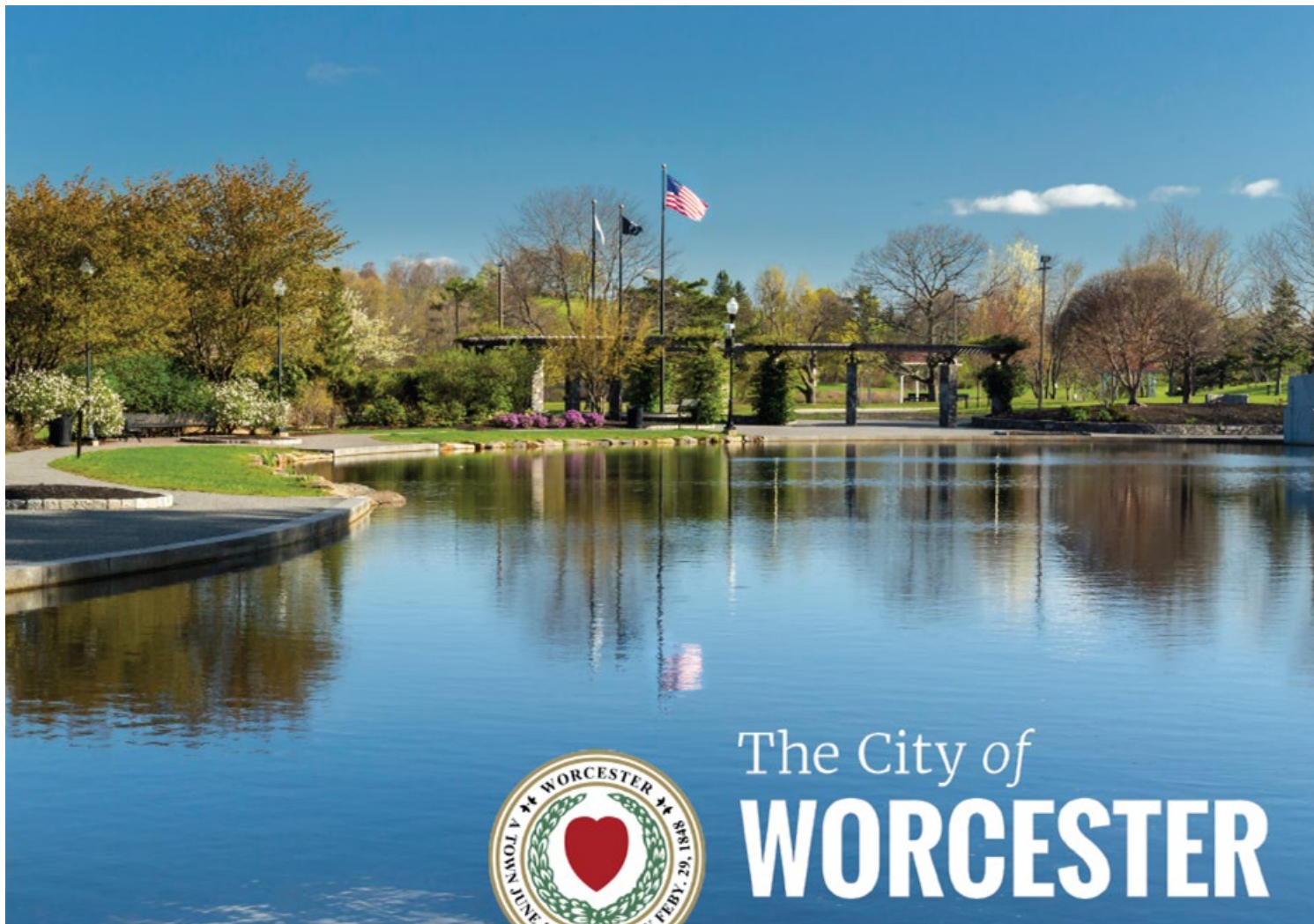


WORCESTER URBAN FOREST MASTER PLAN

Worcester Parks &
Recreation Commission
04 May 2023



The City of
WORCESTER

URBAN FOREST MASTER PLAN



The City of
WORCESTER

DAVEY 
Resource Group

Project Team

City of Worcester

Rob Antonelli, Jr., Assistant Commissioner, DPW and Parks

Brian Breveleri , City Forester

Cesar Valiente , Construction Project Manager



The City of
WORCESTER

Consultant Team

Davey Resource Group

Kerry Gray, Principal Consultant

Moriah Day, Associate Consultant

Ashley McElhinney, Planner



About Davey Resource Group, Inc.



Recognized industry leader in providing professional urban forestry services to communities across the United States.

400 +

Community Urban Forest Plans Developed

1 Million +

Trees Inventoried each year

History

Part of the employee-owned Davey Tree Expert Company.
Expertise and knowledge rooted in a tree care company **founded over 140 years ago** .

210+

Urban Tree Canopy Assessments

TreeKeeper

DRG's Inventory & Tree Canopy
Management Software

500+

Current TreeKeeper & Tree
Keeper Canopy Clients

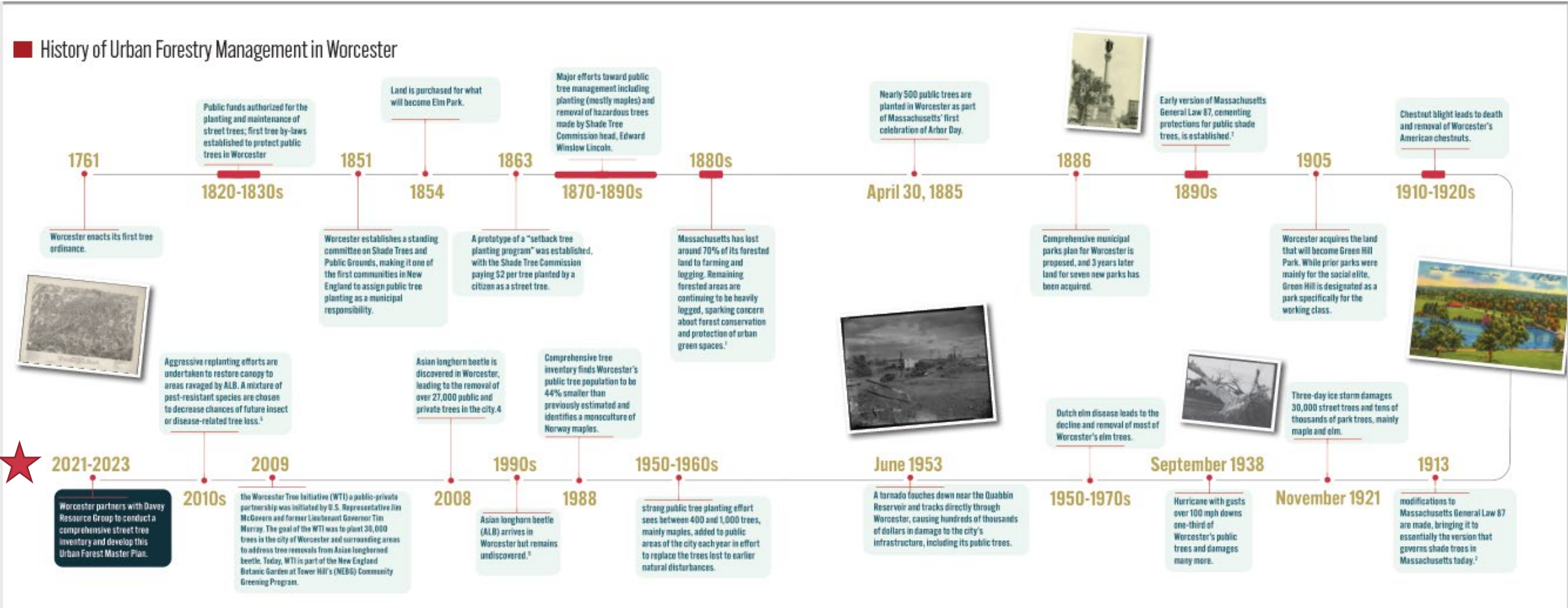
A scenic view of a golf course entrance. In the foreground, a calm pond reflects the sky and the surrounding landscape. A stone archway spans across the middle ground, with an American flag on a tall pole to its right. The background is filled with lush greenery, trees, and a clear blue sky with a few clouds. The overall atmosphere is peaceful and well-maintained.

Section One

INTRODUCTION

Legacy of Urban Forest Management in Worcester

History of Urban Forestry Management in Worcester

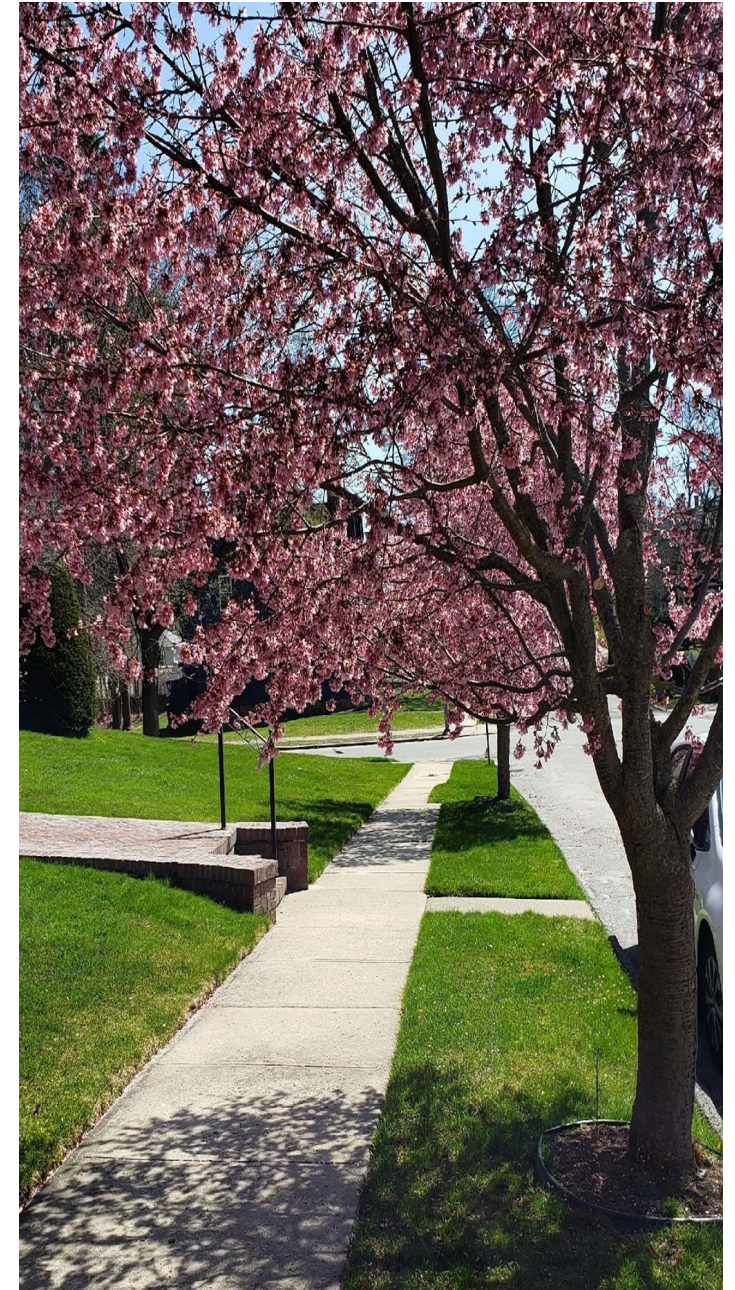


Urban Forest Master Plan

Why Plan?

Worcester's Urban Forest Master Plan serves as a **guiding document** to:

- **sustainably manage, maintain, and grow** Worcester's urban forest.
- maintain a **unified community vision** for the future of Worcester's urban forest.
- **maximize the benefits** that Worcester's trees provide.



Planning Process

How Are We Doing?

Measure Progress

- Use benchmarks and metrics based on best management practices & community priorities

How Do We Get There?

Recommendations & Strategies

- Identification of themes and priorities formed the basis of recommendations and strategies



What Do We Have?

