

Rural Road Resilient Right-of-Ways Vegetation Assessment
Town of Tinmouth Action Items and Recommendations
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December 3, 2018
Updated May 20, 2019



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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.

List of Maps

Map 1: Notable Areas According to Town Residents

A digitized version of the map the project advisory committee sketched at the first scoping meeting on April 3, 2018. Locations are approximate.

Map 2: 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 road 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 road 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.

Map 3: Manageable Vegetation Width

Displays the width of vegetation within the ROW that the town can manage. Manageable vegetation width = $(\text{ROW width}/2) - (\text{Road width}/2) - \text{clear zone}$.

Map 4: Roadside Ash Impact

Displays the approximate number of ash trees that, if 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.

Map 5: 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.

Map 6: 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.

Map 7: Hedgerow Locations

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

Map 8: Softwood Cover

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

Map 9: Overstory Health & Mechanical Damage

This maps 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.

Map 10: 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 visual assessment of the trunk and canopy.

Map 11: Invasive Plant Species (Data Source: iNaturalist)

During field assessments, observations of invasive plant species were recorded on iNaturalist¹, a citizen science data collection application. This map displays data about invasive plant species locations as noted by the Resilient ROW project and other iNaturalist users.

Map 12: 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.

Map 13: 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.

Map 14: 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 Tinmouth than those in the assessed plot locations.

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

Resilient Right-of-Ways Project Overview

In the spring of 2018, the town of Tinmouth agreed to work with the Vermont Urban & Community Forestry program as a case study town in the Rural Roads Resilient Right-of-Ways project (See Appendix A: Letter of Collaboration). Funded by the US 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 Tinmouth 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:

Cathy Reynolds, Selectboard Member
Doug Fontein, Conservation Commission, Chair
Eric Buffum, Road Commissioner
Gail Fallar, Town Clerk
David Birdsall, Tree Warden

The project advisory committee met on April 3, 2018 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 (Appendix B) outlines the project goals to collect data that documents common roadside vegetation scenarios in Tinmouth, reveals where conflicting interests may arise, and leads to suggestions regarding direct action that the town can take to protect, manage, or restore site-appropriate trees, shrubs, and grasses.**

Roadside vegetation assessments occurred on July 23rd and 24th, 2018. Field routes covered approximately 17.5 miles of Tinmouth's unpaved Class 3 roads. On unpaved backroads, Joanne Garton (project lead) or Elizabeth Banner (summer intern with UCF) 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 Tinmouth Work Plan (Appendix B).

As per request of the project advisory team, Joanne and Elizabeth also assessed approximately 6 miles of Class 2 paved roads. Plots were located approximately every mile and data collection utilized the same methodology as the unpaved road assessments.

The assessed routes are drawn in red on Maps 2 through 14. All plot locations are displayed on Map 2: 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. Promote diversity of species, age, structure and density

Many early successional species (birch *Betula spp.*, poplar *Populus spp.* and willow *Salix spp.*) are actually palatable browse for wildlife including moose. Unfortunately, repeated cutting or clearing of roadside vegetation keeps this vegetation in a perpetual state of early forest succession.

Recommendations

- Be intentional about vegetation clearing. Understand that any vegetation regrowth will be even-aged and, at least initially, will lack the structural diversity that keeps roadsides forests healthy.
- Establish native vegetation in cleared areas, including where invasive plants have been removed. [*Note: The Department of Environmental Conservation may have a recommended mix but I am unable to find more information at this point.*]

2. Monitor ash tree health

Ash tree health along Tinmouth roads are in decline. Additionally, all Vermont towns can expect emerald ash borer to kill 99% of ash trees (if not chemically treated), including those along public roads.

Recommendations

- Tinmouth is currently not within close proximity to the [known infested areas](#) in Vermont. There is time to plan as a community.
- Use Map 4: Roadside Ash impact to guide your ash tree inventory. Complete an [ash inventory](#) and an [EAB management plan](#) as described on the Vermont Urban & Community Forestry website.

3. Address hazard trees

Tinmouth's current tree warden, David Birdsall, 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. Tinmouth has already compiled a list of hazard trees in town and it will be beneficial to update this map at least annually. Remember that in order for a tree to be considered a *hazard* tree by the tree warden and be removed without a 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.

Recommendations

- Consider a yearly "look drive" conducted jointly by the tree warden and the road commissioner. 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.

4. Develop a Mowing Policy

Tinmouth is already aware of its common roadside invasive plants: barberry, buckthorn, honeysuckle, and poison parsnip. There is a detection of purple loosestrife in the wetlands. Interestingly, there are no noted detections of Japanese knotweed, a common roadside and riverside invasive plant.

Recommendations

- Mowing during the middle of the growing season spreads seeds. Follow the invasive plant phenology calendar below and know when invasive plants bloom in Tinmouth to use mowing to your advantage. In Tinmouth, consider mowing before the end of June.
- Clean mowing equipment between road segments. Note where there are currently few invasive plant species (Map 10. Invasive Plant Species) and make sure that all mowing equipment is thoroughly cleaned before mowing here (Upper Gulf Road, Gulf Road, segments of Gilmore Road and Merrill Spring Road).
- For more information on the management of specific invasive terrestrial plants, see <https://vtinvasives.org/gallery-of-terrestrial-plants>.

CALENDAR OF COMMON INVASIVE PLANT SPECIES PHENOLOGY IN VERMONT

Name	Apr	May	Jun	Jul	Aug	Sep	Oct
Common barberry (<i>Berberis vulgaris</i>)		Flowering	Mow	Seed Production			
Common buckthorn (<i>Rhamnus cathartica</i>)		Flowering	Mow	Seed Production			
Dame's rocket (<i>Hesperis matronalis</i>)		Flower & Seed Production	Mow				
Garlic Mustard (<i>Alliaria Petiolata</i>)		Flowering	Mow	Seed Production			
Glossy buckthorn (<i>Frangula alnus</i>)		Flowering	Mow	Seed Production			
Japanese barberry (<i>Barberis thunbergii</i>)		Flowering	Mow	Seed Production			
Japanese knotweed (<i>Fallopia japonica</i>)			Mow	Flower & Seed Production			
Shrub honeysuckle (<i>Lonicera spp.</i>)		Flowering	Mow	Seed Production			
Wild chervil or Cow Parsley (<i>Anthriscus sylvestris</i>)		Flowering	Mow	Seed Production			
Wild parsnip or poison parsnip (<i>Pastinaca sativa</i>)		Flowering	Mow	Seed Production			

5. Develop a tree ordinance or policy

Well-developed and active tree ordinances are an effective tool 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.

Tree wardens can remove hazardous trees in the ROW without a public hearing, but they cannot remove 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:

- Learn more about [tree ordinances](#)² to determine if Tinmouth should develop its own tree ordinance or policy.

6. Understand the vegetation management goals of your utility companies

The Tinmouth town plan requires that utility companies do not interfere with the scenic quality and land value of towns.

Recommendations:

- If not already completed, identify and map any roads that the town formally deems scenic. Use Map 1: Notable Areas According to Town Residents to begin this map.
- 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](#)³ and a [2013 Transmission Right-of-Way Management Plan](#)⁴.
 - Vermont Telephone participates in a joint agreement with Green Mountain Power to conduct vegetation maintenance. It only clears trees if they have fallen onto a telephone line and GMP cannot respond quickly.
 - Comcast may also participate in a joint maintenance with Green Mountain Power.
- Pay attention to the health of the ash trees along Gulf Road (pictured on right) just west of the intersection with Rte. 140. Several large ash tower above the both the road and utility lines.



² [Public Policy](https://vtcommunityforestry.org/resources/public-policy) on Vermont Urban & Community Forestry website: <https://vtcommunityforestry.org/resources/public-policy>

³ 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.

⁴ 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.

Roadside Scenarios and Opportunities for Action

The following locations highlight road segments where the town of Tinmouth 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 roads with 1) Plentiful or Prominent Ash Trees, upgrades to the 2) Classic Vermont Road and changes to the 3) Mowed or Farmed Right-of-Way.

1. Plentiful or prominent ash trees

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. Although the current infestations are not near Tinmouth, all Vermont towns are encouraged to prepare and manage the impacts of EAB and the upcoming loss of ash trees. A preliminary survey of ash tree counts along Tinmouth’s rural roads show that ash trees are plentiful in roadside communities; sometimes, ash are the only prominent trees along a stretch of road. During the summer 2018 field assessment, many ash trees were in notable states of decline, although they do not exhibit symptoms of EAB.

Recommendation: Plan for the arrival of EAB in Tinmouth and the management of roadside ash trees. The Urban & Community Forestry Program has many [on-line resources](#)⁵ available and can guide you through [roadside ash inventories](#)⁶ with prepared tools. Work with utility companies to understand ash management in utility right-of-ways (there is a particularly high number of ash near a utility line on McNamara Road).

1a. Plentiful Ash: North End Road near intersection with Rte 140

Description

This densely forested road is affected by an overhead utility line on the east side of the road, road erosion in places, invasive species (particularly poison parsnip) and mature trees. See page 11 for maps and photographs.

Relevant maps

- 3. Manageable Vegetation Width
- 4. Roadside Ash Impact
- 11. Invasive Plant Species
- 14. Thinning opportunities

Opportunities

- Low traffic volume on this road creates more opportunities to retain critical vegetation through established forestry practices such as tree thinning.
- The roadside already hosts a mature tree canopy.

Issues of Concern

- High ash tree count at one location, low ash tree count at many nearby locations.
- Invasive plants, in particular, common buckthorn and wild parsnip.

⁵ [Emerald Ash Borer Management](#) on the Vermont Urban & Community Forestry Webpage: <https://vtcommunityforestry.org/community-planning/tree-pests>

⁶ [Ash Tree Inventories](#) on the Vermont Urban & Community Forestry Webpage: <https://vtcommunityforestry.org/ash-inventory>

- Low vegetation width means that town can consider long-term veg planning
- Utility corridor on both sides of road

Recommendations

- Gradually remove some trees (including ash) according to recommended best practices, taking care to reduce, or even negate, the spread of invasive plants. Preserve desired species of trees while creating a windfirm forest that includes tall and wide trees mixed with shrubs and small trees.
- Work with utility company that maintains this road to understand their clearing rotation. Identify where town and utility company priorities overlap. Preserve some structurally sound trees near utility lines, including woody shrubs and small trees such as dogwoods or hophornbeam. Ensure that site-lines remain clear as understory become dense.
- Understand that roadside tree management extends approximately 100 feet on either side of the road – work with the adjacent landowner to explain the town’s goals in roadside forest management. [One study⁷](#) suggests that a storm-resistant forest can be achieved over time by first thinning a young forest stand to 360-500 trees per each side of road mile (extending 100 feet from the road edge), then thinning a second time 10-15 years later (and perhaps a third time) to 50-80 large trees per road mile.
- Promote a vegetated buffer. Revegetate disturbed areas with native seed mixtures.

1b. [Prominent Ash: North End Road near Northeast Road](#)

Description

The road is bordered by guardrails as it crosses a stream. The south side hosts three ash trees, the north side exhibits frequently mowed grass in the ROW, some woody vegetation, and an overhead utility line.

Relevant maps

4. Roadside Ash Impact
5. Agriculture in the ROW
11. Invasive Plant Species
12. Preservation Opportunity (herbaceous buffer)
13. Roadside Community and planting other/regen ops

Opportunities

- Gentle roadside slopes create easily-managed planting opportunities.
- Few invasive species currently line the roadsides.

Issues of concern

- The three ash trees are the only trees bordering the road and stream along this section of road. When the ash trees die, no emerging canopy is ready to take their place.
- There is currently frequent mowing in the ROW where the land slopes down to an agricultural field (pasture) and stream.
- Invasive plants may spread, particularly during roadwork or tree removal.

Recommendations

⁷ STORMWISE: Integrating arboriculture and silviculture to create storm resilient roadside forests. Ward, J.S., Worthley, T.E., Degnan, T.J. and Barksy, J.P. <http://api.ning.com/files/IGNv64pa5GwYY15N169qIUbob6ziSskzRR4uxqjepz4m4Q9g4yf-5w8piqgU1yjAVPJQXR9-z2pbW3YMDxdFQpRfBn-gBjE/Wardetal.2016Sep22.roadsideforestsprepub.pdf>

- The [Vermont Rivers program](#)⁸ recommends a 50-foot wide buffer of native woody vegetation surrounding streams. Ensure that woody buffers extend to roadsides.
- Work with the neighboring landowner or farmer to improve roadside canopy, reduce erosion, protect water quality while managing invasive plants.
- Plant trees (excluding ash) along the riparian zone, particularly along the south side where there is no overhead utility. Contact a local “Friends of...” group.

⁸ [River Corridor Protection](https://dec.vermont.gov/watershed/rivers/river-corridor-and-floodplain-protection/protection) on the Vermont Department of Environmental Conservation website:
<https://dec.vermont.gov/watershed/rivers/river-corridor-and-floodplain-protection/protection>

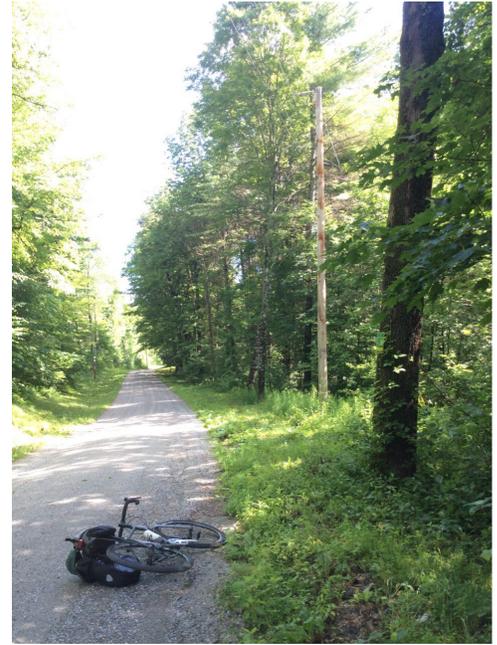
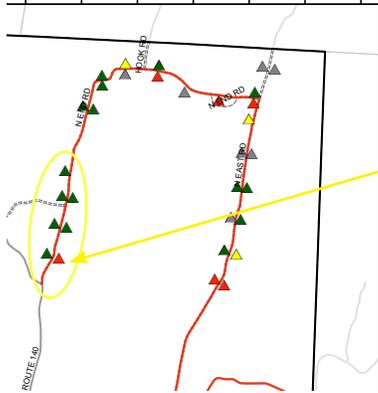
Roadside Scenario 1a: **Plentiful Ash**

North End Road near North East Road

ays Project Data i, VT

Inventory Roads Roadside Ash Count Per Plot

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



Excerpt from Map 4: Roadside Ash Impact

High number ash tree numbers in this segment on the east side of North End Road.

