

Urban Tree Canopy (UTC) Prioritization

How Decision Tools Can Bring People and Programs
Together to Improve Ecosystem Services

Morgan Grove and Dexter Locke
Baltimore Field Station
Northern Research Station
USDA Forest Service
mgrove@fs.fed.us



Overview

- What is UTC Prioritization?
- Results from Baltimore
- Applications
- Future research
- Conclusion

What is UTC Prioritization?

Ecosystem Services as Goals



Goals for Prioritization

Major Criteria	Criteria Variables	City Agencies	Sustainability Plan
Public Health & Safety	Life expectancy, mortality rate, mortality rate from heart disease, mortality rate from strokes, mortality rate from respiratory disease, mortality rate from diabetes, infant mortality rate	BCHD, Planning	Pollution Prevention Goals 2, 4 & 5
	Asthma by zipcode	BCHD, Planning	Pollution Prevention Goals 2, 4 & 5
	Dependency Ratio	BCHD, Planning	
	Urban Heat Island: surface temperature and solar exposure	BCHD, BCRP, Planning, DOT	Pollution Prevention Goal 2
	Crime: Personal, Property and Total	Police	
	Transportation Connections	BCHD, Planning, DOT	Transportation Goals 1, 2, 3 and 4
Environmental Justice	Toxic Releases Inventory	BCHD, Planning	Pollution Prevention Goals 2 & 4
	Brownfields	Planning, DPW	Cleanliness 3 Pollution Prevention Goal 4
	Poverty, Race, Home ownership	Planning	
	Percent Parks	BCRP	Greening Goal 3
Water Quality	Percent Impervious Surface	DPW, DOT, Planning	Pollution Prevention Goal 3
	Watershed H2O quality assessments???	DPW	Pollution Prevention Goal 3
	Stream corridors	DPW, BCRP	Greening Goal 4
	Flood Plains	DPW, BCRP, Planning	
	Critical Area	BCRP, Planning	Greening Goal 4
	Greenstreets	DPW, DOT, BCRP, Planning	Cleanliness Goal 1 Pollution Prevention Goal 3 Greening Goal 1
	Blue alleys	DPW, DOT, BCRP, Planning	Cleanliness Goal 1 Pollution Prevention Goal 3 Greening Goal 1
	Flooding	DPW, Planning	
Air Quality & Noise Pollution	(Major) Road Density	DOT	Pollution Prevention Goal 2
Critical Places	Schools, hospitals, libraries, recreation centers, and elderly care facilities	BCPSS, DGS, BCRP, Planning	
	Population density (per square mile)	Planning, DPW	
Community Presence	Potential stewardship	BCRP, Planning	Education & Awareness Goals 3 & 4

