SOUTH SALT LAKE
CITY ON THE MOVE

ARIEL ANDRUS
CITY RECORDER
220 E MORRIS AVE
SUITE 200
SOUTH SALT LAKE
UTAH
84115
P 801.483.6019
F 801.464.6770
SSLC.GOV

South Salt Lake City Council
Work Meeting Agenda

Public notice is hereby given that the **South Salt Lake City Council** will hold a Work Meeting on **Wednesday, January 28, 2026** in the City Council Chambers, 220 East Morris Avenue, Suite 200, commencing at **6:00 p.m.**, or as soon thereafter as possible.

To watch the meeting live click the link below to join:
https://zoom.us/j/93438486912

Watch recorded City Council meetings at: youtube.com/@SouthSaltLakeCity

Conducting: Council Chair Bynum

Matters for Discussion:

1. Appointment by the Mayor: — Mayor Wood
   Ramona Lopez – Civilian Review Board Alternate Member
2. Reappointment by the Mayor: — Mayor Wood
   a. Jeremy Carter – Planning Commissioner
   b. Olivia Spencer – Planning Commissioner
3. Mill Creek Greenway Vision Presentation — Sharen Hauri
4. Urban Forestry Inventory & Canopy Study — Sharen Hauri
5. Finance Audit Presentation — Crystal Makin

Adjourn

Posted January 23, 2026

Those needing auxiliary communicative aids or other services for this meeting should contact Ariel Andrus at 801-483-6019, giving at least 24 hours' notice.

In accordance with State Statute and Council Policy, one or more Council Members may be connected electronically.

Have a question or concern? Call the connect line 801-464-6757 or email connect@sslc.gov

Ramona Lopez

Salt Lake City, UT | [redacted] | [redacted]

Summary/Objective

I am seeking a challenging position where I can leverage my skills, abilities, and leadership qualities to contribute significantly to the success of an organization. I am dedicated to enhancing operational efficiency and fostering a positive work environment. My goal is to find a role that not only allows me to make a meaningful impact but also provides opportunities for continuous personal and professional development. I am committed to building a long-term career with a forward-thinking organization that values innovation and growth.

Professional Experience

Spectrum Field Services | Salt Lake City, UT

Accounting Specialist | April 2024 – Present

- Manage accounts receivable processes, including invoicing, payment posting, and collections.
- Reconcile customer accounts to ensure accuracy and resolve discrepancies.
- Monitor outstanding balances and follow up with clients to maintain timely payments.
- Prepare and maintain detailed financial records in compliance with company policies.
- Collaborate with internal teams to support efficient billing and reporting procedures.

Enlightened Soul Esthetics | Salt Lake City, UT

Owner and Operator | August 2014 – Present

- Licensed skincare professional specializing in facials, hair removal, and various esthetic treatments.
- Diligently adhere to appointment schedules, ensuring timely and efficient service delivery.
- Conduct client interviews to gather information on contraindications and health-related concerns.
- Provide personalized skincare recommendations based on individual client needs and concerns.

St. Joseph's Villa | Salt Lake City, UT

Central Supply Supervisor | June 2005 – August 2014

- Manage medical equipment and supplies for a skilled nursing facility, overseeing the entire supply chain process.

- Coordinate ordering of supplies, maintaining accurate inventory levels, and ensuring efficient shipping/receiving.
- Streamline distribution and warehouse management, optimizing storage space and logistics.
- Evaluate medical equipment for safety and compliance, adhering to monthly budget guidelines.
- Establish relationships with vendors, negotiating contracts and pricing.
- Handle medical records, ensuring confidentiality, accuracy, and compliance.
- Apply billing experience to support accurate invoicing and collaborate with insurance providers.

Mancuso's Religious Goods | Salt Lake City, UT

Retail Store Manager | 1993-1999, 2001-2003

- Supervised and led a small retail operation, managing a team of seven employees.
- Oversaw staff scheduling, purchasing, and inventory control.
- Handled banking responsibilities, accounts payable, and budget allocations.
- Prioritized and delivered excellent customer service to enhance the shopping experience.

Summary of Qualifications & Key Skills

- Retail Operations Management
- Team Leadership
- Financial Management (Banking, AR/AP, Budgeting)
- Customer Service Excellence
- Adaptability and Quick Learning
- Organizational and Problem-Solving Skills
- Strong Work Ethic and Communication Skills

Education

High School Diploma | 1981 | Salt Lake Community High School
Certification in Office Management | 1987 | Salt Lake Community College

Jeremy Carter

Career Summary

Detail-oriented Draftsperson with over 20 years of experience in drafting and design, with extensive expertise in oil, gas, water processes, and mechanical design. Demonstrated proficiency in mechanical and structural drafting, complemented by significant experience in project management and on-site technical support.

Skills & Qualifications

General Computer
Proficient in AutoCAD, AutoCAD Plant 3D, AutoCAD P&ID, Revit, Raster Design, Inventor, CAD Pipe, MS Office, Plex Earth (GIS), and Adobe Suite.

Drafting
Architectural - Skilled in renderings, sections, site plans, elevations, roof plans, floor plans, dimensioning, electrical plans, and wall section details.
Civil - Competent in topography, coordinate systems, surveying, legal descriptions, and plotting to scale.
Electrical - Experienced in wiring (interconnect) diagrams, schematics, one-line and three-line diagrams, instrumentation loops, grounding plans, PLC cabinet layouts, and conduit/cable schedules.
Mechanical - Adept at 3D modeling, dimensioning, geometric tolerances, assembly drawings, working drawings, reverse engineering, welding, steel detailing, gears, bearings, fasteners, linkages, HVAC, and plumbing systems.

AutoCAD
Expertise in X-ref, blocks, dynamic blocks, paper space, model space, scaling, annotative text, layers, standards, publishing, E-Transmit, Plant 3D object customization, Lisp routines, and 3D applications.

Work Experience

Mechanical and Plumbing Designer – B&D Engineering (Sandy, Utah)
April 2023 to Present
Responsible for design and drafting across industrial, commercial, and residential (shell & core/tenant improvement) HVAC, plumbing, and hydronic projects. Involved in equipment selection and project management activities.

Drafter/Designer – SMD Engineering (Taylorsville, Utah)
May 2016 – April 2023
Served as Drafter within a mechanical engineering firm, focusing on HVAC and plumbing systems for various industrial, commercial, and residential projects. Managed specification sheets and product cuts.

Drafter/Designer - Tetra Tech (Salt Lake City, Utah)
October 2014 – May 2016
Worked on a range of large-scale mining and small water projects within an electrical engineering team. Responsibilities included drafting, instrumentation, controls, and symbol library standardization.

Project Manager/Drafter/Sales - CADanswer (Salt Lake City, Utah)
November 2007 – October 2014
Provided comprehensive customer support on- and off-site. Collaborated with engineers and clients, produced isometric piping and P&ID drawings, and converted AutoCAD files for complete gas plant projects. Developed sheet metal fabrication drawings.

Drafter - Reaveley Engineering (Salt Lake City, Utah)
August 2007 – November 2007
Prepared detailed sheets for concrete, steel, and CMU construction and developed structural plans for multi-level projects following CAD standards.

Education

Madison Elementary School (South Salt Lake, Utah)
September 1979 – July 1986

Granite Park Jr. High School (South Salt Lake, Utah)
September 1986 – July 1989

Granite High School (South Salt Lake, Utah)
September 1989 – July 1991

ITT Technical Institute (Murray, Utah)
March 2004 – September 2005
Associate of Applied Science in Computer Drafting & Design
Cumulative GPA: 4.0
Honors: Multiple Highest Honors, Valedictorian

Community

City of South Salt Lake Planning Commission (May 2014 – Present)
Serving as current Planning Commission Chair, Previous tenure as Chair (January 2017 – January 2018). Function as Land Use Authority for South Salt Lake, reviewing residential and commercial developments, advising the City Council, and ensuring adherence to the General Land Use Plan. Engage with community stakeholders, respond to citizen inquiries, and collaborate with developers to mitigate project impacts.

List of projects addressed as a member of the South Salt Lake Planning Commission:

Winco, S-Line Streetcar, Zellerbach Development, Granite Library, One Burton, Chinatown Supermarket, River Run, The Road Home – Pamela Atkinson Men's Resource Center, Central Park, Hawthorne Townhomes, New South Salt Lake Public Works Campus, Jordan River Parkway, Parley's Trail, In-N-Out, Ritz Classic Apartment Homes, SSL Downtown Development Area Plan, East Streetcar Area Plan, Tracy Aviary's Nature Center, Dominion Energy Regulator Station.

Personal Fact

Lifelong Resident of South Salt Lake (September 1974 – Present)
Fourth-generation resident of South Salt Lake. Family established residence in 1928. Third generation to attend Madison Elementary and Granite High School. Currently residing in and raising a family in the original family home.

Olivia Spencer

[redacted] [redacted] Salt Lake City, Utah

Olivia has strong communication skills, demonstrated through her ability to convey complex public policy concepts and implications to various stakeholders. She has hands-on involvement in conceptualizing and implementing community building initiatives.

