Tracking Portland's Tree Canopy Cover

January 2022

PORTLAND PARKS & RECREATION℠
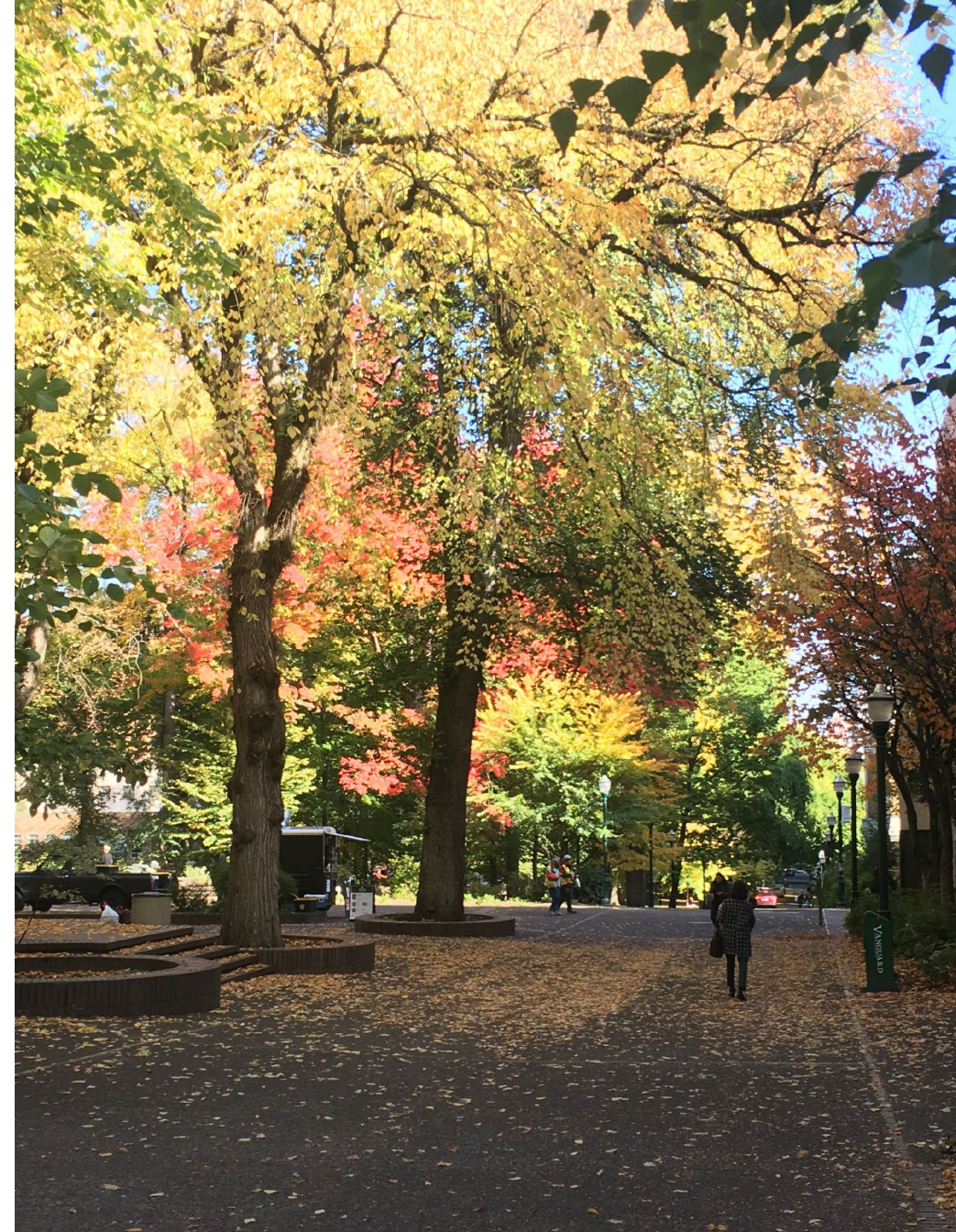Healthy Parks, Healthy Portland

Why Trees?

Infrastructure that provides services:

- Public Health

- Air Quality

- Cooling

- Water Quality

- Mental Health

- Wildlife Habitat

- Energy Conservation

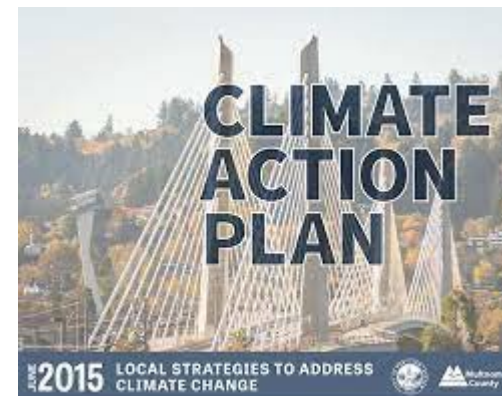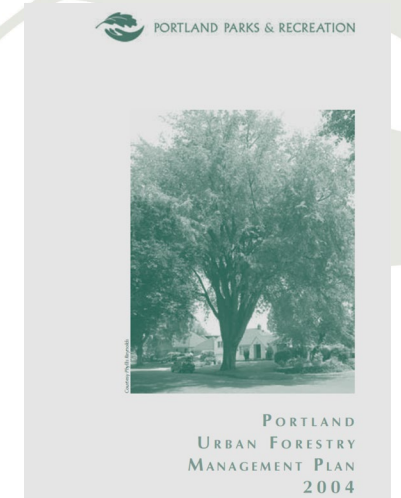- Walkability

- Community Building

- Jobs

Why Do We Track Tree Canopy Cover?

Citywide metric for environmental health

- Urban Forest Mngt. Plan (1995 & 2004)
- Climate Action Plan (2009 & 2015)
- Comprehensive Plan (2016)

Goal: 33.3% by 2035

Why Do We Track Tree Canopy Cover?

