LIVABILITY + THE URBAN FOREST IN SALT LAKE CITY

Livability is a place-based term, defined in Salt Lake City's Downtown Plan (2016) as the capacity of a place to fulfill both daily needs and quality of life needs for residents. Daily needs are basics required for survival, like food, water, housing, transportation, public health and safety, sanitation. Quality of life needs must be met for residents to thrive. Quality of life encompasses the tangible and intangible elements that increase resident happiness, including arts and culture, recreation, social interaction, community, education, social equality, and access to nature. Underpinning both daily needs and quality of life needs is the ability of the community to provide access to good jobs and support a resilient economy. A livable city is one that provides access and choice to both daily and quality of life needs to residents and visitors. (Downtown Plan, 2016)

The urban forest contributes to livability by meeting both daily and quality of life needs, including public health and safety, equity, access to nature, active transportation routes, and fostering places for social interaction. Without a healthy urban forest, life in Salt Lake City would be drastically different.

EQUITY

Equity is foundational to livability, as attention to both the daily and quality of life needs of marginalized communities typically provides benefit to all. The American Planning Association, describes equity as "just and fair inclusion into a society in which all can participate, prosper, and reach their full potential." The APA notes that "equity is responsive to difference; equitable policies actively mitigate the disproportionate harm faced by certain communities." (APA, 2021)

As the national non-profit Partners for Livable Communities notes, "A community that satisfies the full range of its residents' needs is more attractive as a place to live, work and do business and, therefore, more likely to be economically successful." (Partners for Livable Communities, 2021)

The distribution of tree canopy cover is a useful frame of reference to evaluate urban equity. Given the wide range of benefits the urban forest provides, from improved local air quality and public health to increased property values and retail sales, the distribution of canopy cover is a useful metric to assess which neighborhoods have the greatest and least access to those benefits.

Planning undertook GIS analysis of canopy cover per 10-acres of land area (the size of a downtown city block) based on U.S. Environmental Protection Agency land cover data from 2014.*

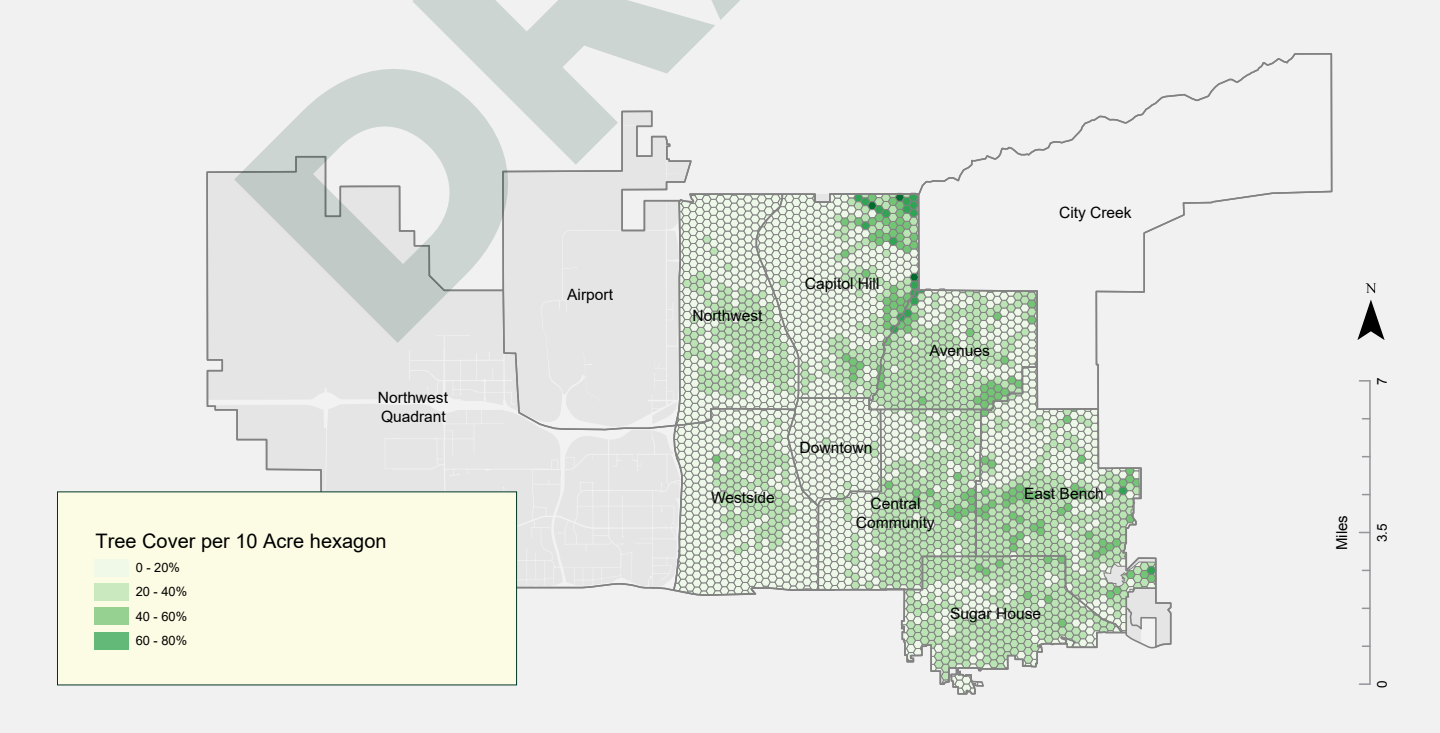
*2014 the most recent publicly available data set at the time this plan was created. Given the slow rate at which tree canopy expands, the data remained applicable in 2021.

The analysis reveals an uneven distribution of tree canopy across the city, and one that correlates closely to other documented inequities in Salt Lake City.

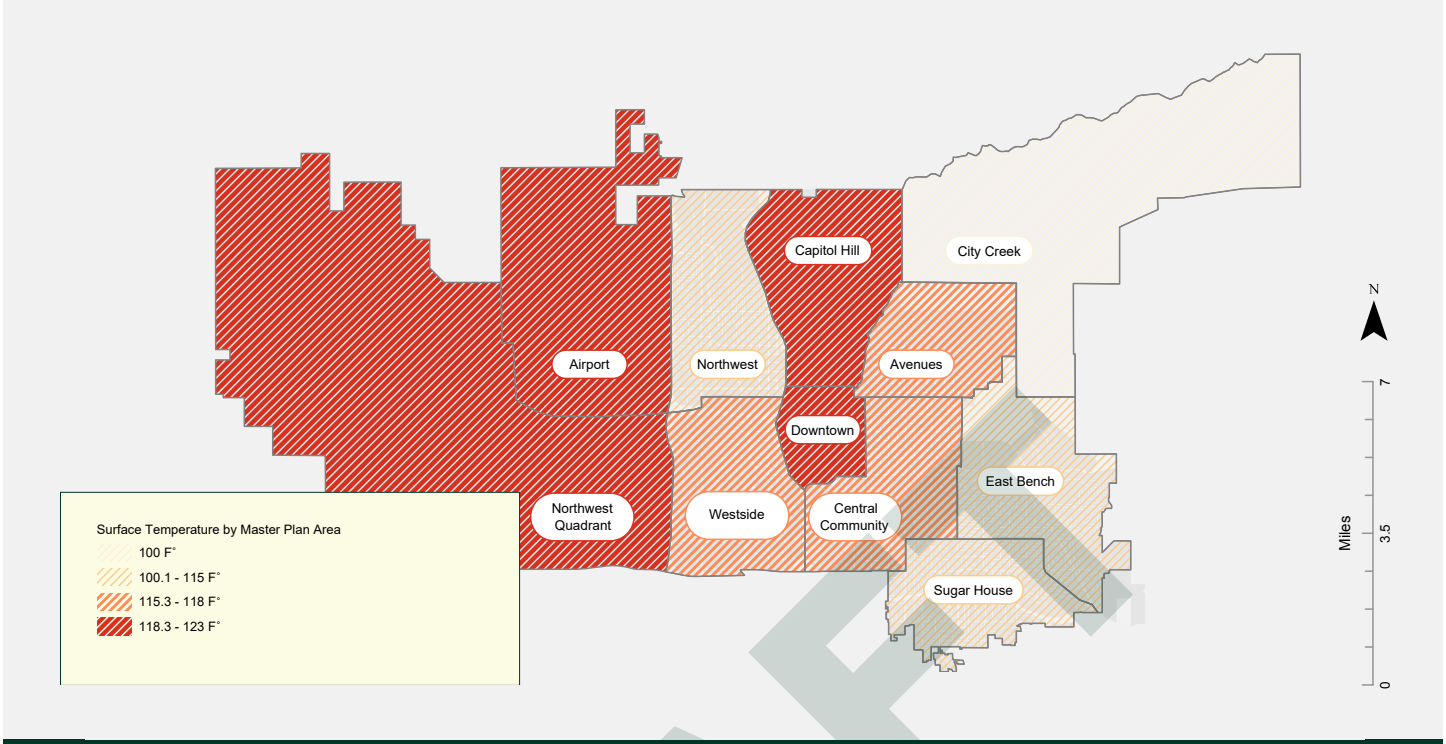
While some of the distribution of trees may be attributed to their "natural" pattern of growing predominantly along waterways and north-facing slopes this eco-region, it cannot account for most of it. Note that urban-scale tree planting in Salt Lake City began nearly two centuries ago, and multiple factors influence when and where trees are planted in the city.

The GIS analysis below divides the city into master plan areas for the purposes of comparing primarily residential districts. Tree canopy cover was notably greater in residential areas east of approximately State Street with the prominent exception of the Downtown Plan area.

The Downtown Plan area is one of the most heavily paved in the city, with the most difficult growing conditions for trees. Downtown has seen an unprecedented rate of new development in the past decade, which often leads to tree removal and replacement with young trees and may be a contributing factor to its low canopy level.



Salt Lake City Tree Canopy Cover by Master Plan Area (2014 EPA vegetation data). East side areas have approximately twice the canopy as the those on the west side, and an average of four times the canopy present in the Downtown Plan area.



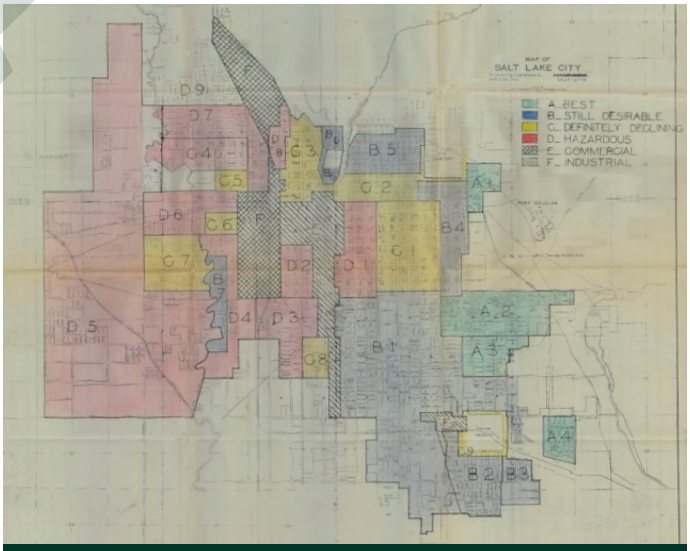
Salt Lake City Surface Temperature by Master Plan Area (temperature measured on July 31, 2020 at 5:05 pm local time by NASA's ECOSTRESS satellite). Lower temperatures correlate to areas with more tree canopy, and vice versa.

THE LEGACY OF REDLINING IN SALT LAKE CITY'S URBAN FOREST

In cities throughout the United States, persistent socio-economic divides in investment and development patterns correlate to the historic practice of redlining. Briefly, redlining is the term commonly used to describe federal, state, and local government policy during the New Deal era of the 1930s, in which policy-makers designated the "quality" of areas for loans provided via the Home Owners Loan Corporation (or HOLC). In practice, this was used to reinforce segregation and discrimination in neighborhood patterns by designating areas of residential settlement based on race, ethnicity, and socioeconomic class. Areas consigned to "the wrong side of the tracks," were labeled "D-hazardous" and shown in red on maps, hence the term "redlining."

The legacy of these discriminatory practices is present in the inequitable distribution of wealth and access in cities throughout the United States, and Salt Lake City is no exception. Households with the highest median income live on the east side of the city, while the lowest income households are located predominantly on the formerly redlined west side.

Just as the pattern of racial, ethnic, and economic inequalities persist in urban areas nearly a century after redlining policies were created in the US, the distribution of urban forest cover often reflects those same inequities. Typically, wealthier communities have greater tree canopy, and therefore more access to the range of benefits the urban forest provides.



Salt Lake City redlining map, c. 1935 (*Mapping Inequality*)

A 2020 study of 37 US cities looked at urban forest distribution and HOLC (or redlining) maps, found that areas designated "A" (typically reserved for US-born white populations) had nearly double the tree canopy cover than those designated "D" for people of color. (Locke, 2021)

This phenomenon is apparent in Salt Lake City as well, with some “A” areas having more than six times the tree canopy of those once designated “D.” For a fuller accounting of inequities in urban forest distribution in the United States see the American Forests Tree Equity Score website.

