

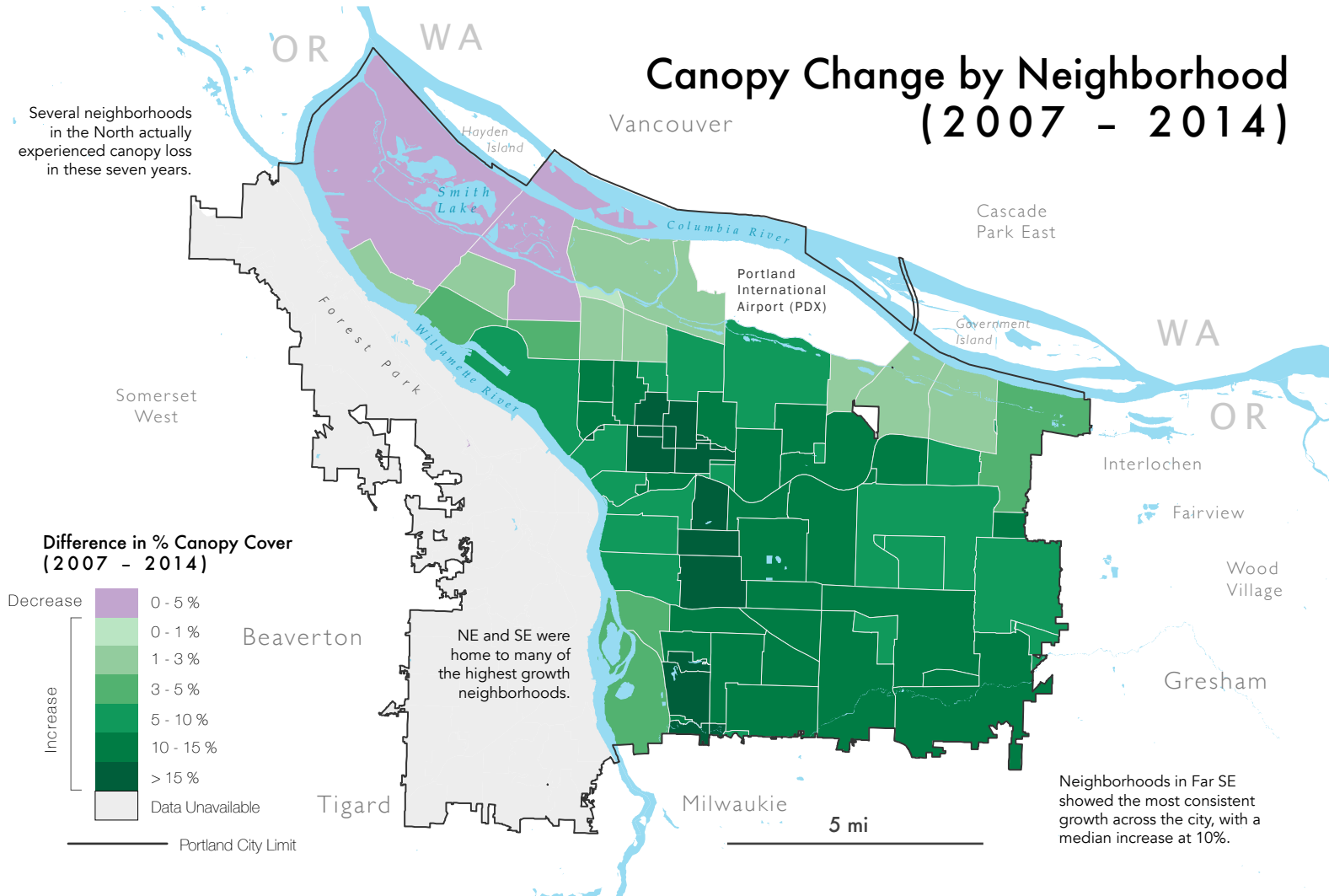
DETECTING CHANGE in Portland's Urban Canopy

Portland's urban canopy is changing.

While the majority of Portland's neighborhoods saw increase in canopy cover between 2007 and 2014, growth rates varied across the city.

