Pawtucket
RHODE ISLAND

Strategic Tree Canopy Plan

Plan by the Green Infrastructure Center Inc. for the City of Pawtucket, RI

City of Pawtucket, Rhode Island
https://pawtucketri.gov/

SEPTEMBER 2025

Green Infrastructure Center
https://gicinc.org

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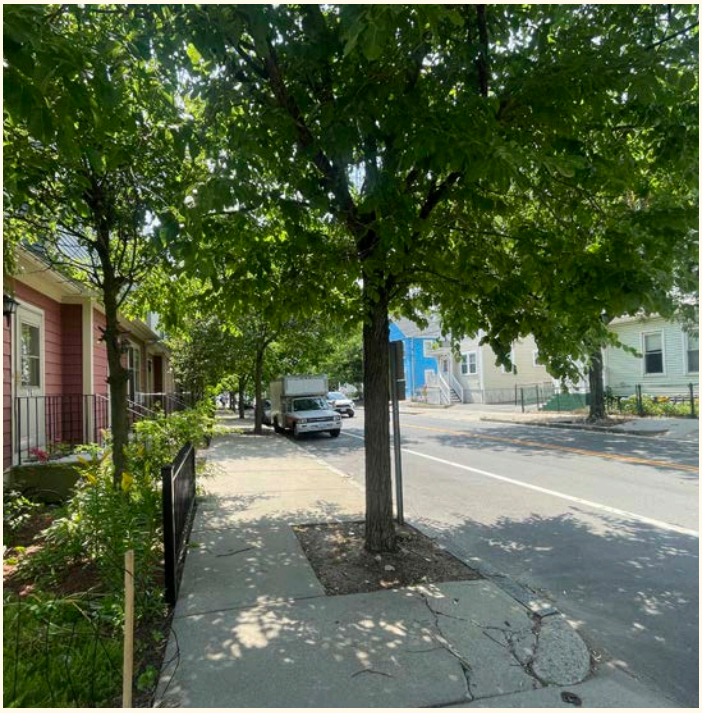
Executive Summary

The urban forest is a critical asset for healthy, resilient, and sustainable cities. Trees provide benefits that directly support public health by cleaning the air and filtering and reducing stormwater runoff, cooling urban temperatures, and fostering greater economic development. However, these benefits are at risk because tree canopy cover is declining across many U.S. localities. This Strategic Tree Canopy Plan provides data and strategies for maintaining and restoring tree canopy in Pawtucket.

This plan is the culmination of a ten-month planning process that included workshops and strategic planning sessions led by the Green Infrastructure Center Inc. (GIC) with City staff and community partners. The public was engaged in this process through outreach events, a community open house and community interviews. The extent of urban forest cover was determined by analyzing aerial imagery to map the city's land cover. Open space was evaluated to determine the Potential Planting Area where future trees might be planted, along with assessments of the environmental and social benefits the city's trees provide. Strategies for retaining, protecting, and restoring tree canopy coverage were created.

City Goal: The City of Pawtucket currently has 21% tree canopy coverage city-wide. The City plans to maintain canopy cover at 21% over the next 10 years. New tree planting will be needed to maintain 21% canopy because trees will still die from pests, storms, landowner removals, additional development, or old age.



Pawtucket Canopy Goal: Maintain tree canopy at 21% over the next 10 years.

Five Strategies to Achieve This Goal

1. **Revamp the City's free street program to allow the City to plant trees in front or side yards.**
2. **Hire or contract a City Arborist to manage city trees.**
3. **Publish an Urban Forest Management Plan that encourages the routine and equitable maintenance of the city's public trees.**
4. **Complete and maintain a city-wide inventory of public trees.**
5. **Launch a public education campaign to increase awareness about the benefits of trees.**

How Trees Benefit the City

Tree canopy provides benefits such as cleaner air, urban cooling, stormwater capture, wildlife habitat, and natural beauty. This plan quantifies and identifies strategies to increase these benefits.

Air Quality

Trees sequester carbon and clean the air of particulate matter and ground-level ozone. Each year Pawtucket's trees remove:

- 5,077 metric tons of carbon
- 23,242 lbs. of ground-level ozone (O3)
- 5,064 lbs. of airborne particulate matter

Urban Cooling

Excessive pavement and lack of shade create urban heat islands. Pawtucket's trees counter urban heating by shading hot areas. Tree canopy cover lowers surface temperatures and cools the city.

Stormwater Uptake

Trees capture rainfall and filter pollutants. During a ten-year/ 24-hour rainfall event (5.1 inches) the city's trees:

- soak up 7.2 million gallons of water
- reduce runoff pollution loads for nitrogen by 6%, phosphorus by 8%, and sediment by 6%

Canopy Goals

Pawtucket's goal is to maintain tree canopy coverage at 21% over the next 10 years. This goal requires planting:

- 35 trees on city-owned land annually
- 140 additional trees on private property through education and tree giveaways.

Tree Canopy and Potential Planting Area

The City of Pawtucket now has baseline data to identify opportunities to plant new trees for shade, energy savings, increased stormwater uptake, and improved air and water quality.

Introduction

The area now known as Pawtucket was first inhabited by the Pawtucket Native American tribe and the Wampanoag Native American people. The name "Pawtucket" comes from an Algonquian word meaning "at the great falls", a reference to the falls on the Blackstone River. The falls attracted European settlers, such as Joseph Jencks, Jr., who established Pawtucket's first European settlement in 1671.

Samual Slater, known as the "father of the American Industrial Revolution," immigrated from England to Pawtucket to establish the first successful water-powered cotton mill in North America in 1793. Slater Mill, once powered by the Blackstone River, still stands as a national historic landmark where visitors can learn about Pawtucket's history as the birthplace of the Industrial Revolution.

The City is located at the confluence of the Blackstone and Seekonk Rivers. In the pre-colonial era, the Blackstone River was filled with salmon and other significant food sources. Despite decades of organized efforts to clean the Blackstone River, the region's rich industrial history continues to pose challenges for aquatic life and water quality. The U.S. Environmental Protection Agency refers to the Blackstone as "the most polluted river in the country". In addition to rivers, the city has several significant urban parks, wetlands, and

Trees add beauty and help tell a story at historic sites within a community.

Pawtucket, RI

Fast Facts

Total city Area: 8.9 sq. miles
Land Area: 8.8 sq. miles
Lakes/ponds: 43 acres
Wetlands & Marshes: 135 acres
Streams: 9.5 miles
Tree canopy: 1,167 acres
Potential Planting Area: 272 acres
Impervious surfaces: 2,905 acres

Population: 76,996 people*

47.7% Non-Hispanic Whites,
24.6% Hispanic or Latino,
14.6% Black/African Americans,
1.6% Asian,
0.6% American Indian,
0.1% Native Hawaiian or Other Pacific Islander,
18.7% Two or More Races

(U.S. Census 2024estimate)

Hazard Mitigation Plan, Action #9

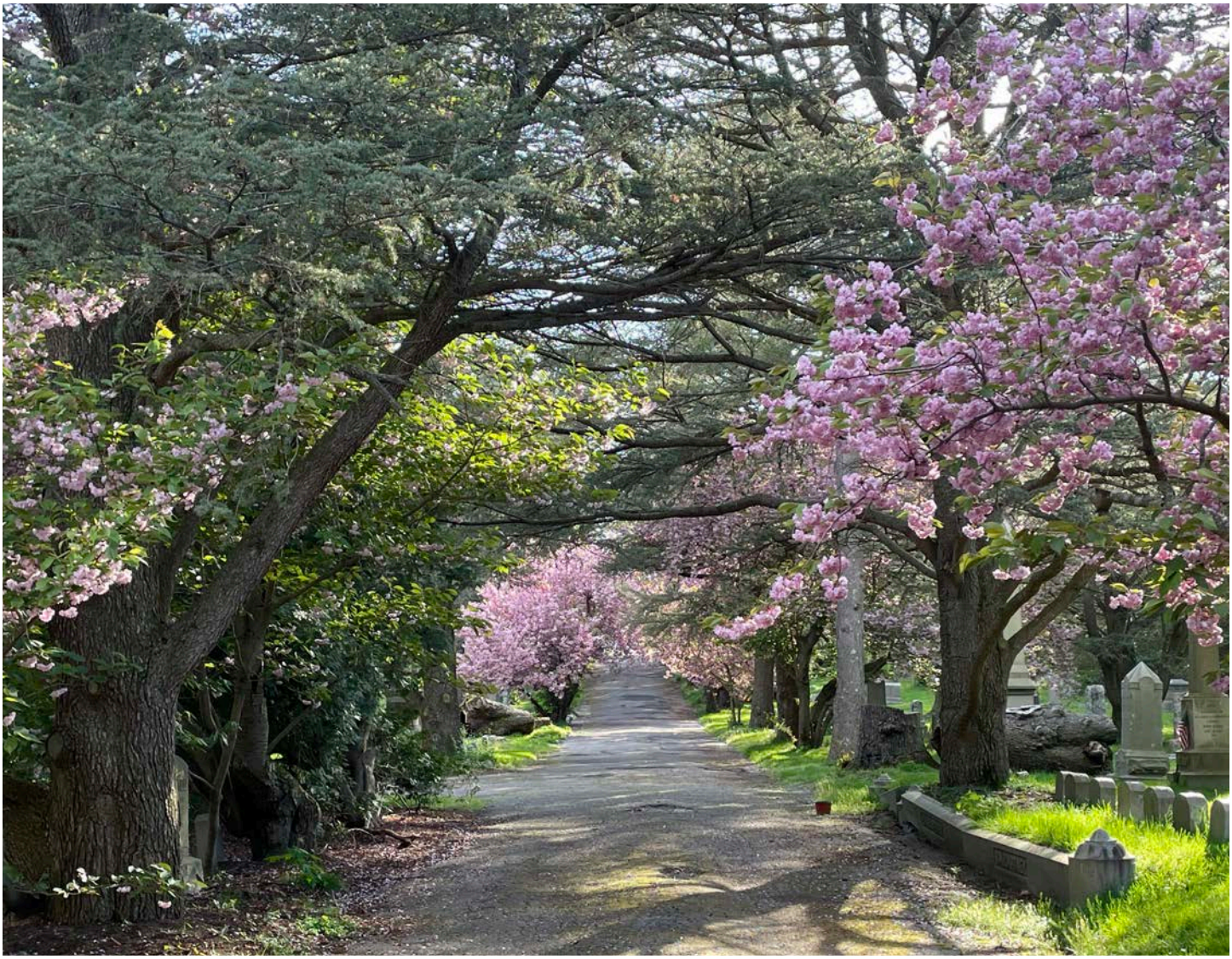
"Conduct a tree inventory in the city and identify areas to plant additional trees for adding to the canopy, reducing heat island, and implementing additional green infrastructure systems."

water bodies that provide social, economic, and ecological benefits to its residents. Protecting and restoring these natural features will help these ecosystems recover and contribute to a thriving city for future generations.

This Strategic Tree Canopy Plan provides a vision and a roadmap for protecting and maintaining the city's urban forest and other natural assets, such as the rivers and streams. The plan is a first of its kind for the City of Pawtucket and includes the first canopy analysis ever completed. The plan calls for maintaining the current tree canopy, which requires active care for existing trees and expanding the city's tree-planting program to target low canopy neighborhoods.

This Strategic Tree Canopy Plan supports the Five-Year Consolidated Plan and Annual Action Plan (July 1, 2025 – June 30, 2030) by strategically expanding tree canopy in low-to-moderate income neighborhoods. This plan calls for implementing green infrastructure for stormwater management and urban heat reduction with trees being ranked as a "high need" priority. The Plan also supports the Cities of Pawtucket and Central Falls Multi-Jurisdictional Hazard Mitigation Plan Update (August 2024) which prioritizes conducting a tree inventory as a preventative strategy.

The data produced by GIC was also used to inform the planting strategy for the City's $3 million award from the USDA Forest Service through the Inflation Reduction Act.



Tree Benefits

Trees benefit communities ecologically, economically, and socially. Some of the many benefits include:

- Cleaner air and water
- Enhanced natural beauty
- Bird and wildlife habitat
- Reduced city heat
- Reduced levels of crime
- Reduced traffic accidents
- Increased revenues from sales and property taxes
- Lower vacancy rates
- Improved mental health and focus
- Improved metabolic function
- Increased access to outdoor fitness opportunities

Large canopy trees provide greater benefits than smaller trees. The USDA Forest Service found that in 2025 dollars, a large tree is worth $7,411 in annual benefits while a small tree is worth just $450 (Center for Urban Forest Research and Southern Center for Urban Forestry Research & Information 2006).

Trees Are Green Infrastructure

Trees and other vegetation serve as the city's "green infrastructure." Just as localities manage grey infrastructure (roads, sidewalks, bridges, and pipes), they should also manage vegetation as infrastructure. Trees support a vibrant, safe, and healthy community while adding to its historic character. They enhance sustainability by filtering stormwater and reducing runoff, cooling streets, cleaning the air, capturing carbon emissions, and increasing property values.

Gray vs Green. Image at left shows an example town's gray infrastructure including buildings and roads. Classified high-resolution satellite imagery (at right) adds town green infrastructure data layer (trees and other vegetation). The green infrastructure provides cleaner air, water, energy savings and natural beauty.

Reducing Stormwater Runoff and Filtering Pollutants

Trees protect communities from problems associated with stormwater runoff. As forested land is converted to impervious surfaces, such as roads, buildings and parking lots, urban stormwater runoff increases. Excess stormwater runoff can cause temperature spikes in receiving waters, increased pollution of surface and ground waters, and greater potential for flooding.

Trees reduce nitrogen, phosphorus, and sediment in stormwater by filtering runoff of these pollutants. Increased loads of nutrients in stormwater runoff reduce oxygen in surface water, causing harm to fish and other aquatic life. Nitrogen and phosphorus can cause harmful algal blooms, while sediment can clog fish gills, smother aquatic life, and necessitate additional dredging of canals and waterways. As tree cover is lost and impervious areas expand, excessive urban runoff of these harmful pollutants greatly increases. The presence of trees means fewer pollutants enter the city's many watersheds, including the Moshassuck River, Ten Mile River, Blackstone River, Seekonk River and eventually the Narragansett Bay.

Trees filter and clean stormwater runoff before it enters surface waters, ensuring healthy rivers and creeks for recreation and habitat.

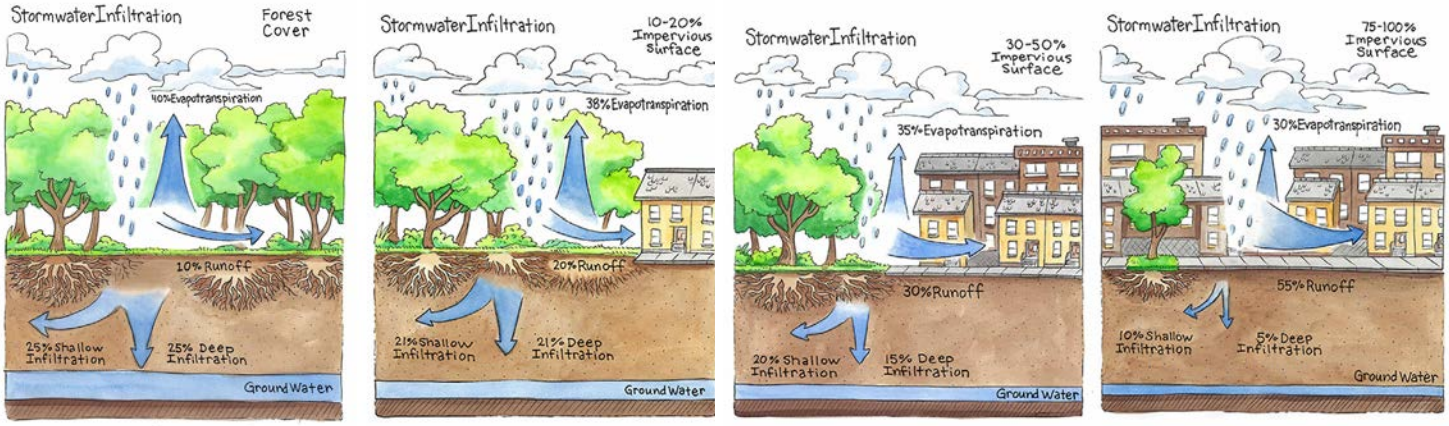
Excess impervious areas cause hotter temperatures and increased runoff. This parking lot could be retrofitted to add more trees, bioswales, and pervious surfaces that allow water to seep into the ground.

