

Seattle 2016 LiDAR Canopy Cover Assessment

Seattle's Urban Forestry Team

May 8, 2017



Today's presentation

- Introduction
- Background
- 2016 LiDAR canopy cover assessment
 - Technology
 - Research questions
 - Study Findings
 - Equity
- Canopy cover change
- Development impacts
- Using the data



Project team

Urban Forestry Commission

University of Vermont
Spatial Analysis Lab

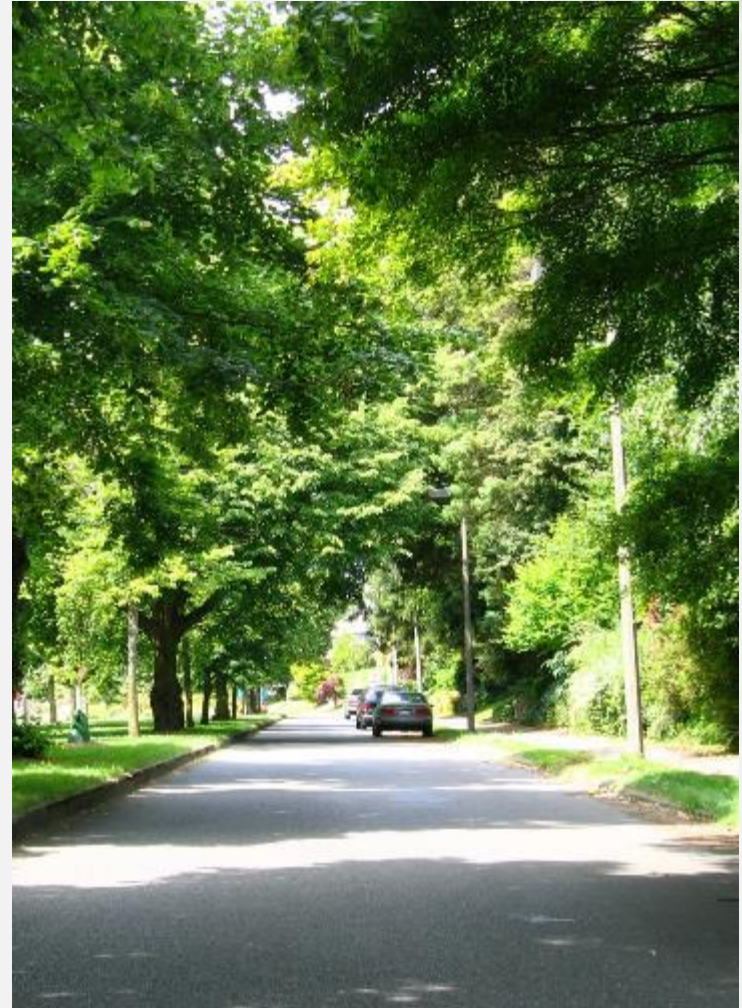


What is urban forestry?

Urban forestry is the care and management of trees and understory plants in **urban** areas for the purpose of improving the **urban** environment.



Wild forest vs. urban forest



The importance of trees



Background

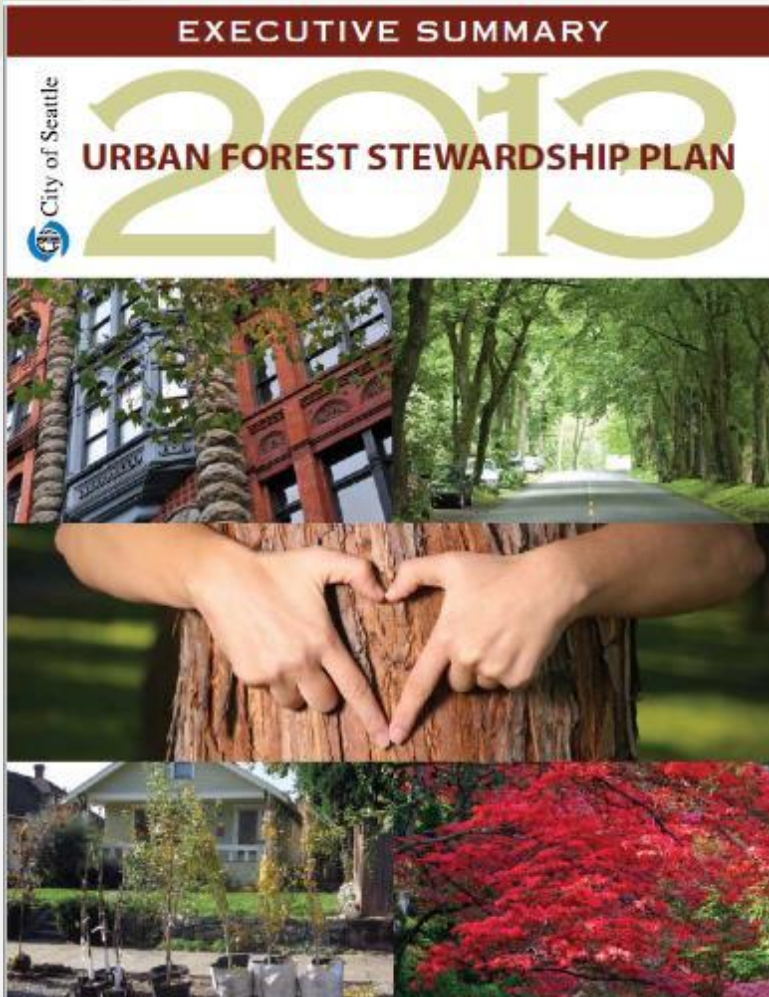


Seattle's commitment



Seattle's urban forest is a **thriving and sustainable** mix of tree and understory **species and ages** that creates a contiguous and **healthy** ecosystem that is **valued** by the City and all Seattle residents as an essential environmental, economic, and **community asset**