EDUCATION

MASTER OF PUBLIC ADMINISTRATION

UNIVERSITY OF WYOMING

BACHELOR OF SCIENCE

INTERNATIONAL STUDIES
MASS COMMUNICATION
UNIVERSITY OF UTAH

TEACHING

INTRO TO PUBLIC ADMINISTRATION

FALL 2023, 2024 & 2025
UNIVERSITY OF UTAH

WORK EXPERIENCE

HEAL PROGRAM MANAGER

STATE OF UTAH
DEPARTMENT OF HEATH AND HUMAN SERVICES

Oct 2022 to Present
Salt Lake City, Utah

- Oversees grant activities for CDC public health initiatives focused on chronic disease for the Healthy Environments Active Living (HEAL) Program
- Co-manages a budget of $3.5 million in grant monies with half earmarked to Utah's 13 Local Health Departments and community-based organizations
- Supervises a team of subject matter experts and interns who oversee projects targeting underserved communities funded under federal grants
- Drafts and manages contracts with outside public and private sector partners
- Coordinates programmatic projects related to public policy
- Manages the hiring process from recruitment to onboarding for new staff
- Serves as the registration chair for the Utah Worksite Wellness Council

TRUE PROJECT MANAGER

UNIVERSITY OF UTAH
SPENCER FOX ECCLES SCHOOL OF MEDICINE

Part time Oct 22 to Present
Sept 2020 to Oct 2022
Salt Lake City, Utah

- Created the Tribal, Rural and Urban Underserved (TRUE) Medical Education Graduate Certificate to help prepare medical students to choose primary care specialties in locations that serve medically underserved communities
- Managed the Rural Primary Care Track program to encourage students to become rural primary care providers through specialized programming, rural rotation opportunities that is incentivized through scholarship funding
- Organized the annual summer Rural Immersion Course to allow students to be fully immersed in hands-on rural medicine in Indian Country through the lens of public health, cultural immersion, and community-based organizations
- Arranged subject matter expert guest speakers semesterly for courses

TRAINING COORDINATOR

SALT LAKE COUNTY
CLERKS OFFICE

Aug 2018 to Sept 2020
Salt Lake City, Utah

- Facilitated trainings for 600+ Poll Workers each election cycle to teach them how to process a voter using specialized voting equipment
- Sought out new locations and inspected existing Vote Center facilities
- Managed and executed contracts for 60 Vote Centers in Salt Lake County
- Maintained voter registration data for new registrations, petitions, provisional ballots in a database of 600,000+ Utah voters
- Created fliers and signage used to guide voters in Vote Centers

Olivia Spencer

[redacted] [redacted] Salt Lake City, Utah

WORK EXPERIENCE

ADJUNCT LECTURER

UNIVERSITY OF WYOMING
SCHOOL OF POLITICS & PUBLIC AFFAIRS
May 2016 to Aug 2020
Taught Asynchronous

- Instructed American and State Government Political Science courses
- Designed syllabi, wrote exams, and lead weekly discussions
- Created and updated virtual courses using Canvas LMS

INSTRUCTOR

SALT LAKE COUNTY
CRIMINAL JUSTICE SERVICES
Dec 2016 to Aug 2018
Salt Lake City, Utah

- Lead psycho-educational and life skills group classes to pretrial clients, probation clients, and inmates in the Salt Lake County jail
- Trained staff on how to teach and use Courage to Change, a journaling program, to reduce recidivism rates
- Managed schedules for temporary instructors within the division

INTERN

ECONOMIC DEVELOPMENT LOAN FUND
SALT LAKE CITY CORPORATION
May to Dec 2016
Salt Lake City, Utah

GRADUATE TEACHING ASSISTANT

UNIVERSITY OF WYOMING
SCHOOL OF POLITICS & PUBLIC AFFAIRS
Aug 2014 to May 2016
Laramie, Wyoming

CENTER PROGRAMMING COORDINATOR

SALT LAKE COUNTY
AGING SERVICES
Mar 2013 to Aug 2014
Salt Lake City, Utah

- Assisted with the daily operation, management, and supervision of the Mount Olympus Senior Center patrons and building employees
- Coordinated and marketed programs, classes, and activities

ACADEMIC TUTOR

STATE OF UTAH
UTAH DEPARTMENT OF WORKFORCE SERVICES
Oct 2008 to Mar 2013
Salt Lake City, Utah

- Provided one-on-one and group tutoring to low-income at-risk youth
- Taught GED and TABE test preparation
- Tutored college, high school, and technical training courses

COMMUNITY INVOLVEMENT

SOUTH SALT LAKE PLANNING COMMISSIONER

PROFESSIONAL ASSOCIATIONS

PHI ALPHA ALPHA HONOR SOCIETY (PAA)

PUBLIC ADMINISTRATION THEORY NETWORK

Mill Creek Restoration

Sharen Hauri, South Salt Lake City
Ronnie Pessetto, Seven Canyons Trust
Gretchen Milliken and Greg Boudrero, ULI Utah

The Longstanding Interest

Who We Are

Seven Canyons Trust is a non-profit organization dedicated to uncovering and restoring the urban creeks in the Salt Lake Valley.

Our Work

Three Creeks Confluence

Address: 950 West 1300 S, Salt Lake City, UT 84104

Before:

After:

Who We Are

The mission of **ULI Utah** is to shape the future of the built environment for transformative impact in communities.

We CONNECT, INSPIRE and LEAD.

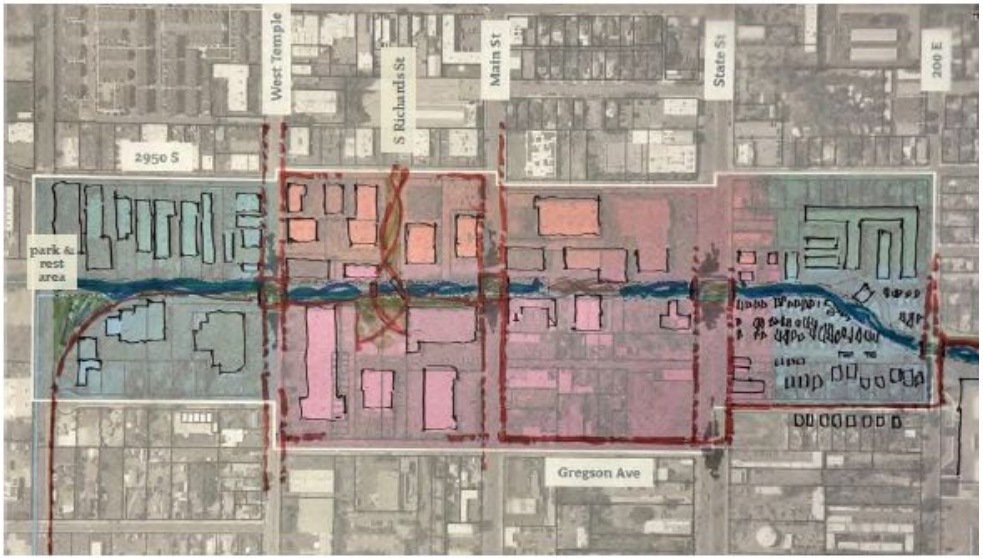
The panel and City of South Salt Lake staff pause for a photo in front of the Community Opportunity Center.

Our Work

Mill Creek Greenway Technical Assistance Panel - 2025

Plan:

Inspiration:



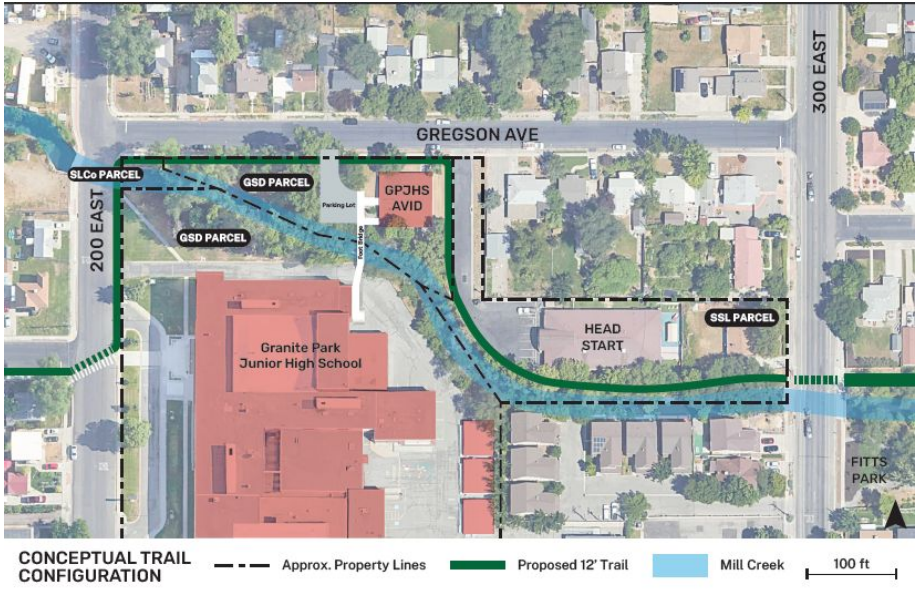
The panel identified several crossings that should be enhanced to draw the public's attention to Mill Creek. While most of these crossings are with north-south streets, a new crossing via a new pedestrian bridge could connect mid-block at South Richards Street.

