



# Tacoma Schools, Urban Heat and Trees

Which Tacoma schools would benefit the most from more trees?

Discover the Benefits of  
Trees for Tacoma Schools

## Ten Priority Schools

Ten schools were identified as priorities for greening activities to mitigate urban heat and environmental inequities.

# Tacoma Schools, Urban Heat and Trees

## Foreword

# Report Background

## *WSU Urban Forest Health Lab*

Faith Dewitz, Joseph Hulbert, WSU Urban Forest Health Lab, Washington State University, Puyallup Research and Extension Center. June, 5, 2023. <https://storymaps.arcgis.com/stories/0b8e2570da4a47d3a6ffb0907b738cea>

This report was prepared by Faith Dewitz and Joseph Hulbert in Spring 2023. Data used in these analyses were downloaded in that spring and may not be representative of current conditions. For example, schools may have been moved or renovated since this report was generated.

The objectives of this Report are to help guide the equitable greening of public schools in Tacoma, discuss barriers, and share resources.

This report was compiled through the generous support of the Albert Victor Ravenholt Fund.

### **More information**

WSU Urban Forest Health Lab, <https://treehealth.wsu.edu>

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# Tacoma Schools, Urban Heat and Trees

## The Problem

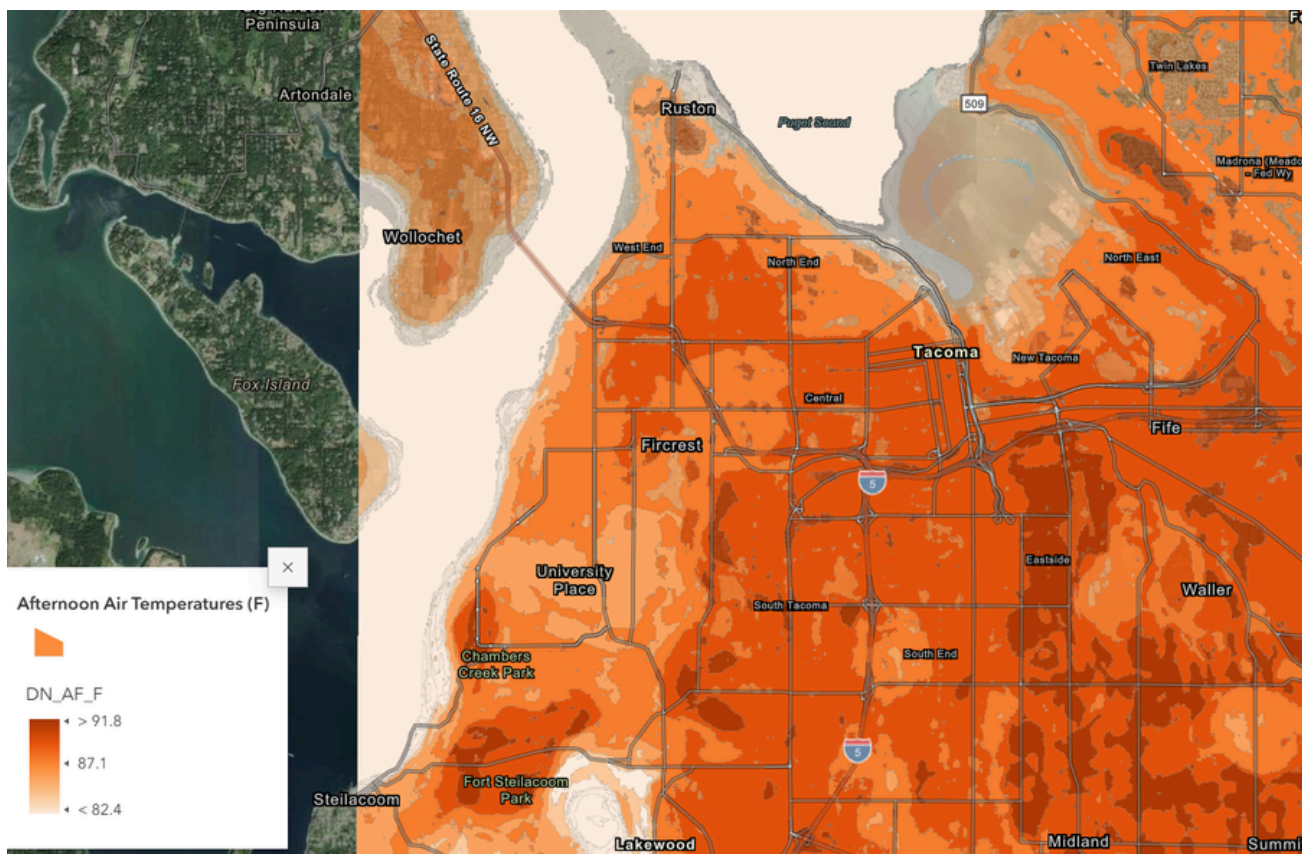
# Some regions of Tacoma are hotter than others.

### *Heat Disparities within Tacoma*

Communities in urban heat islands are more vulnerable to the impacts of heat waves and extreme weather events influenced by climate change.