Urban Forest Stewardship Plan

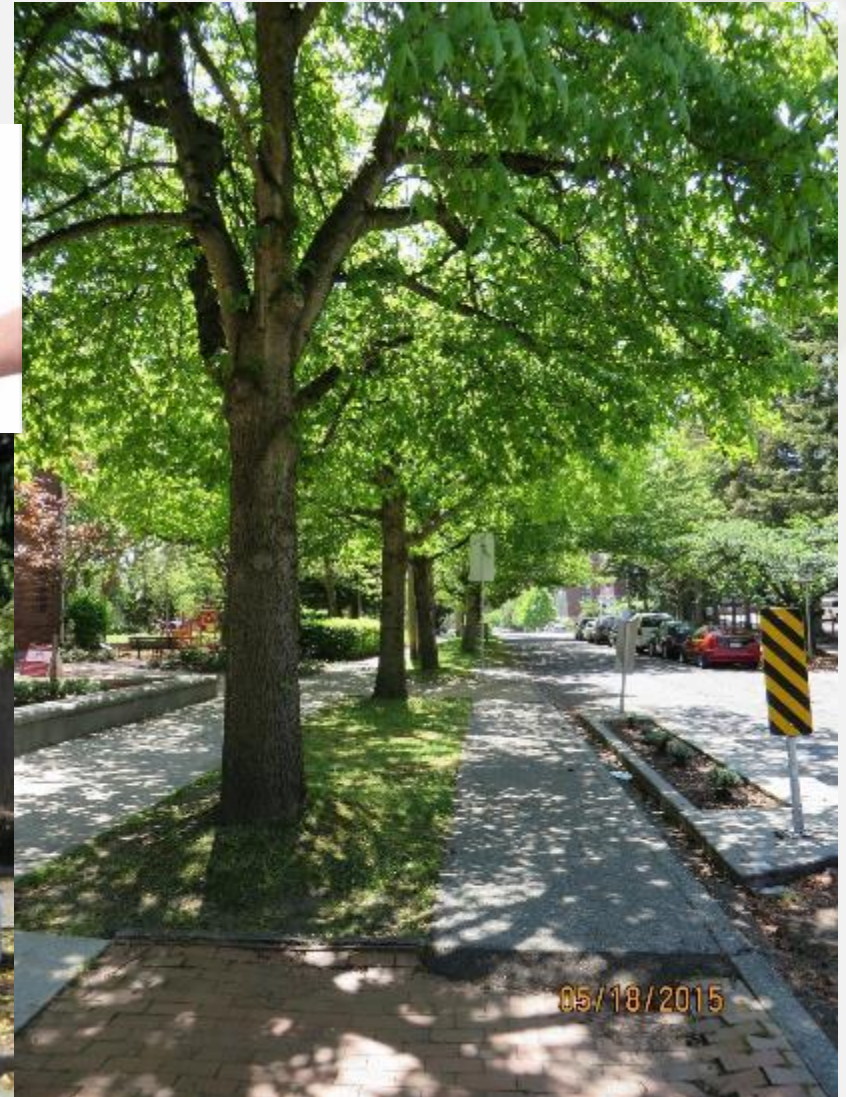


- Establishes goals - 30% citywide canopy cover
- Long-, mid-, and short-term strategies for achieving goals
- Implemented through annual workplans
- Managed via inter-departmental team
- To be updated in 2018

1. Create an ethic of stewardship



2. Replace/enhance benefits



3. Expand canopy to 30% by 2037

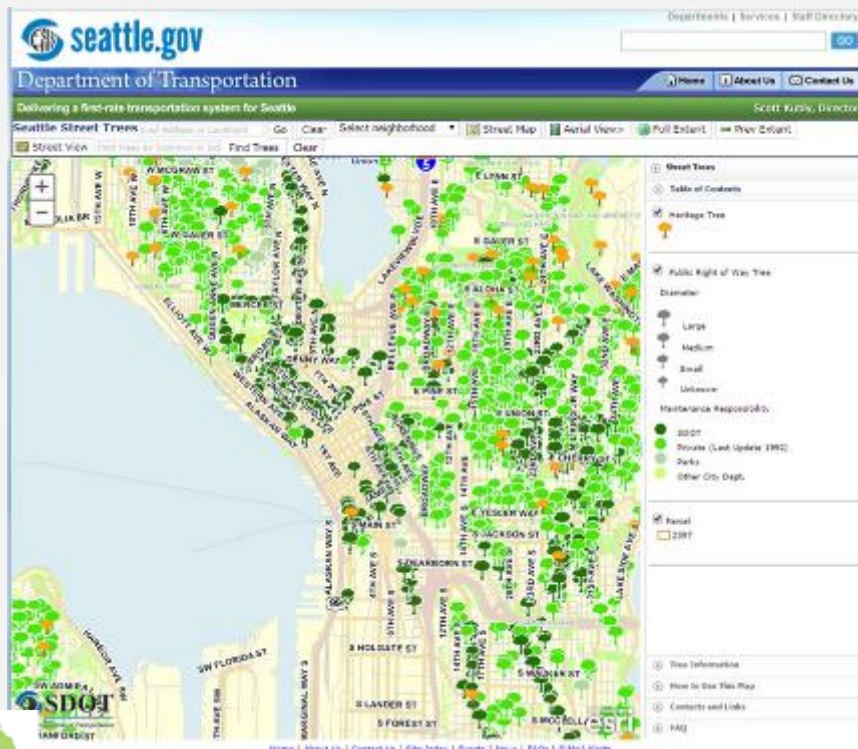
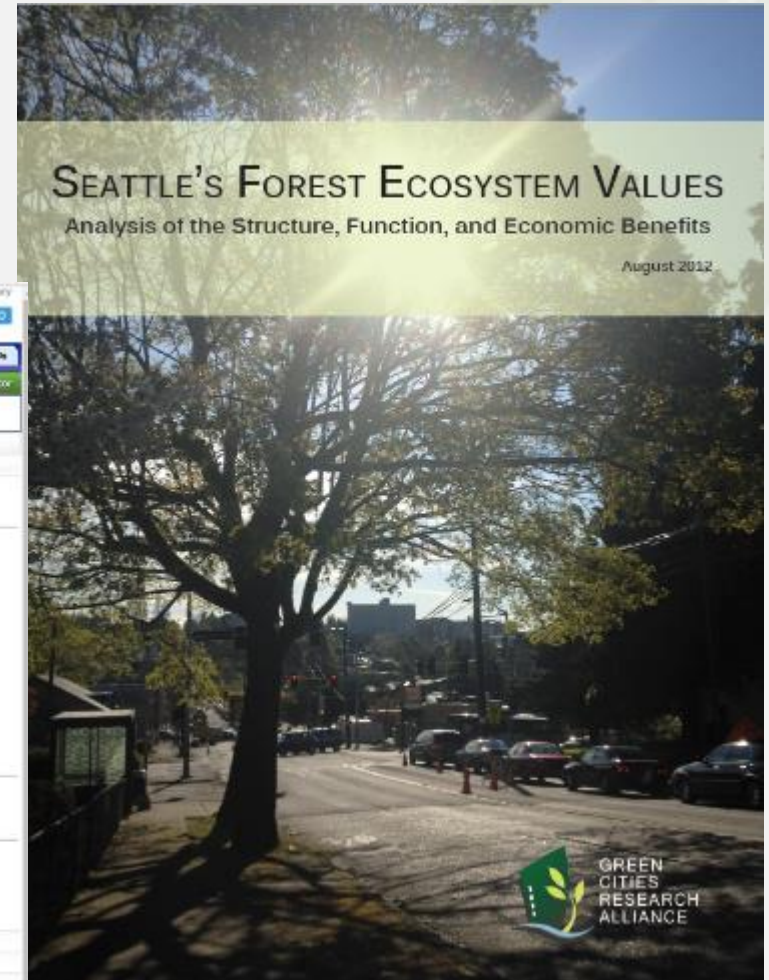


4. Increase health/longevity



Tracking progress

- SDOT, Parks inventories
- 2016 canopy cover assessment
- 2012 Seattle's Forest Ecosystem Values



Past assessments



Study year/ organization	2007 City of Seattle	2009 NDC Imaging for City of Seattle		2012 Green Cities Research Alliance	2013 University of Washington			2015 OSE	2016 OSE
Year measured	2001	2002	2007	2010	2009	2009	2012	2015*	2016
Canopy Cover	18%	22.5%	22.9%	26.3%	26.4%	29.6%	28.5%	2007 – 33% 2010- 33% 2015 - 31% (+/- 3%)	28%
Margin of Error	+/- 5%	Not stated in report	Not stated in report	Unknown	Unknown	Unknown	Unknown	+/- 3%	+/- 1%
Method	LiDAR Analysis (low resolution)	Categorical raster creation	Categorical raster creation	Ground sampling	Point- based random sample	Categorical raster creation	i-Tree Canopy Point- based random sample	i-Tree Canopy Point-based random sample	LiDAR (State- of-the- art)
Data source	LiDAR	Satellite imagery	Satellite imagery	i-Tree Eco plots	Aerial photos	LiDAR, aerial photos	Google maps	Google maps	LiDAR

2016 LiDAR Canopy Cover Assessment



Jarlath O'Neil-Dunne
University of Vermont
Spatial Analysis Lab

LiDAR technology



Calculating canopy cover

91,776 acres (total area of the city including water)
- 38,271 acres (area of water within the city boundary)
= 53,505 acres (total area without water)
15,167 acres (total area of tree canopy) / 53,505

