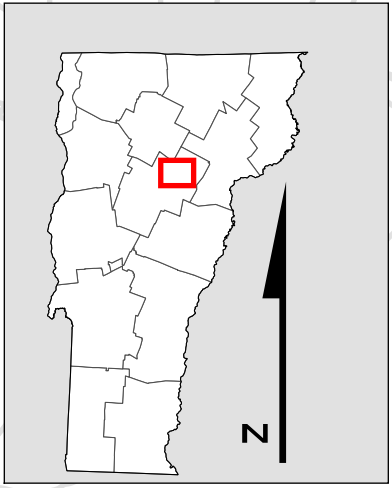
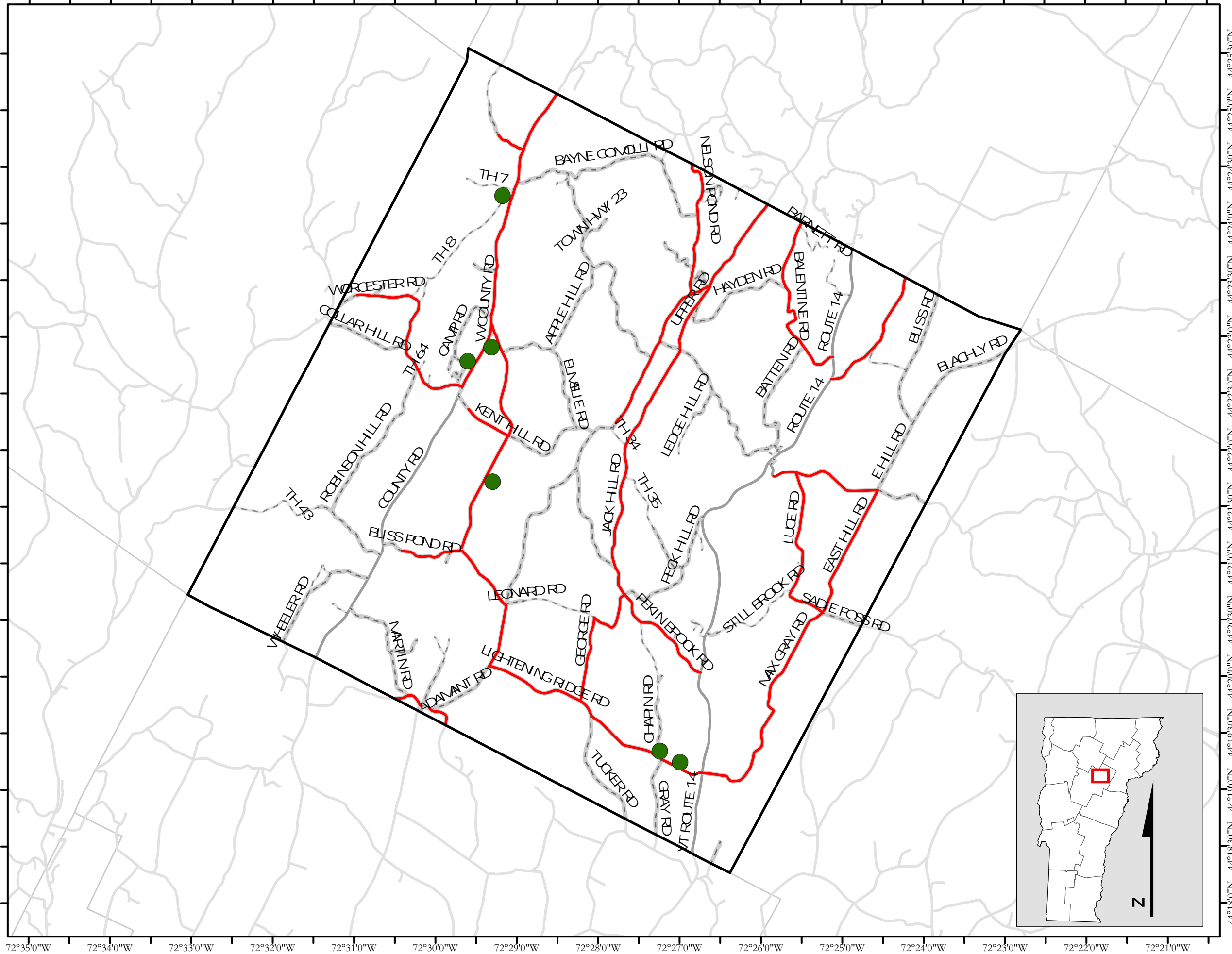
Date: 10/9/2018

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### Legend

- Inventory Roads
- Agriculture in ROW
  - Yes
- Road Surface
  - Paved
  - Unpaved
  - Other



# Resilient Right-of-Ways

## Project Data

### Calais, VT

#### 5. Overhead Utility & Vegetation Regeneration Opportunity



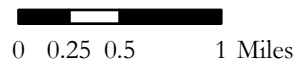
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Forests, Parks & Recreation

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Cartographer: Elizabeth.Bannar