Our Work

Mill Creek Trail and Greenway Development

Past:

Future:

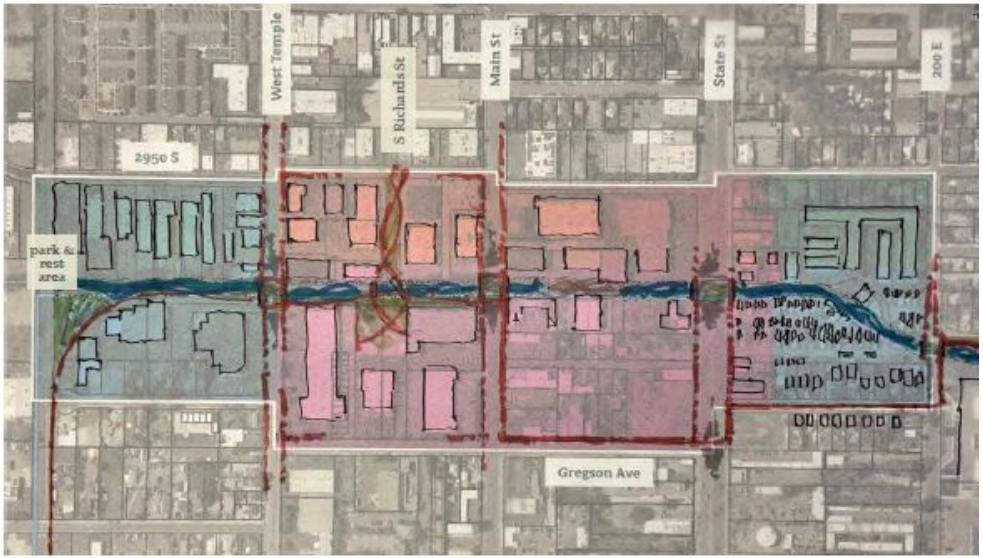


Our Work

Mill Creek Greenway Technical Assistance Panel - 2025

Plan:

Inspiration:



The panel identified several crossings that should be enhanced to draw the public's attention to Mill Creek. While most of these crossings are with north-south streets, a new crossing via a new pedestrian bridge could connect mid-block at South Richards Street.

FOUNDATIONS

COMMUNITY | BIG IDEA

200 EAST TO 200 WEST

In South Salt Lake, Mill Creek flows through patches of residential, industrial, and park. The stream is nearly a straight line through the city and much of the channel is reinforced with concrete—devoid of habitat value. Natural stretches of Mill Creek at Fitts Park show promise for wildlife, trails, and community amenities. West, an abandoned rail corridor and underutilized parcels along the creek present opportunity for a linear park from 200 East to 200 West. The creek should be given a larger riparian buffer and meanders re-established in the channel to improve habitat value. Daylighting Mill Creek west of Main Street would remove a barrier for wildlife and people. Green infrastructure would improve creek health, filter stormwater pollutants, and mitigate downstream flooding.

Amenities, such as bike rentals, seating, art, and interpretive signage, and trail-side development would create a unique experience. A paved mixed-use trail, and adjacent soft-surface trails, would provide opportunities to enjoy nature and learn about our hydrology. The trail would link neighborhoods to the Utah Transit Authority's Millcreek TRAX Station and a key transit corridor. Strategic areas for access would provide angling opportunities. Efforts would greatly benefit South Salt Lake, our most culturally diverse city.

Category:	10-Year
City:	South Salt Lake
Typology:	Utility corridor
Creeks:	Mill
Stream Length:	0.6 mi.
Buried:	0.1 mi.
Impaired:	0.5 mi.
Estimated Cost:	$4-8M

NEXT STEPS

- Update the *Mill Creek Trail Feasibility Study* and include an inventory of adjacent parcels to prioritize acquisition.
- Partner with Utah Transit Authority and other landowners to link trail through private properties.
- Add signage and art in the corridor, such as murals highlighting the creek, and build a brand for the Mill Creek Trail to raise awareness for the vision.
- Create a policy that requires (or incentivizes) developers contribute to goals.

Rendering of Mill Creek in South Salt Lake.

Mill Creek at Main Street in South Salt Lake.

STRATEGIES

01. Connect public and private spaces along the creek with a trail.

02. Daylight the creek and replace culverted street crossings with bridges, where feasible.

03. Increase riparian buffer, enhance the urban forest, and create access for fishing and other recreational opportunities.

ULI TAP Process

The Sponsoring Organization

- Gathers background materials
- Defines the project scope
- Presents the challenge to the panel

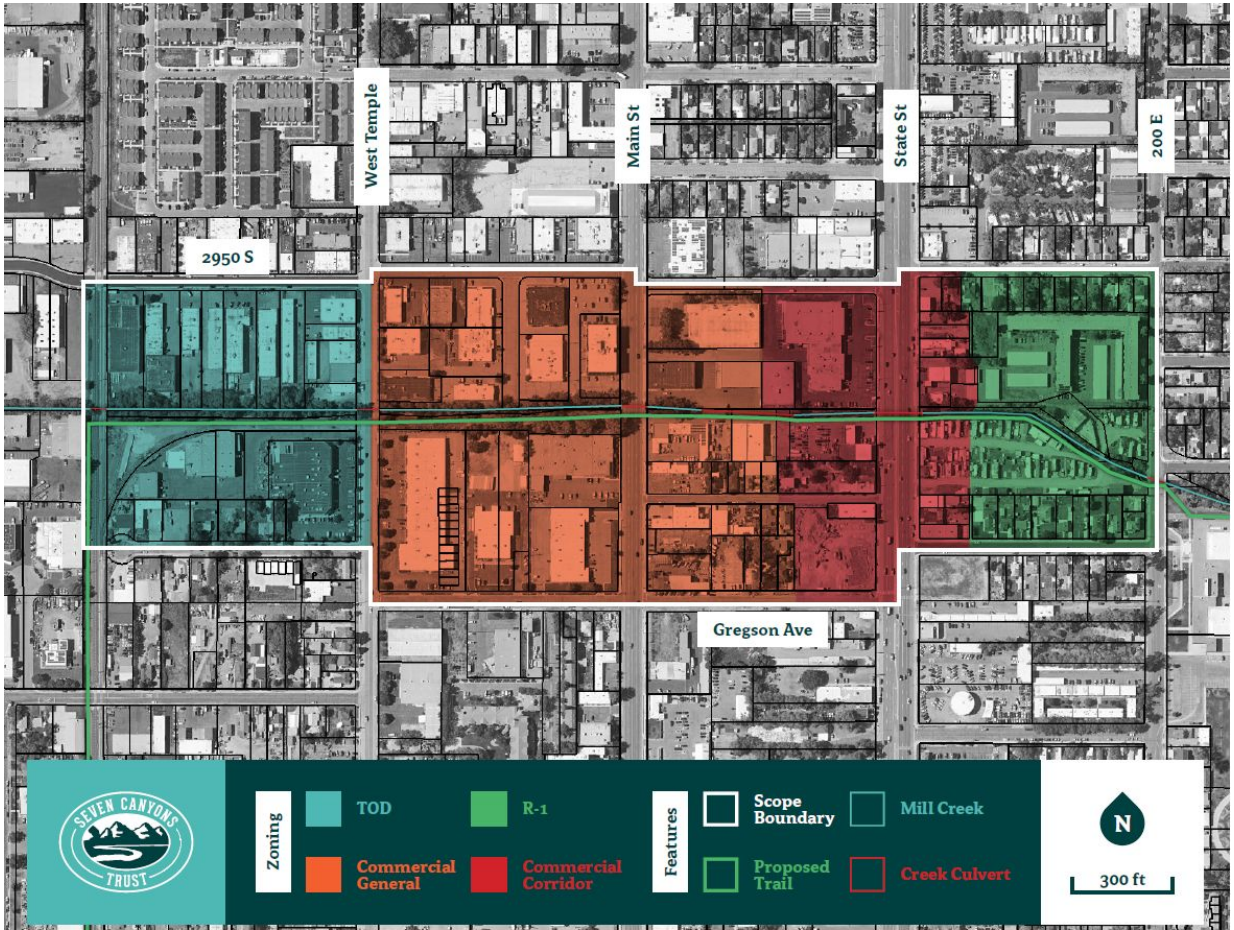
Panelists

- Panelists dedicate **two full days** to:
  - Interviewing stakeholders
  - Touring the study area
  - Evaluating challenges and opportunities

The Conclusion

- The process concludes with a **set of actionable recommendations**

Study Area


West Temple
Main St
State St
200 E
2950 S
Gregson Ave
Zoning
TOD
R-1
Commercial General
Commercial Corridor
Features
Scope Boundary
Mill Creek
Proposed Trail
Creek Culvert
N
300 ft

The Panelist Interviews

Panel interviewed over **40 Stakeholders**, including:

- City of South Salt Lake staff
- Seven Canyons Trust leadership
- Elected officials
- Institutional neighbors
- Nonprofits and creative professionals
- Business owners and residents
- Students from Granite Park Junior High

Interview Takeaways

- Improved creek access
- Waterway protection and restoration
- Trail and greenway connections
- Thoughtful nearby real estate development

