Vegetation management and modeling to promote resilient trees, power, and communities

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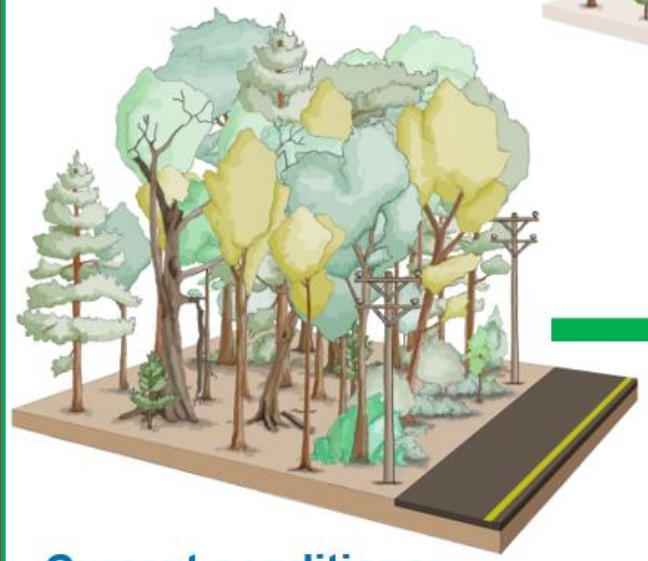
STORMWISE

Forest Management Treatment Plan



Current conditions:

Along much of the roadside in southern New England are dense woodlands of maturing trees growing under stressful conditions.

Identif

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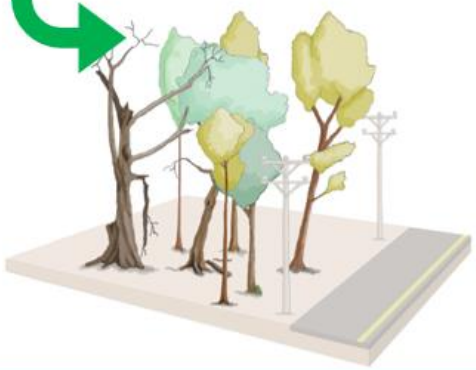
Identify and
high-risk tr

There are also diseased or dying trees, or trees with visible structura defects and/or pronounced lean to the ROW, and these do present a risk to roads and wires.

