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Connecticut
Distribution Vegetation Management

Outline

- Glossary of Terms
- Connecticut's Roadside Forest
- Reliability and Tree Caused Outages
- Remote Sensing Technology
- Connecticut's Proposed Vegetation Management Program
  - Department Structure
  - Program Outline
  - Budget
  - 2027-2030 Contract
- Challenges
  - Documented Notification
  - Traffic Control Costs
  - Summary



Glossary of Terms

- CI – Customers Interrupted
- CMI – Customer Minutes Interrupted
- ESRI – Environmental Systems Research institute
- ETT – Enhanced Tree Trimming
- RTR – Risk Tree Removal
- KPI – Key Performance Indicators
- METT – Maintenance Enhanced Tree Trimming
- METTL – Maintenance Enhanced Tree Trimming Laterals
- QA/QC – Quality Assurance / Quality Control
- RTW – Reliability Tree Work
- SMT – Scheduled Maintenance Trimming

Connecticut's Trees

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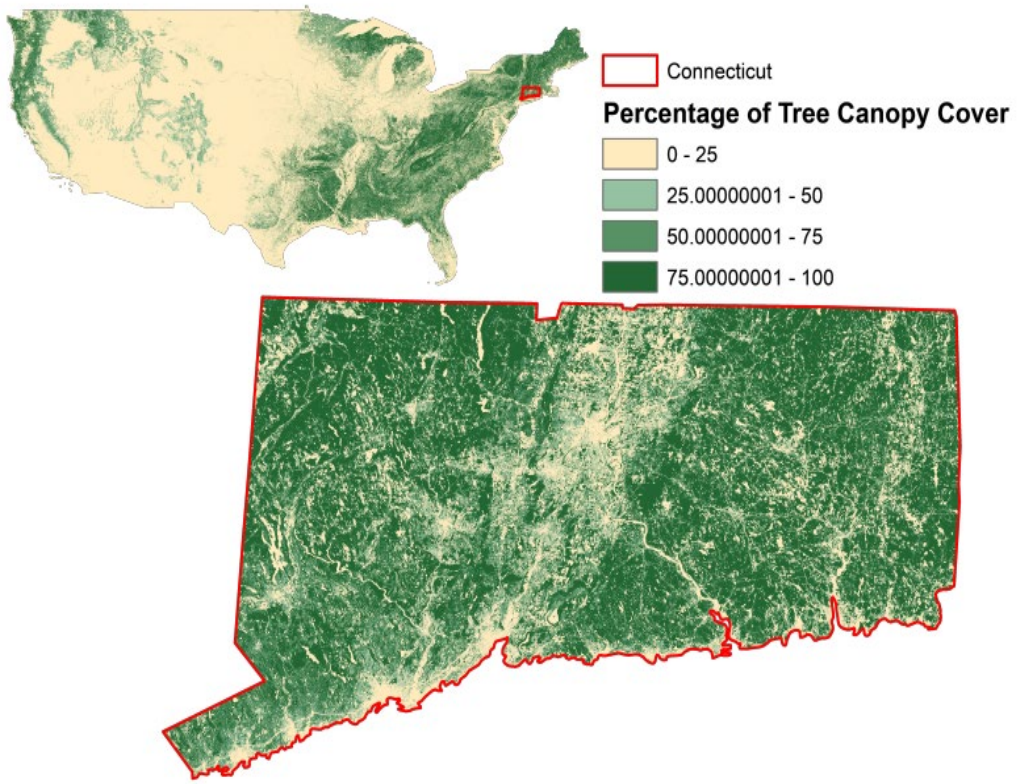
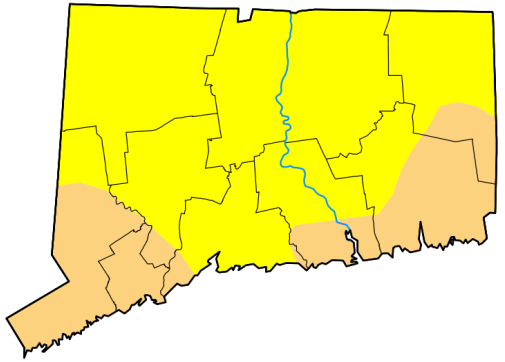
- Within the state's **149 towns** served by Eversource, we maintain **16,640 miles** of overhead electric distribution lines that are adjacent to the roadside forest
- Connecticut is a heavily forested state with aging trees that are stressed by insects, diseases, and environmental factors
- Connecticut's canopy coverage is approximately **75%-78%** per UCONN and Global Forest Watch
- Connecticut has the highest urban tree canopy cover in the nation



Environmental Factors

- Disease & Insects – spongy moth, spotted lantern fly, emerald ash borer, beech leaf disease
- Weather – drought, polar vortexes, bombogenesis, Nor'easters, microbursts, microburst, tornados, tropical storms, hurricanes, wind events

U.S. Drought Monitor
Connecticut



May 19, 2026
(Released Thursday, May. 21, 2026)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	27.29	0.00	0.00	0.00
Last Week 05-12-2026	0.00	100.00	14.18	0.00	0.00	0.00
3 Months Ago 02-17-2026	0.00	100.00	40.70	0.00	0.00	0.00
Start of Calendar Year 01-06-2026	32.92	67.08	0.01	0.00	0.00	0.00
Start of Water Year 09-30-2025	0.00	100.00	7.60	0.00	0.00	0.00
One Year Ago 05-20-2025	97.41	2.59	0.00	0.00	0.00	0.00

Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Rocky Bilotta
NCEI/NOAA


Emerald Ash Borer


Spongy Moth


Spotted Lantern Fly


Beech Leaf Disease

Reliability
Tree Caused Outages

Vegetation Causes of Customer Interruptions

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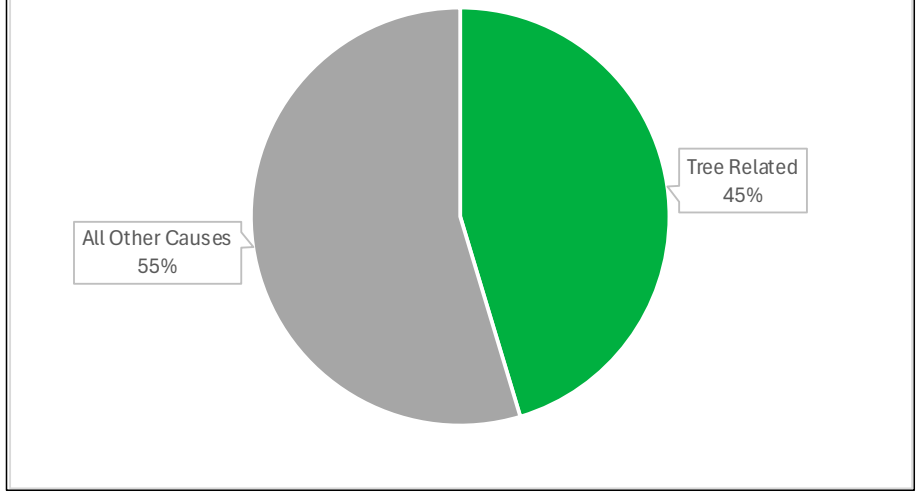
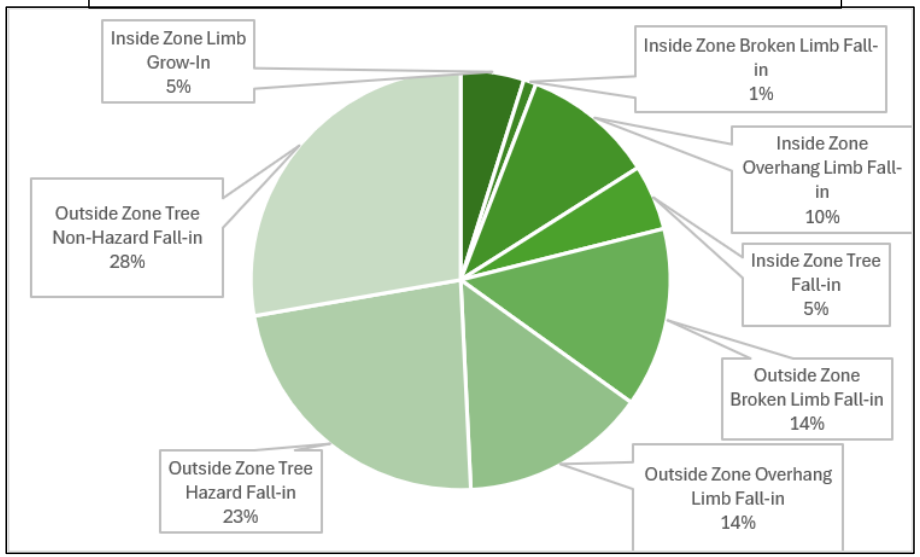
- Vegetation is a leading cause of customer interruptions on blue sky or non-storm days

