

USDA Forest Service

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# THE POWER OF TREE CANOPY DATA TO PLAN, PRIORITIZE, AND INSPIRE STEWARDSHIP

## PART I: RESEARCH FOUNDATIONS



**Tom Jacobs**

*Director, Environmental Programs  
Mid-America Regional Council*



**Morgan Grove**

*Scientist and Team Leader  
USDA Forest Service*



**Dexter Locke**

*PhD Candidate  
Clark University*

Increasing Urban Tree Canopy:  
Tools for a Business Approach  
or  
*Thinking Outside the Tree Pit*

Morgan Grove, Dexter Locke, Mike Galvin,  
and Jarlath O'Neil-Dunne

# Overview

- How have UTC tools been developed?
- How did UTC begin?
- What does it mean to think outside the tree pit?
- What are the UTC tools and how do they help think outside the tree pit?
- Concluding thoughts.

# How have UTC tools been developed?

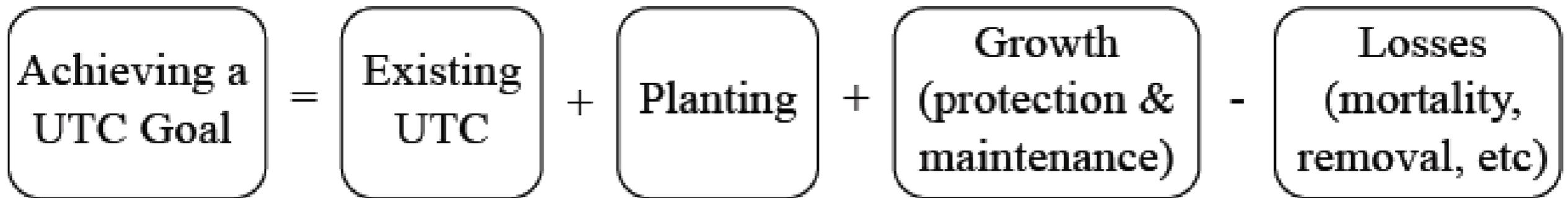
- Forest Service's Baltimore Field Station.
- Linking science and decision making with local partners: dynamic and cumulative.
- Business model for wider application and refinement: pilot, prototype, and enterprise.

# How did UTC begin?

- A story of connectivity:
  - \* Disconnected urban riparian areas.
  - \* Connected urban mosaic of other treed areas.

# What does it mean to think outside the tree pit?

What's in the tree pit?



# What does it mean to think outside the tree pit?

What's outside the tree pit?

- Majority of owners.
- Significant and multiple benefits.
- Untapped resources.

# What does it mean to think outside the tree pit?

## What's outside the tree pit?

- Chesapeake Bay policy context
  - \* City's with UTC goals
  - \* Net change in all urban tree canopy cover
- Practical context
  - \* Direct authority is limited over majority of landowners.
  - \* Trees are essential for many benefits and their associated stakeholders.
  - \* Need for additional resources