Disadvantaged communities are disproportionately located in areas with higher heat and fewer resources for cooling, such as trees and parks.

Darker shades on the map indicate higher afternoon temperatures.



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# Can Tacoma Schools be Oases in Urban Heat Islands?

## *Using Trees to Reduce Urban Heat Disparities*

Many Tacoma Public Schools are present within urban heat islands.

These school grounds are open to the public and could be designed to provide shade to the surrounding community, possibly serving as refuge during heat waves.

Planting trees in hotter areas is one method to mitigate the impacts of urban heat islands.

Grounds of many Tacoma Public Schools could be improved to reduce the impacts of heat waves on surrounding communities.

Many schools could support more dense 'school forests', but what are the barriers and which schools would benefit the most?



# Tacoma Schools, Urban Heat and Trees

## The Benefits of Trees for Tacoma Schools

Urban trees provide many benefits. Studies have shown trees provide:

- Shade / cooling
- Rainfall interception
- Water storage
- Soil filtration
- Nutrient Cycling
- Wildlife habitat
- Air purification

Urban trees are also associated with:

- Building energy savings
- Reduced crime
- Higher property values
- Noise reduction
- Food production
- Mental health benefits
- Connections to nature

Unfortunately, not all neighborhoods in Tacoma have access to the same benefits of trees.



# Tacoma Schools, Urban Heat and Trees

## Prioritizing Schools

# Prioritizing Schools & School Disparities

There are many reasons for the inequities between neighborhoods and schools throughout Tacoma. Many of the disparities across Tacoma are likely systemic and related to historical racist practices, well documented in other cities. For example, [Hoffman et al. \(2020\)](#) found strong links between historical housing policies and land surface temperatures in an assessment of 108 cities.

Tacoma Schools may have different needs depending on the area they are located. Some schools are present within heat islands, where others are not.

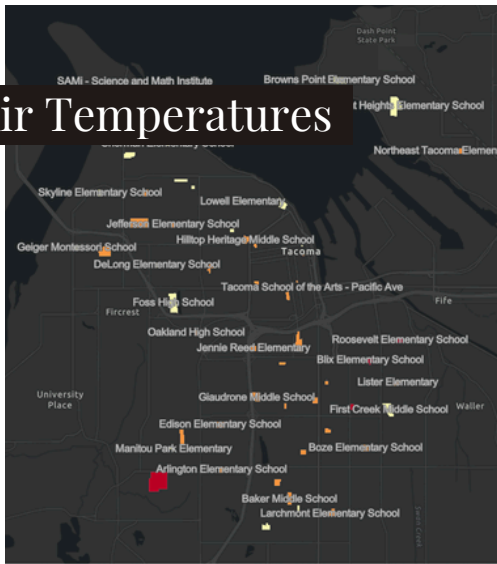
We prioritized schools based on five metrics, including data from the broader area (e.g. equity index values) and data specific to the school ground (e.g. existing canopy cover). The ranks of each school are shared for each metric and then averaged for an overall summary.

Spatial data for Tacoma School's grounds were collected from [Pierce County's Open GeoSpatial Data Portal](#).



# Datasets Used to Rank Schools

## Air Temperatures



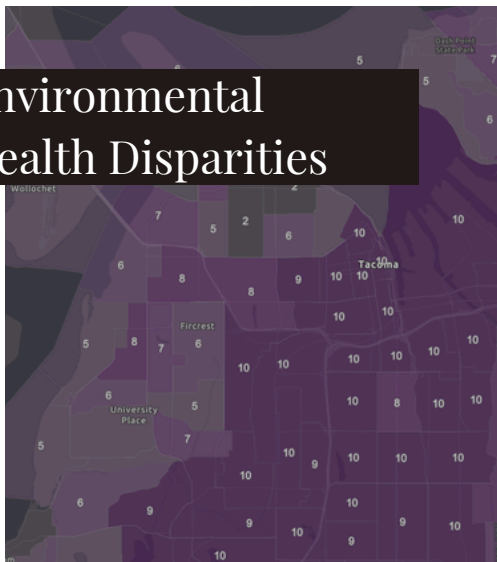
Afternoon air temperature data for each school were extracted from the [City of Tacoma and Portland State University Assessment](#).

## Urban Tree Canopy and Street Trees



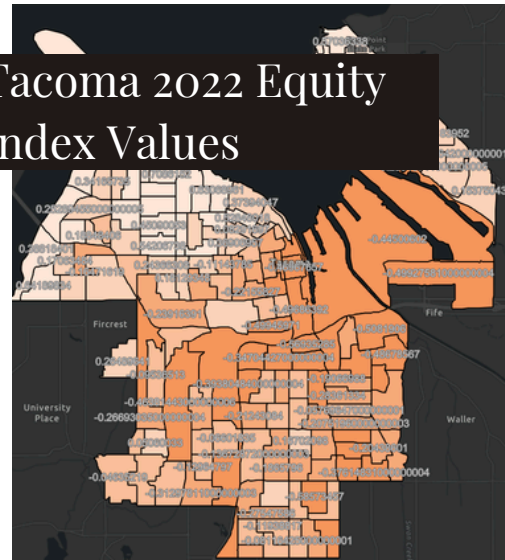
Urban tree canopy data were extracted from [PlanITGeo's 2018 canopy cover assessment](#). Street trees inside school grounds were quantified using Google Street View and Google Maps.