The average annual precipitation in Pawtucket is 49.49 inches (National Weather Service 2025). Much of this runoff flows into the municipal separate storm sewer system transporting surface pollutants from the land to local waterways. Large, paved areas contribute significant volumes to this runoff. While stormwater ponds and other best management practices (BMPs) are designed to mimic natural land cover rainfall release by detaining and filtering runoff, they do not fully replicate pre-development hydrology. In addition, older parts of the city may lack updated stormwater management practices required for new developments, so not all runoff is captured or treated before it flows into open waterways.

Since trees filter stormwater and reduce overall flows, planting or conserving trees is a natural, cost-effective way to mitigate stormwater. Each tree plays an important role in stormwater management. Based on the GIC's review of canopy rainfall interception studies, a typical street tree's crown can intercept between 760 and 4,000 gallons of water per year, depending on the tree's species and age.

The dogwood tree at this home provides stormwater management benefits for this home and the surrounding watershed.

Water Infiltration Rates with Development



Stormwater runoff increases as land is developed. Graphic adapted by GIC. Data Source: U.S. EPA Watershed Academy 2025.

Forests and wetlands are green infrastructure that capture and store water on the landscape which reduces the risk of flooding – Slater Park.

Buffering Storms and Flooding

Another benefit of conserving trees and forests is buffering against storms and reducing losses from flooding. According to the U.S. Environmental Protection Agency (EPA), excessive stormwater causes increased flooding, property damage, and public safety hazards. The EPA recommends ways to use trees to manage stormwater in its book *Stormwater to Street Trees*. Link: https://www.epa.gov/sites/default/files/2015-11/documents/stormwater2streettrees.pdf

Retaining trees and forests along streams prevents erosion and provides key habitat for fish, birds, animals, and people too. A community can categorize their trees as "green infrastructure" to help justify spending money on city trees because they function as natural infrastructure by reducing standing water, preventing erosion, serving as windbreaks, and shading areas to reduce excessive temperatures.

In some cases, FEMA has reimbursed communities for lost tree cover when those trees were part of identified infrastructure, such as when a stream restoration project was damaged by a hurricane and the community had already identified the planted trees as infrastructure. To qualify, trees must be inventoried, have records of maintenance, and be specifically utilized for stormwater management, buffers, or other "green infrastructure" functions. Trees should also be recognized as infrastructure in policy documents such as the Comprehensive Plan, the Capital Improvement Plan (CIP), and even the City's tree ordinances.

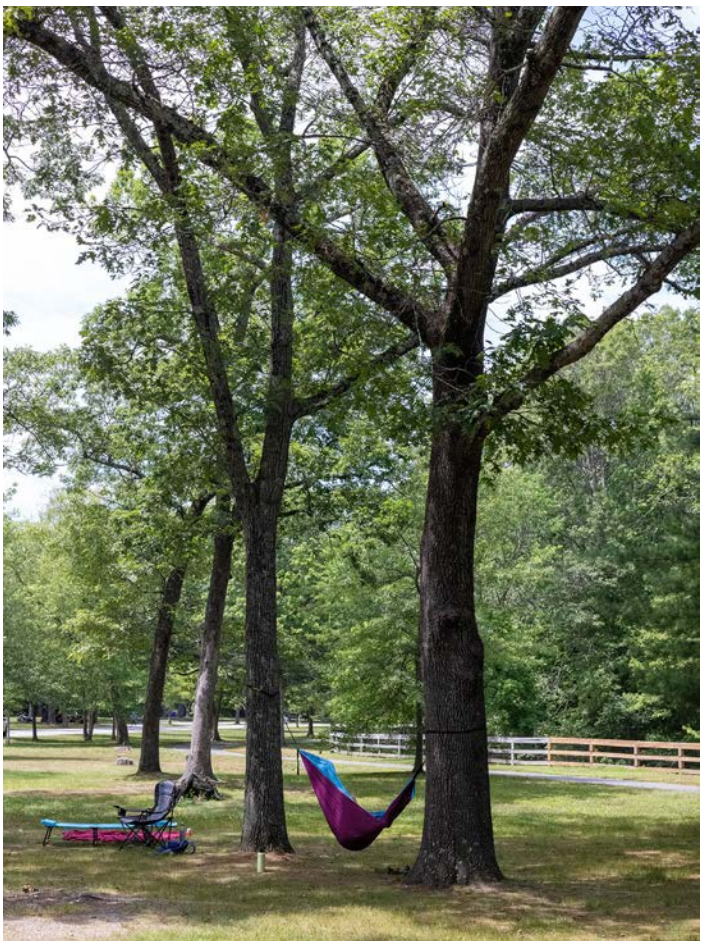
Improving Air Quality, Public Health, and Economic Values

Trees Clean the Air

Higher tree canopy cover is correlated with better air quality. Trees reduce ground-level ozone (O3) while filtering out fine particulate matter, which can damage lungs and lead to respiratory distress and conditions such as asthma. In fact, well-treed neighborhoods have lower rates of respiratory illness (Rao et al. 2014). Trees capture such greenhouse gases as sulfur dioxide and carbon dioxide. These gases contribute to a warming planet and are associated with health problems from excessive heat. Trees also sequester carbon by storing it as wood, preventing its release into the atmosphere and mitigating the impact of climate change.

Trees Cool the City

Tree shade provides important refuge for children and the elderly during hot summers. Excessive heat can lead to heat stress, especially affecting infants and children up to four years of age, and people 65 years of age and older, or people with obesity or other pre-exisitng health conditions. (Centers for Disease Control and Prevention 2024).



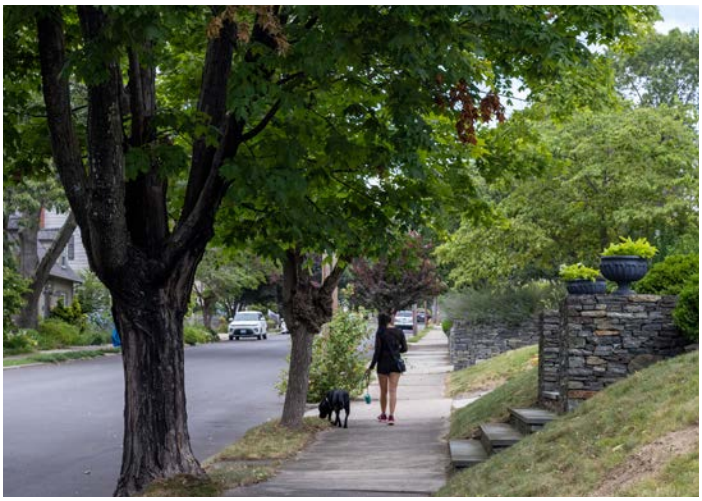
Trees provide shade at Slater Park

The city's trees reduce temperatures during hot summers through evapotranspiration and by casting shade.

Tree canopy shades streets, sidewalks, parking lots, and homes, making urban locations cooler and more pleasant for outdoor activities, such as hiking, gardening and playing in city parks. Multiple studies have found significant cooling (2-7°F) and energy savings from shade trees in cities (McPherson et al. 1997, Akbari et al. 2001). Individual trees can transpire hundreds of liters of water per day, creating a cooling effect equivalent to the energy needed to power two average household central air-conditioning units (Ellison et al. 2017). Proper tree placement can reduce summer air conditioning costs by up to 35% (Arbor Day Foundation 2025). Pavement shaded by trees has a longer lifespan than pavement in full sun, reducing maintenance costs associated with roadways and sidewalks (McPherson and Muchnick 2005).

Trees improve Walkability

Trees result in people walking more and walking farther. The cooler temperatures, aesthetics, and traffic calming effect increase a community's walkability, which is a priority of the City of Pawtucket. When trees are not present on a street, people perceive distances to be longer, hotter, and less pleasant, making pedestrians less inclined to walk than if streets are well-treed (Tilt, Unfried, and Roca 2007).



Well-treed sidewalks encourage people to walk.

Exposure to green spaces for 20 minutes a day can improve cognitive function.

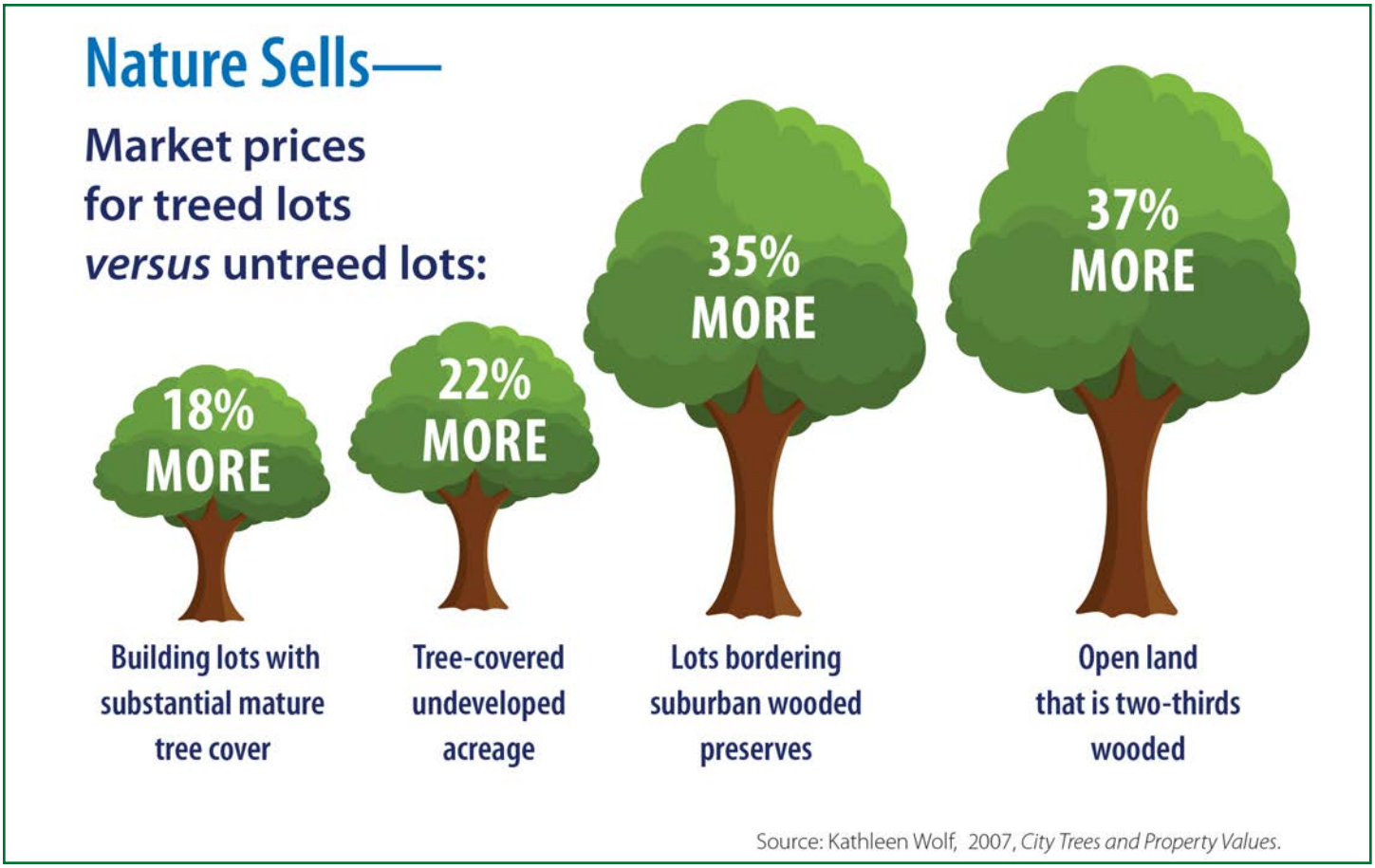
Trees Improve Cognitive Function

Exposure to green spaces such as parks or treed landscapes for just 20 minutes a day can significantly improve cognitive function, emphasizing the need for green spaces around schools to allow children to learn to their best ability. Children with Attention Deficit Hyperactivity Disorder (ADHD) benefit from exposure to greenspace. Children who regularly play in green spaces have milder symptoms of ADHD (Faber Taylor and Kuo 2011).

Trees Increase Property Values

Developments that include green space or natural areas in their plans sell homes faster and for higher profits than those that take the more traditional approach of building over an entire area without conserving natural space (Benedict and McMahon 2006). Individual trees and forested open spaces make lots more valuable. Trees on developed lots add about 18% to property assessments and real estate value. (Wolf 2007). *See the Nature Sells graphic, below.*

Home buyers will pay more for homes with mature trees.



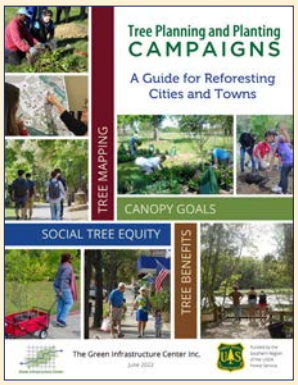
Trees Pay Us Back

As the City considers the cost of planting and caring for more trees, it's important to note that "every dollar invested in planting a tree results in an average return on investment of $2.25" (Endreny 2018). In fact, even a newly planted tree will immediately begin to provide benefits. So, while the City will need to expend more funds to increase and maintain its canopy coverage, those trees will more than pay their way. This includes increases in property values, and thus property tax revenue, the rejuvenation of business districts, tourism revenue, and makes the city more attractive to new businesses. For example, people typically shop longer and spend more in treed commercial shopping districts, which benefits the City through increased sales revenues (Wolf 2007). Planting trees should not be seen in isolation, but as part of a wider cycle of urban renewal and growth, in which trees spur development and raise incomes, business sales and that 'feel-good factor', which can, in turn, lead to a desire for more trees, parks and outdoor leisure facilities. Trees help turn a downward spiral into an upward spiral, as part of a city's renewed sense of pride and prosperity.

These trees along Roosevelt Avenue will one day provide shade and make this shopping district more walkable.

Preventing "Green Gentrification"

Gentrification is a reasonable concern when it comes to community planting projects in lower-income neighborhoods. The concern is that beautifying a neighborhood with numerous shade trees, adding street medians with more trees, planting trees in front yards, and having more parks and other open spaces nearby will raise property values and make houses unaffordable, spur landlords to raise rents and result in property tax increases. This is a legitimate concern and warrants a comprehensive approach that minimizes the negative consequences of green gentrification through policies that encourage residents to stay in their homes while enjoying the many benefits of trees and green space, such as cleaner air, cooler summers, less flooding, lower energy costs and general social well-being. To learn more about how to prevent "green gentrification", see the GIC's *Tree Campaign Guide* https://gicinc.org/books/tree-planning-and-planting-campaigns/



Instead of holding back on greening projects, cities should address the sources of affordability problems. One example would be an agreement with landlords not to raise rents within five years of a planting project; another would be to engage the community housing and development staff in providing more affordable housing. The City of Greenville, South Carolina for example, spent a decade and millions of dollars purchasing land around a future park development, Unity Park, that was to be built on city-owned land in historically black neighborhoods that experienced discrimination and disinvestment. The City created a housing fund to build a thousand affordable housing units around the new park, allowing low-income residents to remain in the adjacent neighborhoods and reduce the risk of gentrification. The desire for more affordable housing in the area surrounding the park was an idea driven by local residents and community activists during the planning of the park.

Tree Canopy Analysis Methods

The tree canopy analysis was performed to map current tree canopy, quantify the ecosystem services these trees provide, map potential planting areas, and estimate potential future canopy based on plantable areas. These new tree canopy data can be used to analyze urban cooling, walkability, and street tree plantings; or to inform area plans, urban forestry planning, and the City's Comprehensive Plan updates.

Satellite imagery from the National Agricultural Imagery Program (NAIP) distributed by the USDA Farm Service Agency was classified to determine the types and extent of different land covers in Pawtucket. The land cover map was created at 1-meter resolution using NAIP imagery from August 22, 2023. LiDAR[1] (light detection and ranging) data were used to determine height, which allows the GIS analyst to separate bushes from trees and other vegetation. This distinction of tree/non-tree vegetation is very important when modeling tree benefits, since the modeled pollution-removal benefits are based on trees, and do not necessarily translate to smaller, non-woody vegetation. In addition, various vector data were used where possible (e.g. sidewalks, driveways, and other impervious surfaces). The tree canopy was mapped at 95% accuracy, with an overall land cover accuracy of 93%.