Citywide metric for environmental health

- Urban Forest Mngt. Plan (1995 & 2004)

- Climate Action Plan (2009 & 2015)

- Comprehensive Plan (2016)

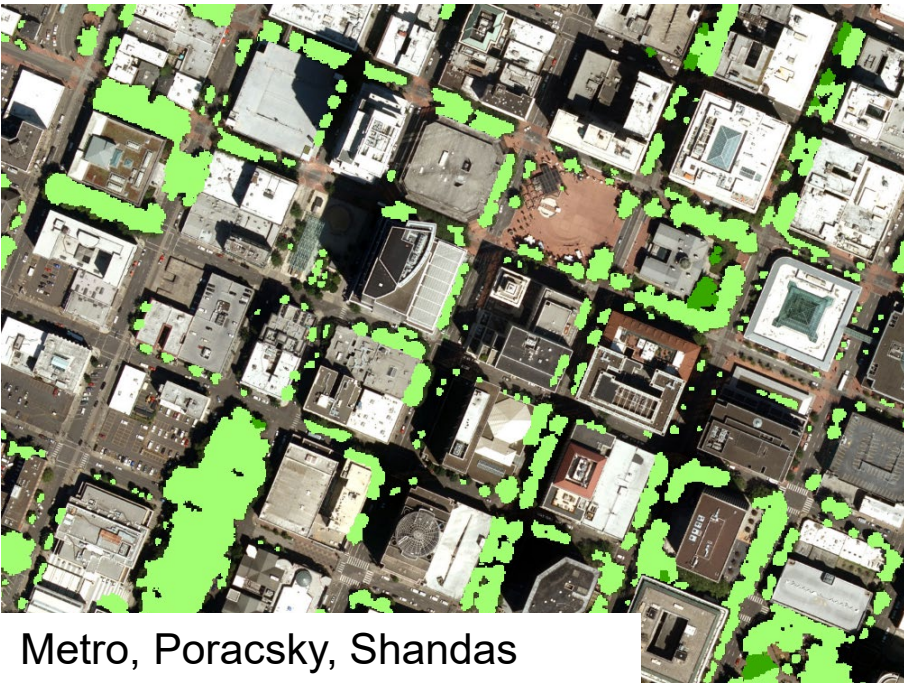**Goal: 33.3% by 2035**

Canopy Potential = 52%

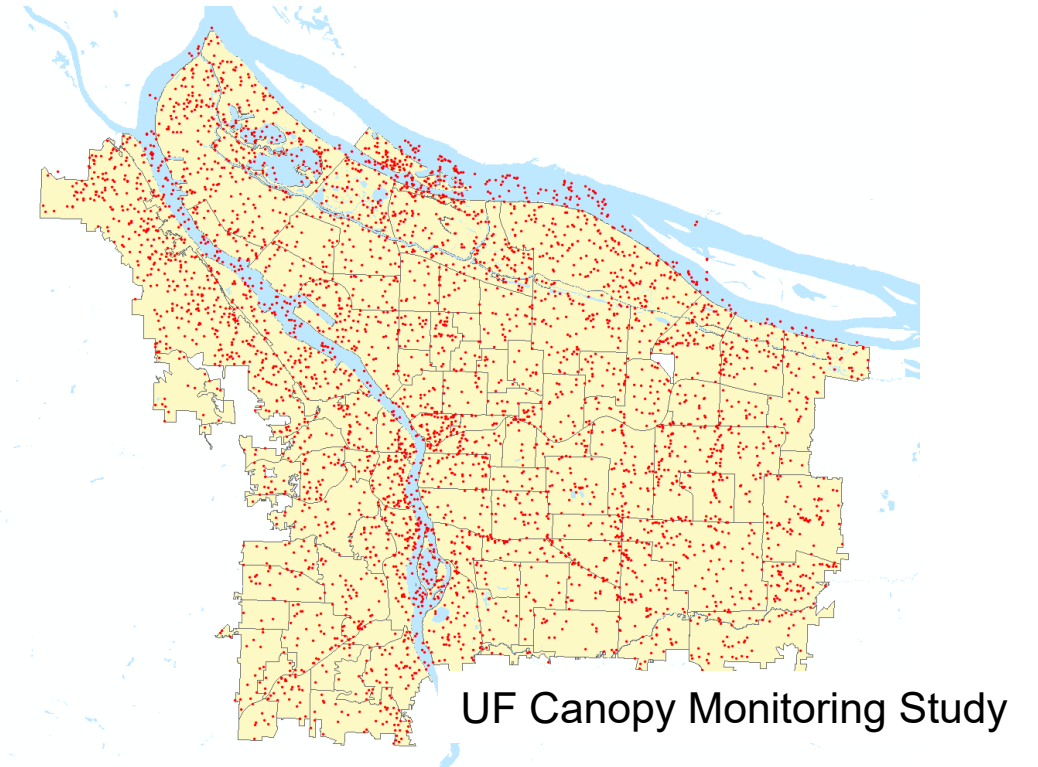Tree Canopy and Potential in Portland, Oregon
February 2018

Ways to Estimate Tree Canopy Cover

- Make a map! (Landcover classification)