Salt Lake City’s street tree planting policy is to provide them free of charge to residents, on the condition that they agree to water them. This is a popular program for residents who are aware of and appreciate the benefits trees provide, but still leave a significant number of street tree planting locations vacant and assume that residents are aware of the needs and costs associated with watering.

An equitable distribution of free trees in Salt Lake City will likely require a significant campaign on both the importance of the urban forest as well as water use and costs to maintain healthy trees. Trees generally use much less water than people assume, while also conserving water by reducing evaporation for the vegetation that they shade.

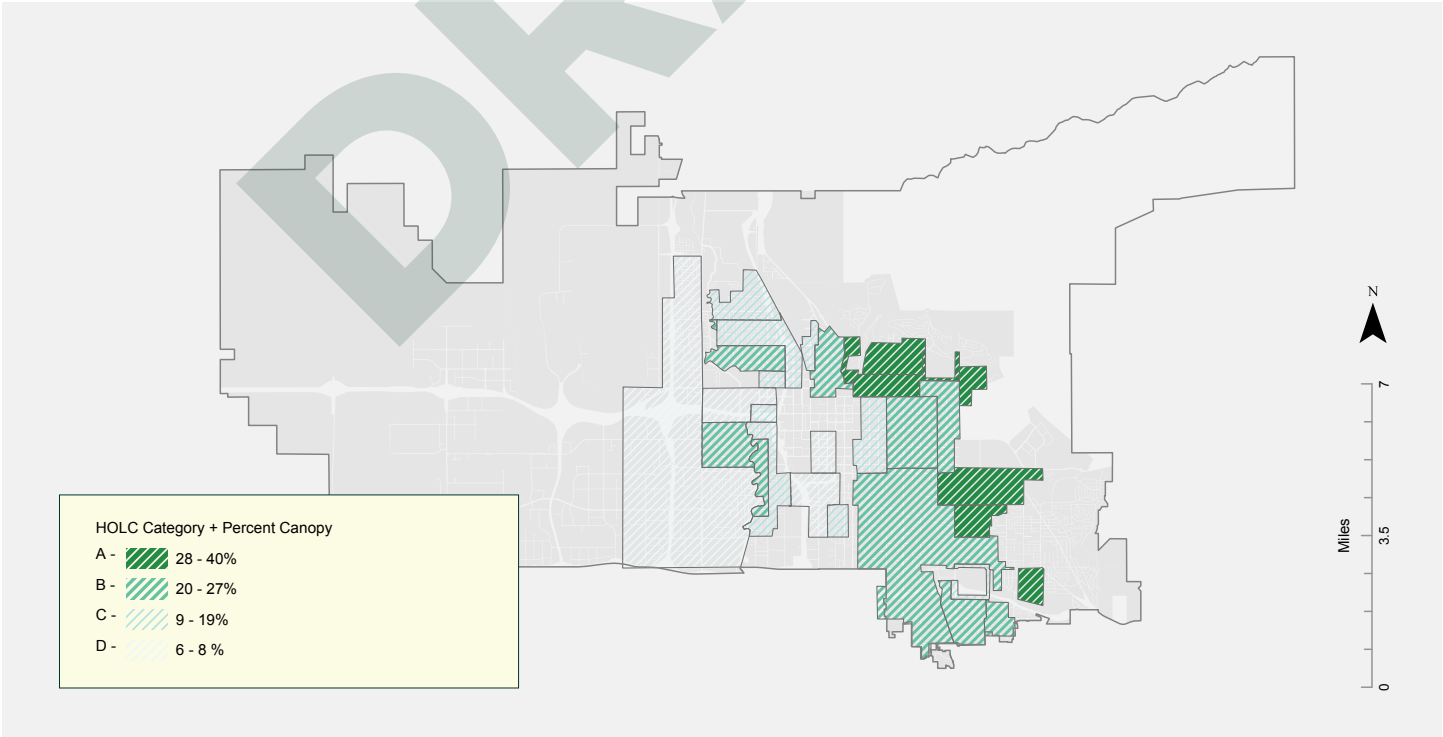
An average mature tree uses 70 gallons of water weekly, while an average adult uses ten times that amount. During the 8-month growing season, monthly costs to water a tree range from $0.10 for a young tree to $ 0.70 for a mature tree.

Sprinkler costs, however, can create a larger burden on low-income residents, as installation and power expenses are a larger share of their income than higher income residents. For those who do not have sprinkler systems, the time required to provide the deep, slow watering that helps trees thrive can also represent a burden.

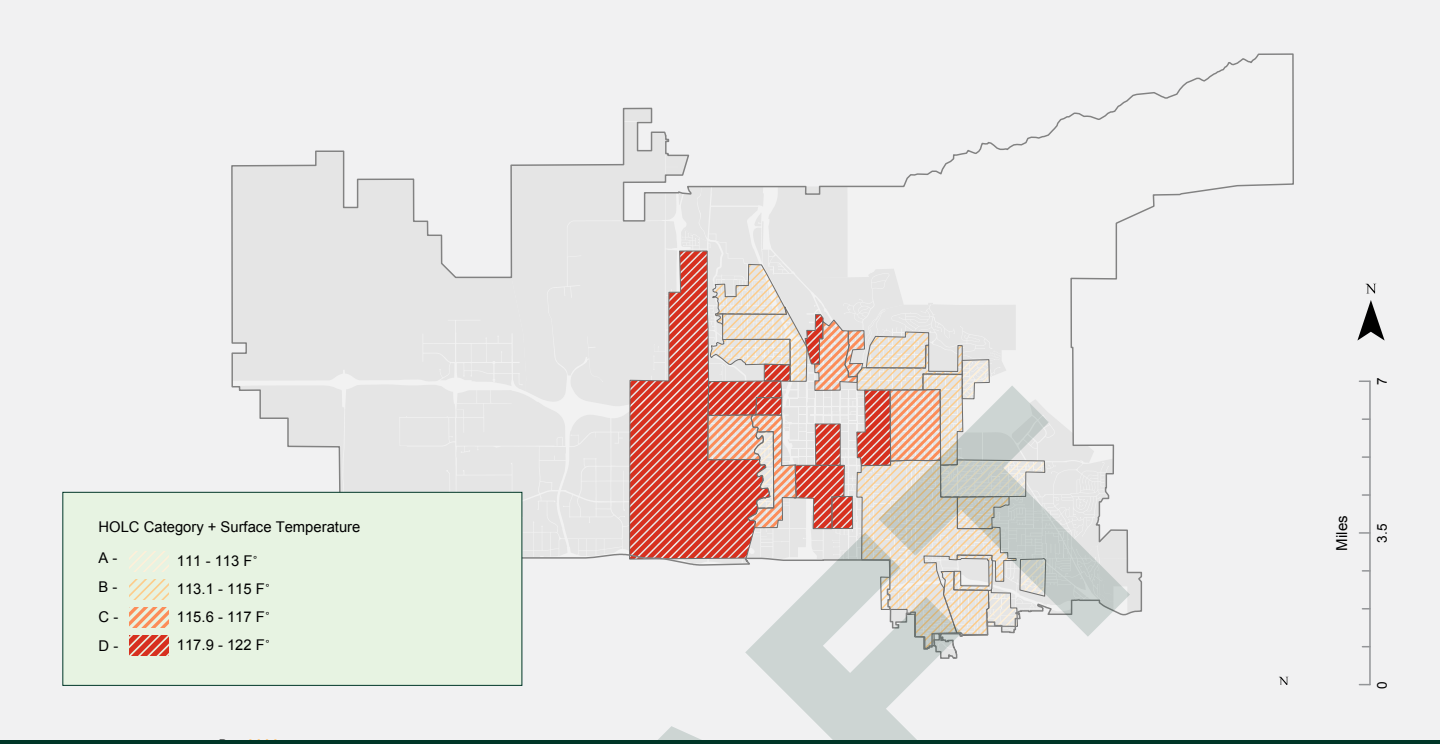
Rising housing rates and rents have made resident turn over more frequent in Salt Lake City. As home ownership or rentals change occupants, new residents may not be aware of their irrigation responsibilities. Further, renters may assume that tree requests and irrigation are the responsibility of the landlord, leading to trees going without water for prolonged periods, resulting in decline and death.

LEGACY OF REDLINING ON THE URBAN HEAT ISLAND EFFECT

Increasing temperatures due to climate change have a direct impact on livability, as do temperature impacts created by many urban surface materials, notably asphalt. Land Surface Temperature is measured by satellite and is a measurement of how hot a given surface feels to the touch, the data is made available by NASA. The difference in Land Surface Temperature



Percent tree cover (EPA, 2014) by HOLC graded areas in Salt Lake City. Redlined areas (D) have the lowest amounts of tree canopy.



Land surface temperature by Salt Lake City HOLC graded areas (NASA ECOSTRESS, July 31, 2020 at 5:05). Areas that were redlined (grade D) and grade C ("definitely declining") have the highest surface temperatures nearly a century later.

(LST) shown in the map below is the difference in mean temperature for within formerly HOLC-graded (or redlined) areas from the mean temperature for all HOLC-graded areas in Salt Lake City. Again, as with other cities in the US, there is a correlation between higher temperatures and redlined areas.

Although air temperature is the gold standard for demonstrating thermal comfort and increased potential for adverse health impacts, this data was not available at the neighborhood or block scale in Salt Lake City.

Although land surface temperatures do not directly correlate to thermal comfort (which requires local air temperature measurements), it does provide some guidance to understand which areas of the city may be likely to have increased heat-related impacts and demonstrate which locations are most in need of shade. Land surface temperature is also an indicator of areas where vegetation is likely to experience heat stress, which has significant impacts on the health and longevity of the urban forest.

Furthermore, the impact of rising temperatures due to climate change are magnified by urban heat island effect and have significant adverse impacts on human health.

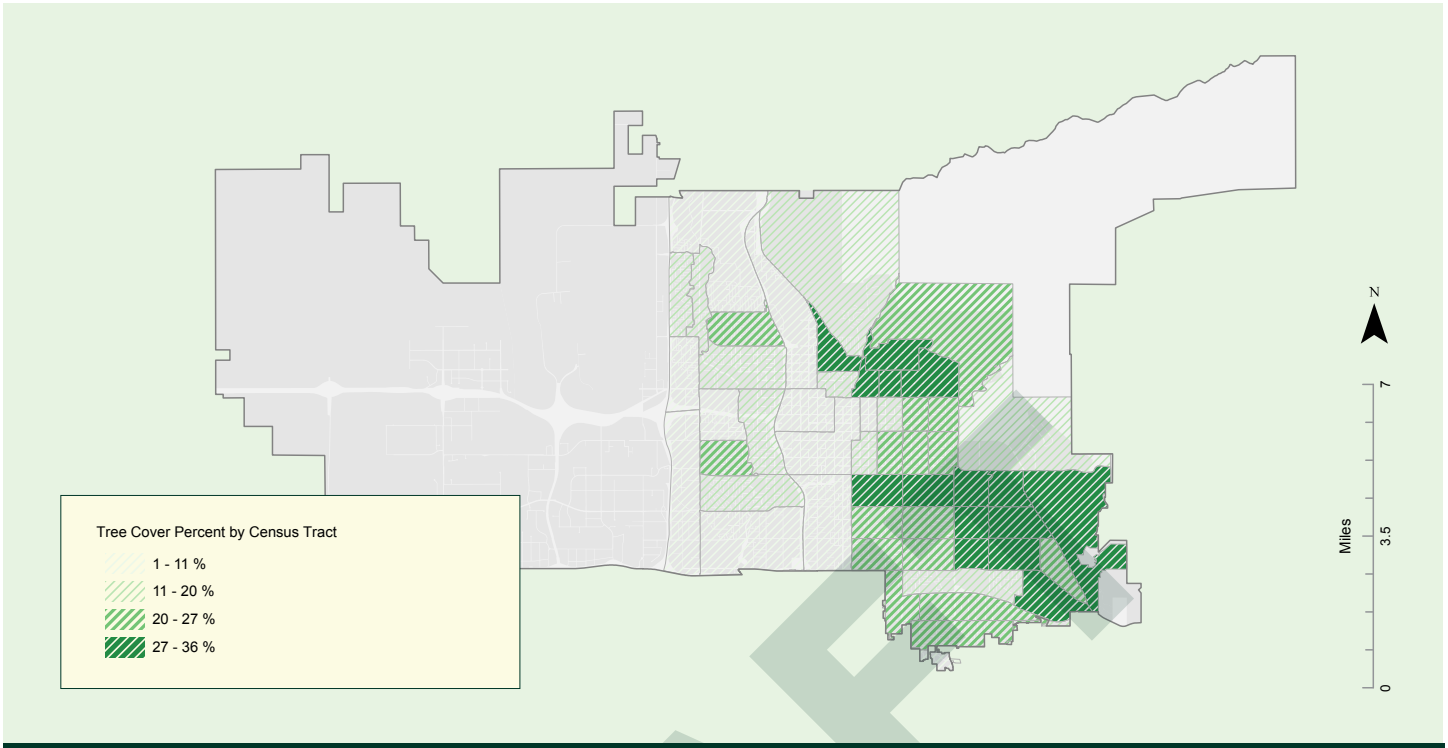
Salt Lake City's poor winter air quality tends to get a greater share of the public's attention, in part because of the visible smog created by particulate matter ($PM_{2.5}$). **Summer air quality, and its relationship to the urban heat island, however, is of increasing concern in the city.**

Nitrogen oxides (NOx), primarily caused by vehicle emissions, react with volatile organic compounds (VOCs) during sunny, hot weather and lead to the creation of ozone (O_3). (https://www.epa.gov/heat-islands/heat-island-impacts, accessed July 2019)

Ozone pollution can trigger respiratory problems, including lung inflammation and asthma attacks, along with heart attacks.