Linkages to City's Sustainability Plan

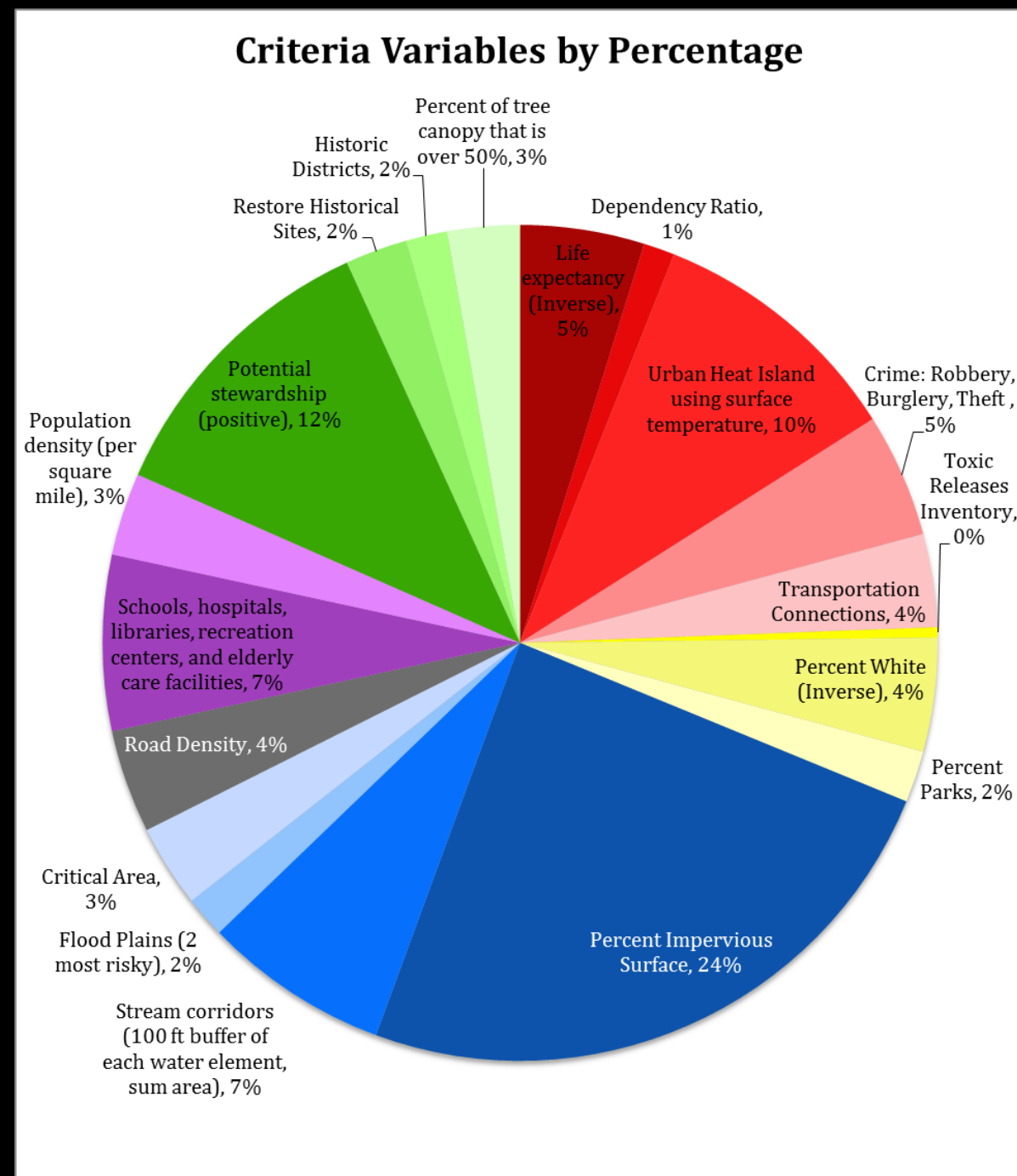
Major Criteria	Criteria Variables	City Agencies	Sustainability Plan
Public Health & Safety	Life expectancy, mortality rate, mortality rate from heart disease, mortality rate from strokes, mortality rate from respiratory disease, mortality rate from diabetes, infant mortality rate	BCHD, Planning	Pollution Prevention Goals 2, 4 & 5
	Asthma by zipcode	BCHD, Planning	Pollution Prevention Goals 2, 4 & 5
	Dependency Ratio	BCHD, Planning	
	Urban Heat Island: surface temperature and solar	BCHD, BCRP, Planning, DOT	
Sustainability Plan Key:			Prevention Goal 2
Cleanliness Goal 1	Eliminate litter throughout the City		
Cleanliness Goal 3	Transform vacant lots from liabilities to assets that provide social and economic benefits		Prevention Goals 1, 2, 3
Education & Awareness Goal 3	Raise the environmental awareness of the Baltimore community		Prevention Goals 2
Education & Awareness Goal 4	Expand access to information on sustainability		
Greening Goal 1	Double Baltimore's Tree Canopy by 2037		3 Pollution
Greening Goal 3	Provide safe, well-maintained public recreational space within ¼ mile of all residents		Goal 4
Greening Goal 4	Protect Baltimore's ecology and biodiversity		
Pollution Prevention Goal 2	Improve Baltimore's air quality and eliminate Code Red days		Goal 3
Pollution Prevention Goal 3	Ensure that Baltimore water bodies are fishable and swimmable		Prevention Goal 3
Pollution Prevention Goal 4	Reduce risks from hazardous materials		Prevention Goal 3
Pollution Prevention Goal 5	Improve the health of indoor environments		Goal 4
Transportation Goal 1	Improve public transit services		Goal 4
Transportation Goal 2	Make Baltimore bicycle and pedestrian friendly		Goal 1 Pollution
Transportation Goal 3	Facilitate shared-vehicle usage		Goal 3 Greening
Transportation Goal 4	Measure and improve the equity of transportation		
	Blue alleys	DPW, DOT, BCRP, Planning	Cleanliness Goal 1 Pollution Prevention Goal 3 Greening Goal 1
	Flooding	DPW, Planning	
Air Quality & Noise Pollut	(Major) Road Density	DOT	Pollution Prevention Goal 2
Critical Places	Schools, hospitals, libraries, recreation centers, and elderly care facilities	BCPSS, DGS, BCRP, Planning	
	Population density (per square mile)	Planning, DPW	
Community Presence	Potential stewardship	BCRP, Planning	Education & Awareness Goals 3 & 4