Research, Review & Analysis

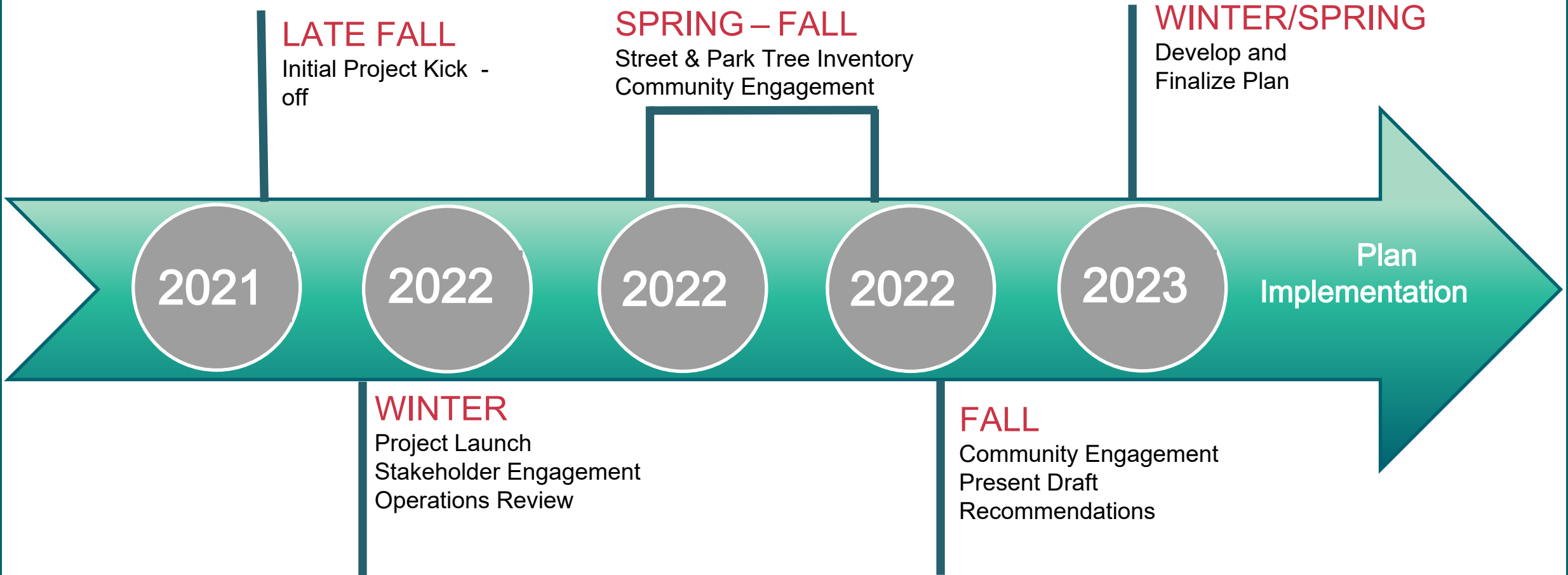
- Tree Inventory Data Analysis and City Plans and Document Review

What Do We Want?

Community & Stakeholder Engagement

- Stakeholder Focus Groups & Interviews
Community Meetings & Survey

Project Timeline





Section Two

THE STATE OF WORCESTER'S URBAN FOREST



Worcester's Urban Forest

What is It?

Urban Forest

All of the trees that surround us every day in Worcester

Public Trees

- Streets
- Parks and Natural Areas
- Other City-owned Property

Private Trees

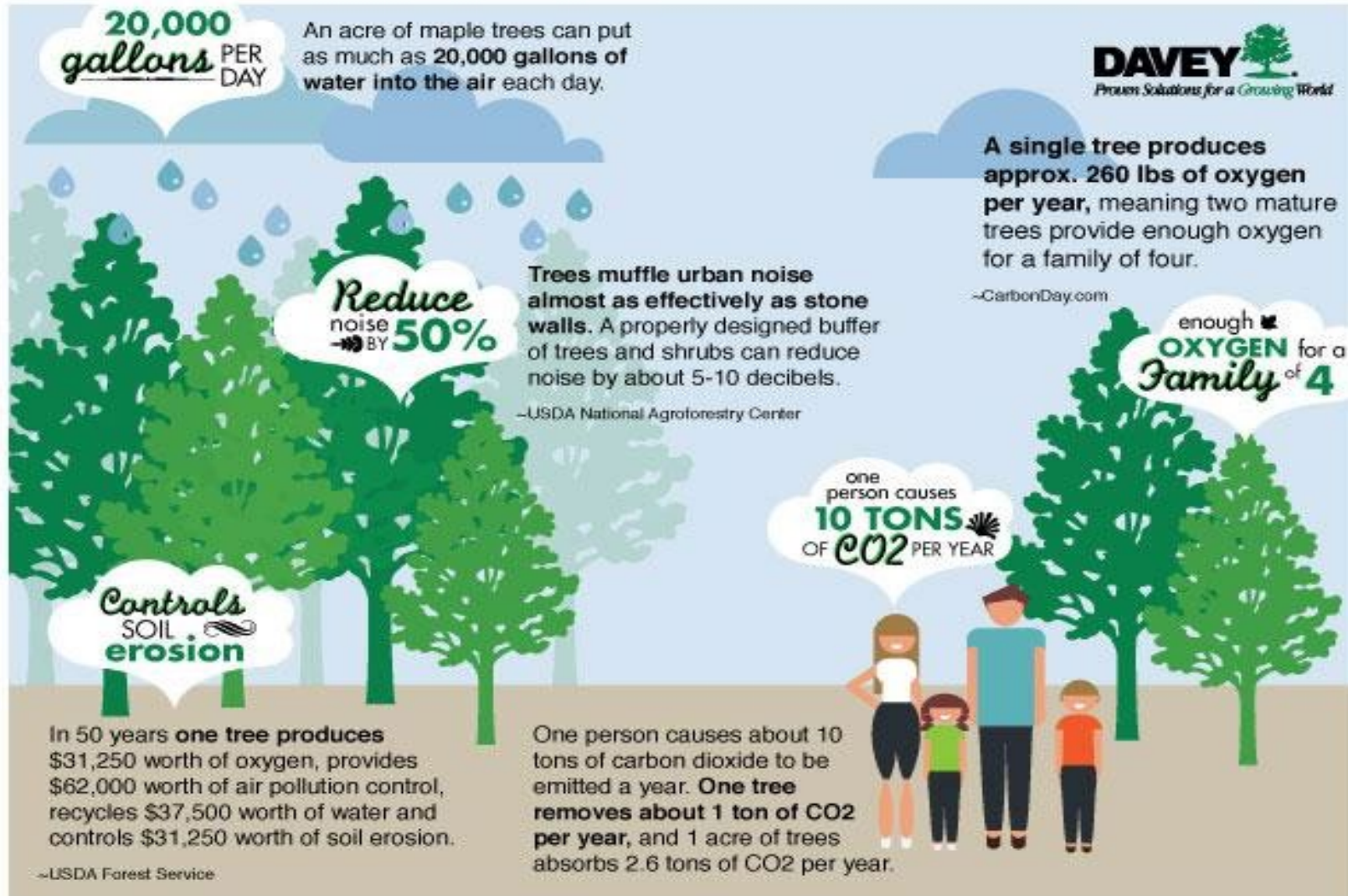
- Residential
- Commercial
- Industrial
- Institutions (colleges, universities, hospitals, etc.)



Photo: Worcester Polytechnic Institute wpi.edu

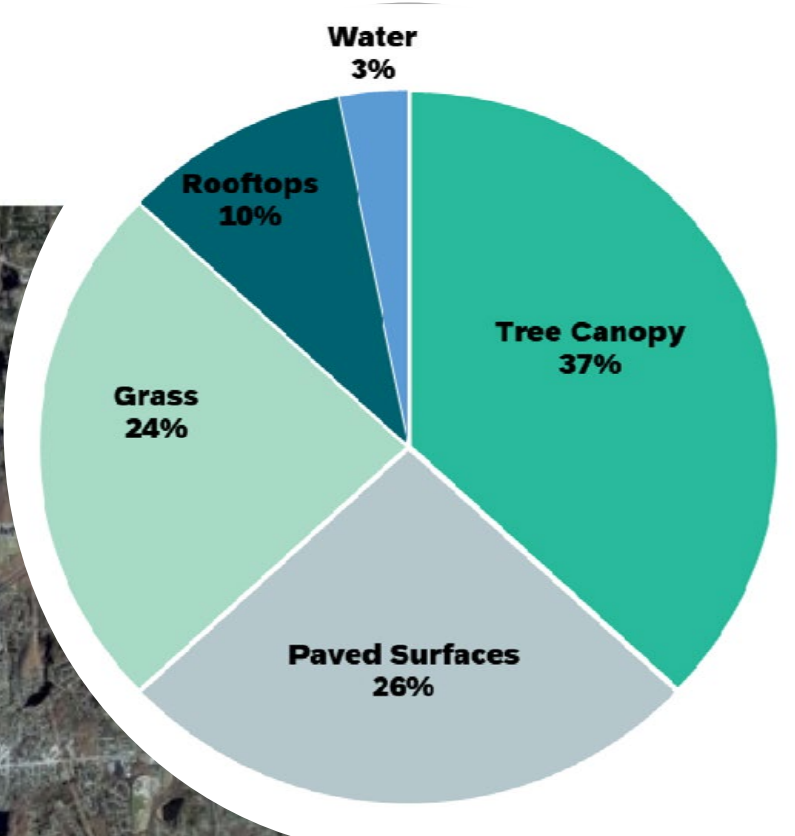
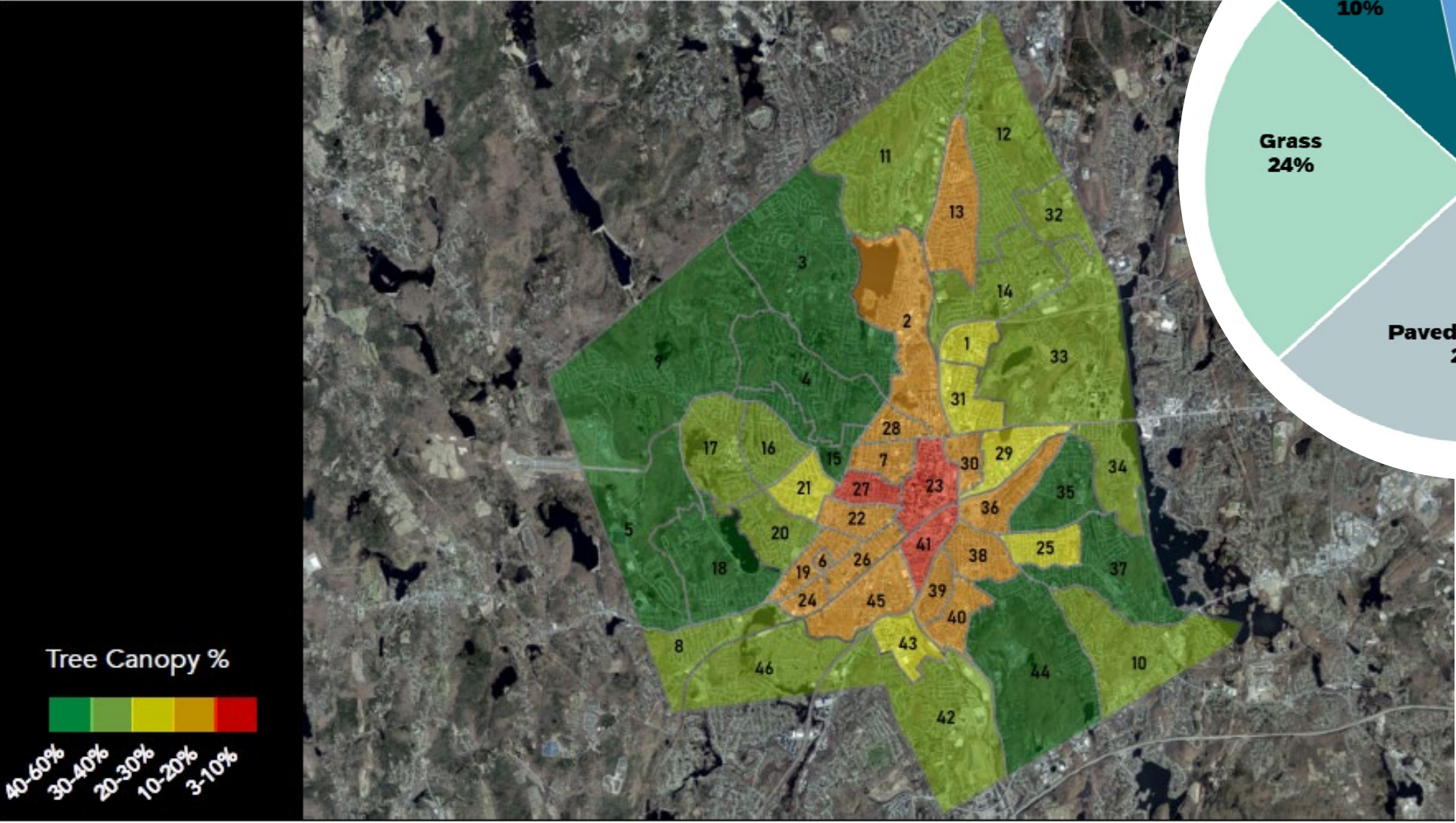
While the urban forest encompasses all the trees in the city — those on both public and private property — the plan focuses primarily on Worcester's public street trees .