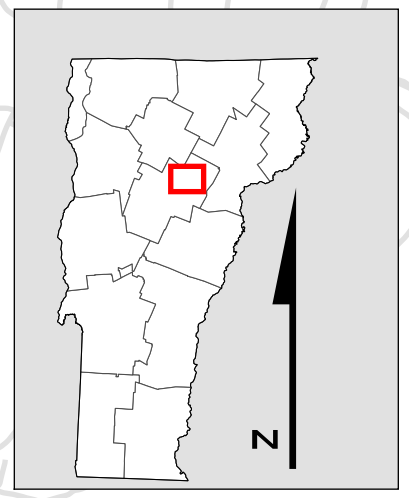
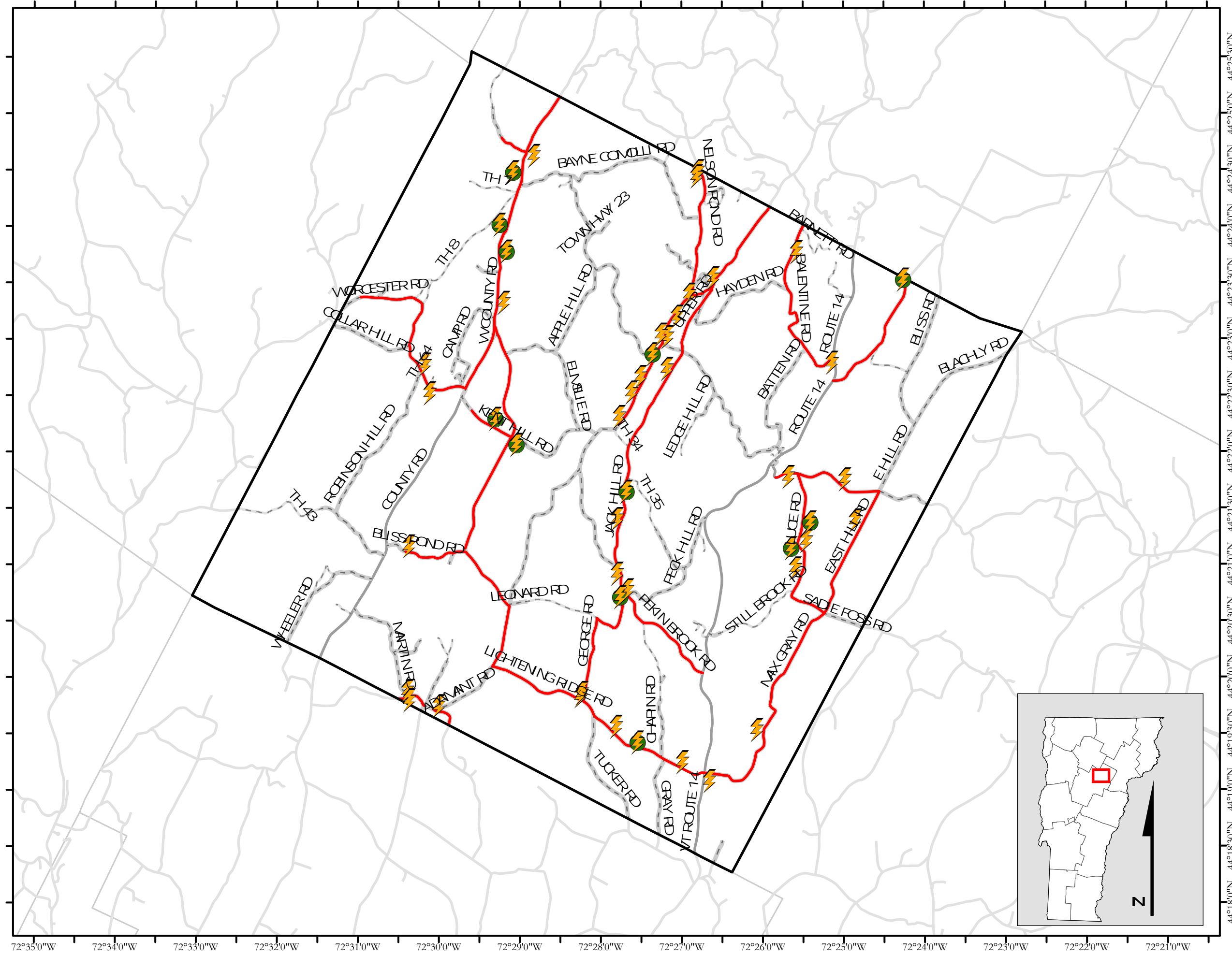
Date: 10/9/2018

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### Legend

- Inventory Roads
- Utility Wire Present
- Promote Regeneration in Powerline
  - Yes
- Road Surface
  - Paved
  - Unpaved
  - Other



72°35'0"W 72°34'0"W 72°33'0"W 72°32'0"W 72°31'0"W 72°30'0"W 72°29'0"W 72°28'0"W 72°27'0"W 72°26'0"W 72°25'0"W 72°24'0"W 72°23'0"W 72°22'0"W 72°21'0"W

44°18'0"N 44°18'30"N 44°19'0"N 44°19'30"N 44°20'0"N 44°20'30"N 44°21'0"N 44°21'30"N 44°22'0"N 44°22'30"N 44°23'0"N 44°23'30"N 44°24'0"N 44°24'30"N 44°25'0"N

# Resilient Right-of-Ways Project Data Calais, VT

## 6. Hedgerow Locations



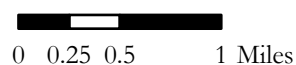
Vermont Department of  
Forests, Parks & Recreation

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Cartographer: Elizabeth.Bannar

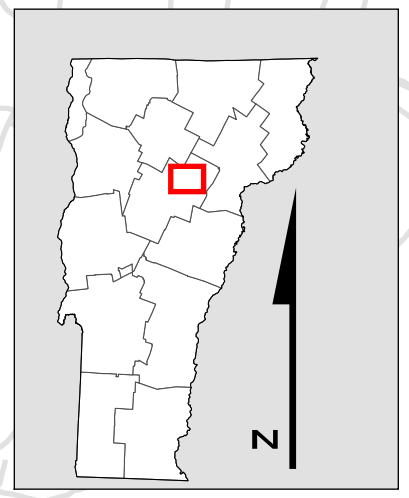
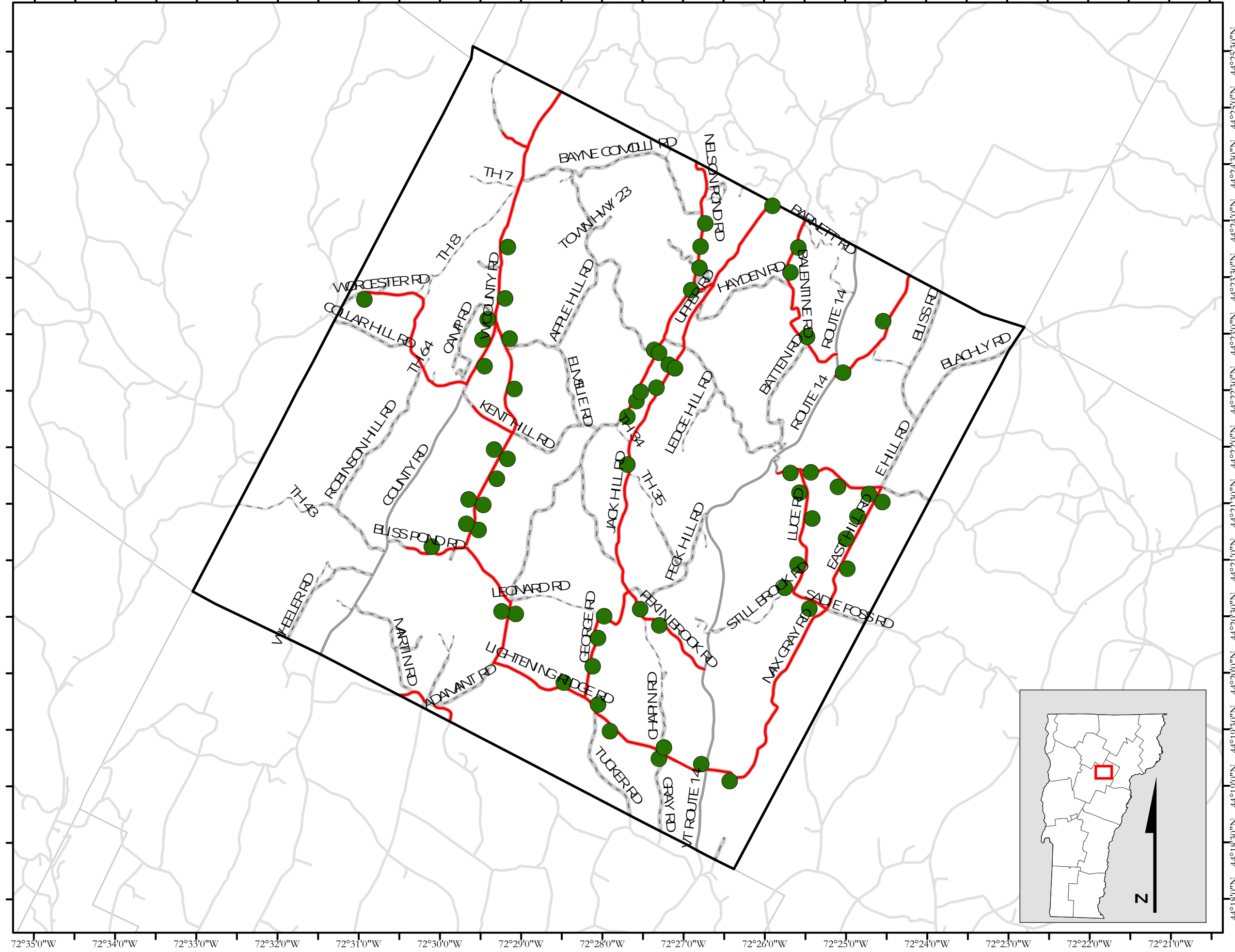
Date: 10/9/2018