Percent of Non-Storm Outages by Cause; Tree Related vs All Other Causes



Tree Related Outages on average over the last four years represents 45% of all non-storm outages on the system.

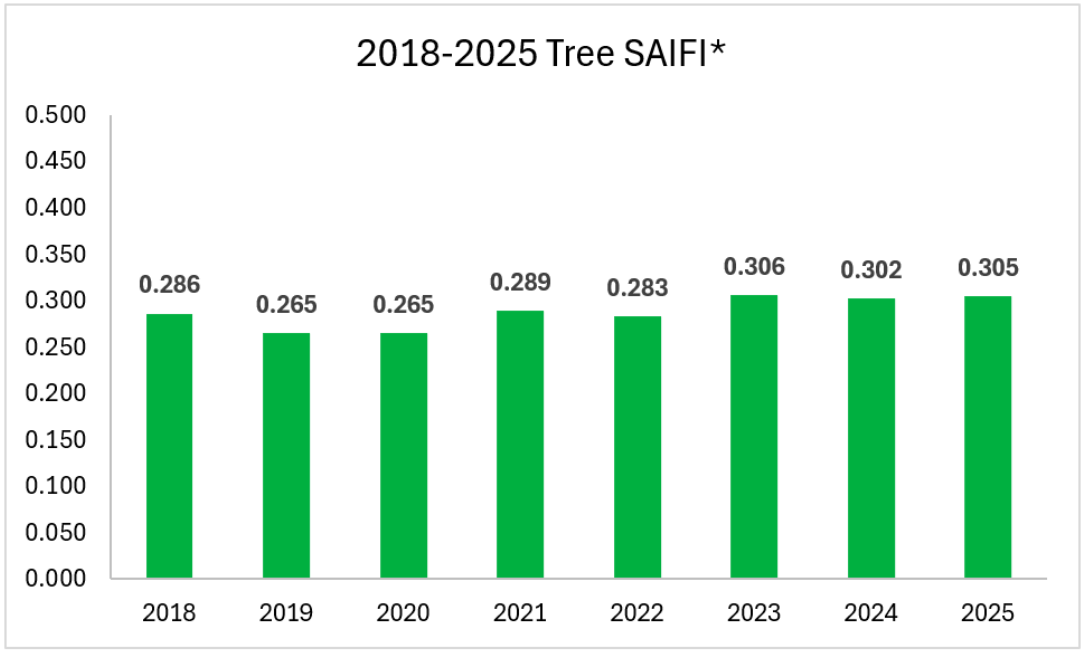
Percent Tree Related Outages by Category



Tree Related Outages investigated by our arborist are put into categories based on if the vegetation came from inside or outside the clearance zone, was a grow-in or fall-in, branch or tree, and if it was an overhanging branch or hazard tree.

Historical Tree Related SAIFI (System Average Interruption Frequency Index)

- Connecticut's tree's have experienced increased mortality from invasive insects and drought since 2018
- Despite increased tree mortality, Tree SAIFI remained stable through the prioritization of scheduled maintenance trimming and risk tree removals on zones with larger customer counts



* Non-storm related

Peer Reviewed Literature in Support of Program

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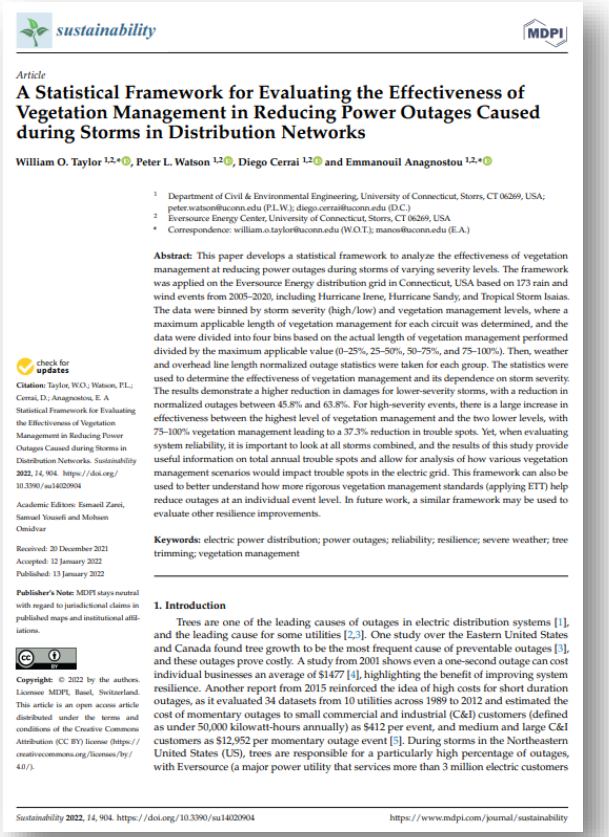
- University of Connecticut Publication on Eversource Enhanced Tree Trimming (ETT)
  - **The results demonstrate that enhanced vegetation management is particularly helpful in reducing trouble spots for lower severity storms, with reductions between 45.8% and 63.8%,** and substantially reduces trouble spots during the most severe events when vegetation management is particularly comprehensive, demonstrating a 37.3% reduction when compared with circuits with little to no enhanced tree trimming.
- Citation
  - Taylor, W.O.; Watson, P.L.; Cerrai, D.; Anagnostou, E. **A Statistical Framework for Evaluating the Effectiveness of Vegetation Management in Reducing Power Outages Caused during Storms in Distribution Networks**. Sustainability 2022, 14, 904.
- Conversion of ETT to Reliability Tree Work (RTW)
  - ETT is seeing diminishing system impact as only lower priority laterals are available for prescription under the current capitalization structure.
  - RTW will address overhang, trees too close, and risk trees on high customer count and high impact zones.



sustainability

MDPI

Article

A Statistical Framework for Evaluating the Effectiveness of Vegetation Management in Reducing Power Outages Caused during Storms in Distribution Networks