Results from Baltimore: Preferences, Gaps, and Coalitions

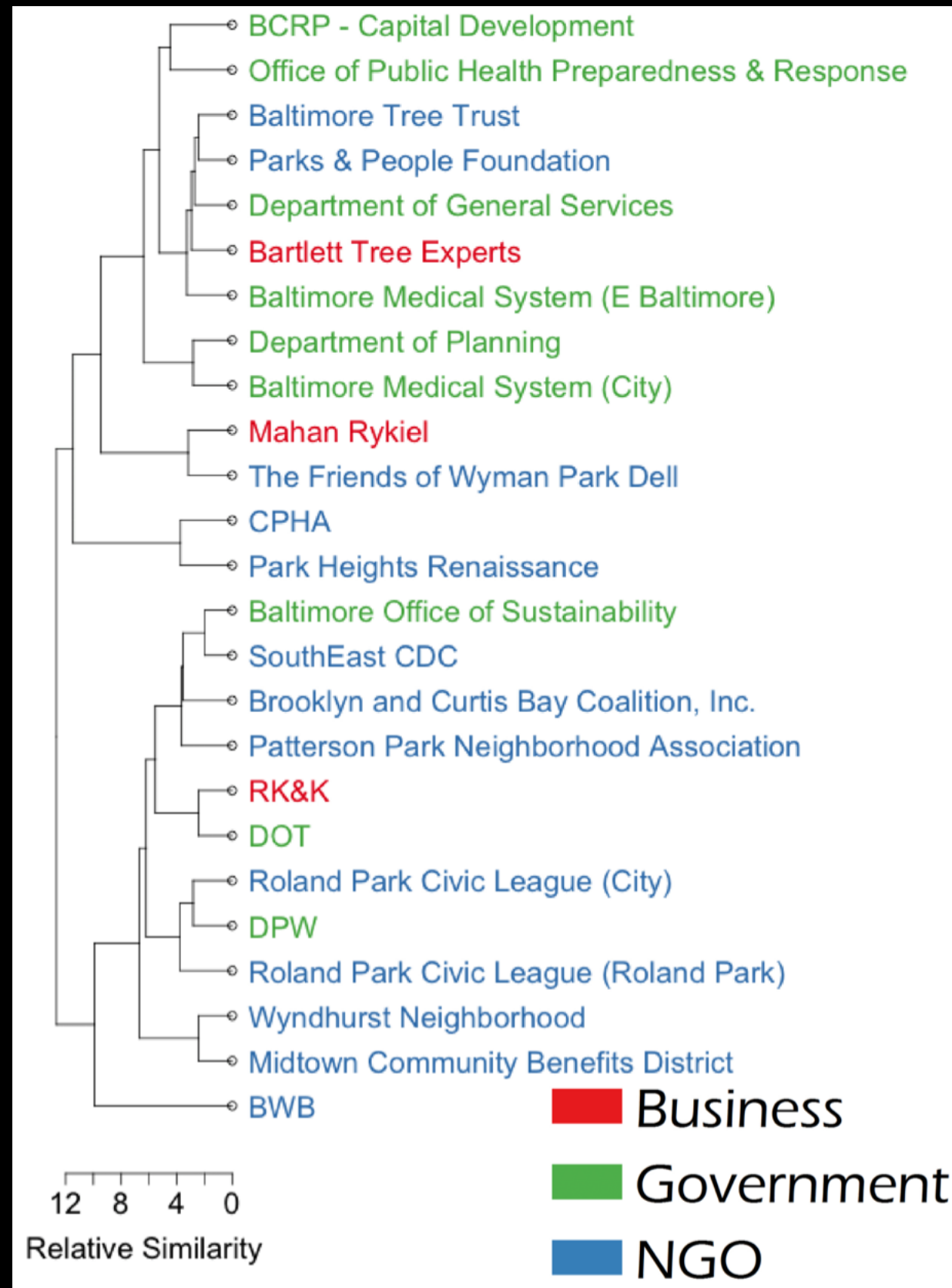
- Types of Goals
- Types of Stewardship
- Units of Stewardship
- Places of Stewardship