General Benefits of Trees



What Do We Have?

Tree Canopy Cover: 37%



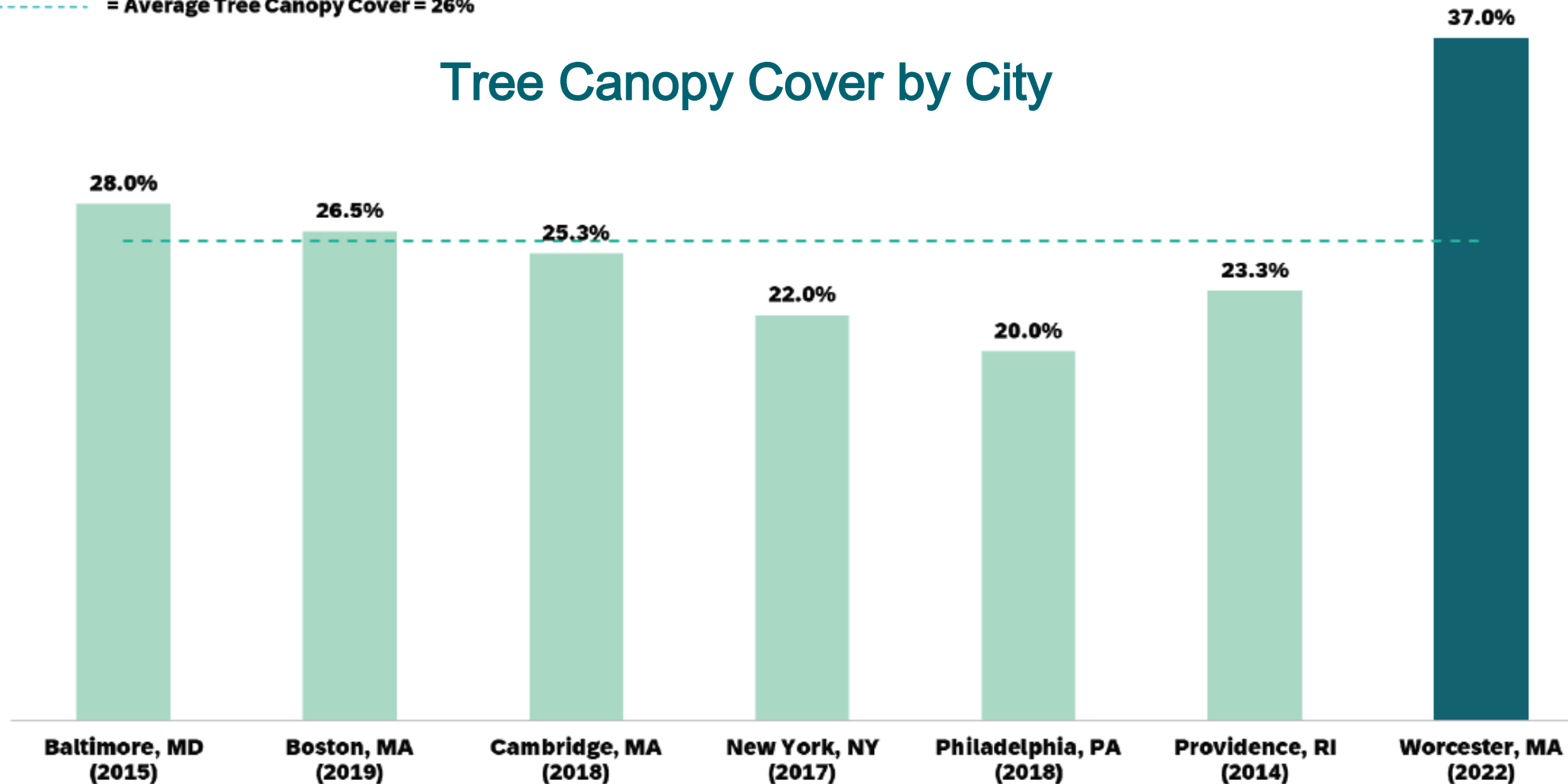
Source: Worcester Heat Risk Assessment (2022) conducted by Urban Climate Consulting for the Worcester Department of Sustainability and Resilience

What Do We Have?

Tree Canopy—How Does Worcester Compare?*

----- = Average Tree Canopy Cover = 26%

Tree Canopy Cover by City



*Note: This is for general comparison purposes only. The methodologies used to calculate tree canopy cover may differ between communities referenced and/or the information may be outdated.

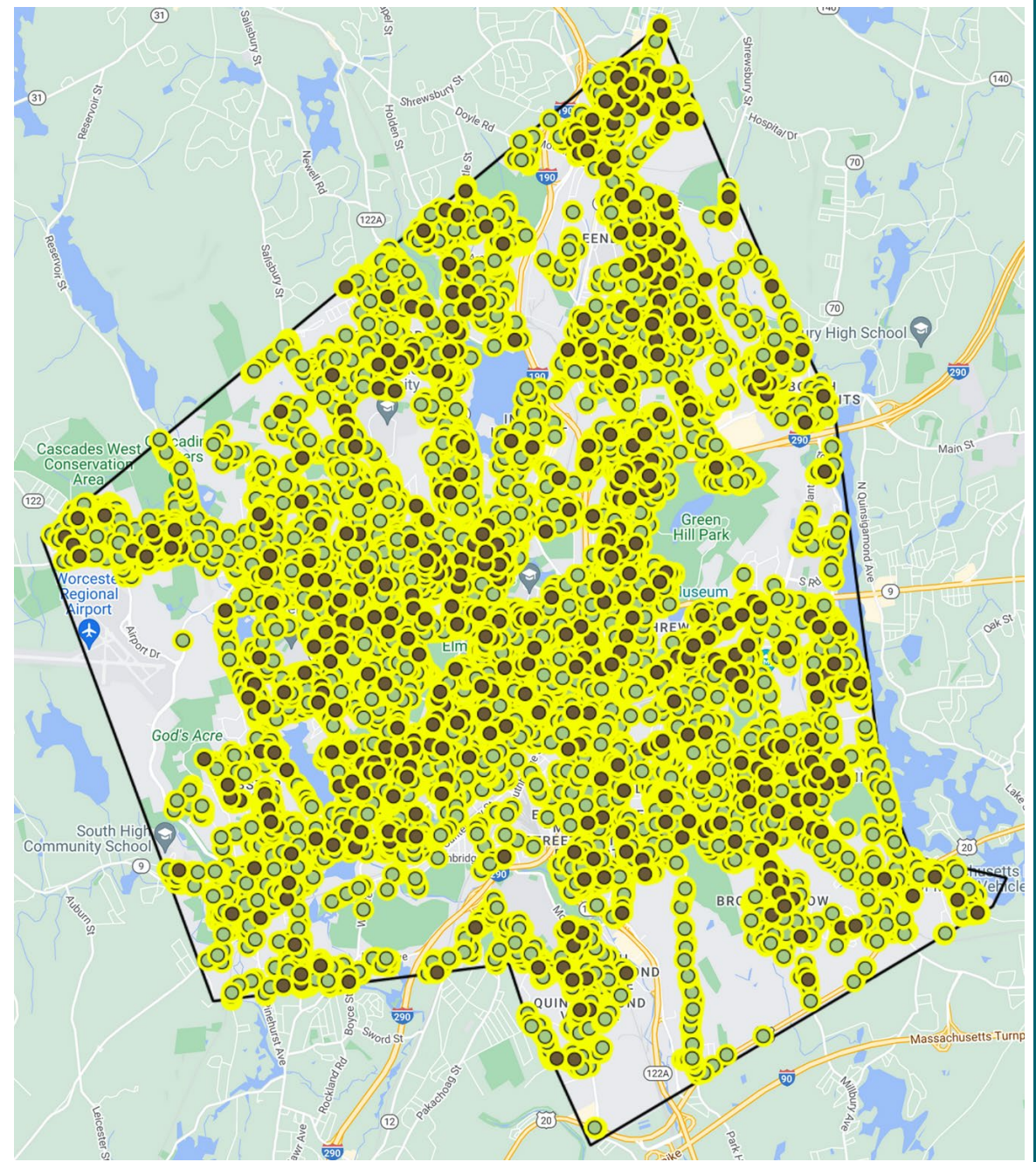
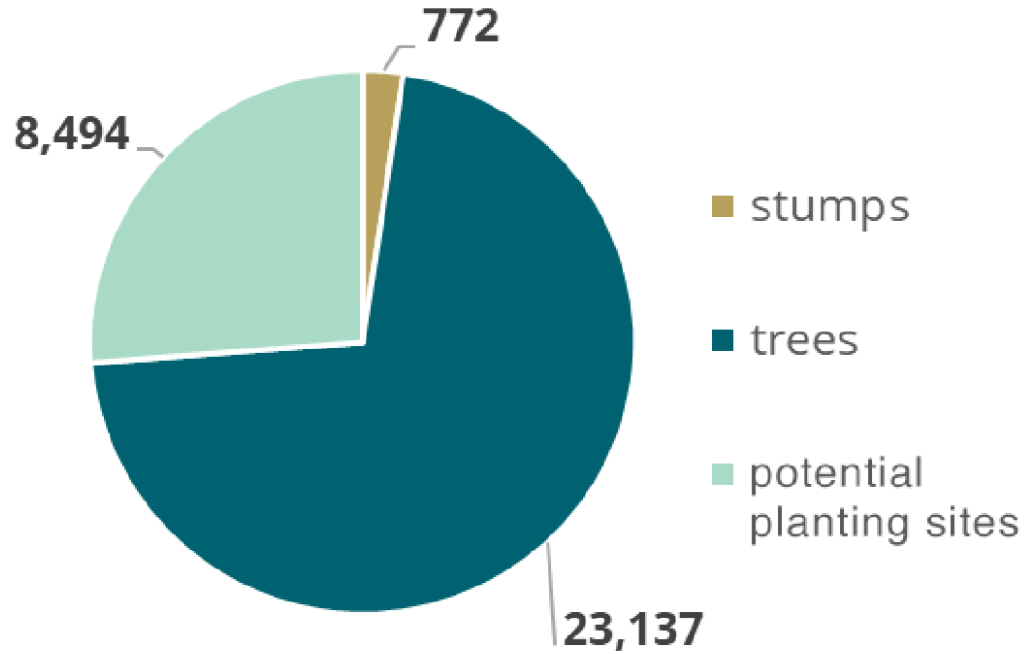


Street Tree Inventory

What Do We Have?

Tree Inventory Summary

Street Trees, Planting Sites, Stumps



What Do We Have?