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Abstract: This paper develops a statistical framework to analyze the effectiveness of vegetation management at reducing power outages during storms of varying severity levels. The framework was applied on the Eversource Energy distribution grid in Connecticut, USA based on 173 rain and wind events from 2005–2020, including Hurricane Irene, Hurricane Sandy, and Tropical Storm Isaias. The data were binned by storm severity (high/low) and vegetation management levels, where a maximum applicable length of vegetation management for each circuit was determined, and the data were divided into four bins based on the actual length of vegetation management performed divided by the maximum applicable value (0–25%, 25–50%, 50–75%, and 75–100%). Then, weather and overhead line length normalized outage statistics were taken for each group. The statistics were used to determine the effectiveness of vegetation management and its dependence on storm severity. The results demonstrate a higher reduction in damages for lower-severity storms, with a reduction in normalized outages between 45.8% and 63.8%. For high-severity events, there is a large increase in effectiveness between the highest level of vegetation management and the two lower levels, with 75–100% vegetation management leading to a 37.3% reduction in trouble spots. Yet, when evaluating system reliability, it is important to look at all storms combined, and the results of this study provide useful information on total annual trouble spots and allow for analysis of how various vegetation management scenarios would impact trouble spots in the electric grid. This framework can also be used to better understand how more rigorous vegetation management standards (applying ETT) help reduce outages at an individual event level. In future work, a similar framework may be used to evaluate other resilience improvements.

Keywords: electric power distribution; power outages; reliability; resilience; severe weather; tree trimming; vegetation management

check for updates

Citation: Taylor, W.O.; Watson, P.L.; Cerrai, D.; Anagnostou, E. A Statistical Framework for Evaluating the Effectiveness of Vegetation Management in Reducing Power Outages Caused during Storms in Distribution Networks. Sustainability **2022**, *14*, 904. https://doi.org/10.3390/su14020904

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1. Introduction

Trees are one of the leading causes of outages in electric distribution systems [1], and the leading cause for some utilities [2,3]. One study over the Eastern United States and Canada found tree growth to be the most frequent cause of preventable outages [3], and these outages prove costly. A study from 2001 shows even a one-second outage can cost individual businesses an average of $1477 [4], highlighting the benefit of improving system resilience. Another report from 2015 reinforced the idea of high costs for short duration outages, as it evaluated 34 datasets from 10 utilities across 1989 to 2012 and estimated the cost of momentary outages to small commercial and industrial (C&I) customers (defined as under 50,000 kilowatt-hours annually) as $412 per event, and medium and large C&I customers as $12,952 per momentary outage event [5]. During storms in the Northeastern United States (US), trees are responsible for a particularly high percentage of outages, with Eversource (a major power utility that services more than 3 million electric customers

Sustainability **2022**, *14*, 904. https://doi.org/10.3390/su14020904 https://www.mdpi.com/journal/sustainability

Vegetation Outages During Storms

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- Trees are the largest cause of customer interruptions during storm events
- Different storm conditions impact trees differently:
  - High Wind
  - Snow/Ice Loading
  - Leaves on vs. Leaves off
  - Gound Moisture levels; drought conditions or saturated soil
- Healthy trees free of visible defects fail too!
- Tree failure during storm is a major cause of blocked roads, a critical priority to towns and emergency services



Microburst, Branford Connecticut August 2020
Wind gusts estimated 80-100 mph

Targeted SAIDI Zones – Performance Improvement

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SAIDI Zone	Miles	Pre-Treatment CMI	Post-Treatment CMI	Pre-Treatment CI	Post-Treatment CI
1	2.00	683,568	0	796	0
2	0.21	211,513	0	587	0
3	2.47	1,127,503	0	2,750	0
4	1.90	663,440	0	922	0
5	1.44	1,235,729	0	1,273	0
6	0.60	187,030	0	901	0
7	1.16	150,136	0	373	0
8	0.47	597,777	412,100	506	247
9	0.40	832,707	0	507	0
10	1.79	334,388	0	697	0
11	2.30	306,624	229,194	640	973
12	3.24	519,696	91,437	1,804	783
13	5.39	59,393	0	577	0
14	1.30	1,020,467	0	3,120	0
15	3.54	216,263	0	3,504	0
16	2.61	13,757	0	1,069	0
17	1.20	1,925,945	0	7,021	0
18	4.60	257,947	0	4,115	0
19	0.15	737,953	0	1,370	0
20	0.60	2,516,333	0	2,656	0
21	0.50	146,182	0	1,805	0
	37.87	13,744,351	732,731	36,993	2,003

	CMI/Mile	CI/Mile
Pre-Treatment	362,935	977
Post-Treatment	19,349	53
Δ	343,586	924
Reliability Improvement	94.67%	94.59%

- 21 circuit zones with high SAIDI were selected for targeted vegetation management in 2023
- The table shows pre- and post-treatment customer reliability (CMI and CI) for circuit zones that received targeted vegetation management (remove trees within 10 feet of the outermost conductor and all overhanging vegetation)
- On average the segments experienced a 94% reliability improvement post-vegetation management treatment
- Removal of overhang, trees that are too close, and high-risk trees show proven results for targeted segments

Remote Sensing and Technology

Ground Based LiDAR Pilot

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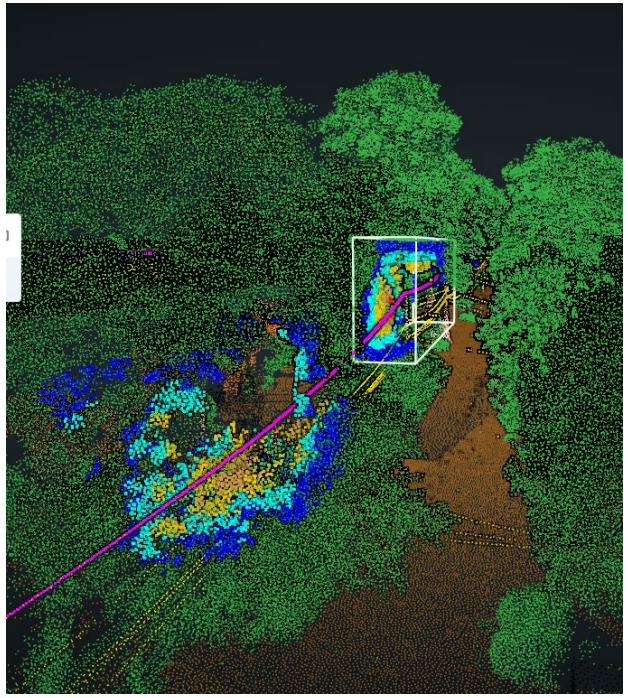
- In 2025 Eversource Vegetation Management captured vegetation encroachment and fall in risk using ground-based LiDAR for scheduled 2026 circuits = ~4,000 miles



Encroachment



NM Group
Innovation In Infrastructure

GE VERNOVA



Fall In Risk

Ground-based LiDAR Results

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LiDAR results highlight Connecticut's tree density and overhanging limb exposure to Eversource's overhead distribution system.
The analysis evaluated the scanned miles per segment for fall-in risk and generated a composite encroachment risk level

- Vegetation Fall in Risk = **88.16%**
  - Segments with vegetation fall in risk present
- Vegetation Overhang = **70.55%**
  - Segments with vegetation above the primary
- Vegetation Encroachment = **74.92%**
  - Segments with vegetation within the trim zone



Fall In Risk



Encroachment

Condition vs. Cycle Approaches

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- Comparison of LiDAR condition based trimming costs (based on zone risk level) compared to 4-year maintenance cycle costs shows **cycle trimming would be approximately $68 million less over 4 years**
- Selective risk-based segment trimming would be less expensive the first year of the program but would be more expensive than cycle trimming in years 2, 3 and 4. In subsequent years, lower risks segments would require pruning having continued tree encroachment growth
- Contractor costs per mile for selective segment trimming are more expensive due to efficiency loss when compared to trimming the entire circuit