Metro, Poracsky, Shandas

- Random sample (Point interpretation)
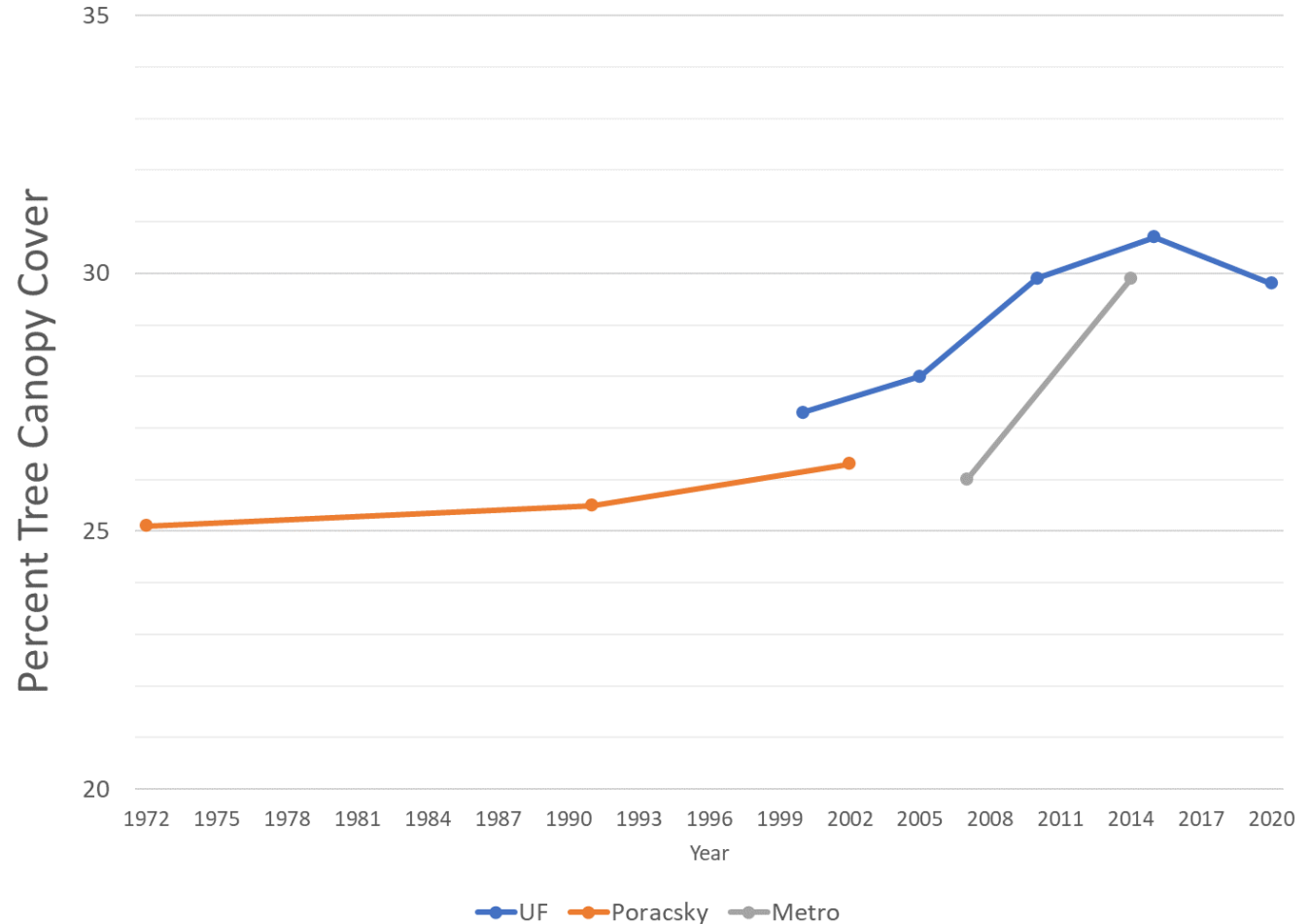

UF Canopy Monitoring Study

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

- <u>Where</u> 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
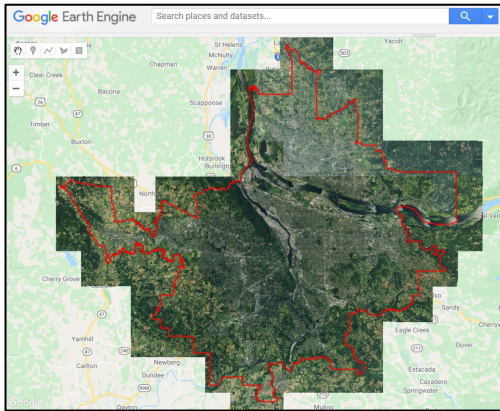- Shandas lab findings
- Metro tree canopy map update

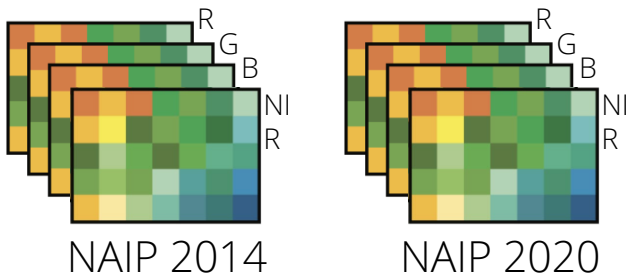# Understanding Loss of Urban Tree Canopy

Pre-processing

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

2. Layers stack
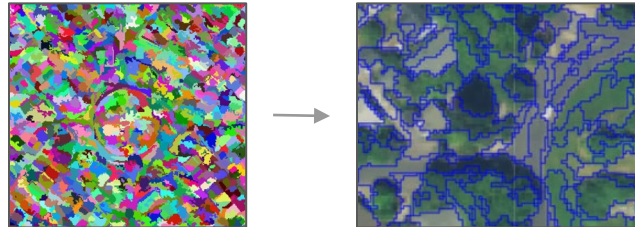

NAIP 2014   NAIP 2020

GEE Object-Based Canopy Cover Classification
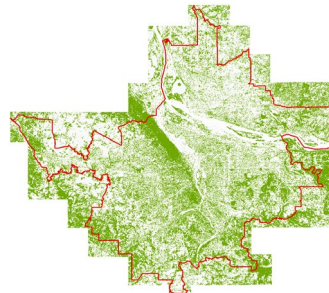
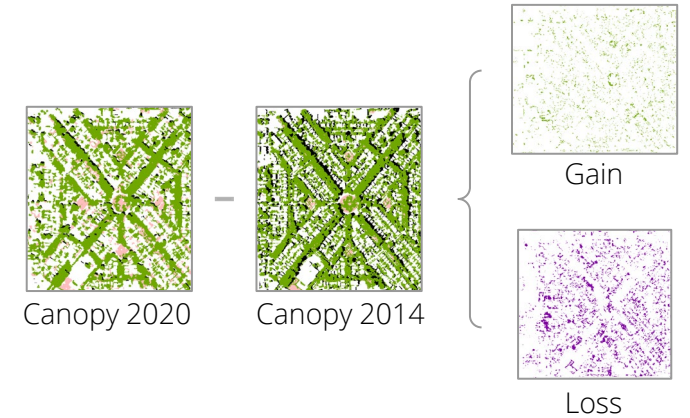2. Collect training data
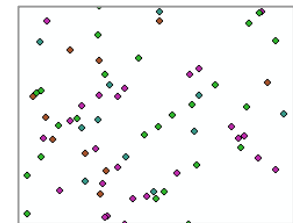