## Environmental Health Disparities



Environmental Health Disparity (EHD) Ranks were extracted for each school based on the [Washington Tracking Network's EHD Rank Map](#) (version 2).

## Tacoma 2022 Equity Index Values

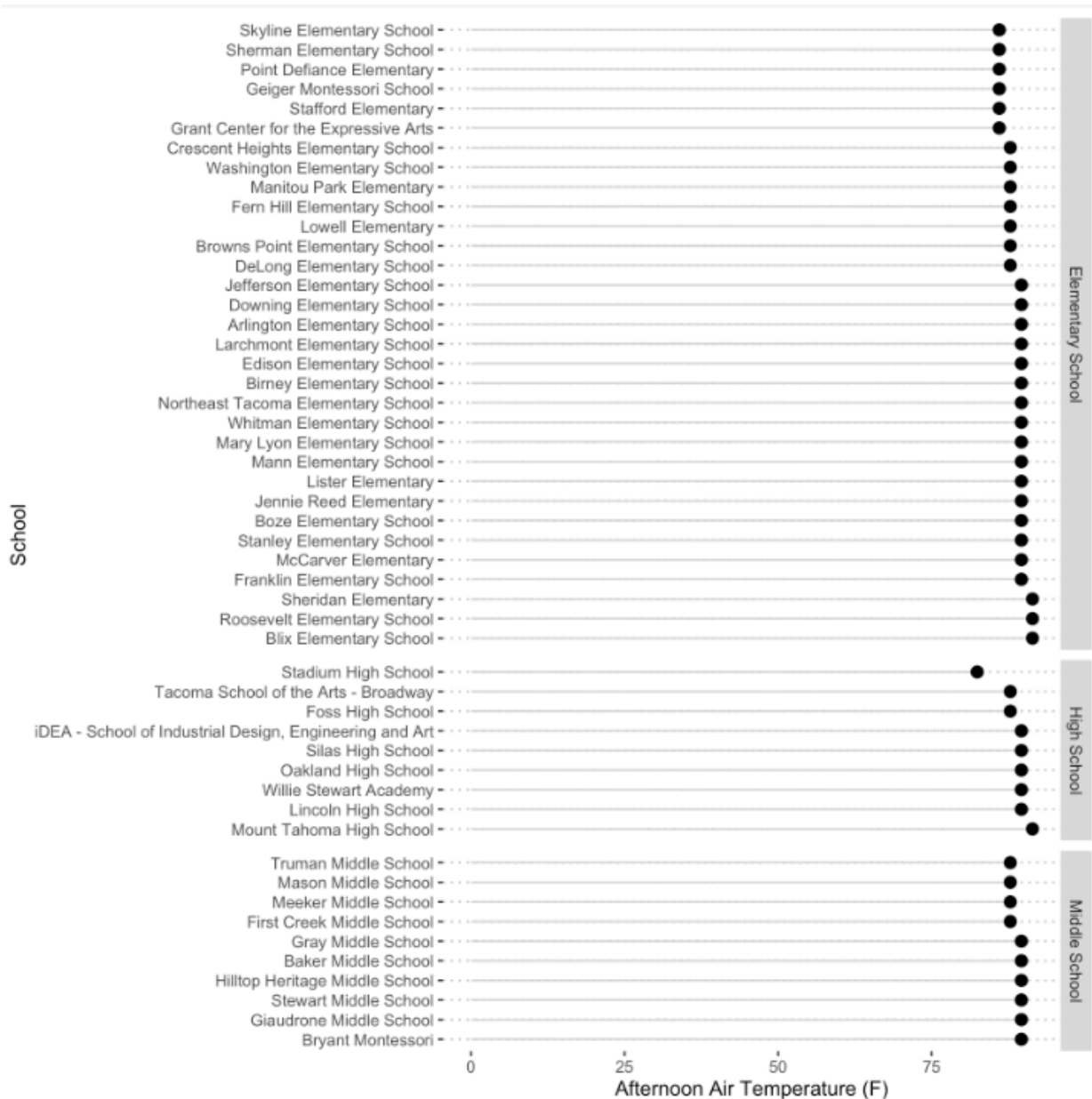


Equity Index values were extracted from districts for each school using data from the City of Tacoma's [2022 Tacoma Equity Index Map](#).

# Results

## Air Temperatures

This plot shares modeled afternoon air temperatures for school grounds on July 28, 2018 from the [Portland State University Assessment](#). Schools are ordered from lowest to highest afternoon temperature in each school type.