Condition-Based Year	Risk Levels	Miles	Condition-Based Cost	Cycle Year	Miles	Cycle Cost
1	5,4,3	2,261	$37,312,593	2026	4,340	$41,313,531
2	5,4,3,2	2,965	$56,119,097	2027	4,202	$47,604,033
3	5,4,3,2,1	3,252	$64,595,286	2028	4,133	$49,870,594
4	5,4,3,2,1,0	3,993	$83,519,021	2029	3,766	$45,867,021
		12,472	$241,545,997		16,441*	$184,655,179

*Excludes Rights-of-Way Mileage

LiDAR Risk Level	Side Clearance	Overhead Clearance
5	0' to ≤1'	0' to ≤3'
4	>1' to ≤2'	3' to ≤6'
3	>2' to ≤4'	6' to ≤9'
2	>4' to ≤6'	9' to ≤12'
1	>6' to ≤8'	12' to ≤15'
0	≥8'	≥15'

- See Appendix (slide 38) for Condition-Based and Cycle detailed information

Proposed Vegetation Management Program

Proposed Department Structure

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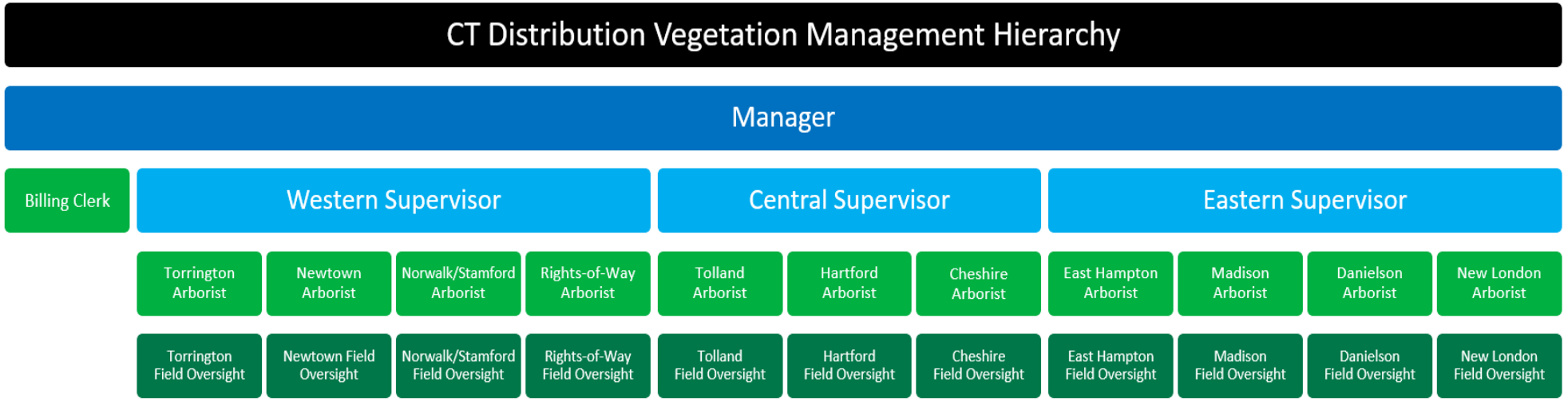

Scheduled Maintenance Trimming

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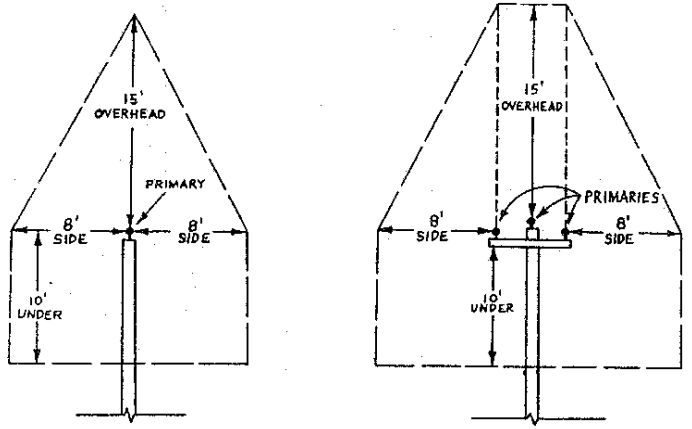
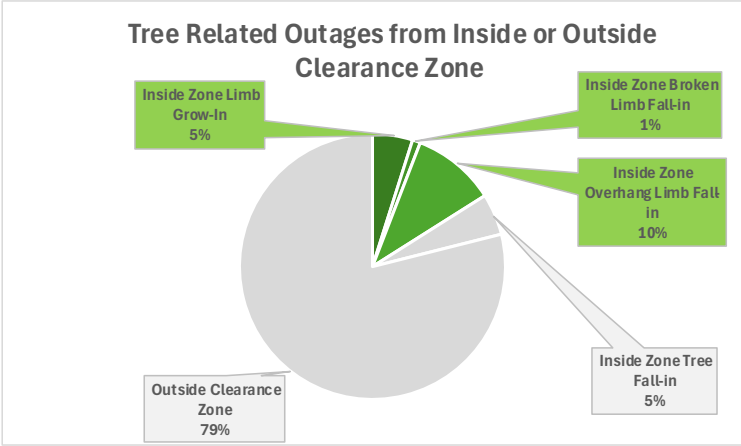
- Maintaining an overhead distribution system clear of vegetation is key in preventing vegetation growth caused customer outages and broken branch fall-in from inside clearance area (see chart)
- Due to the number of trees along the power lines and the level of encroachment, the best approach is Scheduled Maintenance of all overhead distribution lines by circuit on a 4-year cycle with the cycle length based on local tree growth rates
- Scheduled Maintenance includes maintenance trimming on all laterals and backbones to maintain previously achieved clearances
- Circuits with greater reliability concerns are prioritized for work early in the year and portions of the circuit serving the most customers are sequenced first. The sequencing also takes into account operational efficiencies.
- LiDAR assessment will also provide input based on conditions for prioritizing circuits

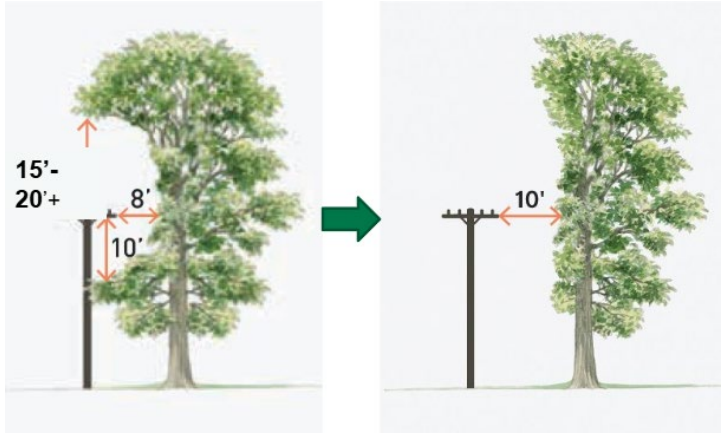




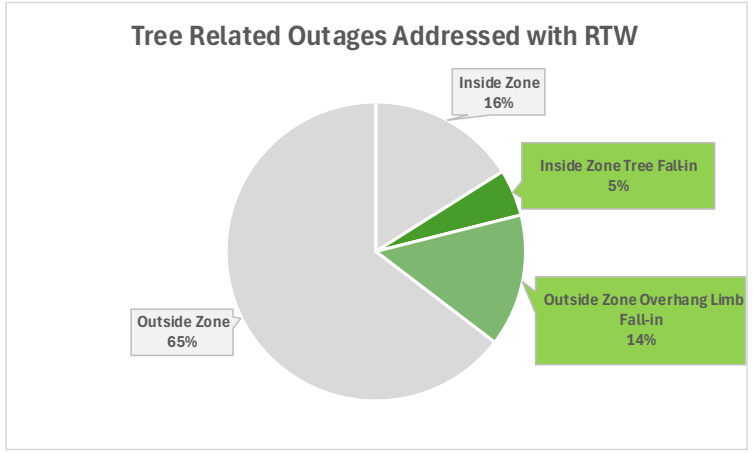
Reliability Tree Work (RTW)

Reliability Tree Work (RTW) will focus on reclaiming overhang clearance on high priority line segments with the goal of achieving clearance of 10 ft of vegetation from ground to sky where permission allows.