3. Image segmentation

4. Random Forest classification

Post-classification

5. Change detection

Canopy 2020   Canopy 2014

Gain

Loss
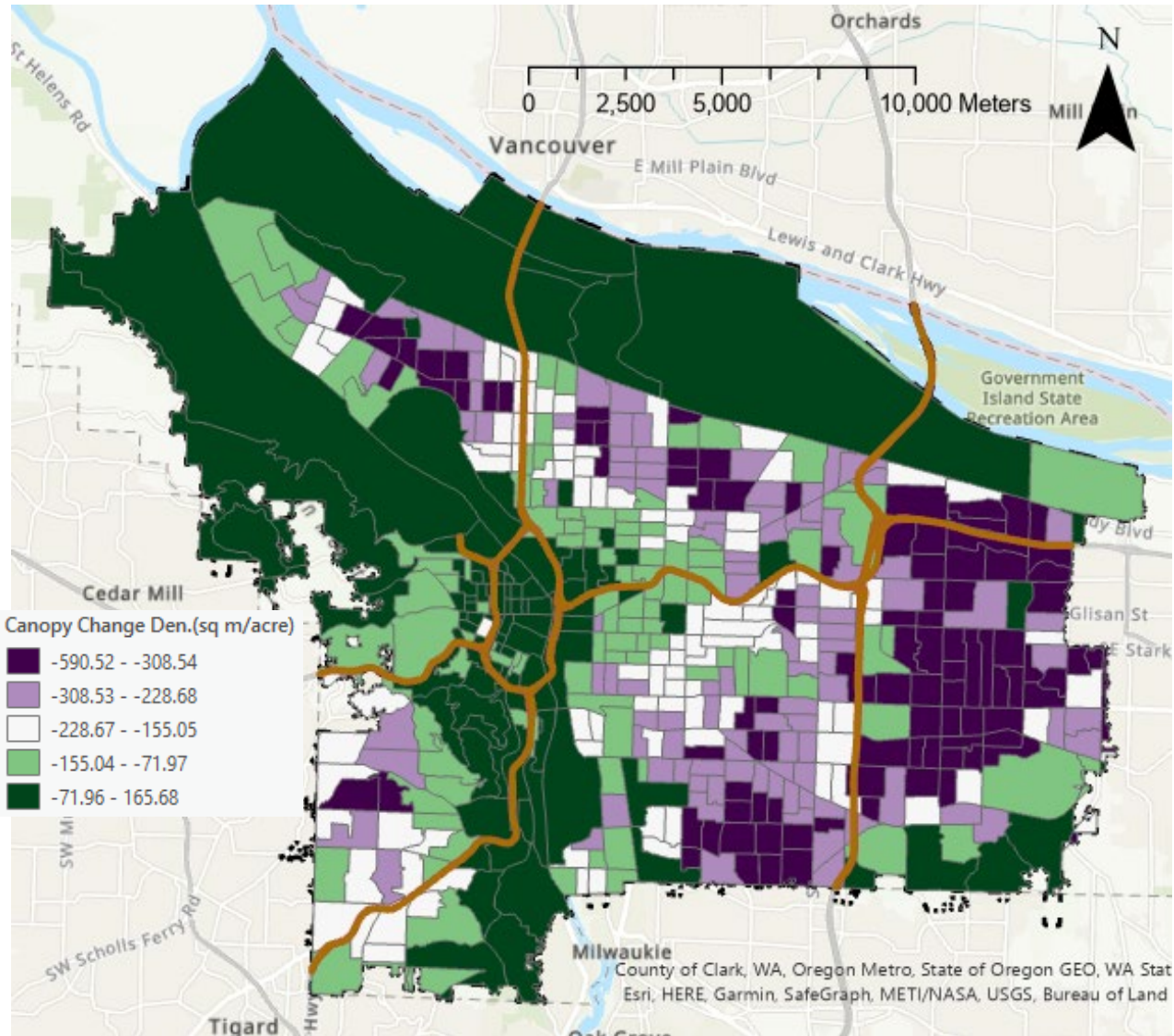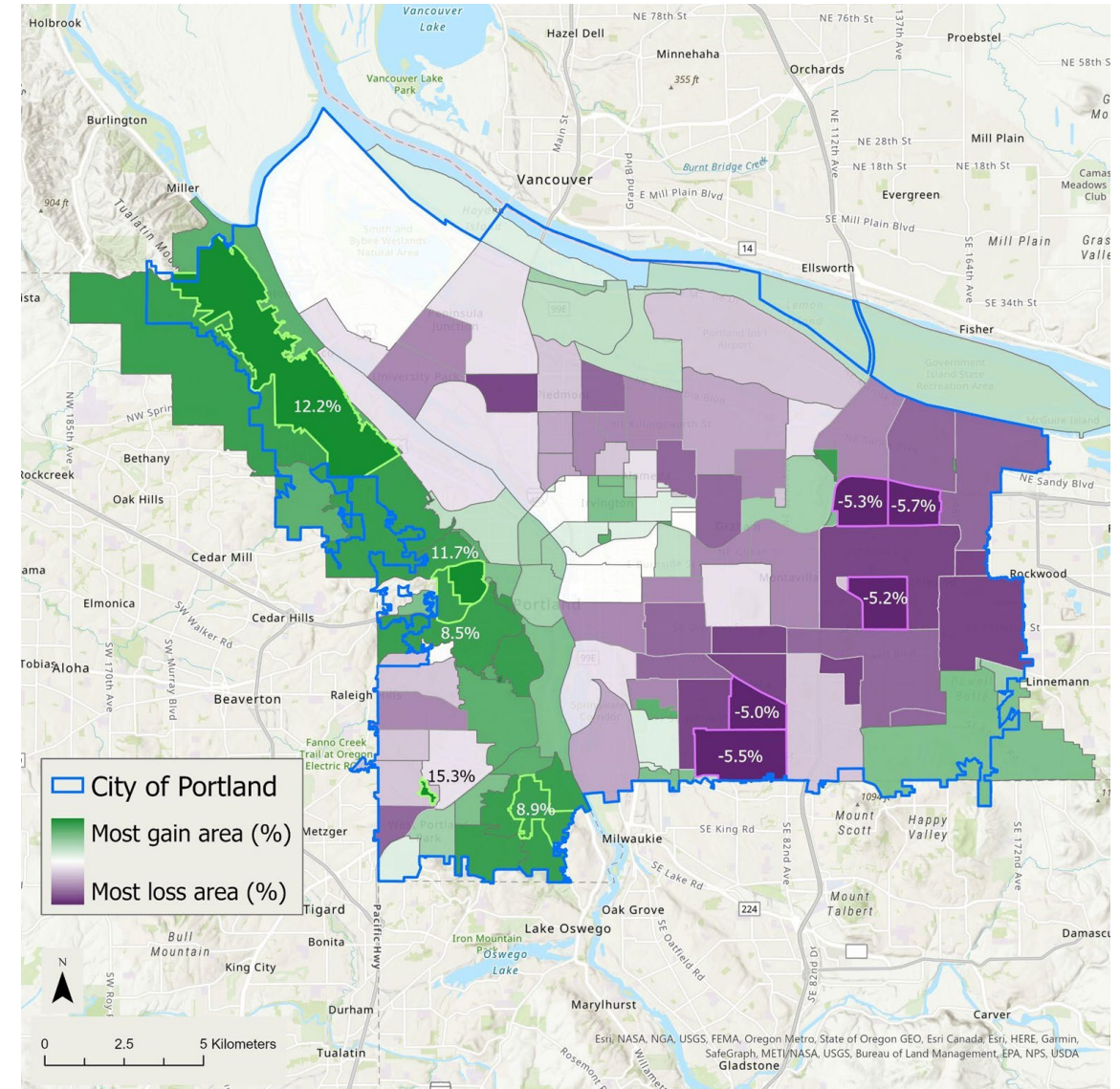
6. Collect independent testing samples