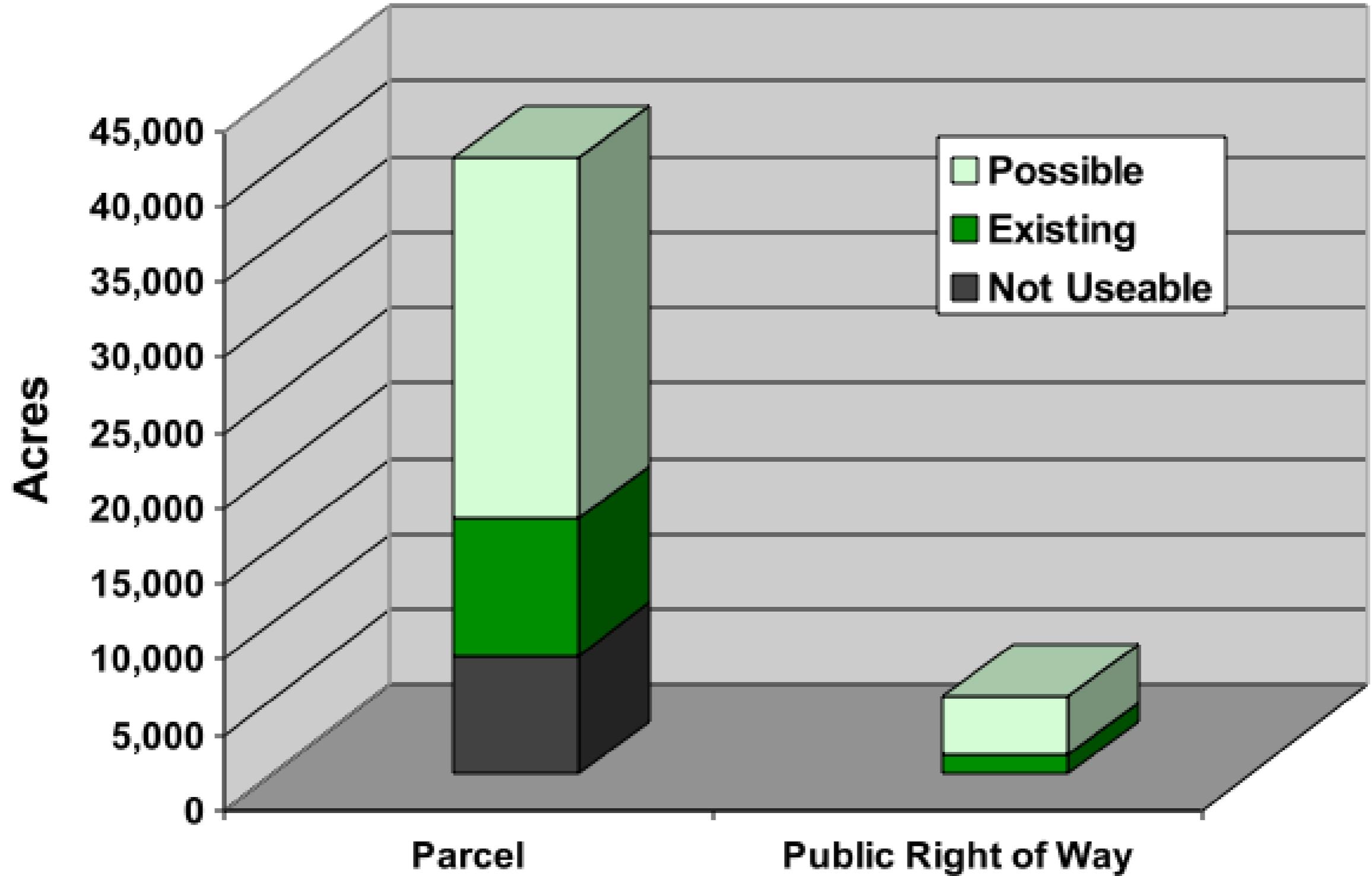
# UTC Tools

1. Assessment
2. Prioritization
3. Market Analysis
4. Change Analysis

# 1. UTC Assessment: Hi-resolution landcover mapping

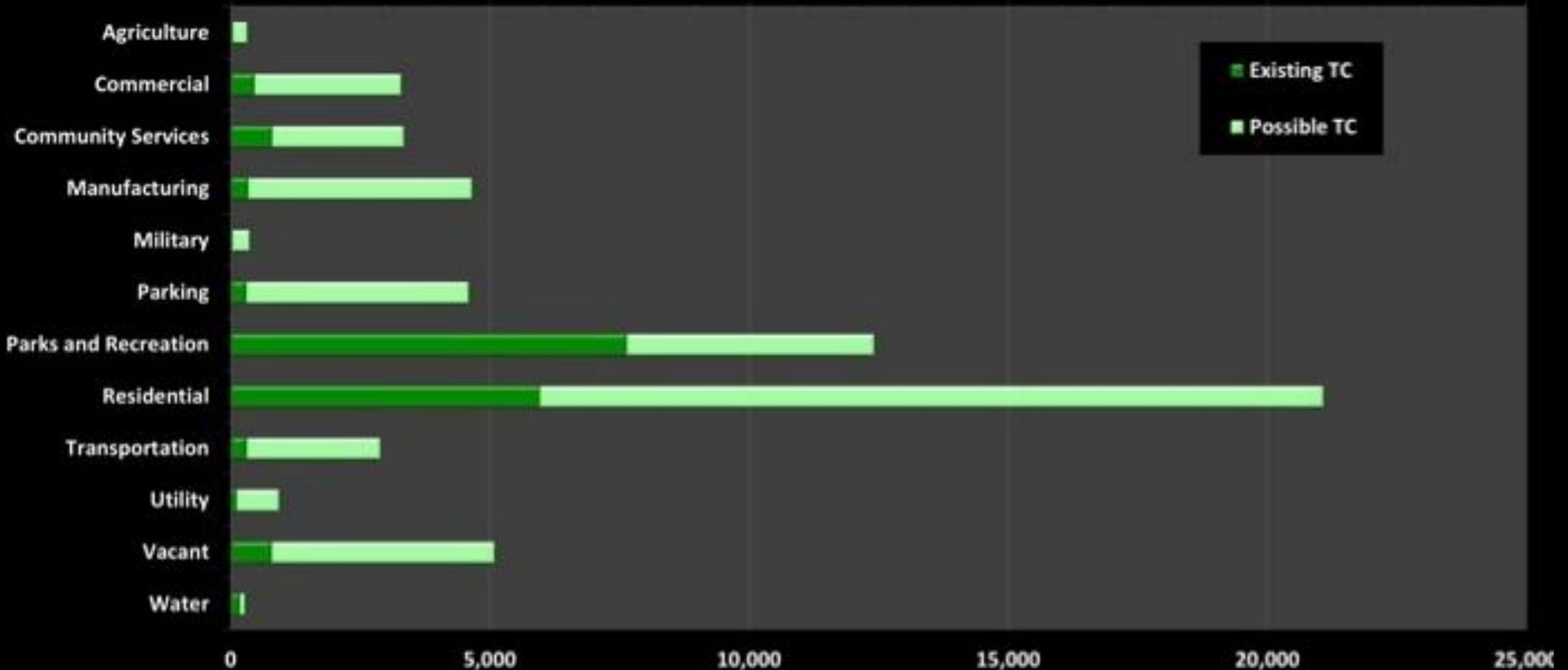


# Private and Public Lands in Urban Areas



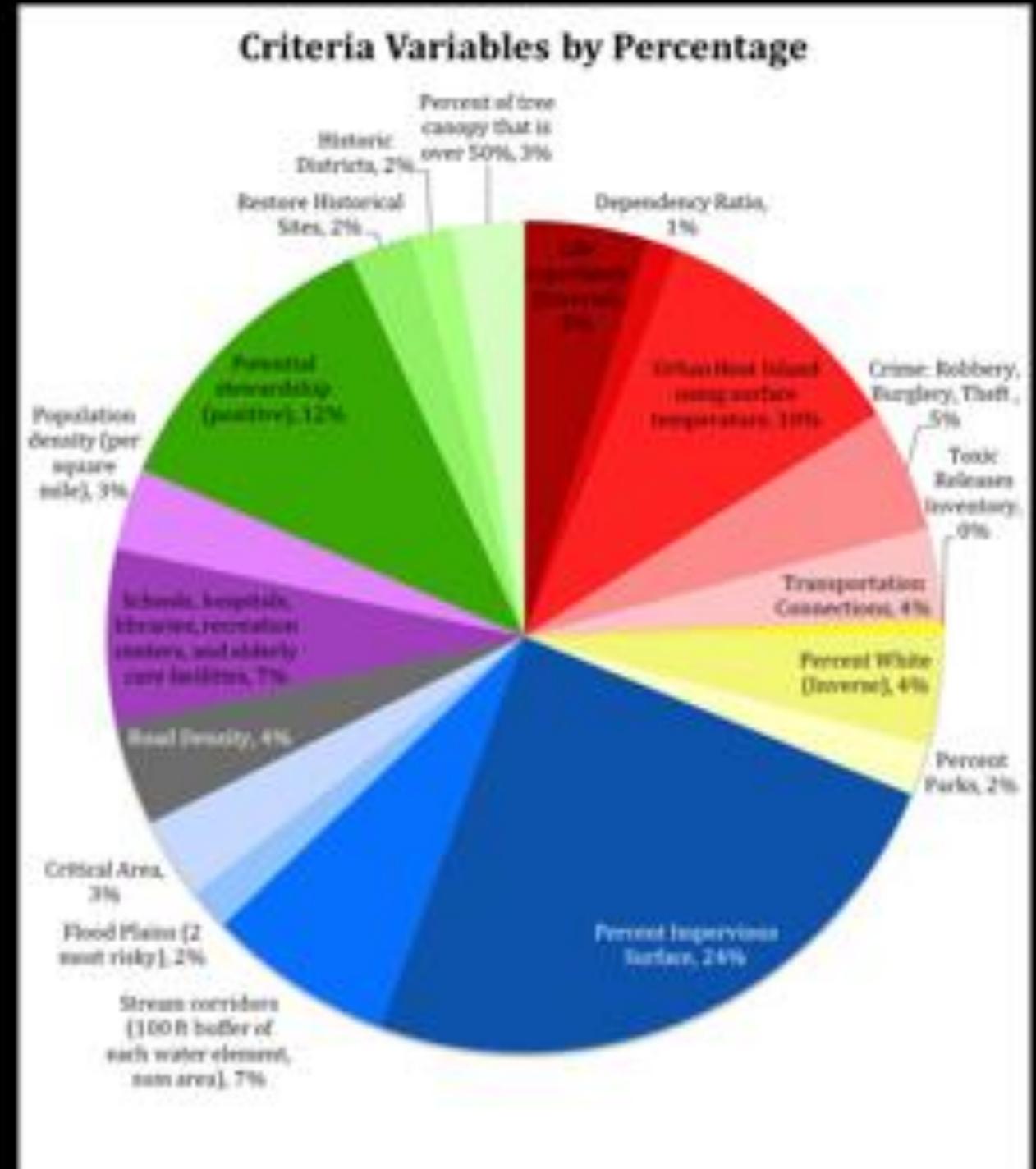
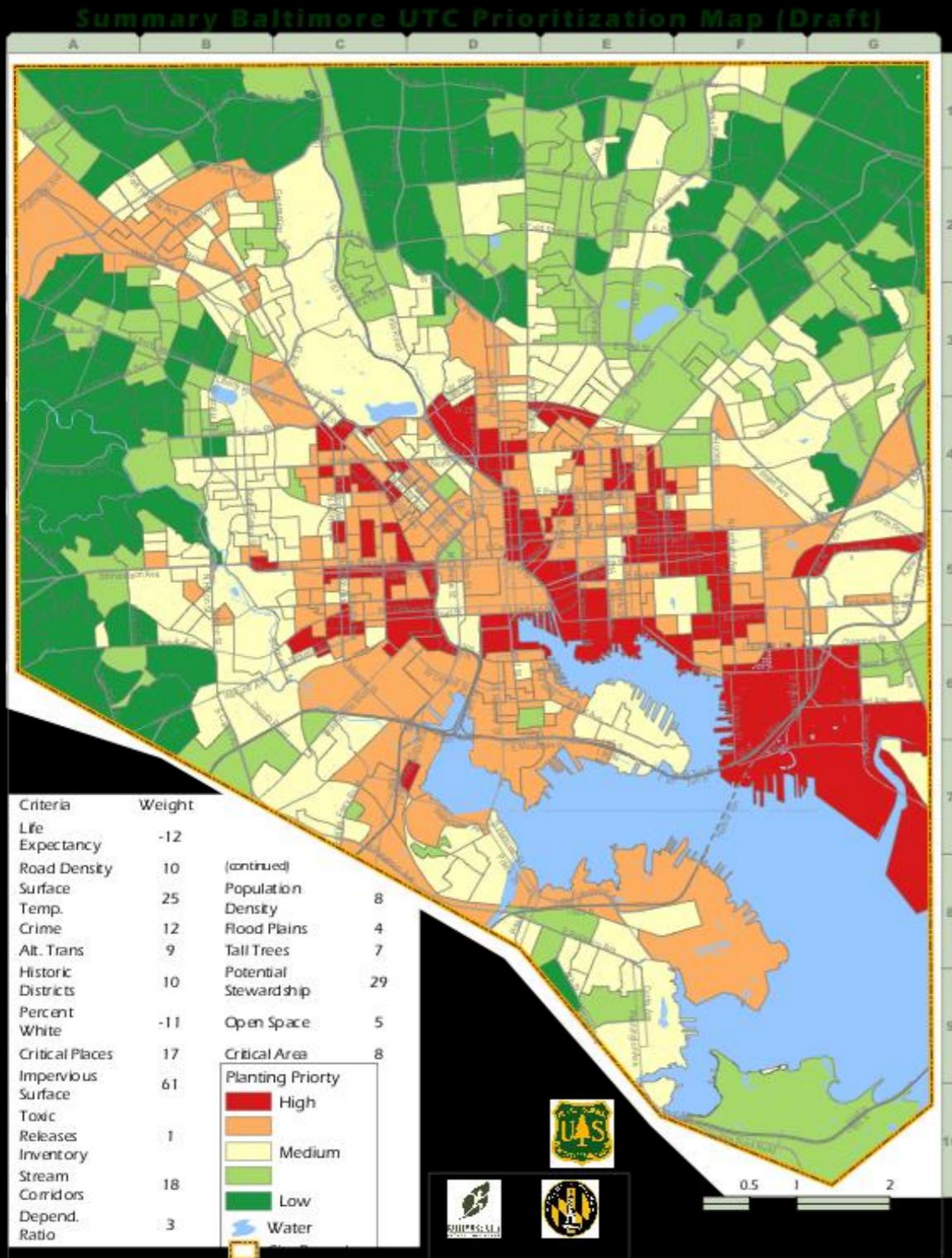
Urban Tree Assessment, Baltimore City

# The New Forest Landowner



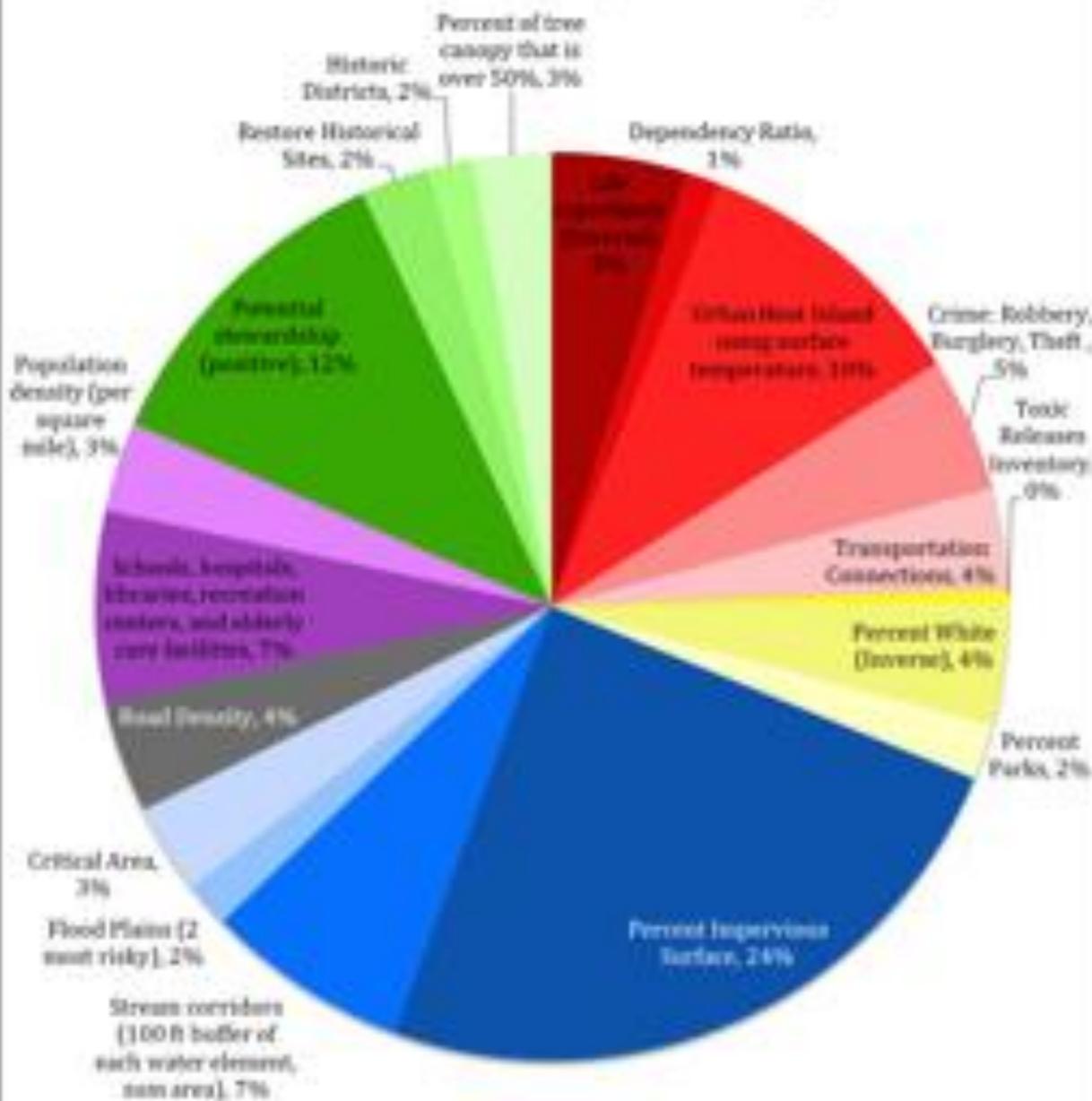
Philadelphia: 67% private, 459,525 residential parcels