=

28%

Canopy Cover

Research questions

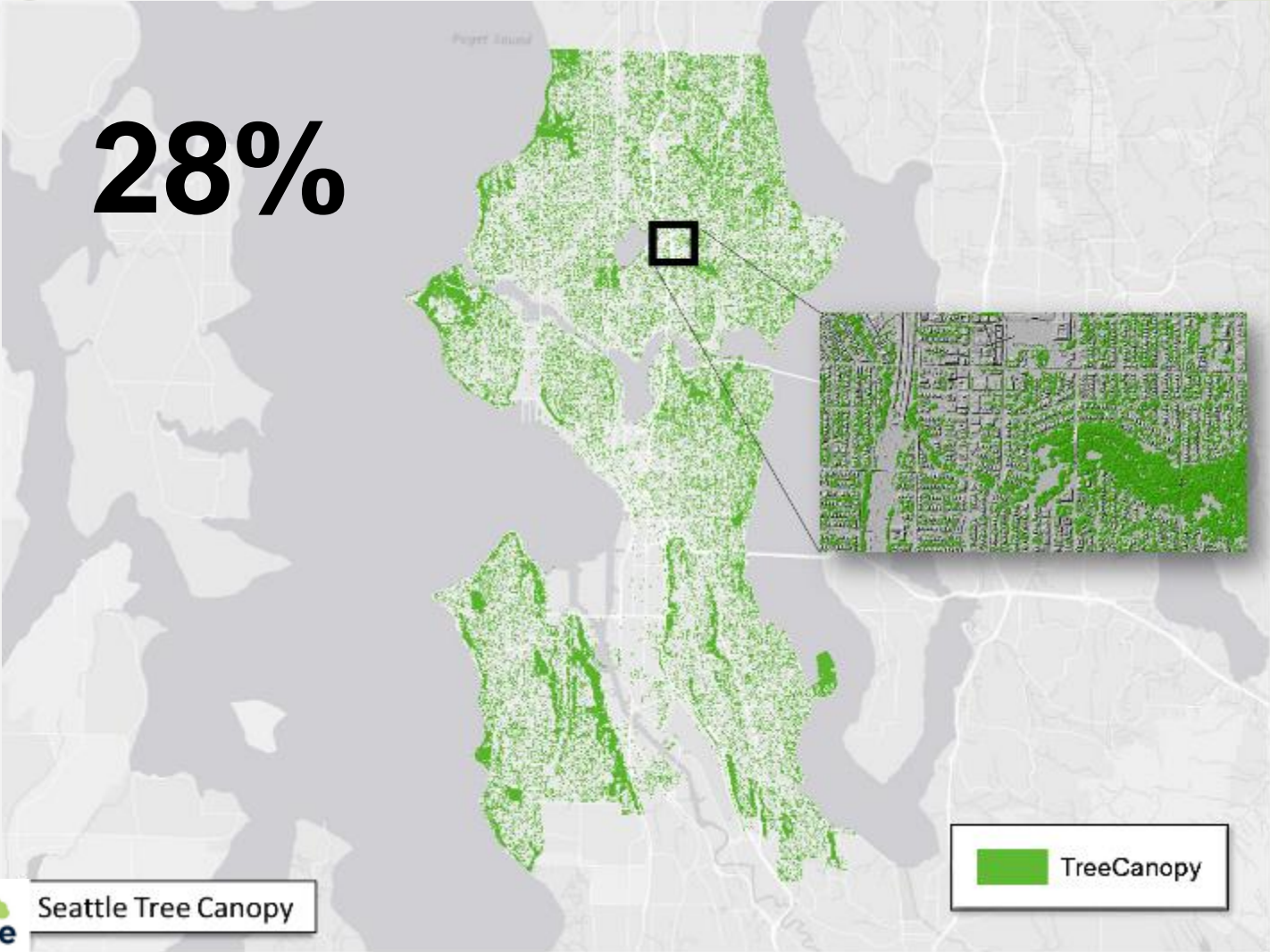
- Progress on citywide 30% goal
- Canopy cover in Seattle neighborhoods
- Progress on targets in different management areas
- Canopy cover in underserved neighborhoods