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
- Hedgerow
  - Yes
- Road Surface
  - Paved
  - Unpaved
  - Other



# Resilient Right-of-Ways Project Data Calais, VT

## 7. Softwood Canopy Cover



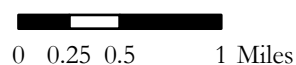
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Forests, Parks & Recreation

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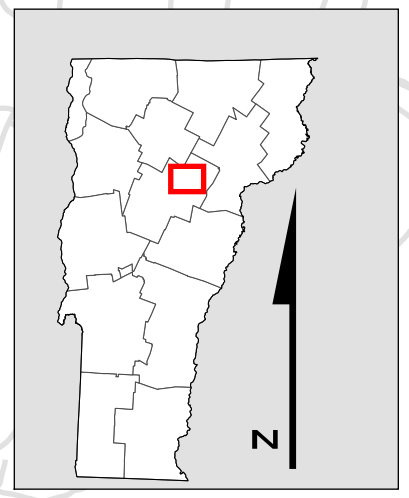
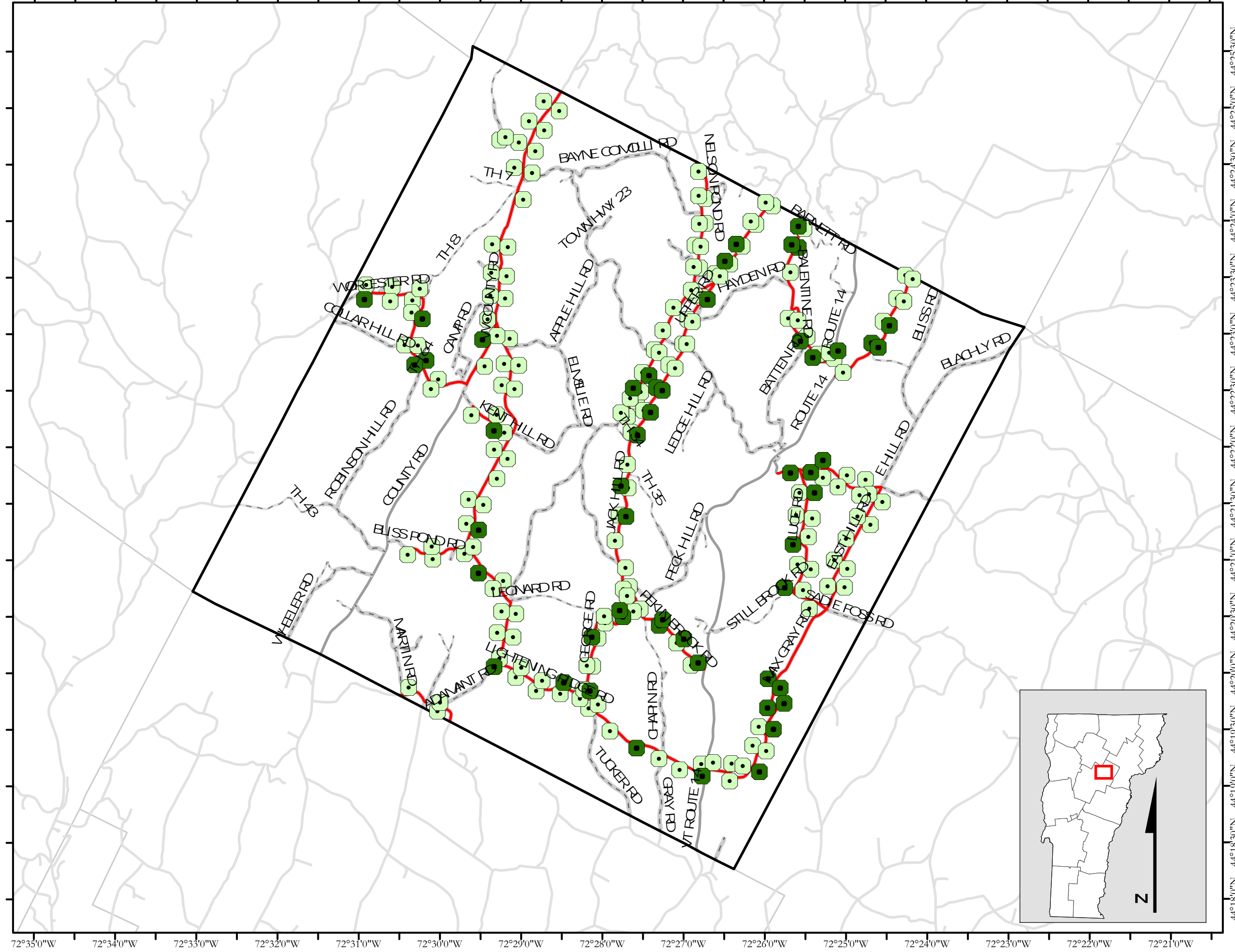
Date: 10/9/2018

