

Carleton College Tree Study; PHC Treatments in 2014 on declining trees across the core campus.

Results from treatments:

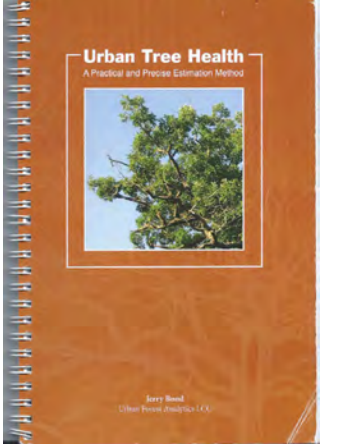
Stem Girdling Roots (SGR's), and multiple site stresses, related to infrastructure changes, (impacting root systems and soils over time, including grade changes, and soil compaction), are the primary influences of tree decline and dieback on campus. Abiotic stress can be complicated as additional periodic environmental stresses, summer droughts, open or severe winters, and more will impact tree condition related to existing site stress.

The field work confirmed that SGR's, appear to account for 65% of symptomatic trees, (22 of 34 trees), examined below ground and treated. The remaining third appear to be primarily impacted by site stresses.

Follow-up: Health Monitoring Study

A multi-year tree health monitoring study to track treatment outcomes will be conducted.

Resource; Bond, Jerry. 2012. **Urban Tree Health**. "A Practical and Precise Estimation Method". Geneva, NY: Urban Forest Analytics LLC.



Urban Tree Health Parameters; Urban Forest Analytics LLC

Ratio is the ratio of the live crown height to the total live tree height, expressed as a percent.

Opacity is the percentage of light visibility blocked by the branches, foliage and reproductive structures of the actual live crown.

Vitality is the percentage of the upper crown that is free from recent mortality on branches with fine twigs.

Growth is the three-year average terminal shoot extension on the three random branches with the same sun exposure, recorded in 2 inch (5cm) increment classes.

Quality measures the percentage of the upper crown that is free from necrotic, chlorotic or undersized foliage.



D06-028: 25.6" sugar maple, raised grade over time. SGR's removed and grade lowered.



D06-052: 29.7" sugar maple, SGR's removed, example with pneumatic chisel.



D06-061: 11.7" sugar maple, found in nursery container, and inside a wire basket, 20+ years.



D06-012: 29.0" tamarack, advanced dieback/decline from site disturbance and soil compaction by foot traffic, over the years.



G07-028: 17.2" sugar maple, dieback/decline by site infrastructure changes and soil compaction from foot traffic, over the years.



D06-032: 32.4" sugar maple, healthy, non-symptomatic control.

Health Monitoring:

Ratio – 80, Opacity – 70, Vitality – 70, Growth – 6-8" (15-20cm), Quality – 60

Health Monitoring:

Ratio – 80, Opacity – 90, Vitality – 100, Growth – 2-4" (5-10cm), Quality – 100



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