The EPA's current air quality standard for ozone is 0.075 ppm, although some EPA scientists recommend lowering this to 0.06 ppm to protect children's developing lungs from its negative effects. The World Health Organization recommends an even lower ozone standard of 0.053 ppm. (Kenward, 2014)

Although the Clean Air Act has provided improvements in ozone levels, these gains may be threatened by increased heat caused by climate change.



Salt Lake City tree canopy cover EPA 2014) by census tract. Tracts: U.S. Census Bureau 2019 American Community Survey (ACS).

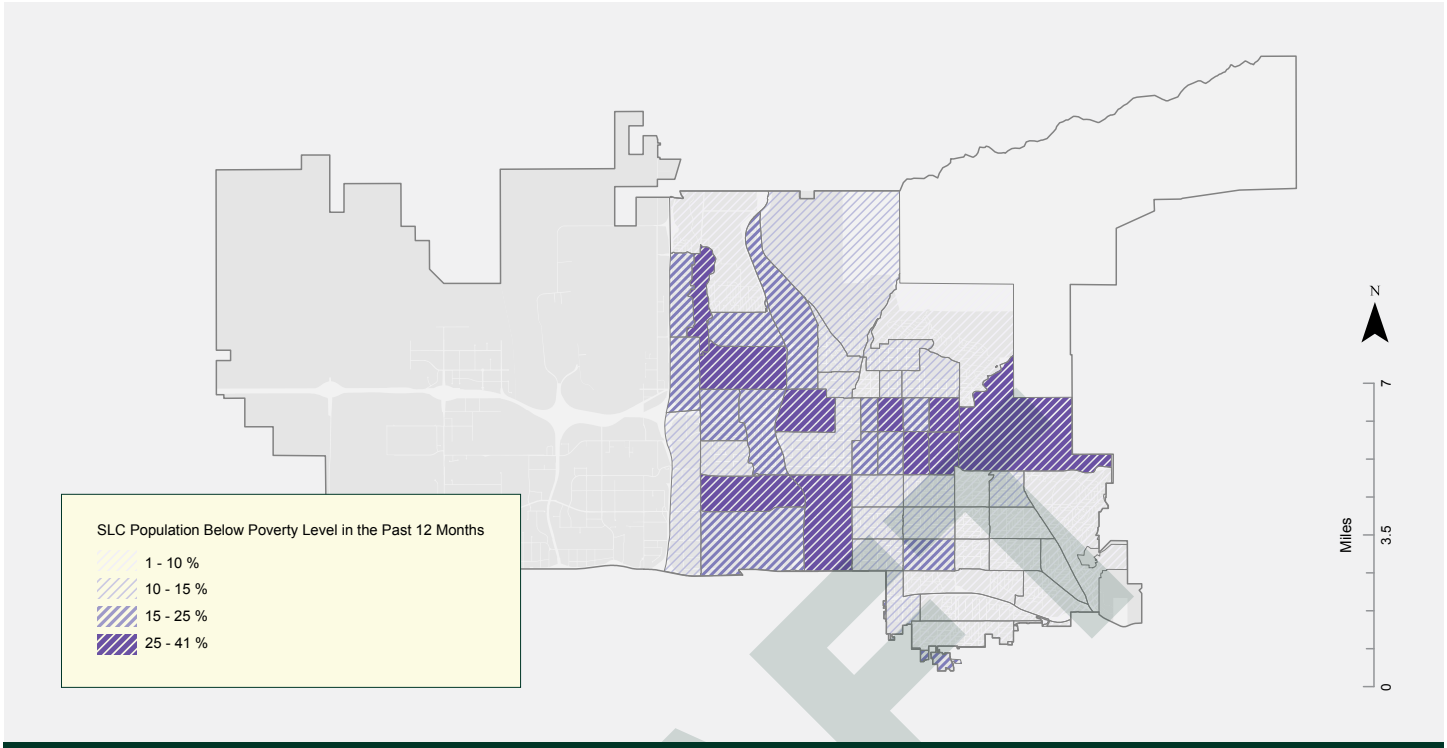
DEMOGRAPHICS

Demographic analysis demonstrates that a lack of tree cover is correlated to neighborhoods with higher concentrations of people living in poverty, people of color, and numbers of children in Salt Lake City.

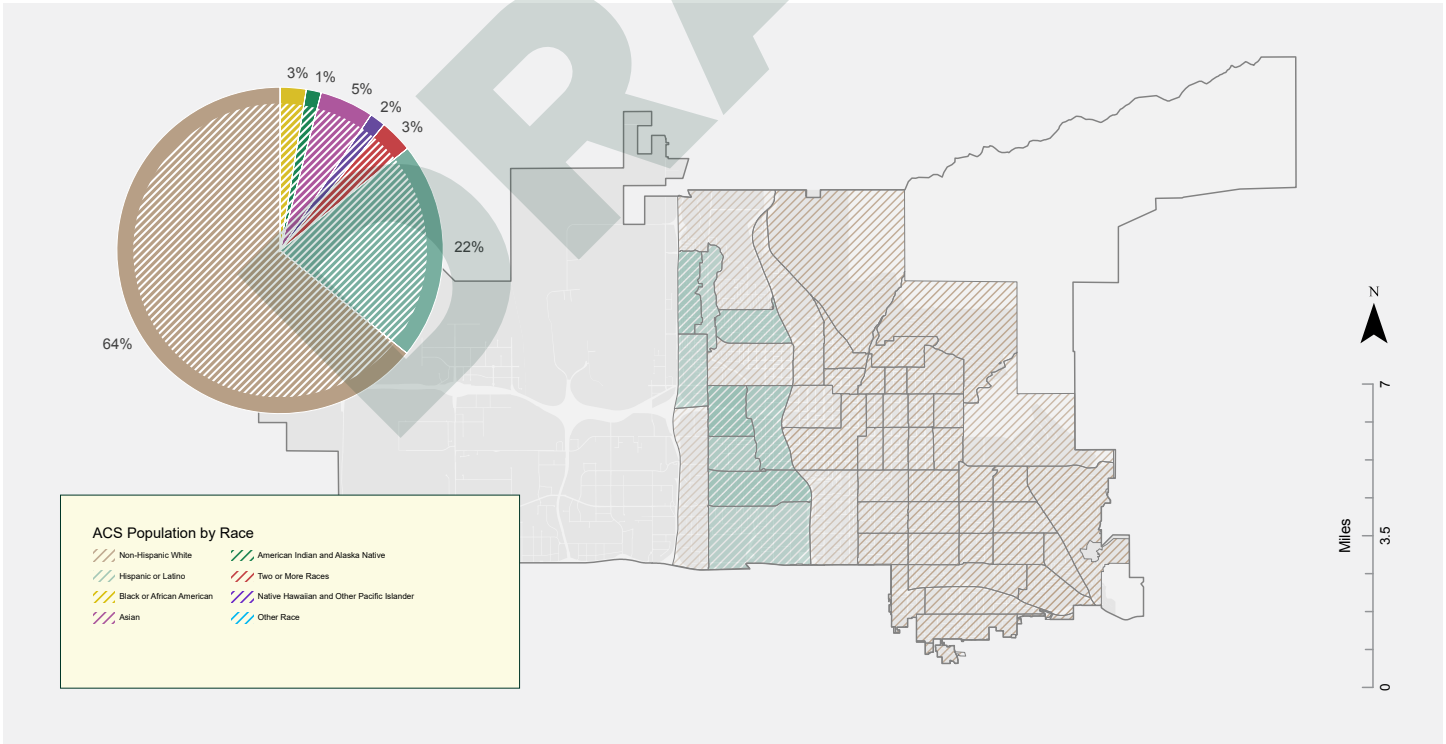
Access to tree cover in residential areas is generally less in areas with higher concentrations of poverty (see above right), meaning the livability factors enhanced by trees are inequitably distributed.

The pattern in Salt Lake City mirrors that found in cities throughout the United States, where wealthier areas have twice the canopy of their lower-income counterparts. This holds true in neighborhoods with higher numbers of people of color as well.

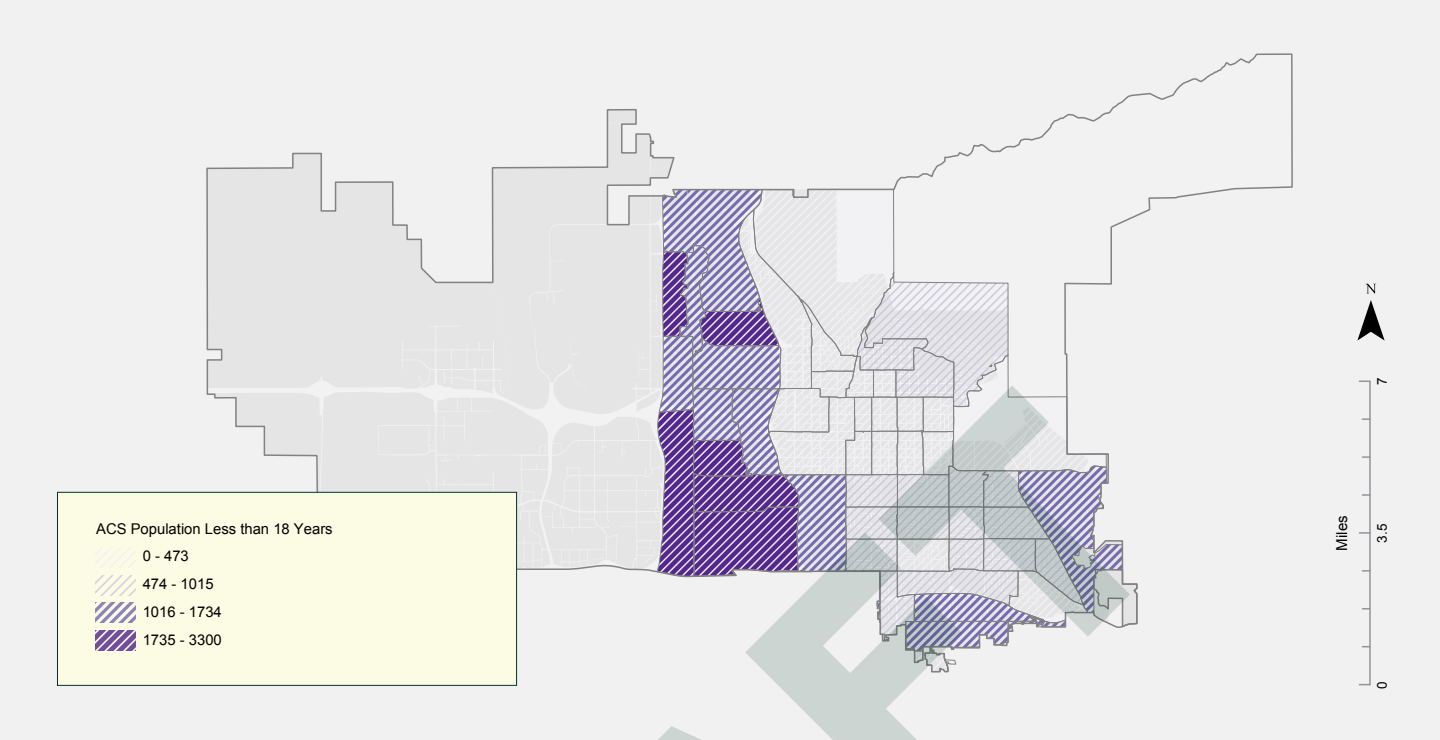
Poverty and systemic racism are both contributors to poor health outcomes, up to and including shorter life spans, as they are significant stressors. Enhanced livability through an expanded urban forest will not, on its own, solve these problems, but can become an significant part of the solution through the many benefits it provides.



Percent of population whose income was below the poverty level in the past 12 months, by census tract (2019 ACS).



