

Effect of tree proximity on sewer pipe resilience

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Introduction

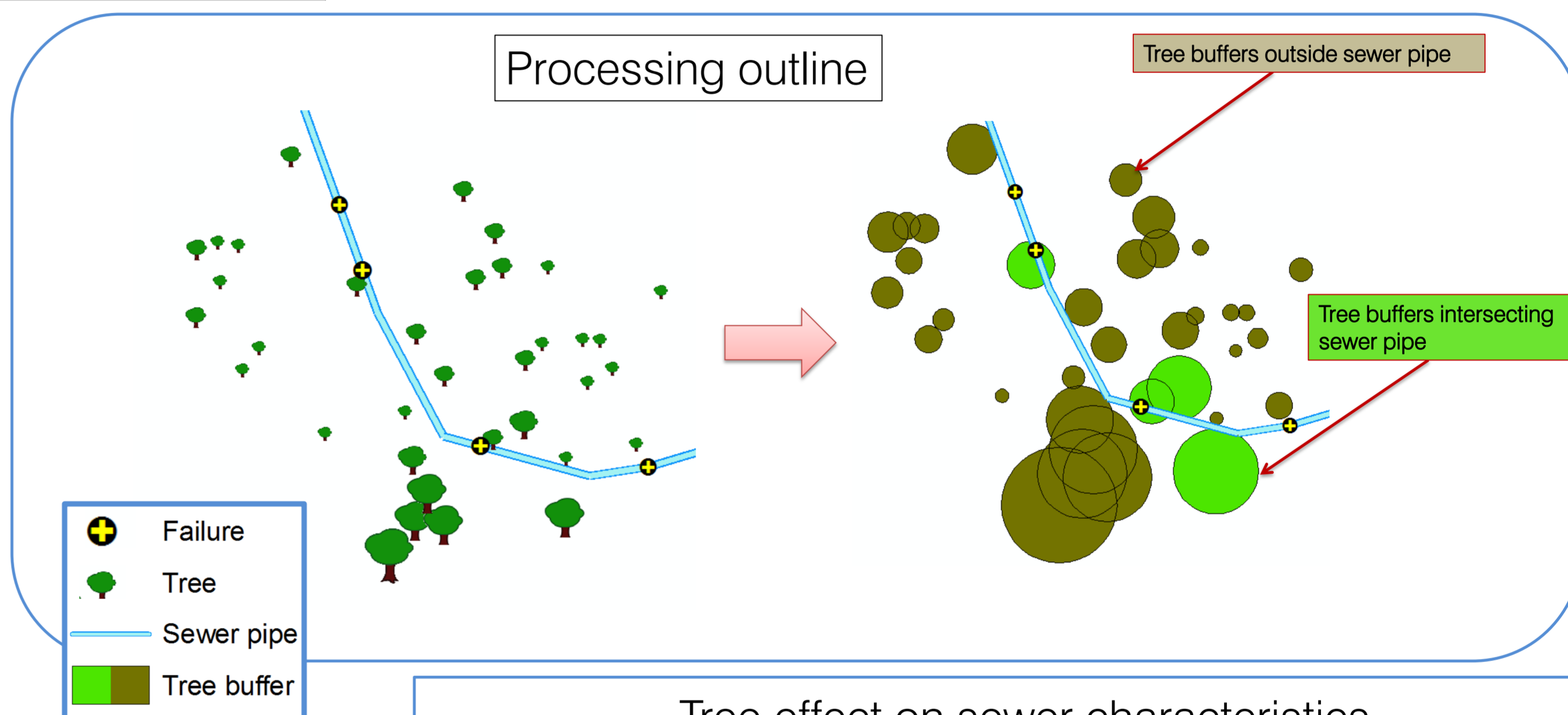
Trees have the potential to burst or block sewer pipes either by direct root intrusion or through the differential soil movement that can be caused by roots induced moisture gradient on expansive soils. This study tries to quantify the extent of the tree damage on underground water utilities using Bluesky tree point dataset together with the locations of root cutting jobs and flooding events in near properties.

Aim and Objectives

- **Aim:** To quantify the effect of tree proximity on sewer pipe deterioration
- **Objectives:**
 - To investigate the effect of tree proximity on sewer with different characteristics (age, diameter, material and sewer system type)
 - To discover which sewer failure types are most associated with the proximity of trees
 - To explore how tree height corresponds with variation of these results