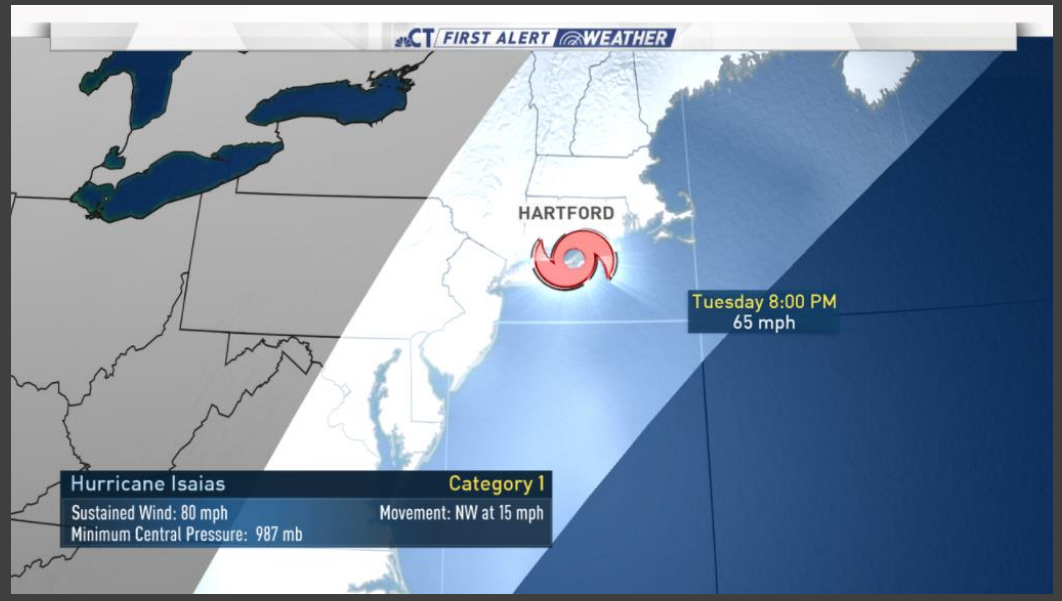


Current Objectives

1. **Evaluate roadside forest management treatment outcomes based on ongoing monitoring in existing Stormwise treatment areas**
2. **Assess the impact of Stormwise treatments and utility trimming practices on tree structure and stability**
3. Investigate the potential for vegetation management options to produce ecosystem service co-benefits
4. Enhanced decision support framework to prioritize selection of treatment areas and optimize investment of vegetation management effort

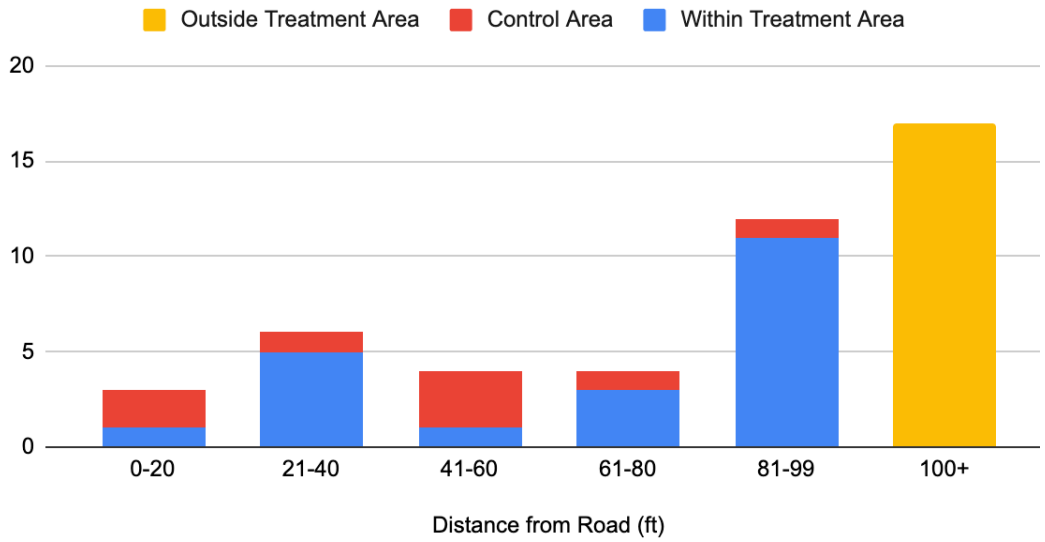
Storm Isaias

1. **Evaluate roadside forest management treatment outcomes based on ongoing monitoring in existing Stormwise treatment areas**
2. **Assess the impact of Stormwise treatments and utility trimming practices on tree structure and stability**