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
- Percent Softwood Canopy Cover
  - ◻ < 25
  - ◻ > 25
- Road Surface
  - Paved
  - Unpaved
  - Other



72°35'0"W 72°34'0"W 72°33'0"W 72°32'0"W 72°31'0"W 72°30'0"W 72°29'0"W 72°28'0"W 72°27'0"W 72°26'0"W 72°25'0"W 72°24'0"W 72°23'0"W 72°22'0"W 72°21'0"W

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# Resilient Right-of-Ways Project Data Calais, VT

## 8. Overstory Health & Mechanical Damage



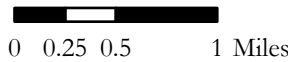
Vermont Department of  
Forests, Parks & Recreation

1:60,000

Cartographer: Elizabeth.Bannar

Date: 10/9/2018

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

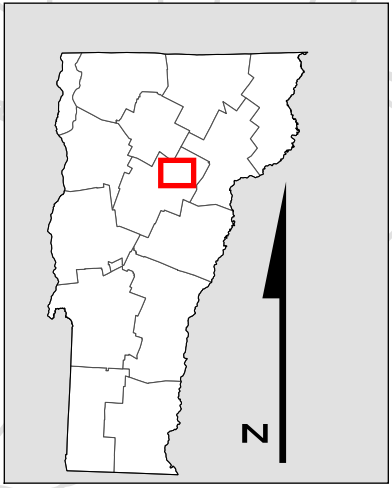
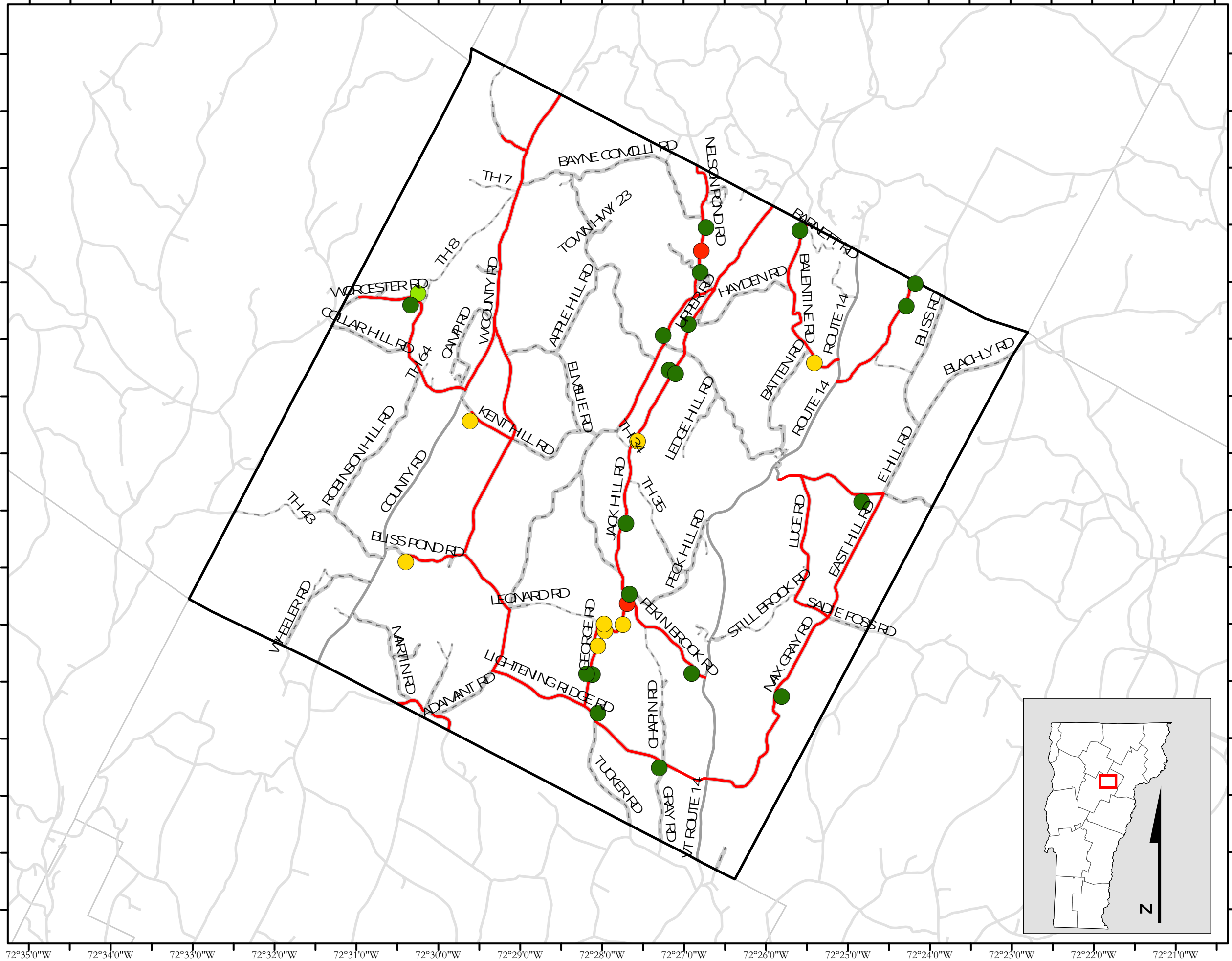
— Inventory Roads

#### Overstory Health, Mechanical Damage

- Poor health, high damage
- Fair health, high damage
- Poor health, low damage
- Fair health, low damage