[1] LiDAR is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the top of the vegetation, compared to the underlying surface of the Earth. The farther the laser beam travels, the shorter the vegetation.

Determining Plantable Acreage

Potential Planting Areas (PPA)

In urban areas, a realistic goal for expanding urban canopy depends on an accurate assessment of the total plantable open area. A Potential Planting Area (PPA) map estimates areas where it may be feasible to plant trees. The PPA is estimated by selecting land cover types that have space available for planting trees and accounts for the overlap of canopy (canopy that is intermingled or a large canopy tree that partially covers an understory tree).

Of the nine land cover types mapped, only pervious and bare earth were considered for the PPA. However, some paved areas could be removed or reduced, soils conditioned, and then used to plant new trees. For example, a parking lot could be redesigned in order to accommodate more tree canopy to absorb and clean stormwater runoff and provide shade for cars.

Eligible planting areas are also limited by their proximity to features that interfere with a tree's natural growth (such as buildings) or where a tree might affect the feature, such as power lines, street signs, or road junctions. The GIC buffers potential planting areas to exclude trees from these features. City staff, local stakeholders, and the GIC reviewed the draft PPA map and removed playing fields, cemeteries, and other land uses where trees would not be appropriate. The resulting PPA represents the maximum potential places trees can be planted and grow to full size.

NAIP Aerial Image

Potential Planting Area (PPA)

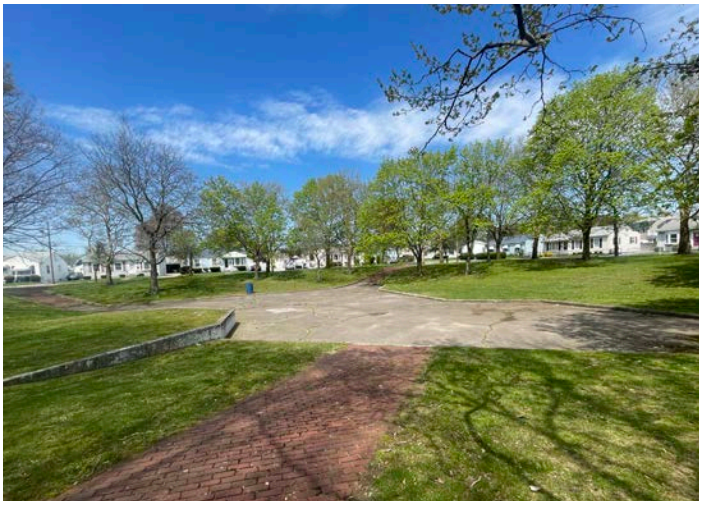
Based on an analysis of existing pervious surfaces, 5% of the city's land area, or 271 acres, could be planted with additional trees. The GIC recommends that no more than half the available PPA, 2.5% or 136 acres, is realistic to plant, since many other uses, such as vegetable gardens or swimming pools, require full sun.

Potential Planting Spots (PPS)

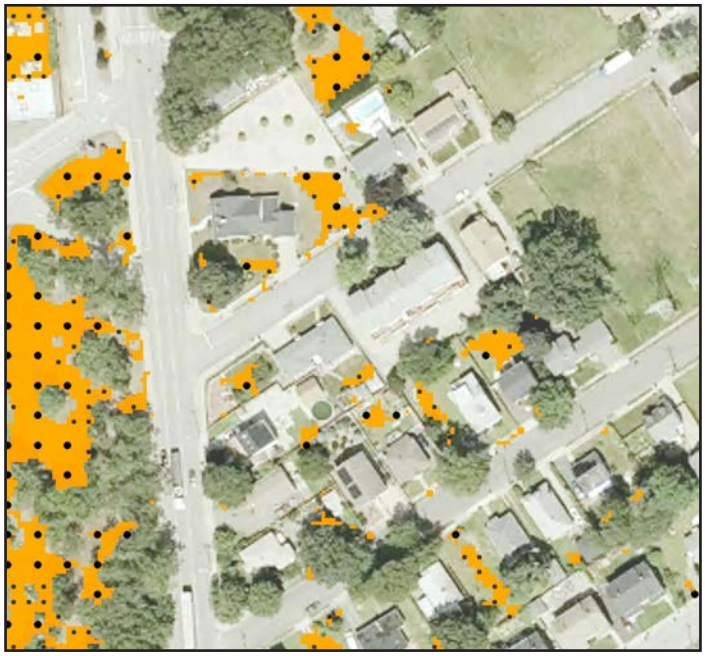
Potential Planting Spots (PPS) are created from the PPA. A GIS modeling process is applied to select spots where a tree can be planted depending on the desired size. For this analysis, expected sizes of 20 ft. and 40 ft. diameter for individual mature tree canopy were used with priority given to 40 ft. diameter trees (larger trees have more benefits).

Potential Canopy Area (PCA)

The Potential Canopy Area (PCA) is created from the PPS. Once possible planting spots are selected, a buffer around each point that represents a tree's mature canopy is created. For this analysis, that buffer radius is either 10 ft. or 20 ft., which represents a 20 ft. or 40 ft. diameter canopy. These individual tree canopies are then dissolved together to form the potential overall canopy area. For Pawtucket 8% more canopy could be added to the town.



Despite the city being 52% impervious, there are still opportunities to plant more trees such as at the park on Polo Street or in residential backyards.



Potential Planting Spots (PPS)

Potential Canopy Area (PCA)

Tree Canopy Maps and Findings

The *Tree Canopy Analysis* has been used to plan the City's target tree canopy goal and will act as a benchmark to gauge the future status of the city's tree canopy. An ArcGIS geodatabase with digital shape files produced during the study has been provided to the City.

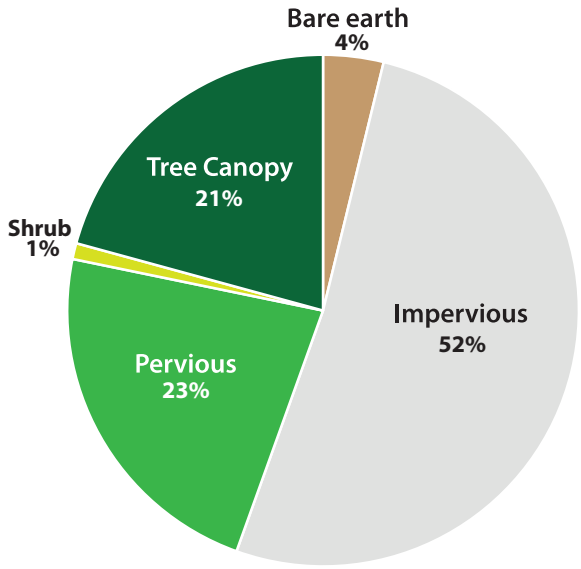
In addition, the City received tree canopy statistics for the following areas:

- Streets
- Parks
- Schools
- Parcels
- Zoning

The *Tree Canopy Analysis* can inform tree planting decisions to meet many goals, such as walkability, greenhouse gas emission reduction, energy savings, urban heat reduction, and economic revitalization.

The following eight pages contain Pawtucket's Tree Canopy Analysis Maps.

Pawtucket Percent Tree Canopy



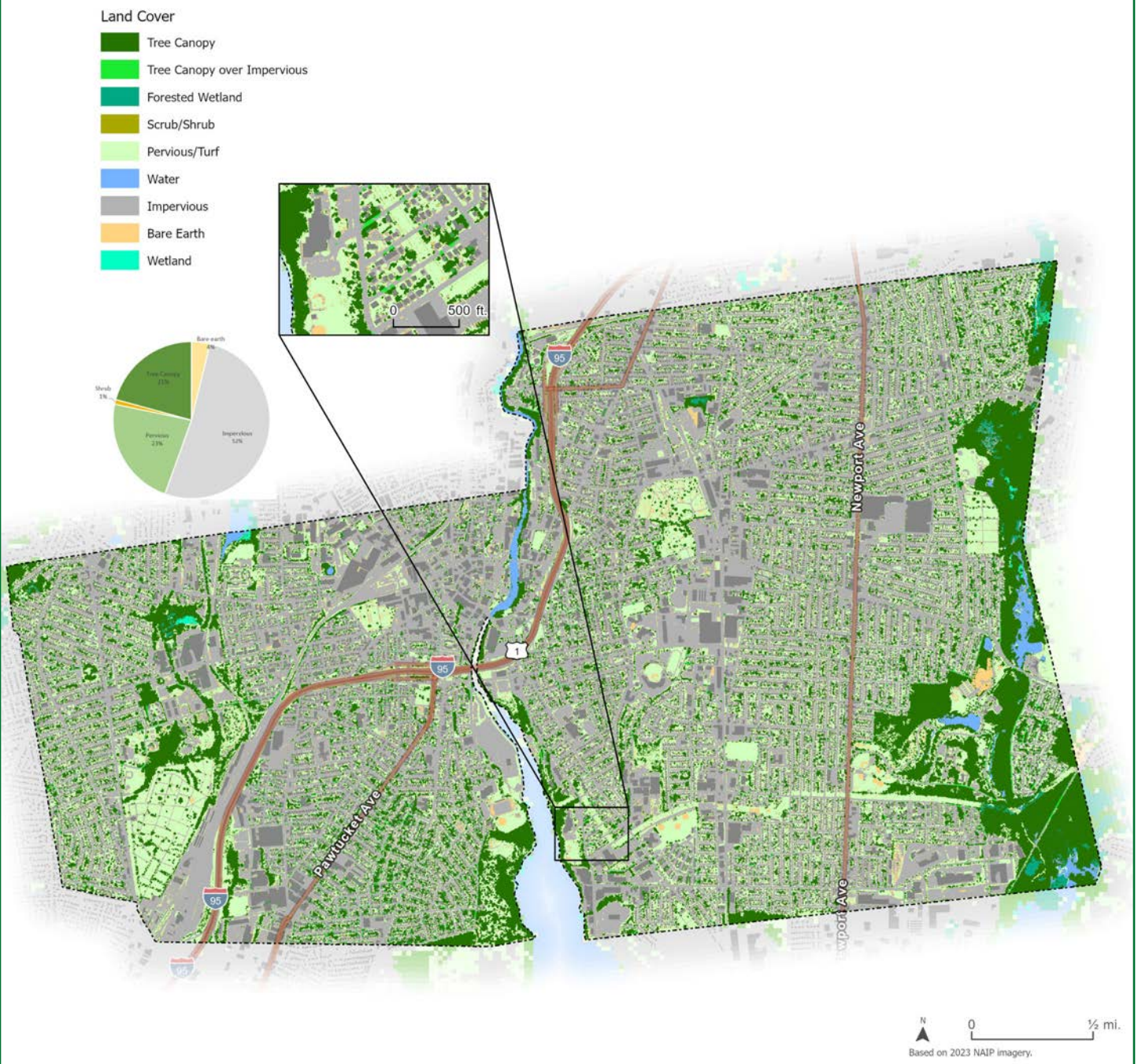
Pawtucket City canopy cover is 21%.

A bicyclist enjoys the tree-lined path of the Ten Mile River Greenway in Slater Park.

One mature tree can absorb thousands of gallons of water per year.

Map of City Land Cover

GIC classified 9 land cover types for the City of Pawtucket from 2023 NAIP aerial imagery.

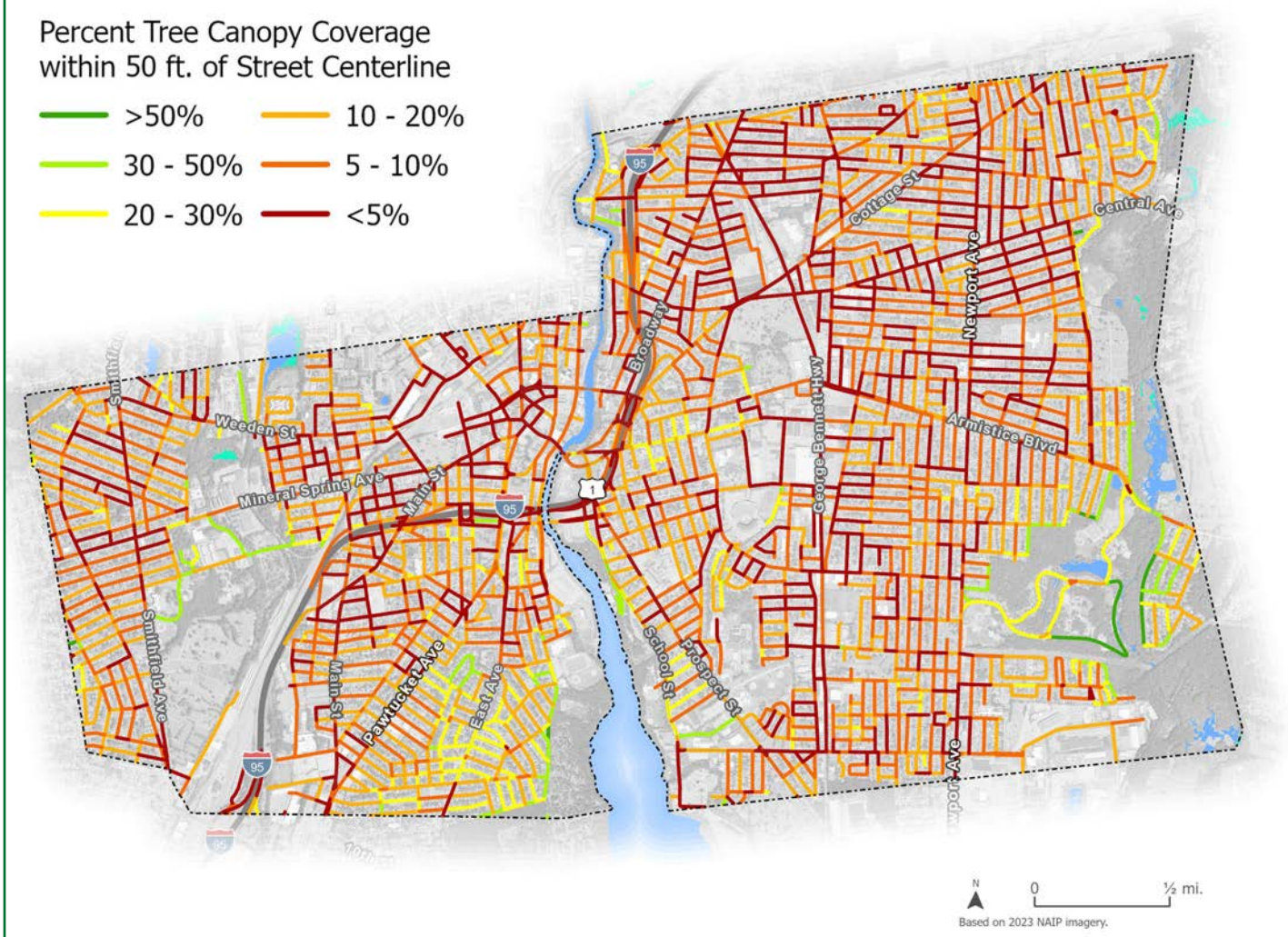


Map of Tree Canopy and Potential Planting Areas

Existing tree canopy (green) and potential planting area (orange) were determined based on land cover data and input from the City. Potential planting areas (PPA) depict areas where it may be possible to plant trees. All sites would need to be confirmed in the field prior to planting. The map shows PPA on both private and public lands.