- Side Clearance
  - 10-feet side clearance shall be measured horizontally outward from the outermost primaries.
  - Remove all trees and limbs in the clearance zone
- Overhead Clearance
  - Trim and remove all limbs in the clearance zone over the outermost primary
- Under Clearances
  - Trim and remove all limbs in the clearance zone under the outermost primary



- The RTW program will target critical zones to remove overhanging limbs and trees within 10 feet of the conductors. Previous Enhanced Tree Trimming (ETT) programs between 2004 and 2026 did not allow for previously completed zones to be readdressed if full clearance was limited by permissions.
- RTW will be key in preventing vegetation outages from overhang and trees within the zone (see chart)
- LiDAR Assessment will be used to assist with evaluation of zones for overhang conditions and prioritization.



Reliability Tree Removals (RTR)

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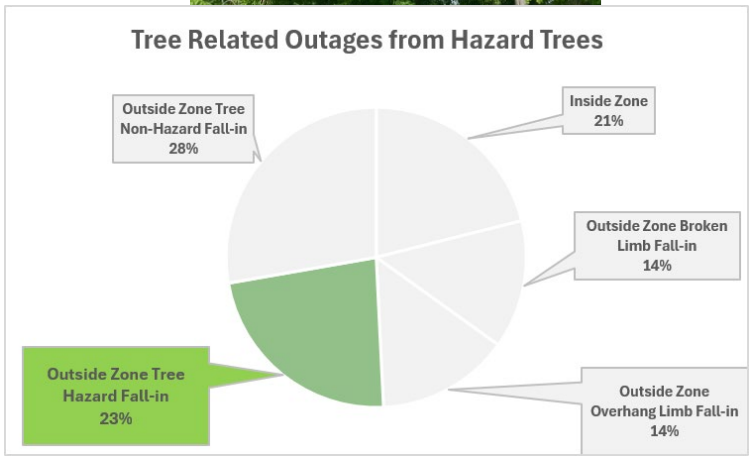
- Utilize risk tree prioritization tool to assess and target highest priority risk and hazard trees across all circuits
- Prioritized using Tree Risk Assessment ESRI Tool
- Focused on dead, declining or structurally unsound trees including trees impacted by invasive insects, disease and drought
- RTR will be key in preventing vegetation outages from hazard and high-risk trees outside the zone (see chart)

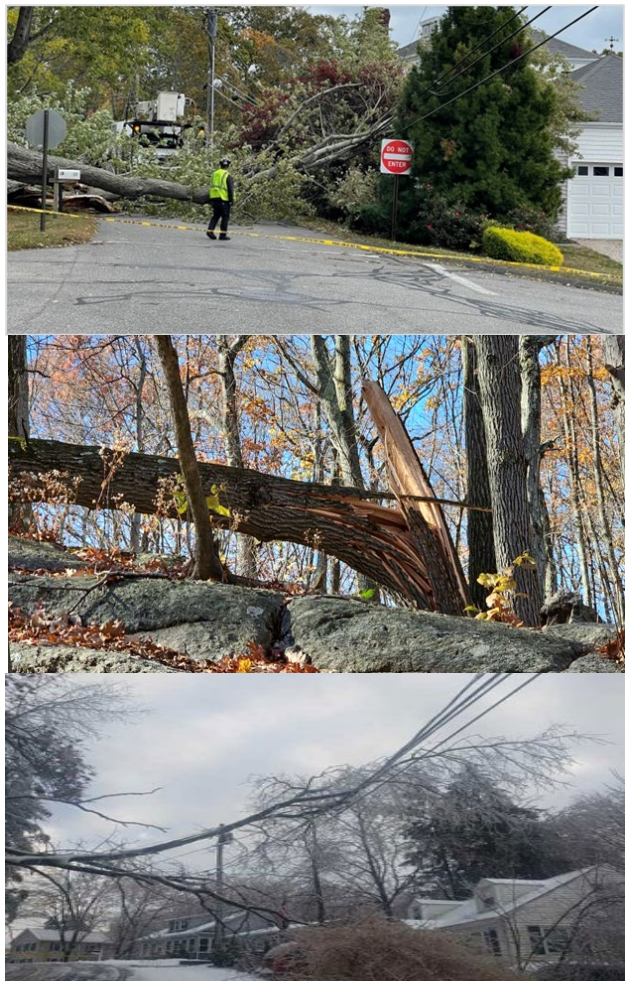
- Trees are assessed and prioritized by:
  - Likelihood of Failure
    - Condition and stability of tree
  - Likelihood of Impact
    - Proximity to conductors, lean, structure
  - Consequences of Failure
    - Potential customer impact or equipment damage





Hazard Trees

- Hazard trees are any tree or part of a tree that is dead, extensively decayed or structurally weak, which if it falls would endanger utility infrastructure, facilities or equipment
- Hazard trees are more likely to fail and cause blue sky outages
- Out of the estimated 7 million trees able to fall and hit the lines, there are approximately more than 100,000 hazard trees across the system
- Annually the Company has been removing ~20,000 hazard tree
- New trees become hazards every year through disease, insect, structural damage and natural mortality
- Prioritized hazard and risk tree removals are key in preventing blue sky interruptions to customers