Study Findings



Progress achieving 30% canopy cover

28%

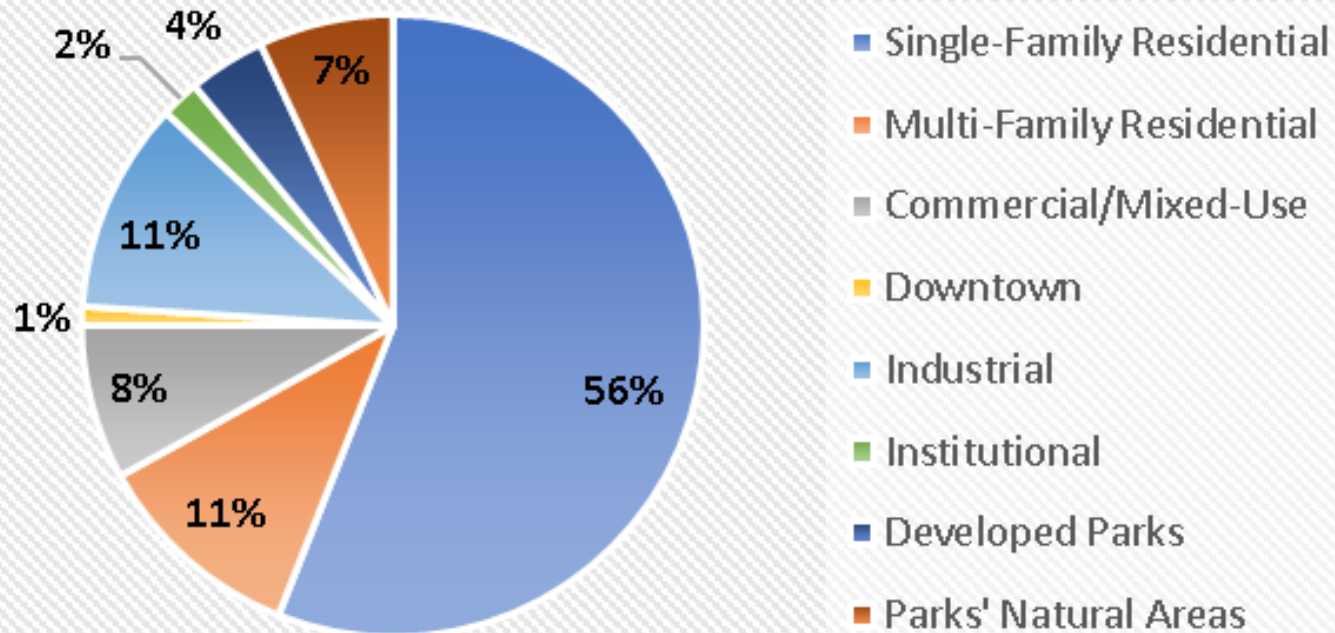


Seattle Tree Canopy

TreeCanopy

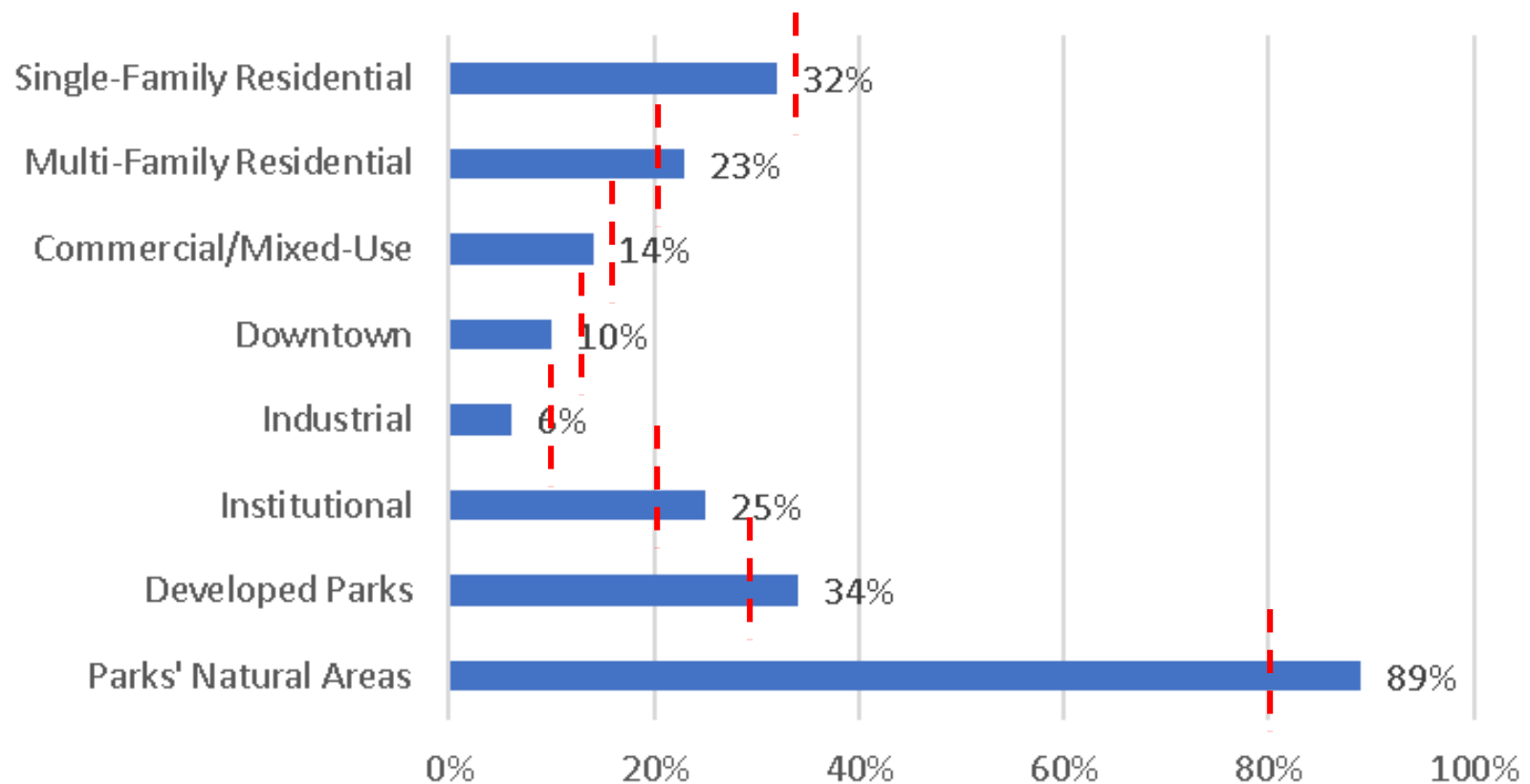
Progress achieving targets by Management Unit

Management Units
Percentage of city



Progress achieving targets by Management Unit

Canopy Cover by Management Unit



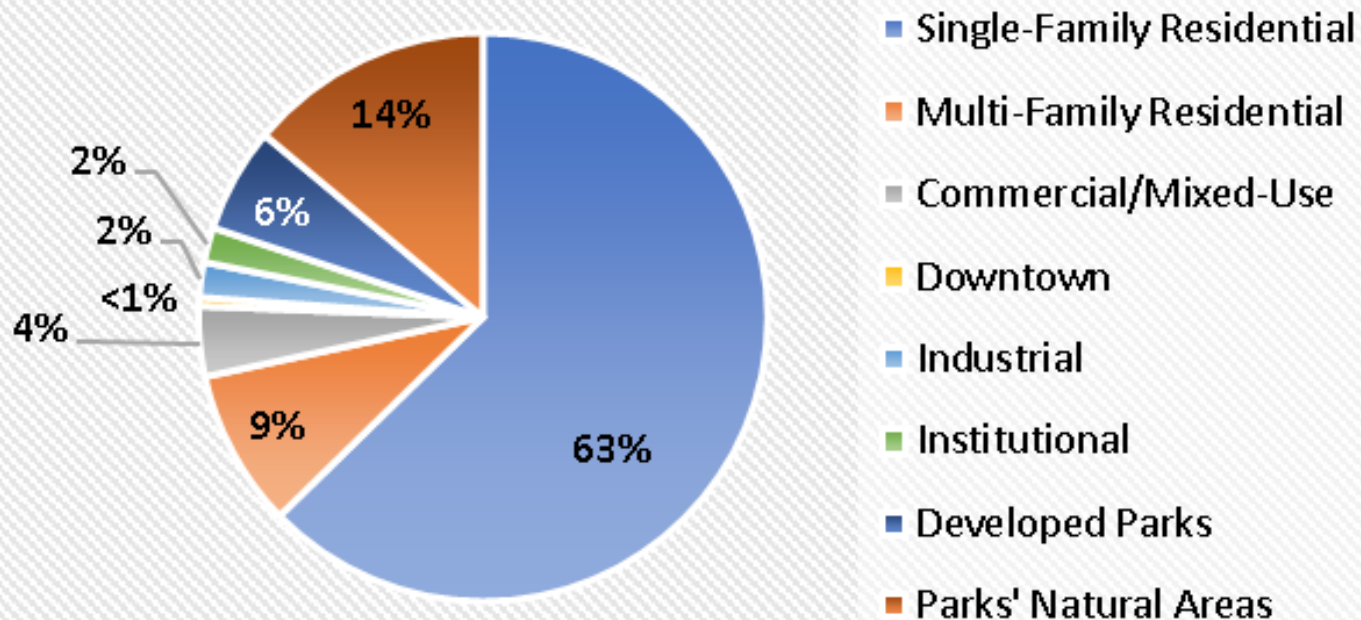
Progress achieving targets by Management Unit

Progress by Management Unit

Management Unit	2016 canopy cover	2037 canopy goal (set in 2007)	Over/Under goal
Single-Family Residential	32%	33%	-1
Multi-family Residential	23%	20%	+3
Commercial/Mixed-use	14%	15%	-1
Downtown	10%	12%	-2
Industrial	6%	10%	-4
Institutional	25%	20%	+5
Developed Parks	34%	25%	+9
Parks' Natural Areas	89%	80%	+9
City total	28%	30%	-2
Right-of-way (runs through all other MUs)	23%	24%	-1