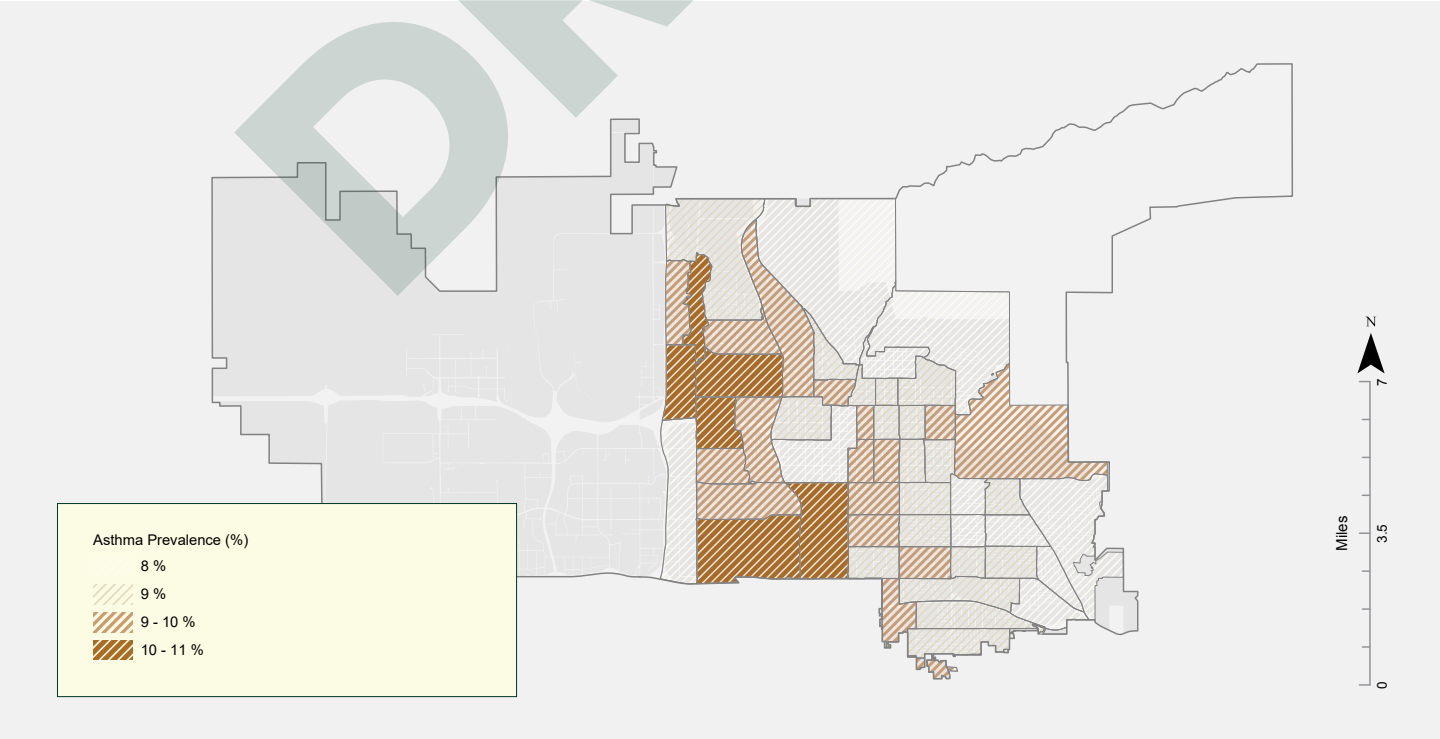
Predominant racial or ethnic group by census tract (2019 ACS).



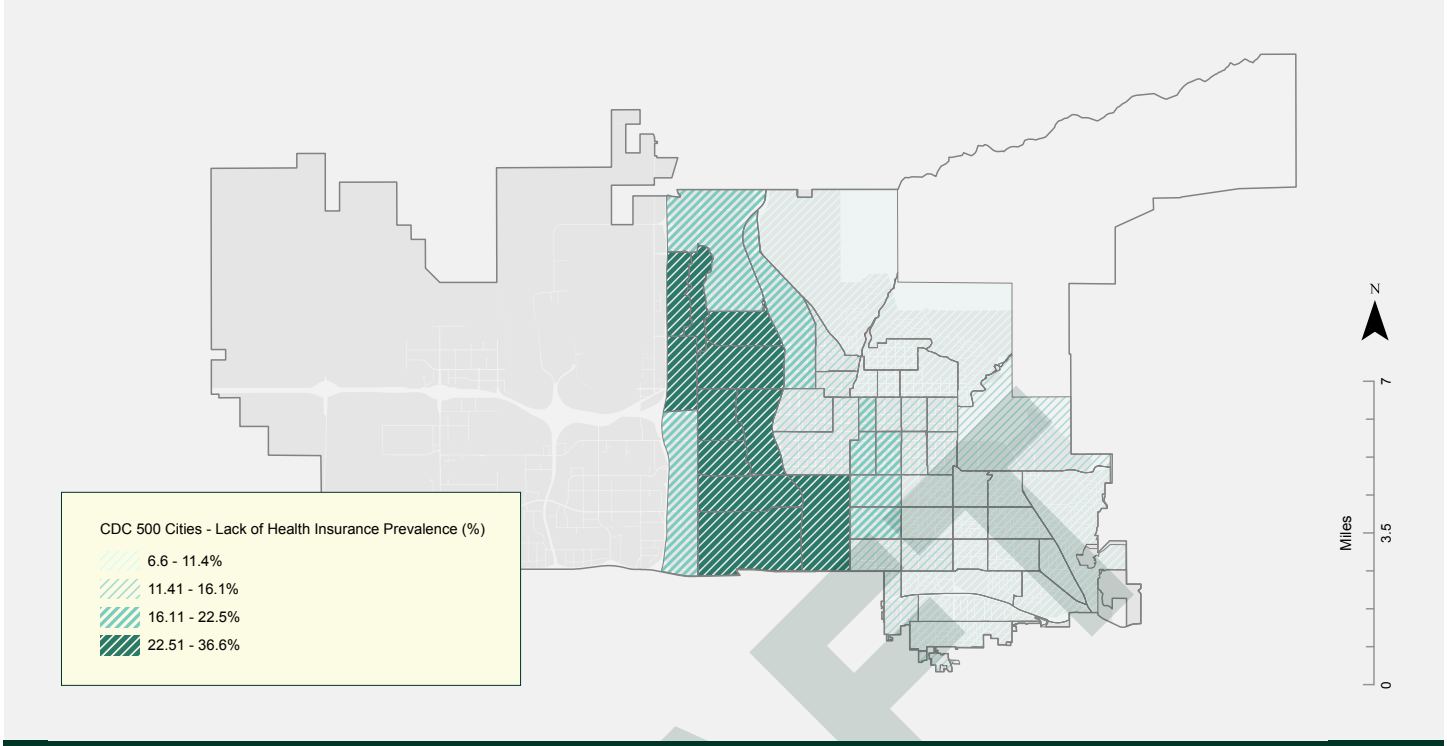
Percent of population under 18 years old by census tract (2019 ACS).

The greatest numbers of children in Salt Lake City live on the west side and are therefore more likely than their east side counterparts to experience the adverse impacts to livability associated with lower canopy cover.

Asthma rates are also significantly higher in areas with fewer trees, higher poverty, and more children. Studies have shown a relationship between lower rates of childhood asthma in neighborhoods with more trees (Vibrant Cities Lab).

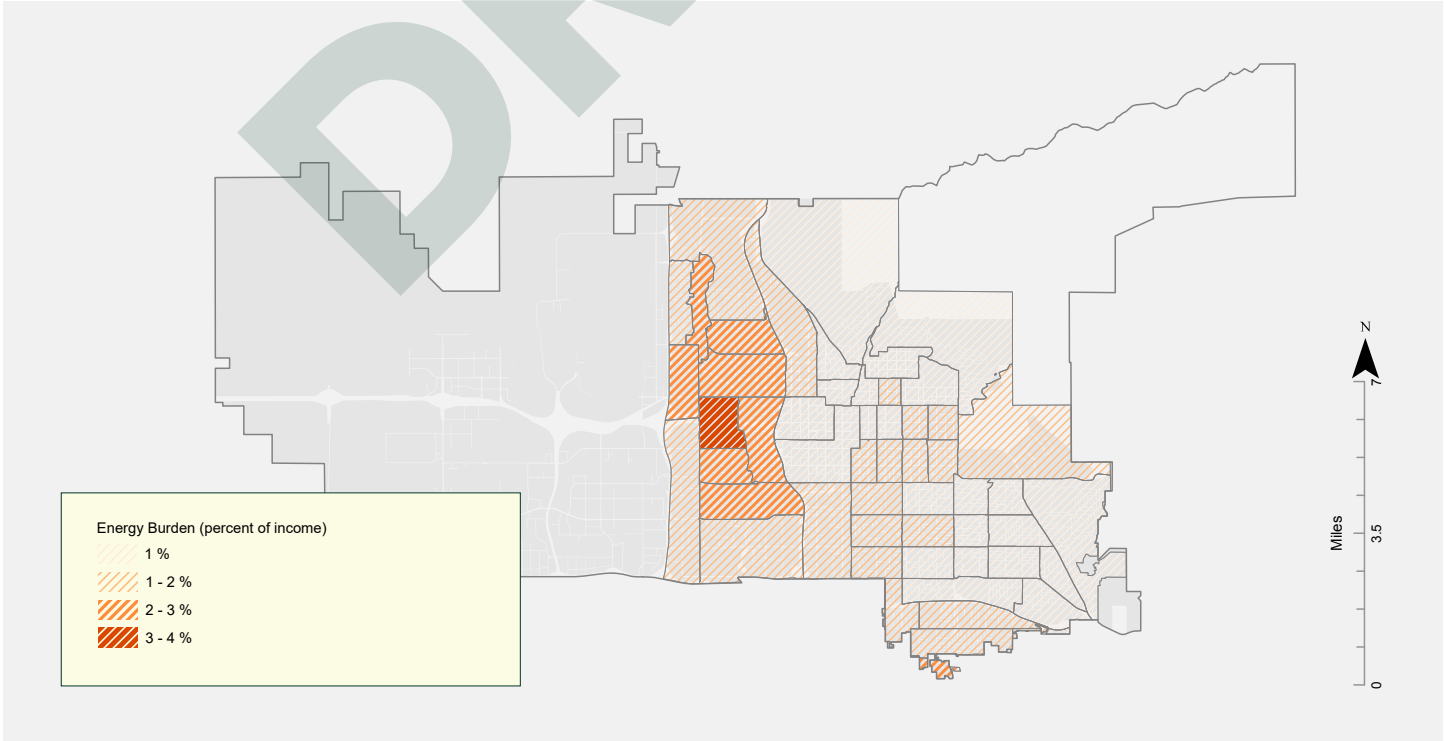


Percent of population with asthma by census tract, from the Center for Disease Control's (CDC) 500 Cities program.



Percent of population without health insurance by census tract (CDC's 500 Cities program).

The prevalence of pulmonary disease on the west side is compounded by a lack of health insurance. Strategic tree planting guided by demographic information, and using species known to mitigate targeted pollutants may provide improved health outcomes for many in these communities.Energy burden, or the costs of energy as a percentage of gross income, also creates strain on lower income households that could be mitigated through tree planting. Strategic placement of trees near buildings lowers energy usage, contributing to fewer greenhouse gas emissions an average of 5% savings on energy costs (Vibrant Cities Lab, 2014).

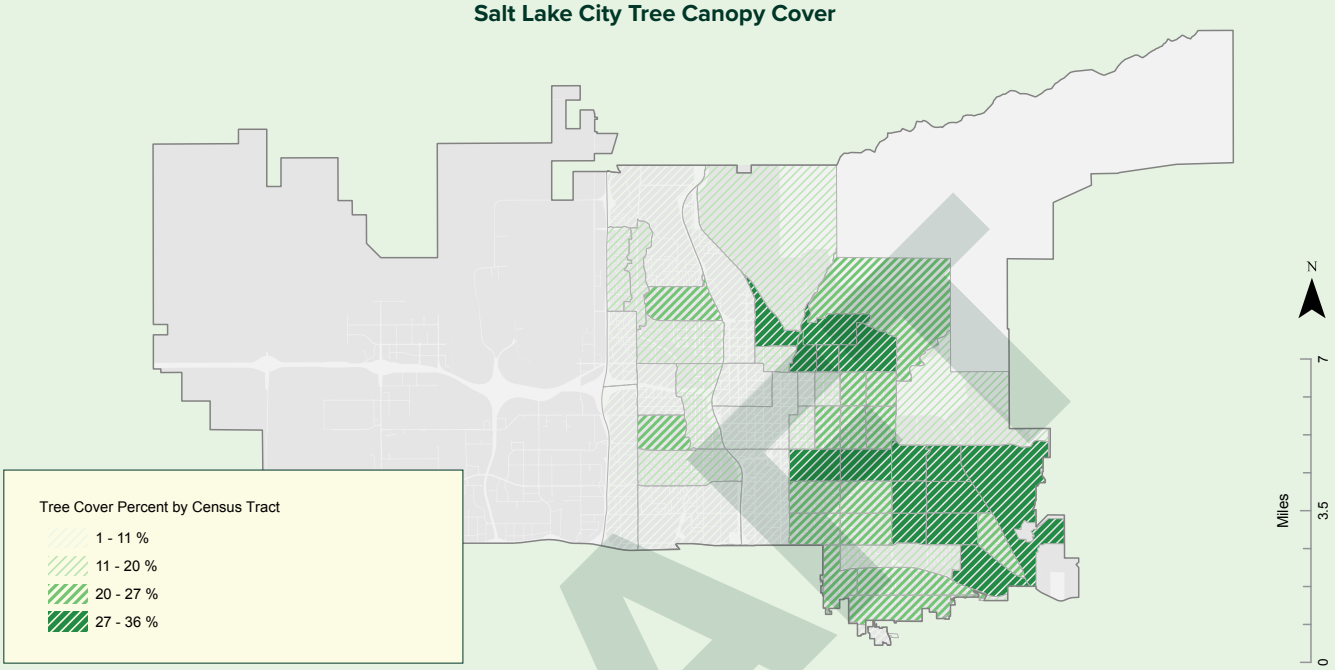


Energy Burden (cost of energy relative to household income) by census tract (2020 energy data; 2019 ACS census tracts)