ULI TAP Recommendations

KEY RECOMMENDATIONS

1. COMMUNITY CONNECTIVITY

Connect across SSL - to Parley's Trail, Downtown SSL, CIZ, and ultimately across I-15 to the Jordan River

a. Add wayfinding

b. Paint pavement to call attention to the creek

c. Continue road diets on Main and West Temple and add sidewalk

d. Build a connected loop between parks - east-west across State St

e. Create activity nodes - plazas, pocket parks, public art

KEY RECOMMENDATIONS

2. CREEKSIDE CONNECTIVITY

An exciting opportunity to create a trail and greenway and build east-west connectivity in the city.

a. Create a trail and park experience between West Temple and Main

b. Install a ped bridge over the creek at Richards Street

c. Create a mini park near intersection with TRAX

d. Create pocket park at 300 East and Gregson

e. Reinforce the Gregson Ave - State Street crossing for peds/bikes

f. Visualize the buried sections of creek with pavement painting

KEY RECOMMENDATIONS

3. REZONING AND OVERLAY POTENTIAL

Expand the mixed-use zone into the study area to stimulate development and generate incentives for creek protection.

a. Comprehensive zoning analysis and update for neighborhood

b. Establish mixed-use zone (west of State)

c. Establish riparian overlay zone for Mill Creek Corridor with grandfather protection

d. Develop incentives for property improvements that enhance greenway and trail

KEY RECOMMENDATIONS

4. FUNDING OPPORTUNITIES

Create new streams of revenue and incentives to support projects.

a. Seek grants and partnerships for creek and greenway projects

b. Establish a CRA (Community Reinvestment Area) to help pay for the public infrastructure

c. Establish a PID (Public Infrastructure District) to help finance infrastructure improvements and additional development

Thank You!

SOUTH SALT LAKE DEPARTMENT OF NEIGHBORHOODS

ULI Utah

SEVEN CANYONS TRUST

ULI Utah

MILL CREEK GREENWAY

South Salt Lake, Utah

Technical Assistance Panel | January 28-30, 2025

About

Urban Land Institute

Urban Land Institute is a global, member-driven organization comprising more than 48,000 real estate and urban development professionals dedicated to advancing the Institute's mission of shaping the future of the built environment for transformative impact in communities worldwide. ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics. Established in 1936, the Institute has a presence in the Americas, Europe, and Asia Pacific regions, with members in 84 countries.

Cover photo: Mill Creek winds through South Salt Lake, serving as a recreational asset in some places while also being buried underground and under-utilized in others. (ULI)

2001 L Street, NW | Suite 200 | Washington, DC 20036-4948

ULI Utah

As the preeminent, multidisciplinary real estate forum, ULI facilitates the open exchange of ideas, information, and experience among local, national, and international industry leaders and policymakers dedicated to creating better places. ULI Utah brings together real estate professionals, civic leaders, and the community for educational programs, initiatives impacting the region, and networking events, all in the pursuit of advancing responsible and equitable land use throughout the region. ULI Utah provides a unique venue to convene and share best practices in the region. ULI Utah believes everyone needs to be at the table when the region's future is at stake, so ULI serves the entire spectrum of land use and real estate development disciplines—from architects to developers, CEOs to analysts, builders, property owners, investors, public officials, and everyone in between. Using this interdisciplinary approach, ULI examines land use issues, convenes forums to find solutions, and impartially reports findings.

ULI Utah Leadership

Beth Holbrook
ULI Utah Chair
Utah Transit Authority

Technical Assistance Panel (TAP) Program

Urban Land Institute harnesses its members' technical expertise to help communities solve complex land use, development, and redevelopment challenges. Technical Assistance Panels (TAPs) provide expert, multidisciplinary, and unbiased advice to local governments, public agencies, and nonprofit organizations facing complex land use and real estate issues in the region. Drawing from its professional membership base, ULI Utah offers objective and responsible guidance on various land use and real estate issues ranging from site-specific projects to public policy questions. The sponsoring organization is responsible for gathering the background information necessary to understand the project and present it to the panel. The ULI panelists spend two days interviewing stakeholders, evaluating the challenges, and ultimately arriving at a set of recommendations that the sponsoring organization can use to guide development going forward.

About

Technical Assistance Panel

Panel Leadership

Molly McCabe
TAP Chair
Principal
Hayden Tanner

Robert Schmidt
TAP Co-Chair
Principal
PEG Companies

Panel Members

Greg Boudrero
Principal
MGB+A

Mary McCarthy
Board Member
Grand Teton National Park Foundation

Gretchen Milliken
Director of Strategic Planning & Initiatives
Blaser Ventures

Diana Rael
Principal
Norris Design

ULI and Panel Staff

Kristen Cordova
Executive Director, ULI Utah

Brette Pattillo
Associate, ULI Utah

Karlee May
Executive Director, ULI Idaho/Montana

Kelly Annis
Report Writer, Branch Communications

Acknowledgments

ULI Utah would like to thank the City of South Salt Lake and Seven Canyons Trust for inviting ULI to conduct this technical assistance panel. Additionally, ULI thanks Salt Lake County and the Wasatch Front Regional Council for their support of this work and insights during the panel workdays. Finally, ULI would also like to thank the over 40+ stakeholders who generously shared their time and insights with the panel.

The panel and City of South Salt Lake staff pause for a photo in front of the Community Opportunity Center.

Contents

Executive Summary

The creeks that run down from the Wasatch Mountain Range into the Salt Lake Valley serve a vital role in helping to channel snow melt from the mountains and manage stormwater runoff in the valley. While many of these creeks have been partially channeled and buried, renewed attention by civic leaders, community members, and organizations like the Seven Canyons Trust is highlighting the valuable role these waterways play in the community and the opportunities they present to not only assist with stormwater management in the valley but to also positively impact community members' health and wellbeing in a variety of ways.

The City of South Salt Lake and the Seven Canyons Trust (together the Sponsors) turned to the Urban Land Institute Utah District Council (ULI) for assistance with plans for Mill Creek. The Sponsors requested strategies for daylighting the stream and creating a greenway trail and also asked ULI to make recommendations for further activating the surrounding four-block stretch of the creek corridor, spurring economic development in the area.

ULI, using its trusted Technical Assistance Panel (TAP) program, convened a panel of real estate professionals with the expertise to answer the questions posed by the Sponsors. The ULI panel's recommendations leveraged the good planning work already completed in the Mill Creek area and identified a series of steps the Sponsors can take in the near, medium, and long term to achieve their goals for an active and vibrant Mill Creek corridor.

The panel articulated the goal of this work as follows: to create a mobile, connected community, to facilitate economic growth, to remain inclusive of meeting all types of housing needs, and to create a healthy and vibrant waterway providing recreation, open space, and connections. The panel's recommendations coalesce around four areas: community connectivity, creekside connectivity, rezoning and overlay potential, and funding.

Recommendations

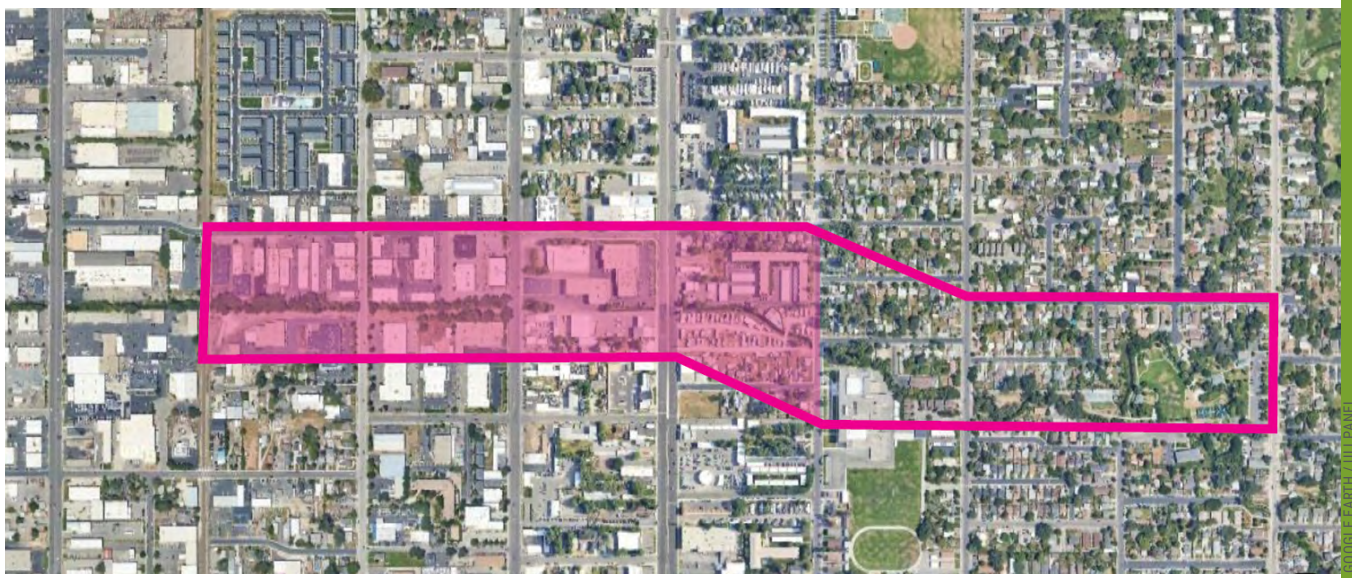
Community Connectivity

The panel's first set of recommendations outline how a Mill Creek trail can connect beyond the creekside. Mill Creek is an extraordinary community asset that provides a host of positive impacts starting east of the study area at Kaleidoscope Park. A trail along Mill Creek should connect the community beyond the corridor, inviting visitors and residents to explore its path and connect them to community assets beyond the trail.

