

## Environmental Services Tree Program Monitoring Effort

**By Jennifer Karpis**

Environmental Services Tree Program Coordinator, City of Portland Environmental Services

Portland's Environmental Services bureau plants and promotes trees in service of clean rivers, healthy watersheds, and livable, sustainable communities. As these trees mature, their ability to benefit watershed and human health increases. Proper planting, pruning, and life-long care optimize the trees' health and longevity and help create a sustainable and resilient urban forest. In addition, monitoring tree growth and longevity helps us understand and quantify urban forest functions and determine or modify forest needs.

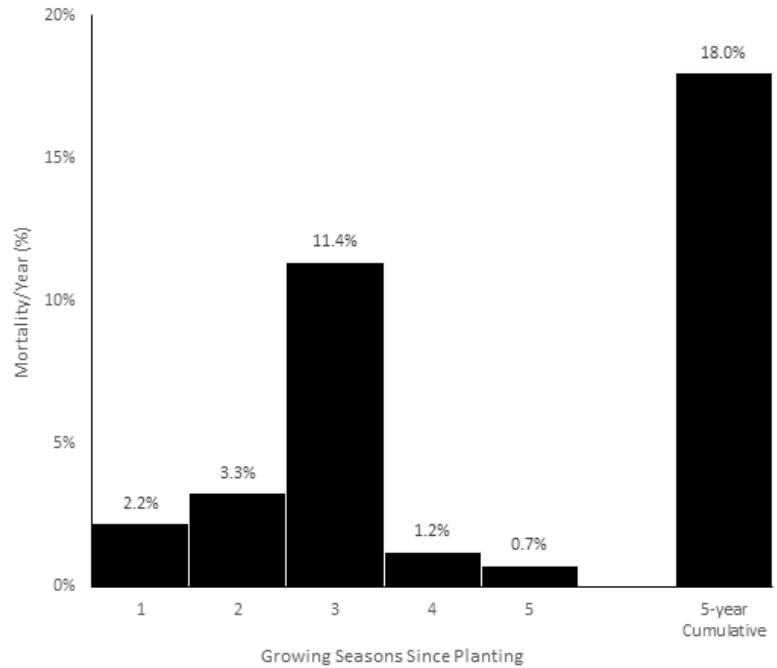
In 2008, increased investments in green infrastructure were made throughout the city to more effectively meet federal, state, and local regulatory demands for wastewater management and watershed health. As a result, Environmental Services has worked with public, nonprofit, and community partners to plant more than 40,000 trees in the city since 2008. Trees are planted at schools, along transportation rights-of-way, and in residential, commercial, and industrial areas. While the care of these trees is the responsibility of the adjacent property owner, inspecting (and monitoring) the trees is the sole responsibility of the City. Monitoring these young, newly planted trees informs program success and return on investment and supports effective and efficient use of public resources. In addition, monitoring data will help answer questions about planted tree growth and mortality and, as a result, test assumptions about appropriate establishment care for young trees in Portland's dry summer climate.

Portland receives about 37 inches of rain each year, primarily fall through spring. Trees are planted during the fall and winter months when the days are typically cool and moist. Proper tree establishment is critical in a place like Portland where the growing season coincides with the dry season, making weekly watering a must. Trees are 1 ½ to 3 ½ inch caliper at time of planting, and each tree gets visited near the end of its first growing season in the ground. At least 10% of trees planted each year get a second monitoring visit after their second growing season. As resources allow, some of these 10% cohorts get another visit after the third growing season, and we hope to follow a few of them into maturity.



At the end of summer, program outreach staff hired to canvass door-to-door in search of prospective tree planters shift gears to focus on tree inspection. After a half day of field training with veteran staff, they work in pairs to inspect roughly 2,500 trees. In their 360° visual assessment of the aboveground parts of the tree, inspectors look at the condition of the bark, branches, and leaves as well as the presence of suckers. Damage

is noted as presence or absence, but modifiers are included if the damage is extreme. Inspectors also capture site factors that could affect tree establishment such as soil moisture, mulch, and weeds. As with the tree attributes, data are collected as presence or absence unless the case is extreme. Based on tree and site factors, a condition rating of good, fair, poor, or dead (or missing if the tree is gone) is assigned. A door hanger is left behind to remind the resident about best practices for getting trees off to a strong start.



The monitoring program began in 2011. So far, data are stored in Excel spreadsheets on a per-project basis. As a result, data analysis and manipulations are tedious. An in-house database under development will facilitate project-to-project and year-to-year comparisons that may help improve what species we plant and where we plant them.

Mortality rates are generally 2.3% or lower during the establishment phase. Program participants receive tree care information when their trees are planted, and we send them watering and care reminders at the beginning and in the middle of the dry season. Our low mortality rates demonstrate that participants take their responsibility for tree establishment seriously. Although mortality rates are low, our multi-year monitoring effort highlighted a higher than expected mortality rate following the third growing season, prompting us to continue encouraging supplemental summer watering.

For more information, please contact [Jennifer](#).