# 2. UTC Prioritization: Multiple Benefits

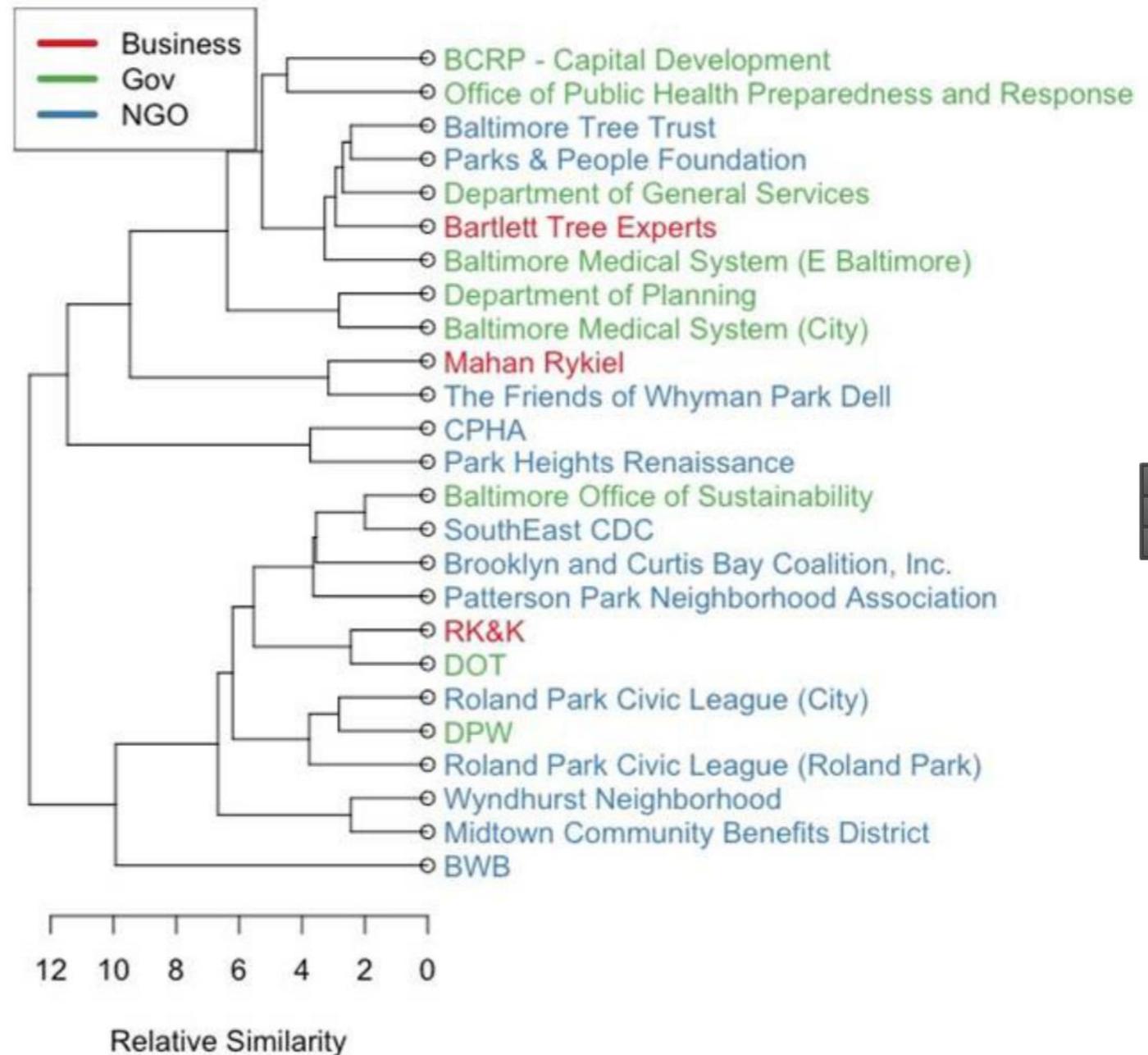


# 2. UTC Prioritization: Collaboration among interests

Criteria Variables by Percentage

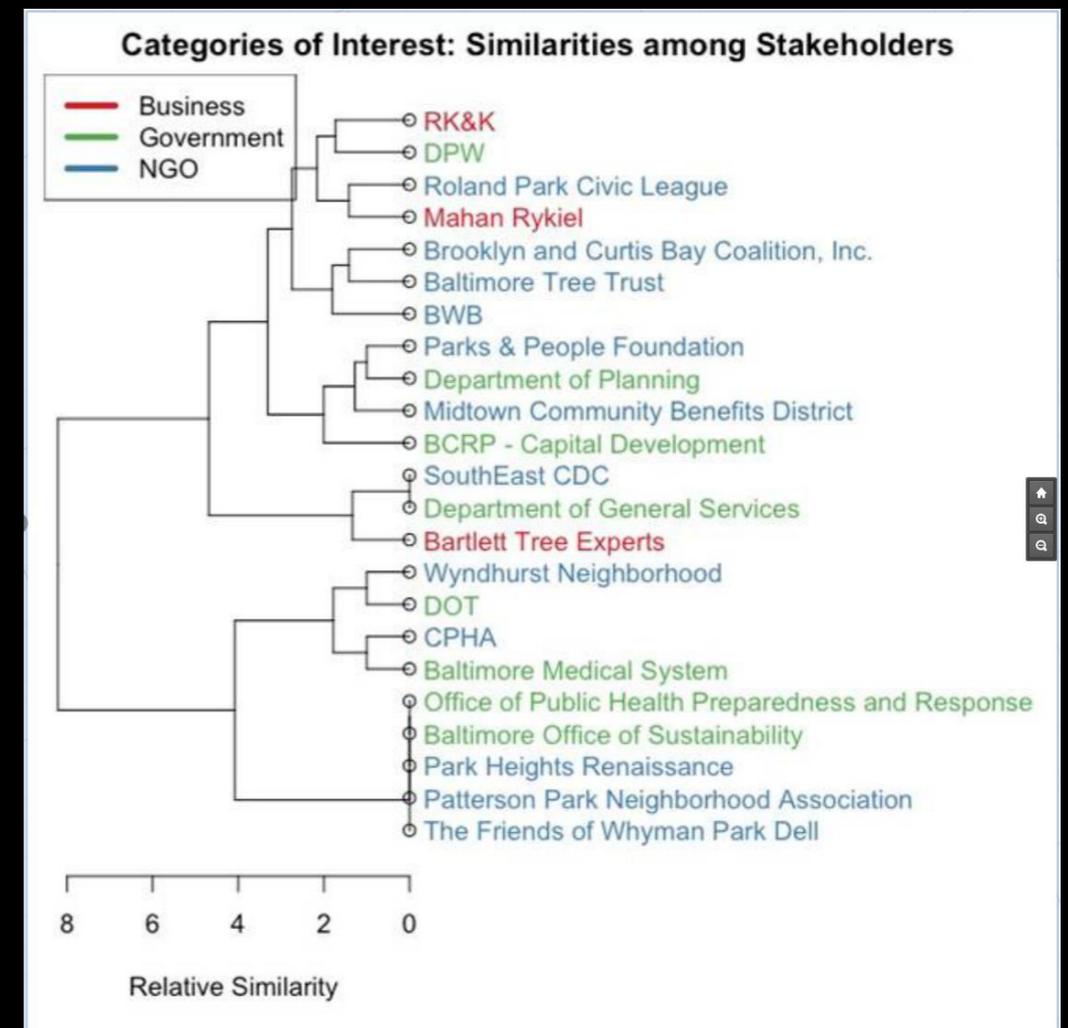


Prioritization Criteria: Similarities among Stakeholders



# 2. UTC Prioritization: Collaboration among site types

	Street Trees	Abandoned Lots	Parks	Schools	Stream Valleys - Riparian Buffer	Shoreline Areas	Private Industrial	Residential Lands	Blue Alleys	Private Non-Profits	DOT Right of Ways
<b>RK&amp;K</b>											
<b>DPW</b>											
Roland Park Civic League - Greater Roland Park Master Plan Implementation											
<b>Mahan Rykiel</b>											
Brooklyn and Curtis Bay Coalition, Inc.											
Baltimore Tree Trust											
<b>BWB</b>											
Parks & People Foundation											
<b>Department of Planning</b>											
Midtown Community Benefits District - Midtown Green											
<b>BCRP - Capital Development</b>											
SouthEast CDC											
<b>Department of General Services</b>											
<b>Bartlett Tree Experts</b>											
Wyndhurst Neighborhood											
<b>DOT</b>											
<b>CPHA</b>											
<b>Baltimore Medical System</b>											
Office of Public Health Preparedness and Response (OPHPR), Baltimore City Health Department											
<b>Baltimore Office of Sustainability</b>											
<b>Park Heights Renaissance</b>											
<b>Patterson Park Neighborhood Association</b>											
<b>The Friends of Whyman Park Dell</b>											