ESRI Tree Risk Assessment

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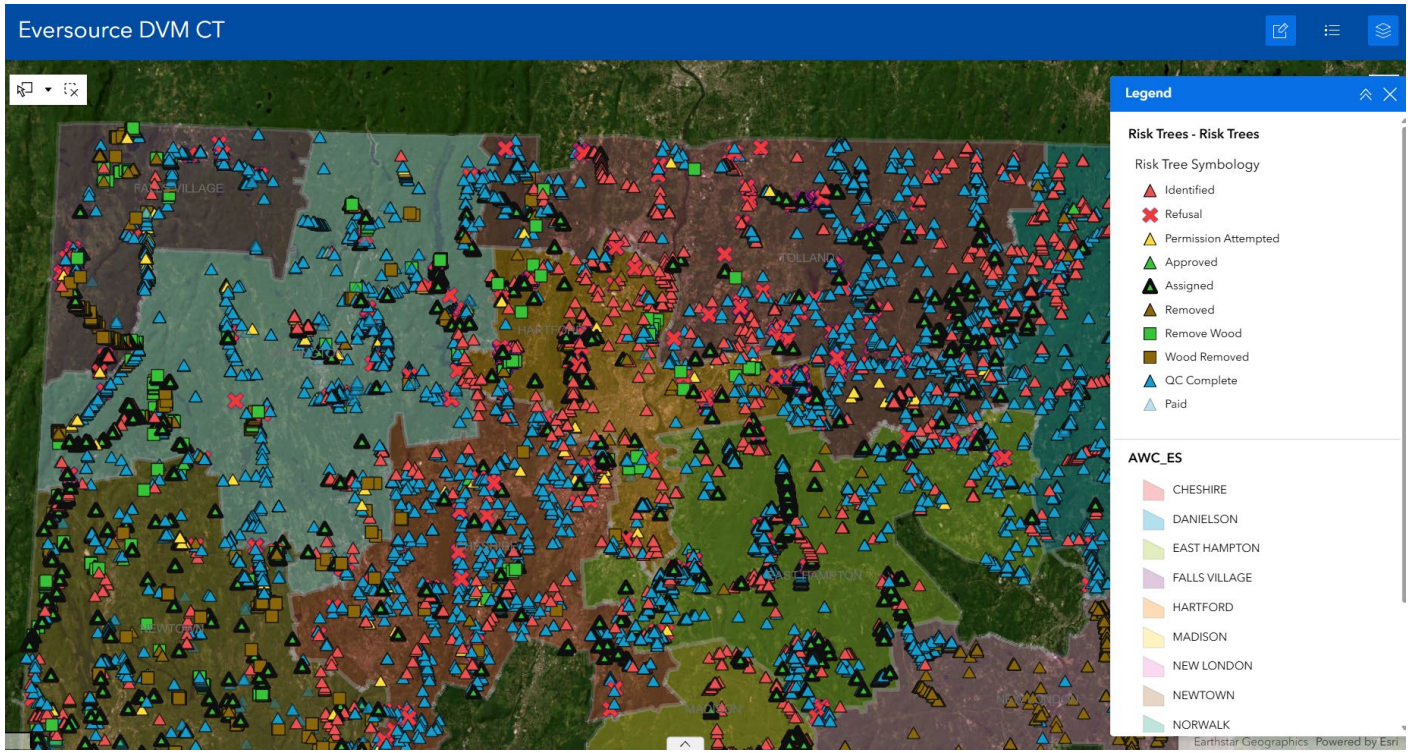
- ESRI field applications are utilized by Eversource Arborists to track the priority level and status of assessed risk trees at the state level





Program Descriptions

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- **Mid-Cycle**
  - Performed on circuit backbones 2 years after maintenance to address encroachment and hazard trees
- **Vines**
  - Cutting and treating vines on backbone overhead distribution lines (between scheduled maintenance and mid-cycle years)
- **Emergent Requests**
  - Inspection and completion of customer requested work and reliability issues
- **Ground Based LiDAR Collection and Classification**
  - Collection of LiDAR to prioritize trimming priorities, overhang and risk tree areas
- **Distribution ROW**
  - Brush removal and treatment in rights-of-way (ROW) on a 4-year cycle. Includes pruning the branches encroaching into the ROW.
- **CT Dept Of Transportation (DOT) Collaboration**
  - Collaboration with CT Dept of Transportation (DOT) to obtain substantial vegetation clearance on priority state roads
- **Emergency Response**
  - Expense for tree crews during restorations not associated with major storms

Program Budget Years 2027-2030

Proposed Program Budget

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Expense Programs	2027 Budget
Roadside Scheduled Maintenance - 4 year cycle	$48,000,000
Risk Tree Removals (RTR)	$18,500,000
Reliability Tree Work (RTW)	$14,500,000
Distribution Rights-of-Way (D ROW)	$1,900,000
Emergency	$2,000,000
Vines	$375,000
Emergent Work	$900,000
Mid-Cycle	$950,000
CT DOT Collaboration	$1,200,000
LiDAR	$950,000
Other	$300,000
Expense Summary	**$89,575,000***

* Does not reflect 15% Frontier reimbursement

Utility Vegetation Management Contractors



- Line Clearance Qualified Contractors
  - Insulated bucket trucks and equipment
  - Must maintain Minimum Approach Distances (MAD) which is dependent on voltage
  - Specialty equipment is sometimes required to complete jobs safely
    - 100-foot bucket trucks
    - Cranes
    - Off-road bucket trucks
    - Climbing
- Non-line clearance qualified contractors must keep 10 ft away from all energized conductors

Competitive Bid Request for 2027-2030 Pricing (RFP)

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- Eversource Procurement has started an RFP for Vegetation Management with pricing expected in Q3 2026
- 4 years of full-service scheduled maintenance has been placed out to bid to collect:
  - Unit cost per mile for scheduled maintenance
    - Pricing is being broken out to illustrate costs of documented notification and traffic control
  - Hourly labor and equipment rates
  - Unit cost per tree removal per size class
- Historic procurement experience shows the best price is obtained at the Area Work Center (AWC) scale
- Benefits include consistency of having tree crews in state for emergency calls and storm response

- Future bids will include LiDAR assessments to specifically identify locations with encroachment requiring trimming and can provide volumetric information for more competitive pricing from vendors

Program Oversight and Controls

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- Licensed Arborists
- Internal planning and prioritization processes for reliability focused improvements
- Quality Assurance (QA) of in-progress work
- 100% Quality Control (QC) of completed scheduled maintenance work
- Contractor tree crew observations performed with Eversource Safety Specialist
- Key Performance Indicators are monitored and corrective actions implemented by contractor



Property Owners and Tree Wardens

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- Eversource Vegetation Management sends the upcoming year's plan to the municipal Chief Elected Official and Tree Warden each January
- Eversource's Arborists coordinate with Tree Wardens to obtain town permits and collaborate with them to identify public safety tree issues
- Some towns have ordinances or permit language that limits the clearance allowed in the town right-of-way
- Vegetation Management has a lot of touch points with customers through notification and consent practices plus customer inquiries
- Property owners may object, modify, or fail to respond to notifications from Eversource to perform utility tree work
- Eversource Vegetation Management works with town tree wardens and customers on recommending utility compatible tree species for planting



Challenges

Documented Notification

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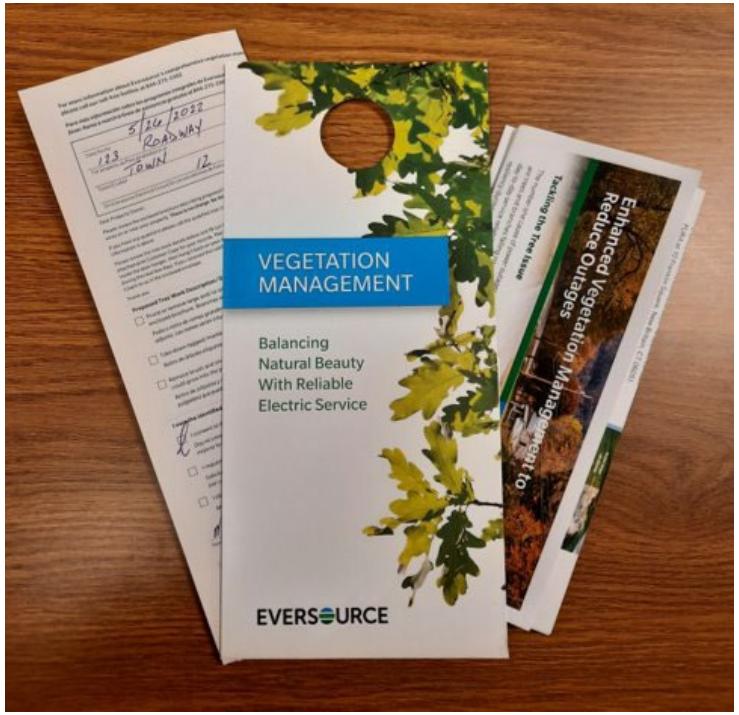
- C.G.S. § 16-234 (c)(1) requires that notice of the proposed vegetation management must be delivered to the abutting property owner or private property owner...
- C.G.S. § 16-234 (2) provides that, “notice shall be considered delivered when it is (A) mailed to the abutting property owner or private property owner via **first class mail**, **electronic mail** or **text message**…”
- PURA docket No. 12-01-10 requires **written documented notification** for all work within the Utility Protection Zone including Scheduled Maintenance trimming.
- The cost of written documented notification varies between $700 to $1200 per mile and approximately $2,800,000 to $5,000,000 per year. Approximately 12% of 2025 trimming budget
- More accurate estimates will be provided through the 2027-2030 RFP process
- Resources allocated to obtaining documented notification could be reallocated to trimming several hundred additional miles of overhead distribution circuits each year