7. Accuracy Assessment

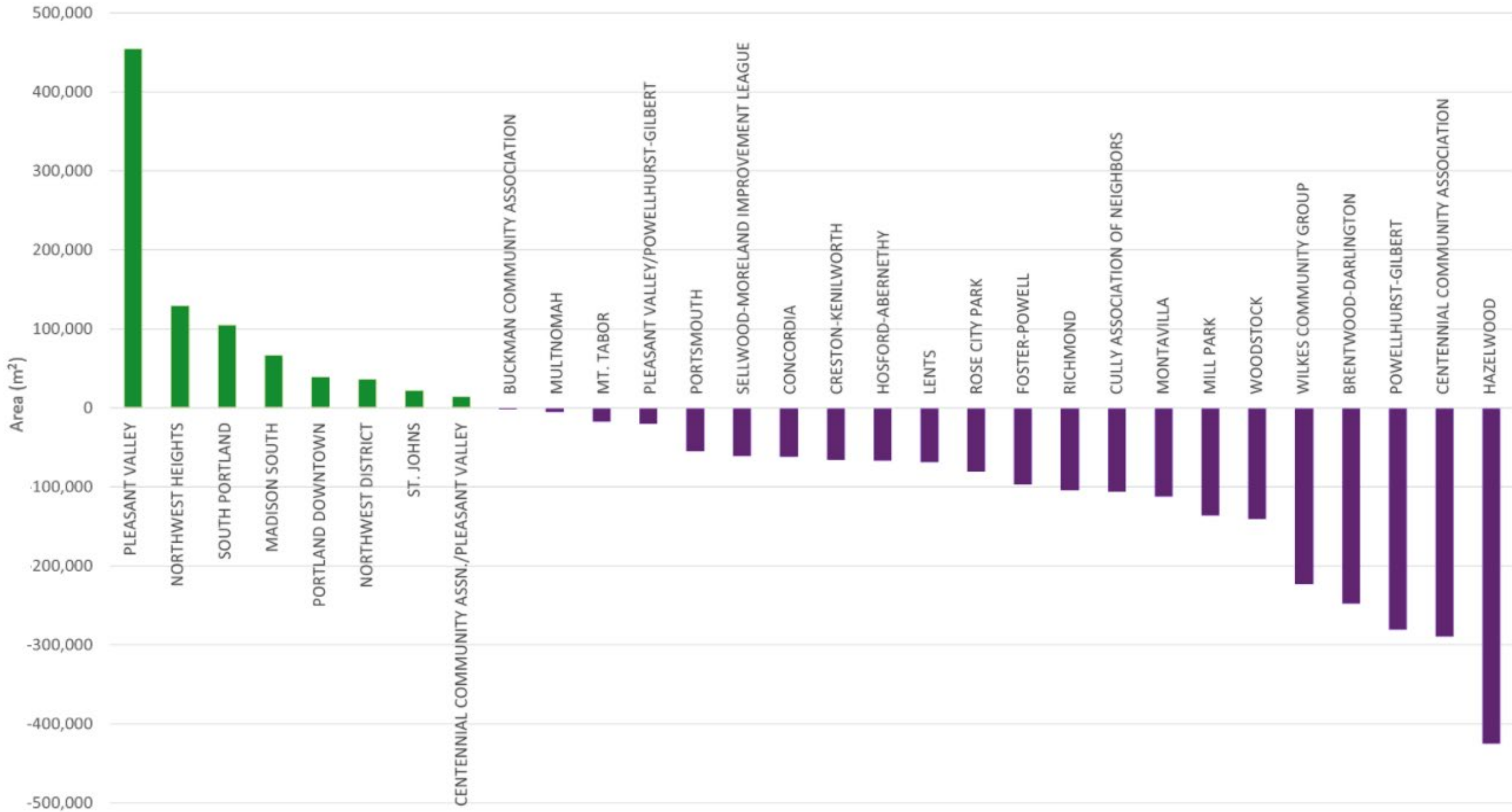# Gain and Loss of Canopy: City of Portland ('14-'20)

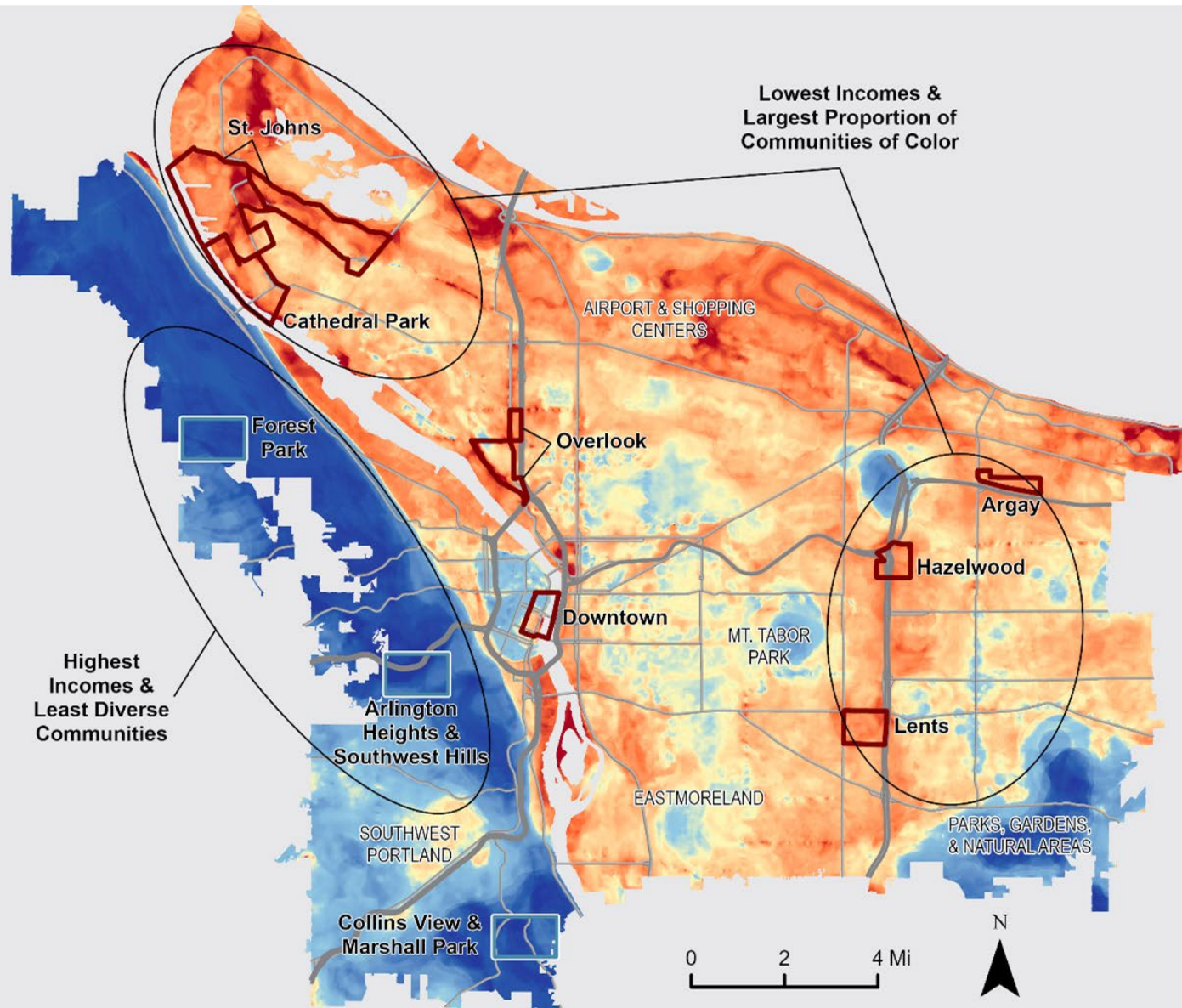Canopy Change Density (square meter / acre)