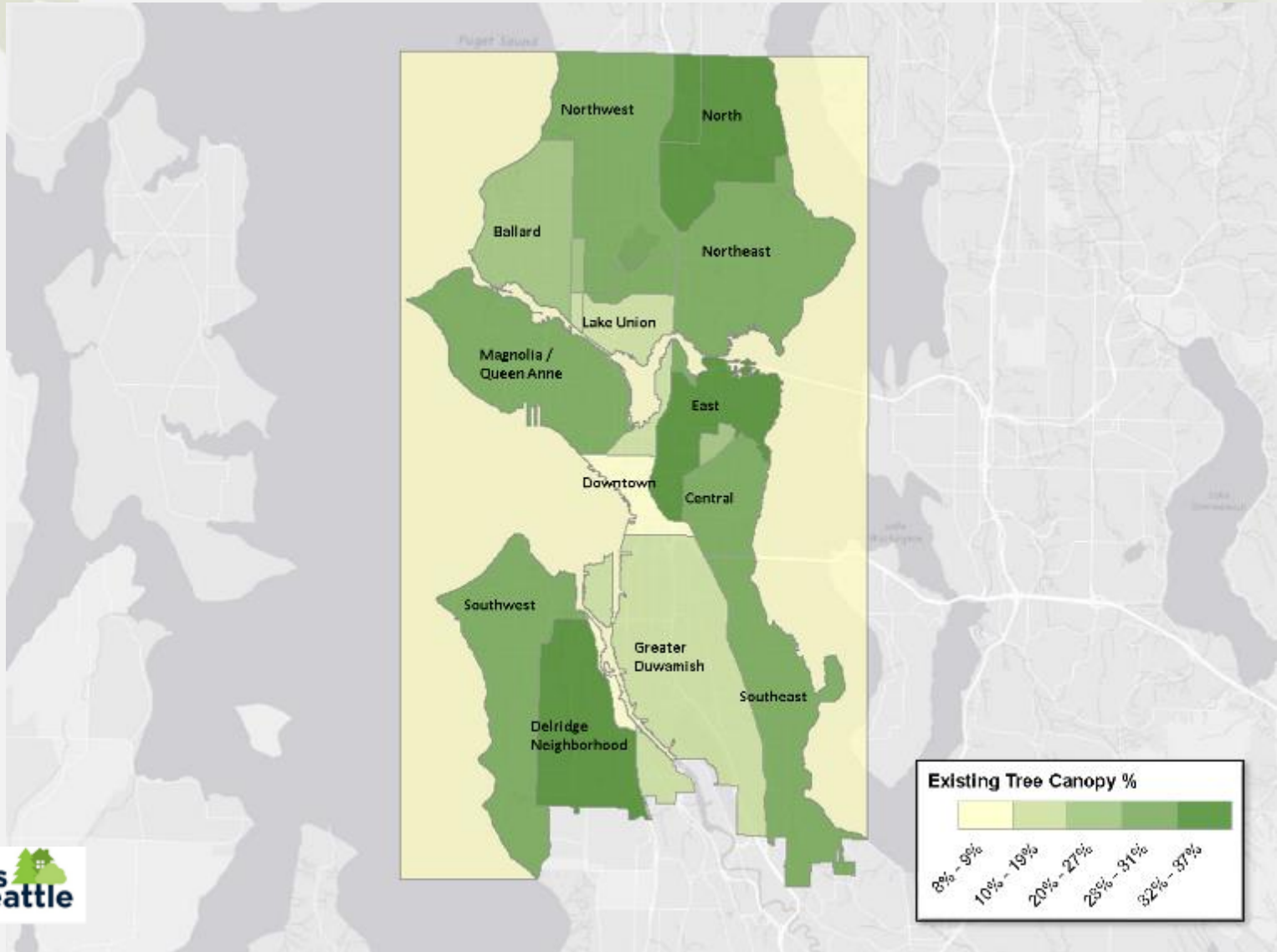
Progress achieving targets by Management Unit