Traffic Control

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- Traffic control requirements vary widely by municipality
- Traffic control may necessitate a certified flagger or uniformed police officer depending on the road speed, set up and line of sight to the work zone
- Some Connecticut towns and city require a police officer perform traffic control for utility vegetation management, regardless of road conditions or speed
- The costs associated with traffic control, especially in towns with ordinances requiring police be used on all roads, are a rising percent of the overall vegetation management cost and a significant driver of price increases



Challenge of Connecticut's Trees

EVERSOURCE

- Trees are a leading cause of interruptions for Eversource customers in Connecticut
- The population of trees that can impact the overhead distribution system via growth or failure is immense and environmental stressors such as invasive insects and drought continue to contribute to Connecticut's tree heath decline.
- Outage data shows that vegetation caused outages are a result of tree growth into the conductors, overhanging or adjacent limb failure, and risk and hazard tree failure including trees from outside the trim zone.
  - The risk of outages from inside the clearance zone from vegetative growth, overhanging limbs, and deadwood can be mitigated
  - Reliability Tree Work reduces the risk of outages from overhanging limbs and tree failure
  - Risk Tree Removals reduce the risk of outages from risk and hazard trees in high priority zones

Appendix

EVERSOURCE

Condition Based	CYCLE 1				CYCLE 2			
Risk Category	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Lidar Yr 1	5, 4, 3	2	1	0	5, 4, 3	2	1	0
Lidar Yr 2		5, 4, 3	2	1	0	5, 4, 3	2	1
Lidar Yr 3			5, 4, 3	2	1	0	5, 4, 3	2
Lidar Yr 4				5, 4, 3	2	1	0	5, 4, 3
Miles	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Lidar Yr 1	2,261	776	348	955	2,261	776	348	955
Lidar Yr 2		2,189	752	336	925	2,189	752	336
Lidar Yr 3			2,153	739	331	909	2,153	739
Lidar Yr 4				1,962	674	302	829	1,962
	2,261	2,965	3,252	3,993	4,190	4,177	4,081	3,993
Cost	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Lidar Yr 1	$37,312,593	$14,692,432	$6,902,431	$19,976,241	$20,985,198	$17,921,901	$8,427,691	$24,328,255
Lidar Yr 2		$41,426,665	$14,929,428	$7,038,450	$7,393,947	$50,532,450	$18,228,447	$8,571,843
Lidar Yr 3			$42,763,427	$15,465,400	$16,246,523	$20,993,655	$52,213,044	$18,834,684
Lidar Yr 4				$41,038,930	$43,111,718	$6,961,453	$20,095,659	$49,979,651
	$37,312,593	$56,119,097	$64,595,286	$83,519,021	$87,737,386	$96,409,458	$98,964,841	$101,714,433
				$241,545,997				**$384,826,118**

Cycle Based	CYCLE 1				CYCLE 2			
Miles	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
	4,340	4,202	4,133	3,766	4,340	4,202	4,133	3,766
				16,441				16,441
Cost	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
	$41,313,531	$47,604,033	$49,870,594	$45,867,021	$56,299,091	$58,057,608	$60,821,893	$59,029,116
				$184,655,179				**$234,207,708**

The table demonstrates preforming scheduled maintenance on all the segments for each circuit in each year of the cycle based on risk assessment, the number of miles and associated cost over two cycles. The need to perform scheduled maintenance on all segments is due to continuing tree growth.

Selective Condition Based	CYCLE 1				CYCLE 2			
Risk Category	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Lidar Yr 1	5, 4, 3				5, 4, 3			
Lidar Yr 2		5, 4, 3				5, 4, 3		
Lidar Yr 3			5, 4, 3				5, 4, 3	
Lidar Yr 4				5, 4, 3				5, 4, 3
Miles	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Lidar Yr 1	2,261				3,211			
Lidar Yr 2		2,189				3,109		
Lidar Yr 3			2,153				3,058	
Lidar Yr 4				1,962				2,786
	2,261	2,189	2,153	1,962	3,211	3,109	3,058	2,786
				8,565				**12,165**
Cost	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Lidar Yr 1	$37,312,593	$0	$0	$0	$70,561,262	$0	$0	$0
Lidar Yr 2		$41,426,665	$0	$0	$0	$71,768,183	$0	$0
Lidar Yr 3			$42,763,427	$0	$0	$0	$74,155,029	$0
Lidar Yr 4				$41,038,930		$0	$0	$70,983,076
	$37,312,593	$41,426,665	$42,763,427	$41,038,930	$70,561,262	$71,768,183	$74,155,029	$70,983,076
				$162,541,616				**$287,467,550**

The table demonstrates preforming only the highest risk segments (5, 4, 3) on each year's scheduled circuits, the number of miles and cost over two cycles.
The second cycle anticipates a greater number of high-risk segments as lower risk segments were not trimmed in prior cycle and tree growth continued resulting in more high-risk segments.
Because of the scope expansion, cost of the second cycle exceeds the second cycle cost of complete trimming. The total cost across two cycles is also greater with significantly fewer miles trimmed, leaving large portions of the system unmaintained at risk for outages from within the clearance envelope.

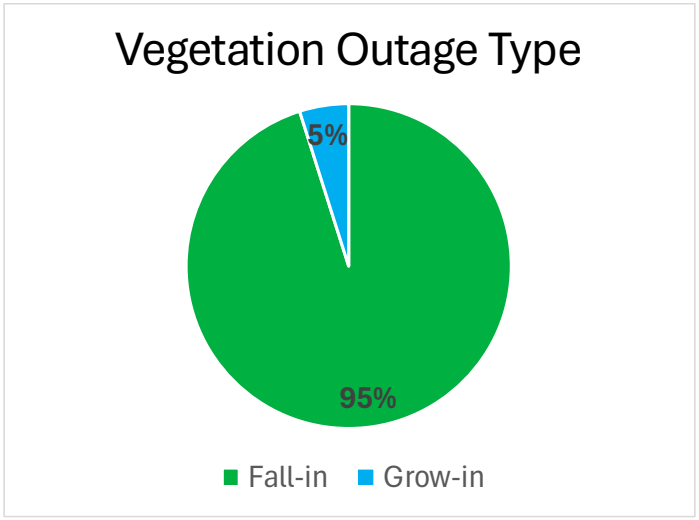
Vegetation Causes of Customer Interruptions