Canopy Change from 2014 to 2020 (by N'borhood)

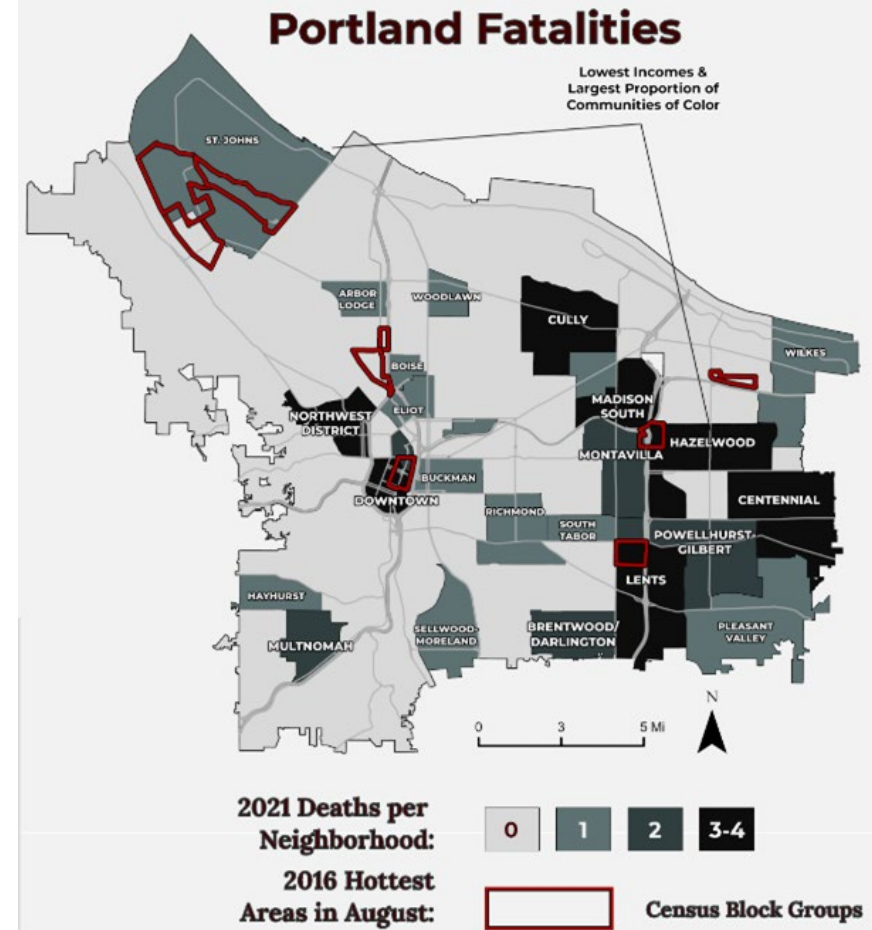Canopy change area (2014-2020) (most populous Portland neighborhoods)
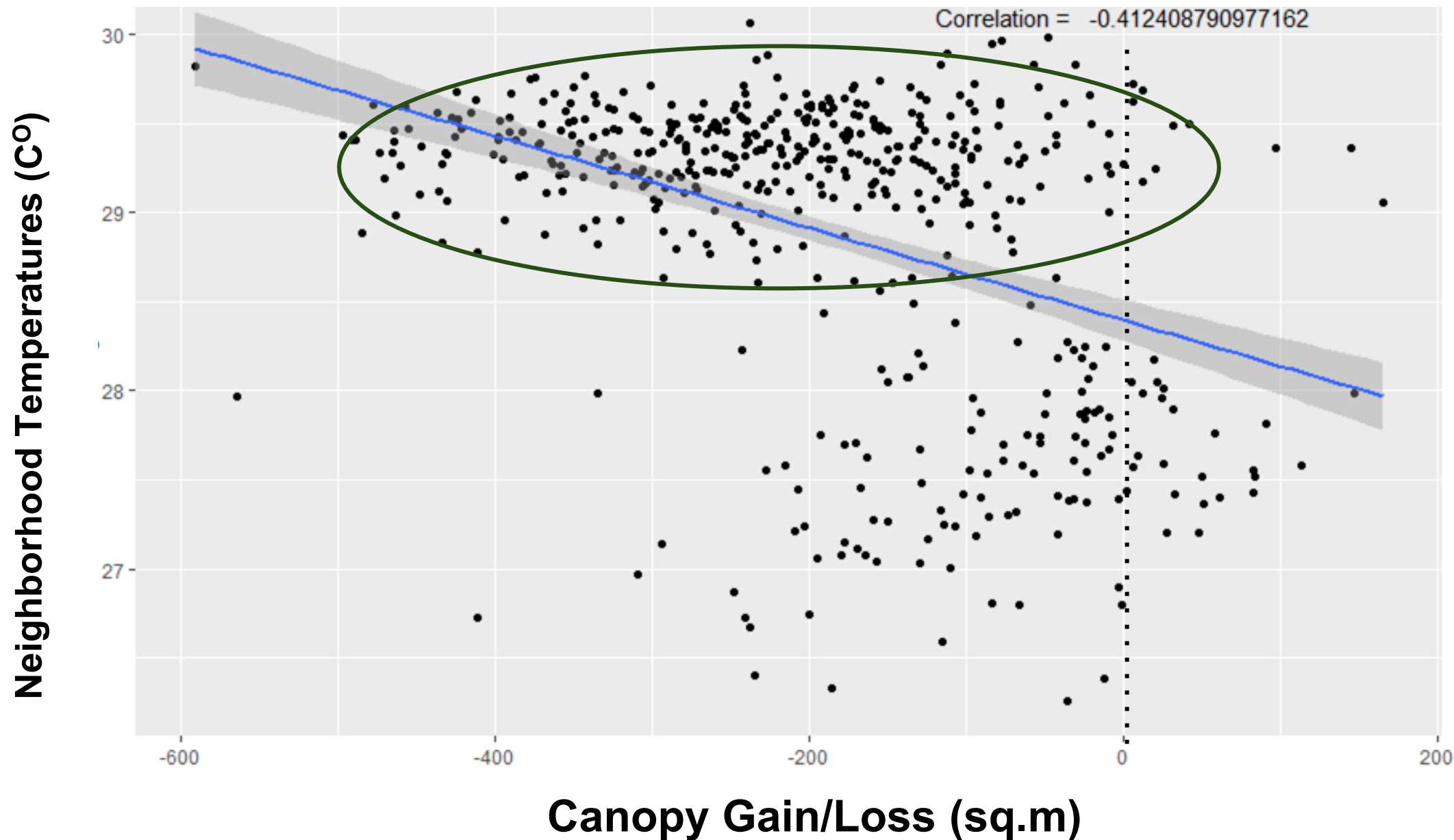
Disproportionate Impacts of Heat on Humans