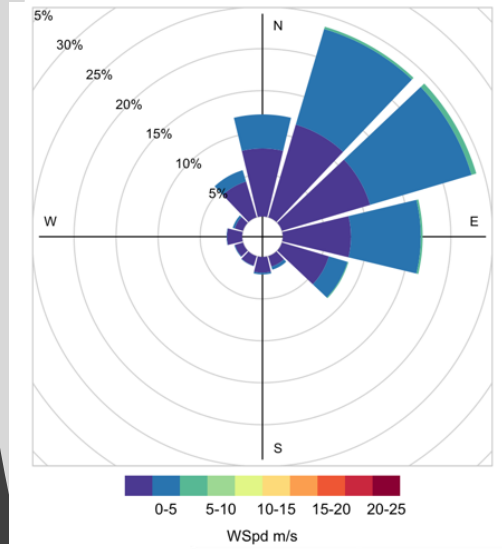
Isaias Stormwise Treatment Outcomes

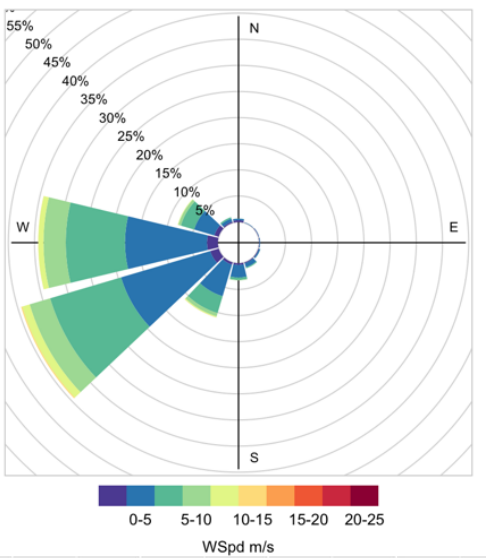
- No outages or damage to infrastructure associated with Stormwise sites
- Only individual limb failures occurred within 50ft of road in treatment areas – in untreated controls some whole crown failures
- More damage outside and on edges of treatment areas than within treated zones
- Draft Report on Isaias outcomes available

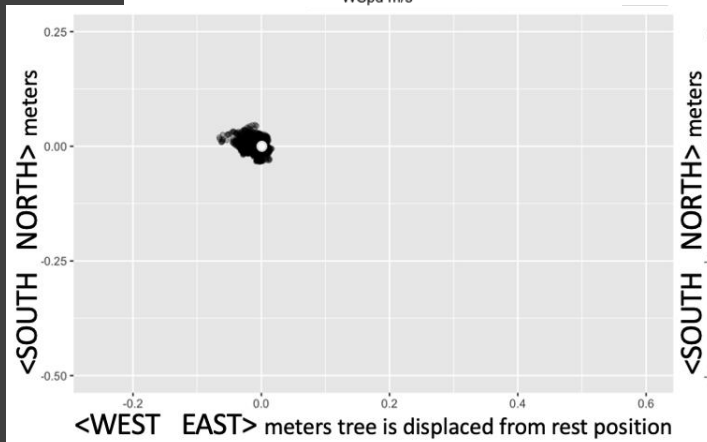


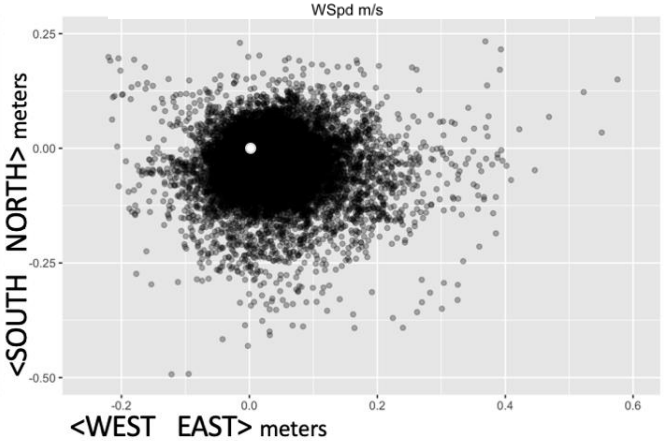
Isaias Stormwise Tree Biomechanics

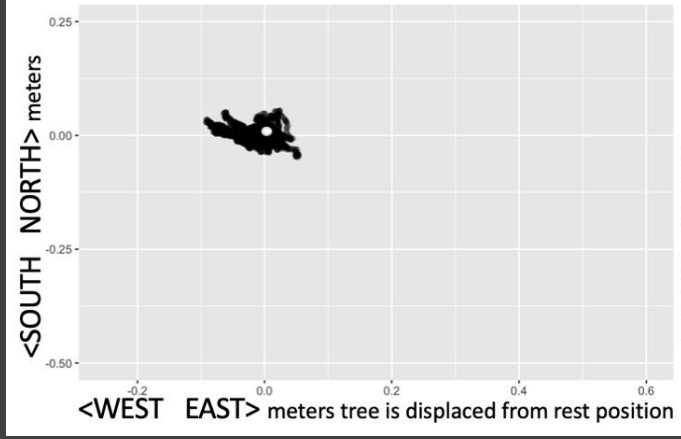
- Comparison of pre-storm (8/3) and during-storm (8/4) tree movement for two trees
- Maximum wind speed during pre-storm period was 7.16m/s, during storm period was 14.75m/s
- Next step is to compare trees in Stormwise treatment areas to control trees
- Spatial point pattern and surface metrics analyses to quantify changes
- Report and publication on Isaias biomechanics underway – planned completion in mid 2021
- PhD Student Amanda Bunce