EVERSOURCE

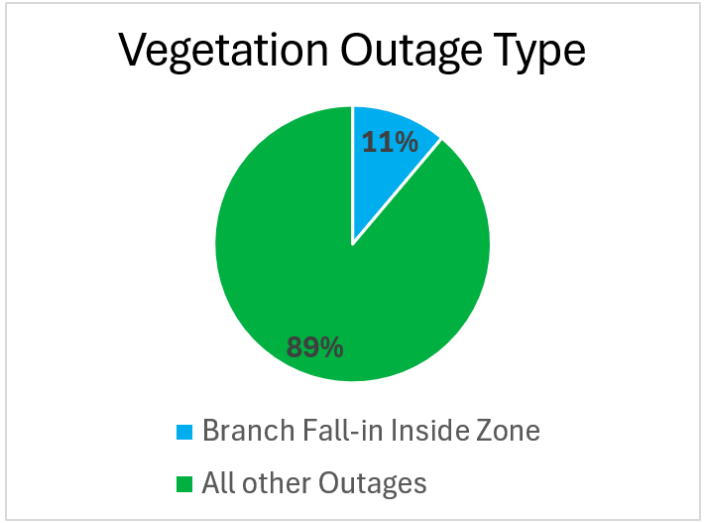
- Vegetation is a leading cause of customer interruptions on blue sky or non-storm days



Growth caused outage; vegetation in contact with the power lines or electric equipment



5% of outages investigated were caused by vegetation contact from growth



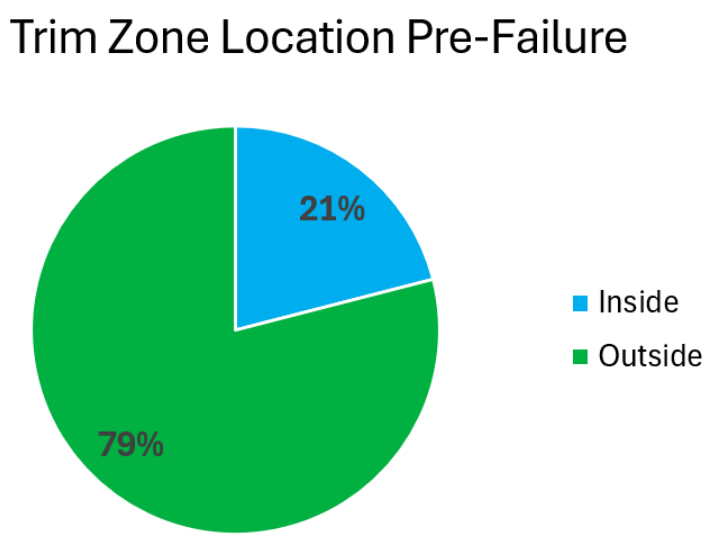
11% of outages investigated were caused by branches from inside clearance zone breaking and contacting power lines

*Data compiled from 1,229 outage investigations performed between 2023-2026.

Tree Outage Investigations

EVERSOURCE

- Over three quarters of outages were caused from trees or limbs coming from outside the trim zone.



*Data compiled from 1,229 outage investigations performed between 2023-2026.



Tree Failure

EVERSOURCE

- **Failure** caused outage; broken, uprooting, snapped trees and branches is driven by wind, rain, snow, ice, decay, and gravity



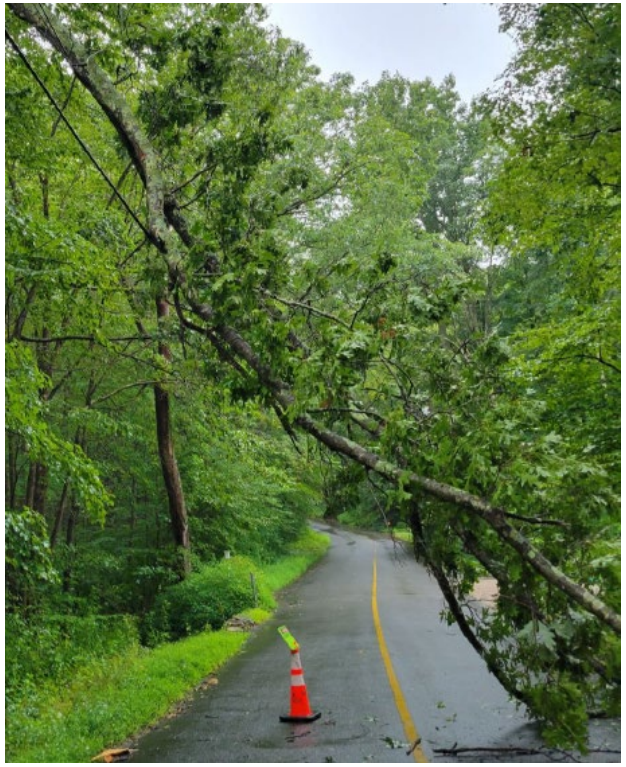




Tree Failure: Partial vs. Whole Tree

Partial Failure: Branches, limbs and leaders

Removing overhanging and maintaining side clearance limbs prevents outages





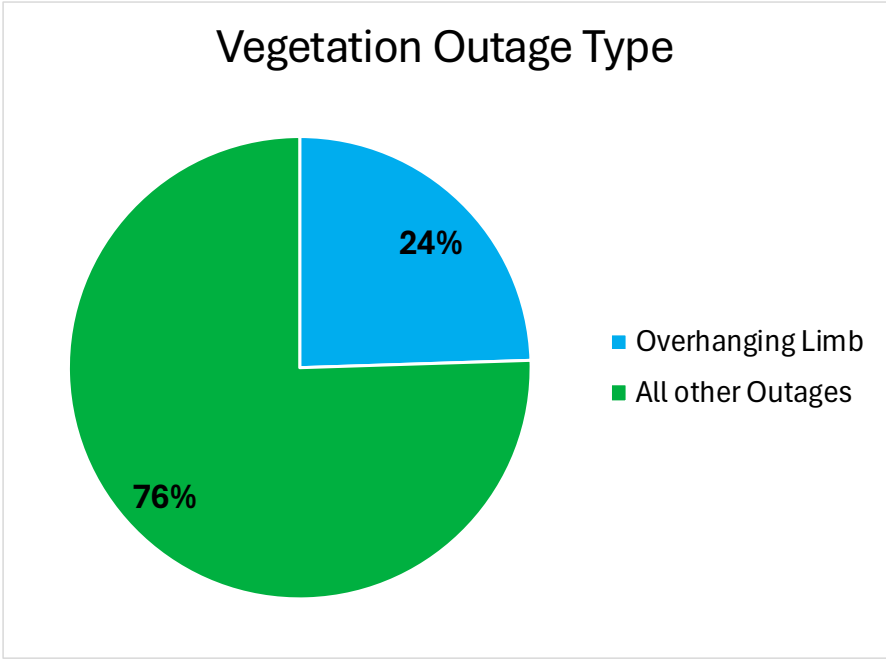
Whole Tree Failure: uprooting, cracking, splitting of entire trunk or stem

Tree removal prevents outages related to whole tree failure

Overhanging Vegetation

EVERSOURCE

- Approximately 24% of all tree outages investigated are attributed to limbs or branches overhanging the electrical conductors
- Overhanging limbs may be present due to lack of property owner consent, Tree Warden decision or equipment limitation due to topography and tree height.
- Removing overhanging limbs is key to reducing customer interruptions – when branches above the conductors fail, there is a high likelihood that they will cause an outage
- “Gravity is undefeated”



*Data compiled from 1,229 outage investigations performed between 2023-2026.