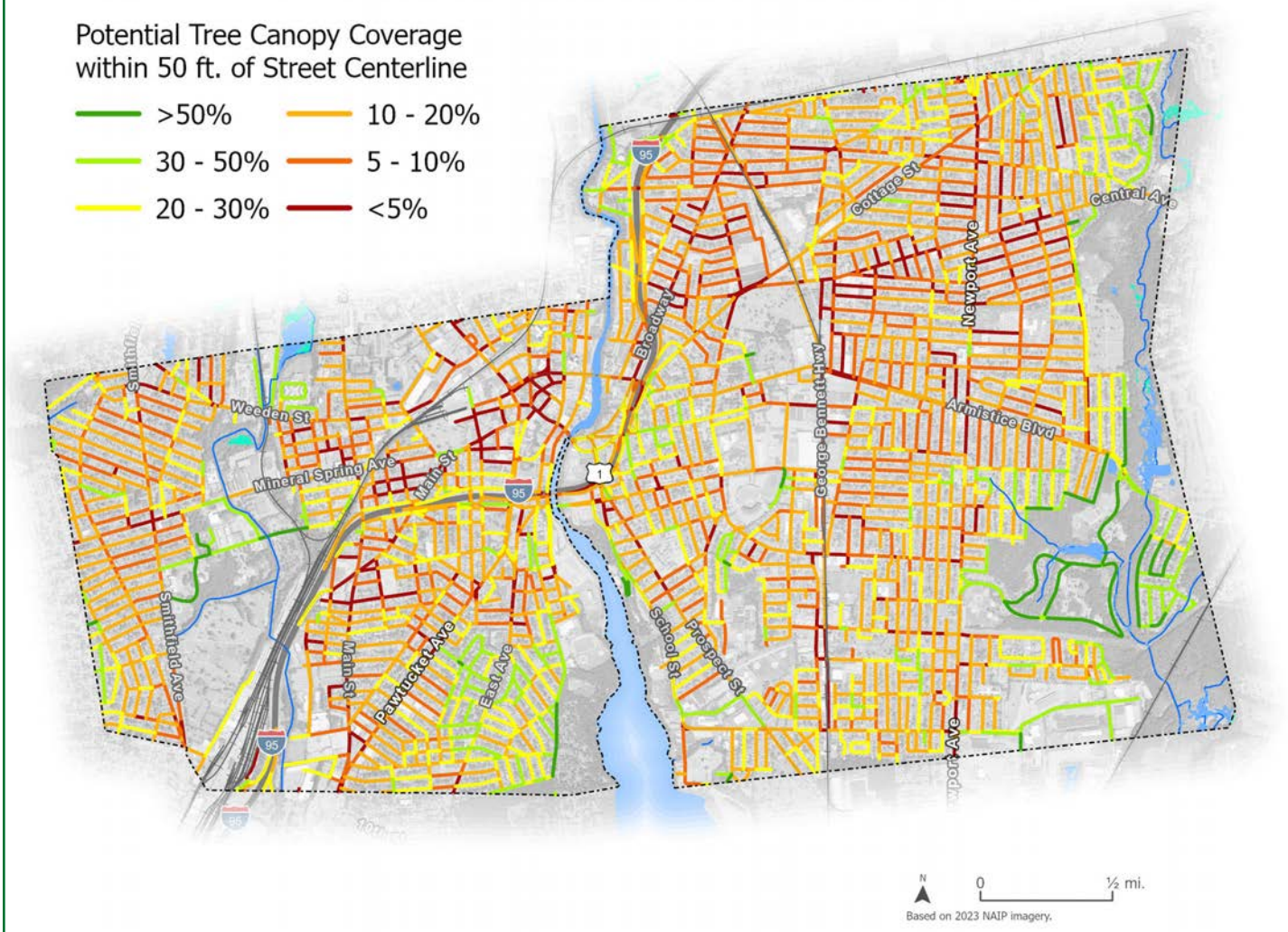
Map of Existing Tree Canopy Coverage Along Streets

Streets that have the most canopy (dark green) and those that have the least canopy (red). Streets that lack good tree coverage can be targeted as appropriate for planting to facilitate specific City goals, such as safe routes to school or beautifying a shopping district.



Map of Potential Tree Canopy Coverage Along Streets

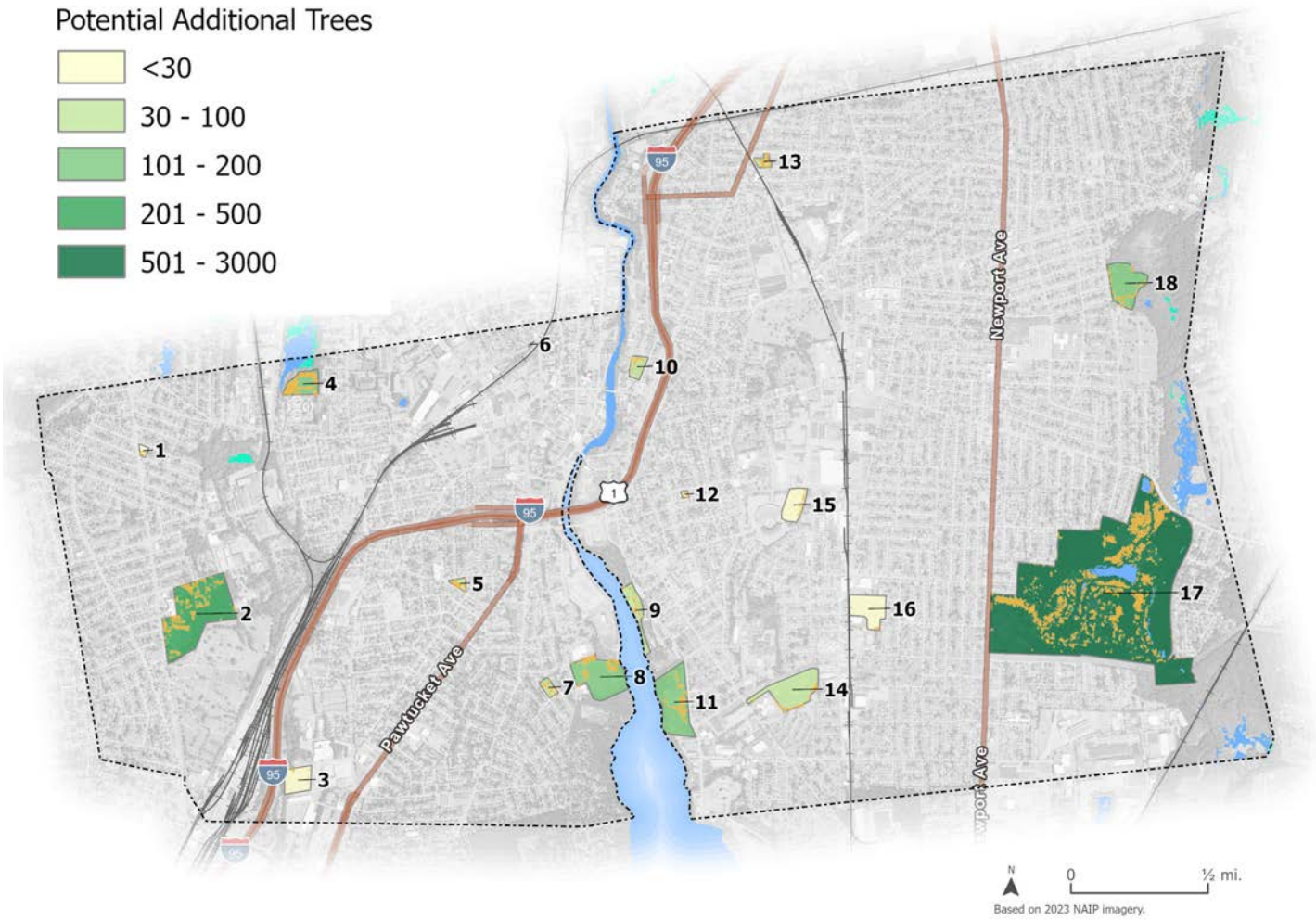
If all potential planting areas within 50ft. of every road's center line were planted, this is what the canopy coverage along streets would look like.



Disclaimer: *This map is based on Potential Planting Areas (PPA) within 50 ft of the Right-of-Way. As such, it identifies unconstrained planting sites based on the best available GIS data, meaning that existing underground tree wells or narrow landscape strips (under 6 ft) are not included in this analysis. As with the overall PPA map, it does not account for utilities, and all locations must be field verified. There may be more or less available street tree planting opportunities than are depicted on the map.*

Map of Potential Planting Spots by Park

Potential number of trees that can be planted for each city park. Parks with trees promote physical and mental health and provide shaded areas for children to play.

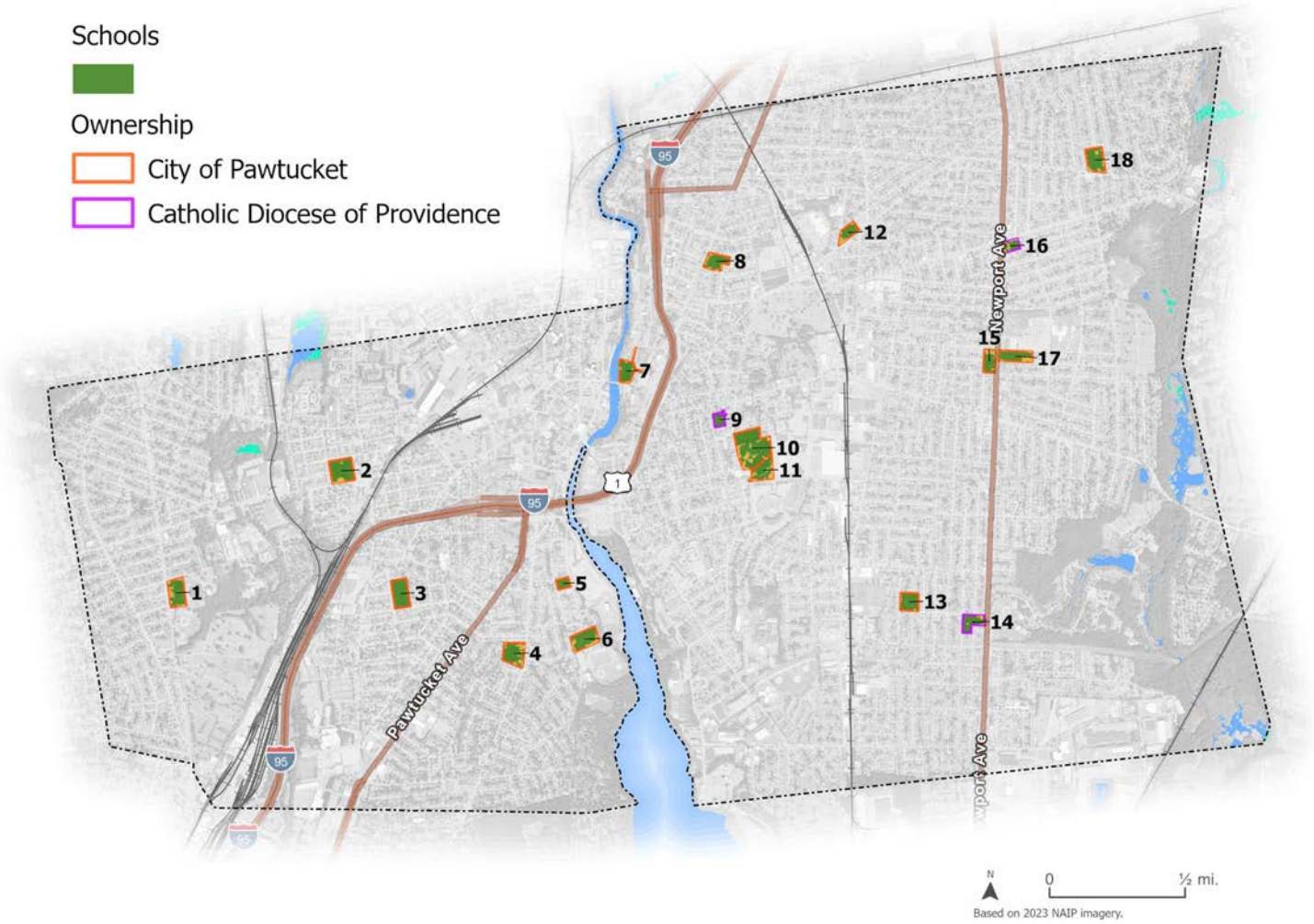


Map Code	Park Name	TC %	PCA %	Potential Trees
1	San Bento Playground	20%	44%	16
2	Veterans Memorial Field	46%	64%	457
3	Morley Field	19%	21%	10
4	Galego Court Complex	14%	62%	185
5	Payne Park	6%	59%	51
6	Barton Street Playground	17%	39%	3
7	Tom Duffy Complex	26%	58%	49
8	Max Read Field/Varieur Playground	14%	27%	151
9	Festival Pier	45%	61%	88

Map Code	Park Name	TC %	PCA %	Potential Trees
10	Coutu Memorial Field	8%	25%	42
11	Mccarthy Park	36%	48%	161
12	Ayotte Playground	20%	54%	12
13	John Street Playground	8%	61%	58
14	Hank Soar Softball Complex	6%	11%	45
15	Pariseau Field	4%	11%	27
16	Mckinnon/Alves Youth Soccer	6%	7%	9
17	Slater Park	60%	76%	2674
18	Tomlinson Athletic Complex	12%	23%	103

Map of Potential Planting Spots by School

Planting at school sites can save energy costs for cooling and boost student concentration and learning.

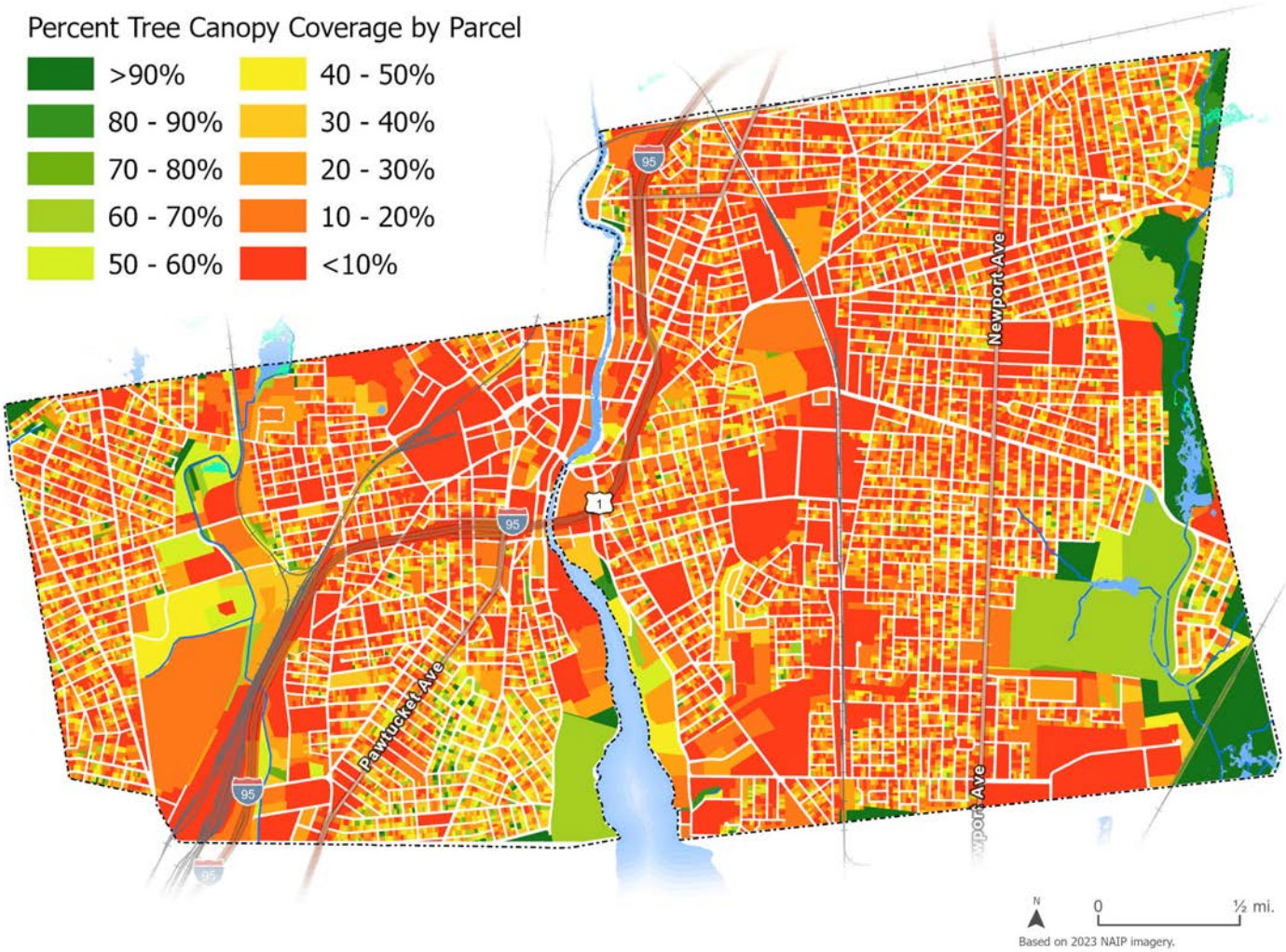


Map Code	School Name	TC %	PCA %	Potential Trees
1	Nathanael Greene School	15%	33%	58
2	Samuel Slater Junior High School	3%	11%	26
3	Elizabeth Baldwin School	0%	0%	0
4	Shea Senior High School	26%	43%	60
5	International Charter School	1%	1%	1
6	Francis J. Varieur School	4%	20%	46
7	William E. Tolman Senior High School	18%	25%	23
8	Henry J. Winters Elementary School	2%	13%	22
9	St. Raphael Academy	17%	18%	3