Canopy cover distribution
by management unit

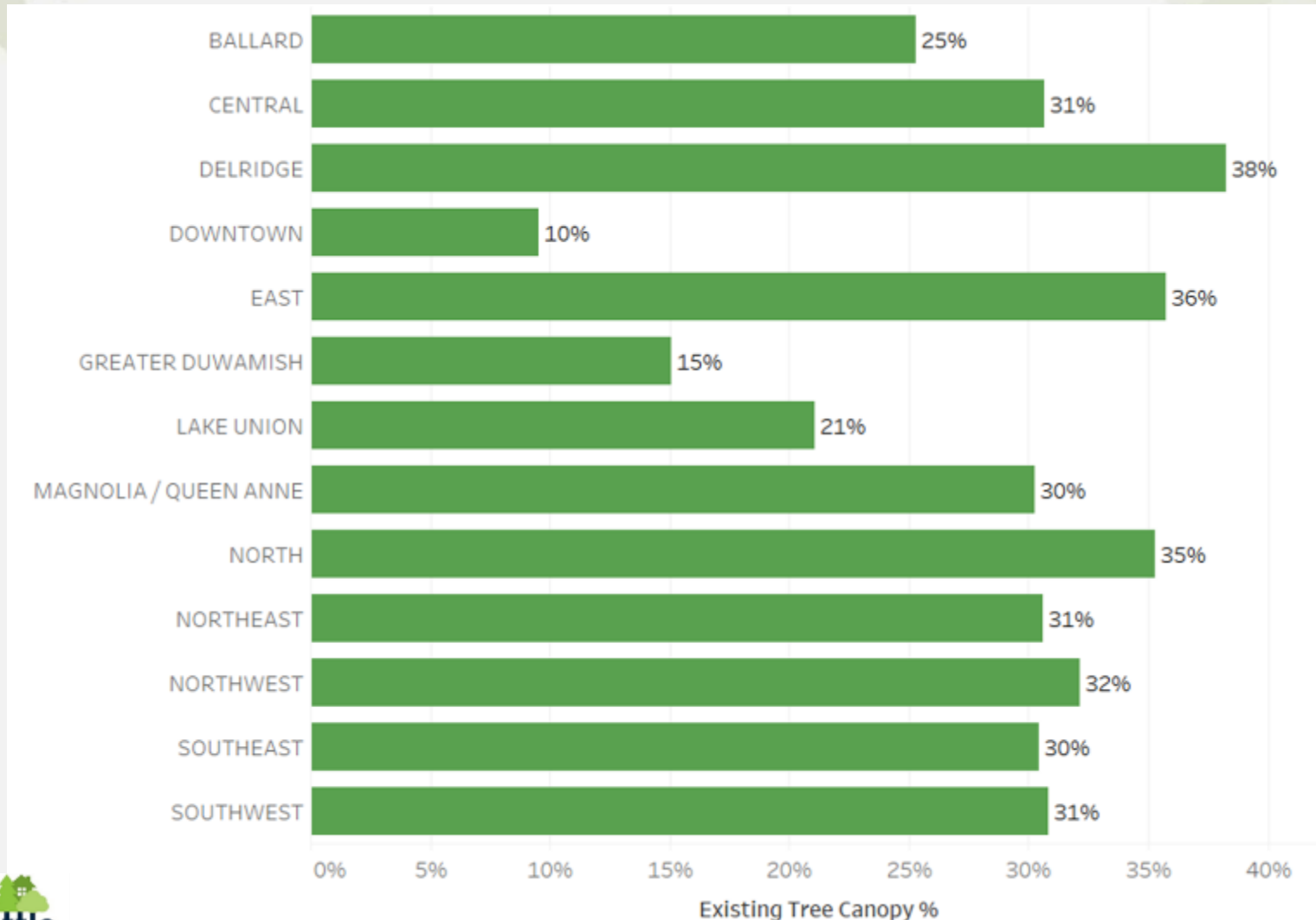


ROW = 22% of total canopy

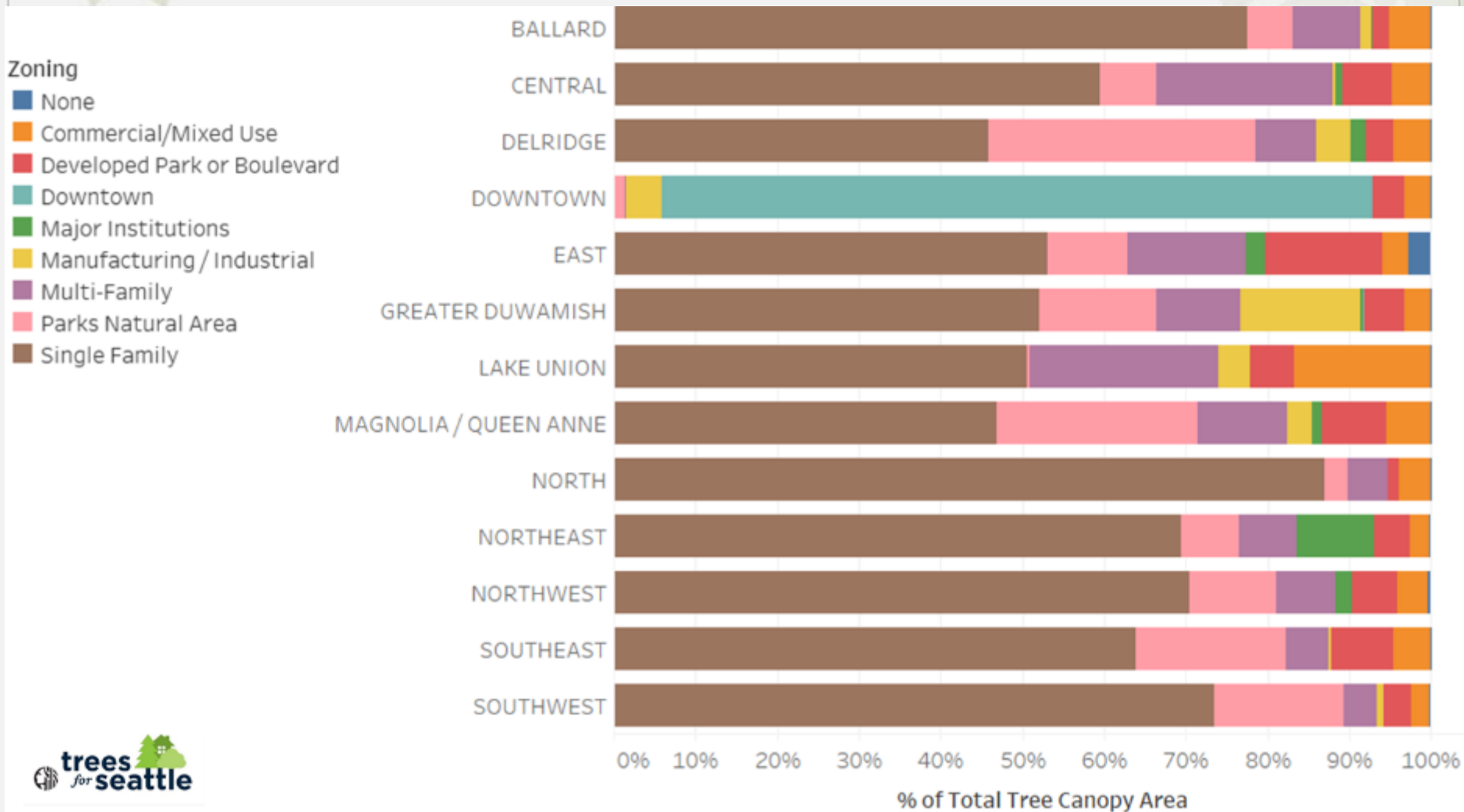
What's the canopy cover in different areas of Seattle