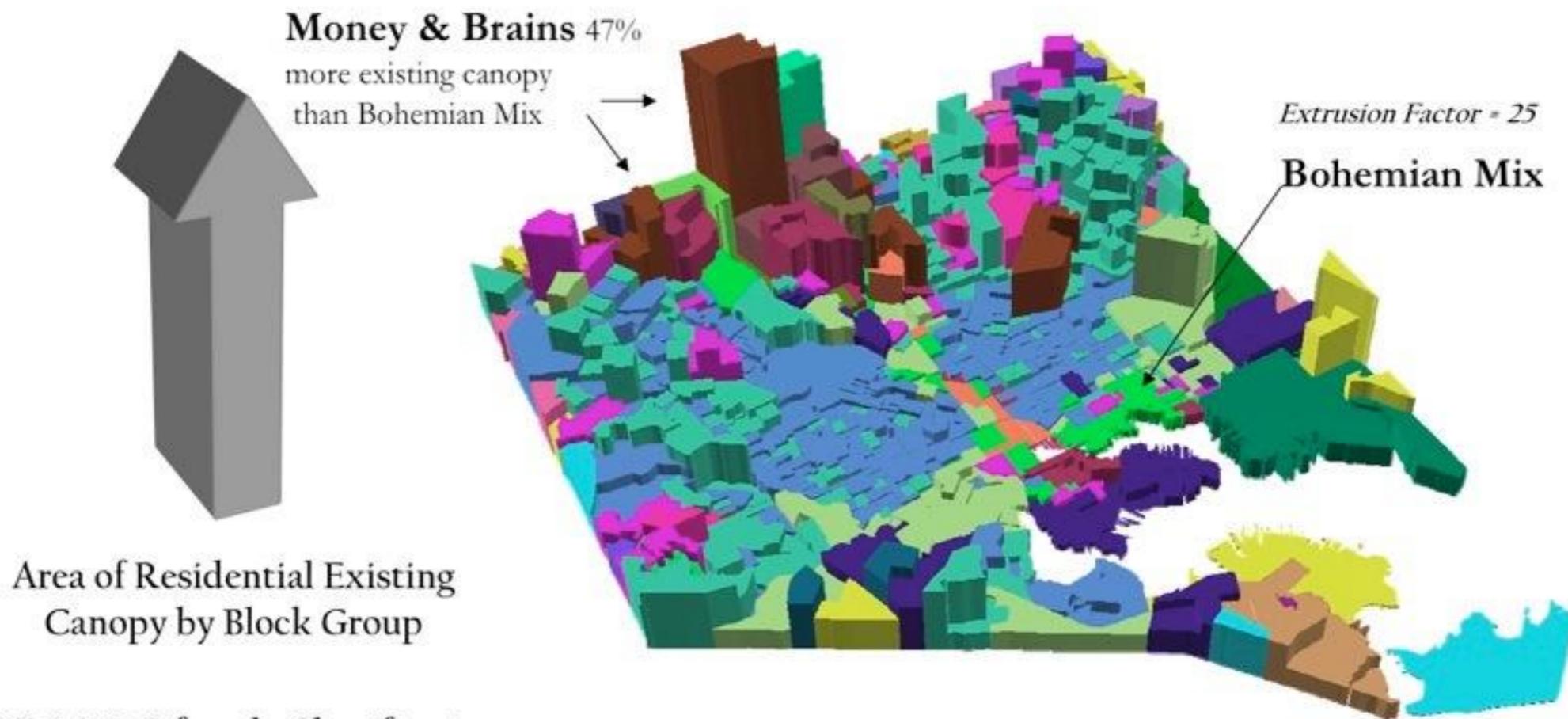


# Increasing Urban Tree Canopy: Market Analyses

Dexter Locke, Morgan Grove, Mike Galvin,  
and Jarlath O'Neil-Dunne

# People Are Not All the Same

## Existing Canopy & Lifestyle

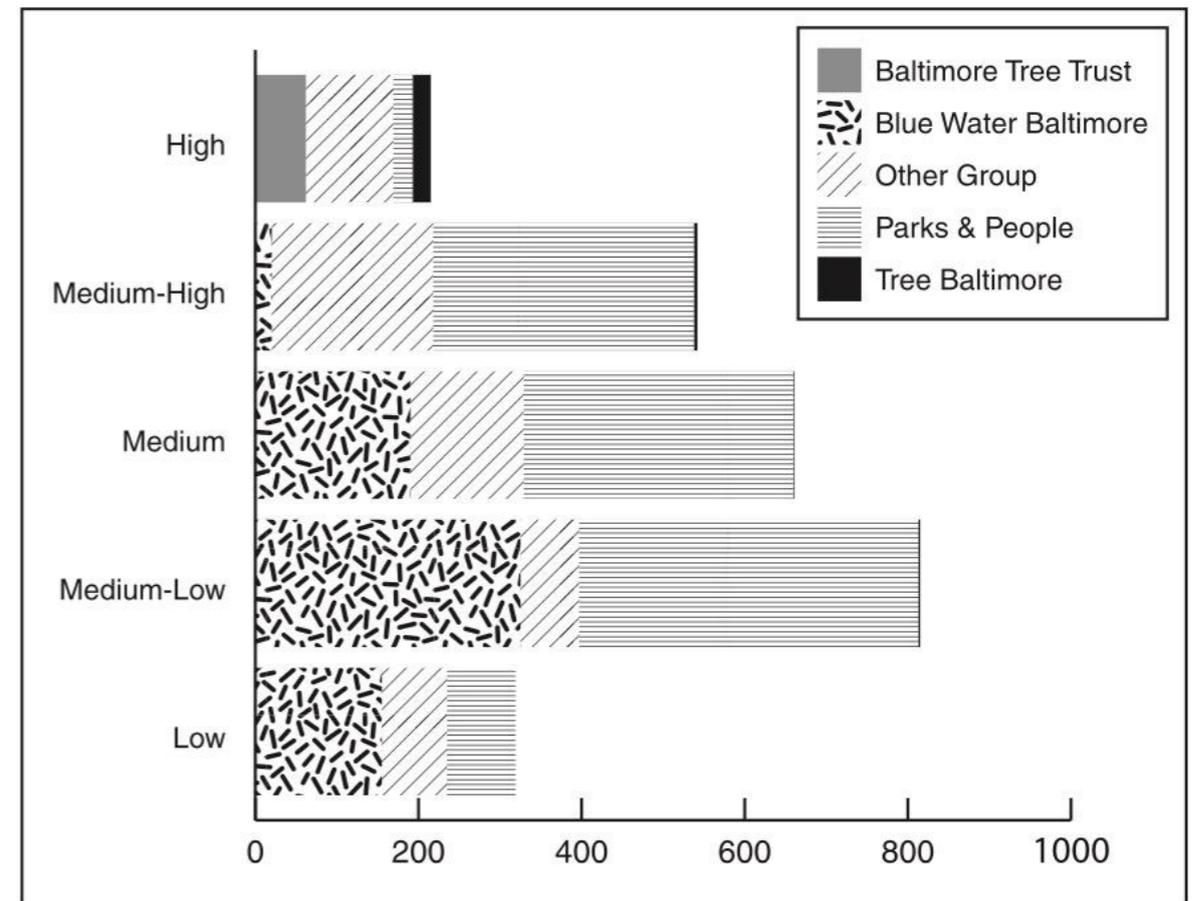
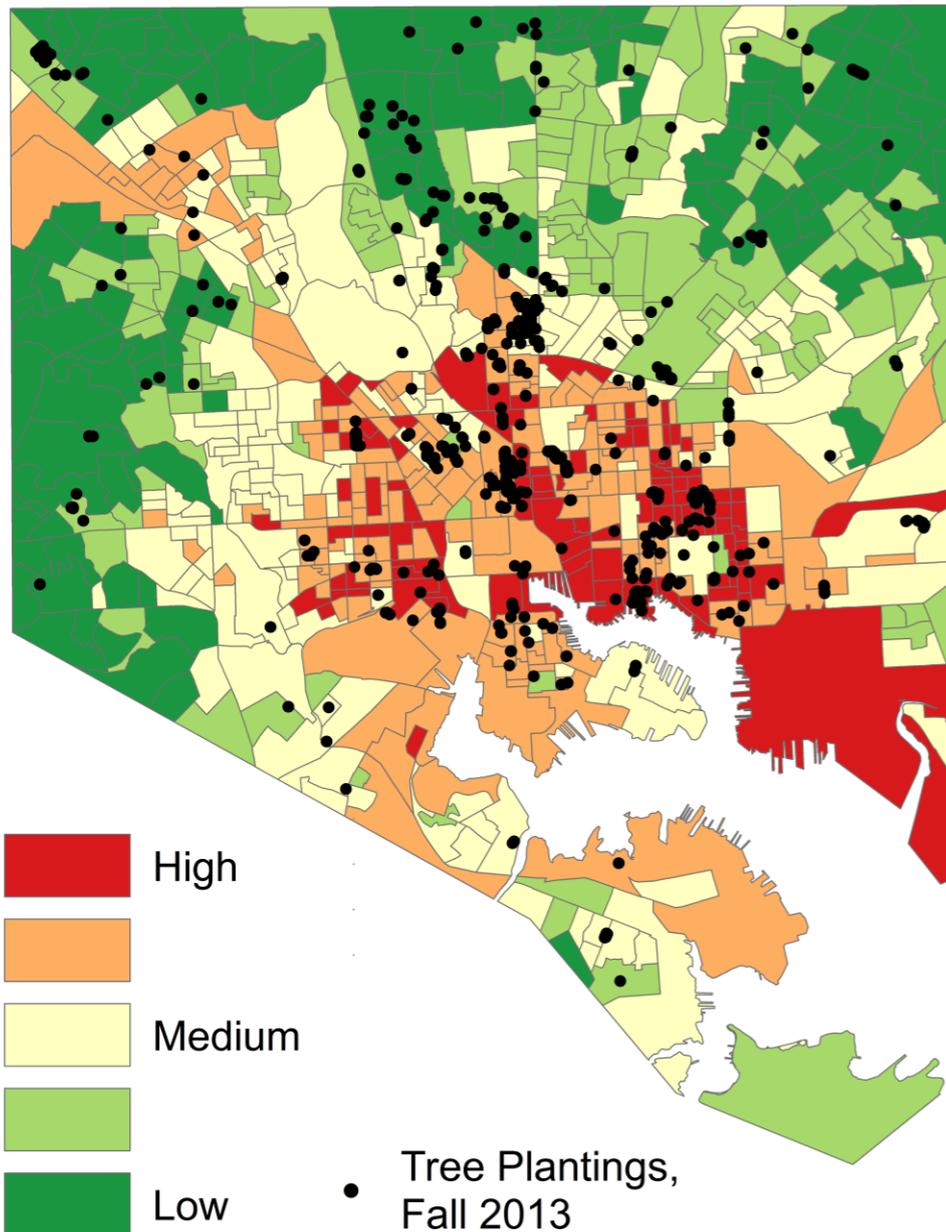


### PRIZM 62 Lifestyle Classification

<span style="color: #FF00FF;">■</span> American Dreams	<span style="color: #FFFF00;">■</span> Gray Collars	<span style="color: #00FFFF;">■</span> Mobility Blues	<span style="color: #90EE90;">■</span> Single City Blues	<span style="color: #FF00FF;">■</span> Urban Achievers
<span style="color: #008080;">■</span> Big City Blend	<span style="color: #808000;">■</span> Gray Power	<span style="color: #8B4513;">■</span> Money & Brains	<span style="color: #800080;">■</span> Smalltown Downtown	<span style="color: #808000;">■</span> Urban Gold Coast
<span style="color: #8B4513;">■</span> Blue Blood Estates	<span style="color: #FFB6C1;">■</span> Hometown Retired	<span style="color: #483D8B;">■</span> New Beginnings	<span style="color: #008000;">■</span> Southside City	<span style="color: #00FFFF;">■</span> Winner's Circle
<span style="color: #9370DB;">■</span> Blue-Chip Blues	<span style="color: #6495ED;">■</span> Inner Cities	<span style="color: #8A2BE2;">■</span> New Empty Nests	<span style="color: #FFD700;">■</span> Suburban Sprawl	<span style="color: #FF0000;">■</span> Young Influentials
<span style="color: #00FF00;">■</span> Bohemian Mix	<span style="color: #40E0D0;">■</span> Mid-City Mix	<span style="color: #4B0082;">■</span> Old Yankee Rows	<span style="color: #FF8C00;">■</span> Towns & Gowns	<span style="color: #8B003B;">■</span> Young Literati
<span style="color: #FF8C00;">■</span> Family Scramble	<span style="color: #008000;">■</span> Military Quarters	<span style="color: #90EE90;">■</span> Pools & Patios	<span style="color: #FF00FF;">■</span> Upstarts & Seniors	

# 3. UTC Market Analysis: Plantings and Prioritization

## Summary Baltimore UTC Prioritization Map





A. Young Digerati market segment.



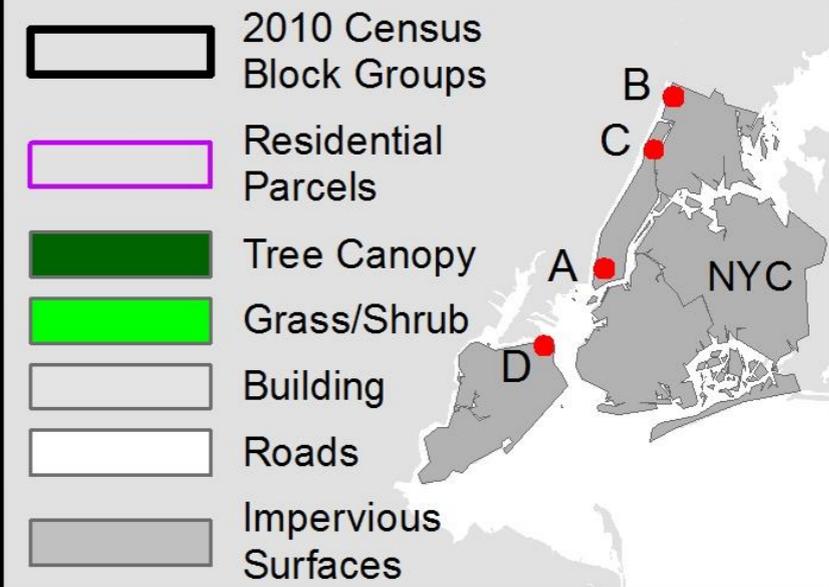
B. Money & Brains market segment.



C. Urban Elders market segment.



D. Low-Rise Living market segment.



Affluence provides a poor explanation of the spatial variation of vegetation on privately owned urban lands. This Young Digerati (A) block group has more than twice the median household income, but less than half the plantable space than the Urban Elders (D), & nearly 18 times less realized stewardship as the Low-Rise Living market segments. The Money & Brains market segment (B) has 3.6 times the median household income of Low-Rise Living (D), but only 20% more plantable and realized area.

Possible = lot area - building area  
 Realized = % of Possible w/ vegetation

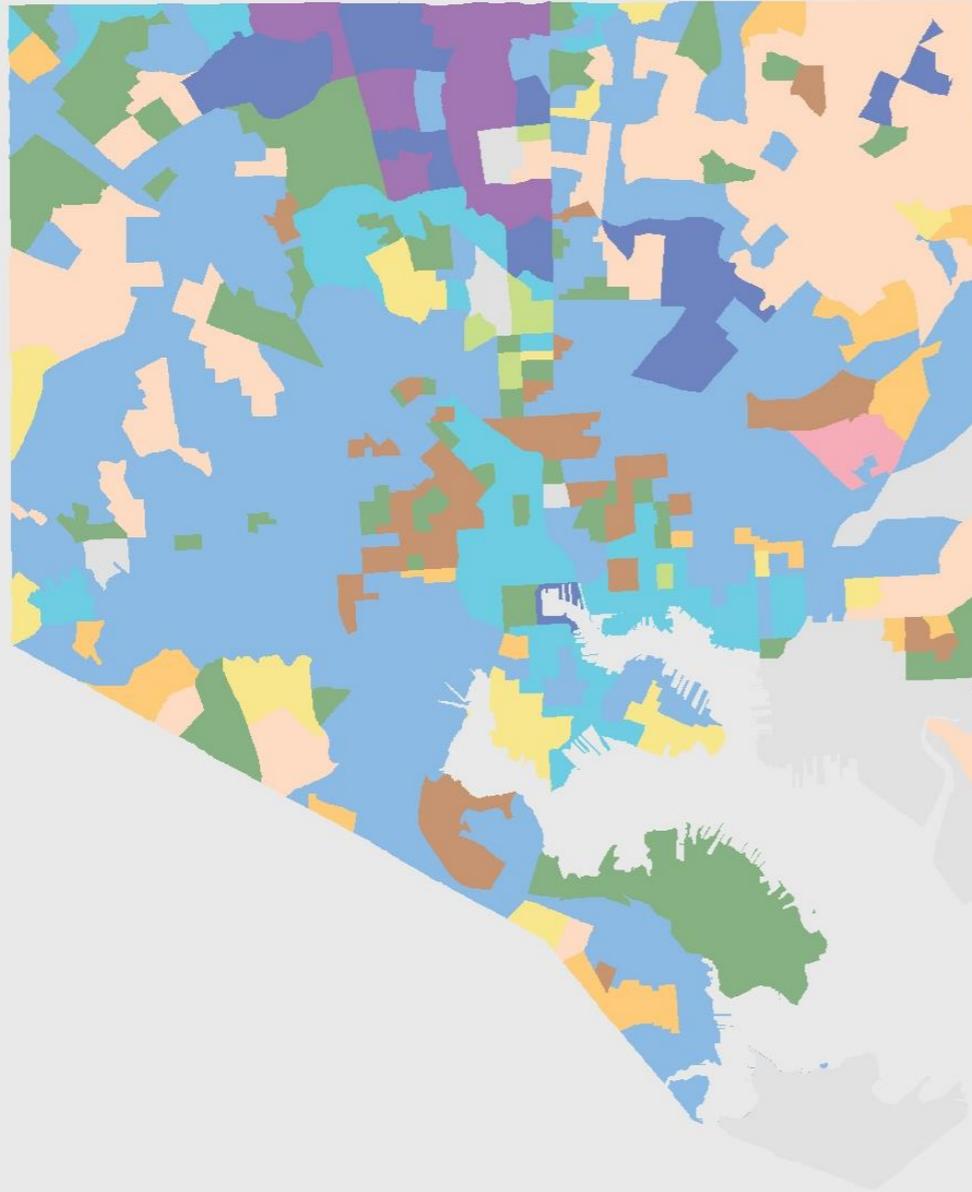
	A Young Digerati	B Money & Brains	C Urban Elders	D Low-Rise Living
Median Household Income	\$69,368	\$114,039	\$26,405	\$ 31,119
Possible Stewardship	14.5%	85.1%	30.0%	69.9%
Realized Stewardship	4.1%	88.1%	0.5%	73.7%

# 3. UTC Market Analysis

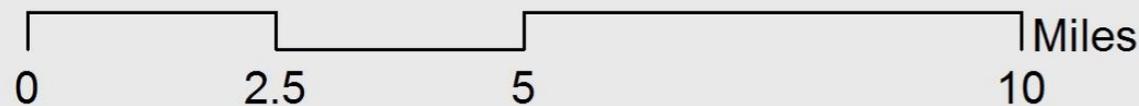
## Plantings and Social Groups

# Markets

Distribution of LifeMode Groups per Block Group



Percent of Total Households per LifeMode Group, Baltimore, MD.