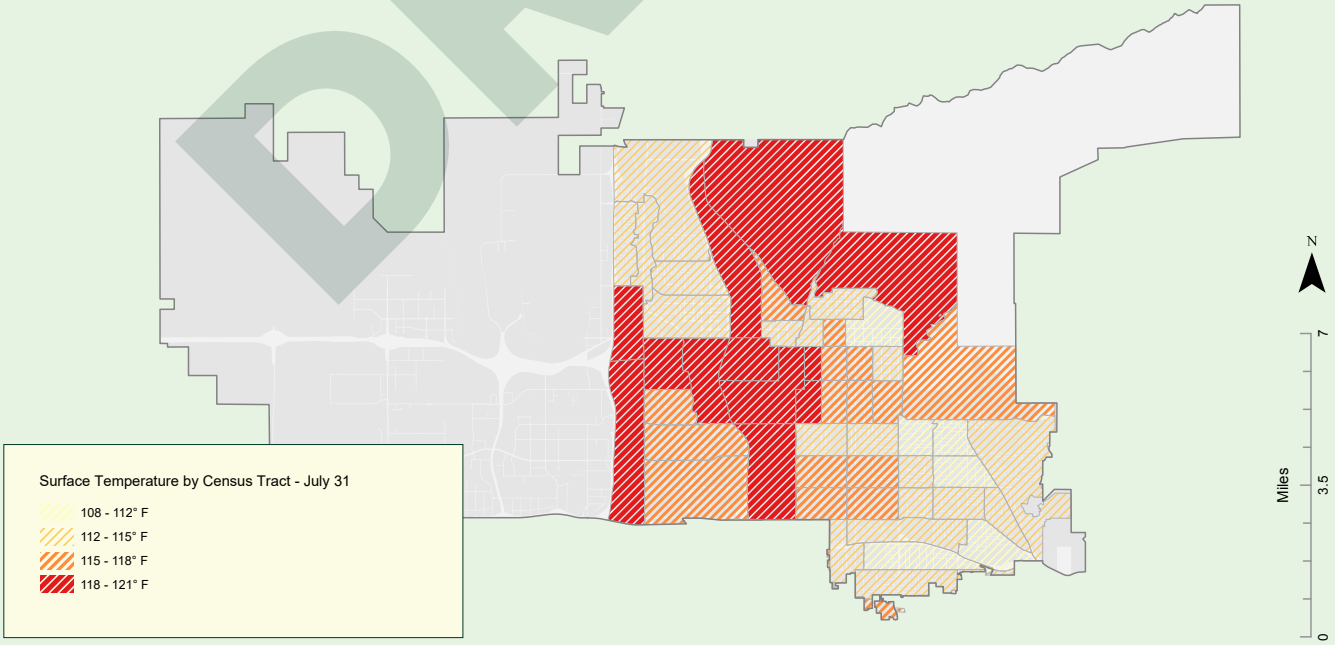
SALT LAKE CITY CENSUS TRACT ANALYSIS

2019 AMERICAN COMMUNITY SURVEY (ACS) TRACT DATA

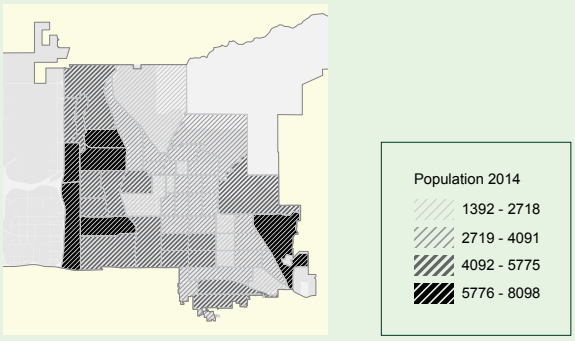
Salt Lake City Tree Canopy Cover



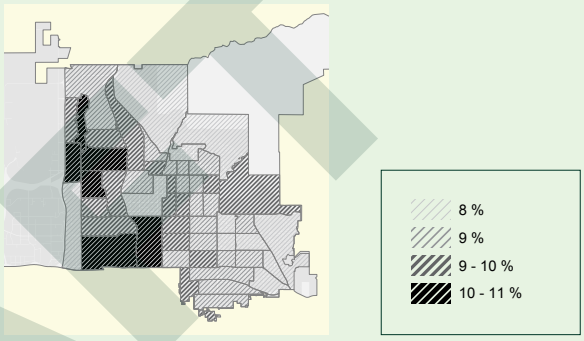
Salt Lake City Surface Temperature (5:05 p.m. MDT, July 31, 2020)



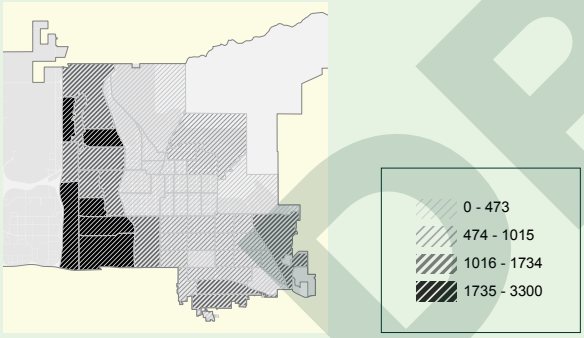
Salt Lake City Total Population



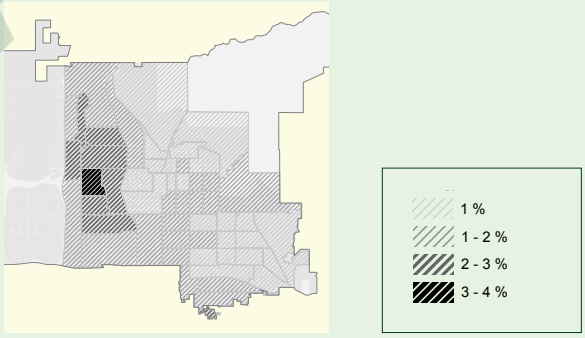
Asthma Prevalence (%)



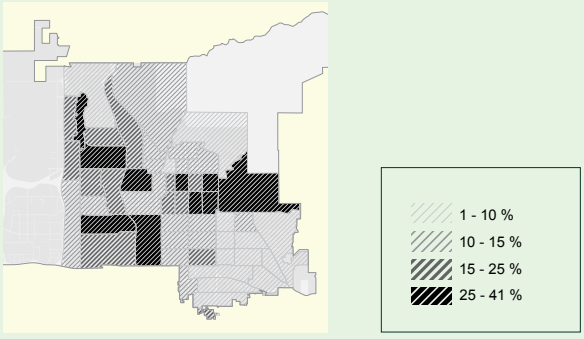
Population Less than 18 Years



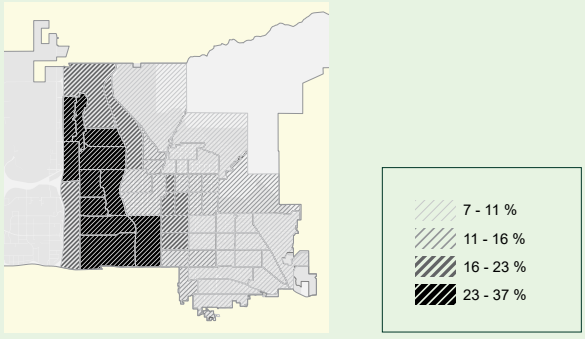
Energy Burden (% Income)



Population Below Poverty Level (Last 12 Months)



CDC 500 Cities - Lack of Health Insurance



ENVIRONMENT

The urban forest has an important role to play in many aspects of livability, but for cities one of the greatest returns on investment can come in the form of improved public health outcomes. To determine the scale and ongoing commitment to investment necessary to equitably distribute these improved outcomes, it is first necessary to quantify the number of trees and other vegetation required.

TREES NEEDED TO MITIGATE URBAN HEAT ISLAND EFFECT

Trees help cool urban areas by physically shading spaces and by cooling the air as they release moisture through transpiration. Selecting the right tree is important as its physical form determines how much sunlight can pass through to hit the ground below the canopy. Researchers at the University of Wisconsin found that a typical city block needs to have at least 40% canopy coverage to reduce the daytime summer air temperature. (Ziter, 2019) The 40% canopy threshold resulted in a temperature decrease of 7-9 degrees Fahrenheit.

TREES NEEDED TO MITIGATE AIR POLLUTION

According to data published by the American Lung Association, the Salt Lake City-Provo-Orem area ranked No. 11 for ozone pollution and No. 7 for short-term particulate pollution in the United States. According to the nonprofit organization Saving Nature, it takes roughly 1,025 trees to offset the average American's yearly emissions, with each tree absorbing about 31 pounds of carbon dioxide per year. (Add citation)

With approximately one of every nine deaths being contributed to poor air quality, a robust and diverse urban forest is one means to offset pollution and in turn, promote human health (World Health Organization, 2016). The amount of pollutants and particulates filtered by each tree vary depending on its placement and composition. Cities need to consider multiple variables including the tree's mature size, growth rate, and the architecture of the tree such as its canopy structure, leaf size and the texture of the leaves. By integrating these criteria into urban design and urban forestry policies and ordinances, Salt Lake City could demonstrably address poor air quality impacts while also enhancing multiple quality of life needs.

TREES NEEDED TO MITIGATE STORMWATER IMPACTS

Trees are important in stormwater management due to their ability to take up water through their roots and leaves and slow the flow of stormwater through the utility system. As detailed in Chapter 2, there are roughly 86,500 publicly owned trees in Salt Lake City, which cover just over 2% of the City's total land area.

A University of Utah study found that stormwater runoff could be reduced by 12% if every house in a typical Salt Lake City single-family home neighborhood collected 2,500 gallons of rain water per year (Steffen, 2013), which is about the equivalent interception capacity, or "the sum of canopy surface water storage and evaporation," of one medium-sized tree (Center for Urban Forest Research, 2002).

Planting trees in just half of the currently available locations on City streets would intercept 30 million gallons (or 4 million cubic feet) of rainwater. This would dramatically reduce the amount of stormwater runoff entering the stormwater system, which is one of the most significant polluters of our waterways. Clean water is vital to livability, one that obviously meets daily needs but also greatly enhances quality of life needs related to recreation, in particular the lake effect impact on winter sports opportunities among the Wasatch peaks.

WATER CONSERVATION + THE URBAN FOREST

Trees can be an important part of water conservation strategies provided there is education as to which species are water wise, or drought tolerant, and how best to water trees. For example, shaded lawn uses much less water than unshaded lawns, resulting in efficient water use.

With the pressing need for water conservation due to increased population and climate change, models can be used to forecast which areas should receive the most sustained investment in the urban forest, and which methods of urban heat mitigation and water conservation will provide greater return on investment (Jones, 2018). In all cases, trees should be considered an important tool in the water conservation toolkit, while evaluating how to pair the urban forest with other types of infrastructure to conserve water.

ORDINANCE

HISTORY OF SALT LAKE CITY'S URBAN FORESTRY + TREE RELATED ORDINANCE

Several city policy documents guide tree protection, preservation, and maintenance within Salt Lake City (See Appendix # for documents). Standards and specifications for the City's Urban Forest are contained in the Urban Forestry Ordinance and the Zoning Ordinance.

SALT LAKE CITY URBAN FORESTRY ORDINANCE

In September of 1988, Salt Lake City amended Chapter 2.26 of the Salt Lake City Code to be entitled the "Salt Lake City Urban Forestry Ordinance", defining responsibilities and establishing standards and specifications for the City's Urban Forest.

Chapter 2.26 aimed to generate coordinated intra-department regulatory efforts and provide a single point of contact for residents to consult with any tree related concerns or questions. The implementation of the amended urban forestry code resulted in new regulations surrounding the protection and responsibility of street trees, public nuisance, and designation of responsible party, while maintaining regulations on all street, park, and City trees.

TREES IN SALT LAKE CITY'S ZONING ORDINANCE

In April of 1995, Salt Lake City adopted a new Zoning Ordinance that established certain standards for landscaping and encouraged the use of drought-tolerant plants. The intent of these changes was to encourage sustainable design in all aspects of landscape planning, from residential and commercial, to public and institutional.

In 2003, after five years of continuous drought, best management practices (BMPs) were developed to increase water efficiency in the landscape, incorporating new technologies in irrigation, and identifying measurable water-use goals and practices. The plant list was also updated to reflect current availability and clarify species identification.