#### Road Surface

- Paved
- Unpaved
- Other



# Resilient Right-of-Ways Project Data Calais, VT

## 9. Historic Tree Location & Health



Vermont Department of  
Forests, Parks & Recreation

1:60,000

Cartographer: Elizabeth.Bannar

Date: 10/9/2018

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

Historic Trees, Health

● Poor

● Fair

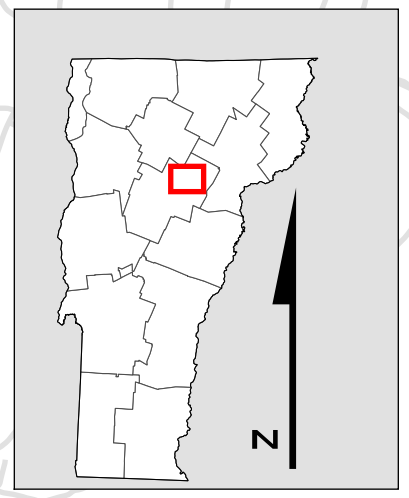
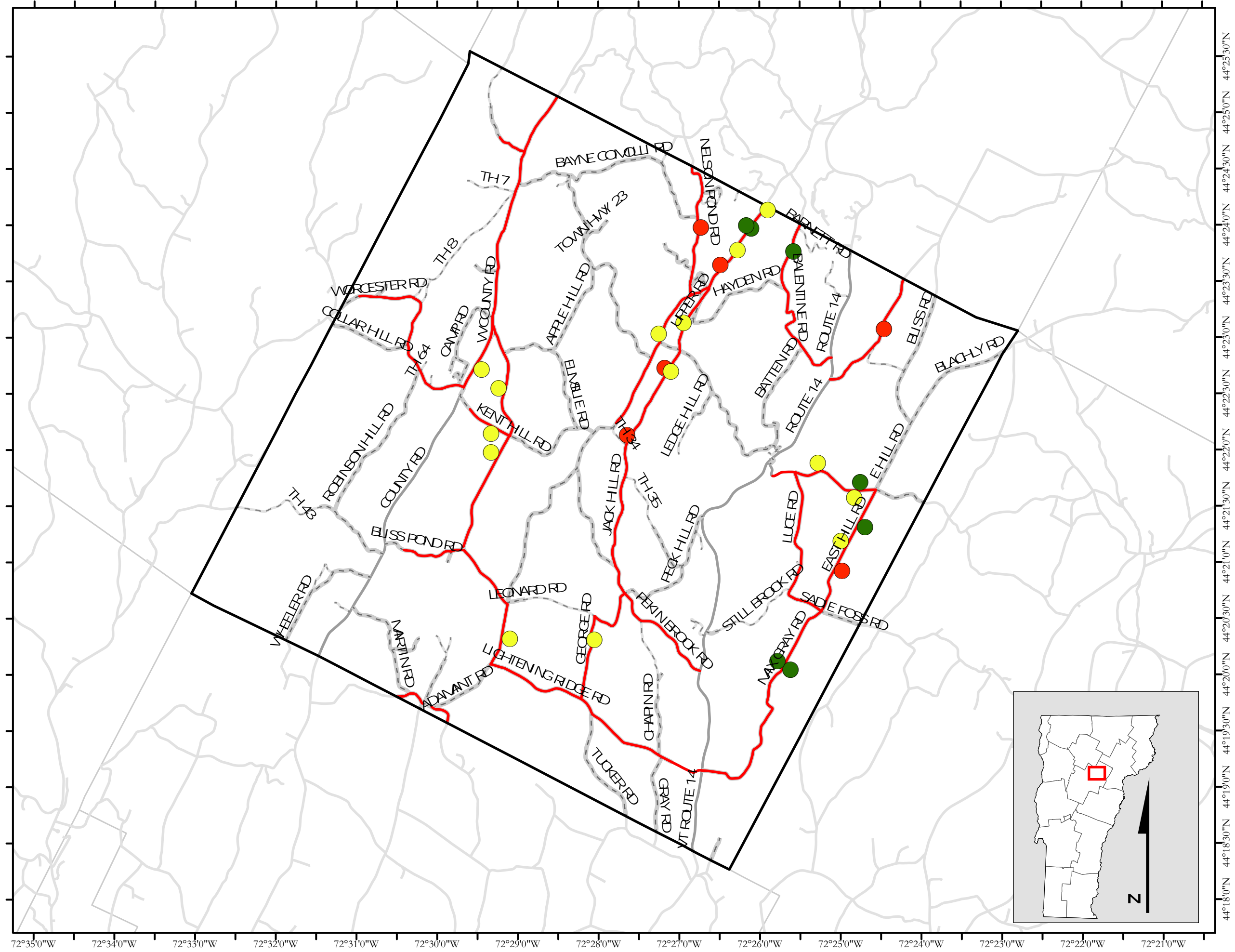
● Good

Roads Surface

Paved

Unpaved

Other



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# Resilient Right-of-Ways

## Project Data

### Calais, VT

10. Invasive Species Locations  
(data source: iNaturalist)



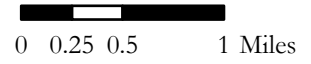
Vermont Department of  
Forests, Parks & Recreation

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Cartographer: Elizabeth.Bannar