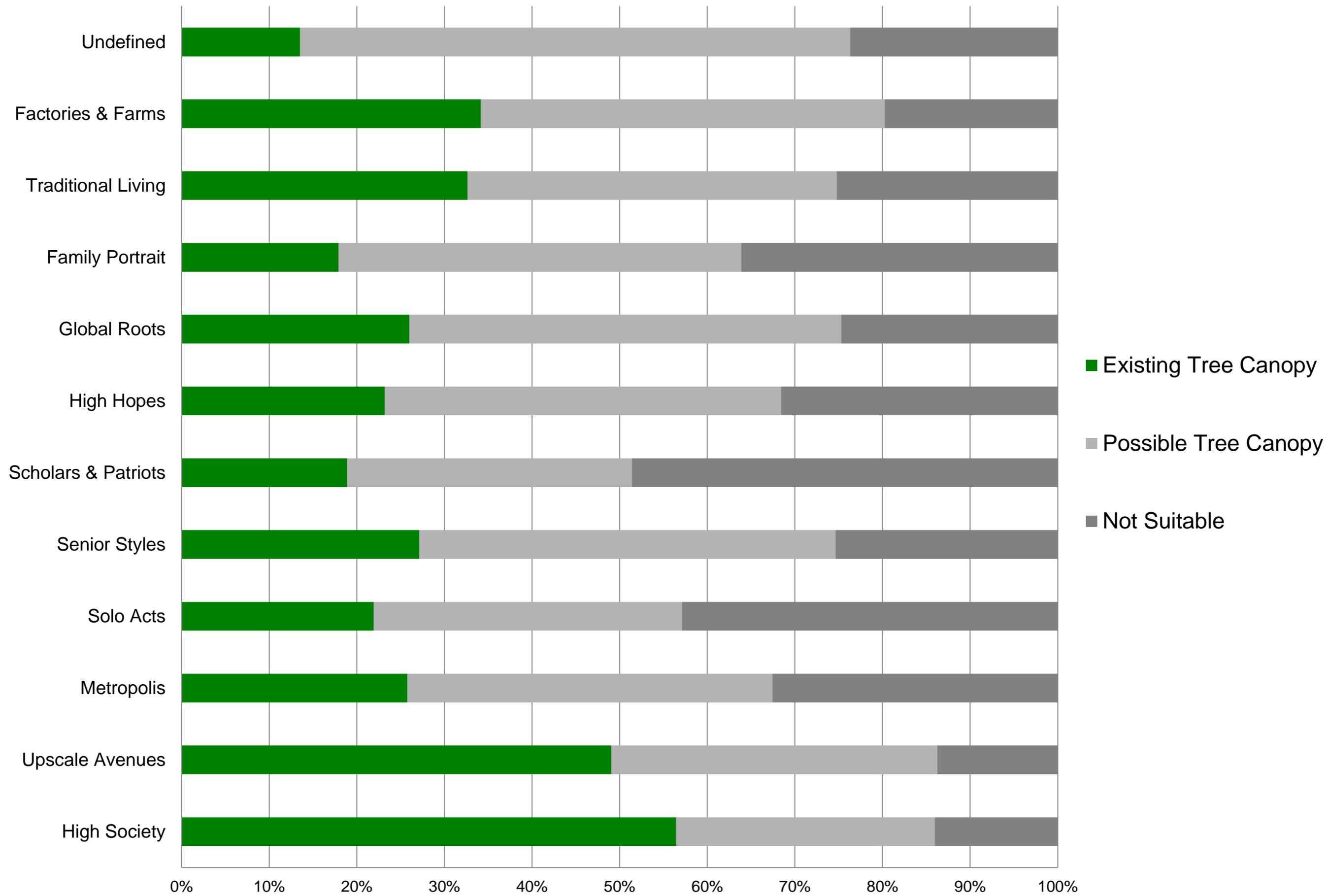


Segments within a LifeMode summary group share an experience such as being born in the same time period and/or a trait such as affluence, similar lifestyles and/or family structure.

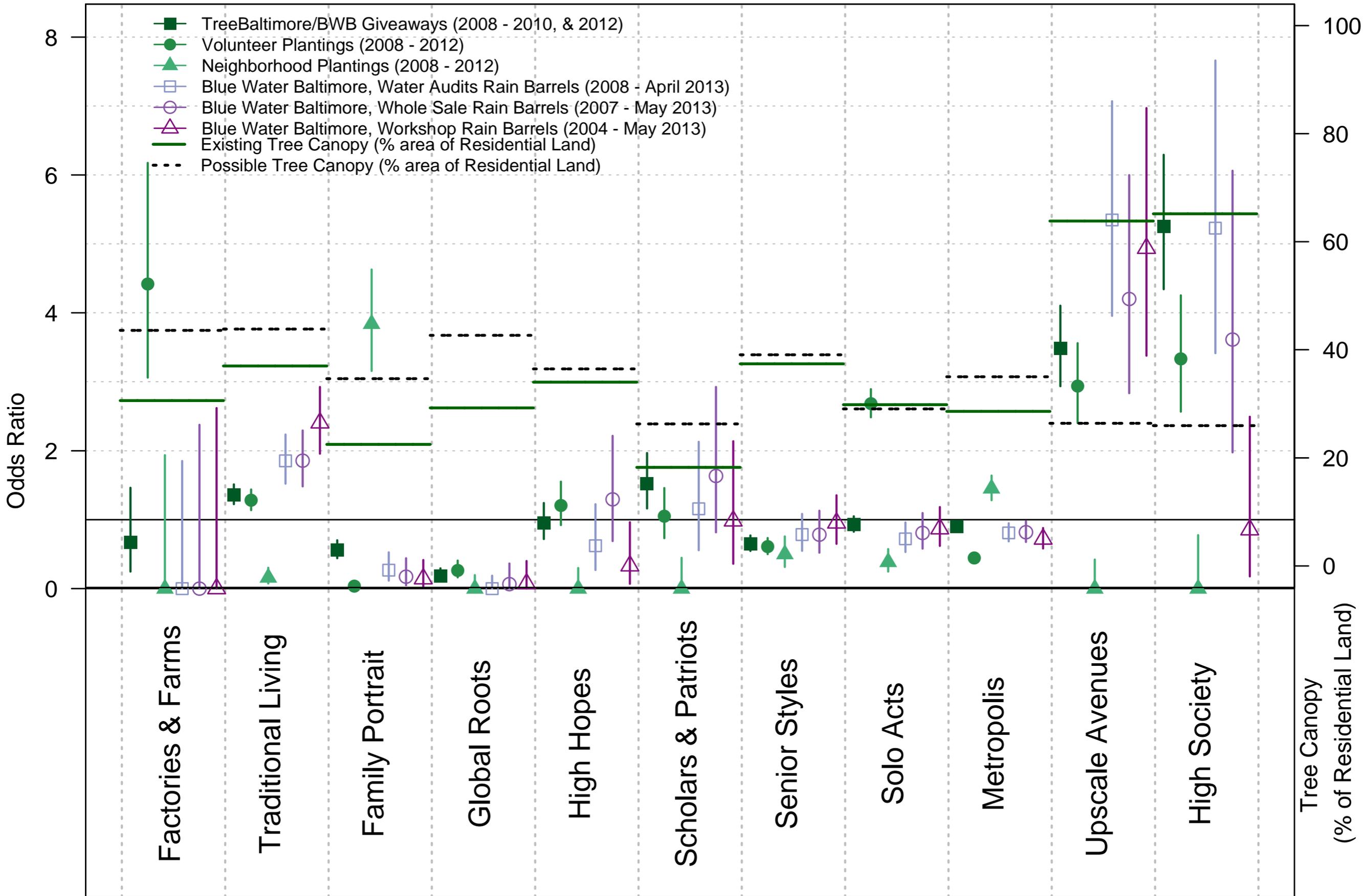
When this version of Tapestry was created, there were 250,343 households containing approximately 622,000 people in Baltimore, MD.

"Tapestry Segmentation Reference Guide - Esri." 2009. 6 Jun. 2013  
<http://www.esri.com/library/brochures/pdfs/tapestry->

# Existing and Possible Tree Canopy in Baltimore, MD by LifeMode Group



# Odds Ratios & 95% Confidence Intervals for Urban Greening Programs on Private Residential Land, by Tapestry LifeMode



# A Market Analysis of New York Restoration Project's Tree Giveaway Program, Spring 2008—Fall 2013



## Project Background

The goal of this project is to analyze New York Restoration Project's (NYRP) Tree Giveaway Program. This report is motivated by the following questions:

1. Where were NYRP's giveaway trees planted?
2. Who participated in the tree giveaway program?
3. Does participation in giveaways vary by available space?
4. Are there seasonal or annual variations?
5. Where are opportunities for the tree giveaway program to improve and grow New York City's (NYC) urban forest?

## How NYRP's Tree Giveaway Program Works

NYRP helps establish and steward NYC's urban forest through several programs. The tree giveaway program is currently NYRP's most robust program for planting trees as the private partner for the city's MillionTreesNYC initiative. NYRP partners with dozens of community groups in all 5 boroughs to provide trees at no cost to NYC residents through the tree giveaway program. Residents are asked to register in advance to reserve a tree, and at least 25% of all available trees at each event are available on a first come, first served basis. The giveaway program began in the spring of 2008, and gave away nearly 700 trees that year. The tree giveaway effort grew and nearly doubled the number of trees NYRP provided community members in its second year, and has been growing rapidly since. In 2013, more than 9,200 trees found new homes in New York City; in 2014, the number of trees given away by NYRP's tree giveaway program is projected to increase to 15,000 (Figure 1a). Between 2008 and 2013, NYRP provid-