Methodology

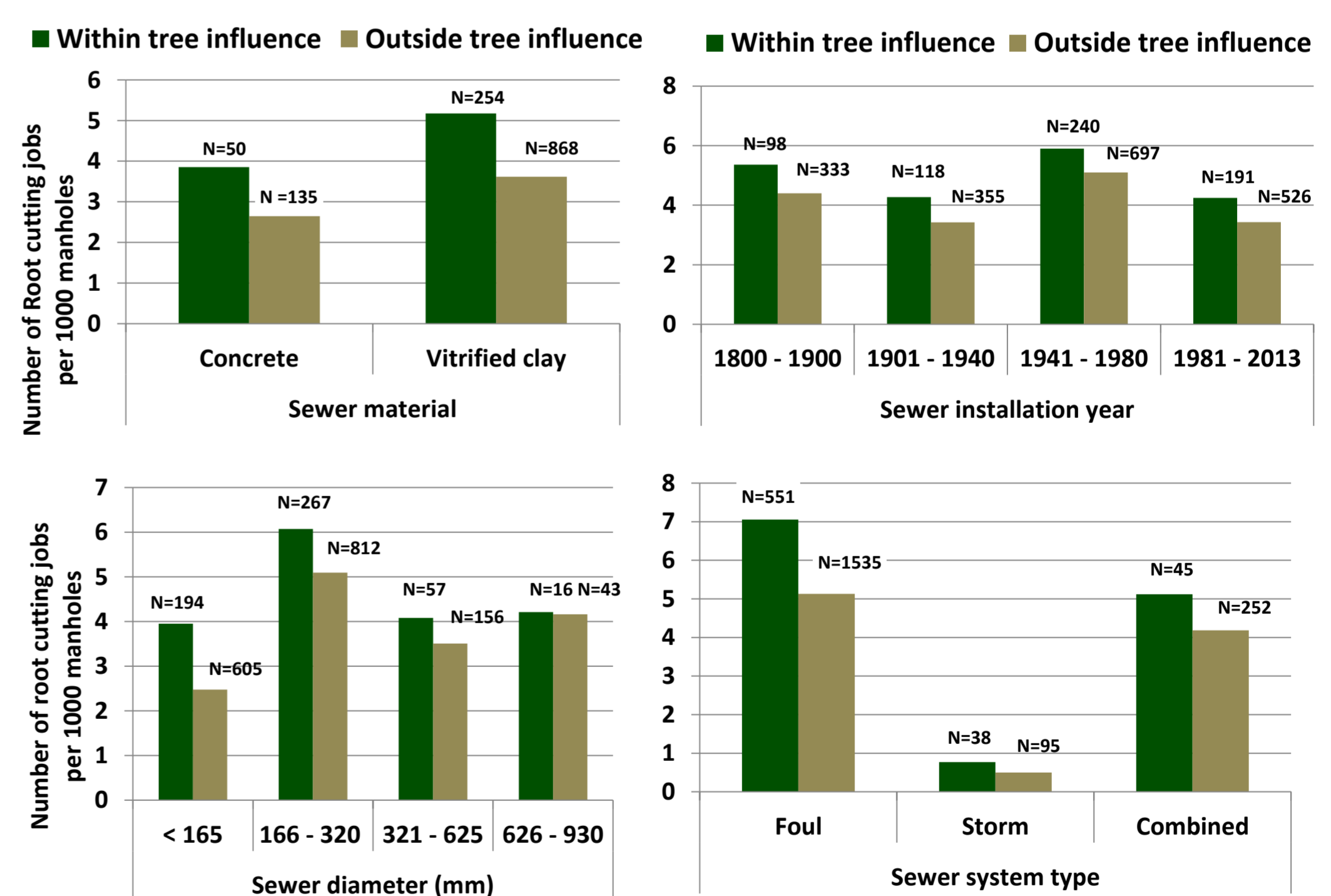
- Buffering tree points based on their height attribute
- Extracting those buffers that intersect with sewer pipe
- Finding out the length of sewer and number of failures inside and outside of tree buffers
- Calculating failure rate per 1000 of sewer manholes
- Repeating this process for each sewer characteristic