What's the canopy cover in different areas of Seattle

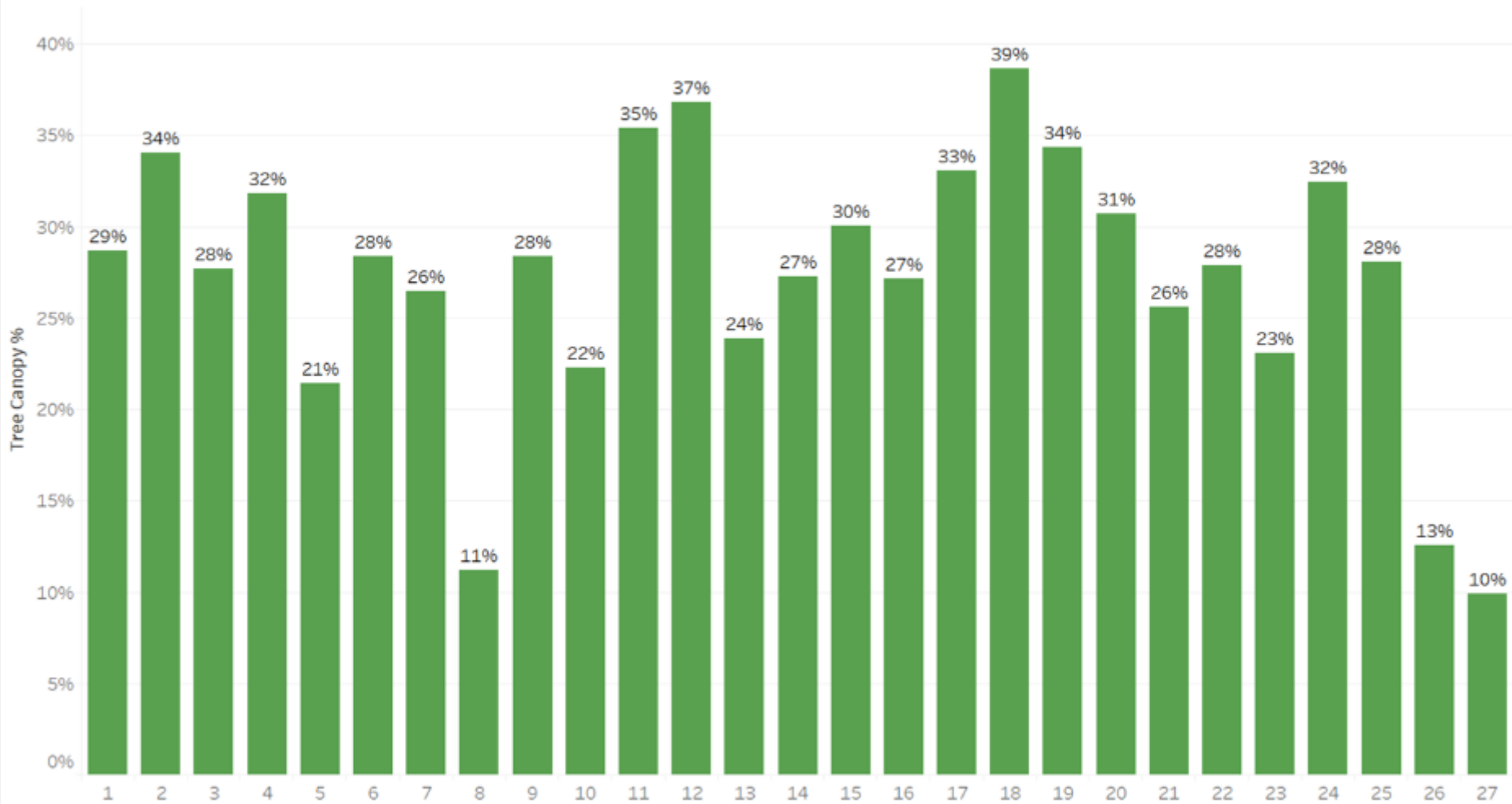


What's the canopy cover in different areas of Seattle



Canopy cover in SDOT's Street Tree Management Units

SDOT Management Units - %Tree Canopy



Conifer to deciduous tree ratio

28%



72%



Largest trees and tree groves

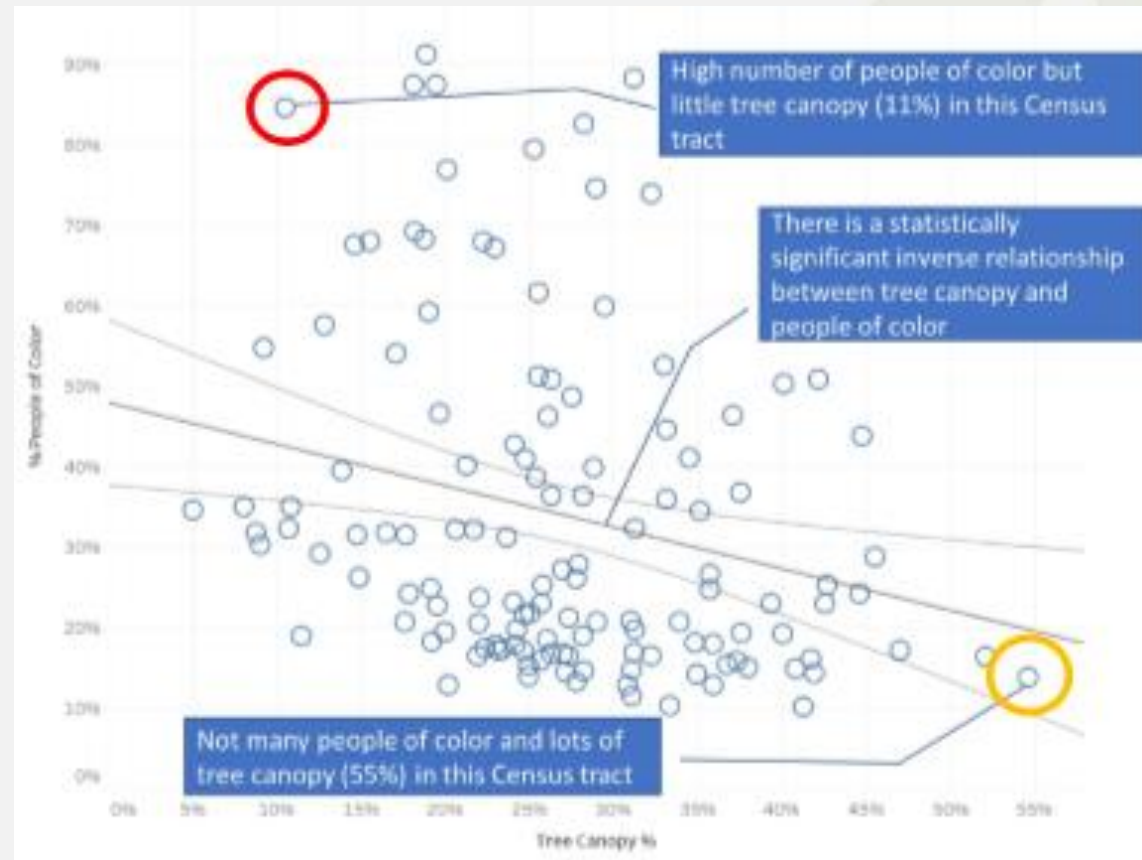
**6,338
large
trees**



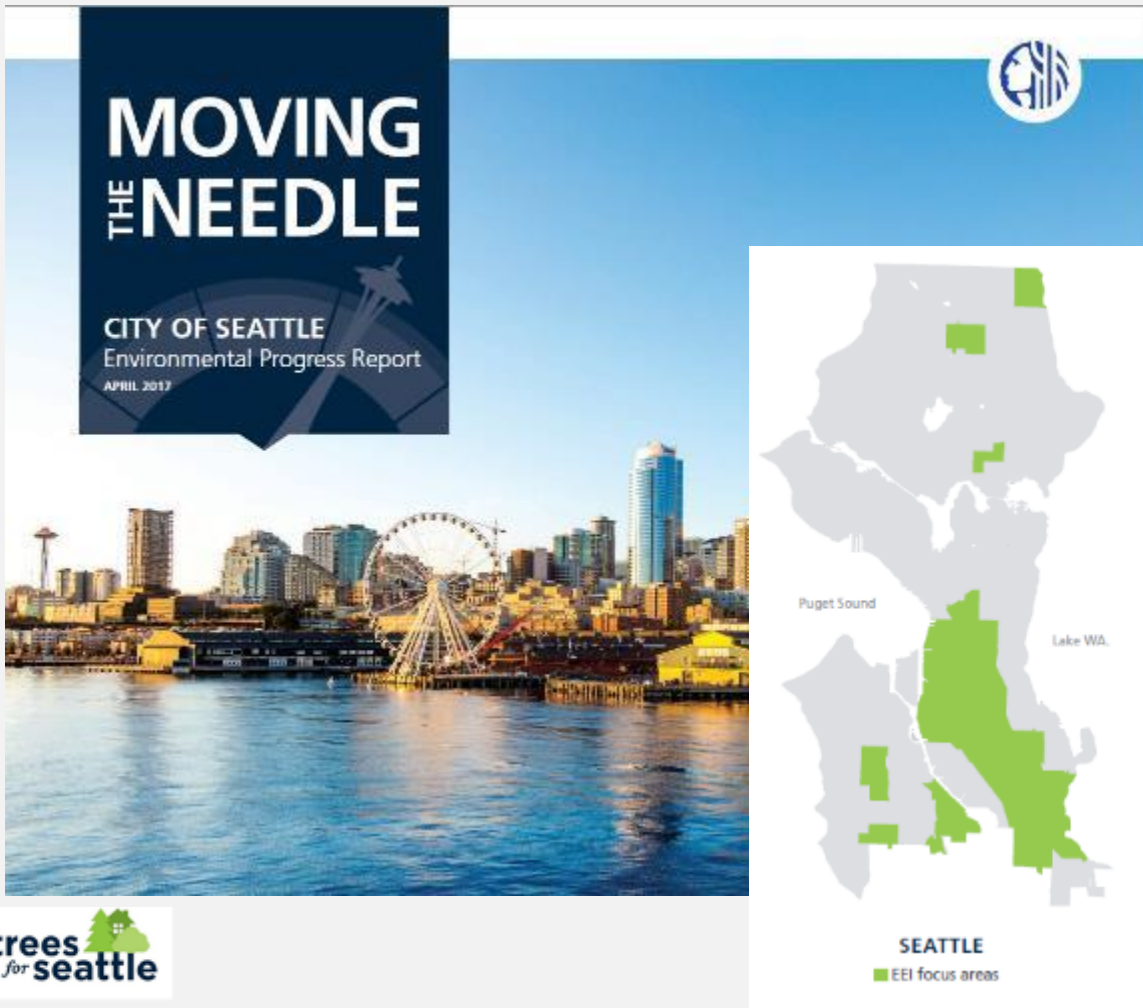
**3,188
tree
groves**



Relationship between canopy and environmental equity



Relationship between canopy and environmental equity




MOVING THE NEEDLE
CITY OF SEATTLE
Environmental Progress Report
APRIL 2017

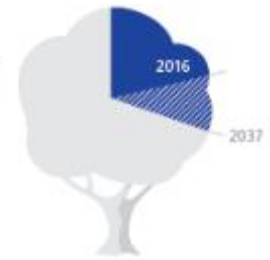
Puget Sound Lake WA.

SEATTLE
■ EEI focus areas

Achieve a 30% canopy cover by 2037



We achieved a **28%** CANOPY COVER in Seattle in 2016.



However, our EEI focus areas only had a **20%** CANOPY COVER in 2016.

Area of Seattle where people of color and people with low incomes tend to live have less tree canopy than the rest of Seattle.