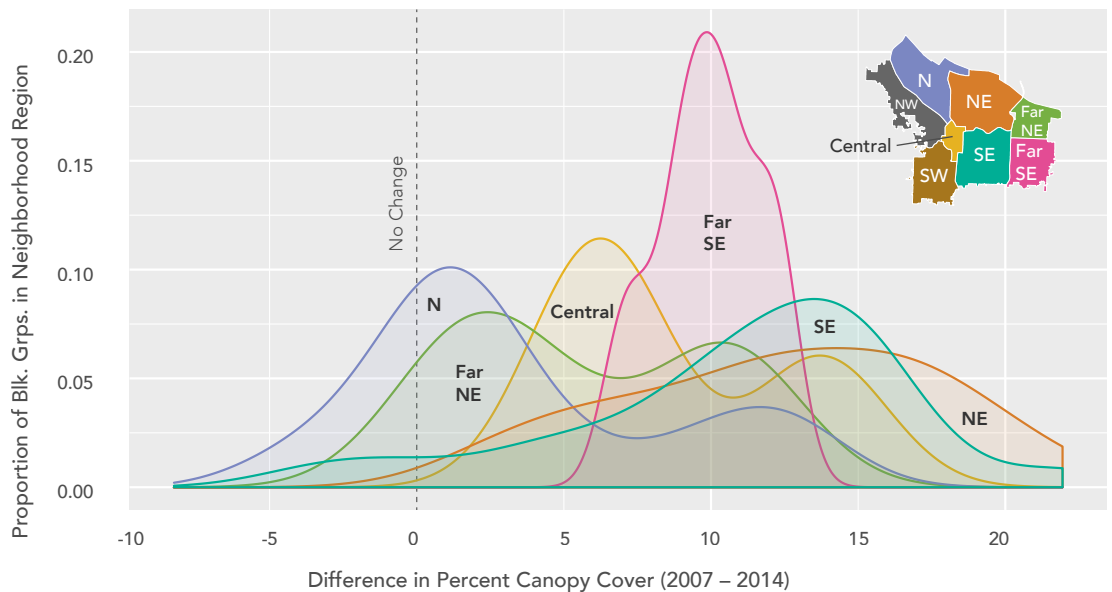
3.9%

The increase in Portland's urban canopy between 2007 and 2014.



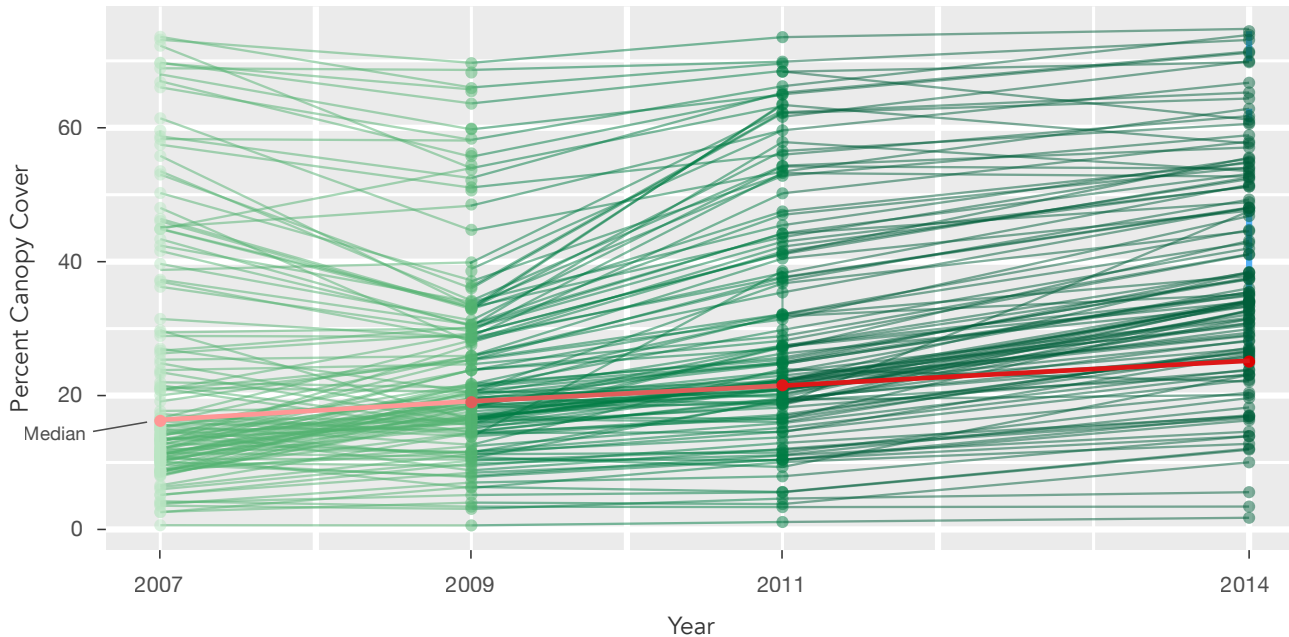
Exploring Canopy Change by Neighborhood Region