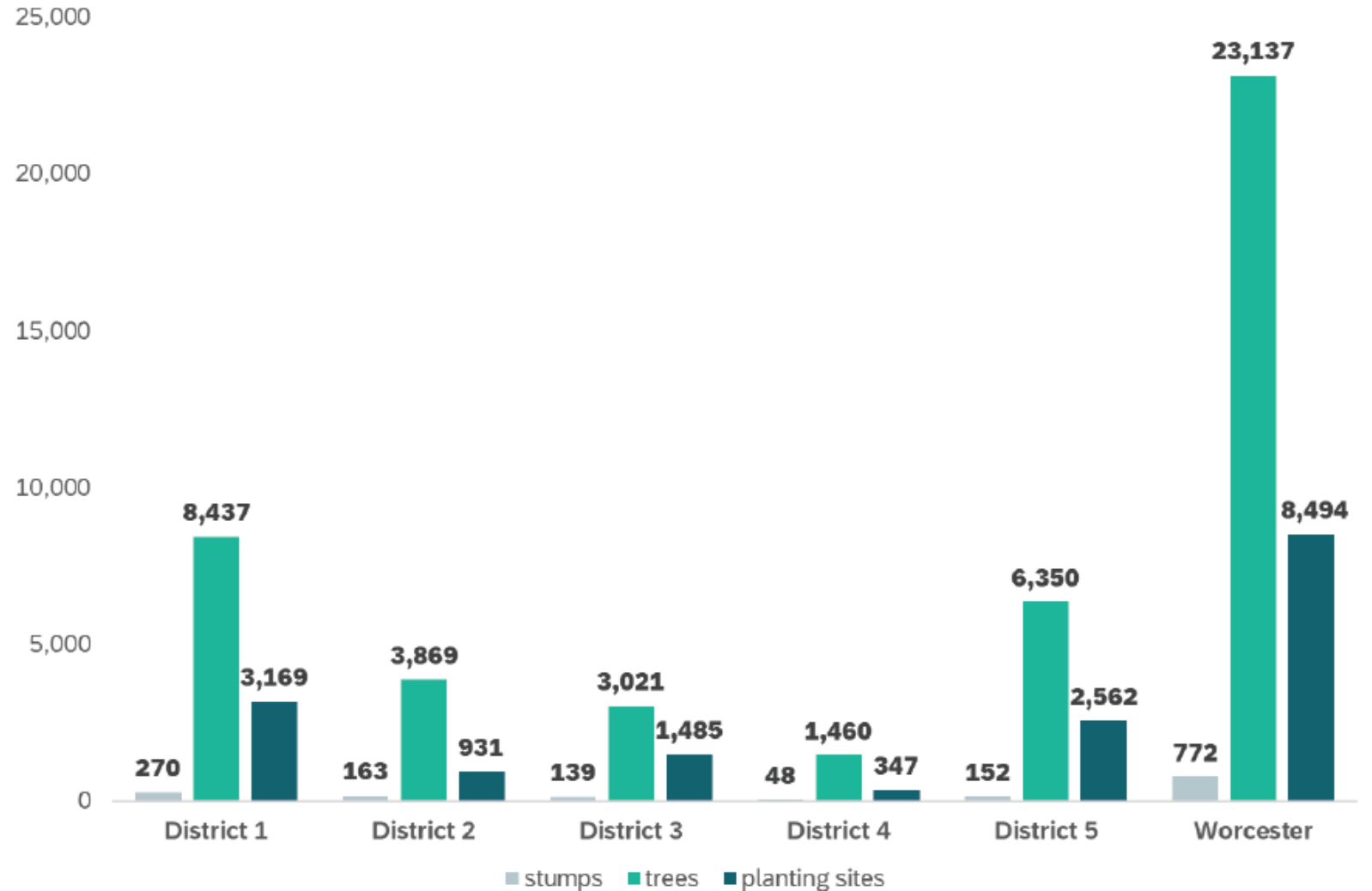
Tree Inventory Summary

Districts 1 & 5

- 64% of the inventoried trees
- 67% of the planting sites

District 4

- 6% of the inventoried trees
- 4% of the planting sites



What Do We Have?

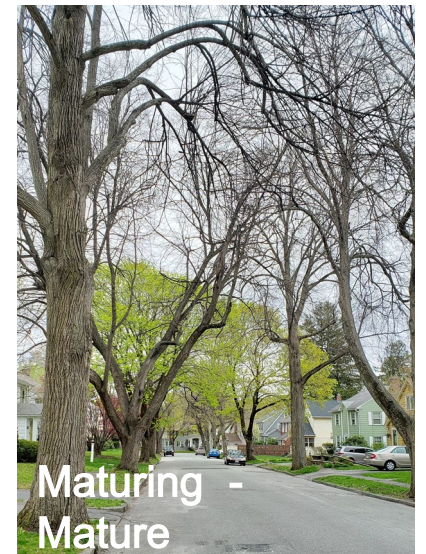
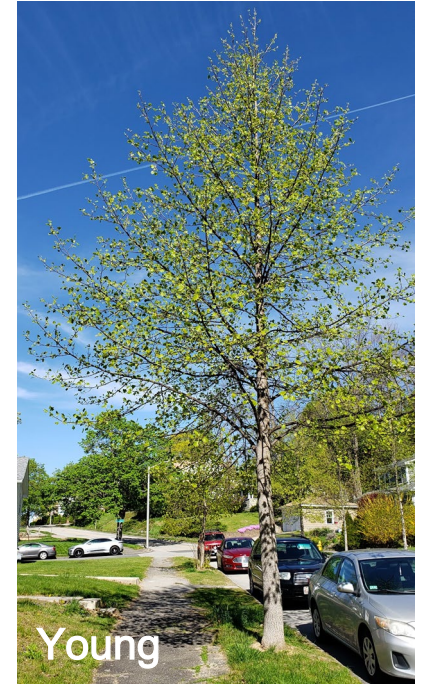
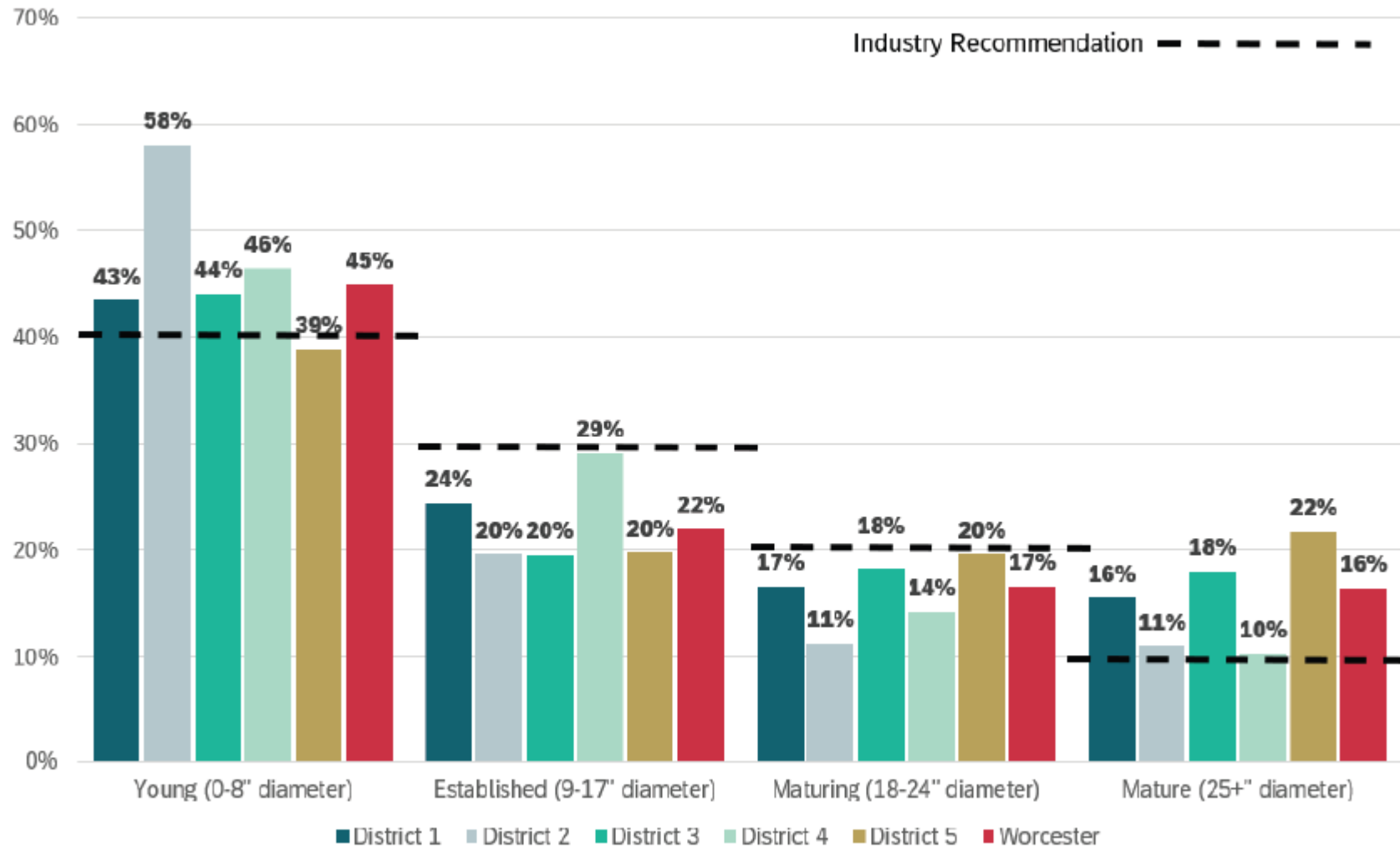
Tree Inventory Changes 2005-2022

	District 1	District 2	District 3	District 4	District 5	Worcester
Number of Trees - 2005	5,880	2,370	1,689	1,302	4,245	15,486
Number of Trees - 2022	8,437	3,869	3,021	1,460	6,350	23,137
% change from 2005 -2022	+43%	+63%	+79%	+12%	+50%	+49%
% trees per district 2022	36%	17%	13%	6%	27%	100%
Trees per public street mile 2022	72	33	36	24	55	47

More public street trees in 2022 than in 2005
Increase in trees in all Districts
Disparity in trees per street mile by District

What Do We Have?

Street Tree Size/Age



What Do We Have?

Tree Inventory Summary

Street Tree Diversity

	2005			2022		
	Species	Count	Percent of Total Population	Species	Count	Percent of Total Population
1	Norway maple (<i>Acer platanoides</i>)	9,364	60%	Norway maple (<i>Acer platanoides</i>)	6,522	28%
2	Sugar maple (<i>Acer saccharum</i>)	1,346	9%	Cherry (<i>Prunus spp.</i>)	1,700	7%
3	Red maple (<i>Acer rubrum</i>)	1,029	7%	Littleleaf linden (<i>Tilia cordata</i>)	1,161	5%
4	Silver maple (<i>Acer saccharinum</i>)	342	2%	Pin oak (<i>Quercus palustris</i>)	1,075	5%
5	Littleleaf linden (<i>Tilia cordata</i>)	335	2%	Honeylocust (<i>Gleditsia triacanthos</i>)	1,018	4%
6	Red oak (<i>Quercus rubra</i>)	327	2%	Red maple (<i>Acer rubrum</i>)	1,005	4%
7	Callery pear (<i>Pyrus calleryana</i>)	270	2%	Silver maple (<i>Acer saccharinum</i>)	820	4%
8	Pin oak (<i>Quercus palustris</i>)	265	2%	Red oak (<i>Quercus rubra</i>)	708	3%
9	White ash (<i>Fraxinus americana</i>)	225	1%	Northern white cedar (<i>Thuja occidentalis</i>)	671	3%
10	Japanese tree lilac (<i>Syringa reticulata</i>)	170	1%	Callery pear (<i>Pyrus calleryana</i>)	627	3%

What Do We Have?