Neighborhood Urban Temperatures & Canopy Gain/Loss

4 year, $1.5 million grant from NSF Coupled Natural-Human Systems Grant Program

http://www.pdx.edu/smarttrees

Undoing Legacies of Inequality in Urban Tree-Human Dynamics:

From redlining to equitable and resilient urban socio-ecological systems

REED

Portland State

WASHINGTON STATE UNIVERSITY

The Nature Conservancy
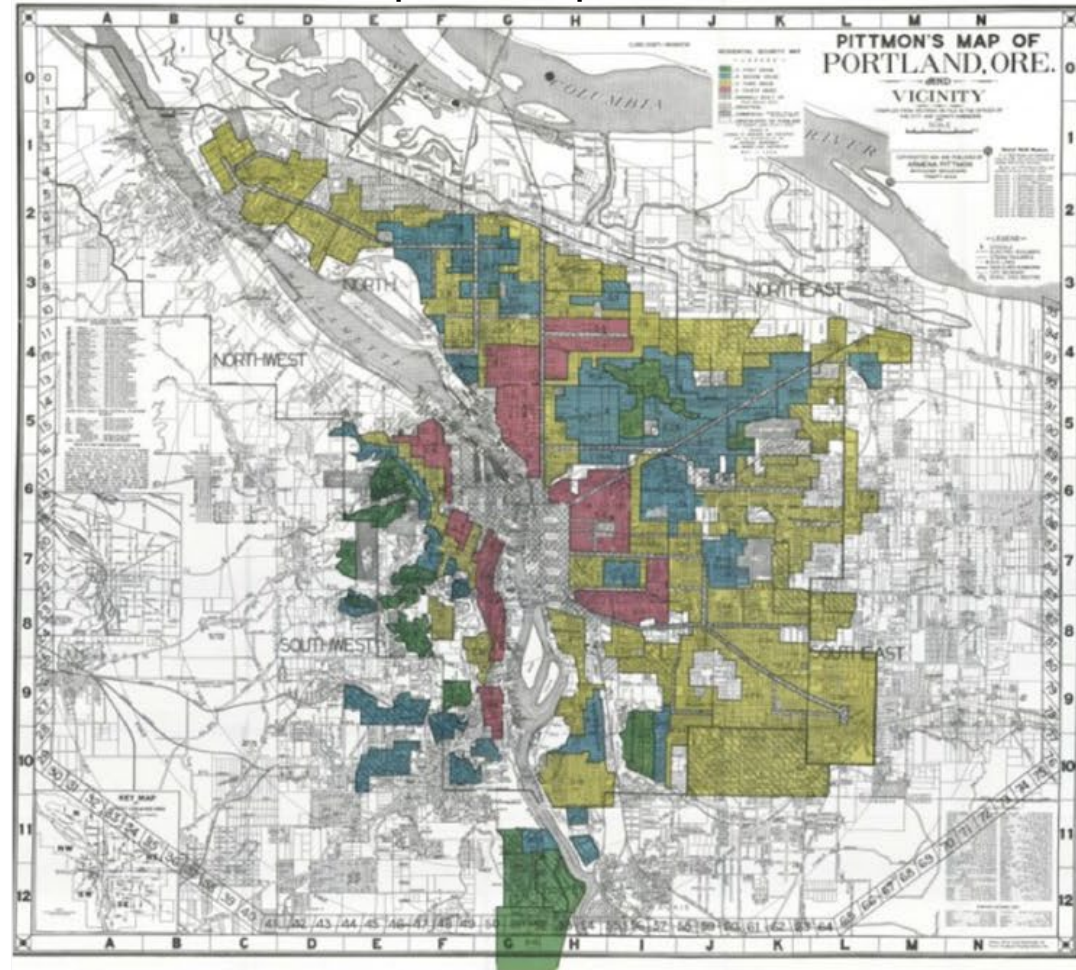
PIs: Aaron Ramirez, Vivek Shandas, Jola Ajibade, Kevan Moffett, Todd Rosenstiel
**Other Personnel:** Jason Maxfield, Fernanda Ribiero, Ingrid Zoll, Axcelle Ball, Kate Gregory