Using a comprehensive approach, a Mill Creek trail can connect users to the Jordan River Trail network, Downtown South Salt Lake, the Creative Industry Zone (CIZ), the TRAX and streetcar lines, Parleys Trail, community parks, and the city's beloved community centers.

Start Now (Year 1)

The following recommendations can begin now and in some instances point to and amplify work already underway.



The panel was charged with evaluating the TAP study area, marked by the pink shading. In doing so, the panel also considered the blocks east to Kaleidoscope Park as outlined in pink to the right of the study area.

- Enhance community wayfinding with larger, more frequent trail signage, and paint bike lanes on streets to assist with trail navigation.
- Create painted intersections on State Street to increase pedestrian safety and call attention to the creek running under the roadway.
- Continue street diets on Main Street and West Temple and continue to improve the City's sidewalks.
- Build an urban connectivity loop using West Temple and Main Street, connecting Mill Creek to downtown, the streetcar line, CIZ, and 3300 South. A second neighborhood loop to the east could connect residential neighborhoods, community centers, and parks.
- Create creekside activity nodes around Fitts Park. Mixed-used development, plazas, pocket parks, and public art would help activate these nodes and welcome people into the greenway and to the businesses lining the corridors to the north and south.
- Connect to the Jordan River Trail network using 27th Street to 600 West and using a new proposed entrance recommended by the panel to Parlays Trail.

Medium Term (2-5 Years)

- Continue to build creekside activity nodes at West Temple and Main Street.
- Connect to the Jordan River Trail network along Gregson Avenue to the TRAX line and south to 3300 South.

> "Often used to describe waterways coming or flowing together, the term 'confluence' for the panel also pointed to community, leaders, and agencies coming together to create something special along Mill Creek.

Long Term (5+ Years)

- Connect to the Jordan River Trail network through a direct path that crosses the TRAX lines, Interstate 15, and the rail yard beyond.

Creekside Connectivity

The study area, the Mill Creek corridor, and additional blocks to the east provide an exciting opportunity to create a trail and greenway that will assist with east-west connectivity in South Salt Lake.

Near Term (Year 1)

- Create a trail and park experience between West Temple and Main Street using a vacant Utah Transit Authority (UTA) right of way.
- Install a pedestrian bridge over the creek at South Richards Street.
- Create a park and trail rest area near the creek's intersection with the TRAX line.
- Create a pocket park on City-owned land at the southwestern corner of 300 East and Gregson Avenue South.
- Reinforce the crossing at State Street and Gregson Avenue with a more robust crossing mechanism, and paint bike lanes on Gregson.
- Visualize the creek's path in paint in places where it is buried under street crossings and other pavement.

Medium Term (2-5 Years)

- Lower the walls and open the channelized portions of the creek with the goal of creating paths along and more proximate access to the waterway.
- Consider a boardwalk along the channelized areas to allow people to walk along the waterway and move closer to its sights and sounds.
- Develop guidelines or a toolkit for private property owners to guide private property improvements that can enhance the riparian environment.

Rezoning and Overlay Potential

With regard to catalyzing development along the Mill Creek corridor, the panel proposes an expansion of the City's mixed-use zoning into the study area, which will help stimulate and expand development in the activity

nodes and along the streets radiating north and south. In conjunction with the change to mixed use zoning, the panel recommends a riparian overlay for the creek corridor, which will preserve and protect the creek as developments and other improvements along the waterway occur.

Near Term (Year 1)

- Move forward with a comprehensive zoning analysis for South Salt Lake, including the efforts for the TOD study underway, to pull all of the updates together and align efforts.
- Establish Mixed-Use zoning in the study area, and consider expanding it into other parts of the city.
- Concurrently with the updated zoning, establish a riparian overlay for the Mill Creek corridor and communicate and emphasize that existing property owners' structures and current property improvements will be grandfathered into the overlay area.

Medium Term (2-5 Years)

- Create compelling incentives for property owners along the waterway who choose to improve their property and enhance its relationship with the creek and potential trail system.

Funding Opportunities

Although the panel was not specifically charged with identifying funding sources for its recommendations, a number of the recommendations and improvements suggested for the study area may require new funding streams, which prompted these additional suggestions from the panel.

Near Term (Year 1)

- Explore potential grant funding with an eye toward opportunities to collaborate with other partners or layer creek improvements with other community initiatives for exponential impact and broader potential funding access.

Medium Term (2-5 Years)

- Establish a Community Reinvestment Agency (CRA) to include the areas around the creek from State Street to the TRAX line to help pay for creek restoration and the public infrastructure improvements needed to build a greenway and trail.
- Overlay a Public Infrastructure District (PID) along the corridor to help finance public infrastructure improvements and incentivize additional development within the study area.

Conclusion

The work proposed by the panel and laid out before the TAP Sponsors will require long-term commitments and the political will to pursue improvements that will preserve and protect Mill Creek, create a greenway trail that can connect inside South Salt Lake and beyond, and stimulate economic activity in the areas surrounding the Mill Creek corridor.

The Sponsors of the TAP have demonstrated their capacity for and interest in working together. The complex connectivity challenges that a Mill Creek trail will face in its direct westward expansion and the real estate challenges inherent in daylighting a fully buried stream will require continued collaboration, determination, grit, and grace. Much like the confluence of nature's waterways, collaboration can be exciting, rocky, and even stressful, but the result will be a stronger path forward together, increased momentum along the way, and bigger downstream impact for the South Salt Lake community.

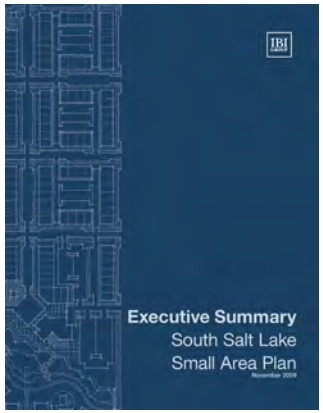
Introduction and Background

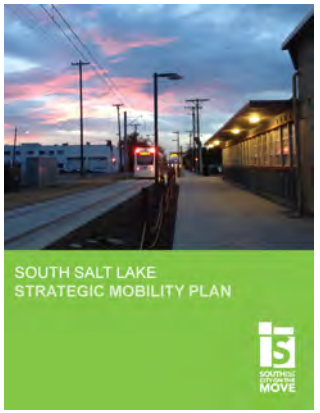
The seven creeks that run through the Salt Lake Valley drain the Wasatch Range and the residential and commercial neighborhoods across the Salt Lake City metropolitan area. Before joining the Jordan River, these small but mighty creeks provide habitat and refuge for wildlife, recreational spaces for people, and important cooling mechanisms for everyone during the heat of the summer.

Mill Creek, one of these waterways, runs east to west through South Salt Lake and is at times visible and celebrated and other times channeled under roadways, funneled into narrow passages, and buried underground in parking lots. Recognizing the additional value that the Mill Creek waterway can bring to the community, to the environment, and to economic development potential in South Salt Lake, the City of South Salt Lake and the Seven Canyons Trust (together the Sponsors), turned to the Urban Land Institute Utah District Council (ULI) for assistance. The challenge was generally three-fold: create a framework for the area around the stream that supports economic and real estate development while protecting the creek and elevating its stature in the community; make recommendations for the long-term daylighting of the creek; and foster development and an identity along the creek that is authentic to the surrounding community.

TAP Questions Posed by the Sponsors

1. What should be developed along the Mill Creek corridor between 200 East and 200 West? Why should it develop that way?
    a. What do you see as the key obstacles (e.g. potential resident displacement, multiple property owners, differing business/civic interests, maintenance, etc.) in revitalizing the Mill Creek area, and how can we address them?
    b. What are the key steps that need to be taken to develop along Mill Creek, and which area along Mill Creek might be the first place to start development and enhancement/restoration efforts?
3. What approaches and strategies can be incorporated to support the long-term of daylighting Mill Creek and building a continuous multi-use trail along its entire length through South Salt Lake?
4. How can new development along Mill Creek celebrate and enhance the area's unique sense of place while recognizing the diverse community and its needs and economic challenges? How can urban design and community engagement help shape the neighborhood's identity, ensuring that development reflects the values of the community while fostering a vibrant and cohesive environment?





From roughly 2009 to 2023, at least six very good studies have focused on South Salt Lake and the area around the Mill Creek corridor. While these studies did not focus specifically on the real estate and economic development potential of a greenway along the creek, the panel did gather key information from the studies that helped inform their recommendations.

Technical Assistance Panel (TAP) Process

To address the questions posed by the Sponsors, ULI convened a technical assistance panel (TAP) of local and regional real estate professionals with expertise in the areas of real estate development, landscape design, urban planning, and real estate finance.

The Sponsors asked the panel to study the Mill Creek corridor from 200 West to 200 East. In addition to this portion of the waterway, the panel also studied areas of Mill Creek to the east, including where it winds through Kaleidoscope Park and Fitts Park and along property owned by the City within the 200 East block. This slightly expanded study area provided the panel with insights into the wide range of creek environments: an open and naturalistic setting in the parks; riprap and concrete channeling; culverts under roadways and through commercial areas; and even complete encapsulation below an asphalt parking lot. Walking the study area also allowed the panelists to experience the challenges pedestrians and others using non-motorized means may face while navigating the area. Movement east and west is particularly challenging and street crossings, State Street in particular, create additional barriers to east-west movement. Beyond the study area, east-west navigation is further challenged by the TRAX rail line, Interstate 15, and an expansive freight rail yard beyond.