Street Tree Condition

77% of Worcester's street trees are in fair condition or better

Small population of dead trees – dead trees should be removed

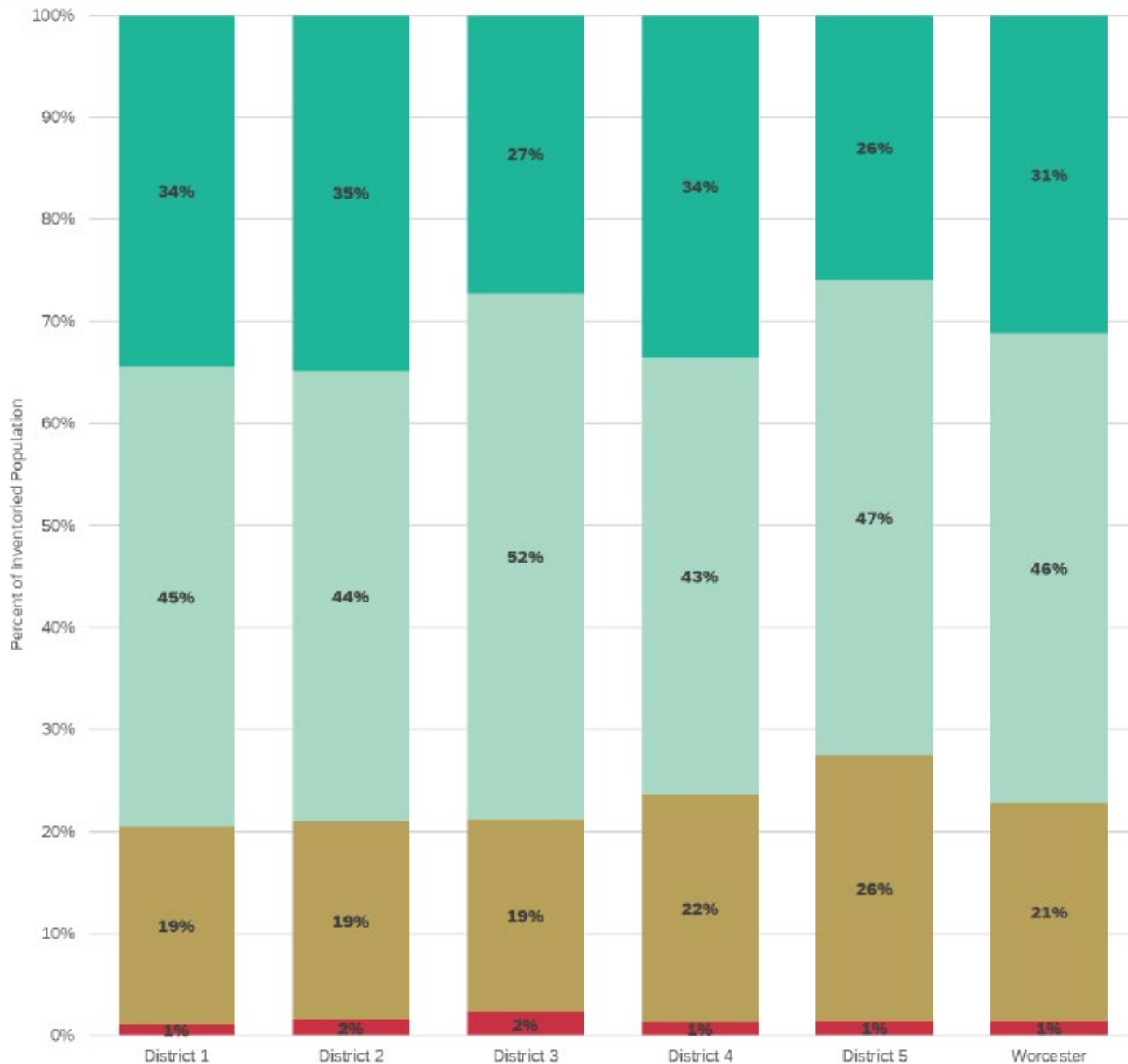
District 5 has 26% poor trees – likely related to tree age (more mature trees)

Good

Fair

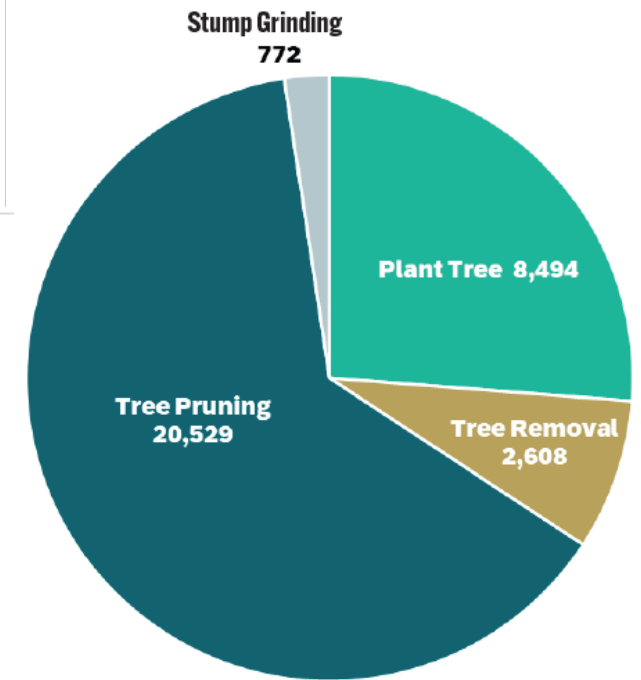
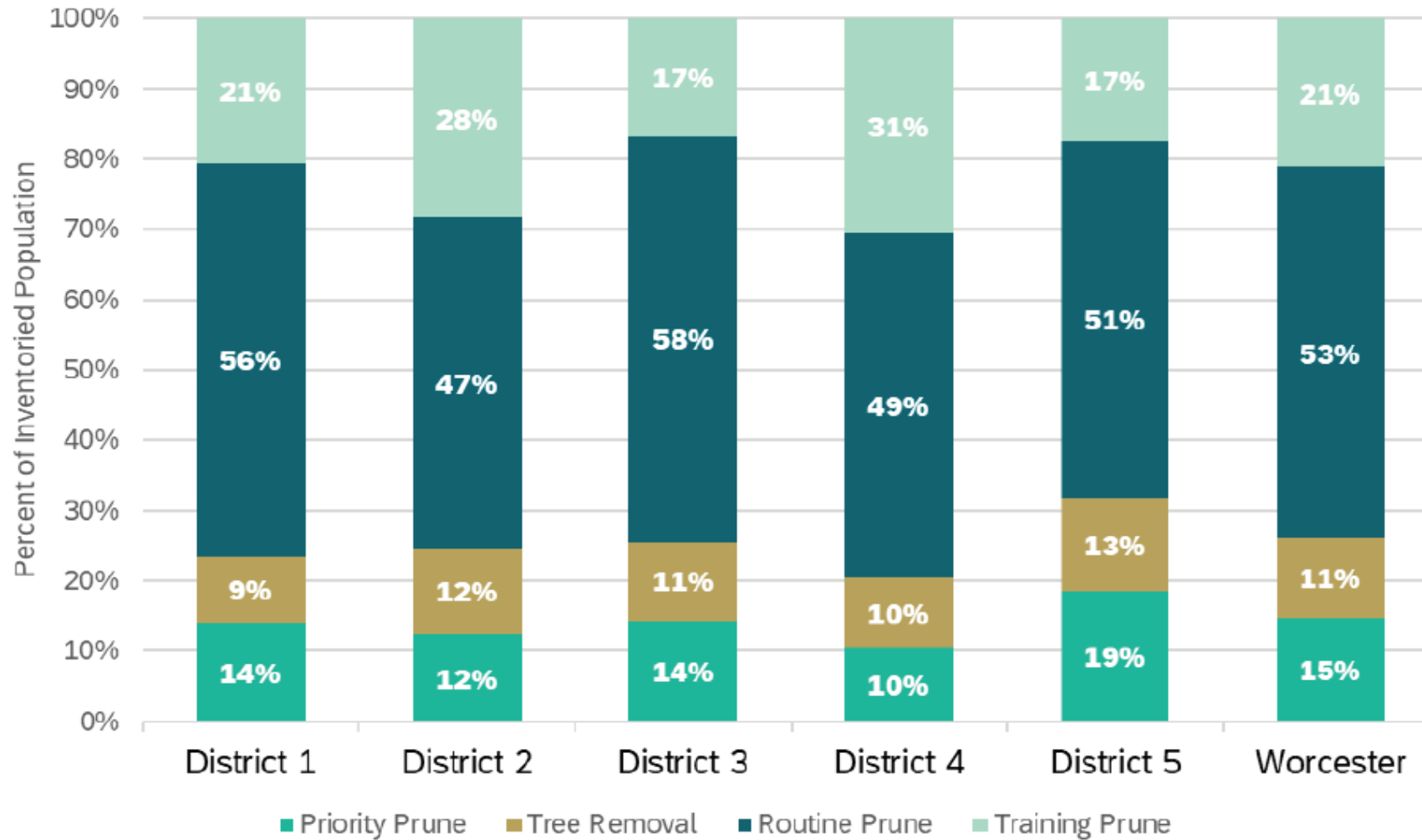
Poor

Dead



What Do We Have?

Street Tree Maintenance



Worcester (City -wide)

What Do We Have?

Street Tree Benefits

Carbon Storage

17,600+ tons of carbon captured and held in tree tissues

Carbon Sequestration

Sequester (absorb) 181 tons of carbon each year.

Stormwater

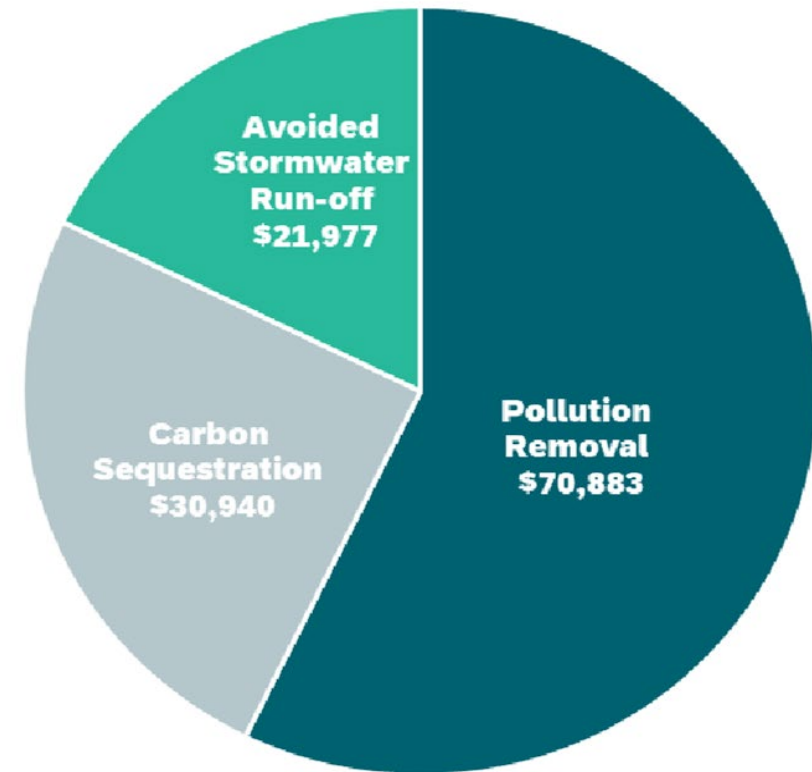
Intercept and absorb 2,457,237 gallons of rainwater per year

Air Quality

Remove 8,080 pounds of airborne pollutants and particulate matter each year.

Replacement Value

(cost to replace all inventoried street trees with a similar tree) is **\$39.7 million**



Section Three

MANAGING WORCESTER'S URBAN FOREST



Urban Forestry Program Assessment

Indicators of a Sustainable Urban Forest

Program assessment tool based on industry standards and best management practices

Worcester's Overall Assessment

The Trees & Urban Forest: *MODERATE*

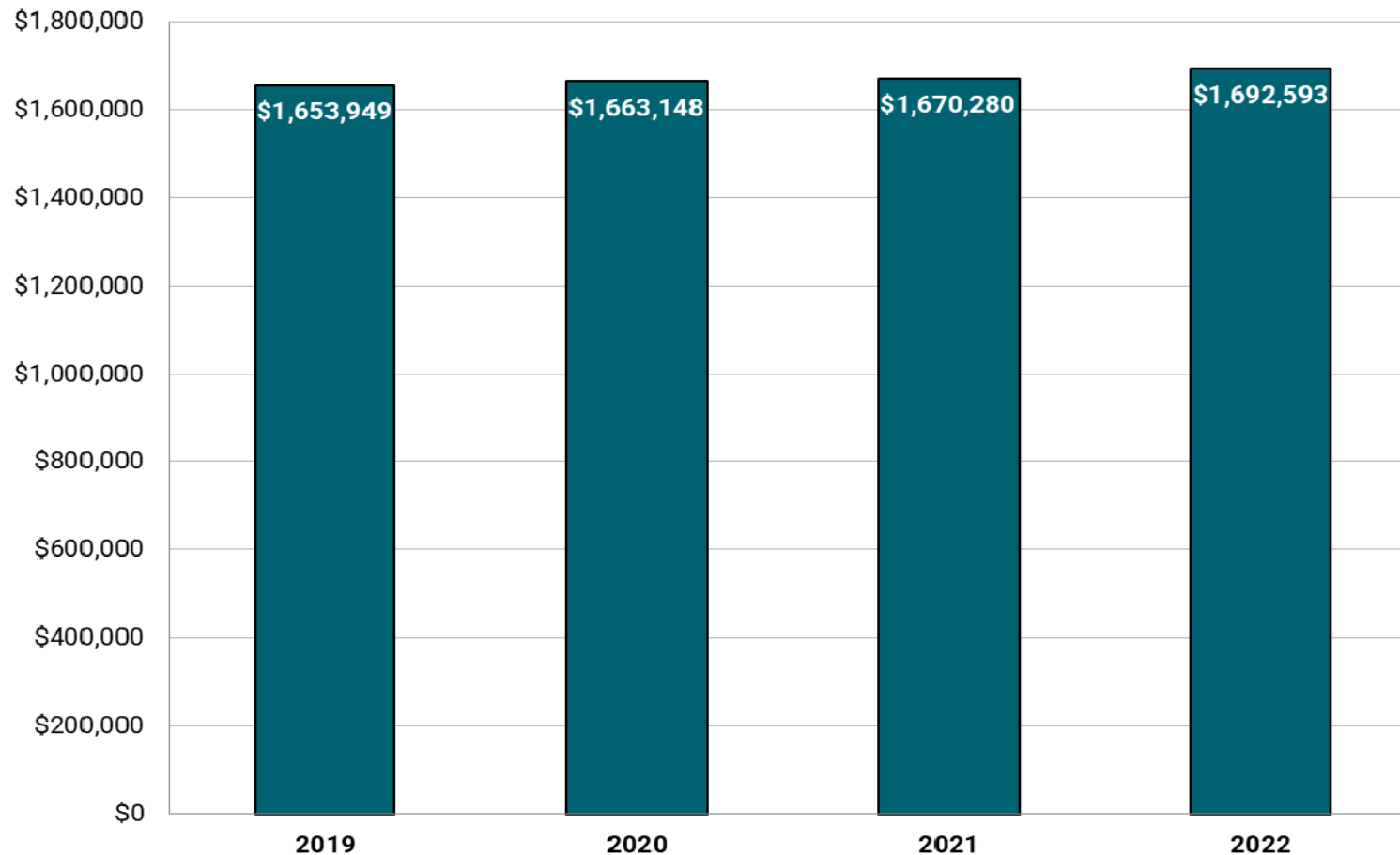
The Community & Stakeholders: *LOW-MODERATE*