Map Code	School Name	TC %	PCA %	Potential Trees
10	Agnes E. Little School	6%	20%	113
11	Joseph Jenks Junior High School	7%	28%	59
12	Curvin-McCabe	2%	20%	29
13	Fallon Memorial School	4%	8%	10
14	St. Teresa School	13%	22%	21
15	Goff Junior High School	5%	26%	41
16	St. Cecilia School	4%	37%	43
17	Potter-Burns School	3%	25%	50
18	Flora S. Curtis Memorial School	8%	20%	39

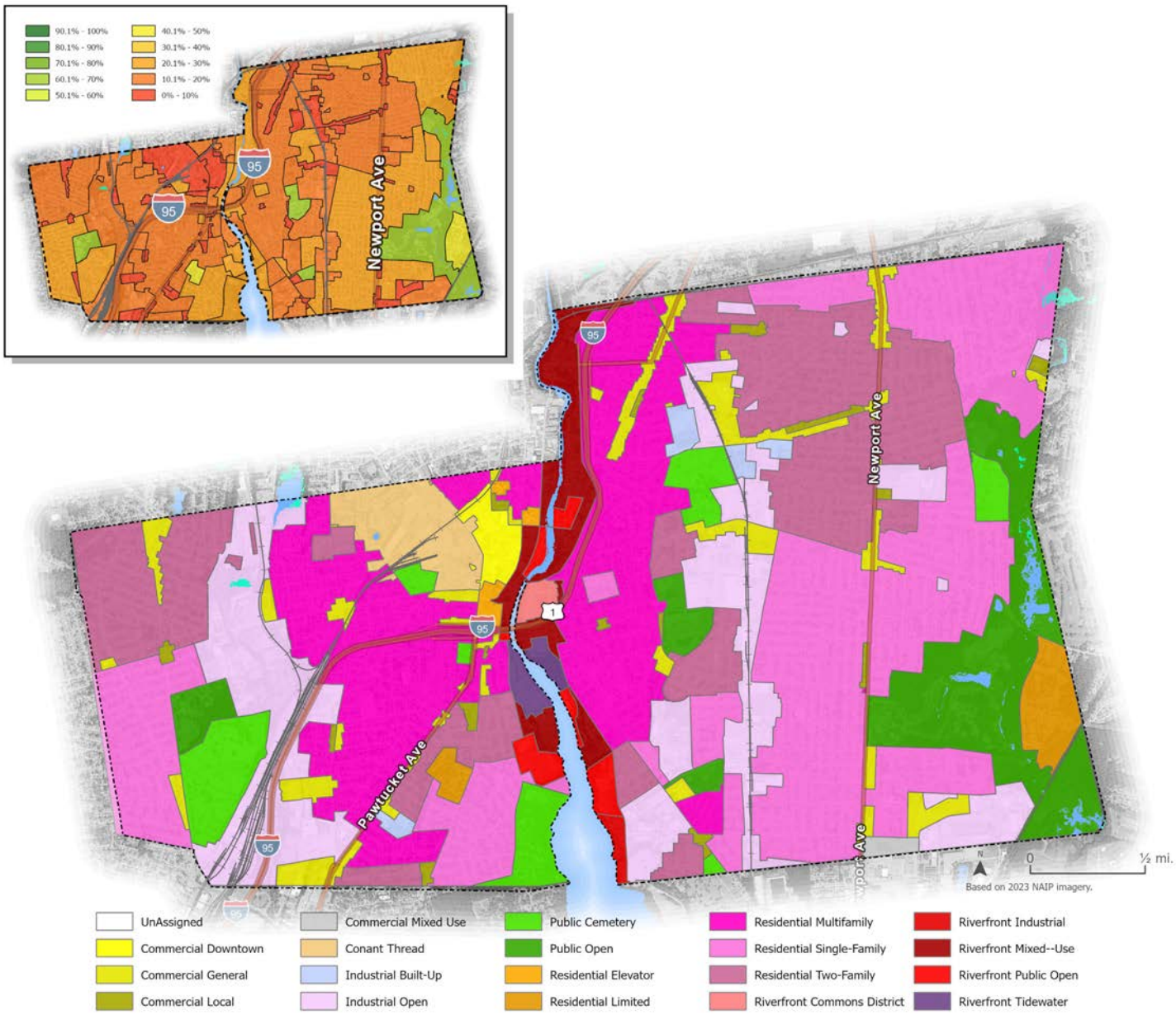
Map of Tree Canopy Coverage by Parcels

Tree canopy data at the parcel level can help the City and local partners identify and engage with private property owners who need trees and may be willing to plant one on their land.



Map of Tree Canopy Coverage by Zoning

The City can use this data to assess how to make changes to landscaping or tree protection requirements in the zoning code that will impact how trees are preserved during development.



Calculating Environmental Benefits

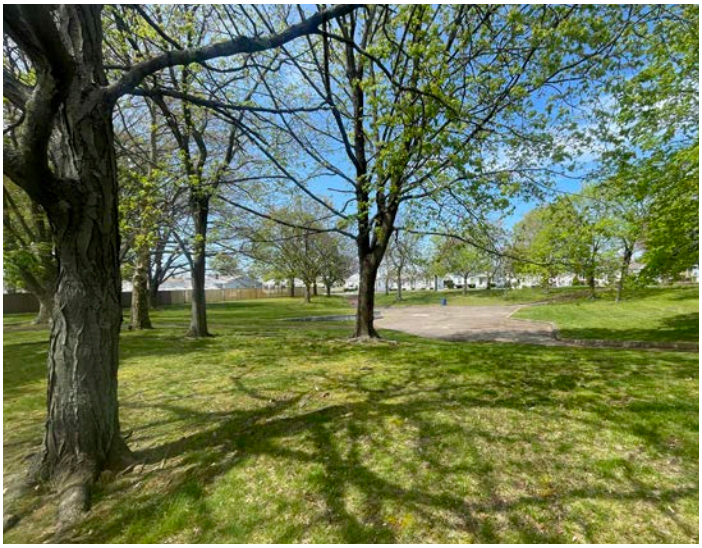
Stormwater Uptake

Trees and forests are the best land cover for taking up urban stormwater and are recognized as such by forestry scientists and civil engineers (Kuehler 2017, 2016). Tree canopy stormwater interception varies from 100% at the beginning of a rainfall event to about 3% at maximum rain intensity (Xiao et al. 2000).

Trees help capture and filter stormwater runoff. The Trees and Stormwater (TSW) Tool developed by the GIC estimates the stormwater interception, infiltration, and runoff of different land cover types. This methodology uses a modified version of the "curve number" approach, originally developed by the Natural Resources Conservation Service (NRCS) which factors in impacts of hydrologic soil groups, land cover types, hydrologic condition, and design/management practices that impact runoff. The modified TR55 curve numbers (CN) provided by GIC include a factor for canopy interception. This approach allows for more detailed assessments of stormwater uptake based on the landscape conditions of the city's forests. It distinguishes whether the trees are within a forest, a lawn setting, a forested wetland, or over pavement, such as streets or sidewalks. This is because the conditions and the soils in which the tree is living affect the amount of water the tree can intercept. For more about this methodology, please visit: https://gicinc.org/projects/resiliency/trees-and-stormwater/

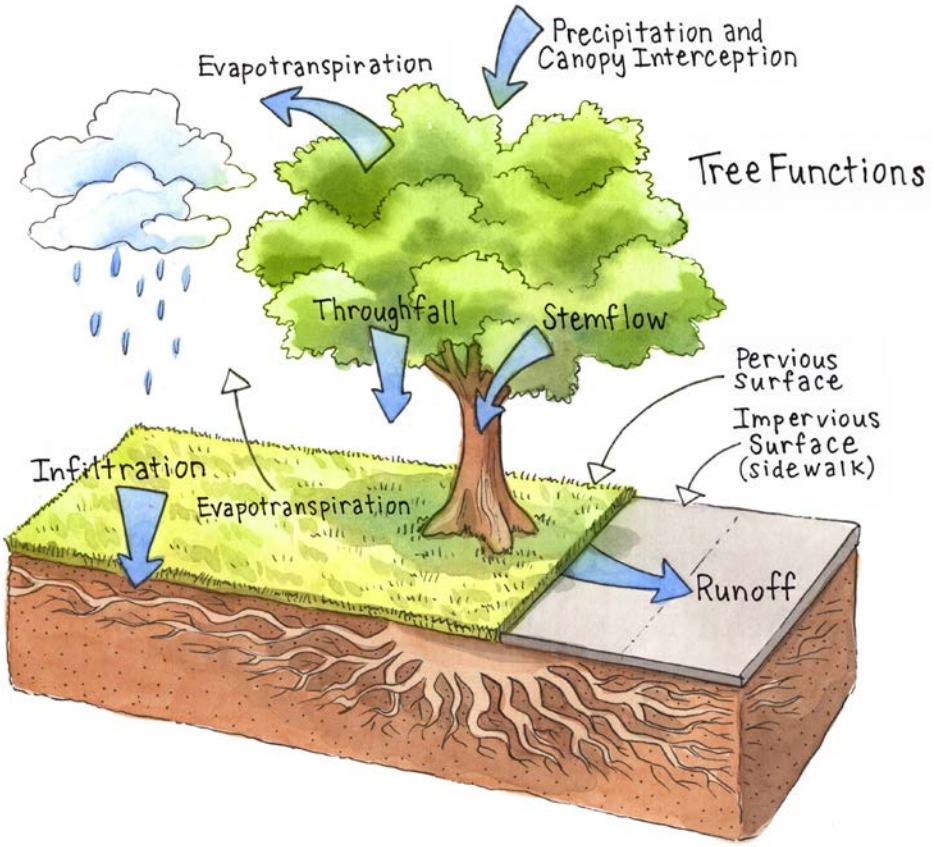
The GIC used its TSW Tool to model stormwater and pollution reductions by city tree canopy. The model shows that, during a 10-year/24-hour rainfall event (5.1 inches), trees take up 7.2 million gallons of runoff, or about 11 Olympic swimming pools of water. Pawtucket's trees capture:

- 5,392 nitrogen lbs. annually
- 431 phosphorus lbs. annually
- 512 sediment tons annually



Lawn trees in a park soak up more stormwater than trees over pavement.

The TSW Tool takes into account the interaction of land cover and hydrologic soil conditions within each watershed. The TSW Tool can also be used to run 'what-if' scenarios, specifically losses of tree canopy from development or storm damage, or increases in tree canopy from additional tree planting at the watershed scale.



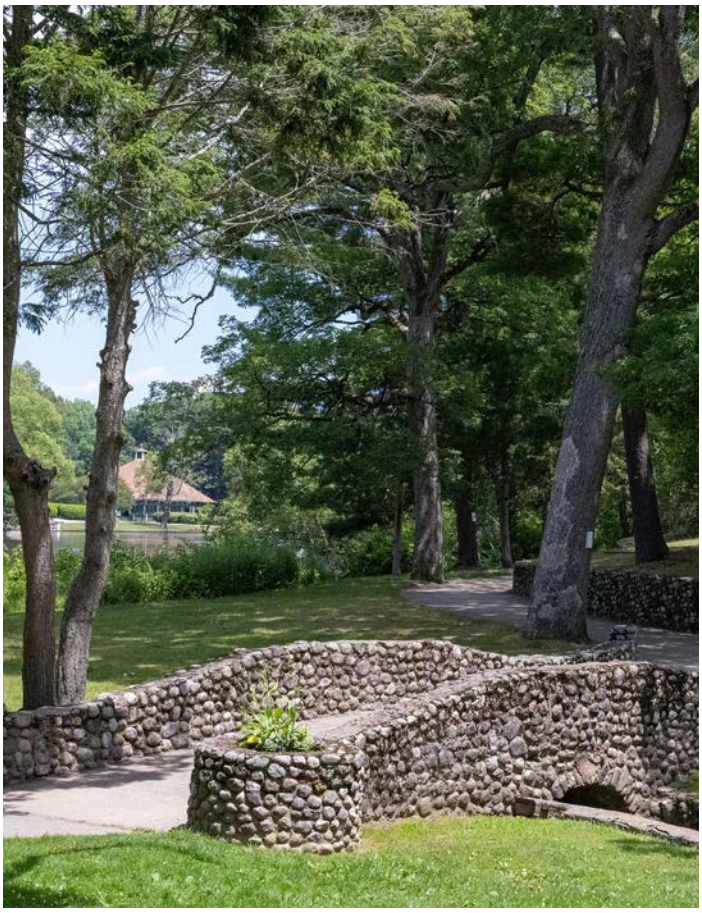
Tree Canopy Coverage by Watershed

The conditions under and around a tree, such as the size of its planting box, the amount and type of open space, surface soils, drainage and root spread affect the infiltration of water. The TSW Tool uses plantable open spaces to determine how many more trees could be planted and how much additional nitrogen, phosphorus, and sediment pollutants new trees and their surrounding soils could absorb.

Removal of mature trees and existing forest results in the greatest increase in stormwater runoff. As more land is developed, the City should maximize tree conservation and encourage new tree plantings to maintain surface water quality and groundwater recharge. The following maps use soil types and tree cover to show the areas where it is most important to retain trees for stormwater uptake and areas where tree planting will have the most benefits for stormwater uptake.

Planting new trees where there is adequate room will help decrease stormwater runoff and increase infiltration.

The TSW model is a tool for seeing the stormwater impacts of adding or losing tree canopy and the resulting pollution increases or decreases.



Slater Memorial Park is a mostly undeveloped 197-acre park. This forested acreage is the best land cover type for stormwater uptake.