North and Far Northeast neighborhoods displayed the lowest median canopy growth between 2007 and 2014, 1.7% and 4.7%, respectively. **Southeast and Northeast** neighborhoods had the highest median canopy growth (11.9% and 12.8%, respectively), but displayed large differences between their minimum and maximum growth neighborhoods. **Far Southeast** Portland neighborhoods displayed the most consistent growth in the city.



DETECTING CHANGE in Portland's Urban Canopy

ACROSS THE YEARS Visualizing Canopy Change at Intervals from 2007 – 2014



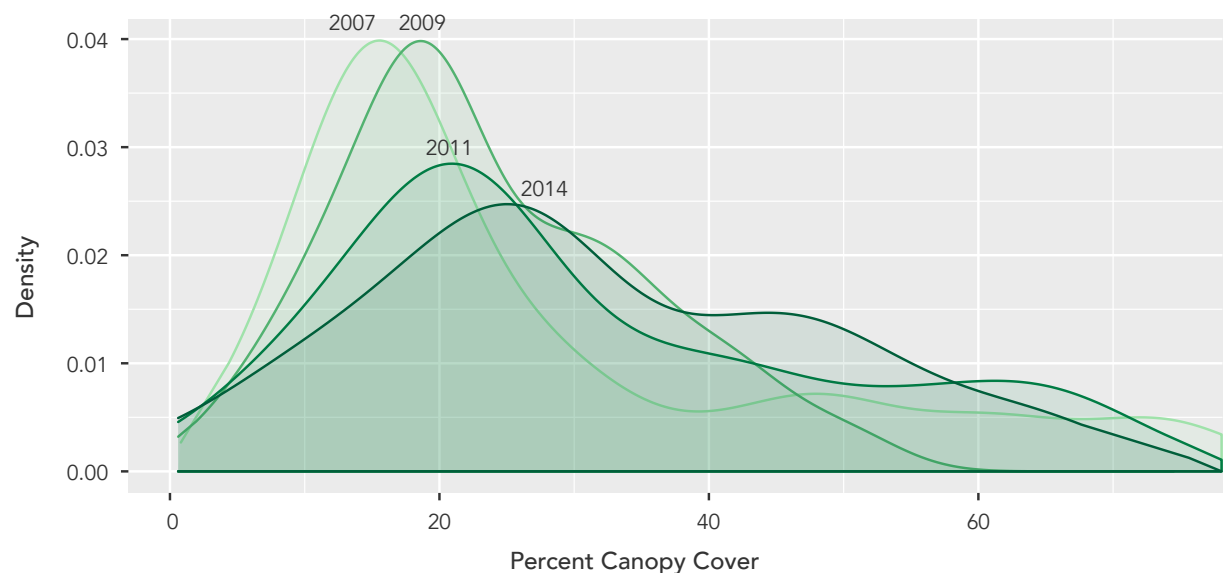
Portland's urban canopy grew consistently from 2007 – 2014.

However, 2007 – 2009 saw more variation in change, with a number of neighborhoods displaying losses in canopy cover. 2009 – 2011 and 2011 – 2014 were higher growth time periods, with most neighborhoods experiencing canopy gains. The red line tracks the growth in the median canopy cover of Portland neighborhoods across the years.

Median Percent Canopy Cover of Portland Neighborhoods

Year	2007	2009	2011	2014
Median % Canopy Cover	16.8%	19.4%	21.5%	24.7%

The median canopy cover in Portland neighborhoods increased every year between 2007 and 2014, starting from roughly **17%** in 2007 and growing to just under **25%** by 2014. However, canopy cover was most consistent among the neighborhoods in 2009. Since then, strong growth in some areas of the city and slower growth in others has increased the canopy cover gap between Portland's neighborhoods.



