Tree Composition and Seedling Recruitment in Urban and Rural Forests

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Background Information
- In 1993, 24 permanent sites were randomly located in Forest Park; an additional site was in the Ancient Forest Preserve (Old Growth).
- The purpose of the original study was to examine the effects of urbanization on forest structure.
- Trees were identified to species and dbh measured.
- In 2003 and 2013, measurements were repeated.
- In 2014, 3 control sites in the Mount Hood National Forest (above Estacada Or.) were added.
- In 2003 and 2013, there were significantly fewer live trees and significantly fewer seedlings (trees <10cm dbh) than in 1993; this was true for all sizes except very large trees and for all species of trees.
- The high tree mortality and lack of recruitment is similar to findings in other urban forests.
- This poster compares tree density between Forest Park sites and the control sites in the Mount Hood National Forest.

Goals of Study
- Establish control sites in a rural area to examine the impact of air quality on trees and recruitment.
- Gather baseline tree data at each control site.
- Compare tree density between control and long term study sites in Forest Park.

Hypothesis
- Tree recruitment (# seedlings and saplings) would be greater at control sites than in urban sites.

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Methods
- 24 random sites were selected in Forest Park in 1993 along the urban-rural gradient; 1 site in the Ancient Forest Preserve.
- Three, 250 m² quadrats were randomly located at each site to measure trees.
- All trees within each quadrat were identified to species and dbh (diameter at breast height) of each tree measured.
- Sites were relocated in 2003 and 2013 and measurements repeated.
- In 2014 three control sites were selected in the Mount Hood National Forest along a perceived gradient of air quality.
- Trees were measured in three quadrats/transects in the same manner as in Forest Park.

Results
- We found significantly more live trees, saplings (trees <10cm dbh) and seedlings (trees <2m tall) at the control sites than at sites in Forest Park.
- We had more seedlings at the three control sites (341) than at all 25 of the Forest Park sites combined (140).

Conclusions
- Forest Park, like many urban forests, is experiencing low levels of seedling and sapling recruitment.
- The control sites had significantly higher numbers of saplings (<10cm dbh) and seedling than sites in Forest Park.
- We believe the lack of tree recruitment observed in Forest Park may be due to nitrogenous air pollution levels in the urban forest.
- We have data on lichens and are waiting for data on levels of NOx in the air at each site, as well as soil analysis for total N and C to further investigate air quality.