Types of Goals

Major Criteria	Criteria Variables	Total Votes	Percent
Public Health & Safety	Life expectancy (Inverse)	12	4.8%
	Dependency Ratio	3	1.2%
	Urban Heat Island using surface temperature	25	10.0%
	Crime: Robbery, Burglary, Theft	12	4.8%
	Transportation Connections	9	3.6%
Environmental Justice	Toxic Releases Inventory	1	0.4%
	Percent White (Inverse)	11	4.4%
	Percent Parks	5	2.0%
Water Quality	Percent Impervious Surface	61	24.4%
	Stream corridors (100 ft. buffer of each water element, sum area)	18	7.2%
	Flood Plains (2 most risky)	4	1.6%
	Critical Area	8	3.2%
Air Quality & Noise Pollution	Road Density	10	4.0%
Critical Places	Schools, hospitals, libraries, recreation centers, and elderly care facilities	17	6.8%
	Population density (per square mile)	8	3.2%
Community Presence	Potential stewardship (positive)	29	11.6%
Aesthetic	Restore Historical Sites	6	2.4%
Design	Historic Districts	4	1.6%
Replacement	Percent of tree canopy that is over 50%	7	2.8%
	Total	250	100.0%



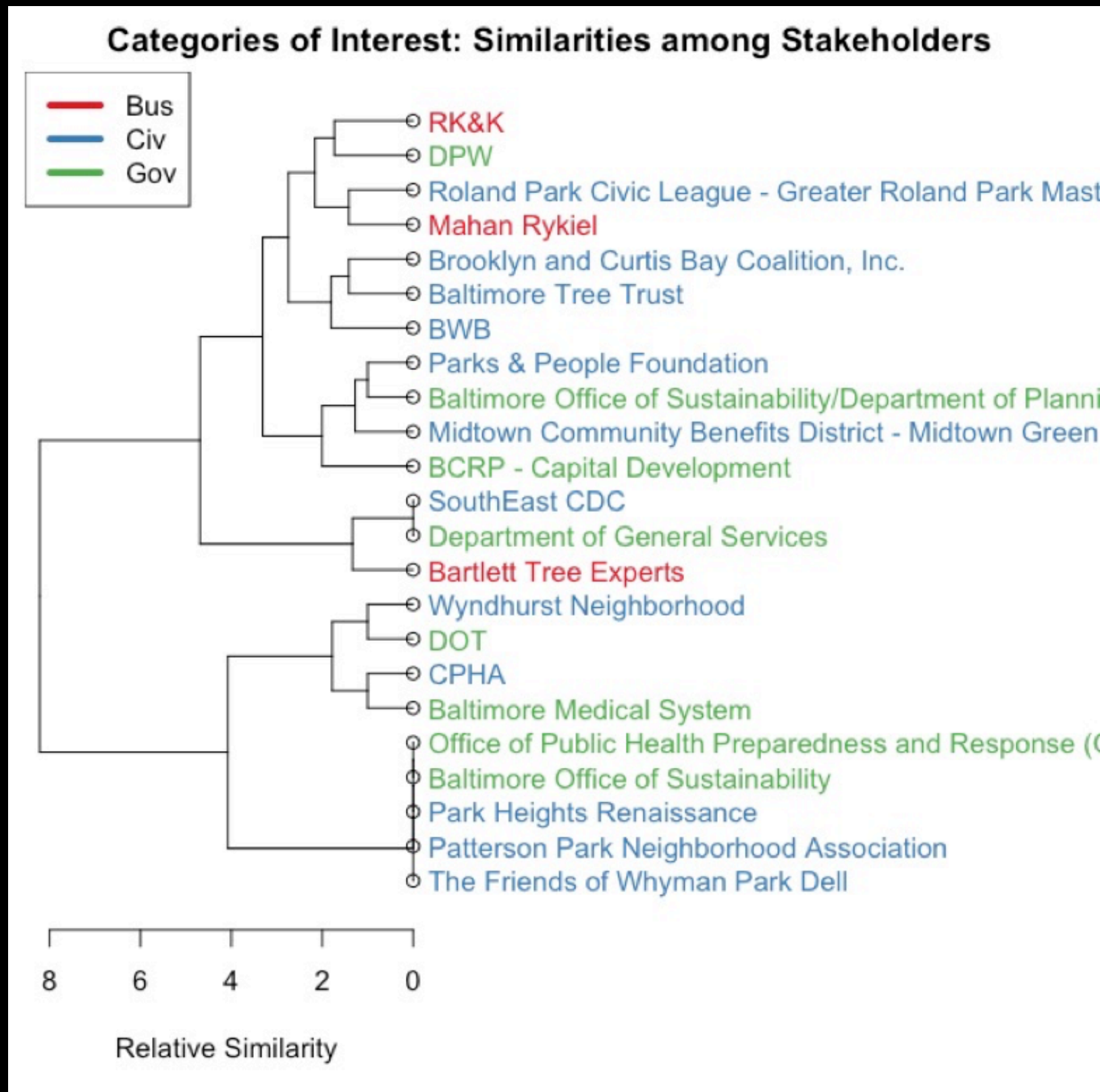
Types of Goals



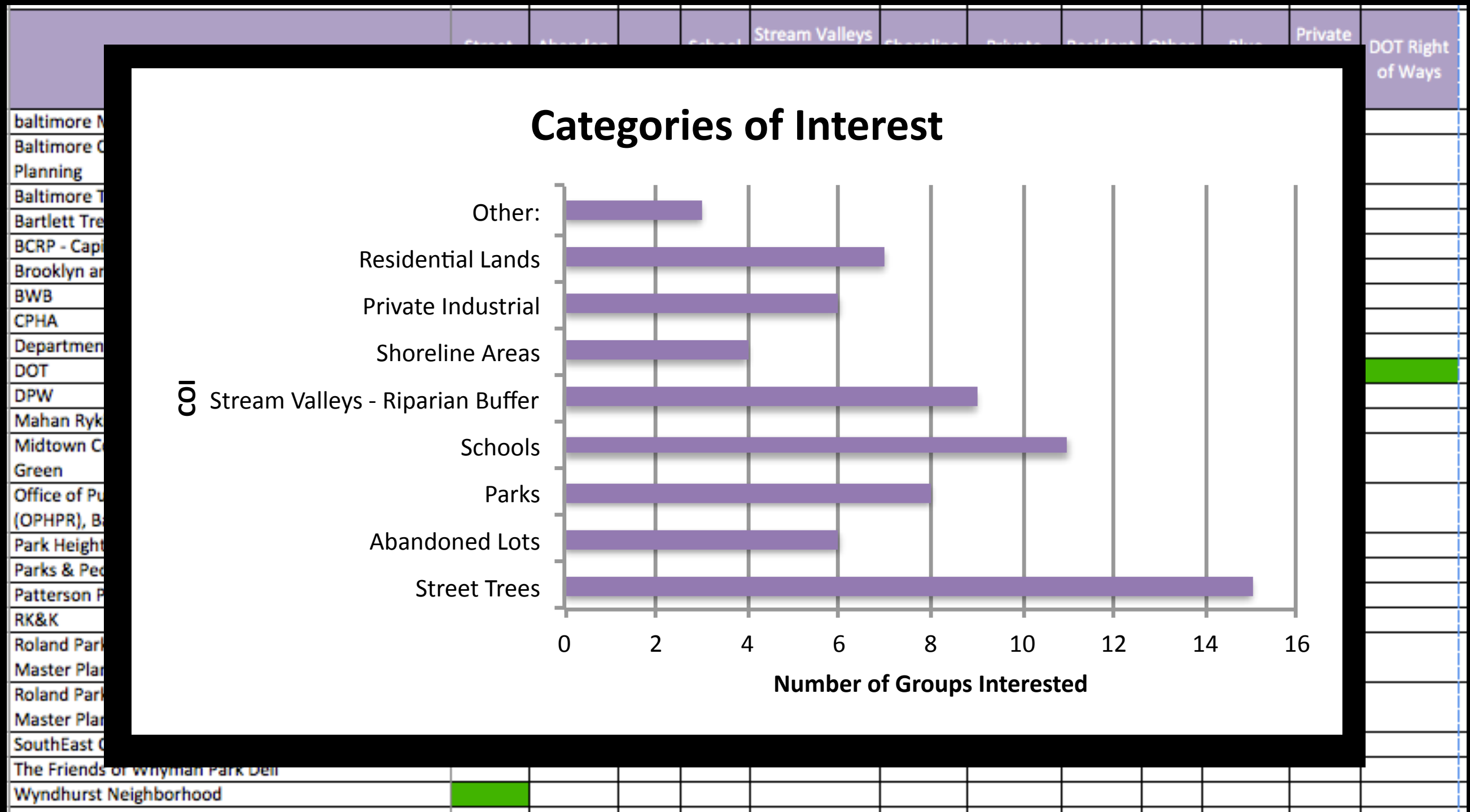
Types of Stewardship

[illegible]