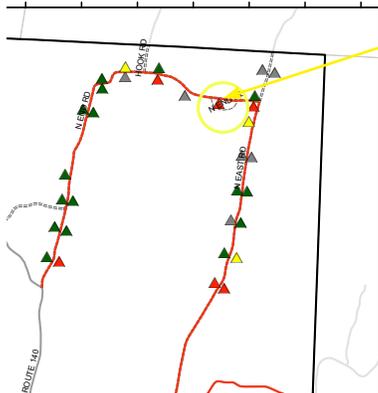
Roadside Scenario 1b: **Prominent Ash**

North End Road near North East Road

ays Project Data i, VT

Inventory Roads Roadside Ash Count Per Plot

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



Excerpt from Map 4: Roadside Ash Impact

There is opportunity to promote woody vegetation for roadside delineation and stream protection.

There are three prominent ash trees on the south side of the road bordering a stream.

2. Classic Vermont Road

Rural roads in Vermont towns have often had many lives -- as farm tracks, one-lane paths, summer-only routes and now year-round, two-lane trafficked roads. Repeated grading, erosion, and changes in neighboring land use have shaped the cross-section of these roads. Sometimes called “dugways”, these roads are beautiful and challenging at the same time.

2a. Southern Upper Gulf Road

Description

The travelled lane of this section of Upper Gulf Road lies below the neighboring vegetated banks. This cross section, combined with the slope of the road, prevents stormwater runoff from dispersing into the neighboring tree hedgerows and farmed landscape.

Relevant maps

2. ROW Vegetation Type

3. Manageable Vegetation Width

10. Historic Tree Location & Health

13. Planting & Regeneration Opportunities in Roadside Communities

Opportunities

- The low ash count compared to other parts of Tinmouth means that there is one fewer threat to the health of this roadside canopy.
- There is adequate vegetation width available within the town ROW for town management.
- The presence of hedgerows promote regeneration in hedgerows by hayfields.
- No invasive species were noted.
- There are no overhead utilities along this stretch of road – the town can manage this ROW vegetation without overlap from utility companies.

Issues of Concern

- The historic trees are in fair (not good) condition along the road.
- One location shows agriculture in the ROW.
- The road is lower than the surrounding landscape – this type of road is sometimes called a “dugway”. Because stormwater runoff cannot follow sheet flow of the side of the road, it must either be directed into a ditch or will run down the road, causing erosion. Ditches may not be collecting the eroding sediment and may need to be stone-lined.

Recommendations

- Monitor historic tree health. Consider thinning around emerging canopy trees to promote regeneration and to select for the next generation of tree canopy.
- Review tree care best practices including [pruning](#)⁹.
- Review history and precedent of agriculture in the ROW along this road. Evaluate whether the town would like to continue as before or reduce agriculture in the ROW.

⁹ [Pruning on the Vermont Urban & Community Forestry website: https://vtcommunityforestry.org/resources/tree-care/pruning](https://vtcommunityforestry.org/resources/tree-care/pruning)

- Follow the [Municipal Roads General Permit](#)¹⁰ baseline standards for gravel roads (MRGP 6.3.1)
 - Gravel roads shall be crowned, in or out-sloped. The minimum is 1/4" per foot, but the recommended slope is 1/4" – 1/2" per foot or 2% - 4%.
 - Remove shoulder berms to ensure that runoff flows into a roadside ditch, not down the road. Consider if any bank or vegetation should be removed on one side of the road to create a ditch.
- To reduce road erosion, look for updated recommendations on ditching from the [Better Roads Manual](#)¹¹ due out in 2019.

¹⁰ General Permit 3-9040 for Stormwater Discharges from Municipal Roads on VT Department of Environmental Conservation website:

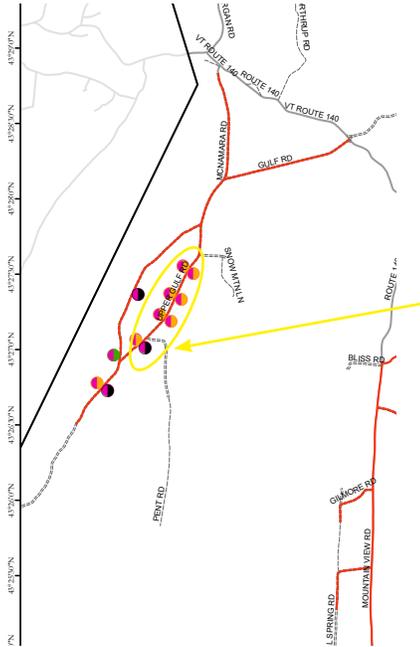
https://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/MunicipalRoads/sw_FinalMRGP.pdf

¹¹ Vermont Better Backroads Manual, 2009:

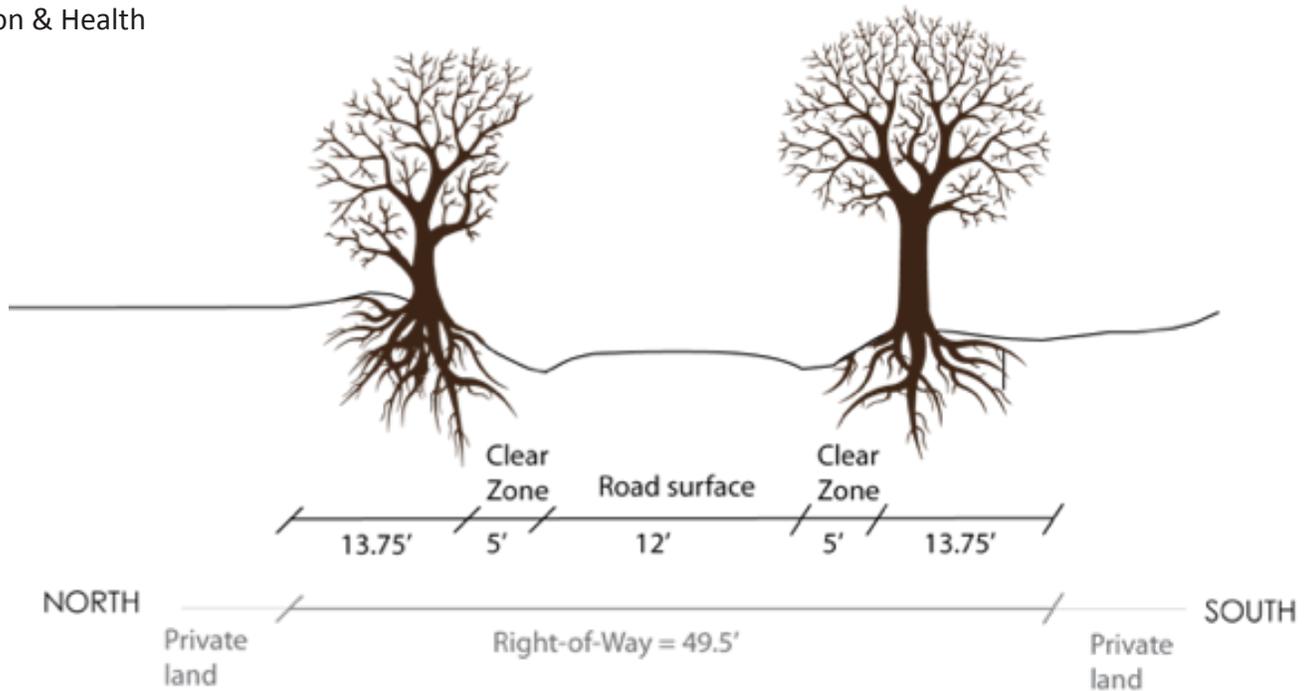
<https://vtrans.vermont.gov/sites/aot/files/highway/2009%20Better%20Backroads%20Manual.pdf>

Roadside Scenario 2: Classic Vermont Road

Upper Gulf Road



Excerpt from Map 10. Historic Tree Location & Health



Schematic cross-section of southern portion of Upper Gulf Road. Note the sunken road and narrow road surface width.

3. Mowed or Farmed Right-of-Way

In many towns, agricultural activities or residential footprints often extend into the municipal right-of-way. Corn, hay, or even livestock sometimes extend to within a few feet of the road, likely as result of a historical precedent or a handshake agreement between the landowner and the town. Alternatively, private landowners may mow their lawns all the way to the road edge to keep their property neat, or because they thought they were responsible for managing this corridor of land.

Any person considering alteration of current land use must certainly consider the relationship of the town's governing board with its private landowners (a.k.a. its constituents) and reflect on the "way things are done" over time. However, acknowledging the rights and responsibilities of the town's right-of-ways may improve road conditions, vegetation health, water quality and traffic patterns for all road users.

3a. East Road between Channel Road and Route 140

Description

This busy and straight section of road promotes fast traffic. Additionally, the active agricultural fields are prime locations for the cultivation and spread of invasive species, namely poison parsnip (a.k.a. wild parsnip, *Pastinaca sativa*).

Relevant Maps

- 3. Manageable Vegetation Width
- 5. Agriculture in ROW
- 6. Overhead Utility
- 13. Planting & Regeneration Opportunities in Roadside Communities

Opportunities

- There is adequate vegetation width available for town management (paved road width = 21, existing vegetation width available for town management that is currently in agriculture (corn or hay) = 8').
- Tree planting opportunities to frame views and protect the road from erosion.
- Neighboring agricultural and hay fields offer planting opportunities.
- Affords scenic views looking west.
- West side of road is not impacted by an overhead utility.

Issues of Concern

- There is no hedgerow or vegetative buffer to reduce snow drifts.
- The road is paved and hosts high-speed traffic.
- An overhead utility impacts east side of the road.
- There is agriculture in the ROW on both sides of the road.

Recommendation

- Consider designing a living snow fence¹² in conjunction with the landowner.

¹² [General information](#) from Minnesota's Best Practices Handbook for Roadside Vegetation Management. The document includes engineering specifications from ESP and the New York DOT: [Living Snow Fences Fact Sheet #3: Living Snow Fence Design](#).

- Understand the seasonal changes in the ROW. Corn is harvested in the fall, eliminating the vegetative buffer provided by the adjacent private land to the west.
- 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 centerline¹³ 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.
- When mowing the clear zone, consider leaving vegetation at a height of at least 6". Tall grasses act as a natural buffer between the road and agricultural field, infiltrating stormwater runoff, slowing its velocity, and filtering some of the sediment and pollutants in the runoff before it reaches the agricultural field.
- Current [Required Agricultural Practices](#)¹⁴ issued by the State of Vermont require 10' of non-tillable vegetated buffers between agriculture and ditches. This buffer helps filter and slow stormwater runoff before it reaches ditches. As such, consider a 10' buffer between roads and agricultural fields to allow a place for stormwater from the road to slow before reaching fields. This could include the existing 6' of cleared ROW, grown as tall as the road foreman deems suitable, and a further 4' (or up to 8') of land still within the public right-of-way.
- Manage to reduce the spread of all invasive species, particularly poison parsnip¹⁵ (*Pastinaca sativa*). Digging out the taproot (while wearing protective clothing) is the most effective way of removing the plant. For larger infestations, mow after peak bloom but before seeds set (likely early July). Plants will resprout after mowing, so consider a second round of mowing or chemical treatment is required. Burning is not an effective treatment.

3b. Gulf Road at intersection of Rte 140.

Description

This section of road is seasonally mowed within 6-8 feet of municipal ROW, in sharp contrast to the forested remainder of the road. It may be susceptible to strong winds and snow drifts.

Relevant Maps

- 2. ROW Community Type
- 3. Manageable Vegetation Width
- 5. Agriculture in ROW
- 6. Overhead Utility
- 13. Planting & Regeneration

Opportunities

- There is adequate space to plant trees or shrubs to protect the road from wind and snow drifts.
- There is no overhead utility on the north side of the road.

¹³ Johnson, Ann M., P.E. Best Practices Handbook for Roadside Vegetation Management. Minnesota Department of Transportation and the Local Road Research Board. July 2008.

¹⁴ [Required Agricultural Practices](https://agriculture.vermont.gov/rap) on the Vermont Agency of Agricultural, Food & Markets website: <https://agriculture.vermont.gov/rap>

¹⁵ Poison Parsnip is described at vtinvasives.org. More thorough management recommendations are outline in [this webpage](#) from Ontario. Note that bloom times may be different than in Vermont.

Issues of Concern

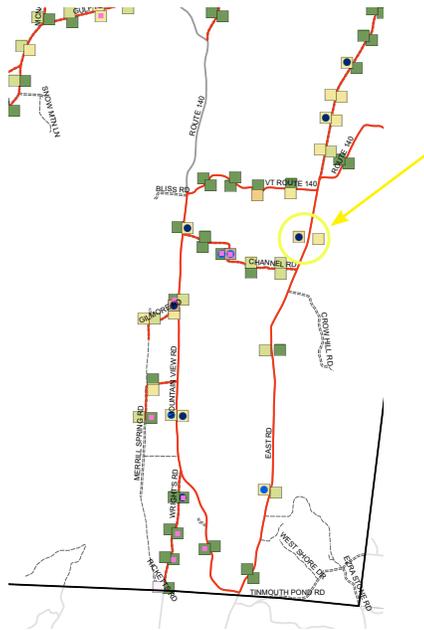
- There is a lack of bushes, shrubs, trees or even tall grasses within the ROW.
- An overhead utility impacts the south side of the road.

Recommendations

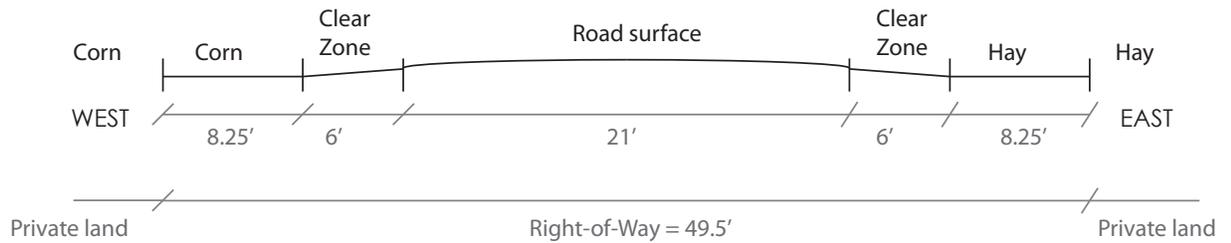
- As above for East Road. Incorporate the direction of prevailing winds and the viability of taller vegetation to create canopy to protect the road surface and frame views.
- Retain a clear line of sight for drivers approaching Rte 140 from Gulf Road.

Roadside Scenario 3a: Mowed or Farmed Right-of-Way

East Road between Channel Road and Rte. 140



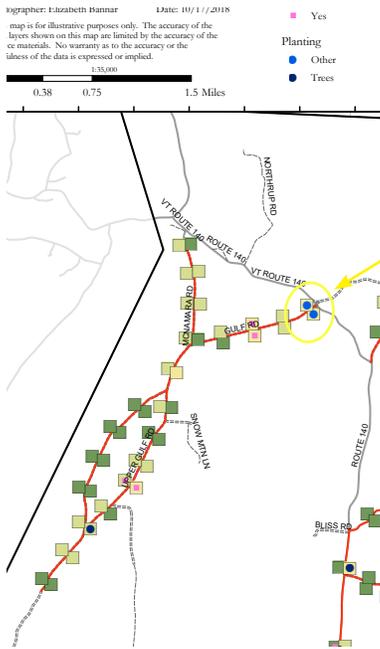
Excerpt from Map 13. Planting & Regeneration Opportunities in Roadside Communities



Schematic cross section of East Road. Note the corn and hay within the Right-of-Way.