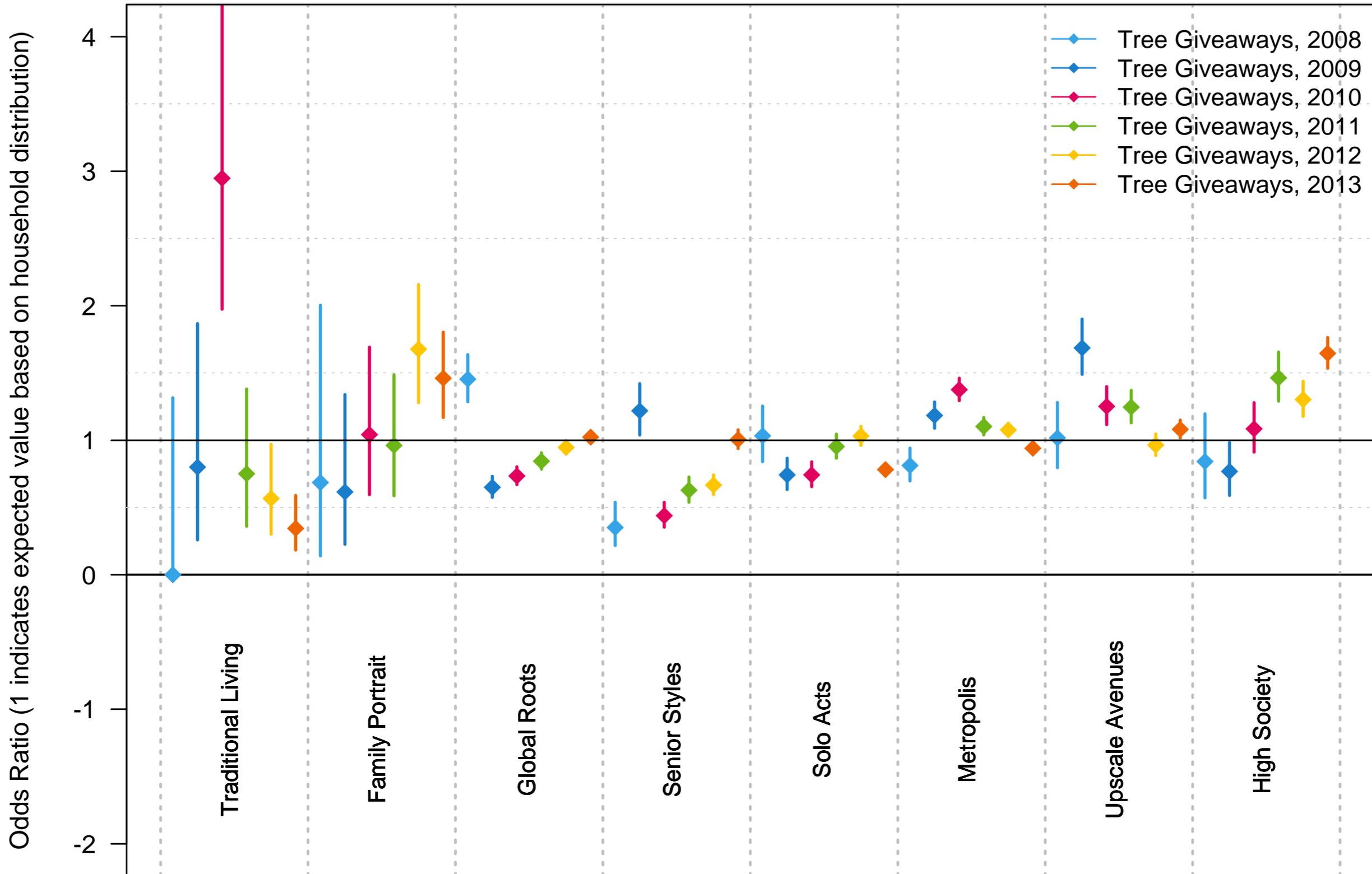
## Geodemography

Geodemographic market segmentation is the process of classifying neighborhoods into categories based on a combination of demographic, socioeconomic and lifestyle characteristics. These useful categories do not correspond neatly to a single characteristic such as race/ethnicity, or the age distribution within a neighborhood. Instead, each market segment describes a range of useful traits among people clustered in similar geographical locations, such as consumer behaviors, consumer preferences and lifestyles. This analysis uses Environmental Systems Research Institute's (ESRI) Tapestry Segmentation system, which includes 65 market segments that are consolidated into LifeMode and Urbanization Groups to provide profiles at the US census block level (ESRI 2010). Figure 2 shows how these categories are distributed across the city.

## Why Tree Canopy is Important

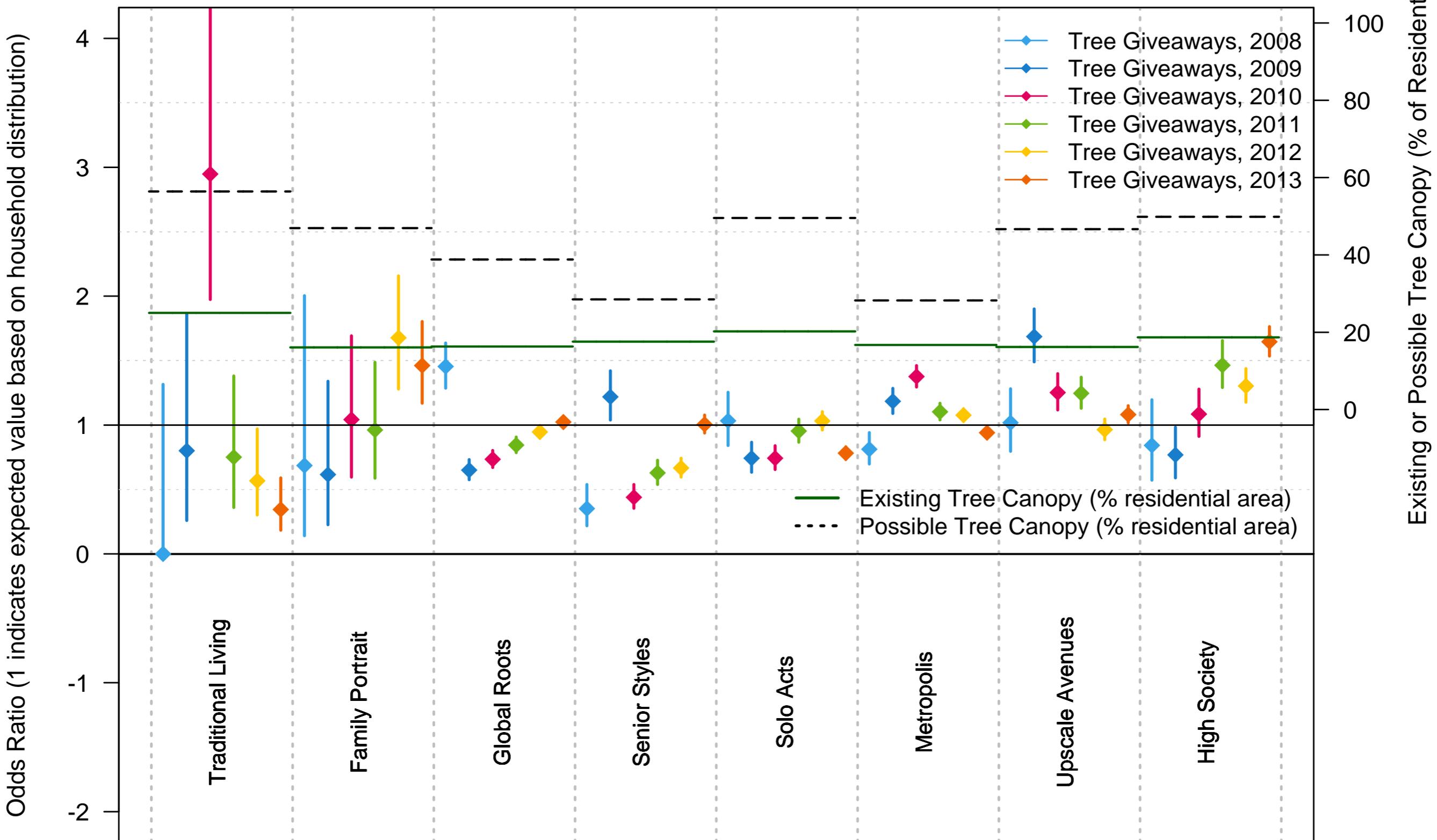
Tree canopy (TC) is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above. Tree canopy provides many benefits to communities, improving water quality, saving energy, lowering summer temperatures, reducing air pollution, enhancing property values, providing wildlife habitat, facilitating social and educational opportunities, and providing aesthetic benefits (ACTrees 2011). Through the establishment of a canopy increase goal from a baseline of 24% canopy cover to 30% canopy cover in PlaNYC's MillionTreesNYC initiative (Grove et al 2006), NYRP is developing the city's green infrastructure in partnership with New York City Department of Parks and Recreation by growing the urban forest on private properties. This market analysis examines where trees are planted, who participates in NYRP's tree giveaway program, and assesses canopy growth opportunities in NYC's various geodemographic market segments.

# Odds Ratios & 95% Confidence Intervals for NYRP's Tree Giveaways (2008 - 2013), by Tapestry LifeMode



Tapestry LifeMode: Demographic groups sharing an experience such as age and/or traits like affluence, lifestyles and/or family structure

# Odds Ratios & 95% Confidence Intervals for NYRP's Tree Giveaways (2008 - 2013), by Tapestry LifeMode



Tapestry LifeMode: Demographic groups sharing an experience such as age and/or traits like affluence, lifestyles and/or family structure

# A Market Analysis of TreePhilly's Yard Tree Program, Spring 2012—Spring 2014



## Project Background

This report is motivated by the following questions:

1. Where were TreePhilly's Yard Trees planted?
2. Who participated in the Yard Tree program?
3. Did participation in giveaways vary by available space?
4. What are the seasonal or annual variations?
5. Where are opportunities for the YardTree program to improve and grow Philadelphia's urban forest?

## Why Tree Canopy is Important

Tree canopy (TC) is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above. Tree canopy provides many benefits to communities, improving water quality, saving energy, lowering summer temperatures, reducing air pollution, enhancing property values, providing wildlife habitat, facilitating social and educational opportunities, and providing aesthetic benefits<sup>1</sup>. Mayor Michael Nutter's 2009 *Greenworks Philadelphia* plan included a goal to increase tree canopy in each neighborhood in Philadelphia to 30% by 2025, as one of 14 goals to make Philadelphia the greenest city in America<sup>2,3</sup>. A report on Philadelphia's tree canopy identified private residential lands as one of the largest opportunities to increase tree canopy in the City<sup>4</sup>.

## How TreePhilly's Yard Tree Program Works

TreePhilly is an education and outreach program of Philadelphia Parks & Recreation, focused on promoting Philadelphia's urban forest and providing resources for Philadelphians to plant and care for trees. The Yard Tree Giveaway is one of several programs of TreePhilly that provides free trees for Philadelphia residents, and is the only program focused on private property. TreePhilly partners with community groups to host between 4 and 6 giveaway events each