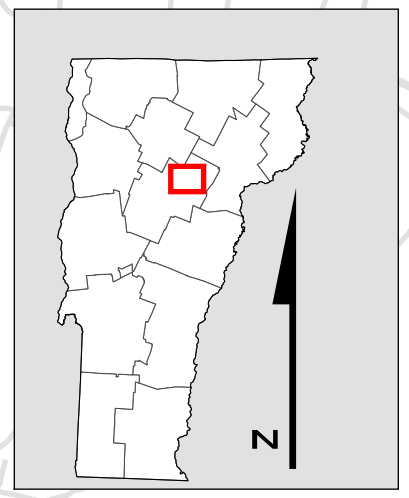
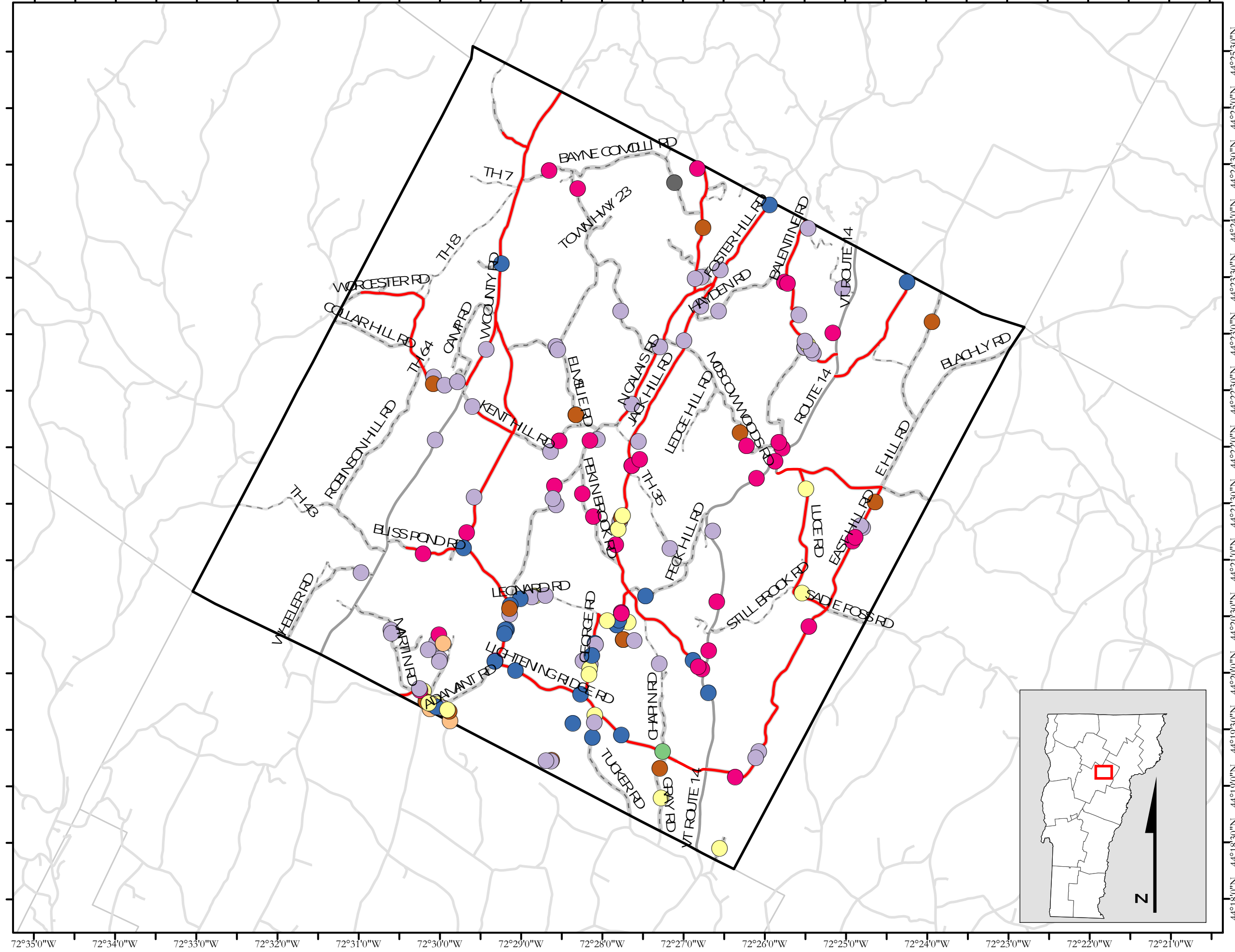
Date: 10/9/2018

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**
- Autumn olive
- Barberry spp.
- Common cowparsnip
- Common buckthorn
- Cow parsley
- Garlic mustard
- Japanese knotweed
- Morrow's honeysuckle
- Multiflora rose
- Roads Surface**
- Paved
- Unpaved
- Other



# Resilient Right-of-Ways Project Data Calais, VT

## 11. Vegetation Preservation Opportunities



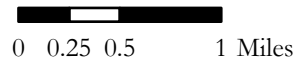
Vermont Department of  
Forests, Parks & Recreation

1:60,000

Cartographer: Elizabeth.Bannar

Date: 10/9/2018

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### Legend

Inventory Roads

#### Steep Slope

Yes, down

Yes, up

#### Preservation Opportunity

Preserve, herbaceous buffer

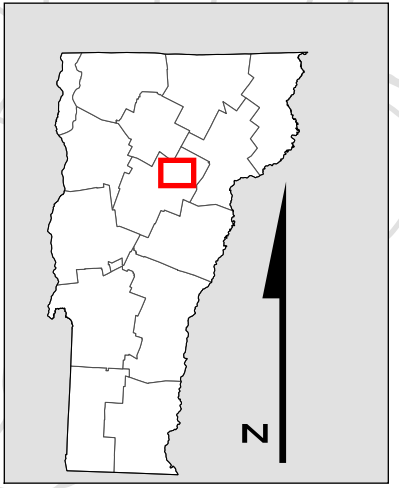
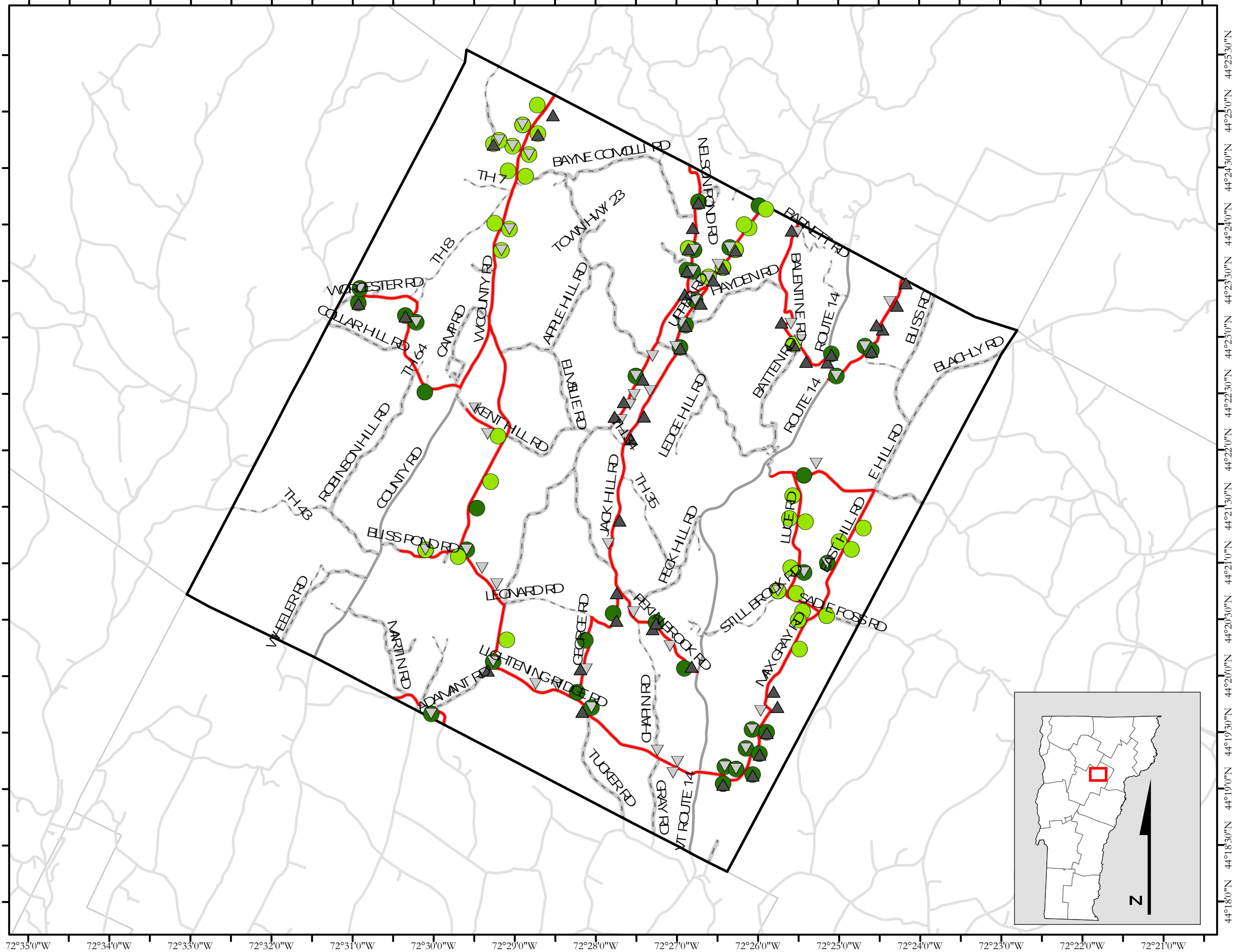
No cut, trees