Roadside Scenario 3b: Mowed or Farmed Right-of-Way

Gulf Road (east end) approaching Rte. 140



Excerpt from Map 13. Planting & Regeneration Opportunities in Roadside Communities

Note the overhead utility line on this south side of the road.

Resilient Right-of-Ways

Field data for the Town of Tinmouth, Vermont
Part of the Resilient Right-of-Ways Action Plan and Recommendations
Prepared by Joanne Garton, Vermont Urban & Community Forestry Program
December 3, 2018, revised May 20, 2019



Map 1: Tinmouth, VT

Notable Areas According to Town Residents



Vermont Department of Forests, Parks & Recreation

Cartographer: Elizabeth.Bannar

Date: 9/18/2018

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.

1:48,718



Legend

Town Boundary

Road Surface

Paved

Unpaved

Other

Resilient ROW

Scenic

Trees too close

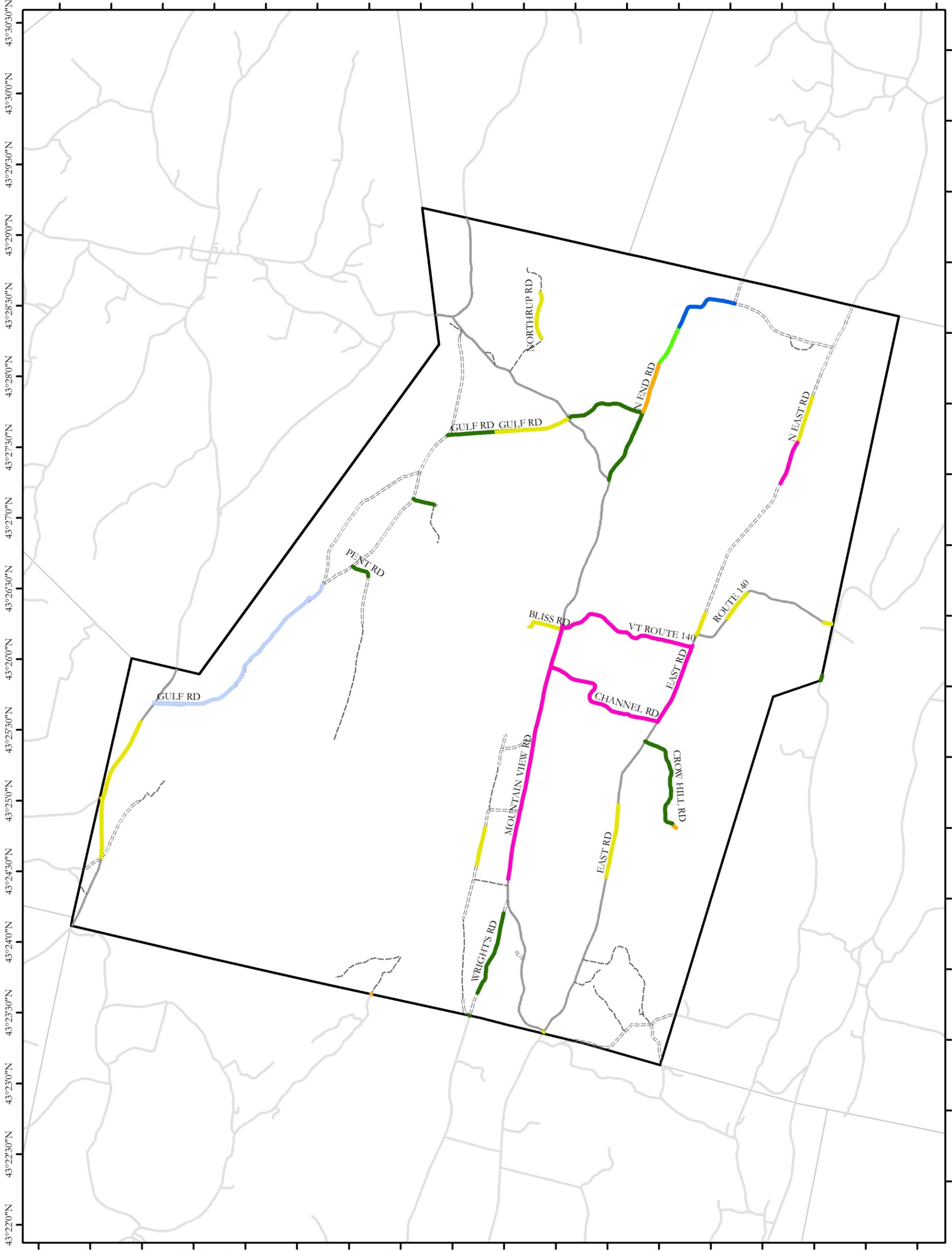
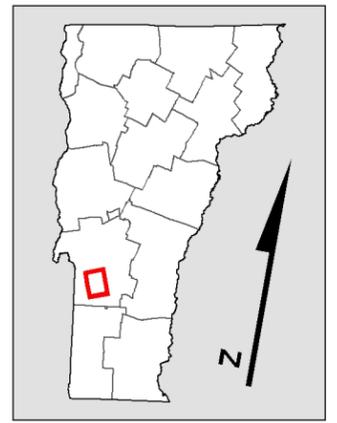
Invasives

Maple tunnel

Road too wide

Ped/rec route

Not plowed



Resilient Right-of-Ways Project Data Tinnmouth, VT

2. Right-of-Way Vegetation Type



Vermont Department of
Forests, Parks & Recreation

Cartographer: Elizabeth Bannar

Date: 10/18/2018

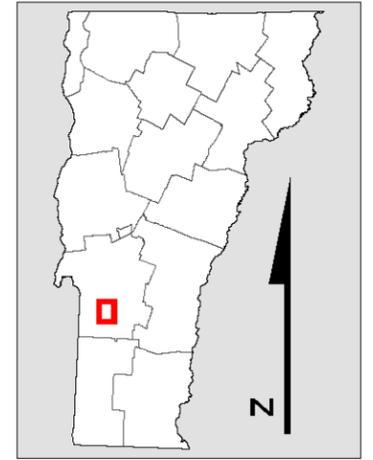
This map is for illustrative purposes only. The accuracy of the data layers shown on this map are limited by the accuracy of the source materials. No warranty as to the accuracy or the usefulness of the data is expressed or implied.

1:35,000

0 0.38 0.75 1.5 Miles

Legend

- | | |
|--|--|
|  2018 Inventory Roads | Vegetation Type |
|  Paved |  Mature Overstory (>6" dbh) |
|  Unpaved |  Immature Overstory (<6" dbh) |
|  Other |  Emerging Overstory (shrubs&saplings) |
| |  Wet Area |
| |  Mowed |
| |  Street Trees |
| |  Bare |



WHAT

Right-of-way vegetation is sometimes indistinguishable from the forests or fields on private land that neighbor rural roads. At other times, however, the transition between this publicly managed land and private property can be quite stark: young beech trees can end abruptly at a private lawn, or a cleared roadside ditch can border mature private trees. Town-managed land can be quite different from surrounding land.

HOW

Within each 100-meter plot, vegetation in the right-of-way was classified into one of four broad categories, each with distinguishing subcategories:



Tree-lined or forested

- **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.
- **Immature Overstory:** The tree-lined or forested roadside with overstory composed of mostly immature trees of less than 6" diameter (at breast height, also called "DBH").
- **Mature Overstory:** As above with overstory composed of mostly mature trees of greater than 6" diameter (at breast height, also called "DBH").
- **Street Trees:** Intentionally planted trees are within the ROW that are surrounded by an established herbaceous layer, mowed grass, or predominantly bare ground.



Mowed

- Frequently mowed (like a lawn).
- Seasonally mowed or harvested (like a hayfield or cornfield).



Wet

- Naturally wet due to ponds, rivers or lakes.
- Artificially made wet because of berms or ditches associated with the road.



Bare

- Due to hardscaped landscapes on the roadside, such as stone-lined ditches.
- Due to repeated disturbance such as scraping or trampling.

WHY

Identifying the type of vegetation in the right-of-way tell us:



The level of obligation the town currently has towards tree care, mowing, or effects of ice and roadside erosion due to stagnant or moving water.



How town residents may perceive their rural roadsides, sometimes independent of adjacent private land use.



Where immature forests may become mature forests with appropriate forest management, or where mature forests may need yearly monitoring for risk trees.

1



Mature (>6" DBH) overstory trees and predominantly bare ground along Northeast Road.

2



Immature (<6" DBH) overstory trees and herbaceous understory bordering a field along McNamara Road.

3



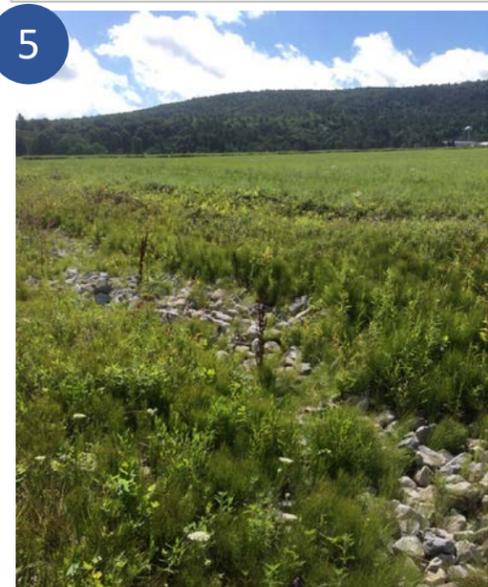
A frequently mowed narrow right-of-way vegetation strip along Channel Road.

4



A seasonally mowed right-of-way along Northeast Road.

5



A vegetated wet ditch along VT Rte 140.

STATISTICS IN TINMOUTH

The right-of-way vegetation types on the **approximately 23 miles** of surveyed rural routes in Tinnmouth exhibited the following general characteristics:

- 72%** Tree-lined, forested, or future forest: (100 / 140)
- Emerging overstory: **2%** (3 / 140)
 - Immature overstory: **7%** (10 / 140)
 - Mature overstory: **62%** (86 / 140)
 - Street Trees: **< 1%** (1 / 140)

26%

Mowed: (37 / 140)

- Frequently: **3%** (5 / 140)
- Seasonally: **23%** (32 / 140)

3%

Wet areas: (3 / 140)

- Riparian area, pond, lake edge, wetland: **0%** (0 / 140)
- Wet ditch: **2%** (3 / 140)

1%

Bare: **0%** (0 / 140)

Resilient Right-of-Ways Project Data Tinnmouth, VT

2. Right-of-Way Vegetation Type



Vermont Department of
Forests, Parks & Recreation

Cartographer: Elizabeth Bannar

Date: 10/18/2018

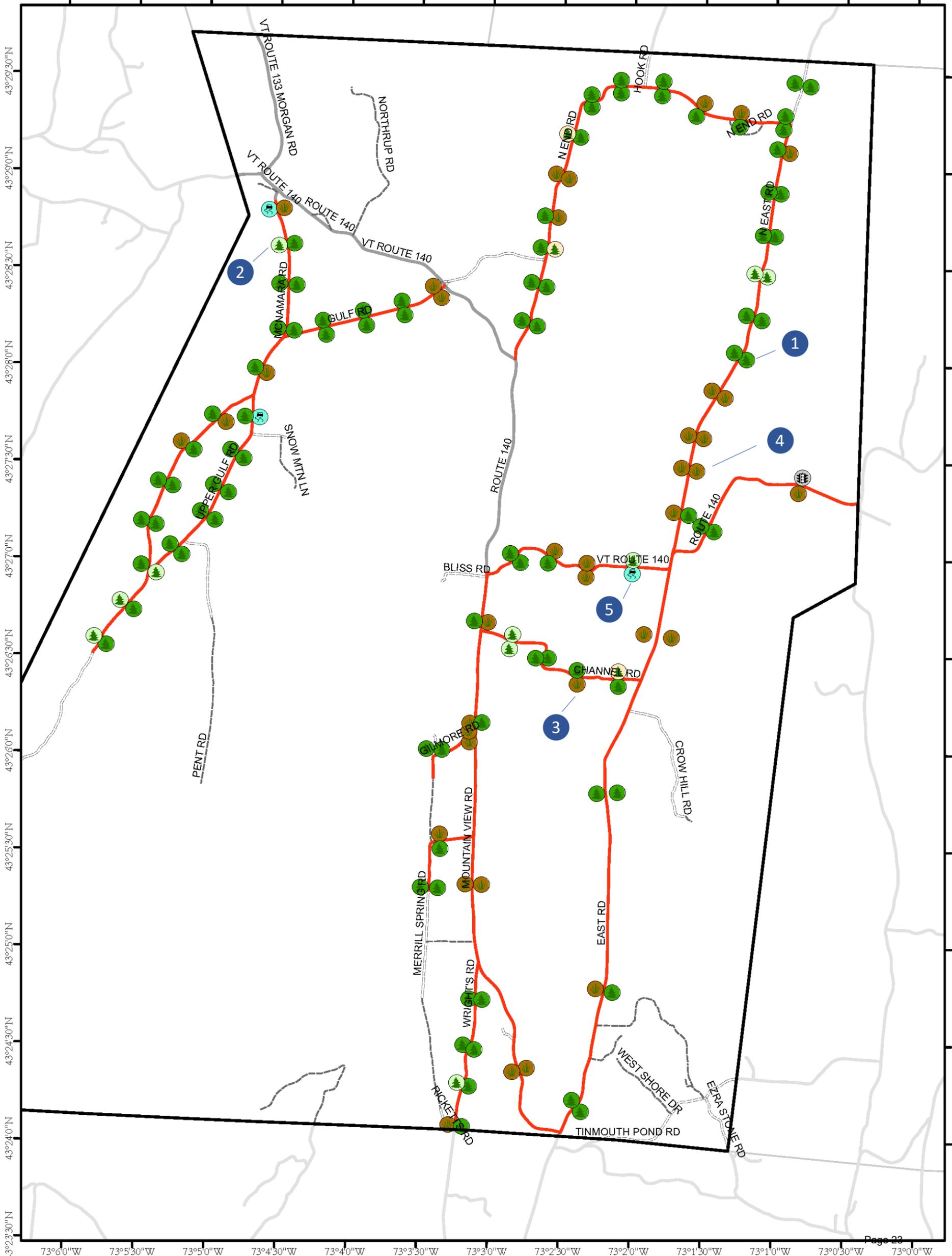
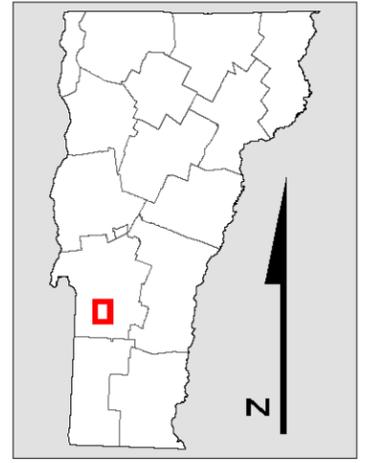
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1:35,000

0 0.38 0.75 1.5 Miles

Legend

- | | |
|--|--|
|  2018 Inventory Roads | Vegetation Type |
|  Paved |  Mature Overstory (>6" dbh) |
|  Unpaved |  Immature Overstory (<6" dbh) |
|  Other |  Emerging Overstory (shrubs&saplings) |
| |  Wet Area |
| |  Mowed |
| |  Street Trees |
| |  Bare |



Resilient Right-of-Ways Project Data Tinnmouth, VT

3. Manageable Vegetation Width



Vermont Department of
Forests, Parks & Recreation

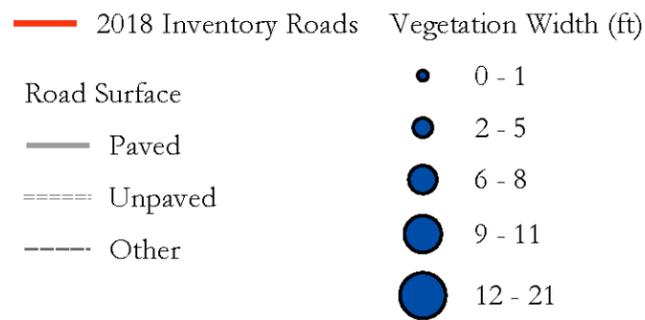
Cartographer: Elizabeth Bannar

Date: 9/18/2018

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Legend



WHAT

In most towns, the right-of-way spans 49.5 feet, or 24.25' in each direction from the centerline of the road. The travelled width of an unpaved road and the clear 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 "leftover" after consideration of the width of the road and its associated infrastructure.