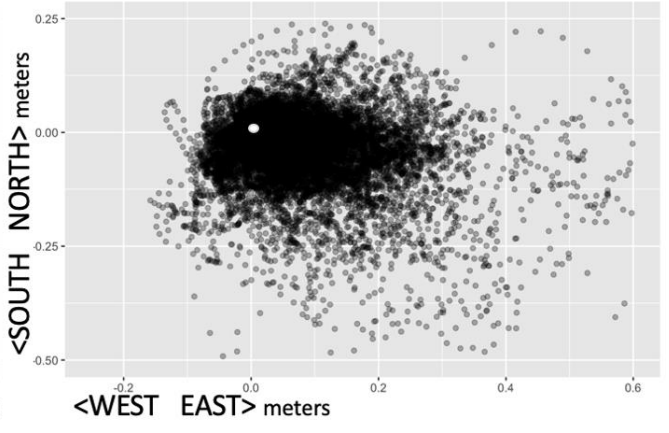






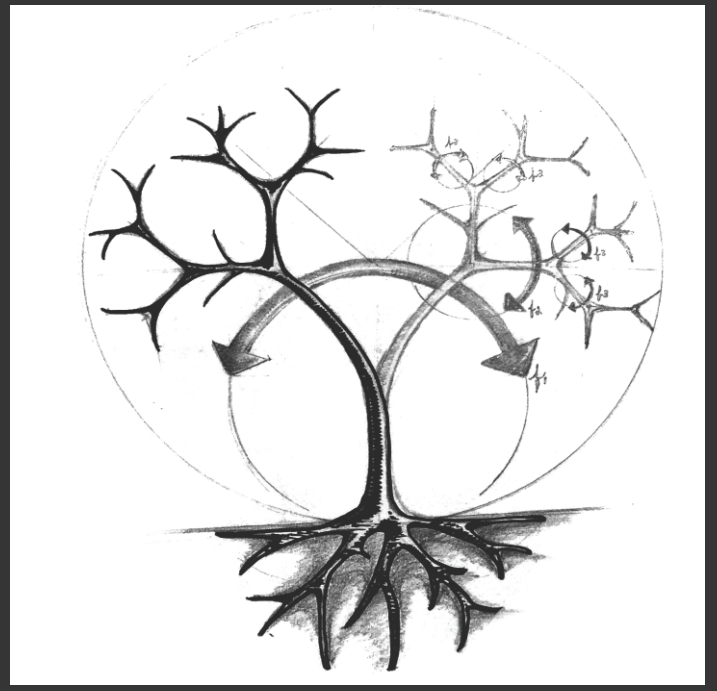






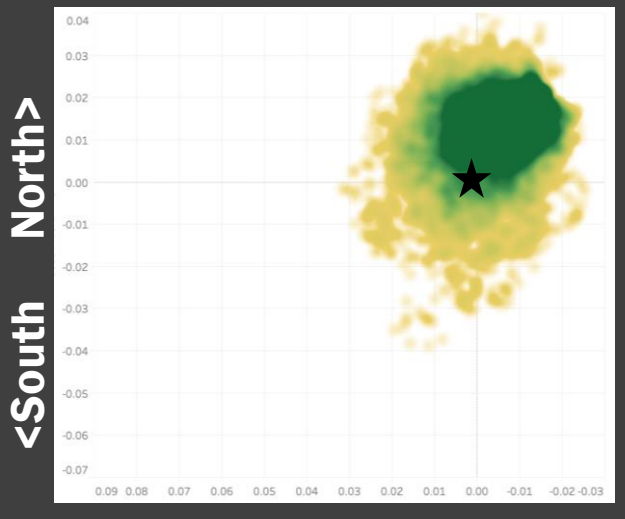
Stormwise Treatment Tree Biomechanics

- Treatments have altered tree movement characteristics overall
- Analysis of movement characteristics during similar “average” wind conditions on different days
- “Final Report” and publication on Stormwise Treatment impacts on biomechanics planned for 2022