In April 2016, Salt Lake City amended sections of the City's landscaping requirements under Chapter 21A.48 to establish water-efficient landscaping, park strip landscaping, landscape yards, and tree protection regulations. The adopted amendments were designed to:

Reduce water consumption through grouping plants with similar watering needs together and ensure efficiencies in the irrigation system design upon installation.

Require the protection of existing trees in landscaping for the design of large projects,

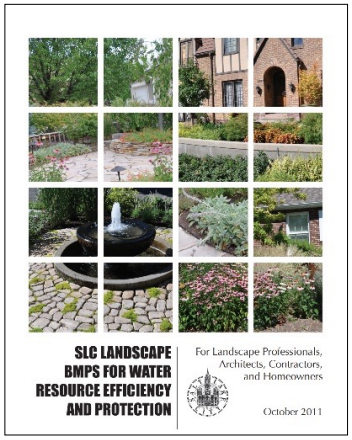
Address the health of street trees and height limits for both plants and structures in park strips.

The Landscape BMPs and Plant List documents are referenced within the amended landscaping regulations to provide clarification on the landscaping standards, including how to achieve greater water efficiencies, improve stormwater quality, and enhance water resource protection.

Additionally, Chapter 21A.48 set in motion a coordinated effort for permitting landscape plans in development situations between other city departments and Urban Forestry. Under Chapter 21A.48, tree preservation requirements in development situations were expanded to be more inclusive to all types of development. Tree protection and preservation requirements on private development are reviewed and approved by Urban Forestry. On development projects Urban Forestry issues and inspects tree preservation requirements.

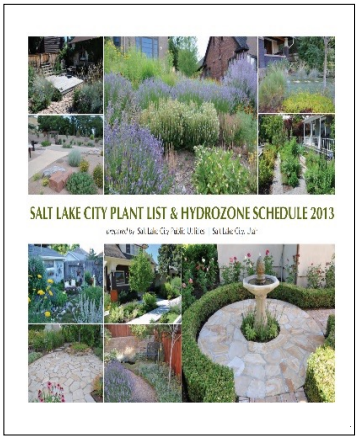
RELATED DOCUMENTS

The following page shows examples from supporting documents intended to aid Salt Lake City in the evaluation of landscaping requirements throughout the city to ensure urban forestry resources are managed carefully and efficiently.



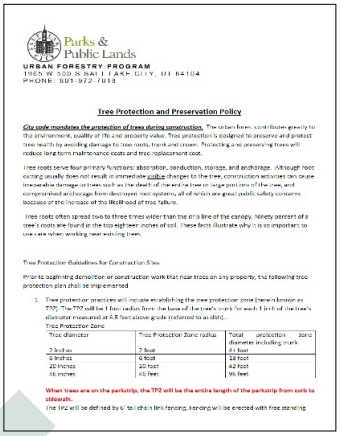
LANDSCAPE BMPs for WATER RESOURCE EFFICIENCY AND PROTECTION

The Landscape Best Management Practices manual identifies and outlines standards to enhance water efficiency, reduce landscape chemical dependence, and eliminate water waste for landscapers or contractors working within the Salt Lake City area.



PLANT LIST AND HYDROZONE

The Salt Lake City Plant List serves as a guide to the public and landscape professionals for selection of a wide variety of plants suitable for water-wise and sustainable landscapes, while fostering creativity in planting design.



TREE PROTECTION AND PRESERVATION POLICY

A set of guidelines for implementation of tree protection and preservation prior to construction work.

CENTER FOR WATERSHED PROTECTION RECOMMENDATIONS

The Center for Watershed Protection (CWP), a national non-profit focused on stormwater management and watershed planning, with expertise on the impacts of development on urban waterways, created a tool to audit municipal ordinances. This worksheet, "Making Your Community Forest-Friendly," is based on best practices in the urban forest, with an understanding that the urban forest plays a critical role in maintaining the health of waterways. The tool is intended "to help communities evaluate their local development regulations to identify revisions that will better promote protection and management of trees and forests as well as tree planting." (CWP, 2018)

While Salt Lake City's Code employs best practices in roughly 70% of the areas the CWP identified, a few sections of the code (below) that could be amended to provide stronger protections to sustain and grow Salt Lake City's urban forest.

The bulk of CWP's recommended code and related policy updates fall within the purview of the Zoning Chapter (Title 21A), while the others may potentially apply to the Streets and Sidewalks (Title 14), Parks and Recreation (Title 15), and Public Services (Title 17) chapters.

STREETS + SIDEWALKS (TITLE 14)

- Consider specifications for street trees that require trees with large canopies, provided they do not interfere with overhead utilities.
- Any requirements for large trees should include related ordinance for soil volume and soil quality to be effective.
- Consider requiring above ground utilities to be placed below ground, under the carriageway, to reduce conflict with trees and allow cities to maximize the benefits the urban forest provides.
- Consider requiring landscape islands in cul-de-sacs to reduce stormwater runoff impacts to water quality and provide a neighborhood amenity.

PARKS + RECREATION (TITLE 15)

- Consider developing or enhancing definitions for priority natural resources to conserve, and creating an ordinance addressing access between neighborhood open spaces and natural lands (e.g., trails).

PUBLIC SERVICES (TITLE 17)

DIVISION III: STORMWATER SEWER SYSTEM

- Consider providing credits for green infrastructure or low-impact development practices that include tree planting. (These credits are typically based on the overall volume of stormwater reduced on-site or mitigated through investment off-site).
- Consider providing credits for forest conservation or to increase vegetative buffers along waterways (which has the added benefit of creating options to develop parcels that have challenges to treat stormwater on-site).
- Consider incorporating trees into stormwater BMPs to reduce runoff, enhance water quality, and provide habitat.
- Consider developing stormwater design manuals that include requirements for species selection and relevant planting practices to address difficult growing conditions created by stormwater impacts.

ZONING (TITLE 21)

BUFFERS (21A.34: RIPARIAN CORRIDOR/LOWLAND CONSERVANCY OVERLAY)

- Consider amending minimum stream buffers in all areas to 50 feet (this applies to Area A in the Riparian Corridor Overlay and the Natural Vegetation Buffer Strip in the Lowland Conservancy Overlay)
- The buffer ordinance should specify that a minimum percentage of the buffer be maintained with tree cover suited to the conditions of the growing site.
- Specify enforcement mechanisms within the ordinance.

PARKING LOTS (21A.44)

- A minimum width of 6 feet or greater is recommended for standard parking lot islands.
- Ensure sufficient space remains available for large trees by specifically allowing alternative layouts that cluster trees and provide for shared soil space.
- Allow flush curbs and/or curb cuts and depressed landscaped areas so that runoff can be directed into landscaped islands.
- Allow vegetated stormwater management areas to count toward required landscape minimums.

LANDSCAPING (21A.48)

- Ensure all landscape areas required by zoning include trees.
- Provide a planting formula for trees, which “may take the form of a minimum number of trees, number of trees per parking area, trees per square feet of developed space or building footprint, density of trees, or percent canopy coverage.” (CWP, 2018)
- Develop tree planting guidelines (like SLC’s Engineering Design Guidelines) referenced in the landscaping chapter that include specifications and standards for:
  - tree selection,
  - planting,
  - size requirements,
  - soil type,
  - soil volume,
  - nursery stock,
  - selection, and
  - long-term maintenance.

SUSTAINABLE CODE REVIEW RECOMMENDATIONS FOR THE URBAN FOREST

The recommendations of the 2020 Sustainable City Code Review are organized into five goals, all of which have a relationship to the urban forest. The three goals that are most directly relevant, however, are discussed here.

GOAL 1: REDUCE URBAN HEAT ISLAND EFFECT

The document recommends preserving and expanding the urban forest to address urban heat island impacts, specifically:

- Expanding tree protections in City code
- Improve parking lot shading standards

Sacramento, CA uses a performance-based parking lot shading ordinance to mitigate heat islands. In addition to the standards in the ordinance, Sacramento also employs design guidelines to provide additional direction related to trees in parking lots.

GOAL 2: INCREASE EFFECTIVENESS OF PUBLIC RIGHTS-OF-WAY

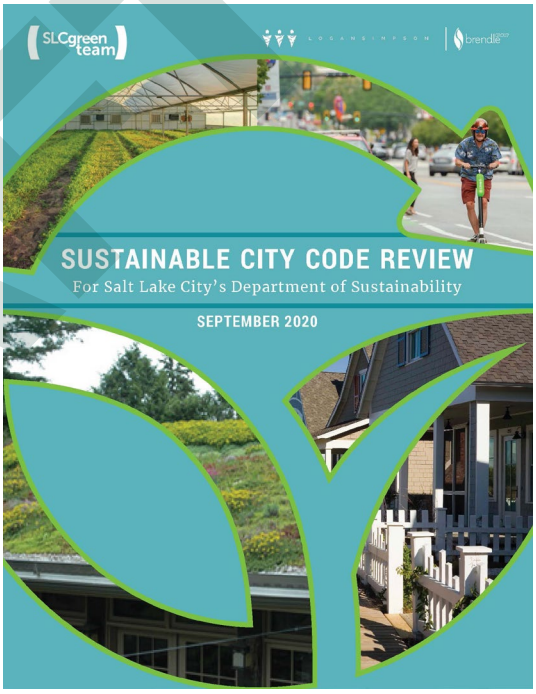
The document examines the multiple opportunities for expanding sustainable practices in Salt Lake City's large rights-of way, including specifics related to the urban forest:

- Incorporating tree trenches into the City Complete Streets Ordinance, which "direct stormwater runoff beneath the surface to gravel pits that allow water to slowly infiltrate" into groundwater sources.
- Co-locating or vaulting utilities to minimize conflicts with tree root zones.
- Using San Antonio's ROW tree protection ordinance as a model to expand existing tree protections in Salt Lake City's code.

GOAL 5: PROMOTE ECOSYSTEM CONSERVATION DESIGN

The document recommends consolidating information related to the urban forest in a single chapter and references the Longmont Colorado City Code as a model. Longmont code has a chapter dedicated to Trees and Plants, under Title 13: Streets, Sidewalks and Public Places. The chapter incorporates requirements related to:

- spacing between trees and utilities
- disease inspection and survey
- tree protection and preservation, and
- replacement or mitigation of removed trees.
(Salt Lake City Department of Sustainability, 2020)



URBAN DESIGN

Urban design that integrates the urban forest into streets and publics enhances livability for all residents of a city, both through principles of environmental psychology and biophilia put into practice by design, and through incorporating and enhancing the ecosystem services trees provide.

Of particular importance to Salt Lake City is **incorporating human scale elements into our wide streets**, which the urban forest does, along with providing visual interest and much needed shade to mitigate the impacts of urban heat island effect.

STREET TREE FORM + SCALE

Given Salt Lake City's large scale right of ways and oversized blocks in many parts of the city, the scale and form of trees becomes more significant. For example, on a narrow street with limited solar access, columnar trees may provide effective streetscape design. On very wide streets, however, columnar trees appear small and out of place, and do not provide adequate shade unless planted very closely together. However, a hedgerow of street trees is impractical and difficult to maintain, in addition to being poor urban design.

Scale requirements for trees also have cost saving implications, such as providing shade to streets to extend the lifespan of the asphalt.

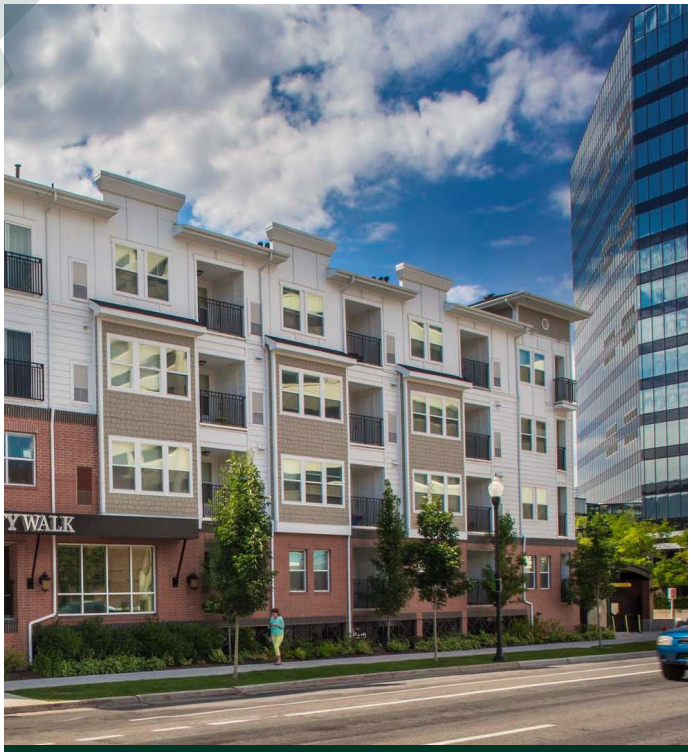
COMPARATIVE STREETSCAPES BY MASTER PLAN AREA

The photographic comparisons on the following pages were developed by the Planning and Urban Forestry Divisions. Streets photographed were selected to represent the "average" streetscape for both high and low canopy areas in each of Salt Lake City's Master Plan areas. The photos were taken by Planning Division staff in August and September 2021.