# Tacoma Schools, Urban Heat and Trees

## Results

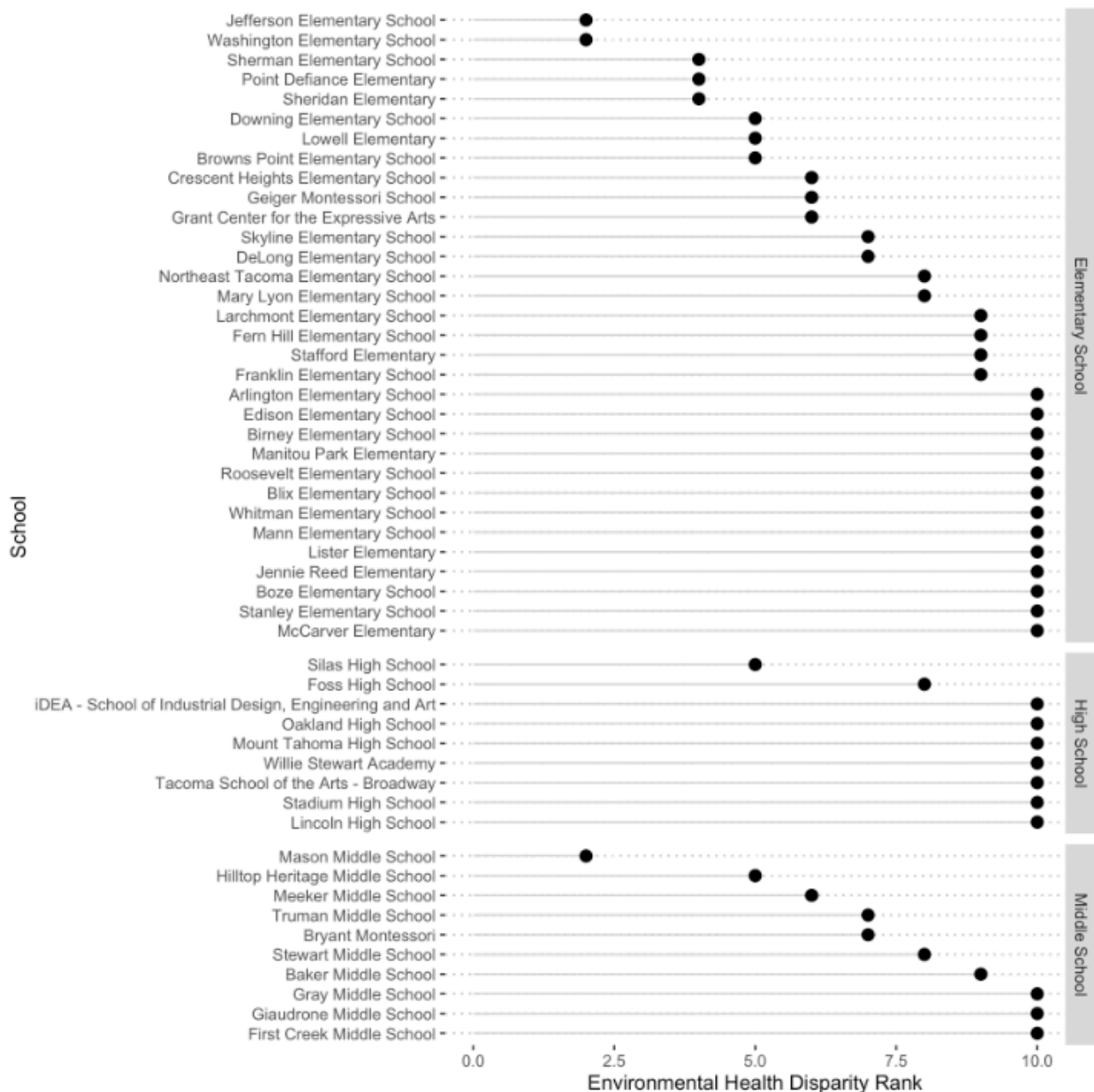
### Schools and Environmental Health

### Disparity Ranks

This plot shows the Environmental Health Disparity Rank for the district containing each school. Schools are ordered from lowest to highest Environmental Health Disparity Rank in each school type.

Many of Tacoma's public schools have high environmental health disparity.

Nearly half of Tacoma's public schools are located in areas ranked the worst for environmental health disparities.