Types of Stewardship



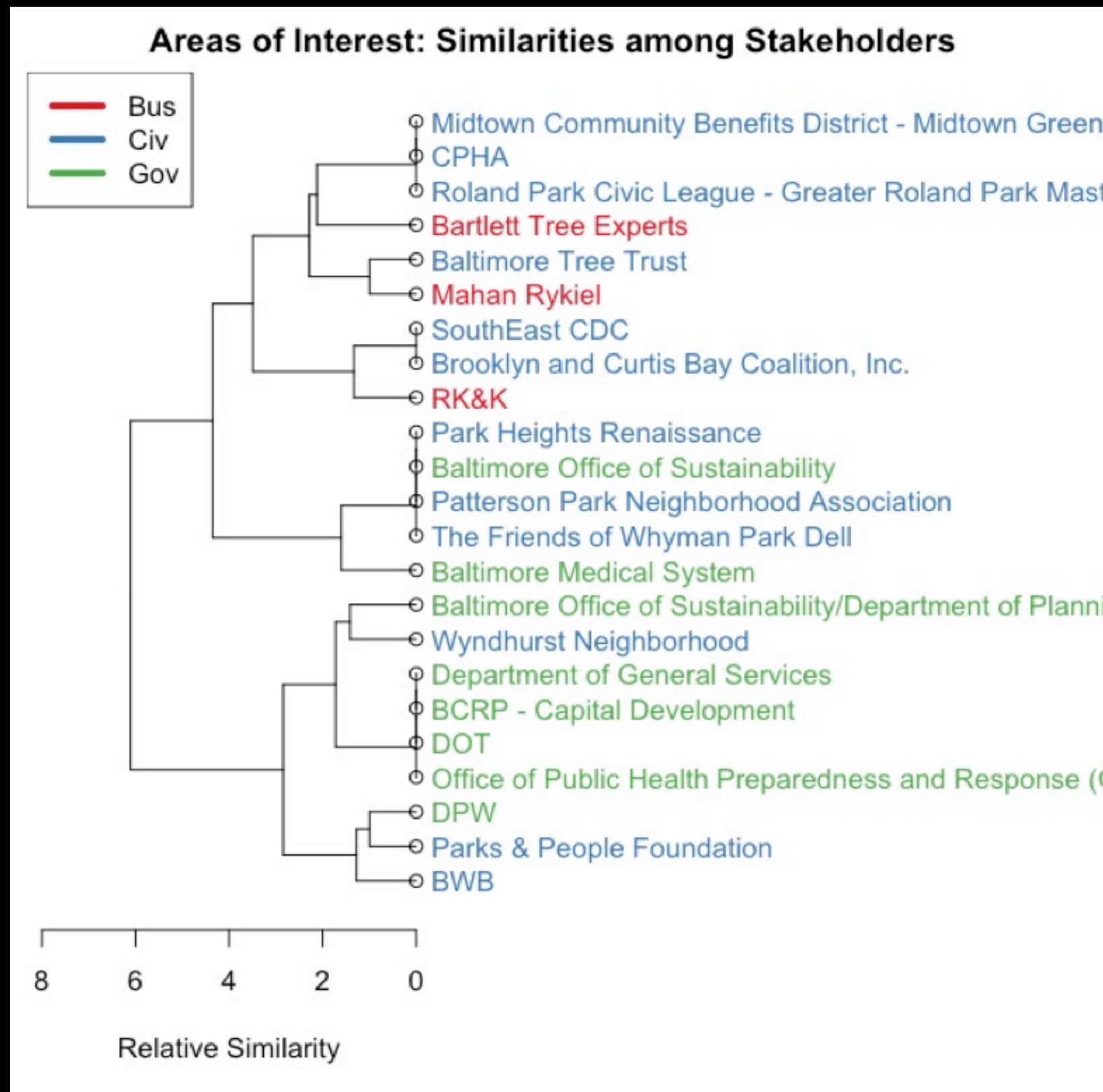
Types of Stewardship