#### Road Surface

Paved

Unpaved

Other



72°35'0"W 72°34'0"W 72°33'0"W 72°32'0"W 72°31'0"W 72°30'0"W 72°29'0"W 72°28'0"W 72°27'0"W 72°26'0"W 72°25'0"W 72°24'0"W 72°23'0"W 72°22'0"W 72°21'0"W

44°18'0"N 44°18'30"N 44°19'0"N 44°19'30"N 44°20'0"N 44°20'30"N 44°21'0"N 44°21'30"N 44°22'0"N 44°22'30"N 44°23'0"N 44°23'30"N 44°24'0"N 44°24'30"N 44°25'0"N



# Resilient Right-of-Ways Project Data Calais, VT

## 12. Planting & Regeneration Opportunities in Roadside Communities



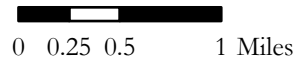
Vermont Department of  
Forests, Parks & Recreation

1:60,000

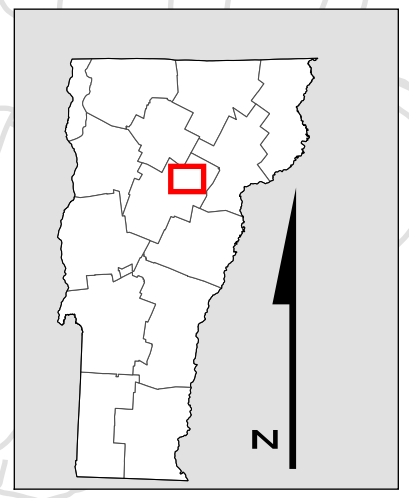
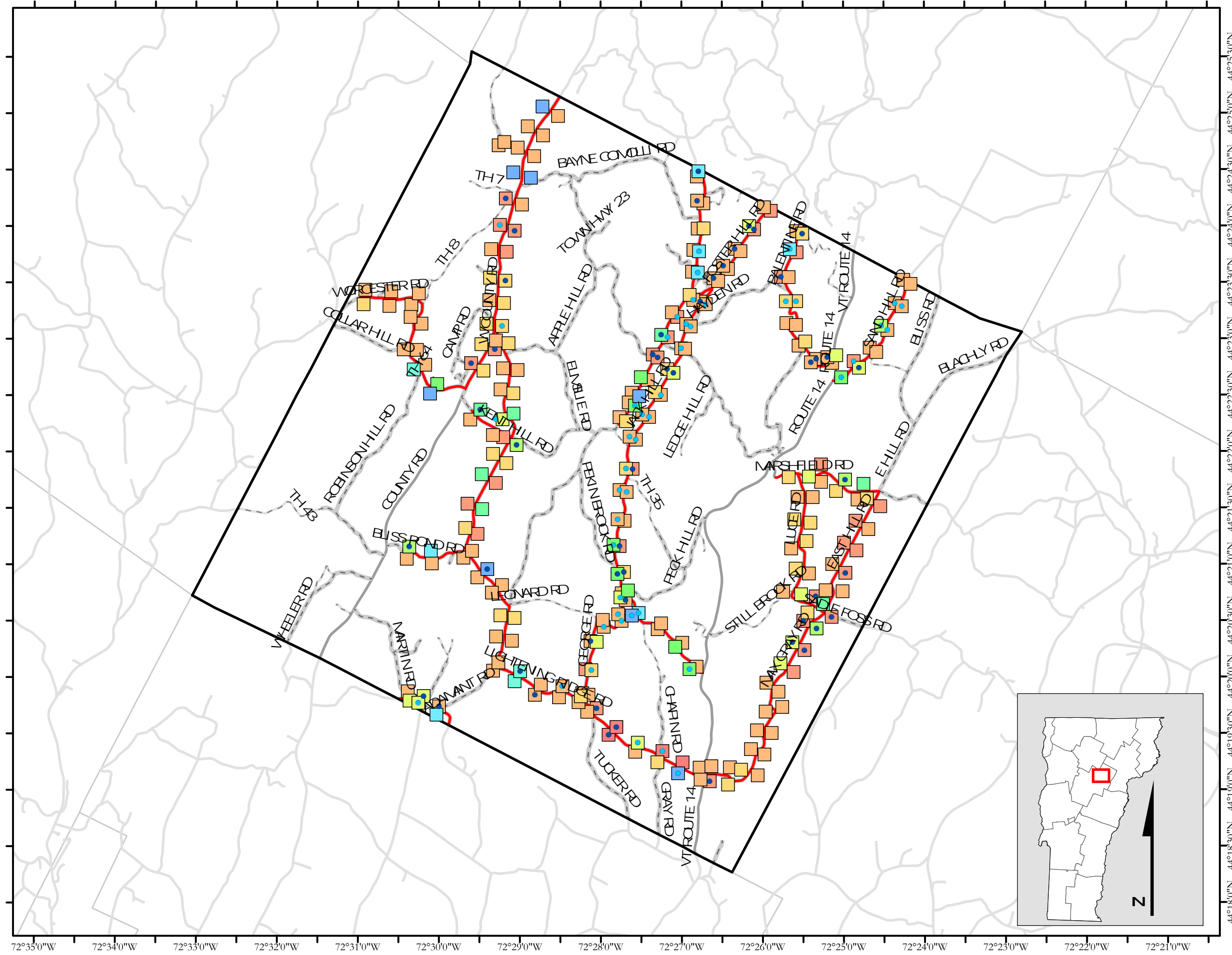
Cartographer: Elizabeth.Bannar