The Management Approach: *MODERATE*

Indicators of a Sustainable Urban Forest		City of Worcester Assessed Performance Level		
		Low	Moderate	High
The Trees & Urban Forest	Tree Inventory		High	
	Canopy Assessment		Moderate	
	Management Plan	Low		
	Risk Management Program	Low		
	Maintenance of Publicly -Owned Trees (ROWs)	Low		
	Maintenance of Publicly -Owned Natural Areas	Low		
	Planting Program		Moderate	
	Tree Protection Policy	Low		
	City Staffing and Equipment		Moderate	
	Funding		Moderate	
	Disaster Preparedness & Response	Low		
The Community & Stakeholders	Communication		Moderate	
	Urban Tree Canopy	Low		
	Equitable Distribution		Moderate	
	Size/Age Distribution		High	
	Condition of Public Trees - Streets, Parks		High	
	Condition of Public Tree - Natural Areas	Low		
	Trees on Private Property	Low		
	Species Diversity		High	
The Management Approach	Suitability		Moderate	
	Neighborhood Action	Low		
	Large Private and Institutional Landholder Involvement	Low		
	Green Industry Involvement	Low		
	City Department/Agency Cooperation	Low		
	Funder Engagement		Moderate	
	Utility Engagement		Moderate	
	State Engagement		Moderate	
	Developer Engagement	Low		
	Public Awareness		High	
	Regional Collaboration		Moderate	

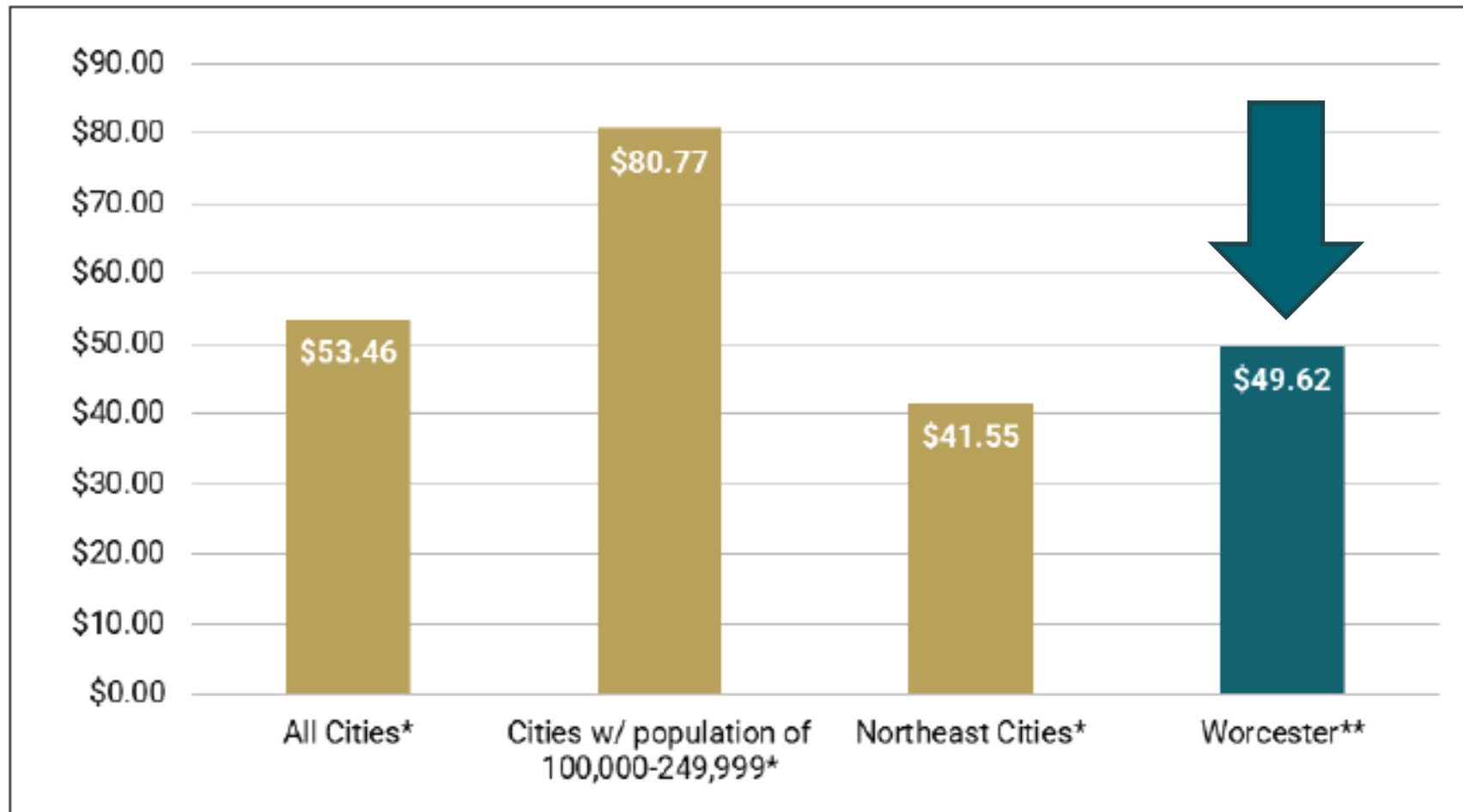
Urban Forestry Program Budget

Worcester's Urban Forestry budget, FY2019 -FY2022*



*Approximately 17% of Forestry's annual operating budget goes towards non-tree care and planting related activities, including leaf pick and biomass recycling.

Urban Forestry Program Budget Benchmarking



Worcester's per street tree spending is higher than other northeast cities and 7% lower than "All Cities" and 39% lower than cities with populations like Worcester.

*Data from: *Municipal Tree Care and Management in the United States: A 2014 Urban and Community Forestry Census of Tree Activities*. 2014 costs have been adjusted for inflation using the Oct 2022 Consumer Price Index.

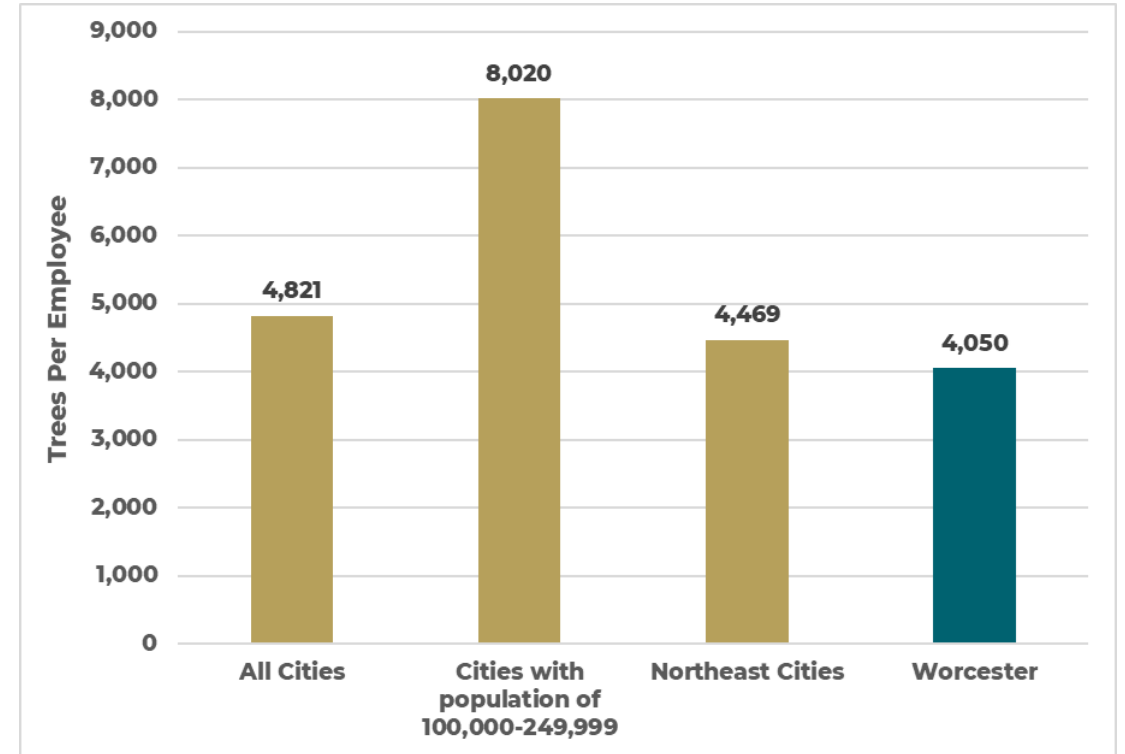
What Do We Have?

Staffing

Full Time Staff	Number of Budgeted Positions	Number of Vacancies	Current Duties
City Forester	1	0	Manages and administers Worcester's urban forestry program.
Foreman	1	0	Oversees crews, reviews service requests, creates, and delegates work assignments, conducts tree inspections, and supports City Forester
Working Foreman	2	0	Leads city tree crews and performs tree maintenance activities and supports Foreman and City Forester with assignments.
Tree Trimmers	6	1	Performs tree maintenance activities.

Worcester's Current Forestry Staffing
(as of October 2022)

Worcester is below the street trees per employee average .