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

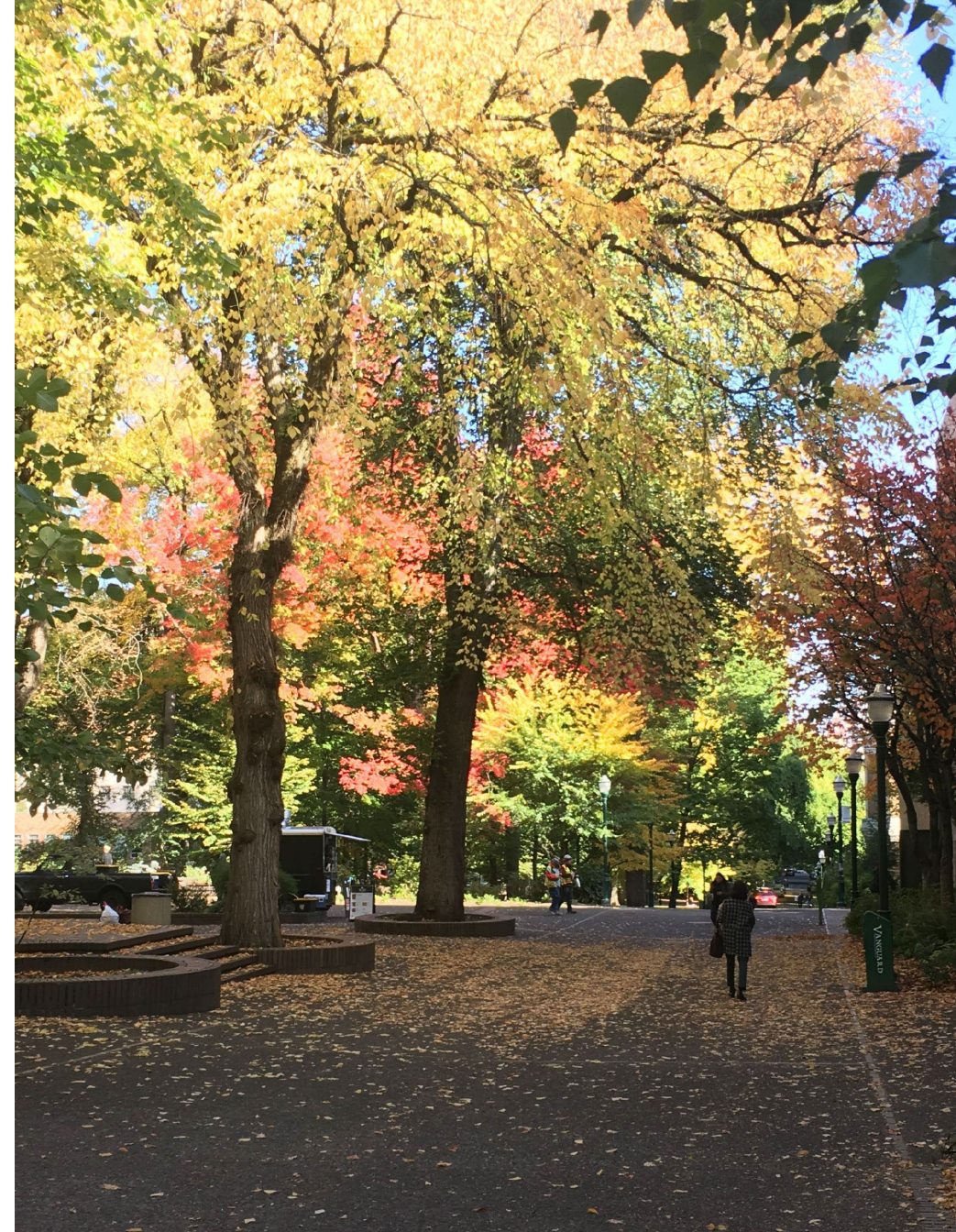- City Council-approved plan for tree policies improvement
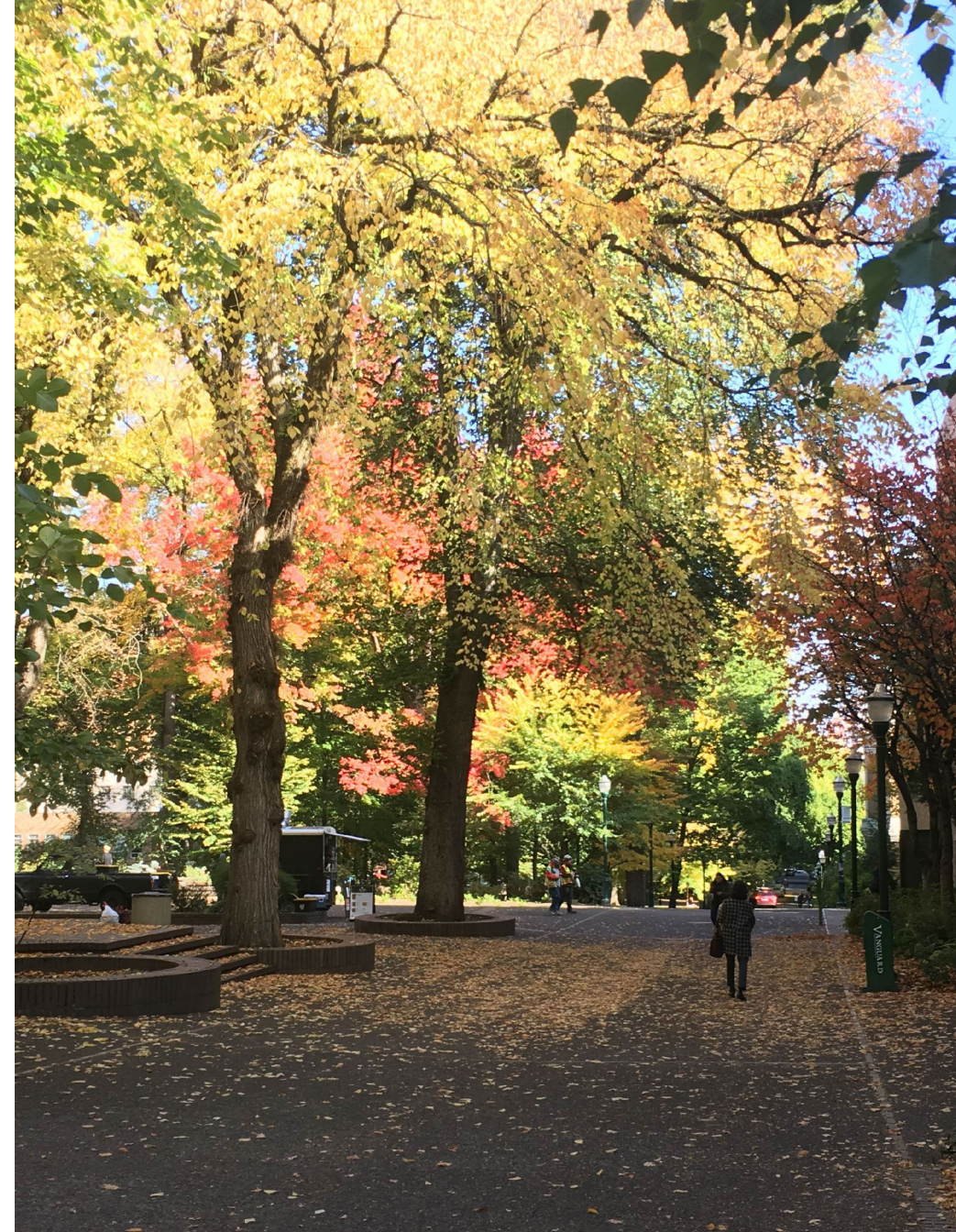
Canopy Expansion Actions

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