There are significant differences between areas, particularly with the provision of shade between high canopy areas. Consistent with the GIS map analysis, high canopy streets on the east side have a more extensive, fuller canopy than their counterparts on the west side. **When looking at the comparative photos, note factors such as:**

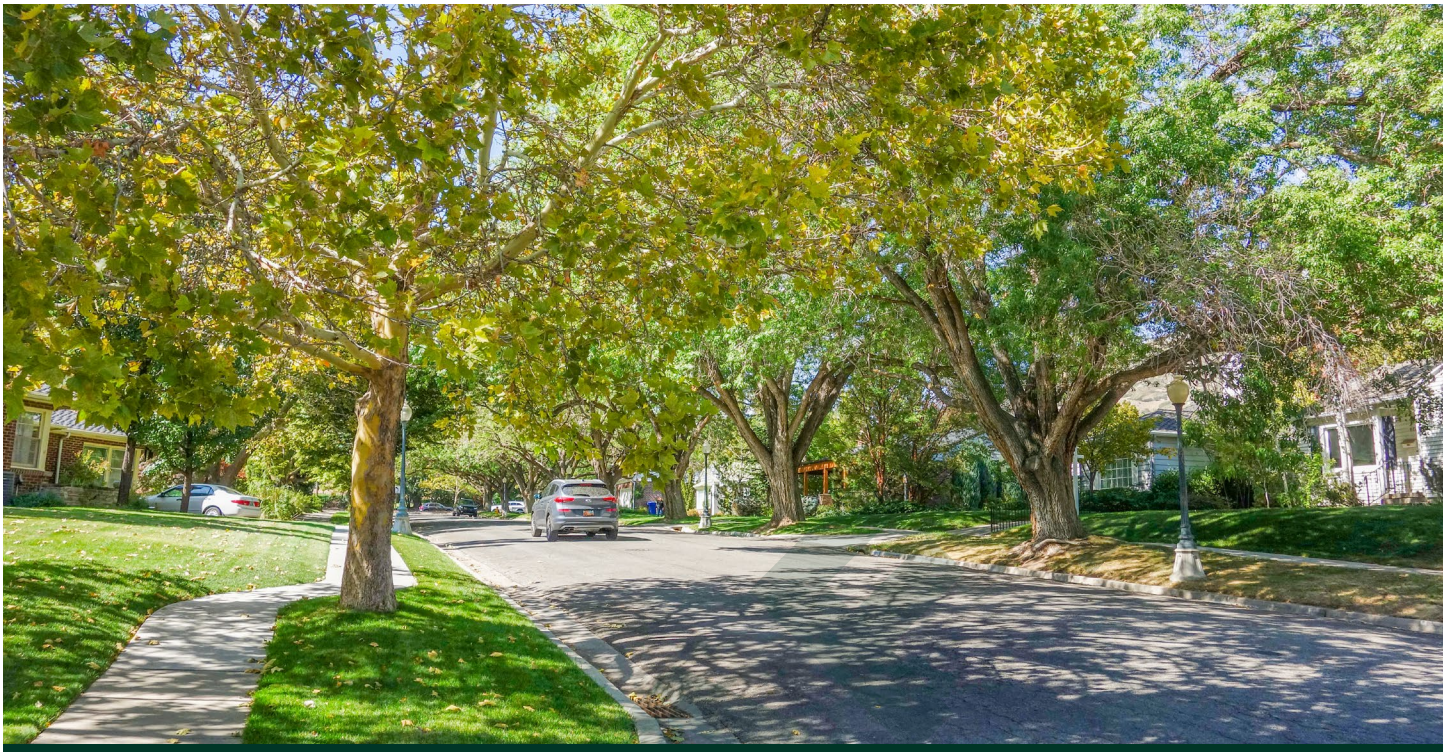
- **tree height**
- **width and fullness of canopy**
- **ground area in shade or sun**
- **size of park strip (soil volumes available for street trees)**
- **number of trees on private property**
- **presence or absence of aboveground utility lines**

Vase-shaped or spreading canopies shade sidewalks, creating a comfortable, human-scale sense of enclosure.



The scale and proportion of columnar species is unsuited to the urban context and they typically provide little or no shade.

STREETSCAPES BY MASTER PLAN AREA

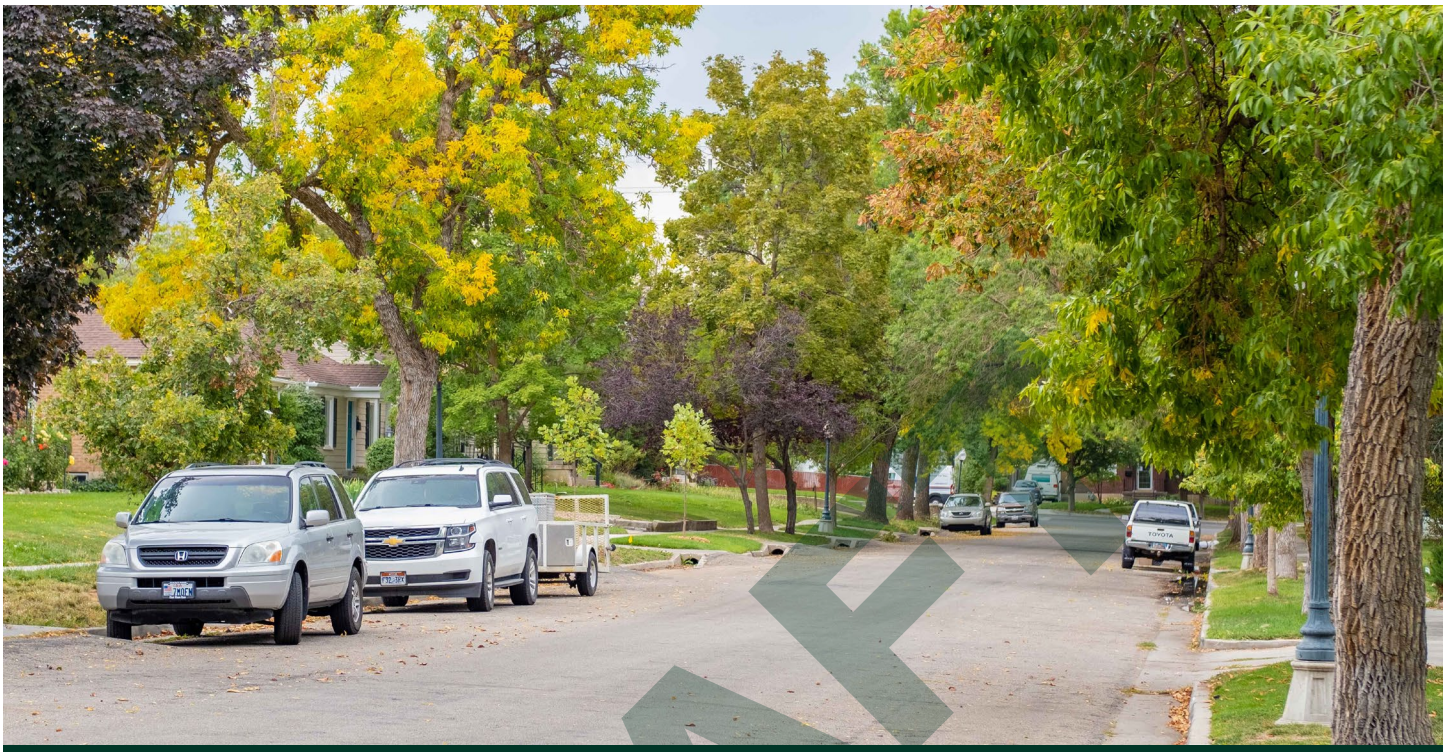


East Bench Community Master Plan Area - High Canopy *(Michigan Ave)*

East Bench Community Master Plan Area - Low Canopy *(Ambassador Way)*

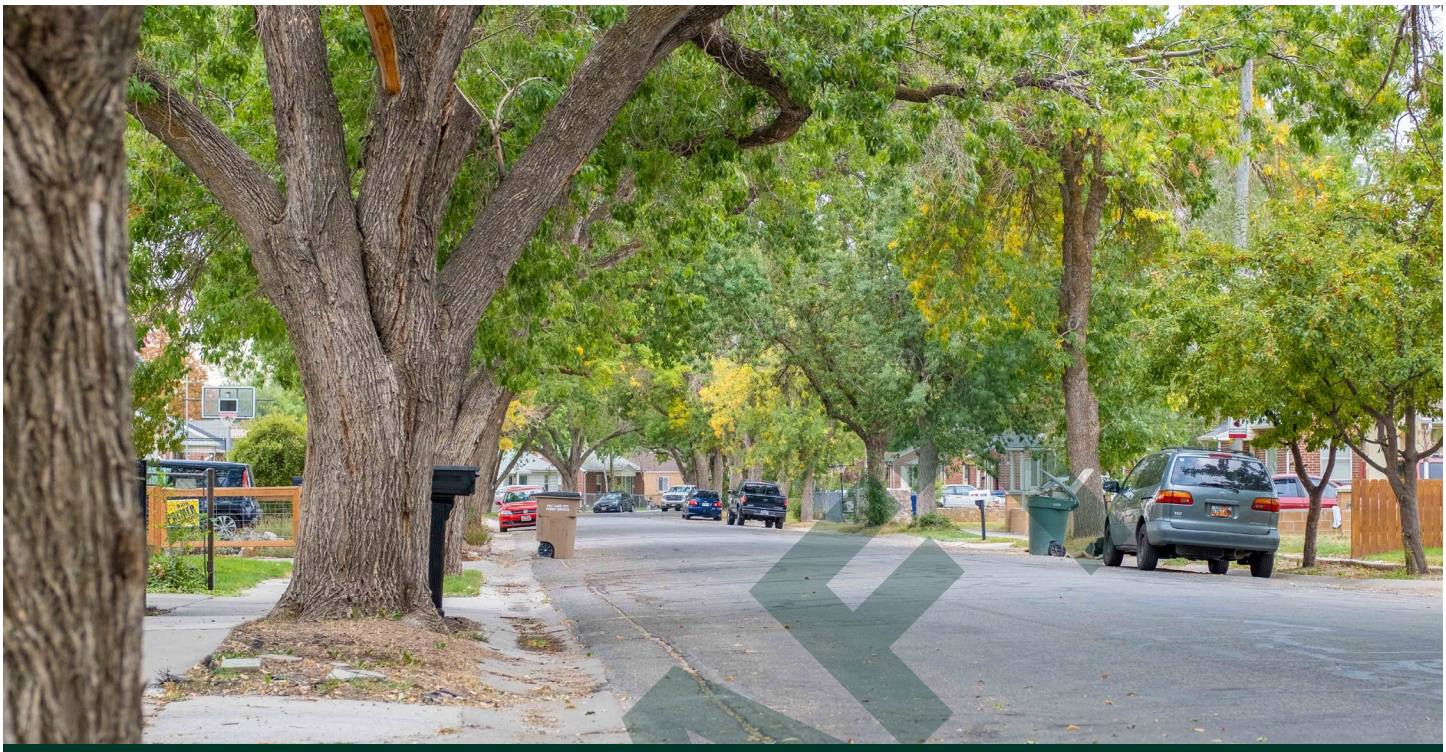
Northwest Master Plan Area - High Canopy *(Prosperity Avenue)*