HOW

In this study, manageable vegetation width was calculated through a three-step process.



1. The road width was measured from travelled edge to travelled edge using a 25' tape measure.
2. The cleared zone (whether mowed, ditched, or bare) was measured on each side of the road using the same tape measure.
3. The manageable vegetation width was calculated for each side of the road by subtracting half the road width and the side-specific clear zone width from half of the right-of-way width, or, manageable vegetation width = (ROW width/2) - (Road width/2) - clear zone width.

WHY

Measuring the width of the road, the width of the clear zone on each side, and calculating the manageable vegetation width on each side of a rural road tells us:



Where opportunities exist to perform recommended silvicultural practices on significant swaths of publicly managed roadside forest.



Where wide roads and ditches or clear 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 to reduce dust, or increase a desired aesthetic (more trees, more fields, or selected trees) along designated scenic routes.

STATISTICS IN TINMOUTH

The manageable vegetation width in the on the **approximately 23 miles** of surveyed rural routes in Tinnmouth exhibited the following general characteristics:

Road width (ft)

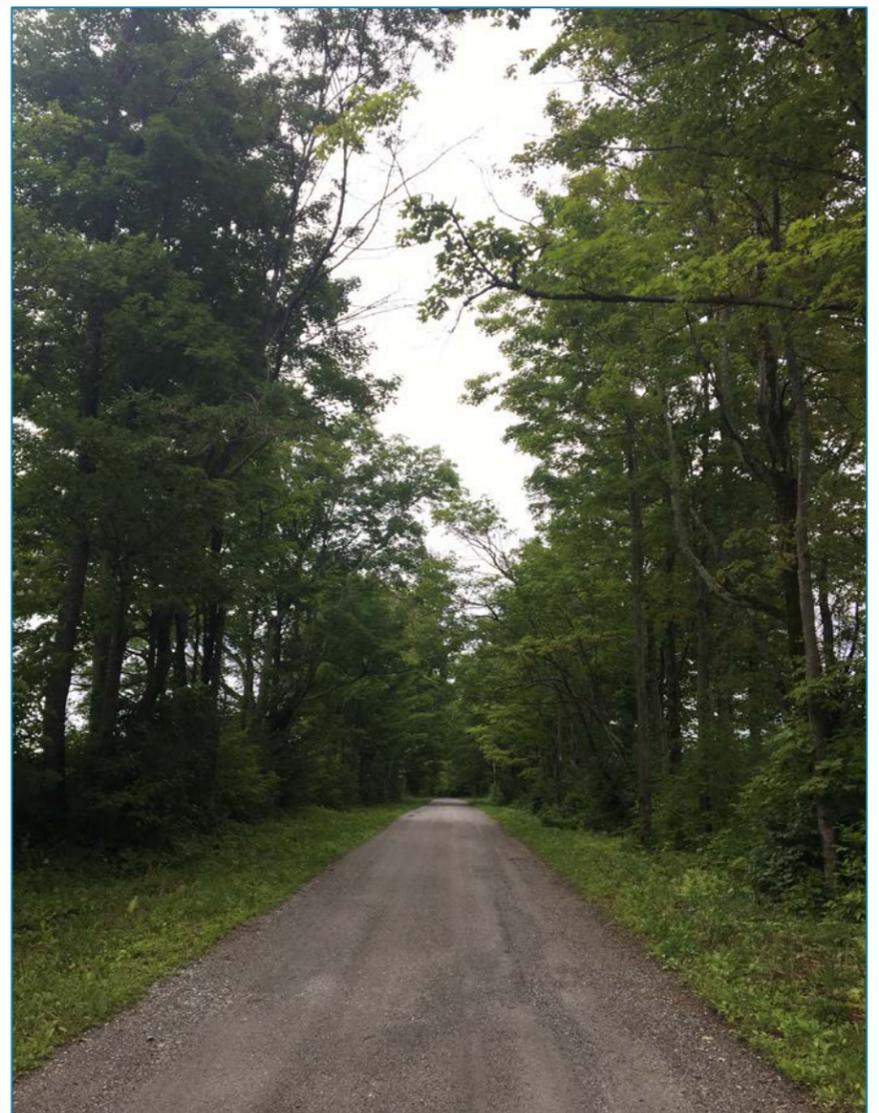
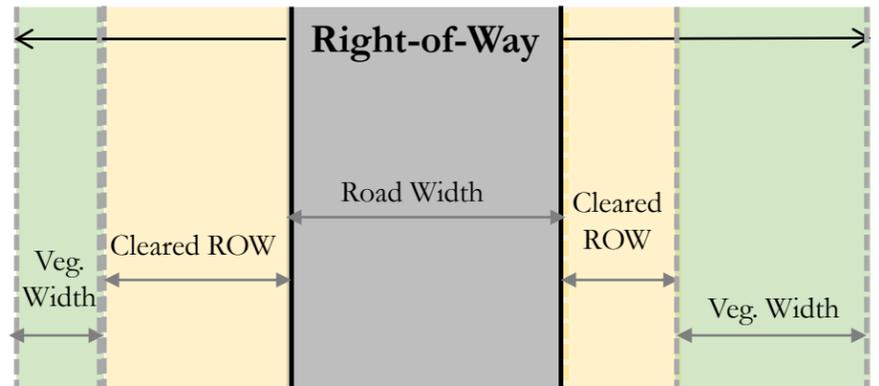
- Range: 9– 24
- Average: 17.7
- Median (or, middle value): 18
- Mode (or, most frequent value): 22

Clear zone width (ft)

- Range: 2 – 20
- Average: 9.7
- Median (or, middle value): 8
- Mode (or, most frequent value): 8

Manageable vegetation width (ft)

- Range: 0 – 15
- Average: 6.4
- Median (or, middle value): 7
- Mode (or, most frequent value): 8



Resilient Right-of-Ways Project Data Tinnmouth, VT

3. Manageable Vegetation Width



Vermont Department of
Forests, Parks & Recreation

Cartographer: Elizabeth Bannar

Date: 9/18/2018

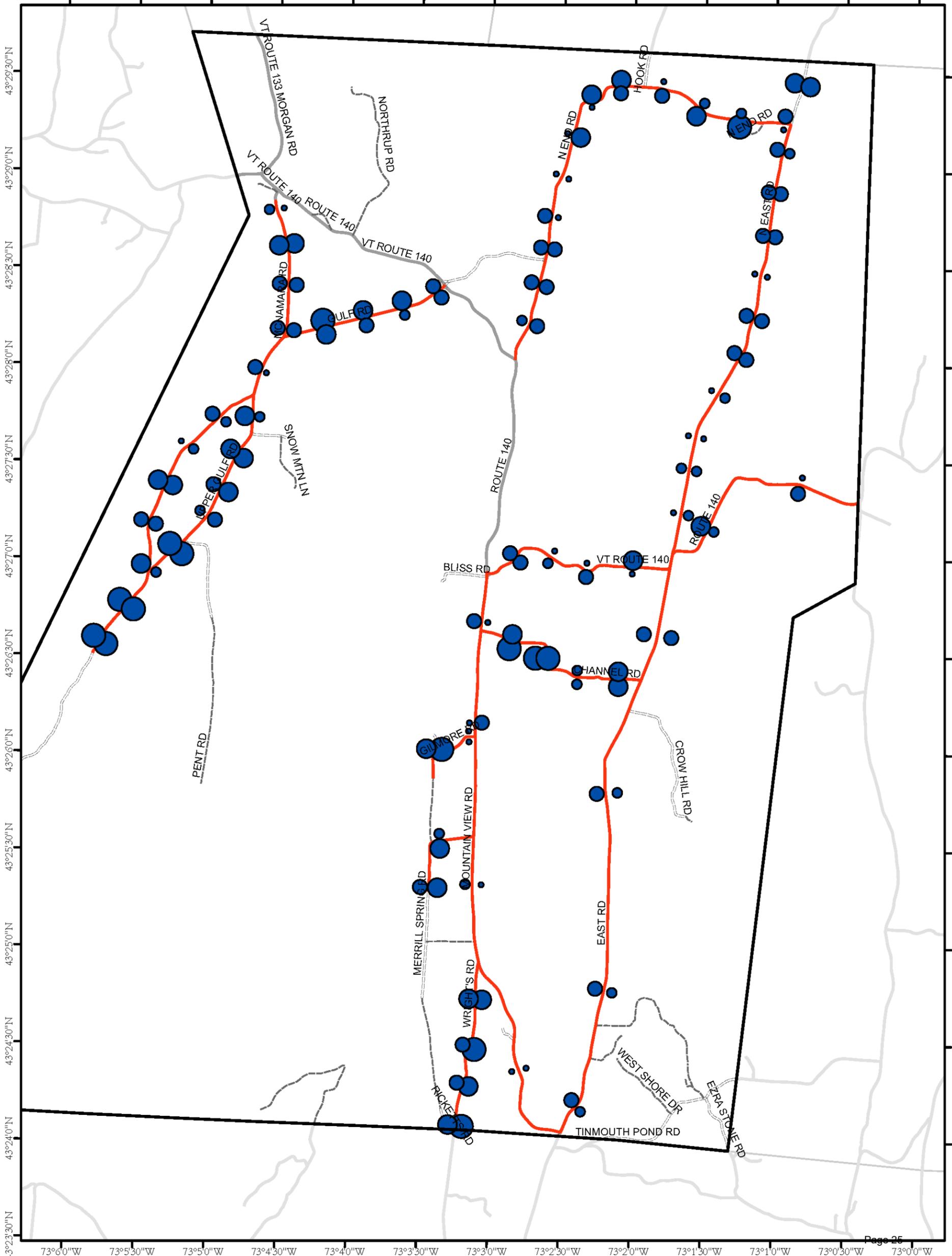
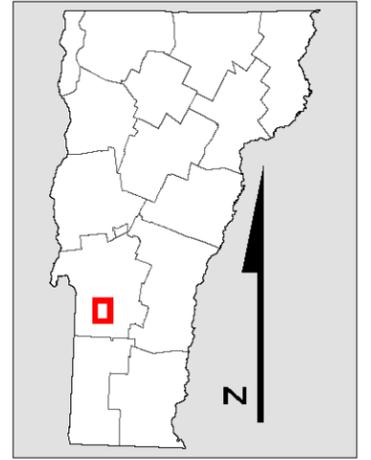
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1:35,000

0 0.38 0.75 1.5 Miles

Legend

- | | | |
|---|----------------------|---|
|  | 2018 Inventory Roads | Vegetation Width (ft) |
|  | Paved |  0 - 1 |
|  | Unpaved |  2 - 5 |
|  | Other |  6 - 8 |
| | |  9 - 11 |
| | |  12 - 21 |