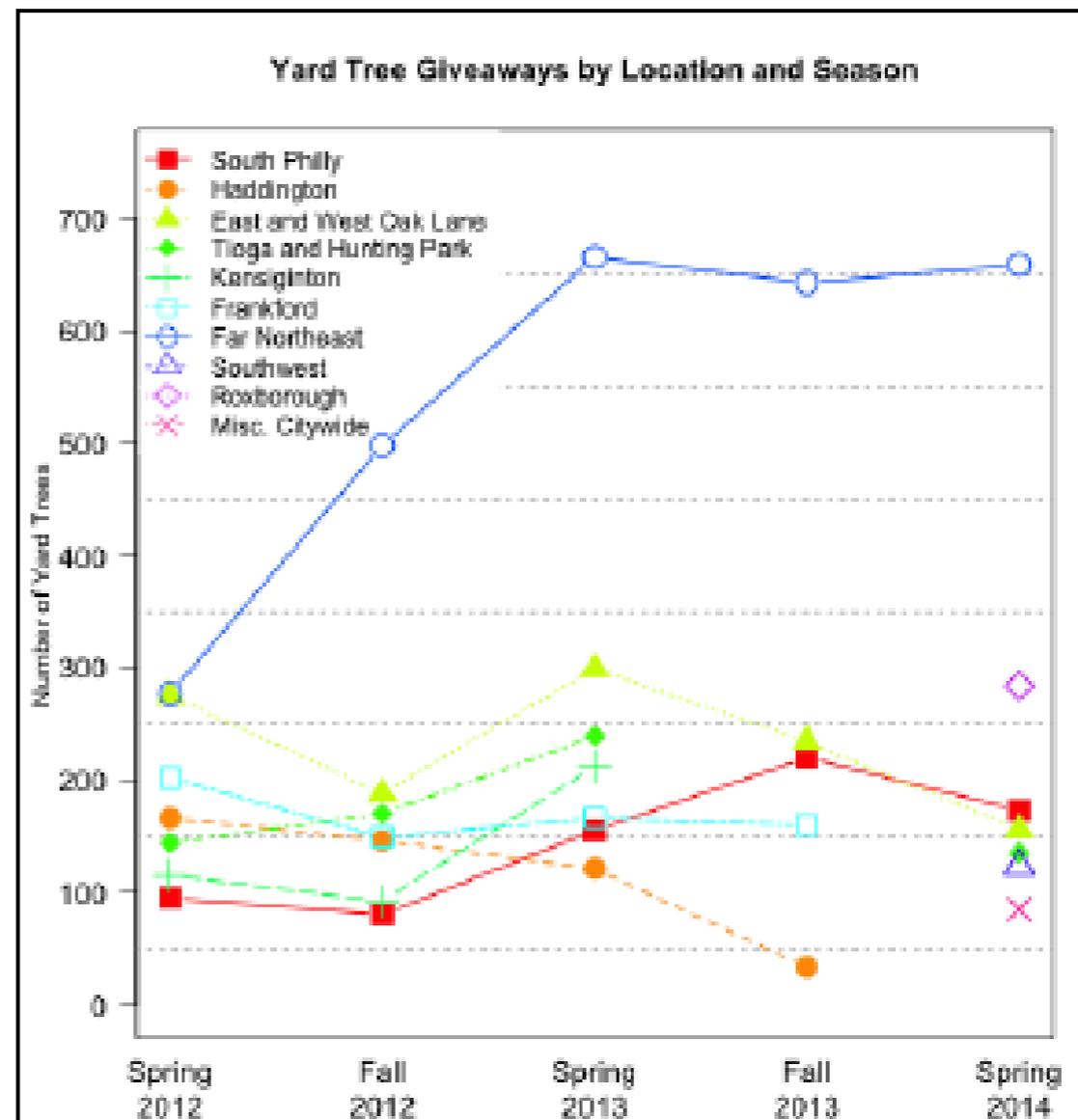
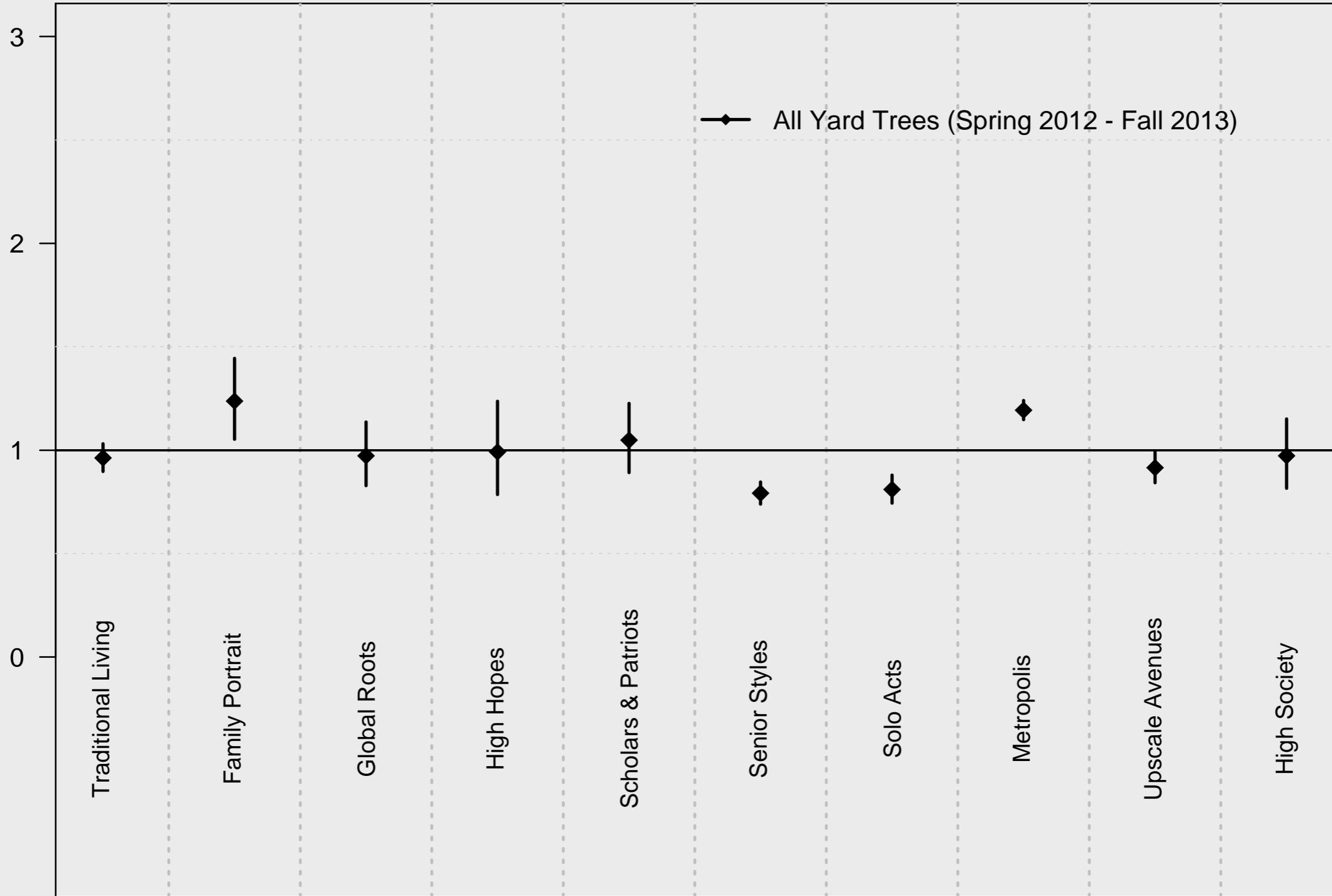


Figure 1. The number of giveaway Yard Trees varies by location & season. Over time, the number of giveaway locations has grown.



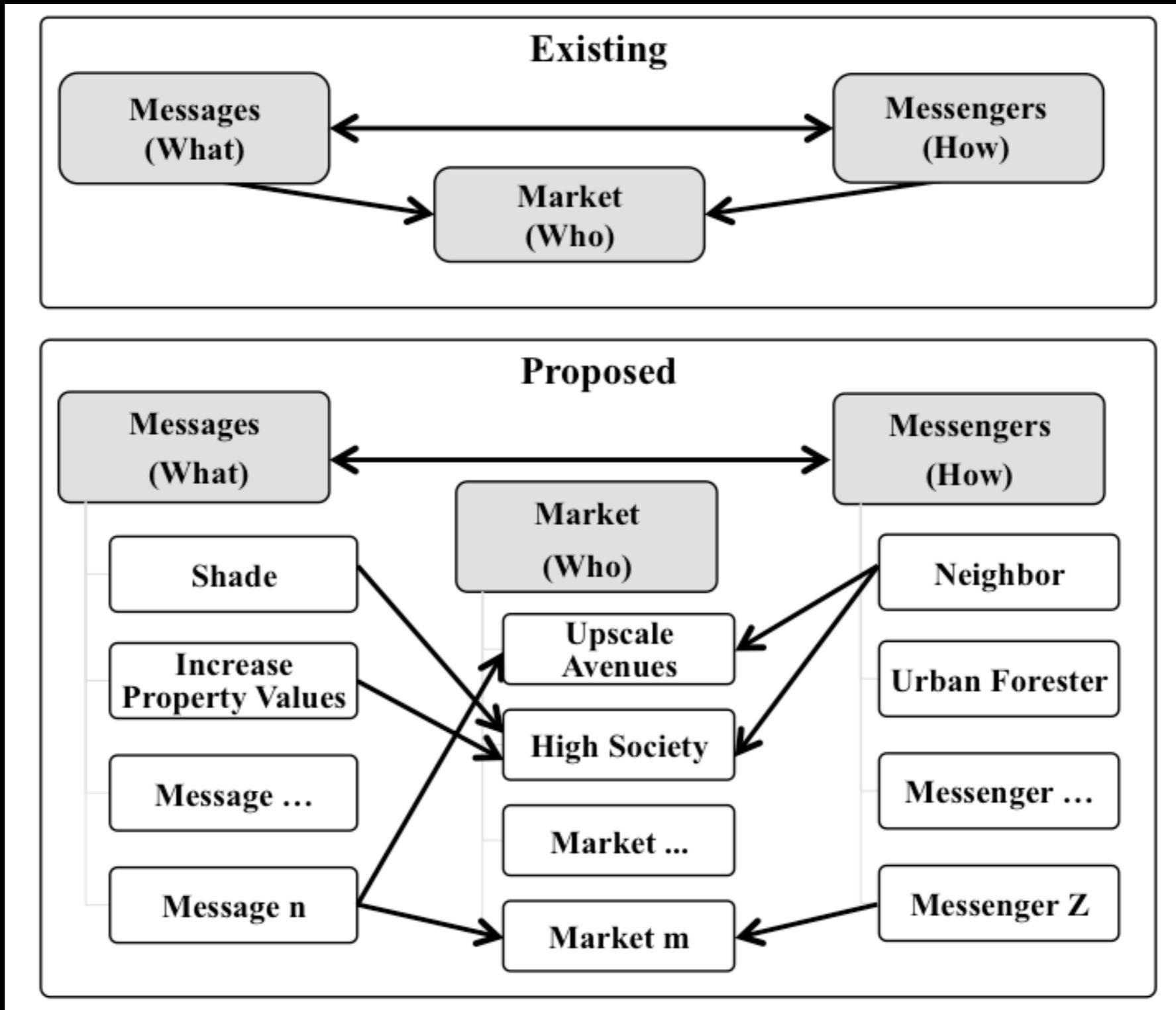
# Odds Ratios & 95% Confidence Intervals for Tree Philly's Yard Trees (Spring 2012 - Fall 2013), by Tapestry LifeMode

Odds Ratio (1 indicates expected value based on household distribution)

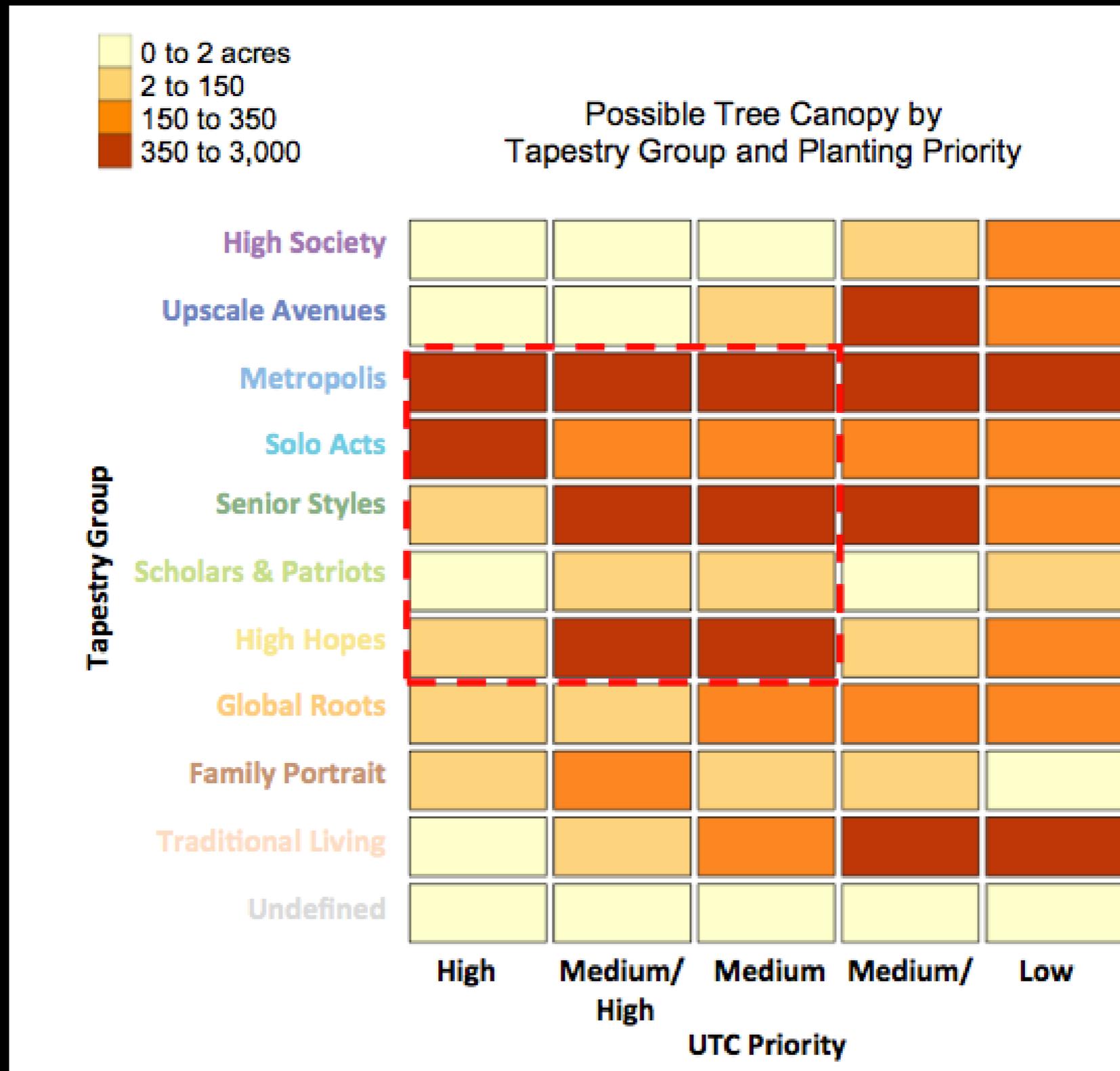


Tapestry LifeMode: Demographic groups sharing an experience such as age and/or traits like affluence, lifestyles and/or family structure

