Tracking Portland’s Tree Canopy Cover

January 2022
Why Trees?

Infrastructure that provides services:

- Public Health
- Air Quality
- Cooling
- Water Quality
- Mental Health
- Wildlife Habitat
- Energy Conservation
- Walkability
- Community Building
- Jobs
Why Do We Track Tree Canopy Cover?

Citywide metric for environmental health

- Comprehensive Plan (2016)

Goal: 33.3% by 2035
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Canopy Potential = 52%
Ways to Estimate Tree Canopy Cover

• Make a map! (Landcover classification)

• Random sample (Point interpretation)

Metro, Poracsky, Shandas

UF Canopy Monitoring Study
Tracking Canopy Cover: 1972 - 2020

Gains 1972 – 2015
• Significant, widespread, unique among major cities

Loss 2015 – 2020
• UF Report: 30.7% to 29.8%
  – Loss across all zoning types
  – 823 acres total canopy loss
Things to Consider

• Title 11 improved tree protection and planting
  – Went into effect 1/1/2015

• Portland is not alone
  – Other cities losing canopy, e.g., D.C., Philadelphia, Charlotte

• Where losses occur is important

• Canopy now = resilience to loss
  – Gains come from existing canopy, not new plantings
Coming Soon

- PP&R UF canopy report update
- Shandas lab findings
- Metro tree canopy map update
Understanding Loss of Urban Tree Canopy

Pre-processing

1. Data acquisition
   - NAIP 2014
   - NAIP 2020 (resampled to 1m)

2. Layers stack
   - NAIP 2014
   - NAIP 2020

GEE Object-Based Canopy Cover Classification

2. Collect training data

3. Image segmentation

4. Random Forest classification

Post-classification

5. Change detection

6. Collect independent testing samples

7. Accuracy Assessment
Gain and Loss of Canopy: City of Portland (‘14–’20)

Canopy Change Density (square meter / acre)

Canopy Change from 2014 to 2020 (by N’borhood)
Disproportionate Impacts of Heat on Humans

2021 Oregon Heatwave Death Toll
Confirmed Hyperthermia Deaths between June 24th to July 13th

Portland Fatalities

2021 Deaths per Neighborhood:
0 1 2 3-4

2016 Hottest Areas in August:
Neighborhood Urban Temperatures & Canopy Gain/Loss

Correlation = -0.412408790977162

Neighborhood Temperatures (°C)

Canopy Gain/Loss (sq.m)
Undoing Legacies of Inequality in Urban Tree-Human Dynamics:

From redlining to equitable and resilient urban socio-ecological systems

Pls: Aaron Ramirez, Vivek Shandas, Jola Ajibade, Kevan Moffett, Todd Rosenstiel
Other Personnel: Jason Maxfield, Fernanda Ribiero, Ingrid Zoll, Axcelle Ball, Kate Gregory
Canopy Expansion Actions

To-Date

• On-going canopy measurement and reporting
• Implementation of Title 11, urban forest policies and programs
• Expanded tree protection for big trees, industrial areas
• Tree planting program expansion
• City Council-approved plan for tree policies improvement
Canopy Expansion Actions

Planned, thanks to the **Parks Levy**

- Improve implementation of regulations and compliance
- Increase strategic tree planting
- Create proactive park trees maintenance program
- Update the *Portland Urban Forest Management Plan*

**PP&R Sustainable Future**

- Street tree maintenance
Canopy Expansion Actions

More Actions: Policy

• T11 amendments projects
  – Technical fixes in 2022
  – More substantive 2024

• Trees and other Bureaus’ policies, e.g.,
  – Streets 2035, Pedestrian Design Guide (PBOT)
  – Employment Opportunities Analysis, Climate Resilience Planning (BPS)
Canopy Expansion Actions

Report to Council 3/9/22

Requests of UFC:
• Letter
• Testimony

Council resolution
Questions and Discussion