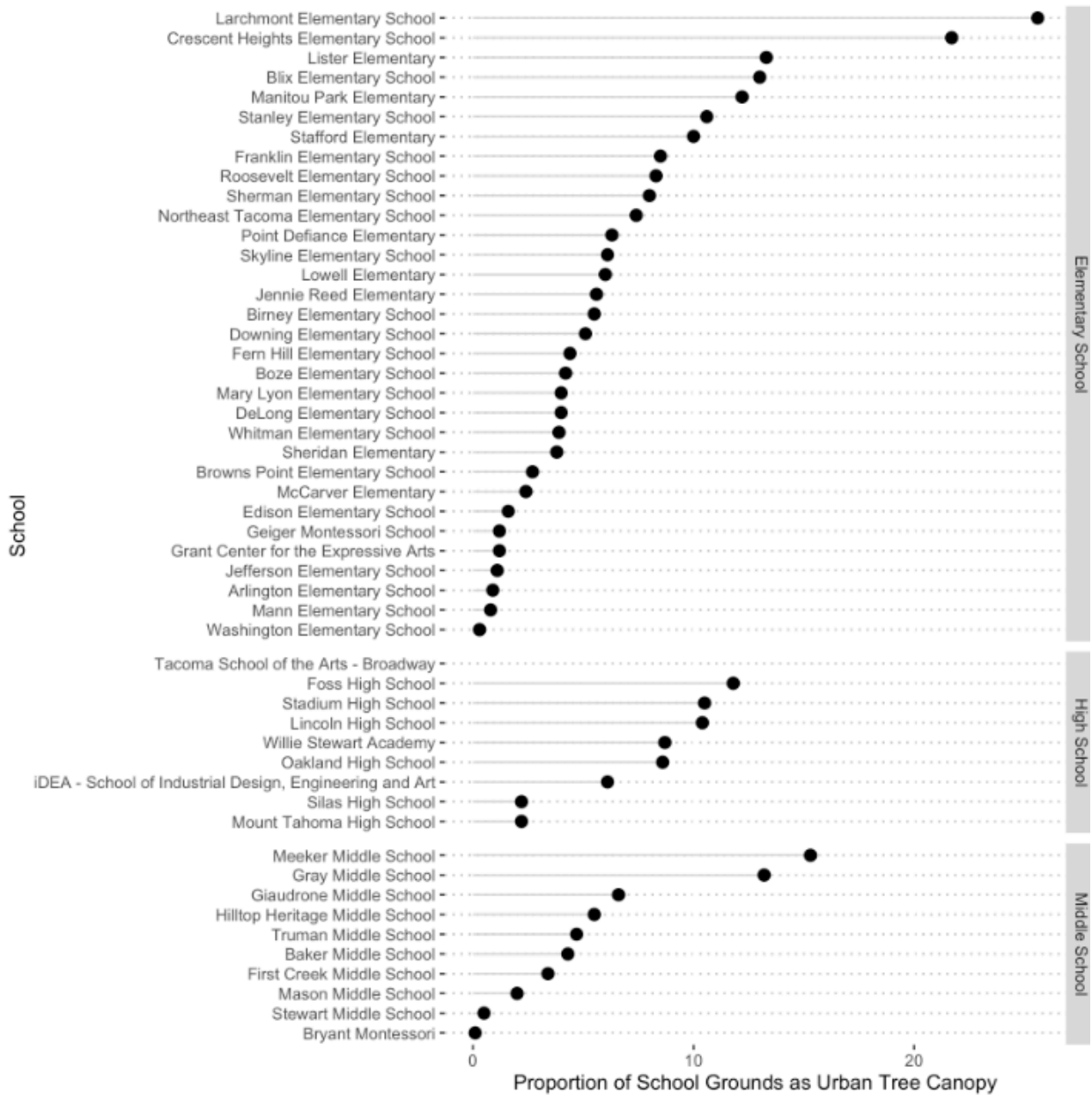


# Tacoma Schools, Urban Heat and Trees

## Results

### Schools and Tree Canopy Coverage

This plot shows the proportion of the school grounds that are identified as Urban Tree Canopy from [PlanITGeo's 2018 canopy cover assessment](#). Schools are ordered from highest proportion of Urban Tree Canopy to lowest in each school type.