# 3. UTC Market Analysis: Messages, Markets, and Messengers

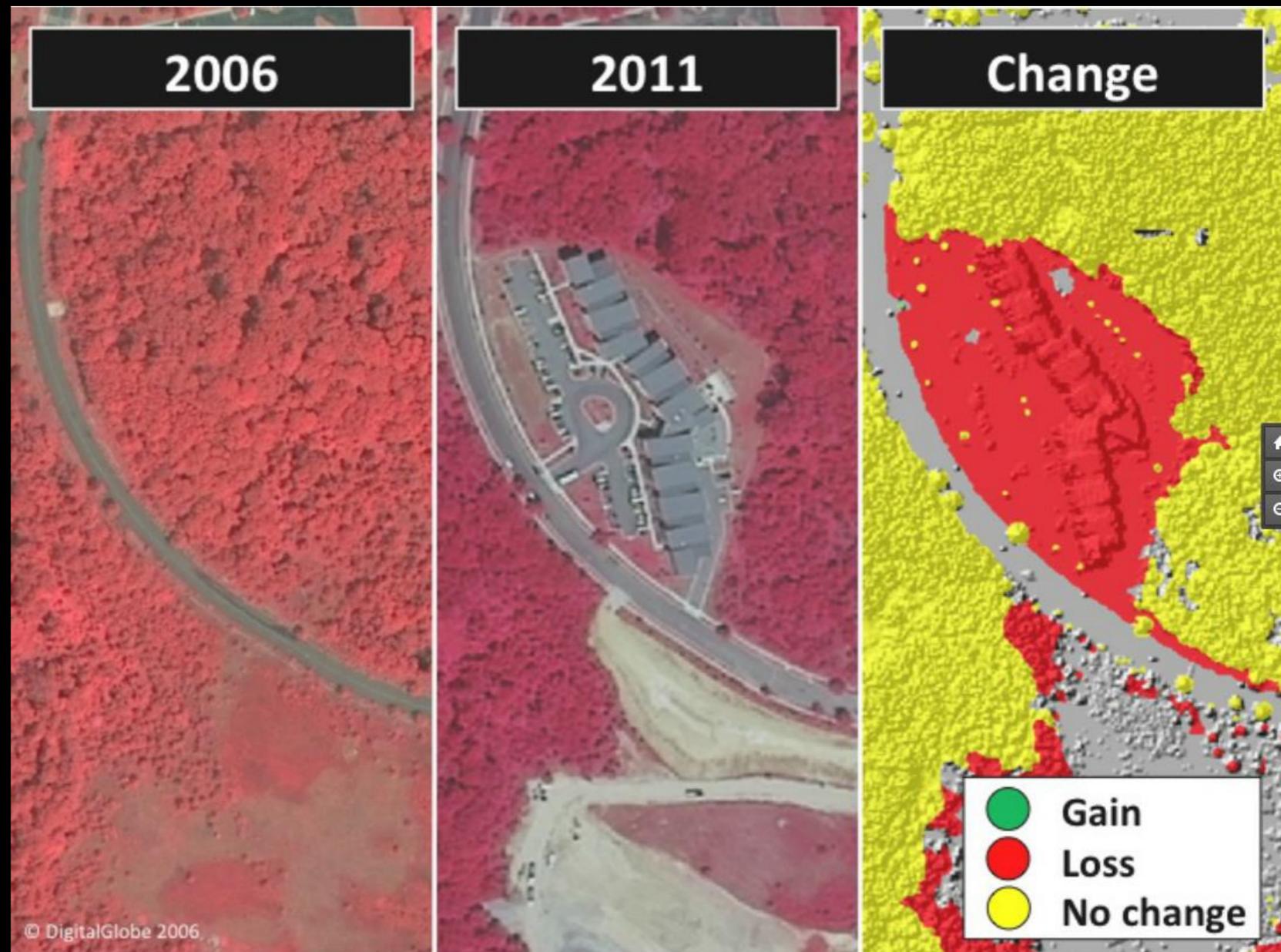


# 3. UTC Market Analysis: Priorities, Markets, and Messages



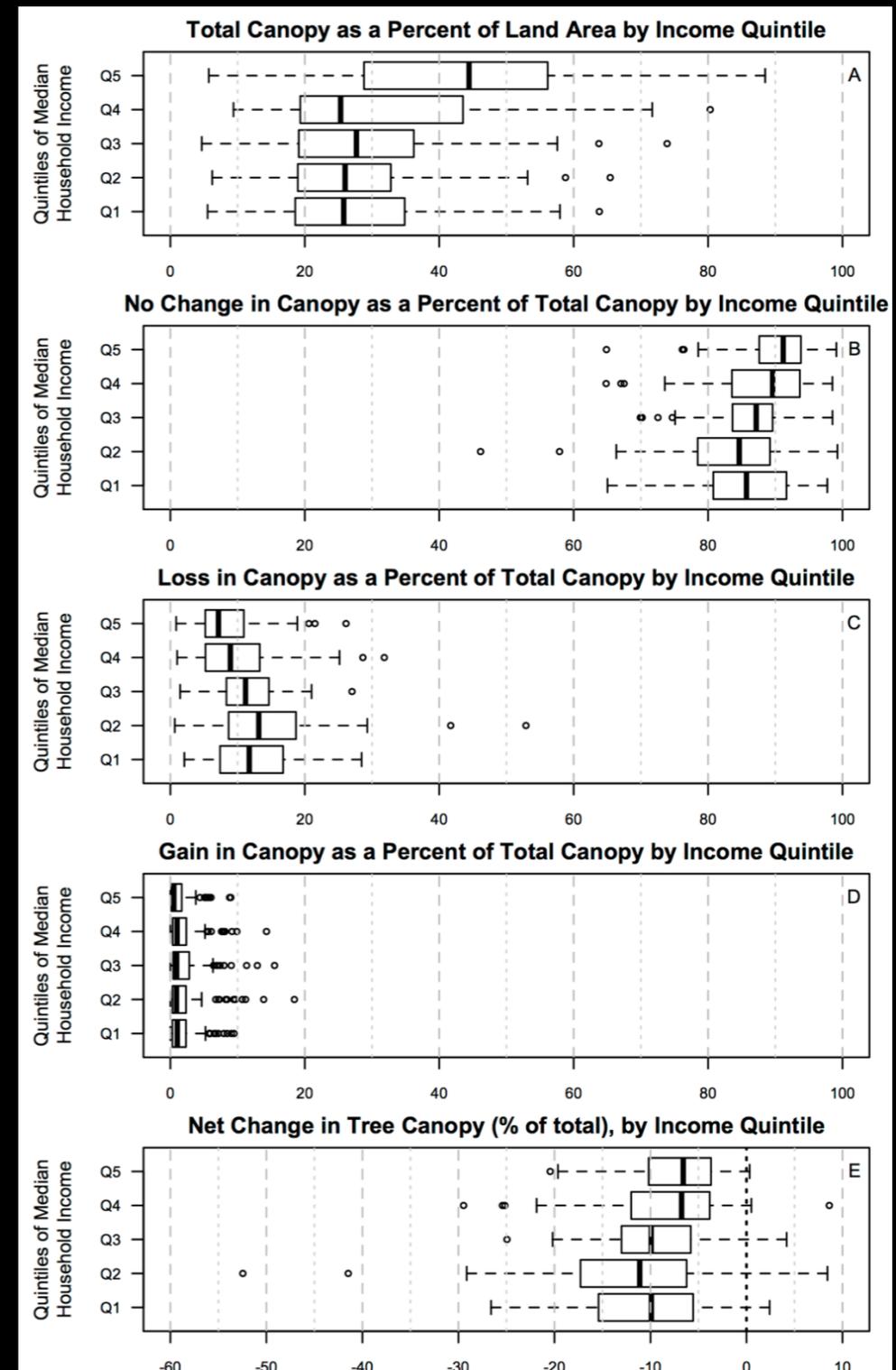
# 4. UTC Change Analysis

- Total change
- Spatial characteristics
- Landuse
- Ownership
- Social, economic, and environmental factors



# 4. UTC Change Analysis

- Total change
- Spatial characteristics
- Landuse
- Ownership
- Social, economic, and environmental factors



# Conclusion

- There is a need and the ability to expand from tree pits to the entire city.
- Tools are available to make it happen
  - \* Assess what you have,
  - \* Build partnerships across landowners and interests to make it happen,
  - \* Monitor and evaluate what you did,
  - \* Adapt as needed ...
- Connections and integration are key
  - \* Systems: with existing data systems, using an open source approach
  - \* Programmatic: other local and regional initiatives such as Green Pattern Book and Green Pattern Registry.

# Thank You

Dexter Locke

[dexter.locke@gmail.com](mailto:dexter.locke@gmail.com)

@DextraordinaryH

310 463 6202

Link to other products: <http://bit.ly/1L8MIX6>

# Solo Acts

“Residents of the *Solo Acts* summary group segments are **singles who prefer city life**. Many are young, just starting out in more densely populated US neighborhoods; others are well-established singles who have **no home ownership or child-rearing responsibilities**. Second only to *High Society*, residents of this group tend to be well-educated, **working professionals** who are either attending college or already hold a degree. Their incomes reflect their employment experience, ranging from a low median of \$44,601 (*Old and Newcomers*) among the newest households to approximately \$93,899 (*Laptops & Lattes*) among established singles. Home ownership is at 28 percent; the median home value is \$236,054. Contrary to modern migration patterns that flow away from the largest cities, ***Solo Acts*’ residents are moving into major cities** such as New York City; Chicago; Washington, D.C.; Boston; Los Angeles; and San Francisco. With **considerable discretionary income and few commitments, their lifestyle is urban, including the best of city life—dining out, attending plays and concerts, and visiting museums**—and, for a break from constant connectivity, extensive travel domestically and abroad.”

Click a LifeMode group, then a segment to see the profile.

LifeMode Group	Segments		
<ul style="list-style-type: none"> <li>● High Society</li> <li>● Upscale Avenues</li> <li>● Metropolis</li> <li>● Solo Acts</li> <li>● Senior Styles</li> <li>● Scholars and Patriots</li> <li>● High Hopes</li> <li>● Global Roots</li> <li>● Family Portrait</li> <li>● Traditional Living</li> <li>● Factories and Farms</li> <li>● American Quilt</li> </ul>	<p>Laptops and Lattes</p> 	<p>Trendsetters</p> 	<p>Metro Renters</p> 
	<p>Old and Newcomers</p> 	<p>Young and Restless</p> 	

# Background: Markets & Their Characteristics (cont.)

## Traditional Living

“The four segments in *Traditional Living* convey the perception of real middle America—**hardworking, settled families**. The group’s higher median age of 38.2 years also conveys their lifestage—a **number of older residents who are completing their child-rearing responsibilities and anticipating retirement**. Even though they’re older, many still work hard to earn a modest living. They typically own single-family homes in established, slow-growing neighborhoods. They buy standard, four-door American cars, **belong to veterans’ clubs and fraternal organizations**, take care of their homes and gardens, and rely on **traditional media such as newspapers for their news.**”

Click a LifeMode group, then a segment to see the profile.

### LifeMode Group

- High Society
- Upscale Avenues
- Metropolis
- Solo Acts
- Senior Styles
- Scholars and Patriots
- High Hopes
- Global Roots
- Family Portrait
- Traditional Living**
- Factories and Farms
- American Quilt

### Segments

Main Street USA



Rustbelt Traditions



Midlife Junction



Family Foundations