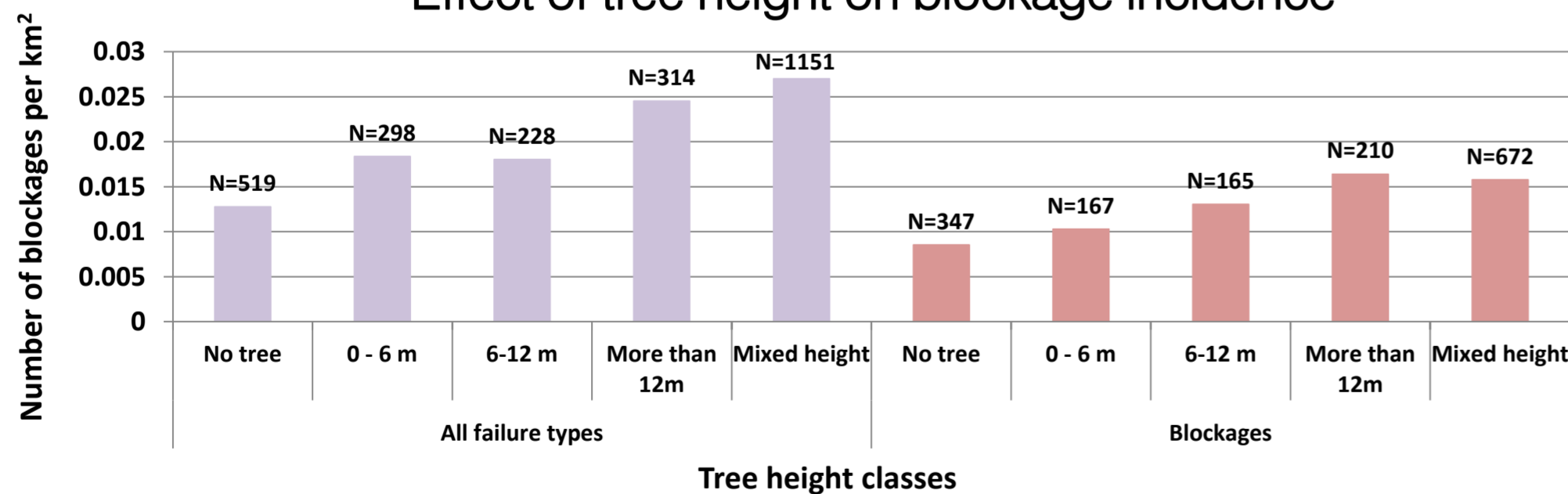
Key findings

- Root cutting job occurrence is higher in the near proximity of trees
- The effect varies within sewer characteristics with high impact on low diameter pipes and foul sewer system type
- The number of blockages in near properties is higher with increasing proportion of high trees in postcode areas

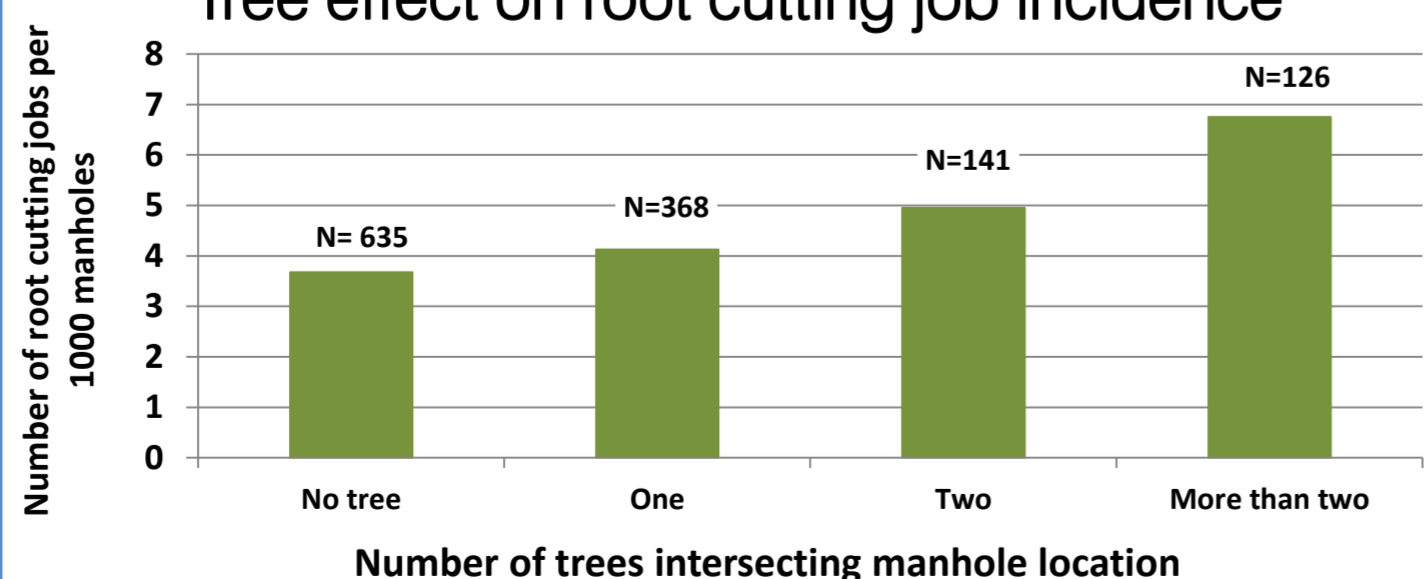
Tree effect on sewer characteristics



Effect of tree height on blockage incidence



Tree effect on root cutting job incidence



Recommendations

This study provides a new insight on the tree-influenced sewer deterioration that can serve as a valuable source of information for water-providing companies. They can use it when developing sewer maintenance plans and prediction models of sewer pipes deterioration.

