

# Constructing a virtual forest: An hierarchical nearest neighbors method for generating simulated tree lists

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## Abstract

A nearest neighbors method for generating simulated tree lists has been developed. The method employs an hierarchical structure to incorporate information at two implicitly defined spatial scales, a coarse scale representing the distribution of stand attributes across a region and a fine scale representing the distribution of individual tree attributes within a stand. The tree list generation method was implemented and tested using data from untreated, naturally regenerated and planted forests in western Oregon, western Washington, and southern British Columbia west of the Cascade Mountains. Simulated tree lists were generated using stand (coarse) scale attributes from each of the actual tree lists in the data, and comparisons of the distributions of the simulated and actual attributes at the stand (coarse) scale and the tree (fine) scale were made. At the stand (coarse) scale, distributions of quadratic mean diameter and average height for the simulated and actual stands were in very good agreement, having approximately 98% of their probability in common for each attribute. At the tree (fine) scale, comparisons of the distributions of diameter at breast height, height, and species composition of the simulated and actual stands were more variable, with approximately 94% of the simulated stands being statistically indistinguishable from their respective actual stands.

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