Units of Stewardship

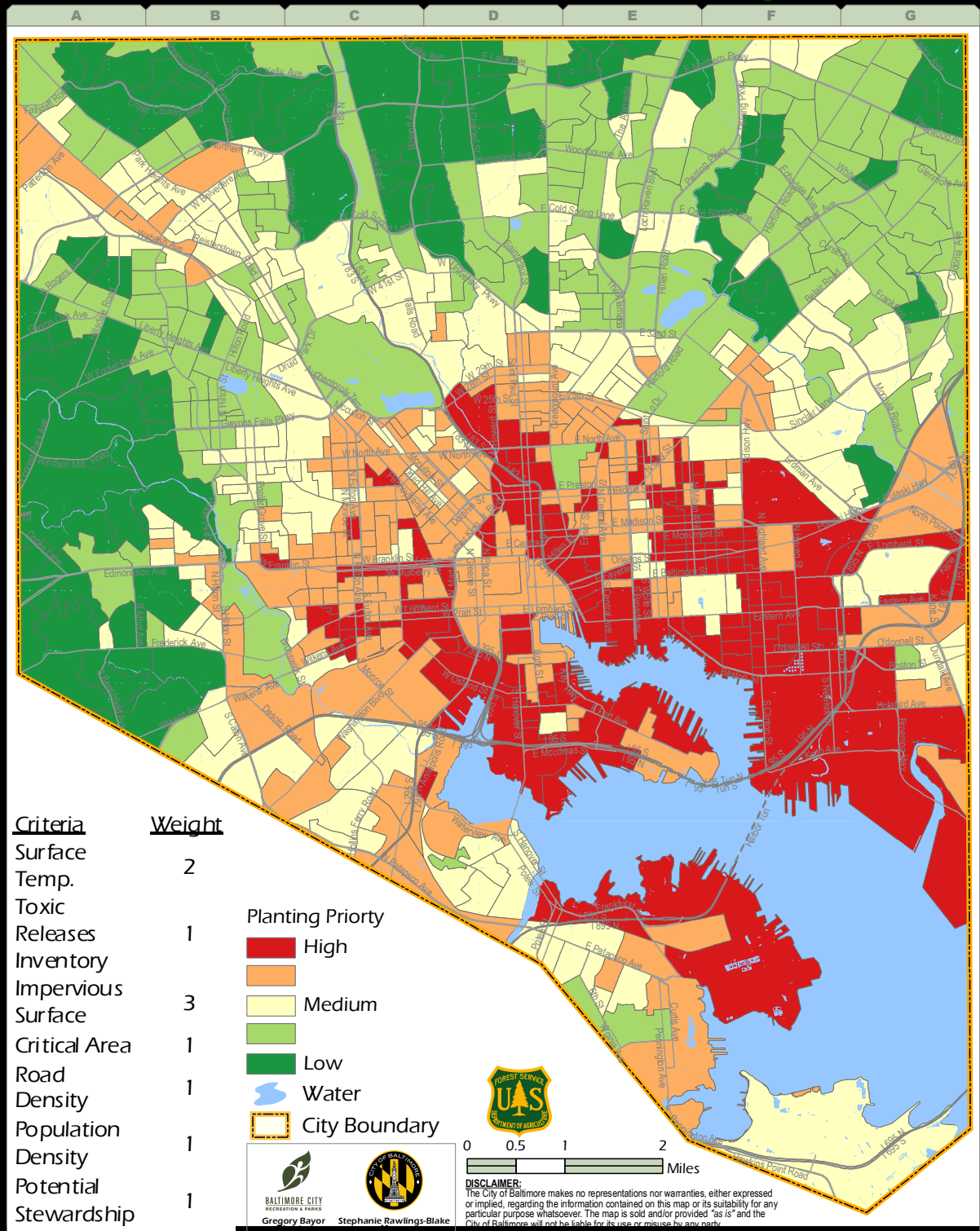
[illegible]