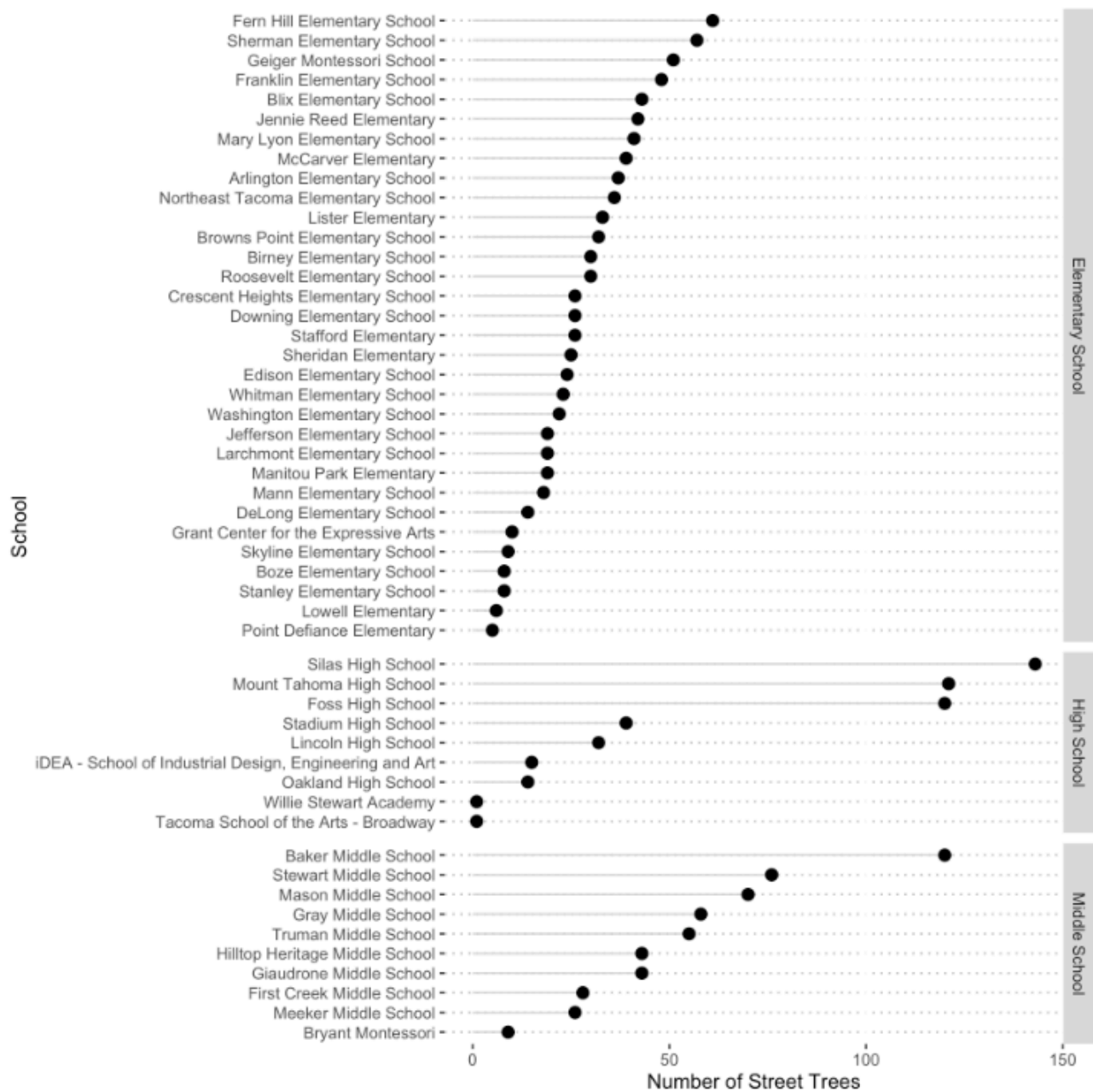
# Tacoma Schools, Urban Heat and Trees

## Results

### Schools and Street Trees

This plot shares the number of street trees (trees within 25 ft of roads) on school grounds counted at each school. Schools are ordered from highest to lowest number of street trees in each school type.

Note this plot does not show the metric used for ranking schools (street trees per area). The number of street trees was divided by the area of the school grounds to account for differences in school property size in the rankings.