Date: 10/9/2018

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
  - Planting**
    - Other
    - Trees
  - Roadside Community**
    - Field (Ag)
    - Field (Hay)
    - Forest
    - Hedgerow to Field/Water
    - Impervious
    - Lawn
    - Other
    - Riparian Zone
    - Street Trees/Lawn
    - Tree Plantation
    - Water Edge
    - Wetland
  - Road Surface**
    - Paved
    - Unpaved
    - Other



# Resilient Right-of-Ways Project Data Calais, VT

## 13. Thinning Opportunity & Mature Short-lived Trees



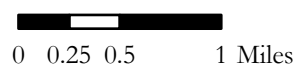
Vermont Department of  
Forests, Parks & Recreation

1:60,000

Cartographer: Elizabeth.Bannar

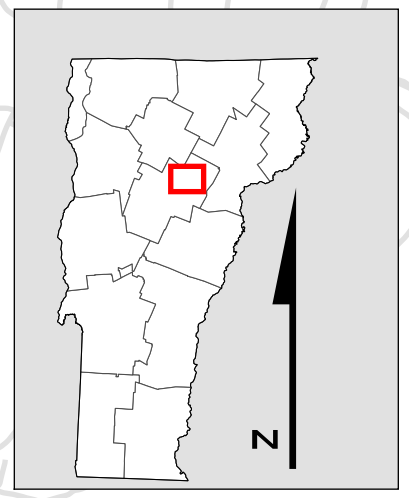
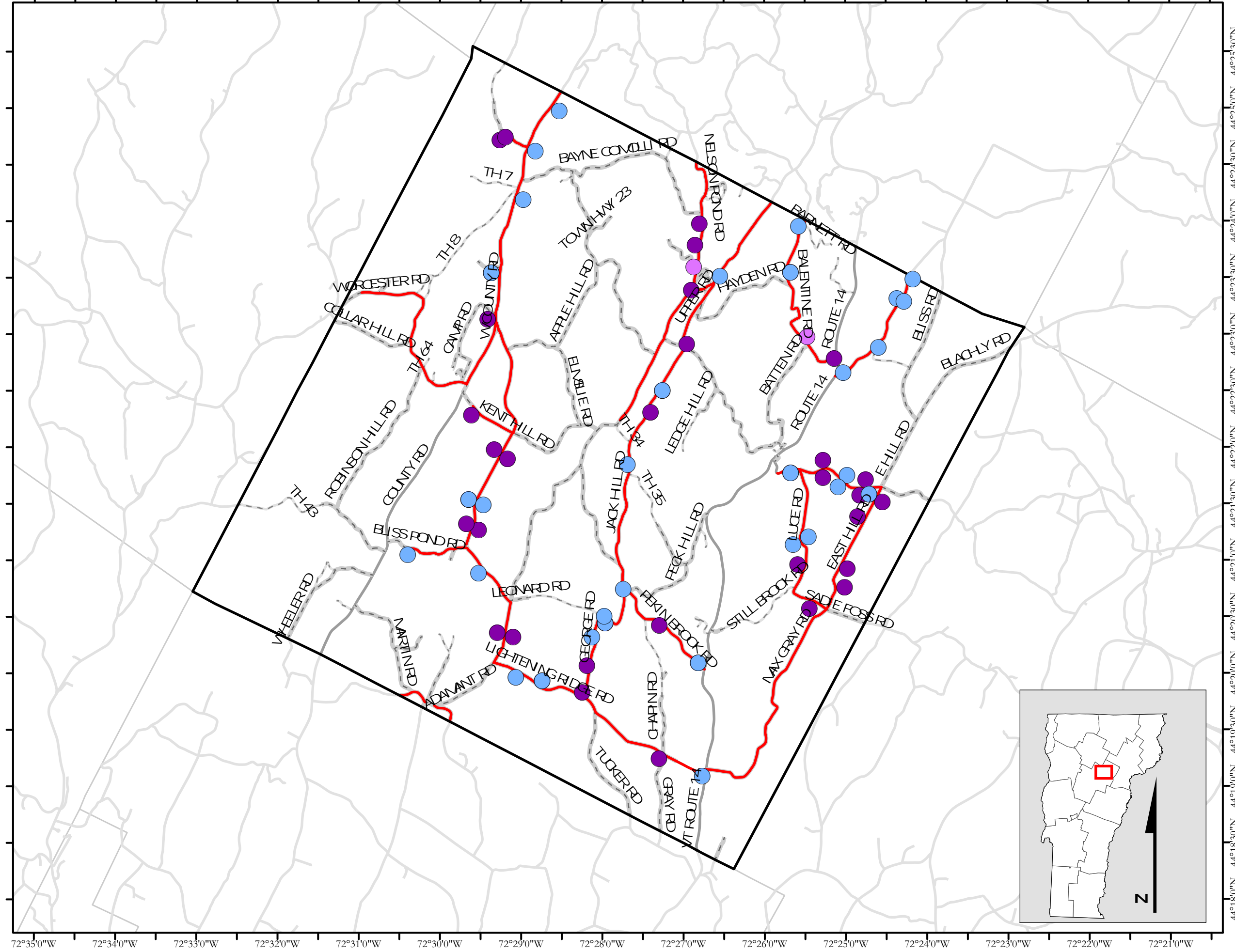
Date: 10/9/2018

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### Legend

- Inventory Roads
- Mature Short-lived Trees
  - Yes
- Thinning Opportunities
  - Yes, other
  - Yes, trees
- Road Surface
  - Paved
  - Unpaved
  - Other



72°35'0"W 72°34'0"W 72°33'0"W 72°32'0"W 72°31'0"W 72°30'0"W 72°29'0"W 72°28'0"W 72°27'0"W 72°26'0"W 72°25'0"W 72°24'0"W 72°23'0"W 72°22'0"W 72°21'0"W

44°18'0"N 44°18'30"N 44°19'0"N 44°19'30"N 44°20'0"N 44°20'30"N 44°21'0"N 44°21'30"N 44°22'0"N 44°22'30"N 44°23'0"N 44°23'30"N 44°24'0"N 44°24'30"N 44°25'0"N 44°25'30"N