Units of Stewardship

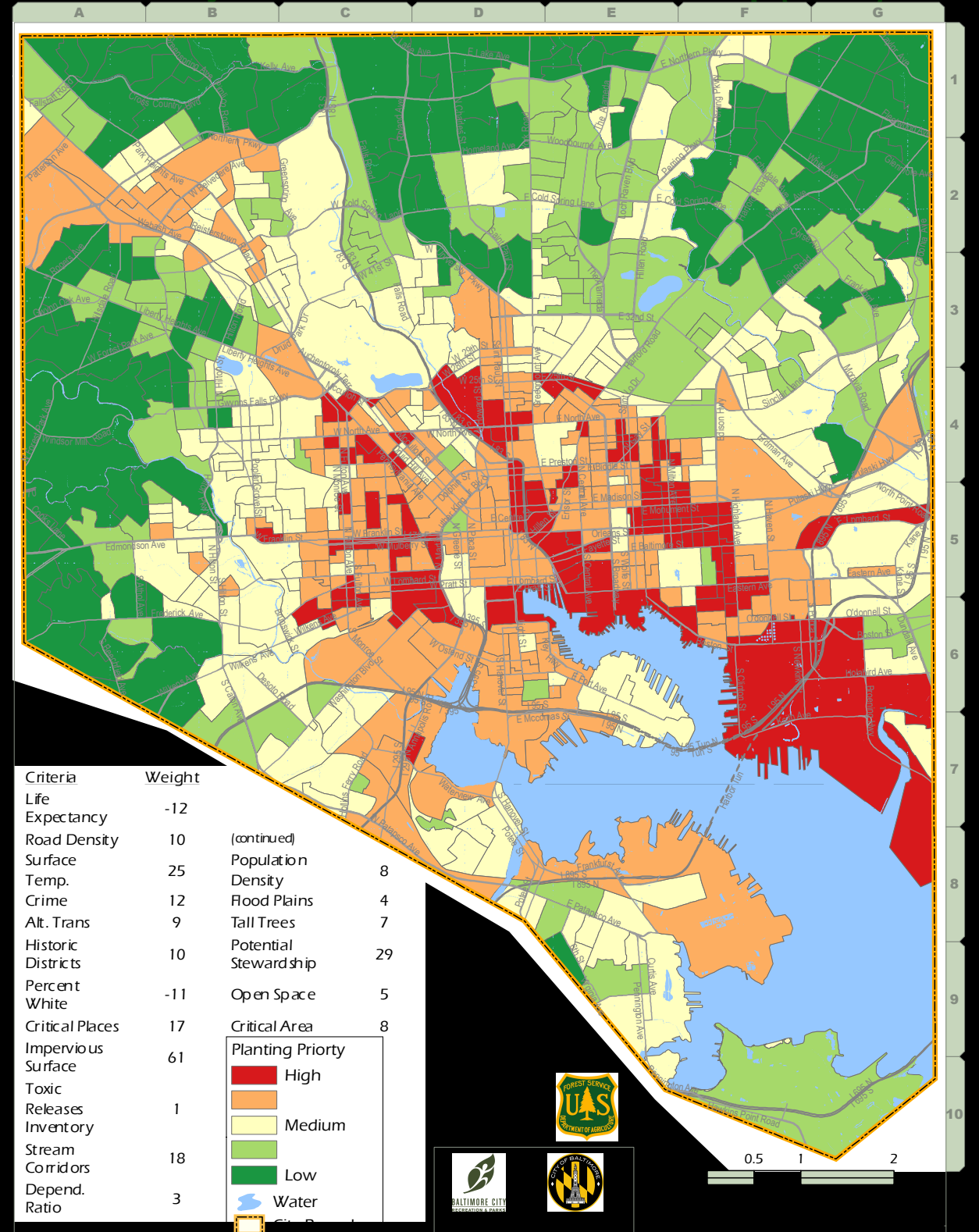


Places of Stewardship

Planting Priority Designed by Abby Cocke,
Baltimore Office of Sustainability



Summary Baltimore UTC Prioritization Map (Draft)



Applications

- Linkages to Municipal Programs: *the obvious* — Water and Air Quality—and *not not so obvious* — Public Health and Safety, and Community Development
- Program Implementation
- Grant Writing
- Off-site Mitigation

Future Research

- Transition from Prototype to Enterprise
- Additional Goals / Ecosystem Services
- Spatial Complexity: connectivity, configuration
- Quantification of Ecosystem Service Production:
 - * Regulatory Compliance
- Bird's Eye versus Worm's Eye Views
 - * Landscape view versus Parcel view

Conclusion

- Collaborative tool for promoting ecosystem services: goals, types, units, places
- Growing community of practice: it's not just a tool, it's how you use it.
- Responds to clients' needs
- A business focus: promoting collective effectiveness and efficiency

Thank you ...