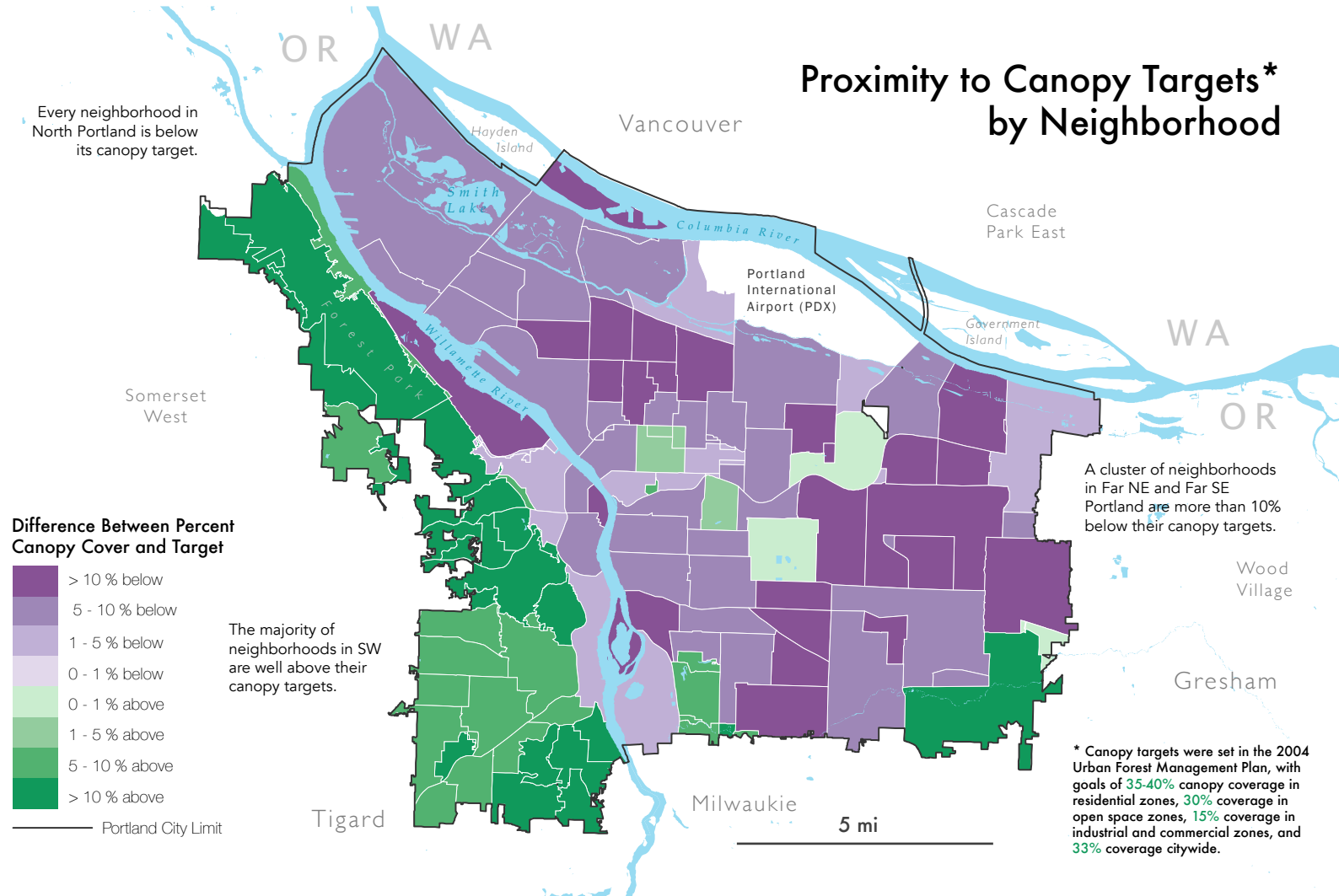
DETECTING CHANGE in Portland's Urban Canopy

There's still work to be done.

Despite consistent growth from 2007 – 2014, the majority of Portland neighborhoods remain below their canopy targets.