Northwest Master Plan Area - Low Canopy *(Rose Park Lane)*

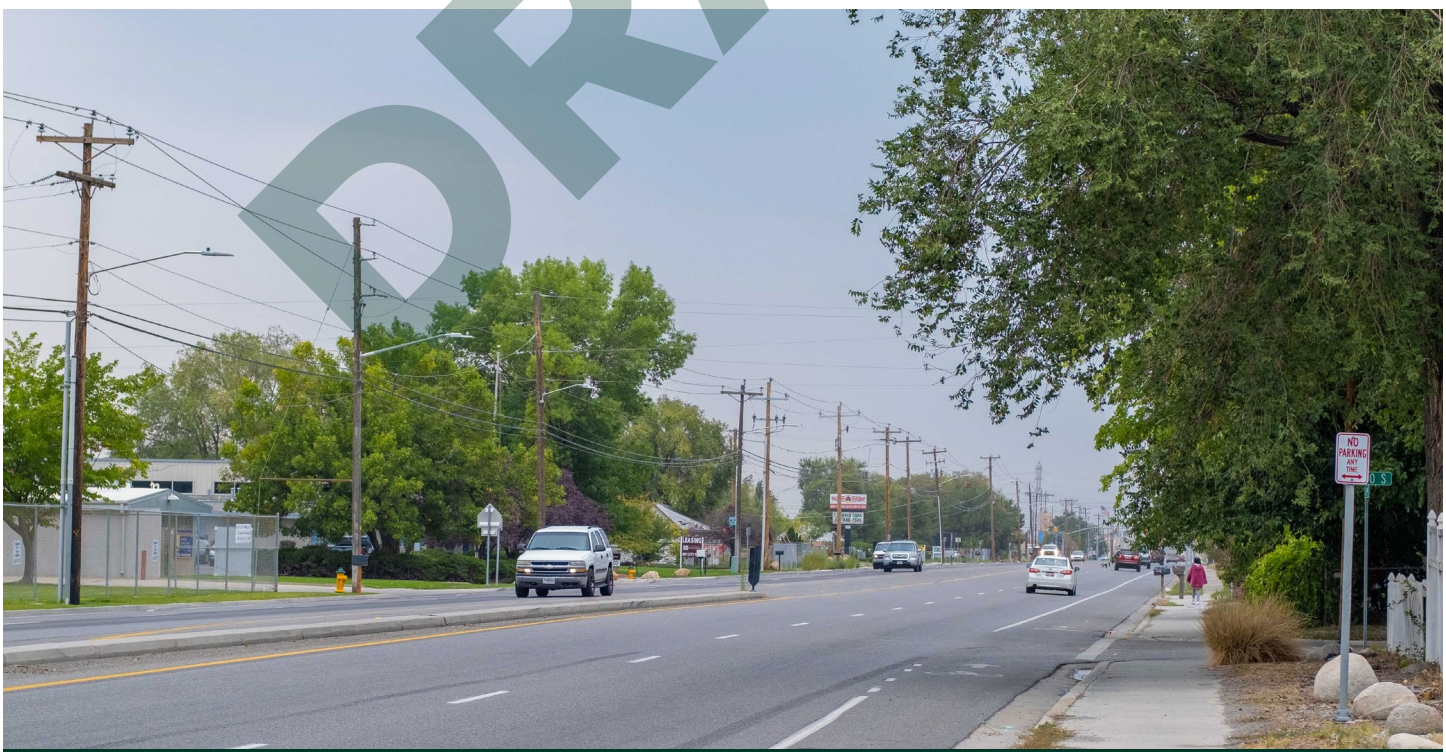


Sugar House Master Plan Area - High Canopy *(1800 East)*

Sugar House Master Plan Area - Low Canopy *(2700 South)*



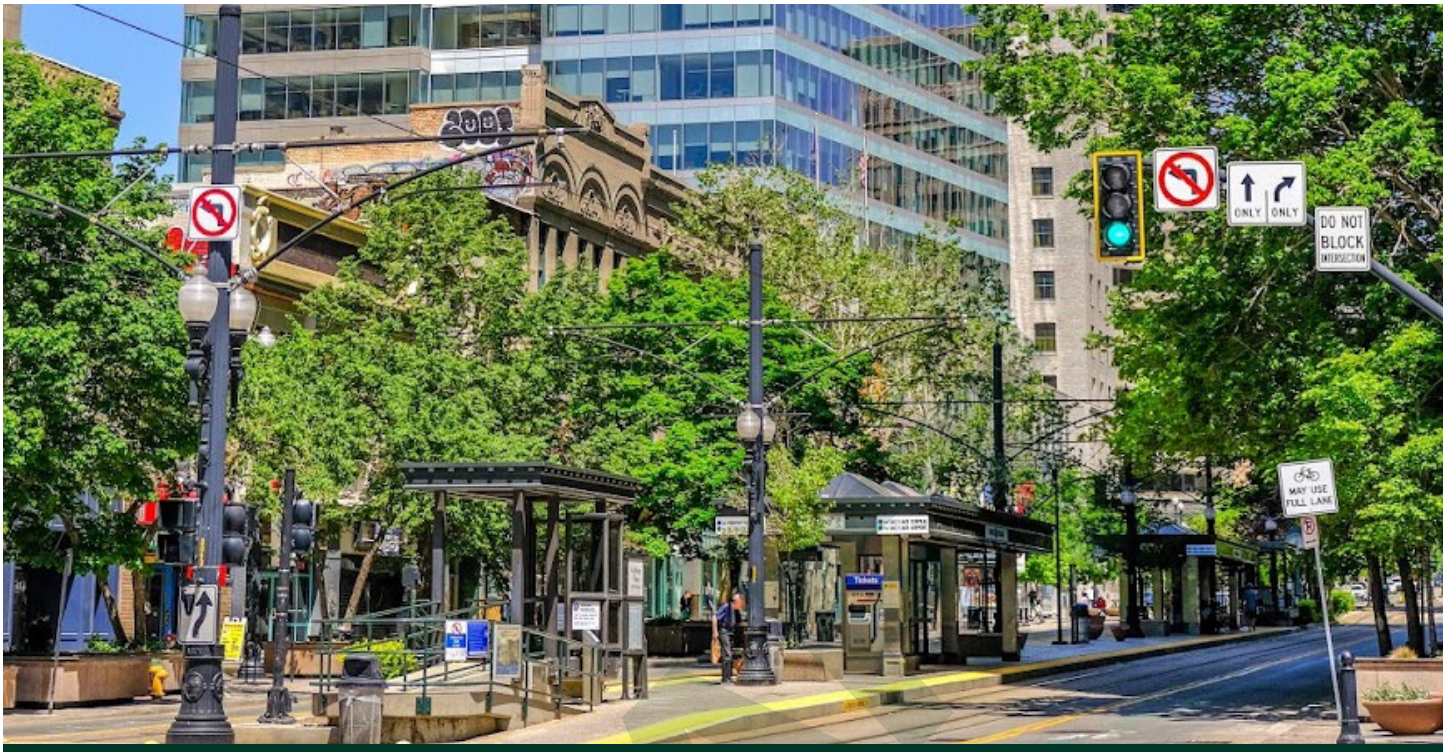
Westside Master Plan Area - High Canopy *(1000 South)*



Westside Master Plan Area - Low Canopy *(Redwood Road)*

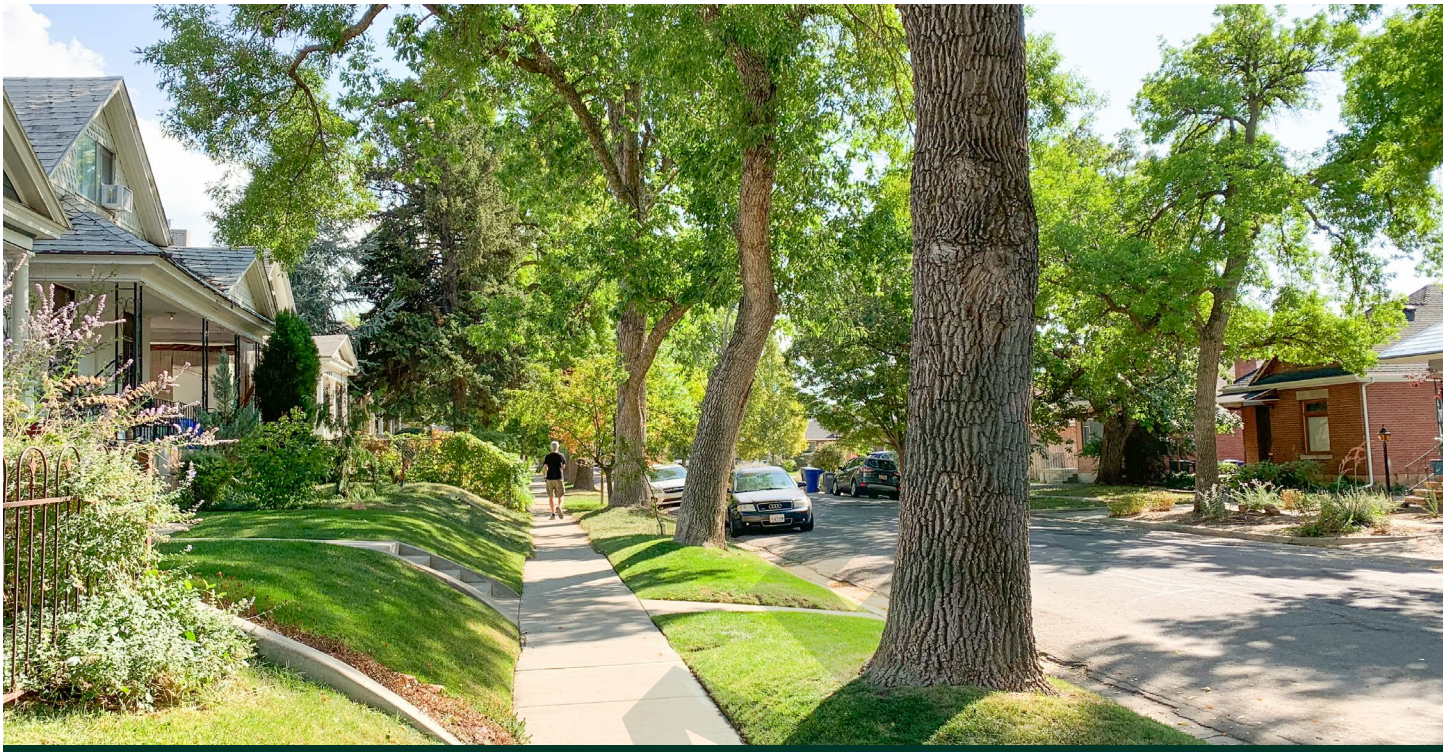
Avenues Master Plan Area - High Canopy *(Second Avenue)*

Avenues Master Plan Area - Low Canopy *(Twelfth Avenue)*



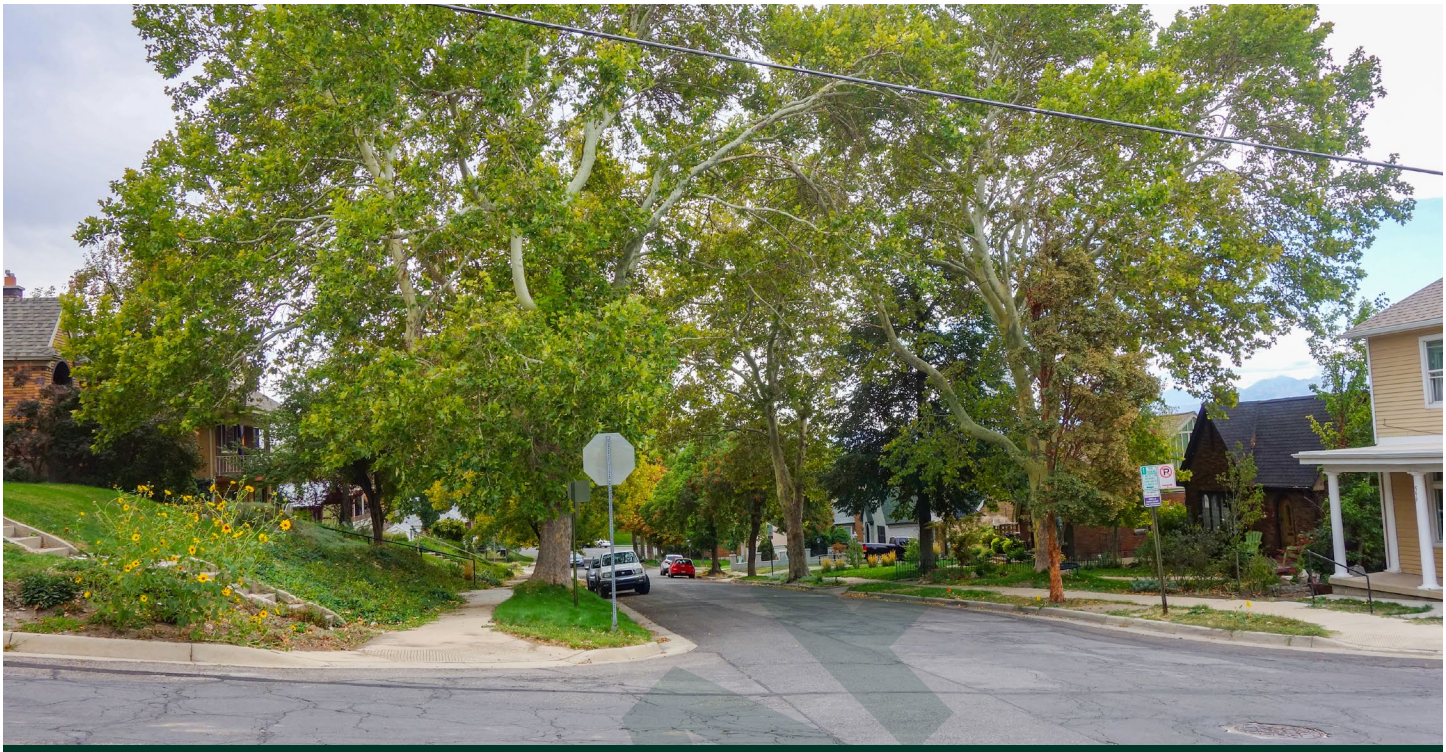
Downtown Master Plan Area - High Canopy *(Main Street)*

Downtown Master Plan Area - Low Canopy *(700 South)*



Central Community Master Plan Area - High Canopy *(Yale Avenue)*

Central Community Master Plan Area - Low Canopy *(Grove Avenue)*



Capitol Hill Master Plan Area - High Canopy *(De Soto Street)*

Capitol Hill Master Plan Area - Low Canopy *(800 North)*