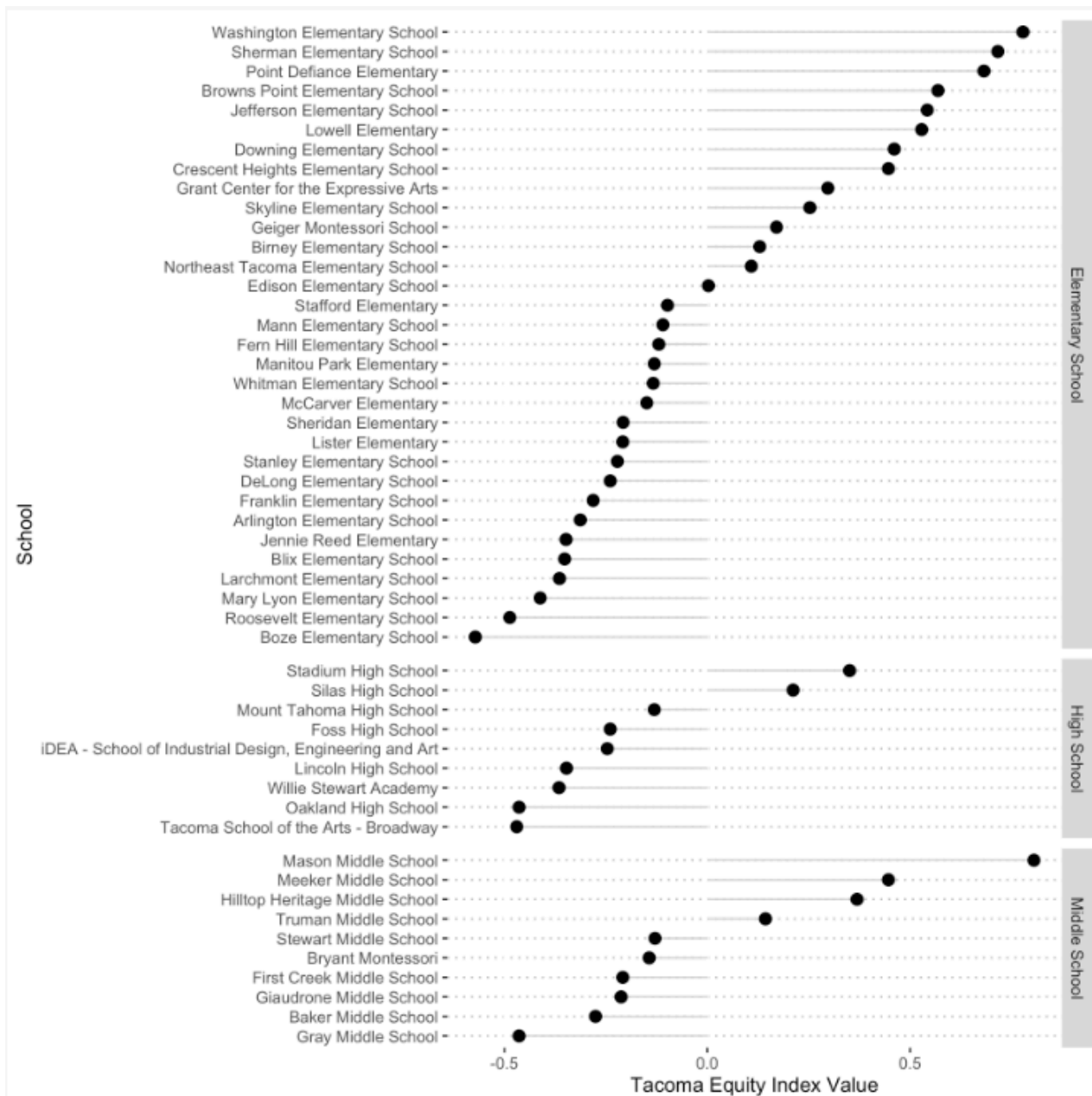


# Tacoma Schools, Urban Heat and Trees

## Results

### Schools and Tacoma 2022 Equity Index Values

This plot shows the ranks of Tacoma schools based on the City of Tacoma's [Equity Index values](#). Schools are ordered from highest to lowest value in each school type. Schools with low Equity Index values typically have less access to opportunities or services.



## Tacoma Schools, Urban Heat and Trees



### School Rankings

# Ten Priority Schools

Schools were ranked based on above metrics. Priority schools were determined based on average rank of the five metrics compared.

Each school was ranked in its placement in the above five metrics (afternoon temperatures, EHD Ranks, street trees, canopy coverage, equity index).

The average of these ranks was determined for each school. Low average ranks indicate the school had low canopy coverage, few street trees, high temperatures, high EHD ranks, and low equity index values.

The ten schools with the lowest averages were identified as priorities for greening activities to mitigate urban heat and environmental inequities.

The overall averages may be helpful for identifying priorities and guiding greening efforts. For example, some schools had higher temperatures, but were not ranked as priorities because they were present in areas with less Environmental Health Disparities.