As a function of the TAP process, the panel interviewed over 40 stakeholders from the community. These interview sessions helped the panel further understand the opportunities and challenges related to Mill Creek access, waterway protection, potential trail development, and opportunities for real estate development nearby. The stakeholders interviewed included City of South Salt Lake professional staff, leaders from the Seven Canyons Trust, elected officials, institutional neighbors, public sector property owners,

Mill Creek flows through South Salt Lake and is found in a wide variety of environments, from park settings to channelized paths to underground culverts. Each of these settings comes with varying degrees of public accessibility: the creek is accessible in the parks; visible yet less-accessible in areas where private property abuts the creek bank; and inaccessible due to infrastructure, fencing, and other man-made barriers that are generally found in commercially-zoned areas.

creative professionals, nonprofit advocates, business owners, residents, and even students from nearby Granite Park Junior High who had been exploring potential designs for a greenway along this same section of Mill Creek.

Following the interviews, the panel spent the remainder of the two days deliberating their findings, ultimately arriving at a set of recommendations the sponsoring organizations can embrace as they continue to elevate the presence of Mill Creek and encourage recreational and nearby economic development. The constant theme across all recommendations is that Mill Creek represents an important confluence for the community. It provides physical and cultural connection points for those living, working, and visiting South Salt Lake. It presents an exciting opportunity to restore the natural environment in and around the waterway. Mill Creek also represents a unique community asset around which the City can encourage complementary economic and real estate development.

The panel further articulated the goal of the TAP and the broader Mill Creek work as follows: to create a mobile, connected community, to facilitate economic growth, to remain inclusive of meeting all types of housing needs, and to create a healthy and vibrant waterway providing recreation, open space, and connections.

What the Panel Heard

Interviews with stakeholders uncovered the following themes.

City and Community Character

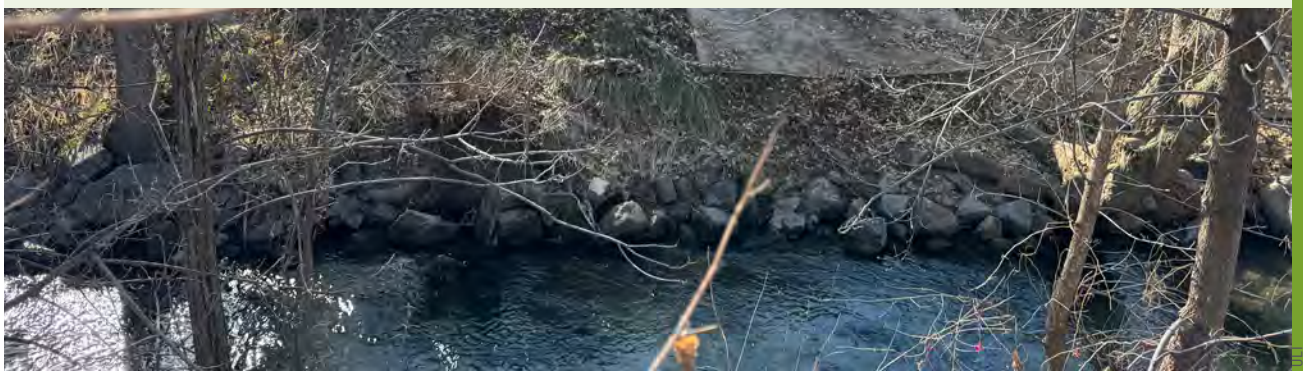
- Strong community identity and pride
- The city is largely self-sufficient
- Welcoming and diverse population
- Gritty and creative (CIZ) and supportive of the arts
- Affordable, yet becoming less so
- Broad respect for private property rights
- Lowest per capita green space in the state; there is a need for more tree canopy
- It is largely a food desert
- Many legacy and engaged property owners
- Committed community partners
- Good plans and previous studies in hand

Mill Creek Waterway

- Variety of conditions including day-lit, covered, naturalistic, and channeled
- Too many ffences, barriers, and invasive plant species
- Trails and access are often hard to see, made harder with varied property lines
- Highest pollution of the seven waterways
- Multiple creek maintenance entities
- Great adjacent neighborhood parks
- Bordered by homes and businesses
- Untapped community asset (may need a reconnaissance survey)

Broader Area

- Walkability is a challenge
- State Street is a barrier with high volumes, traffic, and speeds; limited crossing opportunities
- TOD focus includes bus and rail access
- Good start with bike trail route and signage
- Movement east-west is challenging (north-south connectivity is generally good)
- Challenges with safety and perceptions of safety
- Trail crossings at rail lines and I-15 will be challenging
- Businesses are concerned about disruptions caused by further construction
- Good institutional partnerships in the Utah Department of Transportation, Utah Transit Authority, Union Pacific, and more



Community Connectivity

Connectivity along the Mill Creek corridor will benefit from and lead to connectivity to the broader South Salt Lake community and amenities across the valley. Ultimately, a trail built along Mill Creek needs to connect elsewhere in order to be well-used and fully useful.

Community Connectivity

The panel's evaluation and recommendations were built upon the goals of community connectivity, a focus that was identified and outlined in the reports included in the briefing materials. The panel collected, synthesized, and refined these connectivity goals, applying them specifically to the Mill Creek corridor and calling attention to the following key connection points.

- **Jordan River Trail network.** The Jordan River Trail is a fantastic recreational and commuter trail running north and south through the valley. Connecting a Mill Creek trail to the Jordan River Trail will be complicated due to Interstate 15 and rail yard infrastructure. Because of this, the panel identified ways to connect Mill Creek to the river trail in the near term via a connector to the north, connect in the medium term following improvements along 3300 South, and steps that will support more direct east-west trail connections in the long-term. These connection goals are explained in greater detail in the following pages.
- **Downtown South Salt Lake.** The City's focus on downtown revitalization is paying off with businesses and destinations choosing to locate downtown and support its vibrancy. Connecting trail users to downtown makes good economic sense.
- **Creative Industry Zone**. The Creative Industry Zone (CIZ) is home to a variety of businesses, breweries, and places people want to be, which again would be positively supported through Mill Creek trail connections.
- **TRAX, streetcar line, and Parleys Trail.** Connections to other multi-modal, non-vehicular transportation routes are key to the interconnectedness of the City's trail network, and the Mill Creek corridor can become a key east-west connector to these other transportation assets.
- **Parks.** Stakeholders noted that they would welcome the opportunity to travel to and from city parks via a trail system, making the experience more inviting and safe for all ages. Connecting to parks, beyond Kaleidoscope and Fitts Park will prove beneficial for visitors to the city's parks.
- **Community centers.** The city's community centers are active hubs for all ages. Providing trail connectivity to these centers helps ensure that residents can access the places they need and want to go without having to use their personal automobiles or rely on friends or family for a ride.

Connectivity Loops

The panel pulled one of the excellent maps from the South Salt Lake Strategic Mobility Plan and layered on a host of additional connection points, community amenities, economic zones, and activity nodes. Through this layering, the panel demonstrated how a trail system could be fashioned to create an urban loop and a neighborhood loop, both of which would feature a connection along the Mill Creek corridor. These trail loops could be created now, with a little effort and financial investment, and can help support broader community connectivity.

- **Urban Loop.** Nestled between State Street and the TRAX Red/Blue Line, the Urban Loop rail leverages West Temple and Main Street to connect north to downtown. The streetcar line along this loop's northern edge and 3300 South at its southern edge can take trail users further east or west. This loop runs into downtown, connects through the CIZ, runs along the Woodrow Wilson Elementary School, and connects to new multifamily developments. It is also important to note that the section of the Mill Creek corridor that lies between the two north-south lines of this trail is an excellent location for a new section

of Mill Creek Greenway*, an idea that is described in further detail on page 15.

- **Neighborhood Loop.** The Neighborhood Loop is positioned further east, in the residential neighborhoods, and connects key community hubs. Running north and south along 300 East and 500 East, connections to the Central Park Community Center, Granite Park Junior High School, Fitts Park, and the South Salt Lake Community Center are facilitated along this trail.

The panel's annotated map to the right notes trail connectivity to the west, to the Jordan River Trail, as well as the assets noted above. The green dashed lines show how trail users can connect in the near term with Parleys Trail, the mid-term connection west on 3300 South, and later the longer-term connection directly west close to the Mill Creek TRAX Station.

Over time, mixed-used development should be encouraged at the activity nodes noted by the orange circles on the map to the right. These nodes represent Mill Creek's intersections with key roadways. Plazas, pocket parks, and public art could invite visitors to linger in these spaces, which could also serve as gateways to the greenway east and west and to the small businesses lining the corridors to the north and south. The panel also recommends that zoning in the area accommodate live/work buildings, which would further activate the area.