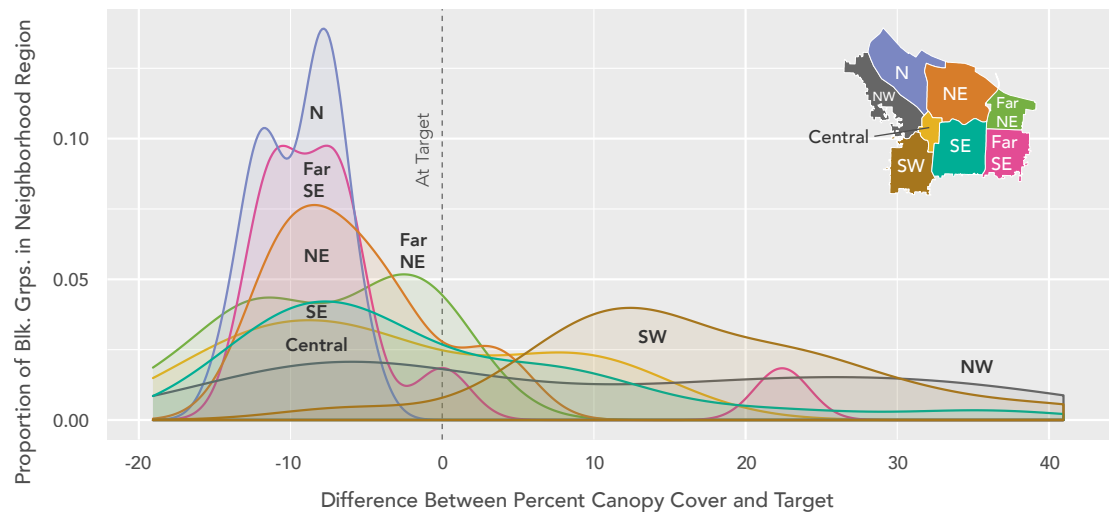
61%

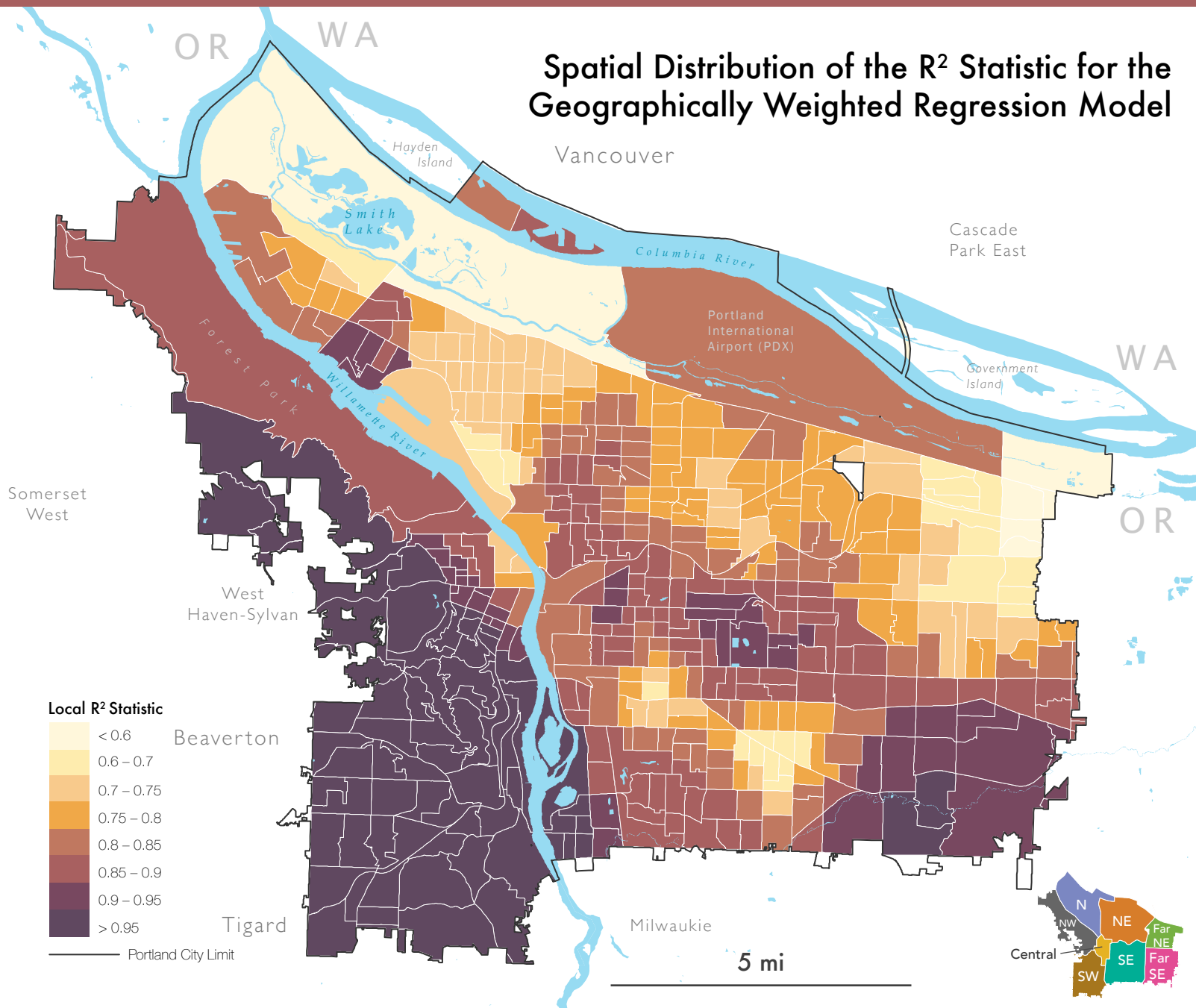
of Portland neighborhoods had not reached their canopy target by 2014.