Resilient Right-of-Ways Project Data Tinnmouth, VT

4. Roadside Ash Impact



Vermont Department of
Forests, Parks & Recreation

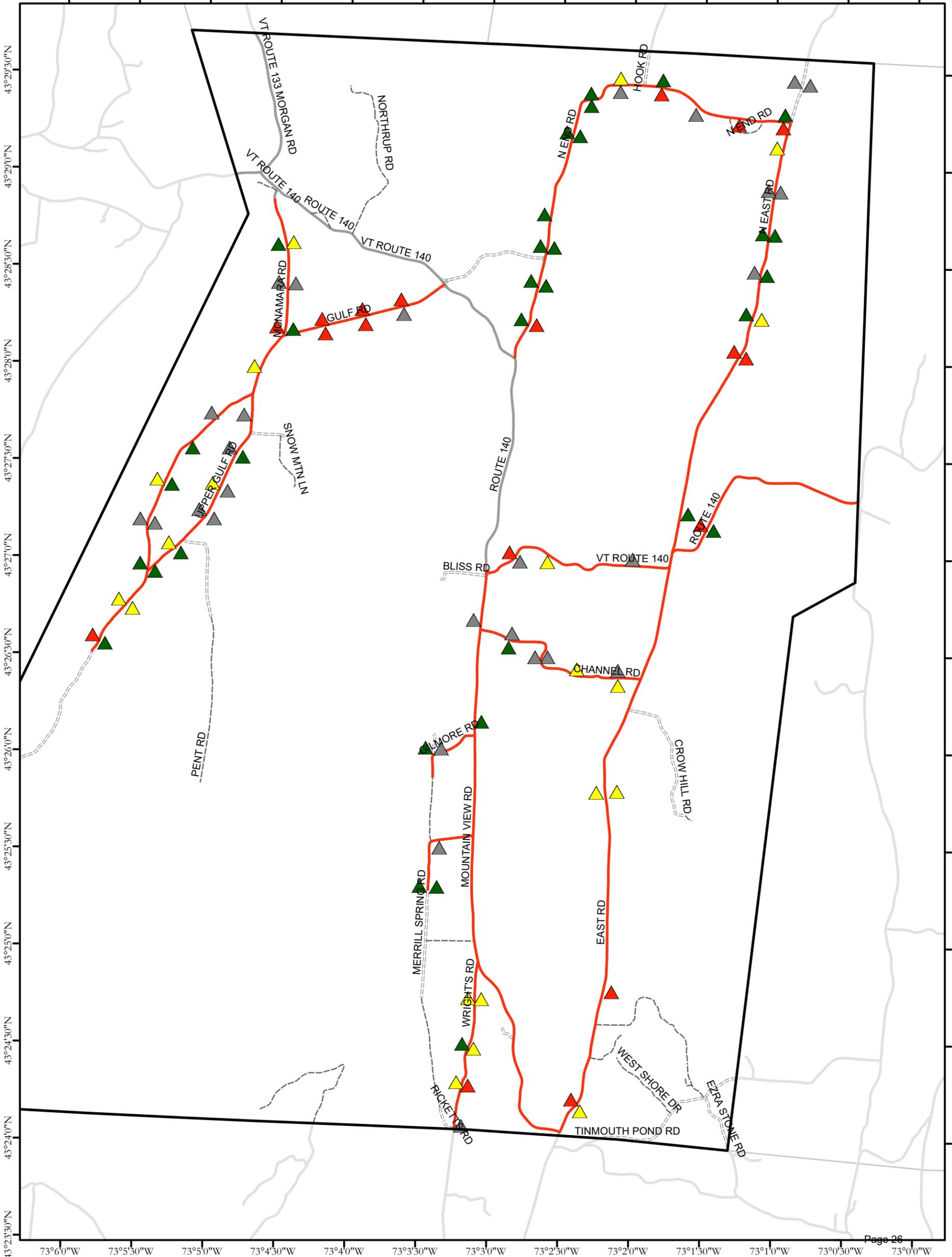
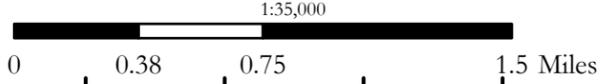
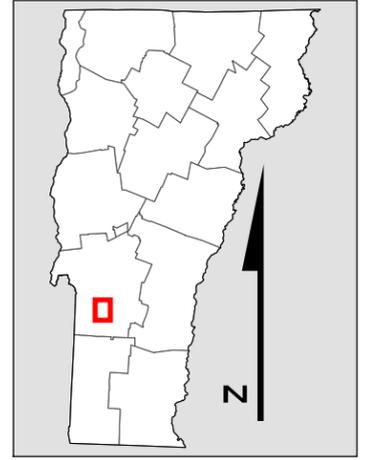
Cartographer: Elizabeth Bannar

Date: 10/16/2018

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

- | | |
|----------------------|------------------------------------|
| 2018 Inventory Roads | Roadside Ash Count Per Plot |
| Paved | None |
| Unpaved | Low (1-2) |
| Other | Medium (3-4) |
| | High (5+) |



Resilient Right-of-Ways Project Data Tinnmouth, VT

5. Agriculture in the Right-of-Way



Vermont Department of
Forests, Parks & Recreation

Cartographer: Elizabeth Bannar

Date: 10/17/2018

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1:35,000

0 0.38 0.75 1.5 Miles

Legend

— 2018 Inventory Roads

Road Surface

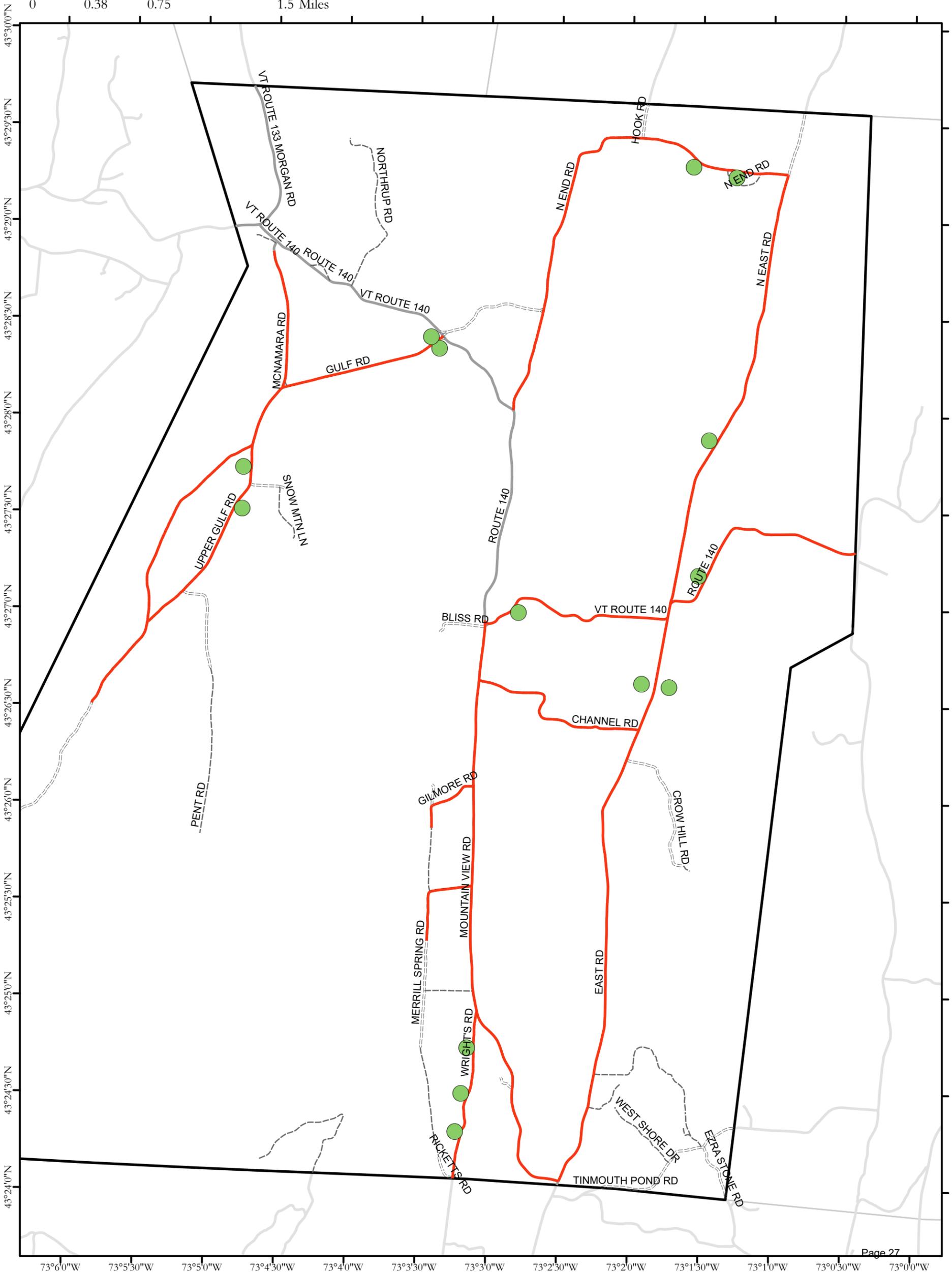
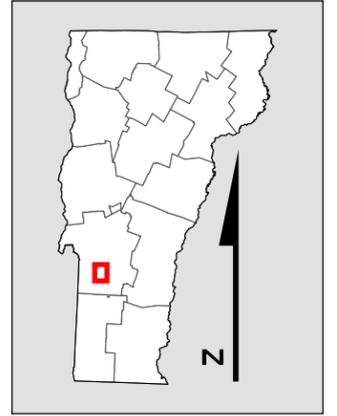
— Paved

==== Unpaved

----- Other

Agriculture in ROW

● Yes



Resilient Right-of-Ways Project Data Tinnmouth, VT

6. Overhead Utility & Vegetation Regeneration Opportunity



Vermont Department of
Forests, Parks & Recreation

Cartographer: Elizabeth Bannar

Date: 10/17/2018

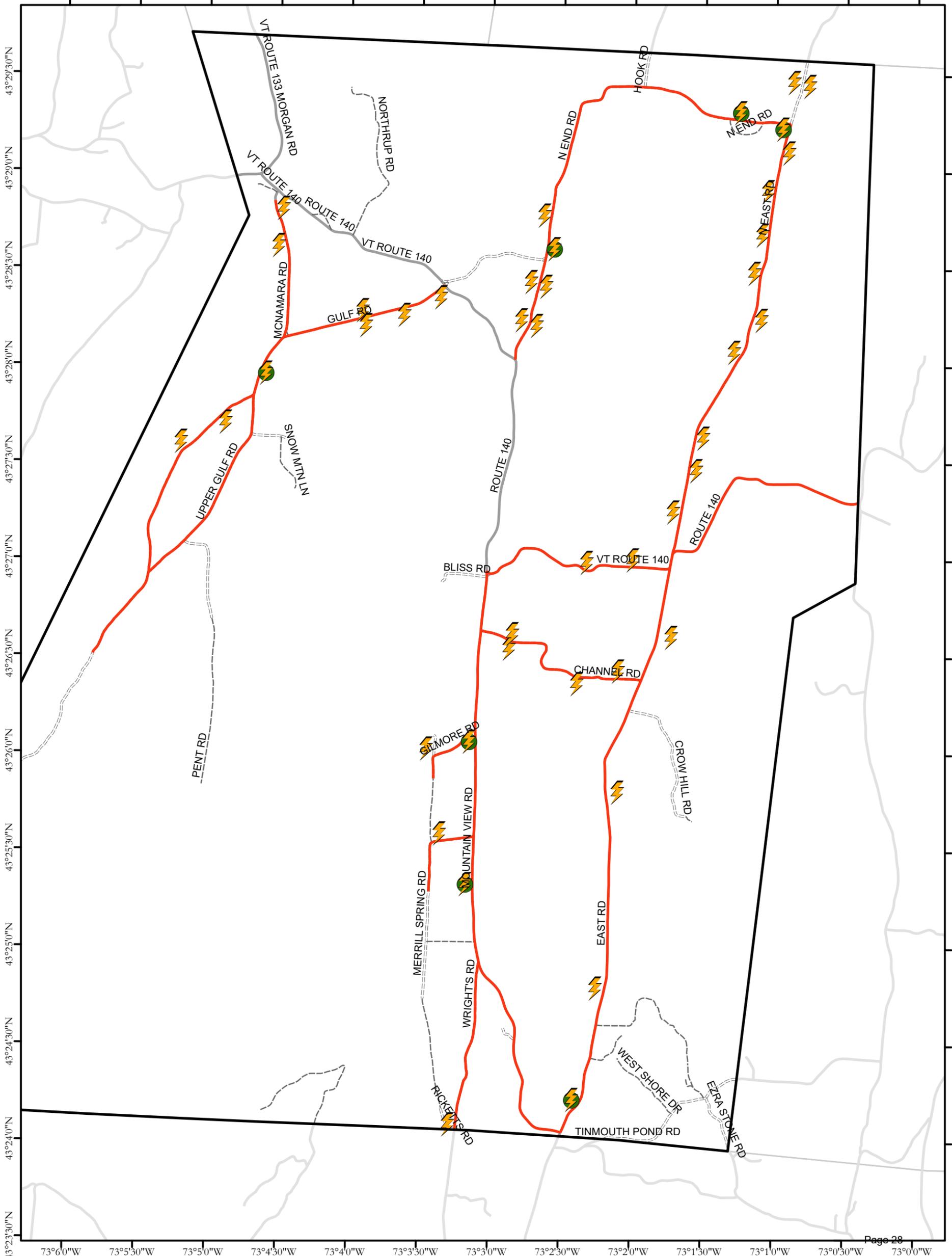
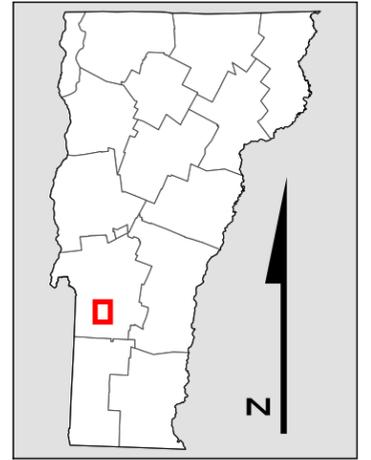
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1:35,000

0 0.38 0.75 1.5 Miles

Legend

- 2018 Inventory Roads
- Utility Wire Present
- Paved
- Unpaved
- Other
- Promote Regen Under Powerline
Yes



Resilient Right-of-Ways Project Data Tinnmouth, VT

7. Hedgerow Locations



Vermont Department of
Forests, Parks & Recreation

Cartographer: Elizabeth Bannar

Date: 9/11/2018

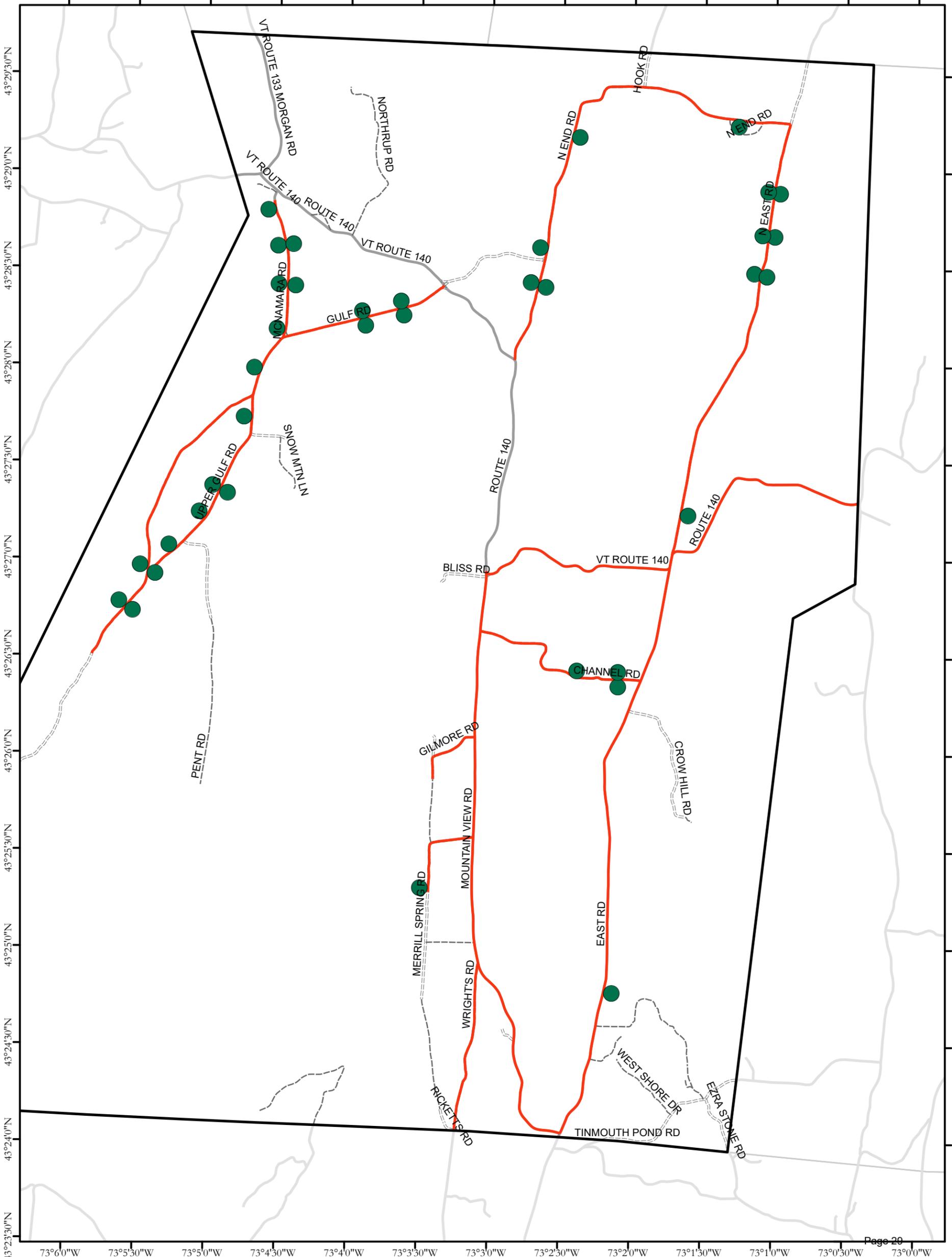
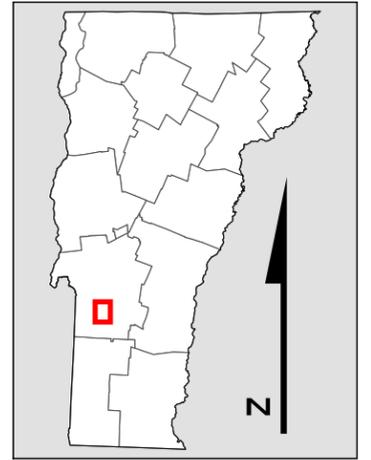
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1:35,000