Name: Pawtucket, Rhode Island, USA* — **Urban Tree Canopy Stormwater Model** — **version May 4, 2022**

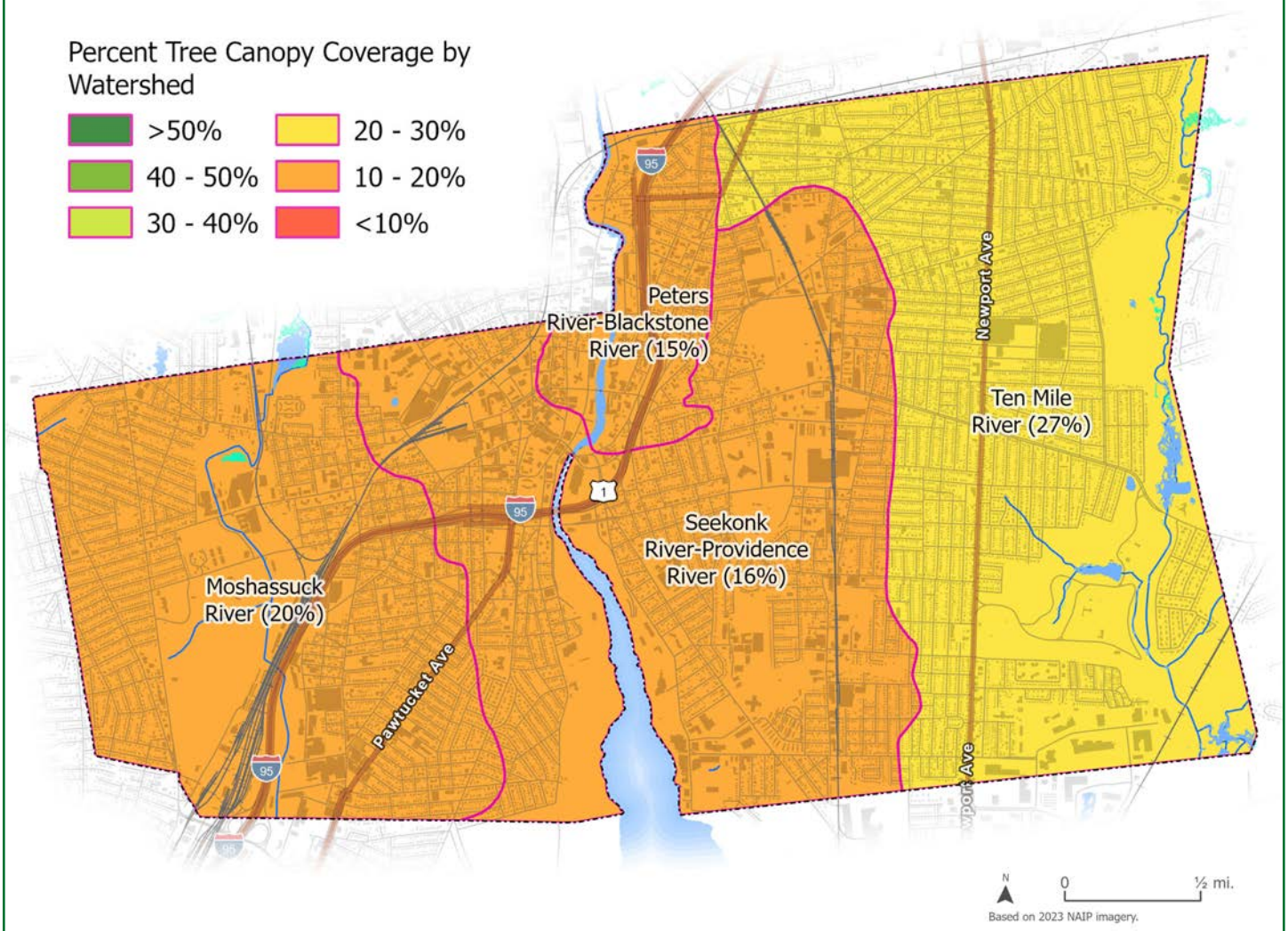
The Green Infrastructure Urban Tree Canopy Stormwater Model estimates stormwater runoff yields for current and potential land cover. The methodology is based upon the NRCS TR-55 method for small urban watersheds. It is used to provide better estimates using GIC's high-resolution land cover and modeling of potential canopy area.

				million gallons											
	TOTALS	20.8%	51.3%	2.3	-	-	20.8%								
	Statistics by Drainage Basin (current settings)							Variable							Variable
	Area	Current Tree Cover	Current Impervious Cover	Tree H20 Capture	Increased H2O w/xx% tree loss	Added H2O Capture w/xx% PCA	Adjusted Tree Cover from loss and gain scenarios	Pick an Event	Pick a loss scenario		Converted Land			Canopy Added	Enter % canopy to add
		%		million gallons			%	Event	% UTC loss	% FOS Loss	% Imperv	Max TC Possible	Maximum Potential Added Canopy Area	% Canopy Added	% of PCA achieved
1	Moshassuck River	19.7%	52.0%	0.6	-	-	20%	1 yr / 24	0%	0%	0%	27.6%	7.9%	0.0%	0%
2	Peters River-Blackstone River	15.3%	62.2%	(0.0)	-	-	15%	1 yr / 24	0%	0%	0%	23.7%	8.4%	0.0%	0%
3	Seekonk River-Providence River	15.6%	57.0%	0.3	-	-	16%	1 yr / 24	0%	0%	0%	23.8%	8.1%	0.0%	0%
4	Ten Mile River	27.2%	44.8%	1.4	-	-	27%	1 yr / 24	0%	0%	0%	35.9%	8.7%	0.0%	0%

The TSW Tool allows the City to model water uptake by the existing canopy and impacts from changes, whether positive (adding trees) or negative (removing trees).

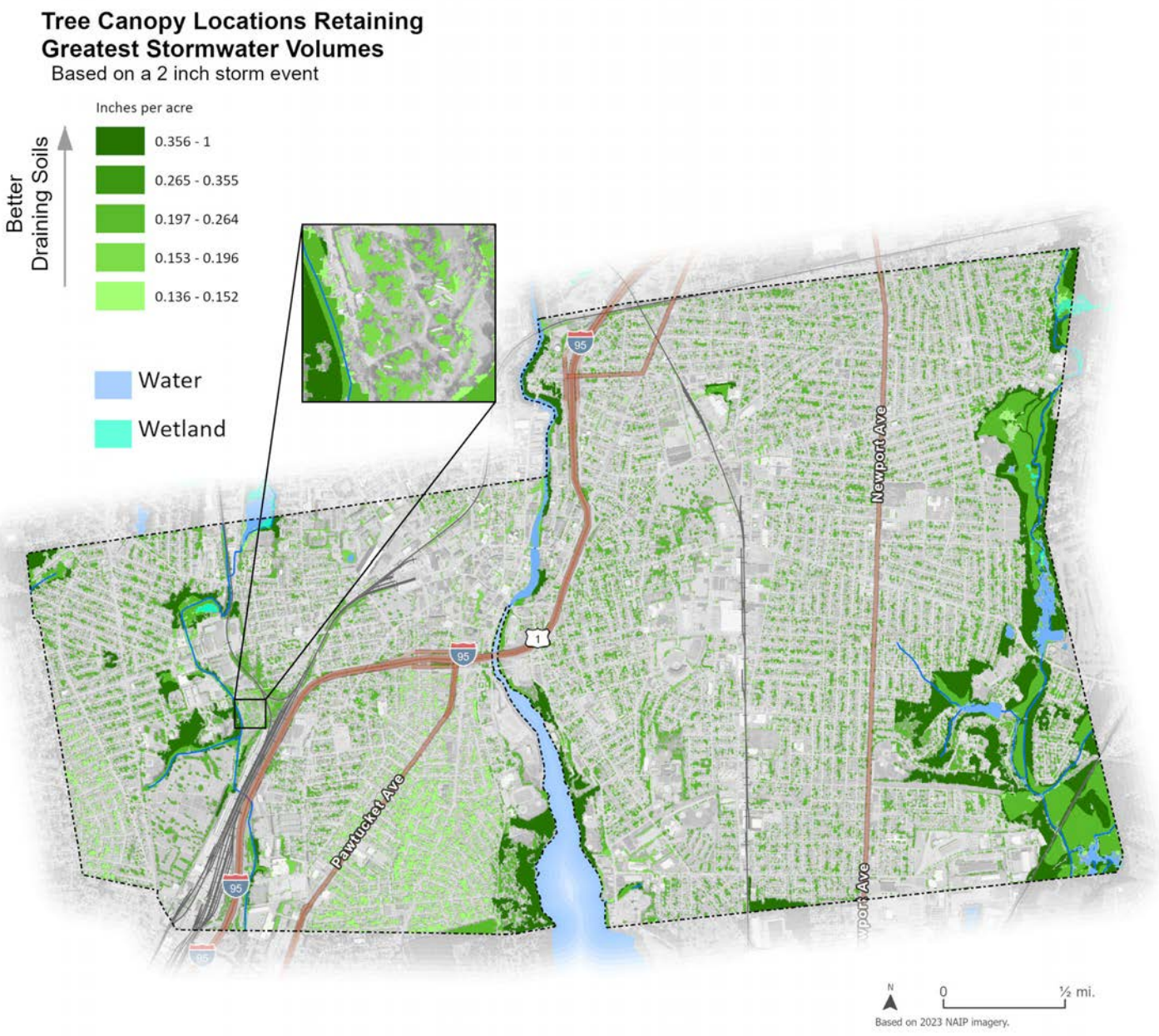
Map of Watersheds

The City can use the TSW Tool for running scenarios and setting goals at the watershed scale, for planting trees, and for evaluating consequences of tree loss, as it pertains to stormwater runoff.



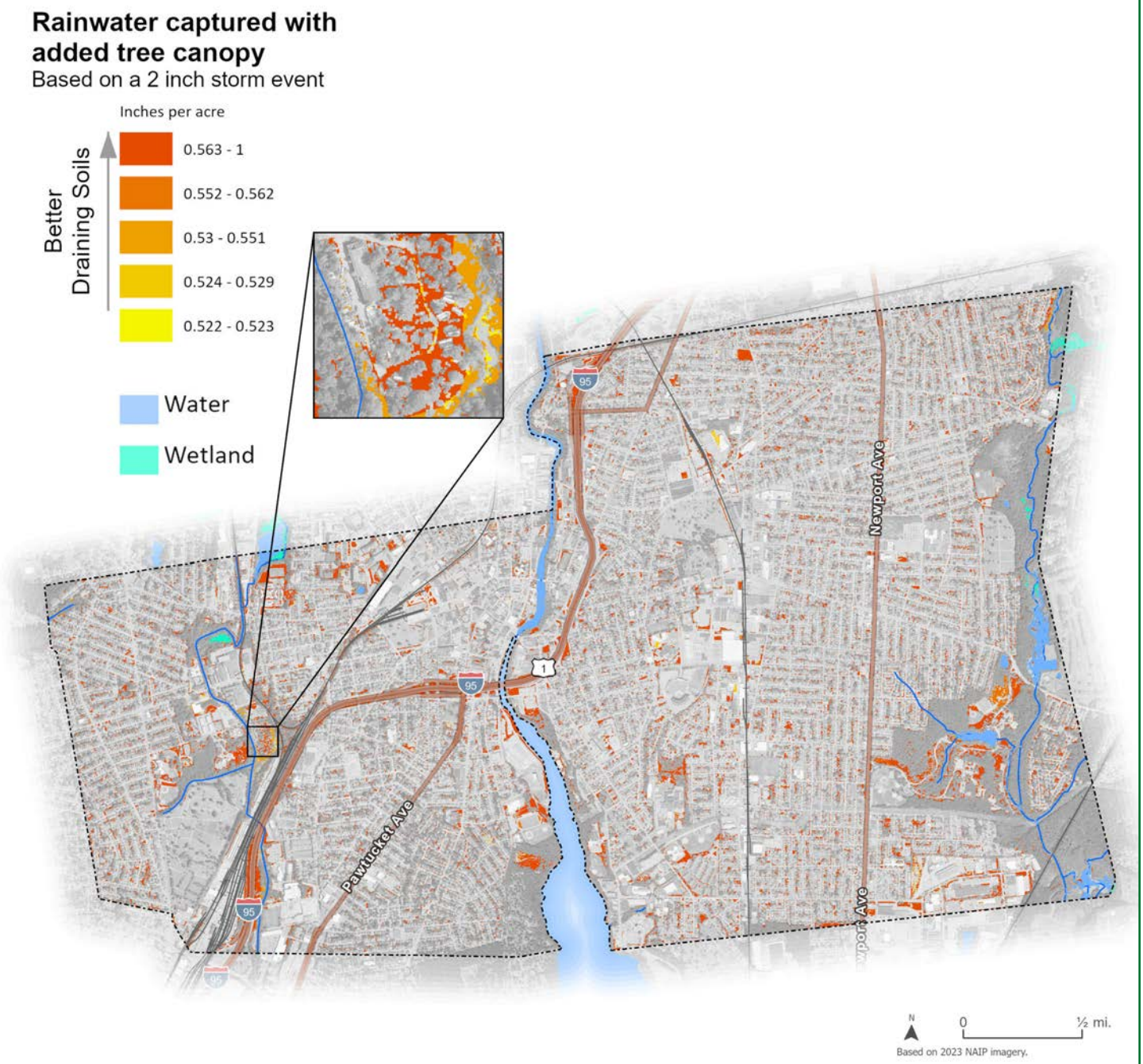
Map of Best Tree Canopy to Save for Stormwater Infiltration

The TSW Tool was applied to map the locations where tree conservation will result in the greatest amount of stormwater capture and infiltration (dark green).



Map of Best Tree Planting Locations for Stormwater Infiltration

The TSW Tool was applied to map locations where planting trees will result in the greatest amount of stormwater capture and infiltration (red).



Well-treed neighborhoods have cleaner air and lower rates of asthma.

Air Quality

Air pollution removal values were calculated by applying the pollution removal values for each acre of tree cover from the i-Tree model. i-Tree is a peer-reviewed software suite from the USDA Forest Service that provides urban and rural forestry assessment tools.

Trees mitigate climate change by storing carbon in their tissue and sequestering atmospheric carbon from carbon dioxide (CO_2) in new tree growth. Current trees in the city are storing 59,868 metric tons of carbon that would otherwise accumulate in the atmosphere and further exacerbate climate change. Trees also capture particulate matter, ground-level ozone (O_3), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) from the air, resulting in better air quality and healthier neighborhoods.

Investments in canopy at the neighborhood level can improve the respiratory health of residents.

Air pollution and greenhouse gases removed annually by trees in Pawtucket						
CO (carbon monoxide)	**NO_2** (nitrogen dioxide)	**O_3** (ozone)	**PM_{10}** (particulate matter 10 microns)	**$PM_{2.5}$** (particulate matter 2.5 microns)	**SO_2** (sulphur dioxide)	**C Seq** (carbon sequestered)
219 lbs	**2,322 lbs**	**23,242 lbs**	**4,037 lbs**	**1,027 lbs**	**671 lbs**	**5,077 metric tons**

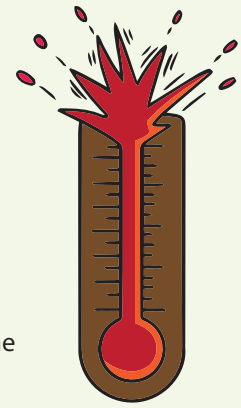
Urban Heat and Equity

Urban heat is a growing concern as extreme heat continues to increase in Rhode Island with the changing climate. In Pawtucket, the number of days above 100˚F is projected to rise from the historic average of 0 per year to 29 per year by the year 2070 (see "Extreme Heat" table below). To reduce temperatures, the City can plant trees to cool the landscape. Inequities in the distribution of tree canopy and opportunities to address them can be identified through tree canopy data, surface temperature data, and U.S. Census data that provides race and income statistics.

What is Tree Equity?

Tree equity ensures all communities have access to the benefits that trees provide. Areas that have been under-resourced, having fewer trees and more heat than the rest of the city, are the focus of tree-planting efforts.

How much hotter is your hometown now than when you were born?