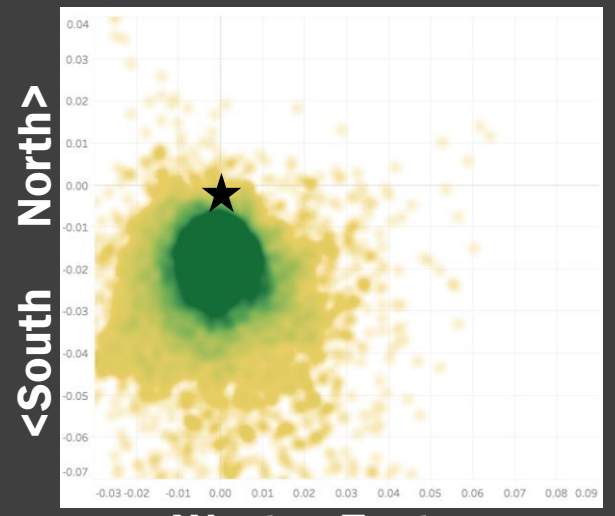
Jan. 27th 2013 10am-1pm

Pre-treatment



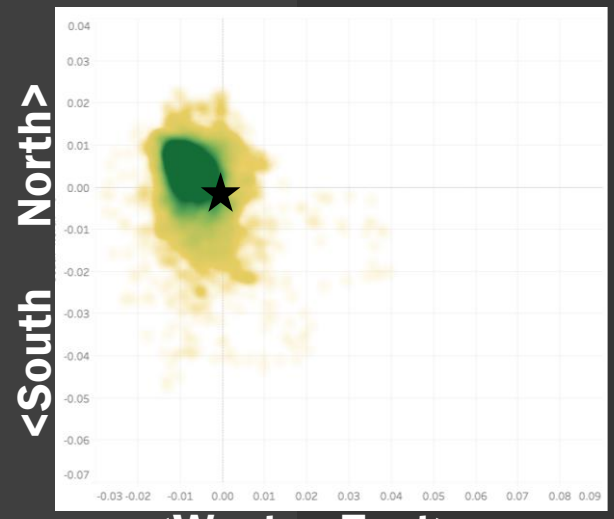
Jan 3rd 2014 7am-10am

Post-treatment



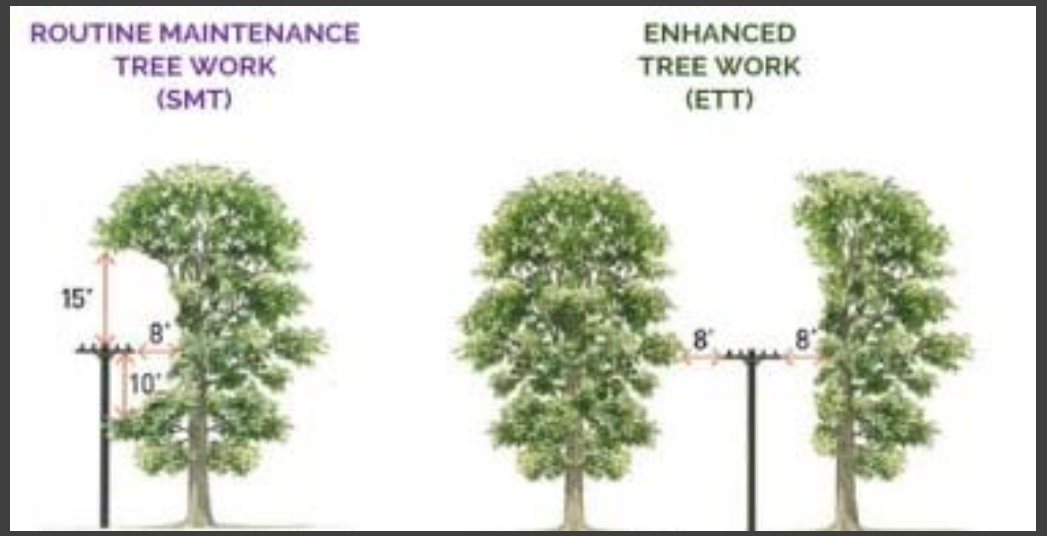
Jan. 18th 2018 1pm-4pm

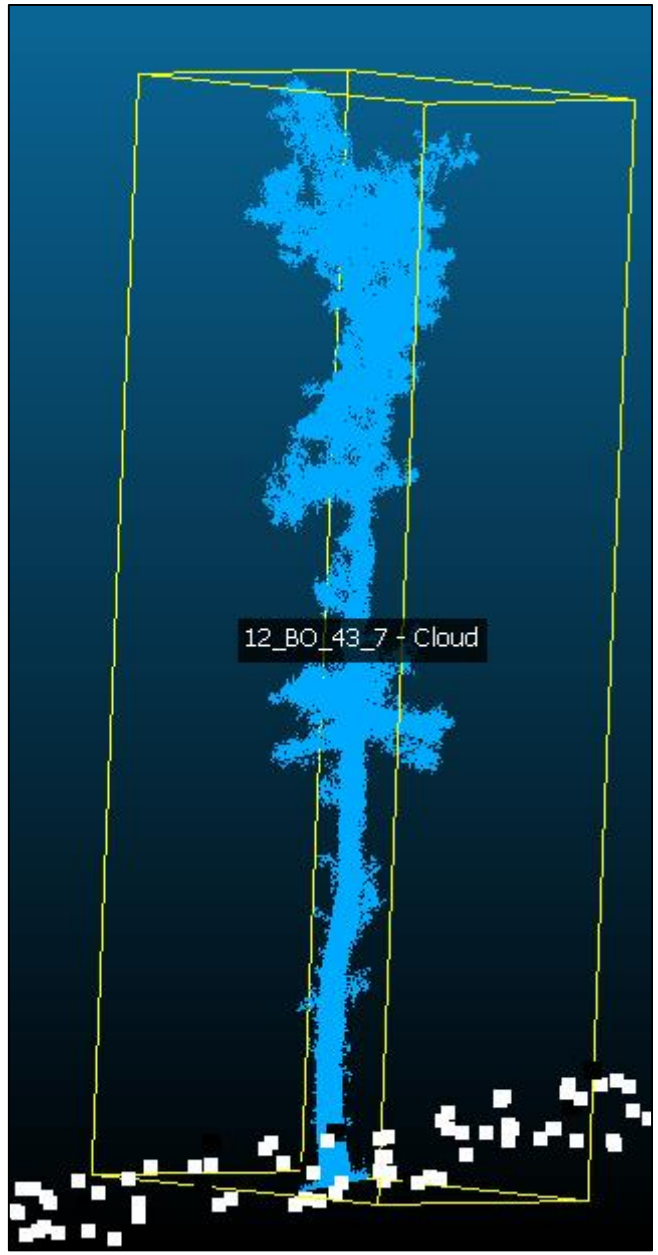
4 years post-treatment



Effects of tree trimming practices on biomechanics and stability

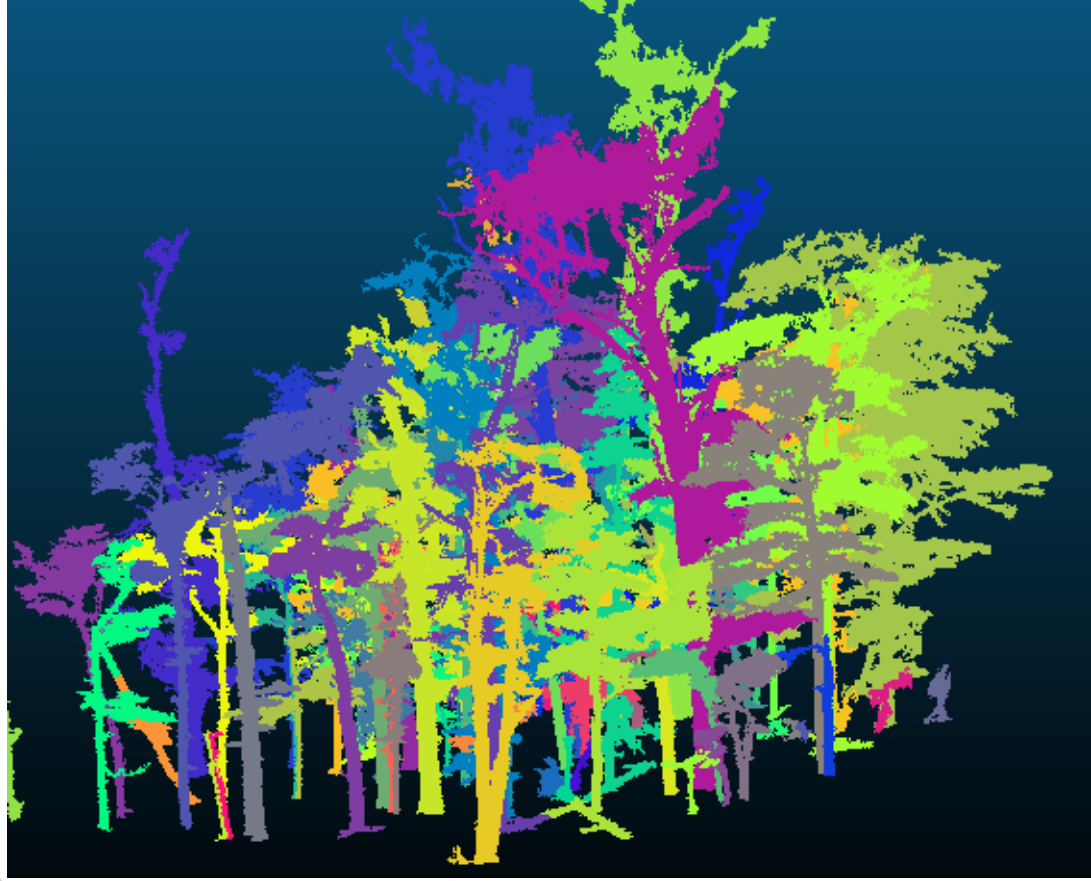
- Experimental assessment of tree trimming impacts on 3D tree structure and movement patterns