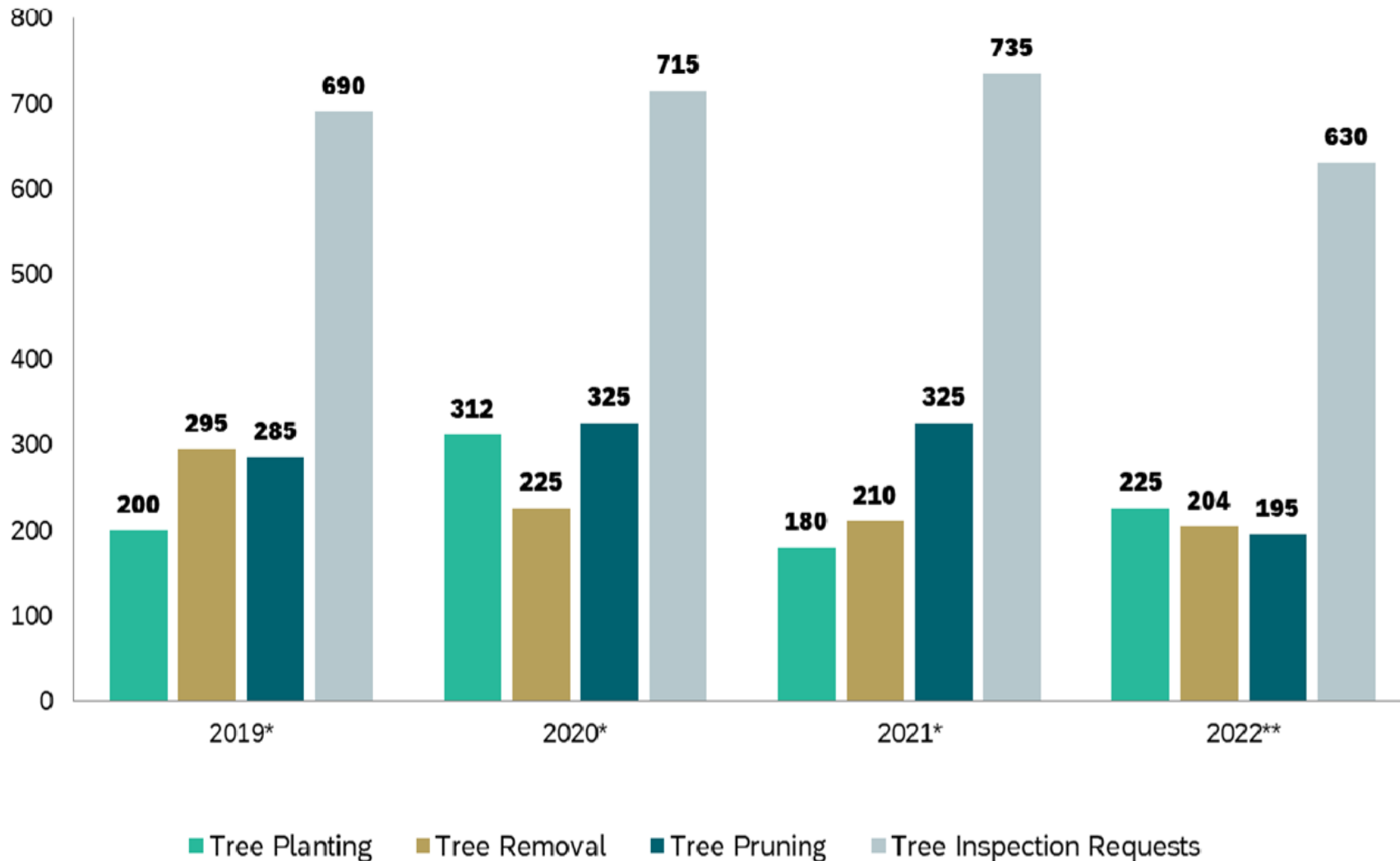


Street Trees Per Employee
Worcester* vs. 2014 Municipal Tree Census Respondents
*Tree Trimmers and Working Foreman

The Street Trees per Employee calculation does not take into consideration cities that contract out all or part of their street tree maintenance operations.

Urban Forestry Program

Tree Maintenance Activities By Year

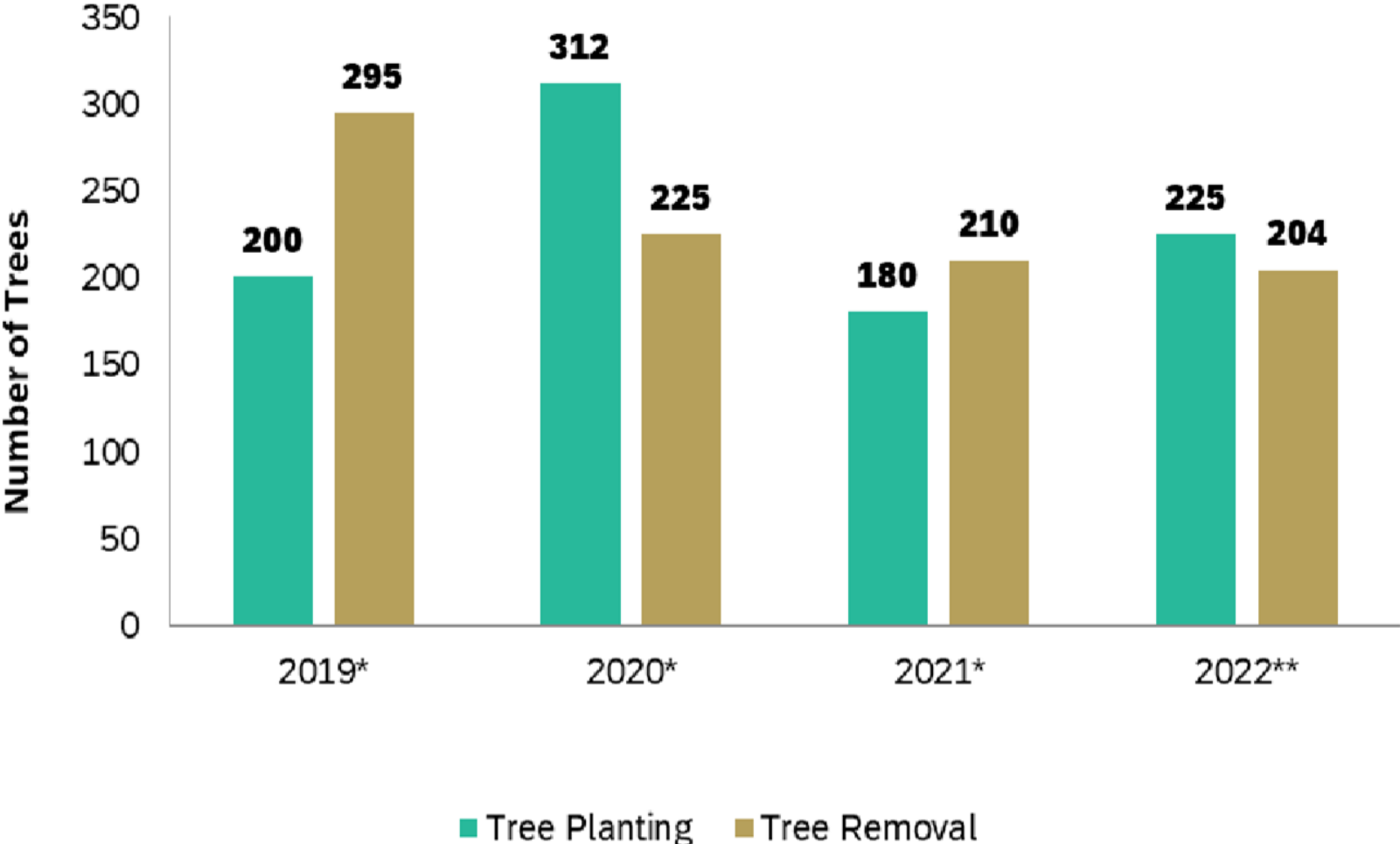


Due to limited resources Worcester's Forestry program is mostly reactive based - driven by resident requests, emergency work, and storm events.

On average each year Forestry:
Prunes (trims) 283 trees
Removes 234 trees
Plants 229 trees
Inspects 693 trees

Urban Forestry Program

Tree Planting & Removals



To achieve no net loss the number of street trees planted in Worcester should, at a minimum, equal the number of tree removed each year.

A scenic view of a river with a metal bridge, ducks, and autumn foliage. The bridge is made of metal and has a person walking on it. The river is blue and has several ducks swimming in it. The background is filled with trees in various shades of green and yellow, indicating autumn. The foreground has some yellow flowers.

Section Four

ENGAGEMENT & OUTREACH: THEMES & PRIORITIES

Urban Forest Master Plan

Public Engagement

City of Worcester

- Parks and Recreation
- Forestry
- Sustainability and Resilience
- Planning and Regulatory Services
- Public Works
- Human Rights

Community Survey

- Open May 1 – August 19, 2022
- 1,131 Responses

Community Open House Meetings

- June 1 and 2, 2022

Community Organizations

- New England Botanic Garden @ Tower Hill
- Worcester GreenCorp (Chamber of Commerce)
- Massachusetts Audubon Society
- Regional Environmental Council
- Greater Worcester Land Trust
- Clark University
- National Grid

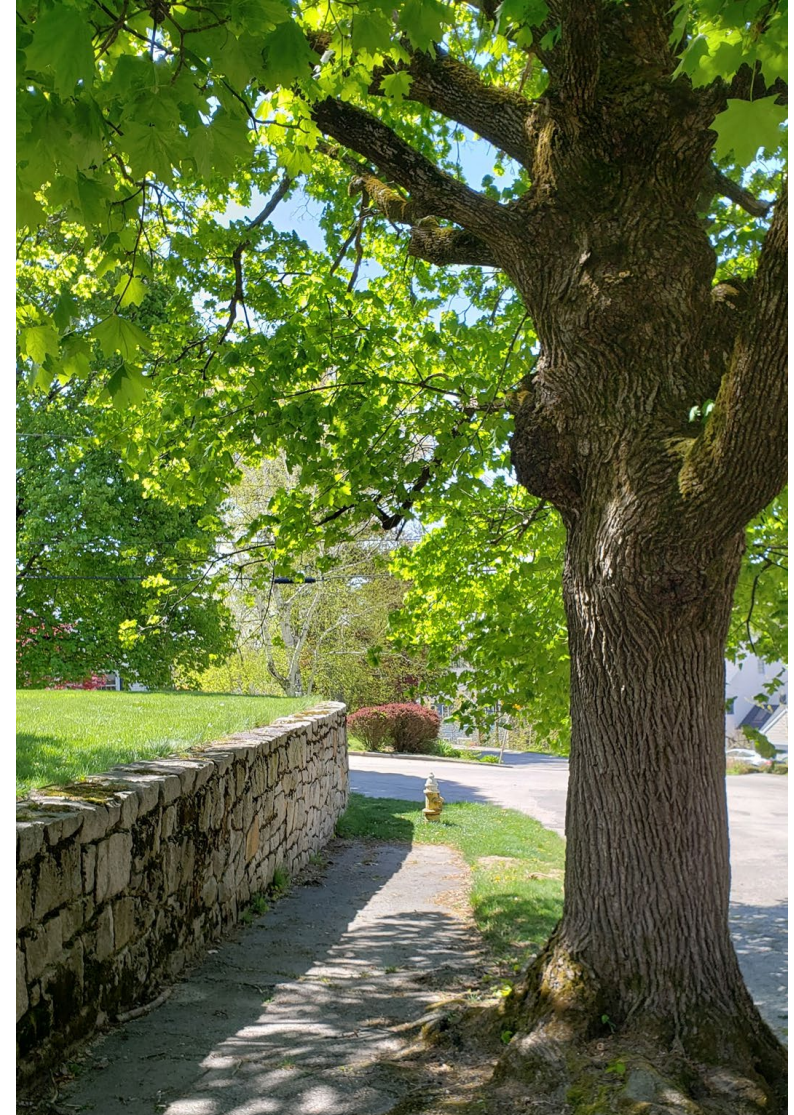
District Meetings

- September 21, 2022 – District #2
- September 22, 2022 – District #5
- October 17, 2022 – District #1
- October 19, 2022 – District #3
- October 20, 2022 – District #4

Urban Forest Master Plan

Public Engagement Themes & Priorities

- **Diverse community opinions around trees**
 - Value benefits particularly shading, beauty and cooling
 - Concerns about large trees
- **Tree Planting**
 - Increase street tree planting
 - Equity considerations
 - Right tree/right place
 - Space for trees
- **Public Tree Maintenance**
 - Need for proactive tree maintenance
 - Funding and Investment
 - Young tree establishment and care
- **Proactive Management**
 - No net loss in public tree canopy
 - Planning



Urban Forest Master Plan

Public Engagement Themes & Priorities

- **Sidewalks/Infrastructure**
 - Damage
 - Accessibility
 - ADA compliance
- **Standards**
 - Need for the development of urban forestry best management practices and standards
- **Tree Preservation and Protection**
 - Stronger regulations to preserve large trees
 - Requiring tree replacements for removal of trees
- **Ordinances/Regulations**
 - Revise ordinances
 - Increase tree planting requirements in/around parking lots
 - Limited staff to enforce ordinances



Urban Forest Master Plan

Public Engagement Themes & Priorities

- **Species Selection**
 - Promote use of native species
 - Consider a variety of factors during species selection, including form, invasive potential, climate resilience and wildlife benefits
- **Composition of city trees**
 - Aging tree canopy
 - Species diversity
- **Legacy of Asian longhorned beetle (ALB)**
 - Tree loss and replacement
 - Species selection



Urban Forest Master Plan

Public Engagement Themes & Priorities

- **Staffing and resources**
 - Increase staffing & resources for more proactive and responsive service
- **Interdepartmental coordination**
 - Process improvements
- **Communication, education and outreach**
 - Improved City communication around trees, forestry and decision making around tree activities
 - Outreach and education on topics including
 - Proper tree care
 - Benefits of trees
 - Rental property owner engagement
- **Partnerships**
 - Fostering and growing partnerships
 - Capacity building



A scenic park landscape featuring a pond in the foreground, lush green trees in the background, and several people, including children, near the water's edge. Two black lampposts with white globe lights stand on the left side of the image. The overall atmosphere is bright and sunny.