This interactive online tool allows a user to put in their hometown and birthdate to see how their hometown has changed since then and how much hotter it may get. The tool provides the average number of days over 90°F.

https://www.nytimes.com/interactive/2018/08/30/climate/how-much-hotter-is-your-hometown.html

Extreme Heat

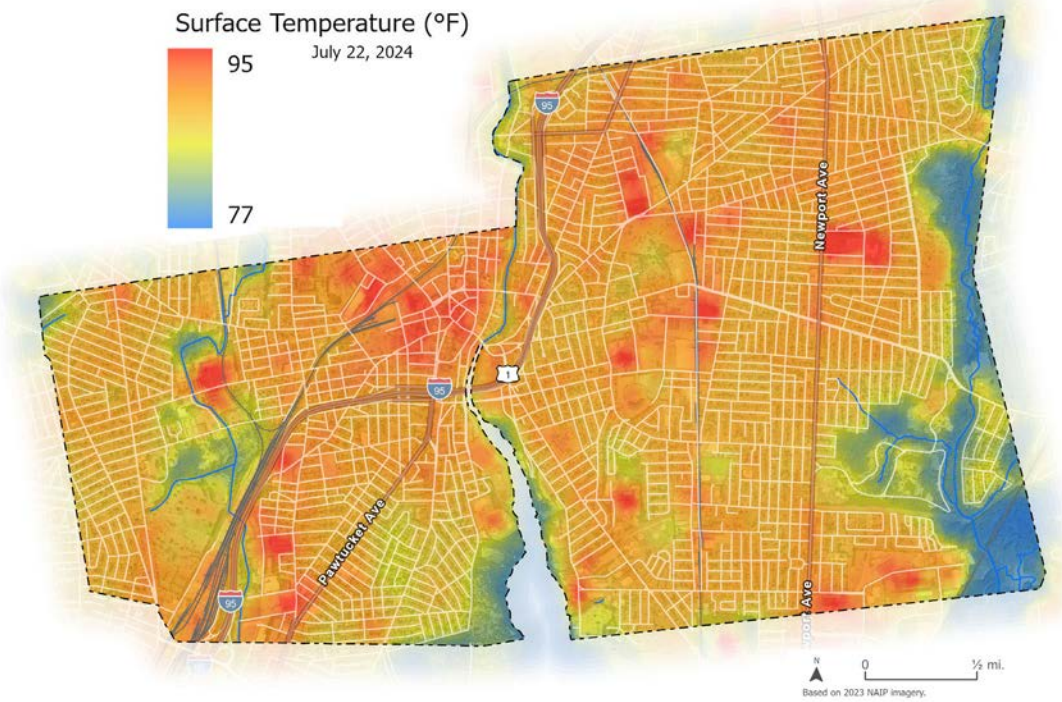
Average days per year temperatures over 100˚F

Where we are now	Where we are currently headed		If bold action is taken
Historically 1971-2000	Midcentury 2036-2065	Late Century 2070-2099	Extreme heat limited to
0 days	**12** days	**29** days	**6** days

In this table "bold action" refers to reductions in greenhouse gases through energy conservation. It does not consider the effects of planting more trees. Source: Union of Concerned Scientists. *2019, Killer Heat Interactive Tool.*

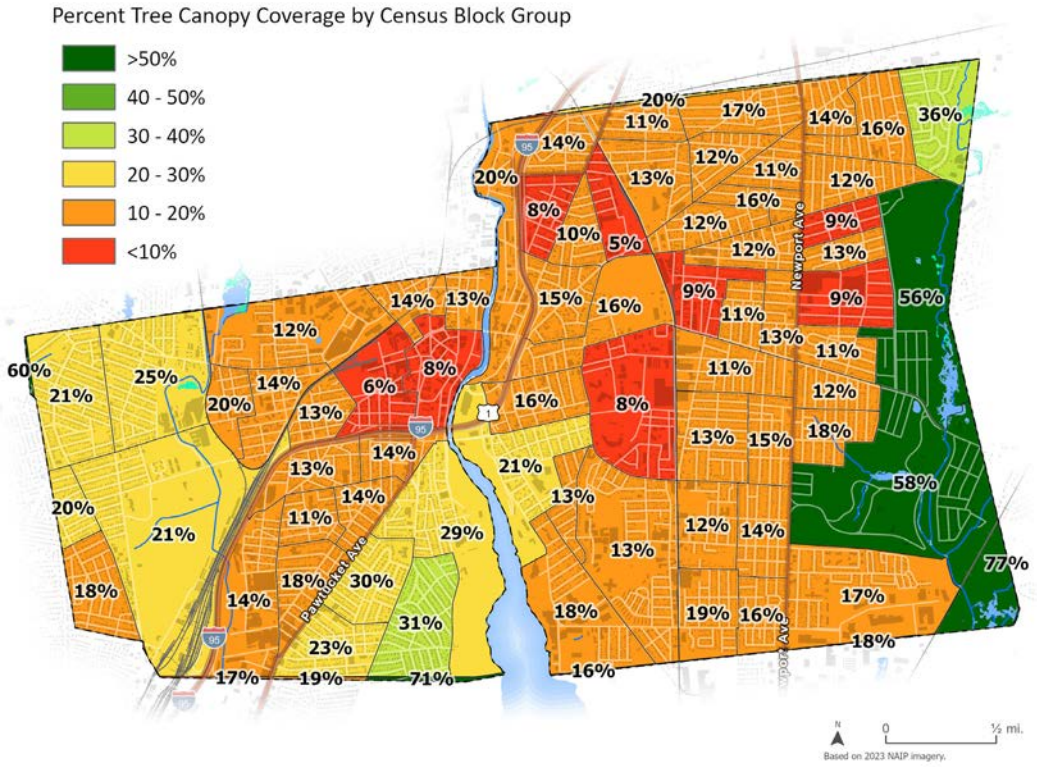
Map of Surface Temperature

The surface temperature map captures the hottest to coolest places in the city on a typical summer day.



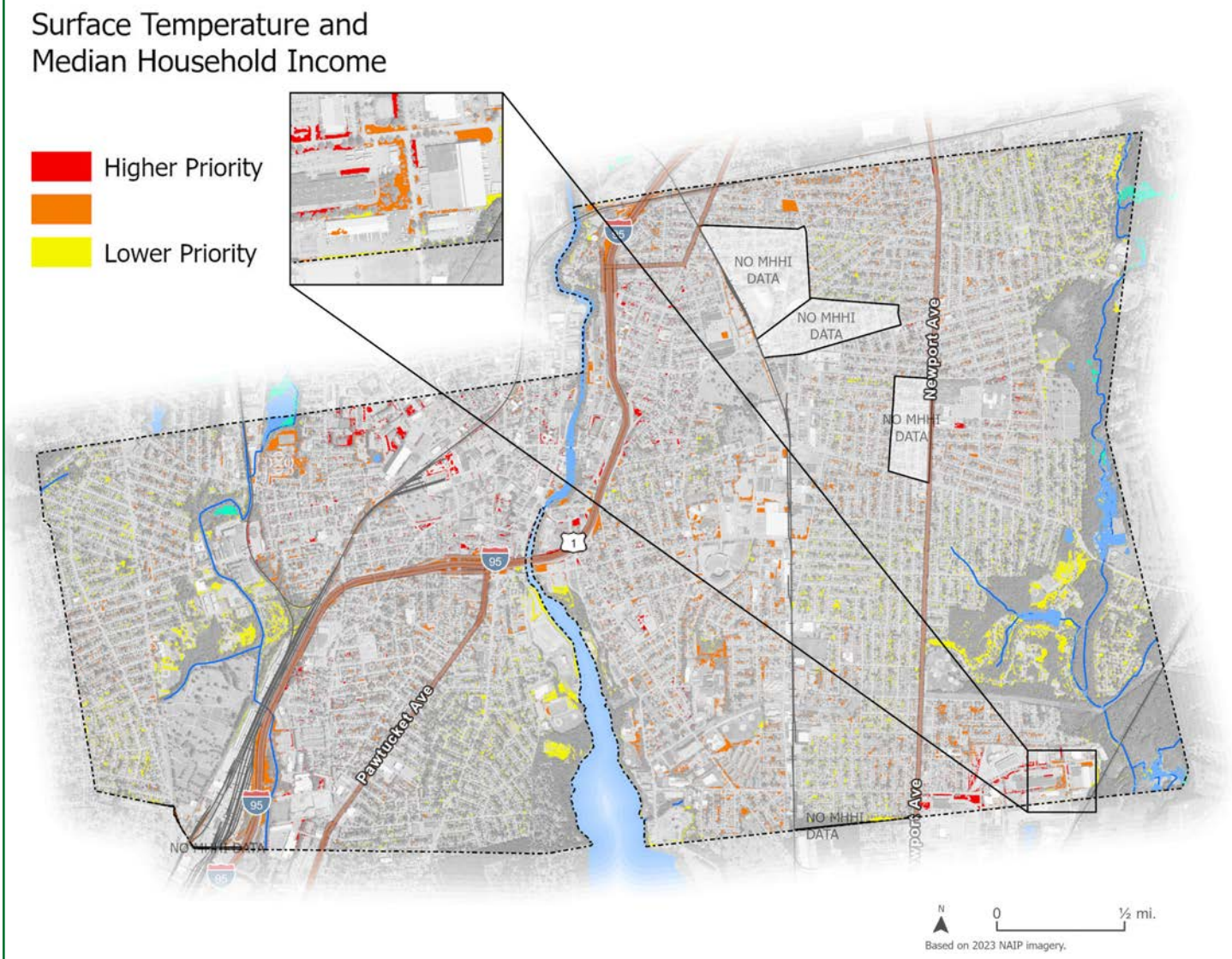
Map of Tree Canopy Coverage by Census Block Group

By combining U.S. Census and tree canopy data, the City can identify equity-based tree planting opportunities.



Map of Heat and Income Priority Tree Planting Locations

This map uses surface temperature data and median household income data to prioritize potential tree planting areas.



Planning and Engagement Process

The City of Pawtucket and the GIC partnered in a ten-month effort to create this Strategic Tree Canopy Plan. Advisory committees made up of representatives from City staff and local community partners met to discuss priorities. They engaged in a series of seven workshops from the spring of 2024 to the winter of 2025 to evaluate tree canopy cover, determine plantable areas, set a canopy goal and evaluate policies and practices that support tree canopy cover. In the summer and fall of 2024, the GIC attended community events and held an open house. GIC continues to engage with City staff, and local partners, to coordinate next steps.

Maps beginning on page 21 show the results of the Tree Canopy Analysis. An assessment of the ecosystem services provided by city trees included:

- A stormwater analysis
- A surface temperature map
- An air quality analysis

Results of these analyses are found on pages 30-35. They were then used to identify opportunities to maximize benefits from future tree planting and retention. In addition, GIC staff conducted a codes and ordinances audit to evaluate the impact of City policies and ordinances on trees, tree care and tree protection. The audit, developed by GIC and used across the U.S., shows which policies contribute to a healthy tree cover and which lead to excessive imperviousness and less green space. Results of the audit were used to inform the final tree canopy cover strategies.

Advisory Committee

During the planning process, a Technical Advisory Committee known as "The Pawtucket Tree Canopy Advisory Committee or TCAC", was created that consisted of City staff across multiple departments and local partners. This committee included representatives from the City of Pawtucket's Mayor's Office, Public Works, Parks Commission, Parks and Recreation, Planning & Redevelopment and Zoning. Local partners on the committee included representatives from Groundwork RI, the Pawtucket & Central Falls Health Equity Zone, and Roots to Empower. Committee members attended workshops and check-ins throughout the planning process and assisted with event organization, information gatherings, and a public open house event. The TCAC reviewed the maps, data, and community input to develop the Strategic Tree Canopy Plan goals and strategies for a healthier Pawtucket.

Community Partners

Throughout the planning process, the City and the GIC met with key community partners to discuss current initiatives and opportunities to work together for a healthier, greener city. Community partners provided support with stewardship, plantings, funding, and outreach. Community partner organizations included:

- The Diocese of Providence
- Groundwork RI
- Pawtucket and Central Falls Health Equity Zone (HEZ)
- Pawtucket Parks Commission
- Roots to Empower
- Blackstone Valley Visitor Center & Museum

Photo credit: GWRI

Groundworks RI is a key community partner that supports tree planting efforts in Pawtucket and participated in the development of this plan.

Public Engagement

Community input and feedback are foundational to the Strategic Tree Canopy Plan. In addition to the planning work undertaken by the advisory committee, this planning process included opportunities for public learning, engagement, and feedback.

On November 14, 2024, the City of Pawtucket co-hosted an open house at the Blackstone Valley Visitor Center, which included tabling by two partners, as well as opening remarks from Mayor Donald Grebien and a presentation from the GIC that introduced the project. Pawtucket Tree Canopy Advisory Committee members were assigned map stations where members from the public were encouraged

to engage in interactive activities by marking up tree canopy maps, pinpointing ecosystem services and identifying potential planting areas. The open house was the result of a collaboration between GIC, the Pawtucket TCAC, and local partner organizations including Groundwork RI, the Pawtucket Parks Commission, and the Pawtucket and Central Falls Health Equity Zone.

In addition to the open house, GIC engaged students at Blackstone Academy Charter School and Shea High School to gather public input and vote on strategies. Attendees were shown Pawtucket's tree canopy maps and provided further comments on strategies to address Pawtucket's urban forest needs. Handouts were also distributed at these events requesting further comments or announcing opportunities to participate in neighborhood planning efforts to improve Pawtucket's tree canopy.

The public open house included a mix of information sharing, discussion, and opportunities for feedback.

Summary of Community Findings

During the ten-month planning process, the City and GIC staff participated in seven public outreach events: Garden Time Green Jobs Trainings, Shea High School assembly, Blackstone Academy Charter School science class, Youth 4 Urban Sustainability Summer Program with the Coalition Center for Environmental Sustainability, and Health Equity Zone Community Learning Events, where community members got to vote on strategies for the city's tree canopy. An online survey was promoted through the City of Pawtucket and the Pawtucket and Central Falls Health Equity Zone and was up for 6 weeks in the fall of 2024. Over 52 responses from community members were recorded. The strategies below reflect the combined responses from all survey respondents (online, open house, and outreach events).

Community Participation Interest and Top 5 Favorite Strategies

The following is a summary of online votes, while a full copy of the online survey questions can be found in Appendix C.

Question 1: Are you interested in participating in future tree events in Pawtucket?

Survey respondents are likely to participate in future tree-related events with 52% saying they were interested in getting involved in the neighborhood tree committee, tree stewards course and/or community tree planting events.

Question 2: Pick your 5 favorite strategies for Pawtucket's Tree Canopy.

This question referred to the proposed strategies identified by the Tree Advisory Committee and shared during the online survey, at outreach events and the open house. The **top five most voted** strategies (with number 5 being a tie between two different strategies) were:

1. **Revamp the City's free street program to allow the City to plant trees in front or side yards. (37 votes)**
2. **Hire or contract a City Arborist to manage city trees. (35 votes)**
3. **Publish an Urban Forest Management Plan that encourages the routine and equitable maintenance of the city's public trees. (33 votes)**
4. **Complete and maintain a city-wide inventory of public trees. (31 votes)**
5. **Launch a public education campaign about the stormwater benefits of trees. (29 votes)**

Canopy Goal and Implementation Strategies

Recent national data show urban and suburban tree canopy cover is trending downwards at a rate of 175,000 acres lost per year – approximately 36 million trees lost annually (Nowack and Greenfield 2012). Trees are lost due to development, disease, storms, and old age. Pawtucket is no exception. Fortunately, this loss can be managed to maintain canopy at 21%, and this plan outlines strategies to do so.

Canopy Goal

This goal accounts for preserving overall city canopy coverage by replacing trees that are lost. Achieving this goal requires a coordinated effort by both the City and private property owners. Since city-owned land is estimated to make up 20% of the total land area, the City is committed to replanting 20% of any annual tree loss, while the remaining 80% will be replanted on private property by residents, businesses, and developers. Estimating annual tree loss at 175 trees, the City will plant 35 trees per year on city-owned land and will engage with local partners, private landowners and businesses through outreach, education, tree planting and tree giveaways to encourage the planting of 140 trees per year on private property.

As this is a new program, planting numbers may vary from year-to-year. The City is already committed to planting 500 new trees between 2024-2029 on public and private property. This effort is supported by the $3 million Inflation Reduction Act award the City received from the USDA Forest Service. As

Pawtucket City Goal—
Maintain tree canopy coverage at 21% over the next 10 years

Top Objectives to Achieve This Goal

1. Estimating annual tree loss at 175 trees, the City will plant 35 trees per year on city-owned land
2. The City will engage local partners, private landowners and businesses through outreach, education, tree planting and tree giveaways to encourage the planting of 140 trees per year on private property.
3. The newly appointed Resiliency Manager will be responsible for implementing these strategies and monitoring progress towards the 2035 tree canopy coverage goal.

Trees planted recently by Groundwork RI at Curvin-McCabe Elementary School help meet the goal of planting 35 trees annually on City-owned land.

Many streets and public properties, such as this dog park, have room for more trees. City-owned land is estimated to make up 20% of the total land area.

the City's capacity and the urban forestry program expands, the number of trees planted and maintained is expected to increase in partnership with the community to achieve the goal. The newly appointed Resiliency Manager will be responsible for implementing these strategies and monitoring progress towards the 2035 tree canopy coverage goal.

The tree canopy goal and objectives for Pawtucket's urban forest are on the following pages. These, and other practices, will provide long-term care, protection, and best planting practices for the urban forest, and will ensure that investments in city trees pay dividends by reducing stormwater runoff, cleaning the air and water, lowering energy bills, raising property values, and providing natural beauty long into the future.

Many private yards and parking lots have room for planting trees to add shade, beauty, and improve air quality.

Strategies

Goal:

Maintain tree canopy cover at 21% over the next 10 years.

Objective 1: Hire or contract a City Arborist to manage city trees.

Public trees are green infrastructure and like any other infrastructure requires regular maintenance and upkeep by a professional. Hiring or contracting a City Aborist will allow the City to better manage public trees for health and longevity.

Responsible Parties: City Administration, Planning & Redevelopment

Timeline: 3 months

Objective 2: Complete and maintain a city-wide inventory of public trees.