- Will be implemented in Summer 2021 with monitoring through 2022 into 2023
- MS Student Nicholas Cranmer

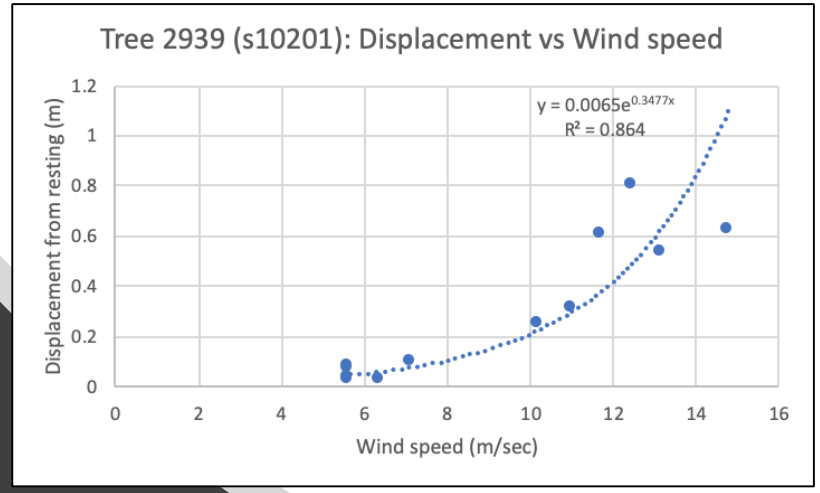




Next Steps

- Link to RS and outage data to prioritize sites for continued Stormwise implementation (in 2022)
  - possible large-scale implementation if funding from FEMA awarded
- Continued monitoring of field conditions in Stormwise treatments areas to quantify C dynamics and other ecosystem services (2022)
- Biomechanics data as an input to outage models? – movement and related stability as a function of wind inputs to the system
- Structural modeling using 3D lidar and tree biomechanics data – individual and stand level options





Acknowledgments

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(Past and Present)

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Mark Rudnicki
Jeff Ward

The Uconn Forest Crew &
An army of undergraduate researchers!

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