Section Five

GOALS, RECOMMENDATIONS & ACTION STEPS

Urban Forest Master Plan

Goals

Plan and Manage

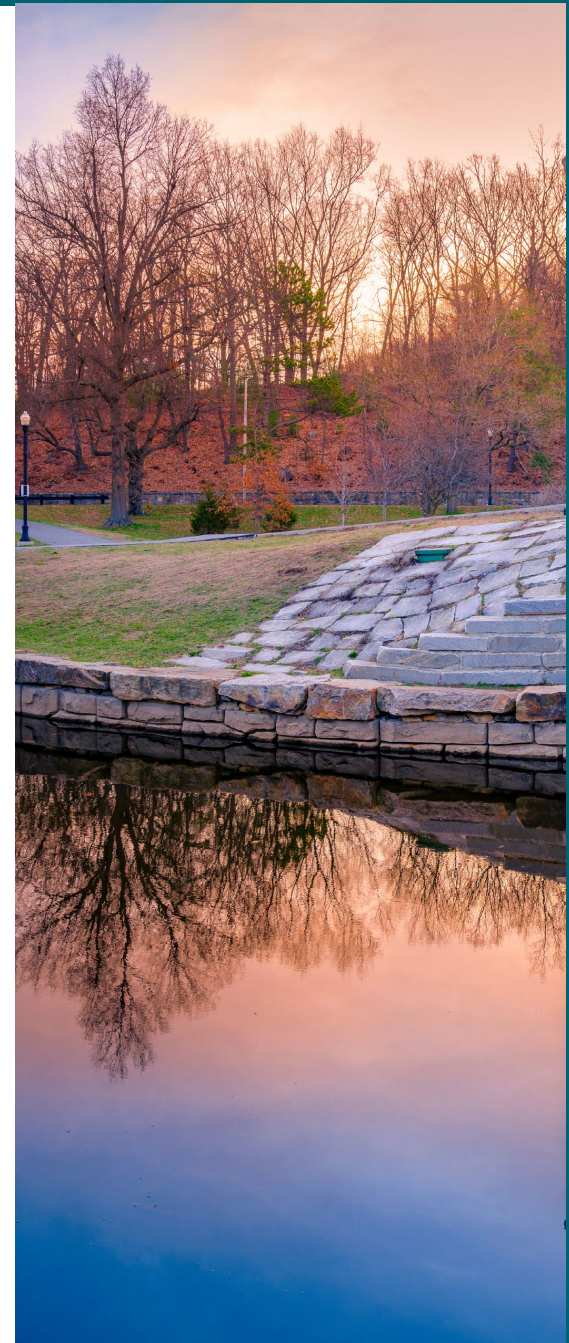
Support the City's sustainability, equity, and climate resilience goals and priorities

Maintain & Grow

Increase Worcester's urban forest through continued proactive maintenance and protection to create a healthy, equitable, and resilient urban forest that maximizes the environmental, economic, and climate mitigation services trees provide.

Connect & Engage

Support and grow efforts to connect, educate, and engage with the Worcester community about the city's urban forest and the important role they play in its care and growth.



Urban Forest Master Plan

Action Plan

Each recommendation includes a set of action steps, time frame for implementation, and implementation notes

Table 13. Action and Implementation Plan

RECOMMENDATION 1: Establish a proactive management program for Worcester's public trees that is beyond the current Customer Service Model.				
Action Steps	Priority	Resources	Responsibility	Percent Complete
1.1. Prioritize completing maintenance tasks for high and moderate risk trees identified in the recently updated street tree inventory and based on updated inspections completed by City staff.	2024	Staff Additional Funding <i>Estimated costs: To be determined. Will require reallocation of current resources and new funding to transition from proactive service delivery model.</i>	Forestry Operations	
1.2. Use the updated street tree inventory to develop an urban forest management plan that includes a risk management program, public tree maintenance program, and disaster preparedness and response plan.	2025	Staff/Consultant Additional Funding <i>Estimated costs: \$25,000 (2023 dollars) – one-time. May be eligible for grant funding.</i>	Forestry Operations & Emergency Management	
1.2.1 Develop a routine pruning schedule for established trees and the structural training of young trees.	Yearly	Staff/Consultant Additional Funding <i>Estimated costs: To be determined based on length of cycle.</i> Costs, in 2023 dollars, range from \$210,000 (15-year cycle) to \$450,000 (7-year cycle). Funding may be reallocated from the current budget or new funding may be needed.	Forestry Operations	

Urban Forest Master Plan Recommendations

Recommendation 1

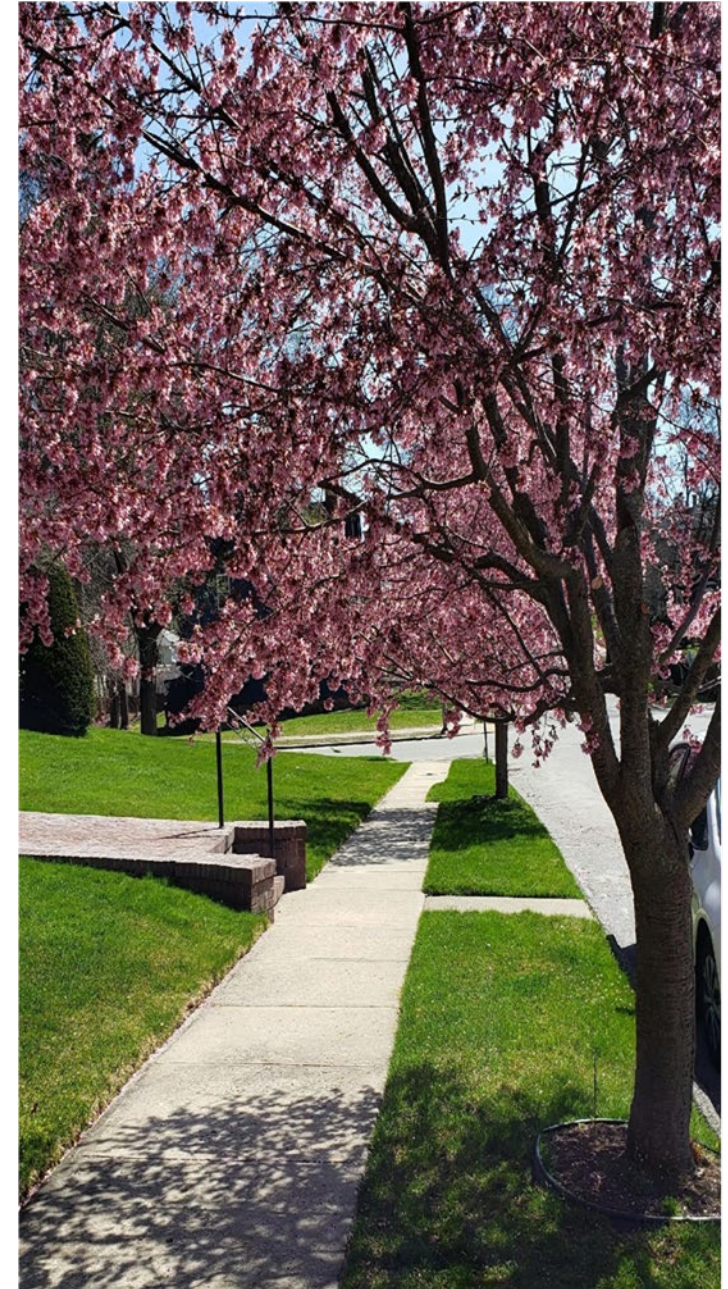
Establish a proactive management program for Worcester's public trees, that is beyond the current Customer Service based model.

Recommendation 2

Increase City staff and contractors to transition to a proactive management program and support urban forest planning, operations, and education.

Recommendation 3

Revise and develop urban forestry processes to support improvements to customer service, service delivery, data, technology, and information management using national arboricultural standards and best management practices.



Urban Forest Master Plan

Recommendations

Recommendation 4

Expand and develop regulations, best management practices, and guidelines to support urban forest growth and preservation.

Recommendation 5

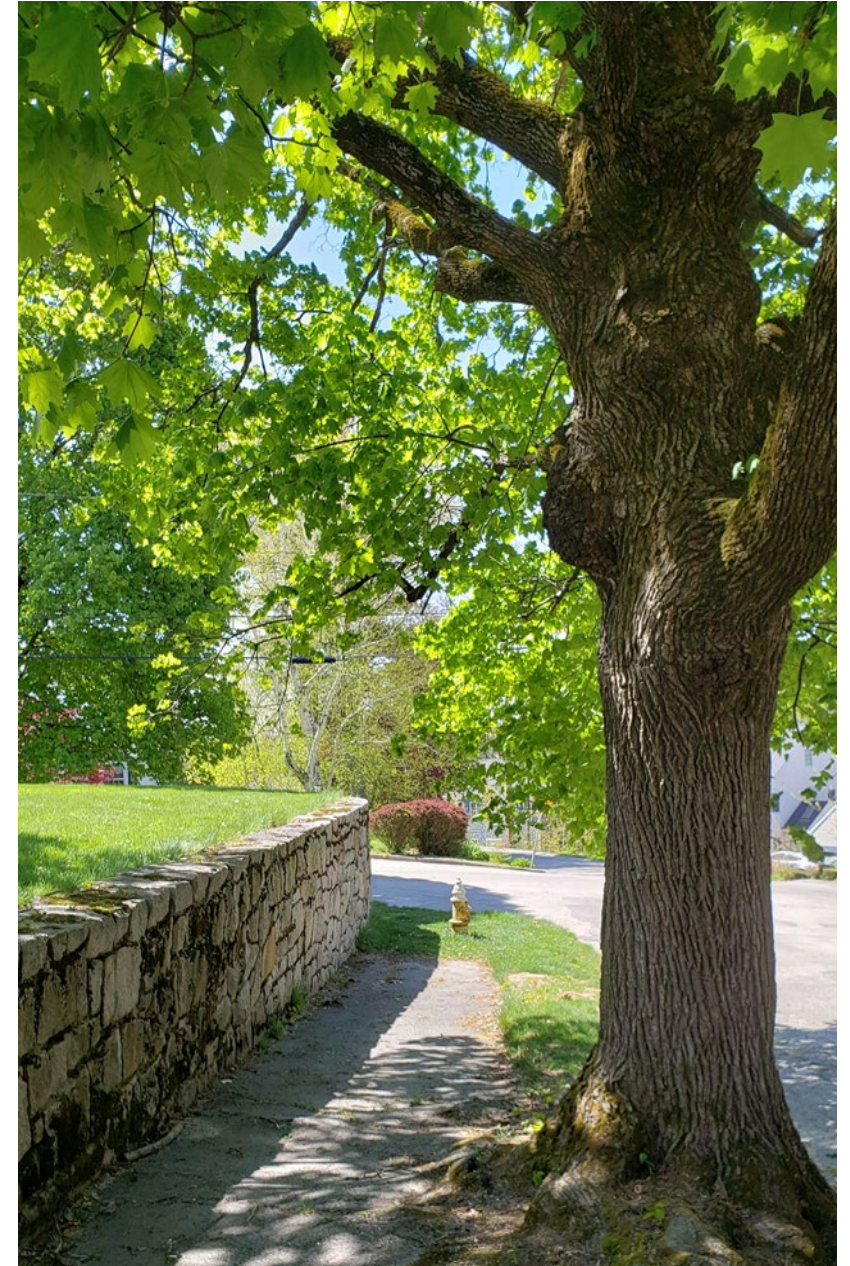
Ensure there is adequate space for trees to grow and thrive, in Worcester's challenging urban environment.

Recommendation 6

Conduct a comprehensive urban tree canopy assessment for the City of Worcester.

Recommendation 7

Continue tree planting and care citywide with attention to areas that advance city sustainability and equity priorities.



Urban Forest Master Plan Recommendations

Recommendation 8

Strengthen and develop partnerships with community and regional partners to support implementation of the urban forest master plan.

Recommendation 9

Implement an urban forestry communication and outreach plan that supports the growth and care of Worcester's urban forest.

Recommendation 10

Expand development and implementation of a program to monitor and address environmental threats to Worcester's urban forest.





Next Steps

Community Feedback accepted through May 16, 2023.



Revise & finalize Urban Forest Master Plan based on community feedback early June 2023.



To provide feedback on the
DRAFT Urban Forest Master Plan please visit:
<https://www.surveymonkey.com/r/worcesterufmp>

OR

scan this QR Code



**Thank
You!**