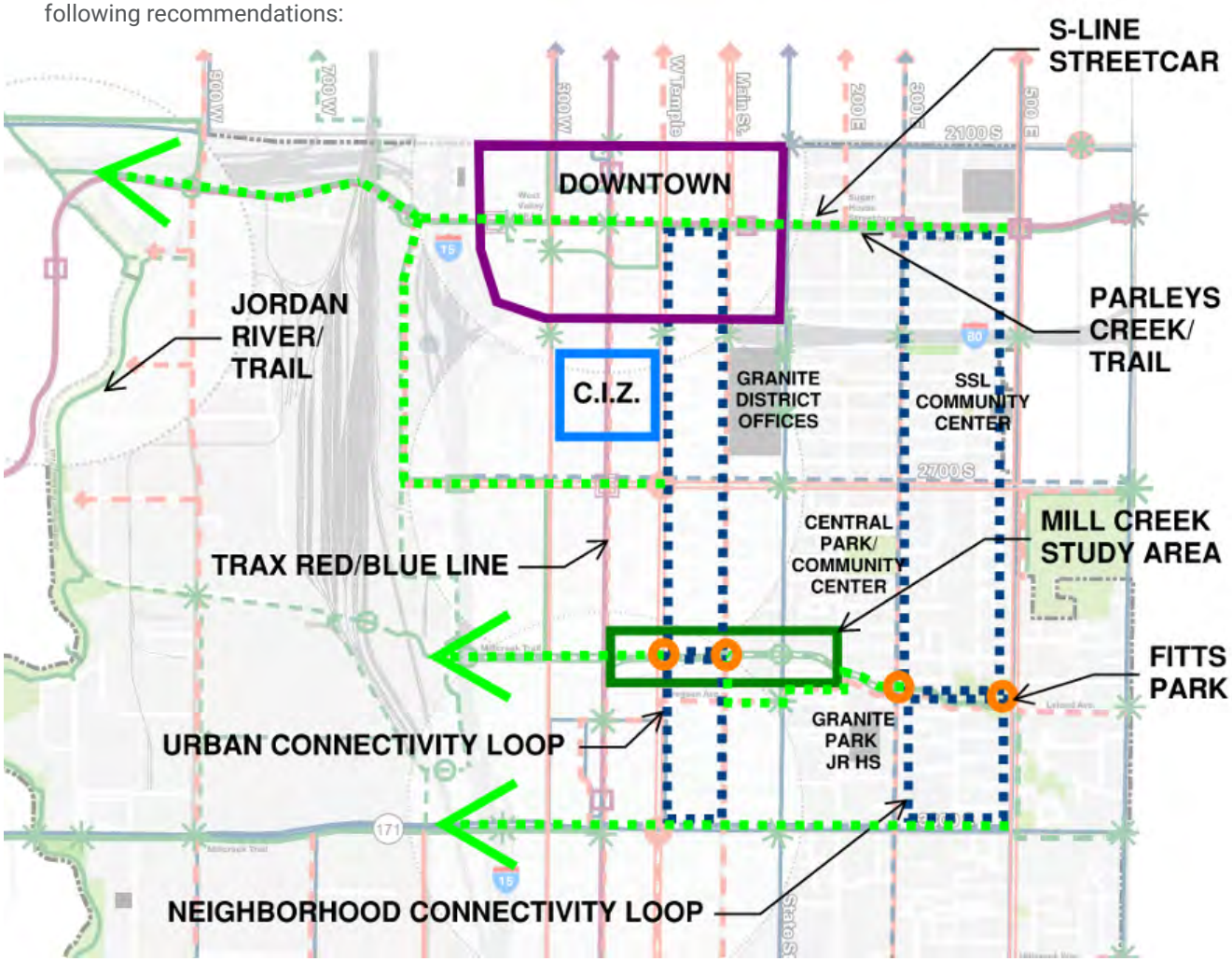
* The panel used the name "Mill Creek Greenway" as a placeholder in its work. To determine the actual name for the greenway, the panel recommends engaging the community in a naming pursuit, contest, or other community-led exercise. It is also important to note that the panel focused on a greenway instead of a park as the latter comes with certain legislative constraints that may prove limiting on the use and potential for events hosted in the space.

Connectivity Recommendations

To put the above connectivity plans to work for South Salt Lake, the panel had the following recommendations:

Start (Continue) Now

- **Create painted intersections on State Street.** Work with the Utah Department of Transportation (UDOT) to create painted intersections at key points along State Street. Painted road surfaces will not require costly infrastructure and will not create physical barriers for traffic. The



The panel used a map from the South Salt Lake Strategic Mobility Plan depicting the "existing and proposed bike and pedestrian network" and then layered on top of it key community assets, the proposed Urban and Neighborhood Loops (blue dotted lines) and activity nodes along the Mill Creek corridor (orange circles).

painted surfaces do, however, enhance multi-modal safety by slowing traffic speeds around the painted intersections.

- **Continue street diets on Main Street and West Temple.** The road work to date on West Temple and Main Street is having positive effects on traffic speeds and pedestrian safety. Those road diets should continue south to 3300 South.
- **Build sidewalks.** The published mobility studies highlight the importance of and the public's desire for wide sidewalks that are in good repair. This work is important to community and trail connectivity and should continue.
- **Create connectivity loops.** The two loops identified by the panel could be mapped and created now. The urban loop would connect downtown, arts, industry, and nature. The neighborhood loop would connect the streetcar, residential areas, community centers, parks, and nature.
- **Enhance community wayfinding.** Work has also begun on wayfinding for the bike network and small signs pointing to the trail connections dot city streets. Additional signage, more frequent and larger installations, will assist trail users in navigating the on-street trail. The City could turn to the community for assistance in naming the loops identified by the panel, and the community could likewise participate in branding activities for those loops.
- **Paint bike lanes on streets.** Similar to the need for enhanced wayfinding, painted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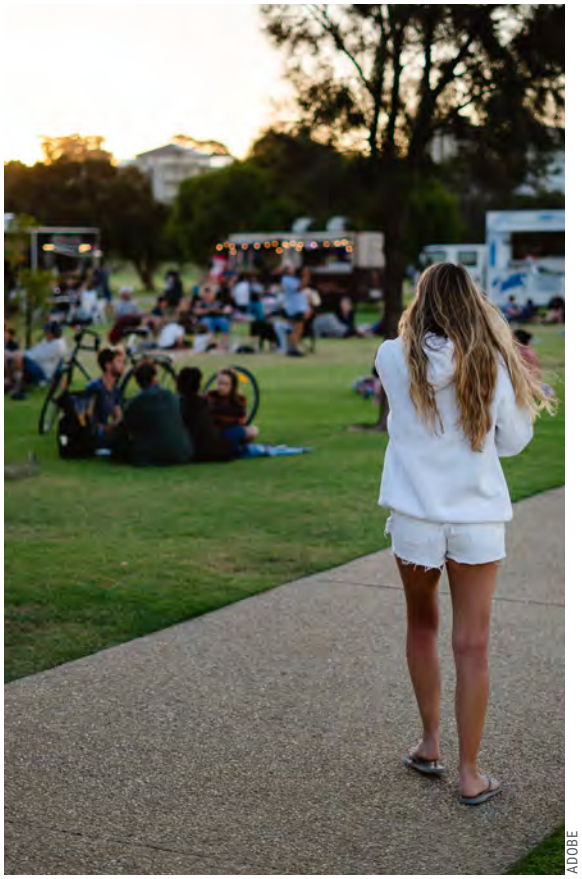
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These images depict how public spaces and community parks can be activated to draw visitors in, encourage them to linger and explore, and elevate the benefits that nature can deliver in an urban environment.

bike lanes are particularly important for sections of the trail that use city streets.

- **Create creekside activity nodes around Fitts Park.** The trail is well-established through Fitts Park and could be leveraged further to support more activity where the trail intersects with the surrounding street network. Encouraging activity, including economic and real estate activity, at those sites can further activate the area and enhance the trail experience.
- **Connect to the Jordan River Trail network.** The early and easier trail connections west will be found by first traveling north on West Temple. From there, trail users could follow 2700 South to 600 West. With a small addition to Parleys Trail, bringing the trail down to grade, trail users could then travel along Parleys Trail over the railway infrastructure to reach the Jordan River Trail beyond.

Medium Term

- **Create additional creekside activity nodes.** As Mill Creek trail development extends further west, additional activity nodes should be encouraged where the trail intersects with the street network.
- **Connect to the Jordan River Trail network.** The medium-term solution to a westward connection lies along Gregson Avenue. This path will take users along the street to the TRAX line at which point they will travel south to 3300 South, which then passes under the interstate. This solution will require some infrastructure updates to create safer passage along the rail lines, and upgrades to the bicycle/trail route along 3300 South are also warranted.

Long Term

- **Connect to the Jordan River Trail network.** The long-term solution to connect a Mill Creek trail directly west will require some complex maneuvering to cross the TRAX lines, Interstate 15, and the rail yard beyond. Work should start soon, meeting with partners to understand the most viable long-term solution, knowing that the realization of that vision is still a long way off.

Painted crosswalks and bicycle lanes help slow traffic and guide trail users. Signage and maps provide helpful navigation guidance, and murals enliven public spaces creating welcoming places that people want to explore and enjoy further.