0 0.38 0.75 1.5 Miles

Legend

- 2018 Inventory Roads
- Resilient ROW Hedgerow
- Yes
- Paved
- Unpaved
- Other



Resilient Right-of-Ways Project Data Tinnmouth, VT

8. Softwood Canopy Cover



Vermont Department of
Forests, Parks & Recreation

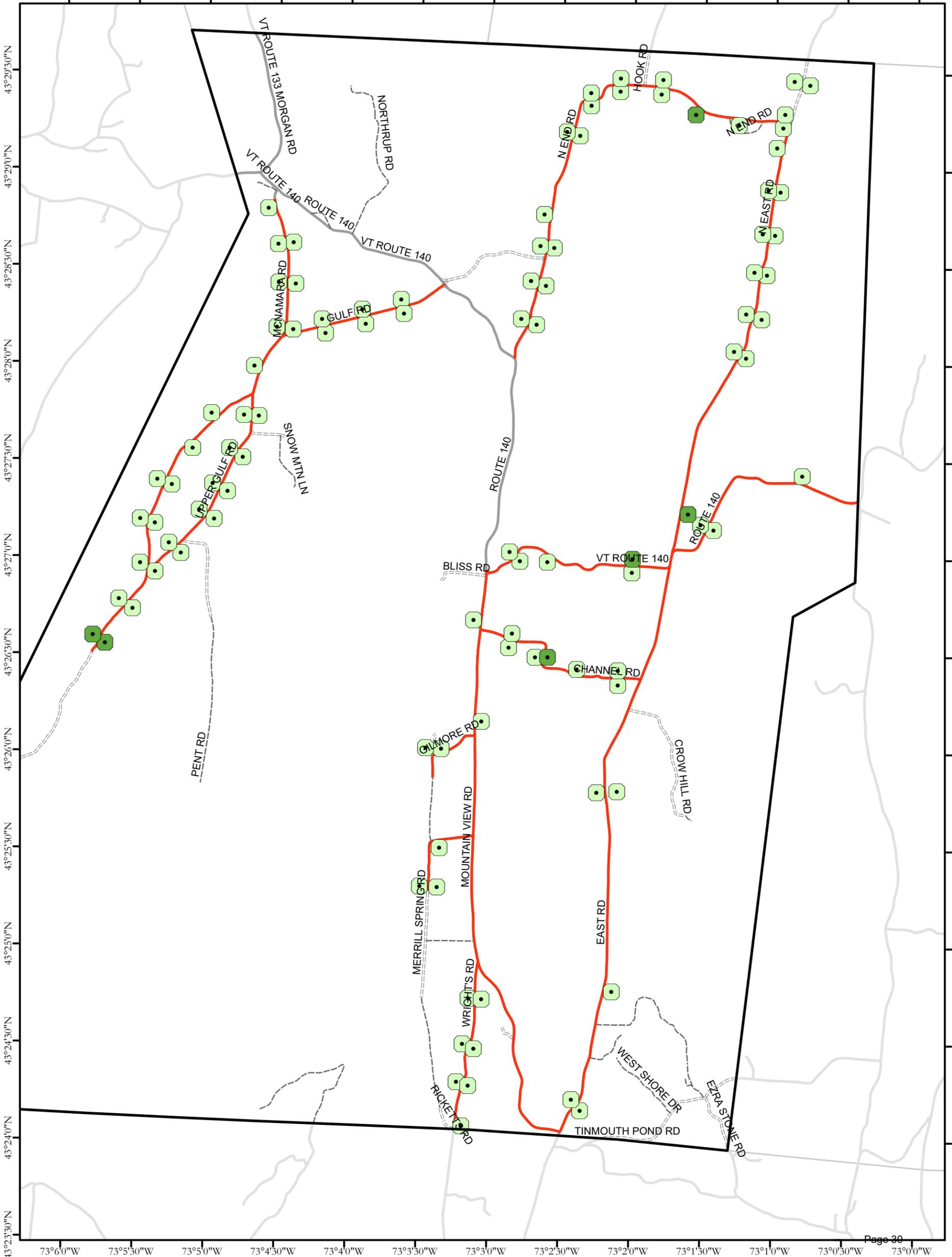
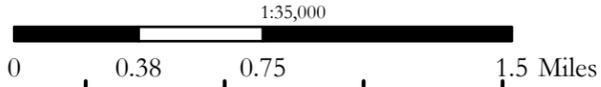
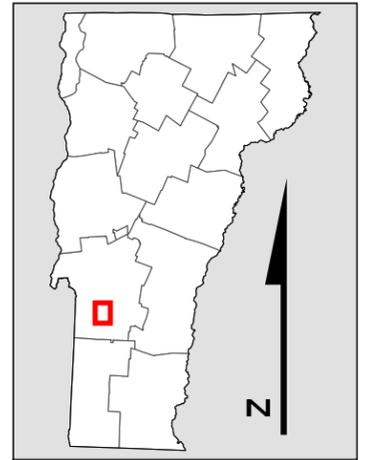
Cartographer: Elizabeth Bannar

Date: 9/11/2018

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Legend

- | | | |
|---|----------------------|---|
|  | 2018 Inventory Roads | Resilient ROW |
|  | Paved | % Softwood Canopy |
|  | Unpaved |  <25 |
|  | Other |  >25 |



Resilient Right-of-Ways Project Data Tinnmouth, VT

9. Overstory Health & Mechanical Damage



Vermont Department of
Forests, Parks & Recreation

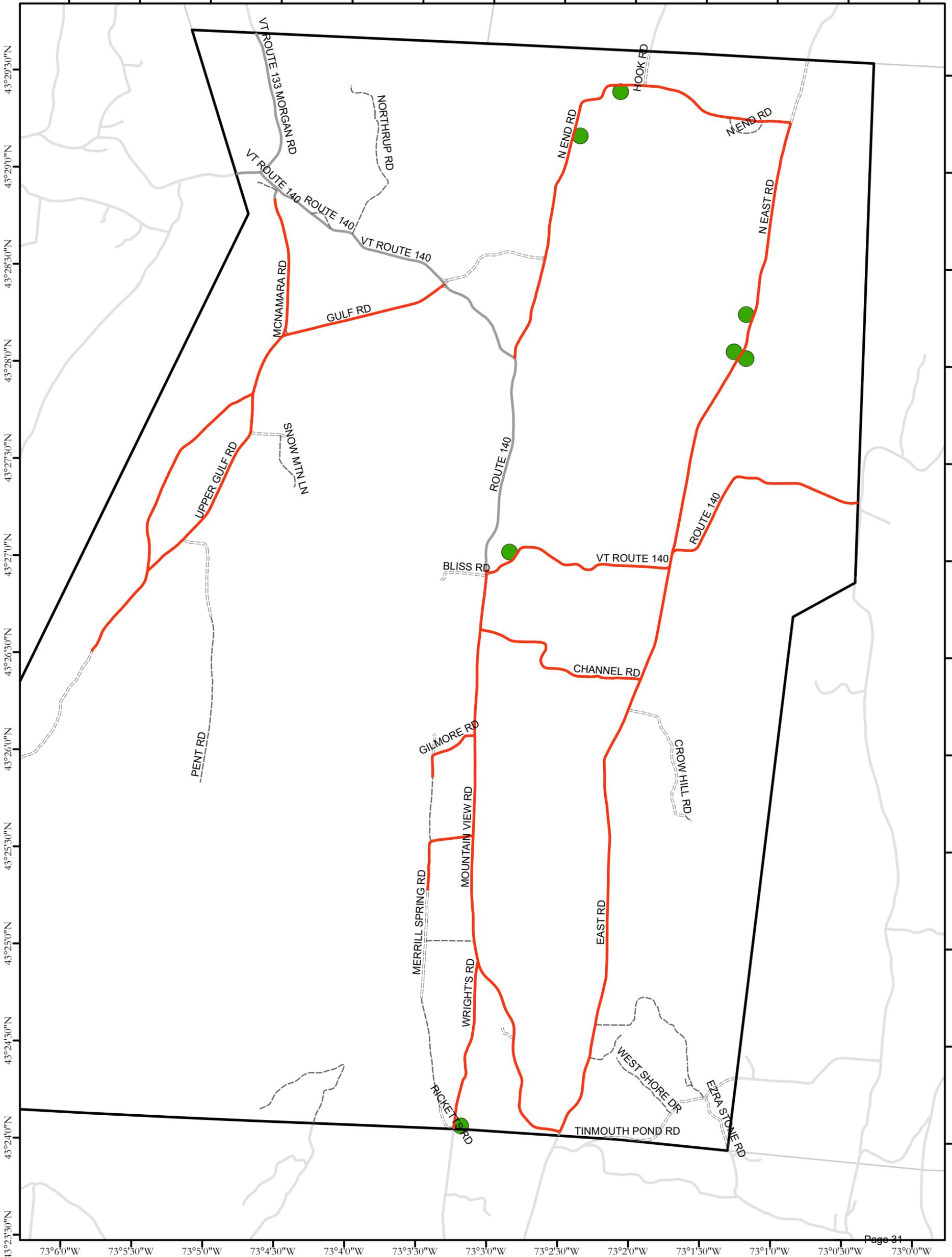
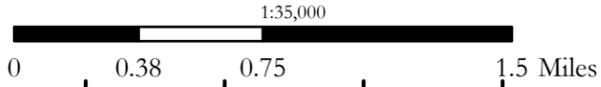
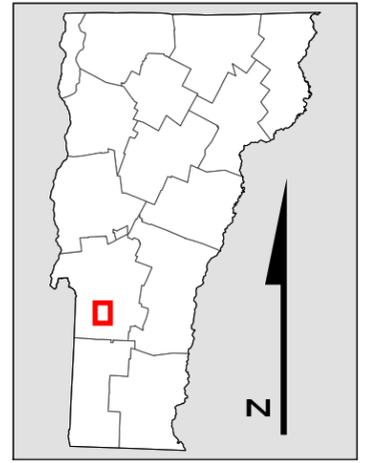
Cartographer: Elizabeth Bannar

Date: 9/11/2018

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

- | | |
|----------------------|----------------------------------|
| 2018 Inventory Roads | Overstory Health + Damage |
| Paved | Fair health, low damage |
| Unpaved | Fair health, high damage |
| Other | Poor health, low damage |
| | Poor health, high damage |



Resilient Right-of-Ways Project Data Tinnmouth, VT

10. Historic Tree Location & Health



Vermont Department of
Forests, Parks & Recreation

Cartographer: Elizabeth Bannar

Date: 10/17/2018

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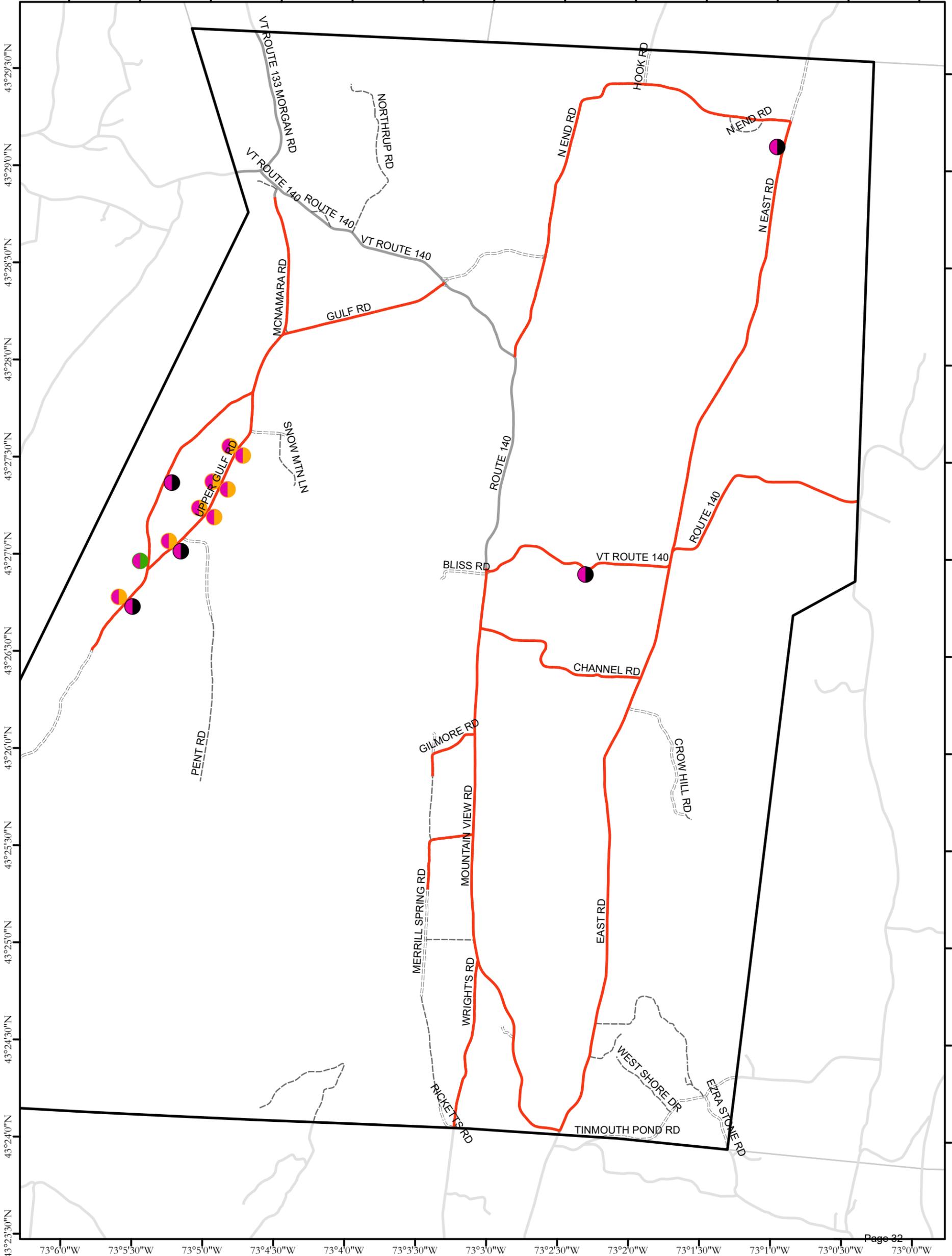
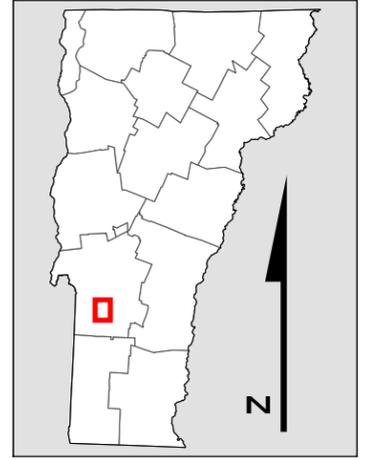
0 0.38 0.75 1.5 Miles