Progress Towards Canopy Targets by Neighborhood Region

Every neighborhood in **North Portland** is below its canopy target by more than 5%. **Northeast, Far Northeast, and Far Southeast** neighborhoods are also struggling, with fewer than 15% of neighborhoods in these regions above the canopy target. **Northwest** neighborhoods are spread across the spectrum, with several neighborhoods well above and several well below their targets. **Southwest** neighborhoods tend to be well above their targets.





Geographically Weighted Regression (GWR) Model

Dependent Variable	% Canopy Cover
Independent Variables	% of Residents without a Bachelor's Degree % of Units that are Renter-Occupied % Change in White Population (2010-2013) Difference between Current and Target Canopy Population Density
R^2 / Adjusted R^2	0.957 / 0.945
AICc	2231.768
Kernel Type / Bandwidth	Adaptive / 74 Neighbors
Global Moran's I Residuals	0.746 / Residuals are Randomly Dispersed

Above, the geography of the R^2 statistic across Portland's Census block groups for a geographically weighted regression model predicting **percent canopy cover**. GWR operates by fitting a unique regression line to each feature in the dataset. This model closely fits the data in **Southwest** and **Far Southeast** Portland, with pockets of weaker fit in **Southeast**, **Far Northeast**, and **North** Portland.

RASTER COEFFICIENT SURFACES

Concentrations of positive coefficients on the border of **Southeast, Northeast, and Downtown Portland** suggest that increases in the percent of residents without a Bachelor's Degree here are associated with increases in percent canopy cover. Interestingly, each of these areas is flanked by a patch of negative coefficients, suggesting an opposite relationship in adjacent neighborhoods.

Areas of negative coefficients throughout **Southeast, Southwest, and Northeast Portland** suggest that increases in the percent of renter-occupied units here are associated with lower canopy cover. Only the farther reaches of **North and Northwest Portland** display increases in the percent canopy cover when the percent of renter-occupied units increases.

Heavy concentrations of positive coefficients in **North-east and Southeast Portland** show that increases in the white population in these regions is strongly associated with increases in the percent canopy cover. However, the opposite is apparent in **Downtown, North, Far Northeast, and Far Southeast** neighborhoods, where increases in the white population are associated with decreases in the percent canopy cover.

Coefficients for this metric are positive across the city, suggesting that areas with a greater difference from their canopy target are associated with greater percent canopy cover. The effect is strongest in **Northeast and Southeast Portland**, where differences between the 2014 canopy and the target canopy tend to be smaller than other parts of the city.

Interestingly, increases in the population density across the majority of the city are associated with increases in the percent canopy cover. This effect may be related more generally to the sharp increase in population that Portland has experienced since the early 2000s, and the influence of the **urban growth boundary** on preventing the development of sprawl.