A tree inventory provides additional data about the city's urban forest that a canopy assessment cannot, such as the species, age, health and maintenance needs of individual trees. A complete inventory of all public trees in the city will support long-term management of public trees.

Responsible parties: Resiliency Manager, GIS Coordinator, Planning & Redevelopment, Public Works

Potential Partners: RI Department of Environmental Management's Division of Forest Environment, Urban and Community Forestry Program (or DFE), Pawtucket Central Falls Health Equity Zone, Groundwork RI, Pawtucket Green Life

Timeline: 2 years

Tree inventory data will help the City make appropriate urban forest management decisions.

Objective 3: Publish a Tree Standards and Guidelines Manual that is referenced in the tree ordinance.

This strategy would charge the City with collaborating with the Parks Commission to develop a Tree Standard Manual. It could also include details for planning documents and guidance on best practices for protecting, planting, and caring for public trees. The manual should be referenced in the City's tree ordinance so that it can easily be updated to include tree planting and care guidelines that align with the most recent industry standards from the American National Standards Institute (ANSI).

Responsible party: Resiliency Manager, Public Works, Parks Commission

Potential Partners: RI Division of Forest Environment

Timeline: 1-2 years

Objective 4: Launch a public education campaign to increase awareness about the benefits of trees.

Trees are good for our health and well-being. They beautify our communities and can lower our energy bills, improve air quality, reduce flooding, and so much more. Increasing public awareness of these benefits can generate greater public support and funding for trees.

Responsible party: Mayor's Office

Potential Partners: Pawtucket Green Life, Pawtucket and Central Falls Health Equity Zone, Groundwork RI Youth Green Team, RI Tree Council, Zoning Task Force

Timeline: Ongoing (3-4 years)

Trees need room to grow both above and below ground. The City and residents can work together to create more space for trees and their roots.

By selecting appropriate planting sites using best practices and standards, arborists can avoid needing to prune trees around other infrastructure conflicts.

The City and partners can use data from this project to create more public education materials, display them around the city and via social media, and raise awareness about the benefits of trees.

Objective 5: Publish an Urban Forest Management Plan that encourages the routine and equitable maintenance of the city's public trees.

The City does not currently have an urban forestry management plan. Such a plan provides a five-year action strategy for managing the urban forest proactively rather than being reactionary. A plan can also ensure more equitable services for public tree care.

Responsible party: Resiliency Manager, City Grant Administrator, Public Works, Parks Department

Potential Partners: Division of Forest Environment, Pawtucket & Central Falls Health Equity Zone, Groundwork RI, Parks Commission

Timeline: 3-4 years

The City and its partners can use data from the tree inventory and canopy data to develop a management plan that provides routine maintenance to city trees.

Objective 6: Adopt a municipal stormwater utility fee to reduce impervious surface cover and that incentivizes tree planting and built green infrastructure practices.

Over half of the city's land area is impervious (e.g., concrete, buildings, pavement). A stormwater utility fee would charge property owners based on the amount of impervious surface and incentivize or provide credit for properties who add trees and other green infrastructure.

Responsible party: Public Works, Planning & Redevelopment, City Administration, and Resiliency Manager

Potential Partners: Green Infrastructure Center, RI Green Infrastructure Coalition

Timeline: 4-5 years

Large areas of impervious surfaces contribute to stormwater issues and urban heat islands. The City needs strategies, such as a stormwater utility fee, to reduce the amount of impervious surfaces created during redevelopment.

Objective 7: Revamp the City's free street program to allow the City to plant trees in front or side yards.

The City's current street tree program is limited to planting trees in the public right-of-way (e.g. sidewalks). The request-based program does not prioritize areas with low tree canopy cover, which can further inequities in tree cover. This objective aims to increase tree canopy cover along roadways with the lowest tree canopy cover and take advantage of front and side yards with better-growing conditions that allow the tree to thrive.

Responsible party: Public Works, Planning & Redevelopment, Resiliency Manager

Potential Partners: Parks Commission, RI Tree Council, Groundwork RI

Timeline: 1-2 years

Objective 8: Adopt a city-wide Green Complete Streets Ordinance.

The City's current green and complete streets ordinance only applies to the Conant Thread District (around the train station). A city-wide green and complete streets ordinance would ensure that new projects are designed to support all road users and create better spaces for trees and stormwater management.

Responsible party: Planning & Redevelopment, Public Works, City Administration, Pawtucket City Council

Potential Partners: GIC Neighborhood Tree Committee, Pawtucket Central Falls HEZ, Groundwork RI, RI Department of Transportation (RIDOT), Grow Smart RI

Timeline: 1-2 years

Residential yards are some of the best planting spots for trees because of greater soil area. The City wants to incentivize residential homeowners with free trees to plant in their yards and provide benefits to the City rights-of-way.

The bioswales with trees adjacent to the sidewalk along Pine Street is an example of a Complete Green Street, where pedestrian and bicycle infrastructure also accommodate trees and stormwater management practices.

Objective 9: Prioritize city tree resources and outreach to areas with the lowest relative household income combined with disproportionately higher exposure to heat and flooding.

Before the Green Infrastructure Center's Tree Canopy Assessment, the City lacked data to inform the equitable distribution of urban forestry spending. This strategy encourages the City to combine community voices with a data-informed approach to determine where resources should be prioritized to protect frontline communities most vulnerable to climate change.

Responsible party: Planning & Redevelopment, Public Works, City Administration, Resiliency Manger

Potential Partners: Green Infrastructure Center, Green Life Pawtucket, Pawtucket Central Falls HEZ, Groundwork RI, Roots2Empower

Timeline: 6 months to 1 year + ongoing

GIC is working with community members to identify areas that most need trees and then develop planting projects to put more trees in those neighborhoods.

Objective 10: Update the City's policies to require minimum tree canopy cover amounts and enforce these standards for new developments based on zoning class.

Impervious surfaces (e.g., concrete, pavement, buildings, etc.) can increase flooding and heat. The City's current zoning ordinance does not require a minimum tree canopy cover for any zoning class, which results in excessive impervious surfaces for many zoning classes. For instance, the City's industrial and commercial zoned areas have up to 86% impervious surfaces.

Responsible party: Planning & Redevelopment and the Zoning Task Force

Timeline: 2-3 years

New zoning requirements that increase tree canopy and decrease impervious surfaces will reduce urban heat island and stormwater impacts as the city redevelops.

Conclusion

Pawtucket has new data and strategies in this plan to guide the management of its urban forest. Implementing these tree strategies will ensure that current and future residents enjoy the continued benefits of trees and a healthy, sustainable, and beautiful city for all.

This plan is a living document that is intended to be integrated into on-going staff work plans, annual budgets, grant proposals, and partnerships with outside agencies. It is recommended that an implementation committee or Tree Board meet at least quarterly to document the plan's progress and adapt its strategies as needed.

Appendixes

Appendix A: Funding Opportunities

For tree campaigns to be successful, there must be dedicated funds. These funds can come from a variety of sources, including federal, state, local, and private resources. Examples of these opportunities are listed below.

The Pawtucket Foundation

https://www.pawtucketfoundation.org/

- A foundation local to Pawtucket that "advocates and provides a catalyst for downtown, riverfront and transportation gateway enhancements within the City of Pawtucket. As civic entrepreneurs, it fosters a vision of the community's future by mobilizing and coordinating research, information, talent and resources to positively impact the city".

Rhode Island Division of Forest Environment

https://dem.ri.gov/natural-resources-bureau/agriculture-and-forest-environment/forest-environment/urban-and-community

- Tree Equity RI Grant Program
- Urban and Community Forestry Grant Program
- Community Design Assistance

Rhode Island Infrastructure Bank

https://www.riib.org/solutions/programs/climate-resilience

- Municipal Resilience Program
- Stormwater Project Accelerator

Rhode Island Foundation

https://rifoundation.org

- Donations to a public entity must be held in a trust or endowment

Rhode Island Commerce

https://commerceri.com/main-street-ri-streetscape-improvement-fund

- Main Street Rhode Island Streetscape Improvement Fund

Arbor Day Foundation

https://www.arborday.org

- Distributes various tree planting grants aimed to increase tree canopy in communities or aid communities recovering from natural disasters in restoring their urban forest.

Appendix B: References

Akbari, Hashem, Melvin Pomerantz, and Haider Taha. 2001 "Cool Surfaces and Shade Trees to Reduce Energy Use And Improve Air Quality in Urban Areas." *Solar energy*, 70, (3): 295-310.
https://www.sciencedirect.com/science/article/abs/pii/S0038092X0000089X?via%3Dihub

Arbor Day Foundation. 2025. "How to Plant Trees to Conserve Energy for Summer Shade." Accessed March 17th, 2025.
https://www.arborday.org/tree-resources/summer-shade

Benedict, Mark A., and Edward T. McMahon. 2006. *Green Infrastructure: Linking Landscapes and Communities*. Island Press.

Centers for Disease Control and Prevention. 2024. "Heat and Older Adults." Accessed March 17th, 2025.
https://www.cdc.gov/heat-health/risk-factors/heat-and-older-adults-aged-65.html

Center for Urban Forest Research and Southern Center for Urban Forestry Research & Information. 2006. "The Large Tree Argument." Accessed March 17th, 2025.
https://ctufc.org/wp-content/uploads/2018/03/The-Large-Tree-Argument.pdf

Ellison, David, Cindy E. Morris, Bruno Locatelli, Douglas Sheil, Jane Cohen, Daniel Murdiyarso, Victoria Gutierrez et al. 2017. "Trees, forests and water: Cool insights for a Hot world." *Global Environmental Change* 43: 51-61.
https://www.sciencedirect.com/science/article/pii/S0959378017300134?via%3Dihub

Endreny, Theodore A. 2018. "Strategically Growing the Urban Forest Will Improve Our World." *Nature Communications* 9 (1160).
https://doi.org/10.1038/s41467-018-03622-0

Faber Taylor, Andrea, and Frances E. Kuo. 2011. "Could Exposure to Everyday Green Spaces Help Treat ADHD? Evidence from Children's Play Settings." *Applied Psychology: Health and Well Being* 3 (3): 281-303.
https://iaap-journals.onlinelibrary.wiley.com/doi/10.1111/j.1758-0854.2011.01052.x

Kuehler, Eric, Jon Hathaway, and Andrew Tirpak. 2017. "Quantifying the Benefits of Urban Forest Systems as a Component of the Green Infrastructure Stormwater Treatment Network." *Ecohydrology* 10 (3).

McPherson, E. Gregory, and Jules Muchnick. 2005. "Effect of Street Tree Shade on Asphalt Concrete Pavement Performance." *Journal of Arboriculture* 31 (6): 303-310.

McPherson, E. Gregory, David Nowak, Gordon Heisler, Sue Grimmond, Catherine Souch, Rich Grant, and Rowan Rowntree. 1997. "Quantifying Urban Forest Structure, Function, And Value: The Chicago Urban Forest Climate Project." *Urban ecosystems* 1 (1): 49-61.

National Weather Service. 2025. "NWS Climate Information." Accessed July 3rd, 2025. https://www.weather.gov/wrh/Climate

Nowak, David J., and Eric J. Greenfield. 2012. "Tree and Impervious Cover Change in U.S. Cities." *Urban Forestry & Urban Greening* 11: 21-30. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1239&context=usdafsfacpub

Popovich, Nadia, Blacki Migliozzi, Rumsey Taylor, Josh Williams and Derek Watkins. 2018. "How Much Hotter Is Your Hometown Than When You Were Born?" *New York Times*. https://www.nytimes.com/interactive/2018/08/30/climate/how-much-hotter-is-your-hometown.html

Rao, Meenakshi, Linda A. George, Todd N. Rosenstiel, Vivek Shandas, and Alexis Dinno. 2014. "Assessing the Relationship among Urban Trees, Nitrogen Dioxide, and Respiratory Health." *Environmental Pollution* 194: 96–104. https://www.sciencedirect.com/science/article/abs/pii/S0269749114003030

Tilt, Jenna H., Thomas M. Unfried, and Belen Roca. 2007. "Using Objective and Subjective Measures of Neighborhood Greenness and Accessible Destinations for Understanding Walking Trips and BMI in Seattle, Washington" *American Journal of Health Promotion* 21 (4): 371-379. https://journals.sagepub.com/doi/10.4278/0890-1171-21.4s.371

Union of Concerned Scientists. 2019, Killer Heat Interactive Tool. Accessed March 17th, 2025. https://www.ucsusa.org/resources/killer-heat-interactive-tool

U.S. Environmental Protection Agency, 2013. "Stormwater to Street Trees." Accessed March 17th, 2025. https://www.epa.gov/sites/production/files/2015-11/documents/stormwater2streettrees.pdf

U.S. EPA Watershed Academy. "Growth and Water Resources," Slide 10, Development and Runoff Graphic. Accessed March 17th, 2025. https://cfpub.epa.gov/watertrain/moduleFrame.cfm?parent_object_id=170

Wolf, Kathleen L. 2007. "City Trees and Property Values." *Arborist News* 16 (4): 34-36.

Xiao, Qingfu, E. Gregory McPherson, Susan L. Ustin, Mark E. Grismer, and James R. Simpson. 2000. "Winter Rainfall Interception by Two Mature Open-Grown Trees in Davis, California" *Hydrological Processes* 14 (4): 763-784

Appendix C: Community Feedback

The following questions were posed to the community at 3 different events in 2024:

- Pawtucket Tree Canopy Open House
- Blackstone Academy classroom
- Health Equity Zone Community Learning events & collaborative meetings

Following is a compilation of all questions and public input from the online survey.

Q1. Are you interested in volunteering for future tree planting events in Pawtucket?	
Response	Votes
Yes	18
No	19

Q2. Pick your 5 favorite strategies for Pawtucket's Tree Canopy.	
Strategies	Votes
Hire a tree professional to have on call or as full-time staff to review development plans, enforce tree protection and planting regulations, and manage contractors.	35
Complete and maintain a city-wide inventory of trees documenting tree species, location, size, and health (pests and disease).	31
Develop a Tree Standards Manual with guidelines for tree planting and maintenance.	10
Launch a public education campaign to increase awareness about the benefits of trees.	29
Publish a management plan that encourages routine and equitable maintenance and care of the city's trees and addresses ongoing issues such as pests and diseases that threaten existing trees.	33
Adopt a municipal fee to reduce impervious surface cover while incentivizing tree planting and building other green infrastructure.	20
Revamp the City's free street tree program to allow the City to plant trees in front or side yards; target outreach and prioritize resources for streets with less than 10% tree canopy cover.	37
Adopt a city-wide green and complete streets ordinance.	22
Focus City resources and outreach in medium-high priority areas that factor in household income, heat, and local flooding.	25
Update and enforce the City's zoning to require minimum tree canopy cover amounts for new developments by zoning class.	27
Other: • "Offer portable air purifiers and filters, for heating, ventilation, and air conditioning systems". • "Save Morley Field!" • "We need more trees in Woodlawn and along Lonsdale Ave." • "What are the plans for more trees at the site for the new unified HS?" • "An alternative to traditional single and isolated street trees, planting Miyawaki Forests (urban pocket forests) can create self-sustaining ecosystems within three years, requiring minimal maintenance." • "Study out of Germany in 206: 'Radio frequency radiation damages tree canopy' details over 60 instances of damaged trees near radio frequency antennas (cell towers, police transmitter antennas, etc.). The side of the tree facing the cell towner usually shows more damage.	

Q13. Are you interested in participating in the Pawtucket & Central Falls Neighborhood Committee?	
Response	Votes
Yes	9
No	17
Potentially, I need to know more	11

Q4. How did you hear about the survey?	
Response	Votes
The Mayor's Newsletter	6
A church announcement	0
Word of mouth (friends, family, neighbors, etc.)	3
Flyer	2
Other	26

Q5. Is there anything else you would like to share?
Additional Comments
"We should be planting sidewalk tree varieties that do not destroy our sidewalks, curbs, streets. Chinese elm is an awful sidewalk tree. How was this bad decision made?"
"We desperately need more tree cover and incentives for landlords to plant and maintain trees, since so many residents are renters."
"Thank you for making trees a priority!"
"Some trees need maintenance to strengthen their longevity. When the City removes trees, can they replace with the same number of trees? We're losing time -- esp. on Roosevelt X Main St, 4 trees were taken out but only 2 were replanted."