Legend

- 2018 Inventory Roads
- Paved
- Unpaved
- Other

Historic Trees, Health

- Historic Trees, Good
- Historic Trees, Fair
- Historic Trees, Poor



Resilient Right-of-Ways Project Data Tinmouth, VT

11. Invasive Plant Species Data Source: iNaturalist

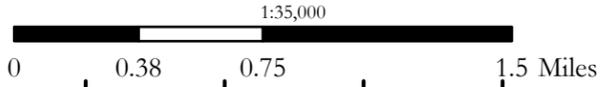


Vermont Department of
Forests, Parks & Recreation

Cartographer: Elizabeth Bannar

Date: 10/17/2018

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— 2018 Inventory Roads

Road Surface

— Paved

--- Unpaved

--- Other

Invasive Plant Species

● European barberry

● Morrow's honeysuckle

● Tatarian honeysuckle

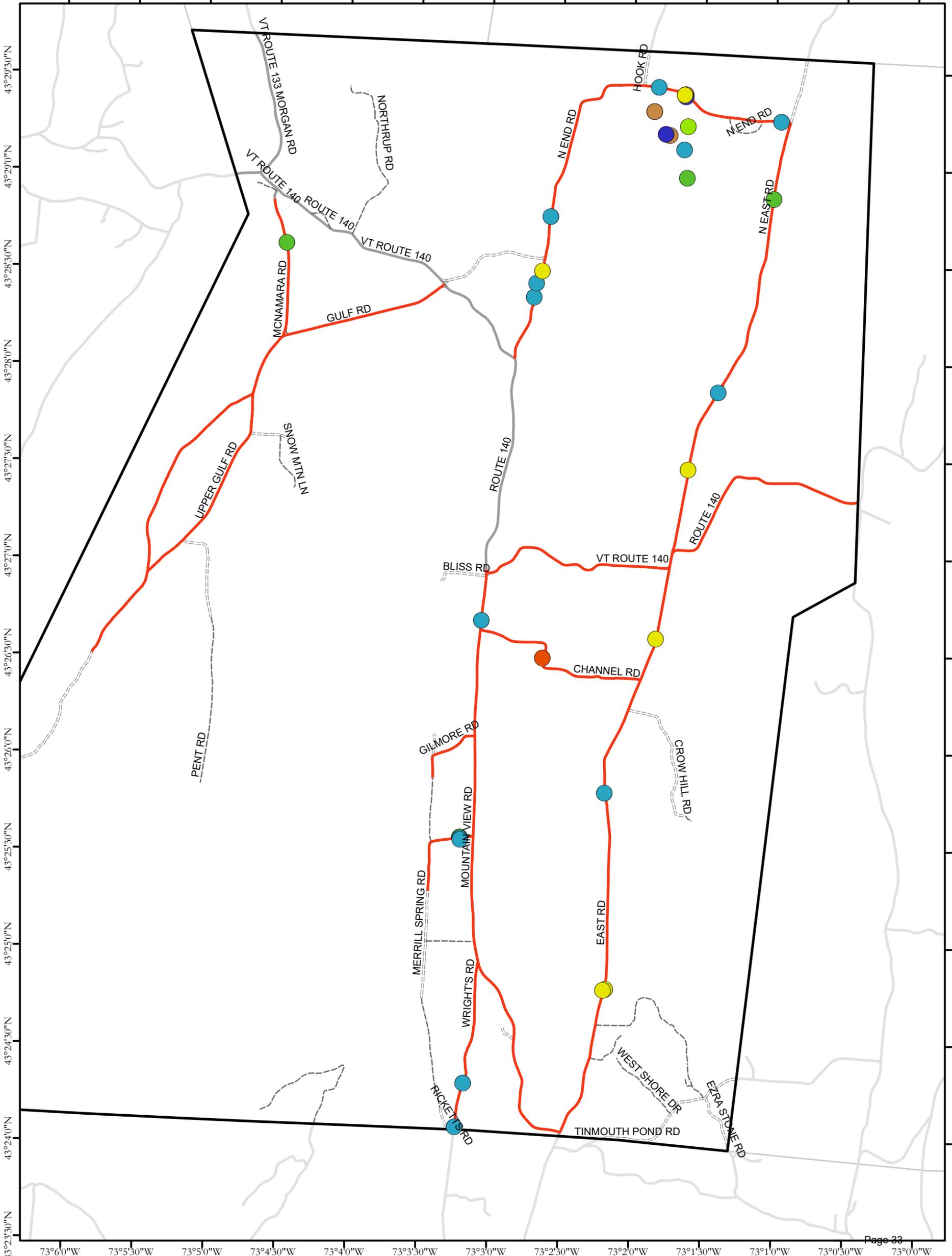
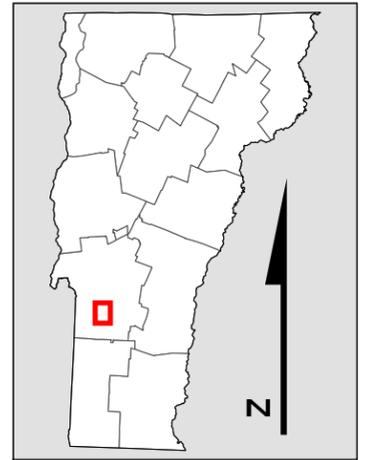
● common buckthorn

● garlic mustard

● poison ivy

● purple loosestrife

● wild parsnip



Resilient Right-of-Ways Project Data Tinnmouth, VT

12. Vegetation Preservation Opportunities



Vermont Department of
Forests, Parks & Recreation

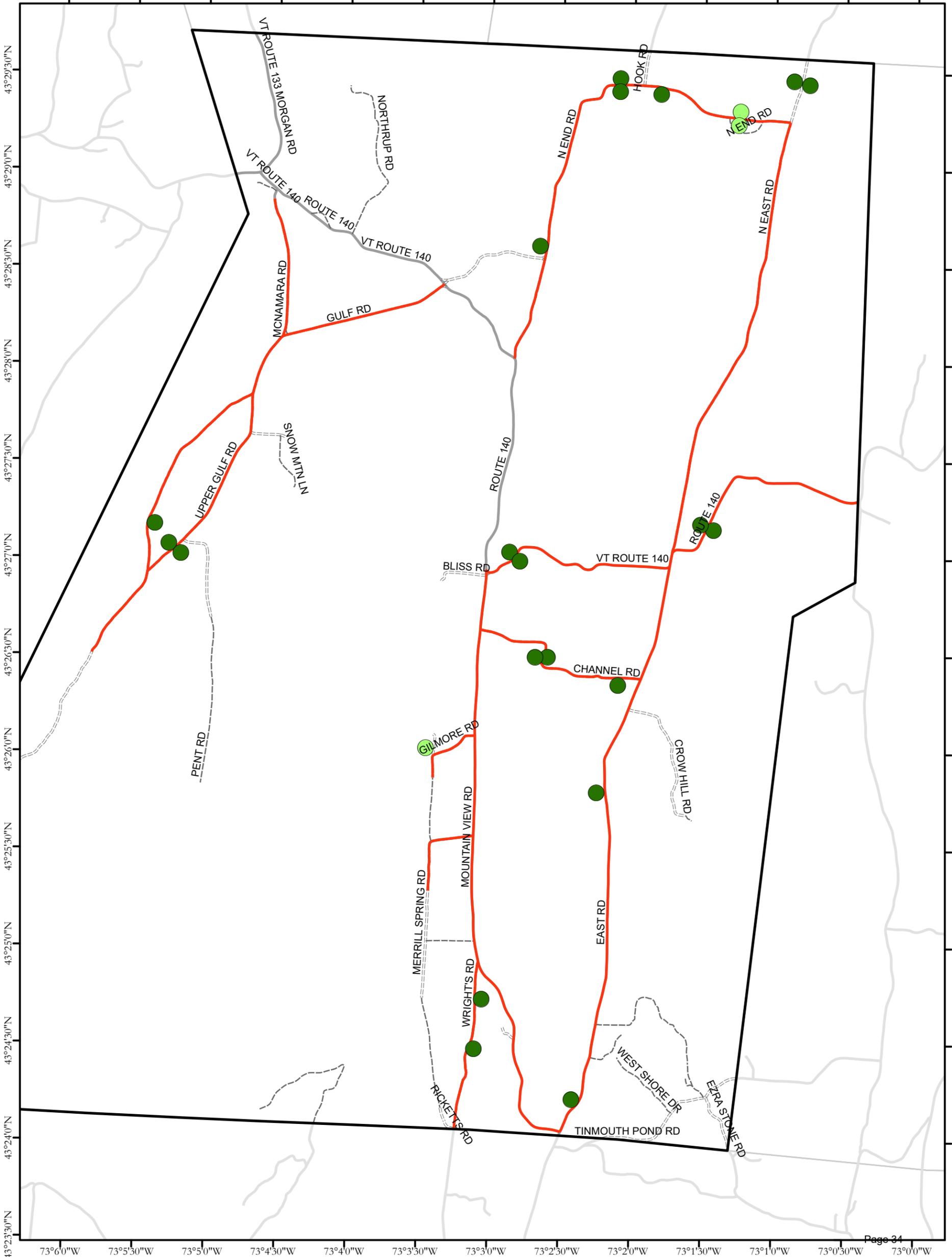
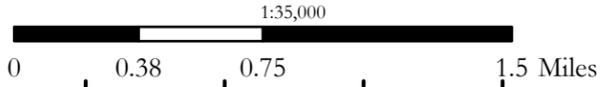
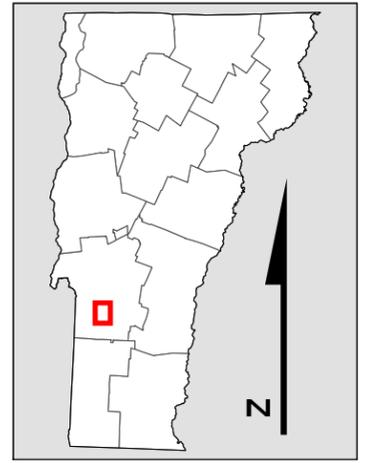
Cartographer: Elizabeth Bannar

Date: 10/17/2018

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

- 2018 Inventory Roads
- Paved
- Unpaved
- Other
- Preservation Opportunity
- Preserve, herbaceous buffer
- No cut, trees



Resilient Right-of-Ways Project Data Tinnmouth, VT

13. Planting & Regeneration Opportunities in Roadside Communities



Vermont Department of
Forests, Parks & Recreation

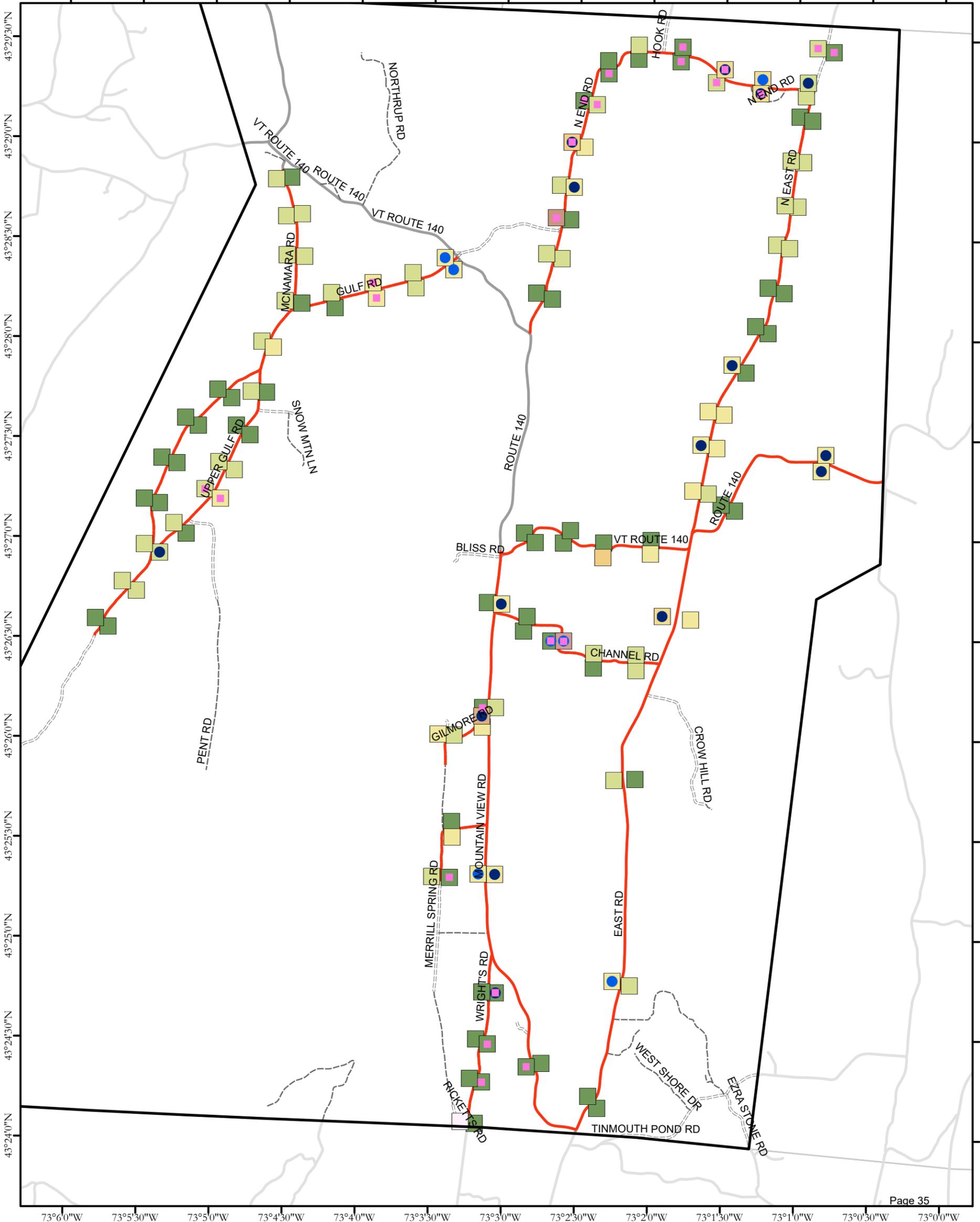
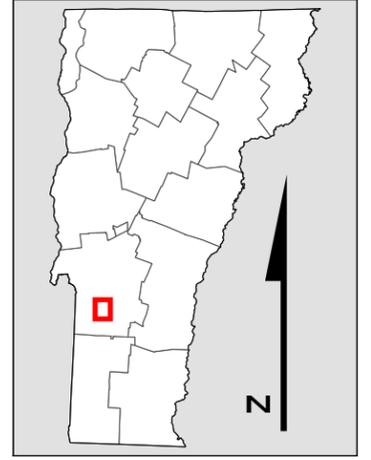
Cartographer: Elizabeth Bannar