# Ten Priority Schools for Tree Planting in Tacoma

Mann Elementary School

Arlington Elementary School

Edison Elementary School

Boze Elementary School

Giaudrone Middle School

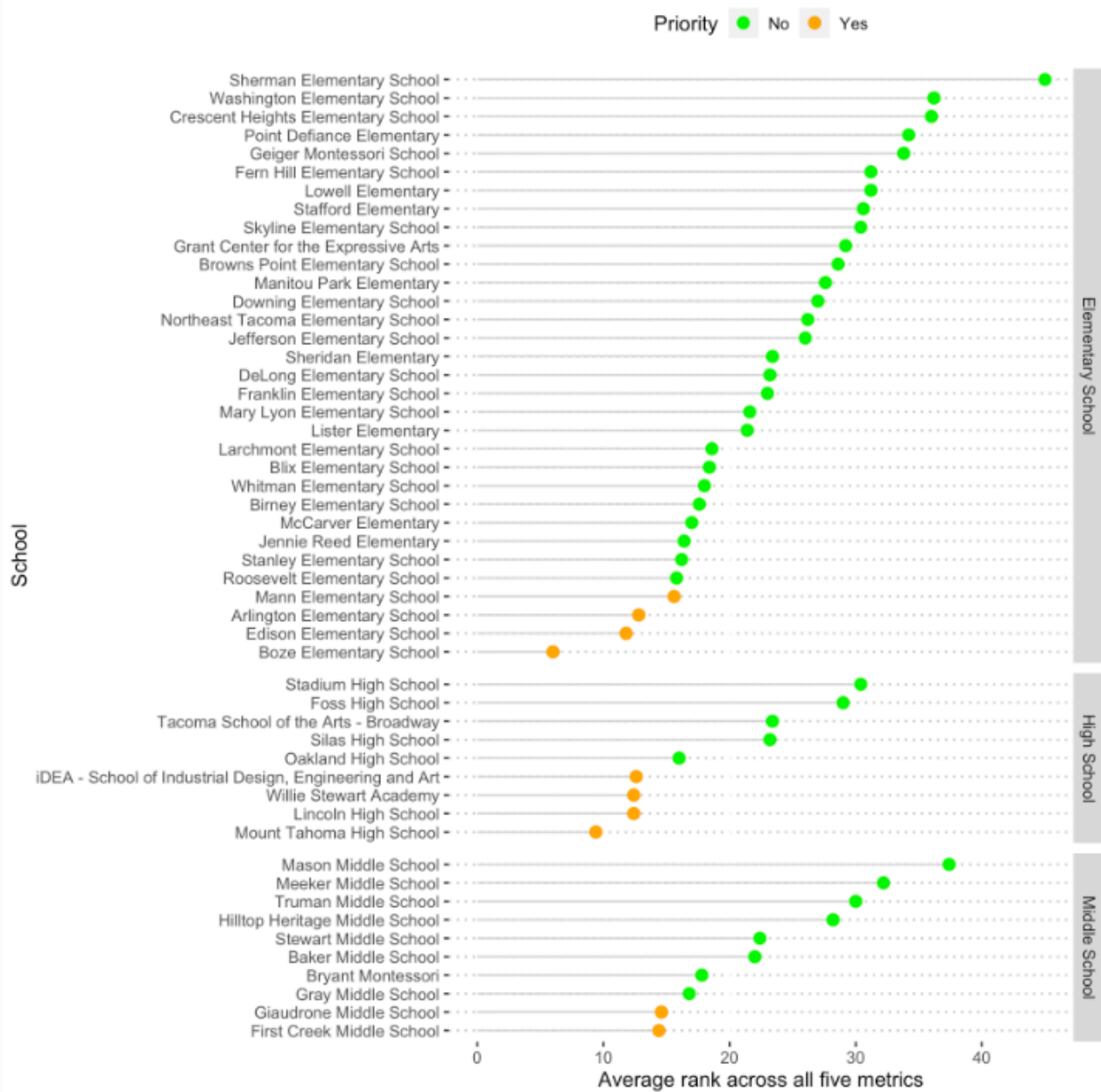
First Creek Middle School

iDEA High School

Willie Stewart High School

Lincoln High School

Mount Tahoma High School



Note that some of the data used for ranking the schools may be outdated. Additionally, both the canopy coverage and urban heat data used were measured in 2018.

# Barriers and Opportunities



## ***Barriers to planting more trees at schools***

The objectives of this storymap were to provide guidance for equitably greening schools in Tacoma. The above analysis identifies 10 public schools as priorities because they have high temperatures, high environmental health disparities, relatively few street trees, relatively low canopy coverage and low equity index values. These schools may have the greatest need for efforts to equitably reduce the impacts of heat waves.

There is enormous need and opportunity to equitably grow Tacoma's urban forest. Planting trees anywhere would be helpful, but here we highlight ten schools that need trees the most based on five metrics. However, there are many other factors to consider when limited resources are available. For example, these schools may not be the easiest to plant trees at as this study did not account for available planting space or the amount of impervious surface. Some schools may also have greater barriers to planting or stewarding trees compared to others.

# Tacoma Schools, Urban Heat and Trees

## Barriers and Opportunities

# Opportunities for

# More Street Trees

Planting more street trees may be one method to overcome barriers with planting trees at schools. The following schools were identified as schools with possible space in the Right of Way for more trees. However, more evaluation into the costs and ease for planting in these areas is needed. For example, some areas of the Right of Way may be impermeable surfaces where others may be grass or other vegetation easily planted into.

- DeLong Elementary
- McCarver Elementary
- Stanley Elementary
- Mann Elementary
- Whitman Elementary
- Sheridan Elementary
- Boze Elementary
- Meeker Middle
- Northeast Tacoma Elementary
- Lowell Elementary
- Stafford Elementary
- Larchmont Elementary
- Edison Elementary
- Arlington Elementary
- Point Defiance Elementary



## *Planting Trees to Enhance Safe Routes to School*

In addition to planting more street trees on school grounds, there is great opportunity to plant trees along arterial roads leading to schools. For example, planting more trees could enhance the City of Tacoma's Safe Routes to Schools by providing students with shade and intercepting pollutants.

The City of Tacoma's Safe Routes to School program aims to improve safety for students to walk and bike to school.



# Get Involved

## *Planting in Your Community*

Planting trees in your school and neighborhood is one way to help your community. Together we can equitably grow Tacoma's urban forest to increase the resilience of our communities to the future impacts of heat waves and extreme weather events. Below are a number of local organizations and programs that you can get involved with, or learn more from, today.

### *Tacoma Tree Foundation*

The [Tacoma Tree Foundation](#) is a local 501(c)(3) organization dedicated to equitably greening Tacoma. They offer [free trees](#), organize community tree planting events, and provide guidance and training in tree stewardship. Visit [their website](#) to get involved or give a gift to support their efforts.

### *GRIT City Trees Program and Tree Coupon Programs*

The [Grit City Trees Program](#) offers free trees to Tacoma residents annually. The program delivers trees and can provide planting assistance. Applications are accepted in summer for trees to be planted in October.

The [Tree Coupon Program](#) is another City of Tacoma initiative to help offset the costs of planting trees. Residents can receive coupons for purchasing trees between October and March at many local retailers.



Discover the Benefits of Trees for  
Tacoma Schools

## **Tacoma Schools, Urban Heat and Trees**

Learn More at the QR code



[treehealth.wsu.edu](http://treehealth.wsu.edu)