Equity implications



EQUITY & ENVIRONMENT AGENDA



HEALTHY ENVIRONMENTS FOR ALL



JOBS, LOCAL ECONOMIES
& YOUTH PATHWAYS



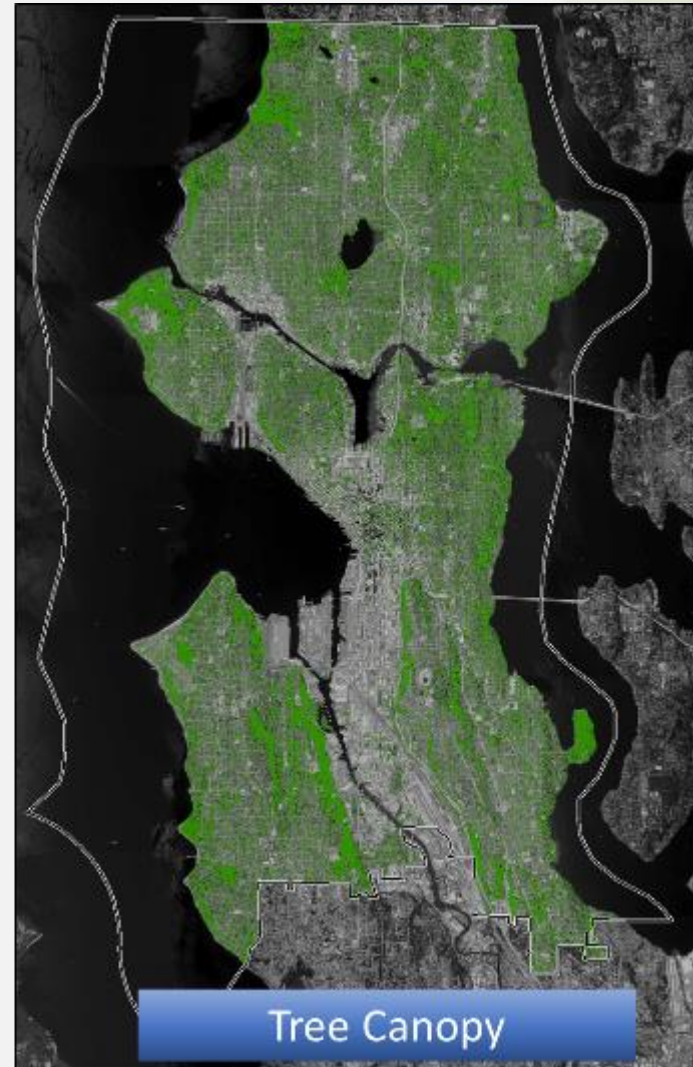
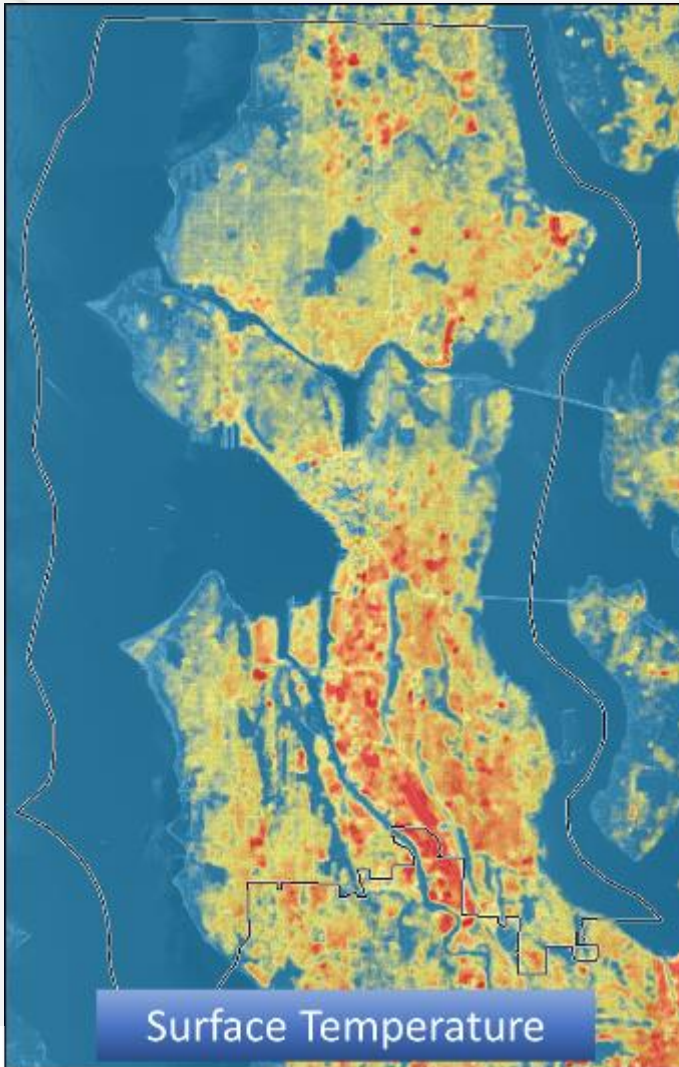
EQUITY IN CITY
ENVIRONMENTAL PROGRAMS



ENVIRONMENTAL NARRATIVE &
COMMUNITY LEADERSHIP

OPPORTUNITIES FOR LEADERSHIP

Tree canopy and heat island effect



Canopy within SCL's 10ft minimum clearance distance



Canopy cover trend



Dave Wenning

Canopy cover trend

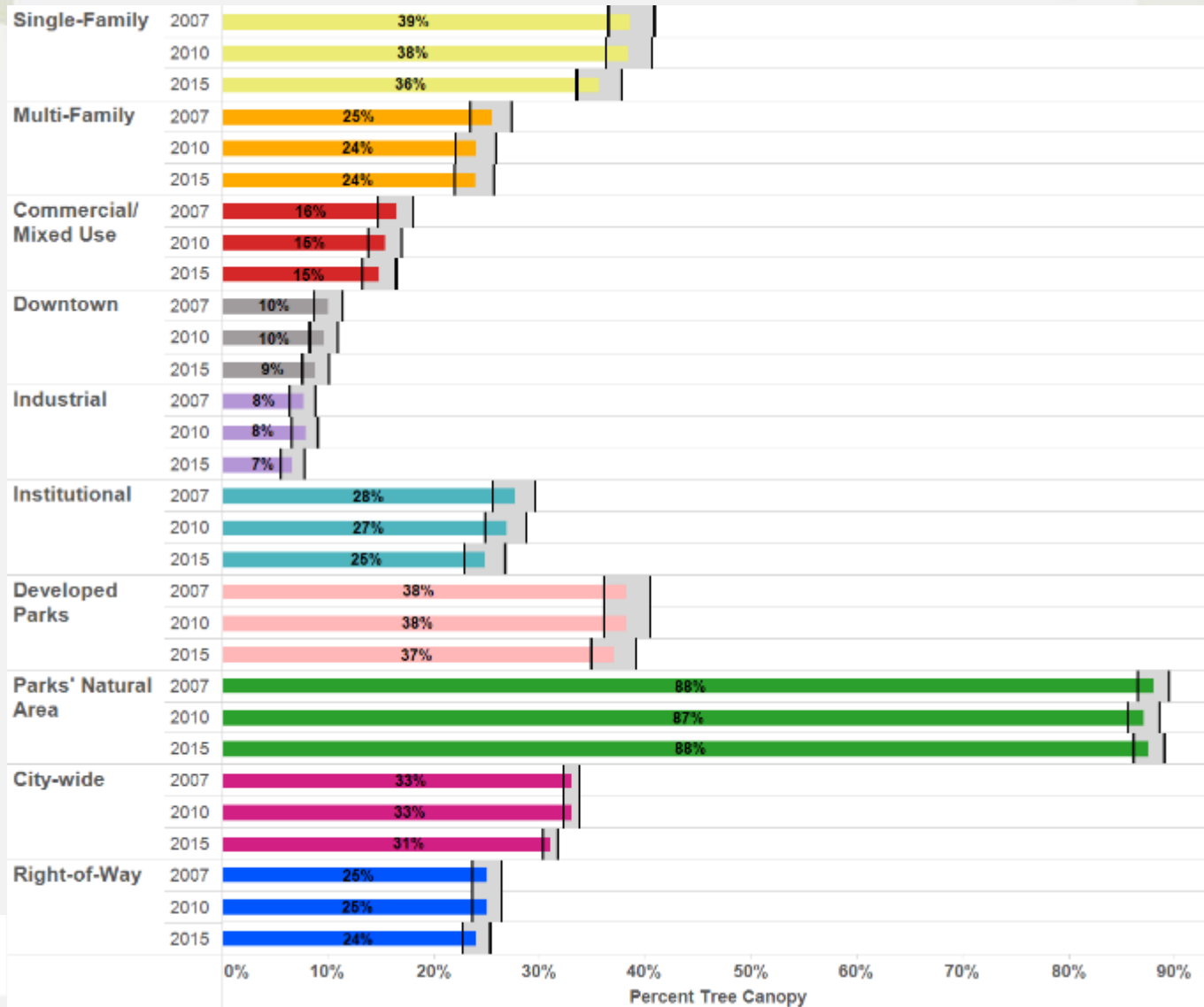


UW special collections

Canopy cover trend



Canopy cover trend



Urban forest challenges



Development Impact



Single Family 2011

Single Family 2016

Using the findings





Conclusion





Links

Final report and webinar recording:

<http://www.seattle.gov/trees/canopycover.htm>

GIS canopy cover layer:

<https://data.seattle.gov/dataset/data-seattle-gov-GIS-shapefile-datasets/f7tb-rnup/data>



Questions?

Sandra.Pinto_de_Bader@seattle.gov

(206) 684-3194

www.seattle.gov/trees