Date: 10/17/2018

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- | | |
|------------------------|---------------------------|
| — 2018 Inventory Roads | Roadside Community |
| — Road Surface | ■ Forest |
| — Paved | ■ Tree Plantation |
| --- Unpaved | ■ Hedgerow to Field/Water |
| --- Other | ■ Hay Field |
| Promote Regen | ■ Agriculture Field |
| ■ Yes | ■ Street Trees/Lawn |
| | ■ Lawn |
| Planting | ■ Water Edge |
| ● Other | ■ Wetland |
| ● Trees | ■ Riparian Zone |
| | ■ Other |



Resilient Right-of-Ways Project Data

14. Thinning Opportunities & Mature Short-lived Trees Tinmouth, VT



Vermont Department of
Forests, Parks & Recreation

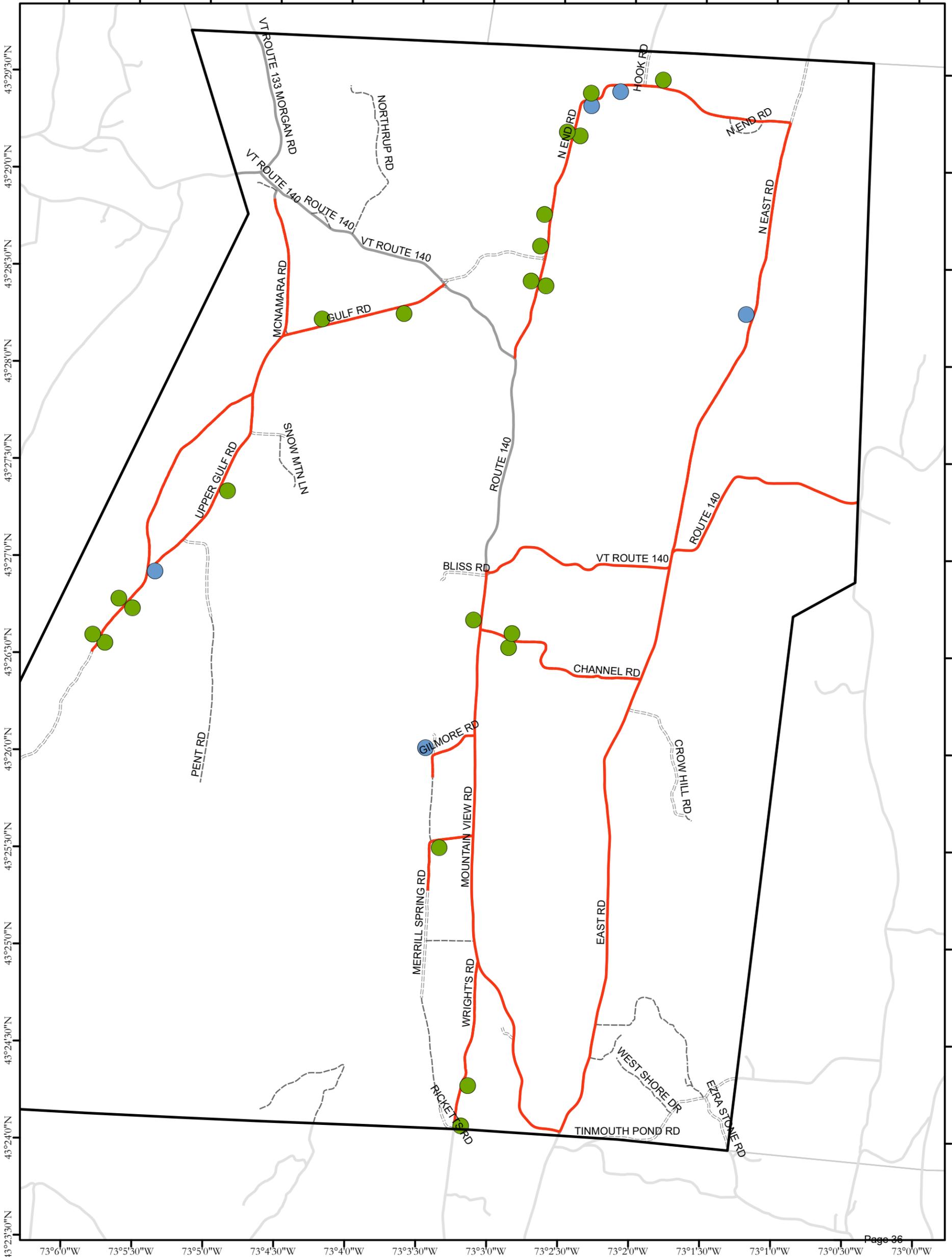
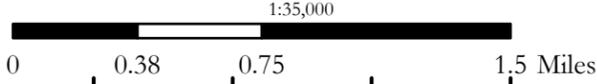
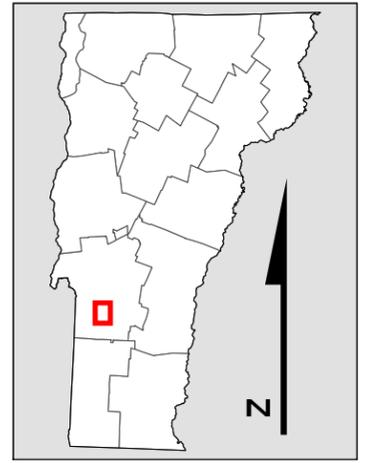
Cartographer: Elizabeth Bannar

Date: 10/17/2018

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Legend

- 2018 Inventory Roads
- Thinning Opportunities: Yes, trees
- Road Surface: Paved
- - - - Road Surface: Unpaved
- - - - Road Surface: Other
- Mature Short-lived Trees: Yes



Appendix A:

Rural Road Resilient Right-of-Ways Project
Town of Tinmouth Letter of Collaboration

RESILIENT RIGHT-OF-WAYS

PLANNING FOR SAFE AND HEALTHY RURAL ROADSIDE VEGETATION

LETTER OF COLLABORATION

This letter summarizes the collaborative work to be completed by the Urban and Community Forestry Program of the Vermont Department of Forests, Parks and Recreation (FPR) and the Town of Tinmouth.

PROJECT DESCRIPTION

The Resilient Right-of-Way projects connects ten communities in Vermont with resources and processes that advance understanding of the role of rural roadside vegetation in supporting local environmental, economic, and cultural values. Through an on-the-ground vegetation assessment and analysis of town priorities, Vermont FPR staff will work alongside the Town of Tinmouth to develop recommendations for long-term resilience of its roadside forests, hedgerows, and other vegetated landscapes. Work will focus on the role of vegetation to manage stormwater runoff, provide native habitat, and create scenic and cultural roads that preserve the rural nature of Vermont's backroads. The Resilient Right-of-Ways project also prioritizes the necessary physical requirements of safe and well-maintained roads. Finally, the project considers the importance of cost-efficient and effective road maintenance solutions that maximize road safety, comply with new stormwater regulations, maintain scenic sections of canopy roads, and are sensitive to the environmental concerns of landowners in each town. Funded by the US Forest Service, this research and outreach initiative will also feed into updated educational material and technical assistance to be offered state wide beginning in 2018.

DELIVERABLES

Deliverables will be tailored to the town of Tinmouth's specific needs and may include, but are not limited to:

- 1) a roadside vegetation assessment (both desk- and field-based) of at least 50% of the unpaved roads;
- 2) a report, interactive tool, or map summarizing assessment results;
- 3) identification of best practices and management priorities that maximize public benefits from safe and healthy roadside vegetation; and
- 4) facilitation of a public meeting to share results of the assessment.

PARTNER AGREEMENT

The Town of Tinmouth will:

- Determine membership of a Project Advisory Committee.
- Provide a point of contact responsible for communication between FPR and the town.

- Convene meetings of the Project Advisory Committee with FPR staff and any interested members of the public to:
 - outline the project scope;
 - review assessment results; and
 - receive a final presentation on the results and facilitate discussion about how to advance resilient roadside vegetation management.
- Notify the public of key steps in the project development and invite and manage public comment.

FPR will:

- Meet with the Tinmouth Project Advisory Committee to develop a tentative schedule for the roadside vegetation assessment, management recommendation development, and any public meeting(s).
- Conduct the roadside vegetation assessment.
- Work with the Tinmouth Project Advisory Committee and other key stakeholders to develop integrated recommendations and best practices to care and plan for Tinmouth's rural roadside vegetation.
- Provide agreed upon deliverables including the vegetation assessment summary report.

REPRESENTATIVES

- Joanne Garton will be the primary point of contact for FPR.
 - (802) 249 - 4217; joanne.garton@vermont.gov
- Cathy Reynolds for the Town of the Tinmouth, will be the primary point of contact for Tinmouth.
 - Contact information.

MONETARY OUTLINE

No money will be exchanged during this project.

TERMINATION CLAUSE

Either party may terminate this working relationship at any time, seven days after notifying the other party in writing.

EFFECTIVE DATE AND SIGNATURES

This scope of work will be effective from 4/9/18 to the end of the grant period in September 2019.

Both parties agree to the conditions as described above.

Appendix B:

Rural Road Resilient Right-of-Ways Project
Town of Tinmouth Work Plan
July 17, 2018

Rural Road Resilient Right-of-Ways Vegetation Assessment

Town of Tinmouth Work Plan

July 17, 2018

Town priorities

Maintain healthy forests and roadside vegetation along Tinmouth's rural roads by planning for vegetation management practices appropriate to the types of right-of-way roadside communities found in the town. Through this rural roadside vegetation assessment and resulting action plan, the town will examine:

- management of roadside forests to promote healthy and long-lasting tree canopies;
- areas that merit preservation of vegetation for environmental or cultural reasons;
- areas that are relatively free of invasive plant species;
- assess areas at higher risk from storm damage that causes trees to fall on or across the road (including areas with high concentrations of ash trees);
- areas affected by utility lines; and
- areas in conflict with road maintenance equipment.

Additional deliverables will explore ways to:

- promote relevant communication between the road foreman and Tinmouth Tree Warden;
- reduce the spread of roadside invasive species, specifically by addressing mowing practices that may facilitate migration and/or reproduction of these species;
- provide outreach and education regarding emerald ash borer and ash tree management;
- provide outreach and education regarding the use of iNaturalist to log invasive species (or any species) in the area;
- inform the drafting of a municipal tree ordinance; and
- review best practices regarding town communication with utility companies.

In addition, Vermont Forests, Parks and Recreation staff may facilitate exploration of a **field walk** that outlines on-the-ground management techniques recommended for a specific road segment within the town. This may include marking of trees to be preserved or cut within the right-of-way, and/or location of potential locations for forest regeneration or planting. The pilot project will serve to highlight site-appropriate species composition for improved forest health in roadside environments. If the town of Tinmouth would like to pursue this, the location will be chosen at the completion of the road assessment.

Priority Roads

The road assessment will likely occur on July 23rd and 24th. The assessed routes will cover most roads in Tinmouth as outlined below, focusing on unpaved or “back” roads. Assessments will also include some paved roads (portions of Routes 2, 3 (East Road) and 140.

Currently, the roadside vegetation assessment focuses on 100-foot long road plots assessed approximately every quarter mile of road. Plots register data for both the left- and right-hand side of the roads as travelled S-N and W-E. Selected plots will convey a typical representation of the roadside environment at or near that quarter-mile marker.

Tinmouth routes are also sketched and labeled on [this map](#).

Route 1 – Approx. 6 miles

North End Road (TH 7) from intersection with Rte 140 north to TH 9 – TH 9 west and south until intersection with Rte 140.

Route 2 – Approx. 5.5 miles

McNamara Road - Gulf Road from Rte 140 to Rte 133

Route 3 – Approx. 3.5 miles

Rte 140 from intersection of East Road (TH 3) to Tinmouth Village center – Mountain View Road (TH 2) south to Channel Road – Channel Road to TH 3 - TH 3 north to Rte. 140

Route 4 – Approx. 2.5 miles

Merrill Road – Gilmore Road – Pucker St – Wright’s Road south to town border with Danby

Route 5 – Approx. 6 miles, as time permits

Paved roads: East Road (TH 3) from Channel Road (TH 19) to Mountain View Road (TH 2) – Mountain View Road north to Tinmouth Village center

Data Collection

Collected data consists of:

- Survey Data
- Direction of Travel
- Road side
- Road width and cleared or mowed ROW width
- Width of municipally managed vegetation in ROW
- ROW community type (Forest or forest edge, Street Trees, Wet Areas, Mowed, Bare)
- ROW community sub-type (further defines community type listed above, e.g. mature forest with established understory, seasonally mowed area, pond)
- Roadside community (e.g. lawn, forest, water body, street trees, hay field, agriculture)
- Roadside ash > 6’ dbh (0, Low = 1-2 trees, Medium = 3-4 trees, High = 5+ trees)

- Overstory Health (Good, Fair, Poor)
- Mechanical damage to trees (None, Low, High)
- Steep slope in ROW (Up, Down, None)
- Utility Present?
- Softwood > 25% canopy cover?
- Trees are part of a hedgerow?
- Historic Trees?
 - Historic Tree Health (Good, Fair, Poor, Dead)
- Agriculture in ROW?
- Field Recommendation
 - No cut?
 - Preserve herbaceous buffer?
 - Promote regeneration?
 - Watch for mature short-lived trees?
 - Planting opportunity (trees or other)?
 - Thinning opportunity (trees or other)?
- Comments

Also, representative data of invasive species present along roadsides recorded as point data using the Mapping for Healthy Forests Vermont Project in iNaturalist.