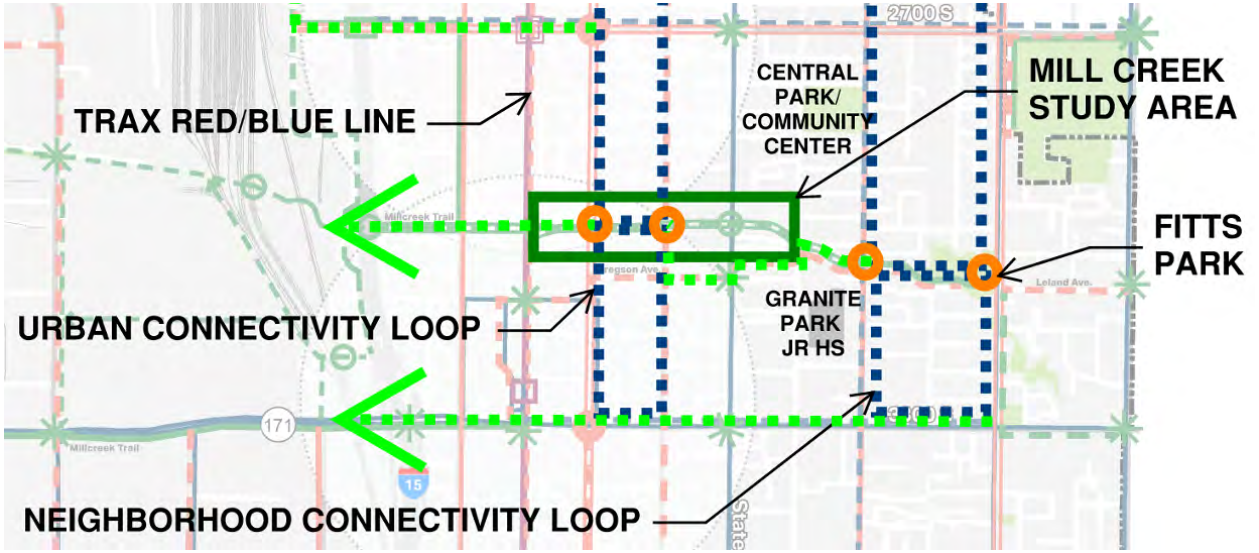
Creekside Connectivity

The panel heard often from stakeholders that it is difficult to move east and west in the area. The Mill Creek corridor provides an exciting opportunity to create a trail and greenway that will not only assist with that east-west connectivity but will do so in a very enjoyable way.

Creek Context

As Mill Creek flows through the study area, it takes a variety of shapes and forms each of which were considered by the panel.

- **Natural state.** In the eastern side of the study area, generally from Fitts Park to 200 East, Mill Creek is generally allowed to flow in a naturalistic stream bed. There are street crossings where the waterway is channeled through a culvert, but the stream is generally open to daylight. It is part of an enhanced park system that features an earthen stream bed and edge that is dirt, rock, grass, and plants. The bank is relatively low and park visitors can get close to and engage with the creek. The creek creates a southern edge to Fitts Park and it is in this park where Spring Creek joins Mill Creek.
- **Channeled waterway.** Moving west from 200 East, the creek is funneled through a concrete channel and bordered on both sides by tall chain link fencing. Transforming this creek environment into something more naturalistic, with room perhaps for a creekside trail, will require long-term planning and early and regular



This zoomed-in image of the study area shows how the activity nodes can connect the Creek, the trail, and the surrounding mobility networks.

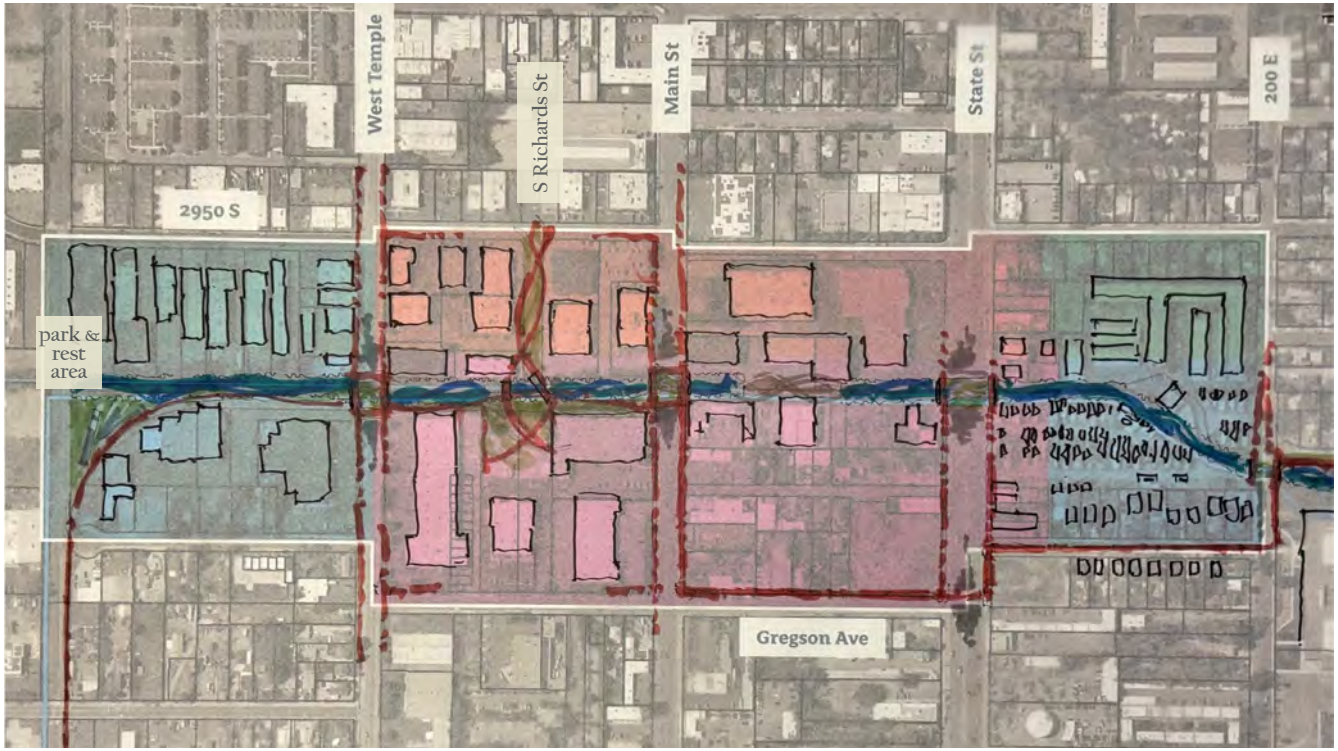
The area that surrounds Mill Creek, from Fitts Park to 200 East, features a waterway that is relatively close to its natural state, and the parks that surround the Creek feature its presence.

conversations with property owners who currently abut the concrete channel.

- **Buried waterway.** Daylighting the stream in places where it currently lies within a culvert and under dirt and asphalt is a project for the long term. This work will benefit from conversations with property owners today to open talks around potential future easements and alternatives to the current adjacent and perhaps incongruent land uses for a creek environment. In the meantime, the panel suggests artistic measures that will visually continue the creek through these areas and over the pavement.

Creekside Recommendations

- **Create a trail and park experience between West Temple and Main Street.** In the center of the study area, between West Temple and Main Street, there is an existing UTA right of way with few barriers that would be a great location for a greenway trail and creekside park.
- **Install a pedestrian bridge over the creek.** In the block between West Temple and Main Street, a new pedestrian bridge could connect South Richards Street into the above-mentioned new public park and greenway.
- **Create a park and trail rest area near the TRAX line.** At the far western edge of the study area, between West Temple and the TRAX line, UTA also owns excess land that is no longer needed by the rail



GOOGLE EARTH / ULI PANEL

The panel identified several crossings that should be enhanced to draw the public's attention to Mill Creek. While most of these crossings are with north-south streets, a new crossing via a new pedestrian bridge could connect mid-block at South Richards Street.

WIM RIEMES

THE SALT PROJECT

The panel proposed a bridge connecting south over the creek from South Richards Street. Calling to mind the area's industrial past and creative nature, a container bridge (left) could be installed rather quickly, or a more traditional bridge could provide users with a wonderful view of the creek while crossing. The container bridge, **Bridge**, was a temporary installation with two converted 20ft containers by Hoorn, The Netherlands, Luc Deleu and T.O.P.

line. The area close to West Temple is already in use by the community, with people fishing in the stream or visiting over their lunch hour. This full space could be transformed into a creekside park, creating another pearl along the city's string of Mill Creek parks. This park's location next to the rail line and its history as a freight loading area could provide inspiration for park furniture or amenities that would bring that railroad history to mind.

- **Create a pocket park at the southwestern corner of 300 East and Gregson Avenue South.** At the eastern end of the 200 East block, the City of South Salt Lake owns two parcels, one of which features a vacant home and the other features a commercial building with an uncertain future. By turning this corner into a pocket park, the enhanced natural landscape following the creek through Fitts Park is extended west, connecting the creekside trail experience further and making it more enjoyable.

- **Improve the waterway functionally and visually.** In the places where the creek is channeled in concrete, near-term enhancements to the waterway can improve the visual appeal of the creek. By bringing more plant material to the streambed and allowing those to grow up closer to street level, people are better connected to nature along the waterway. Additional plants, stones, and other natural material added to the channel edges can also help filter the stormwater runoff entering the creek in these increasingly commercialized spaces.

- **Reinforce the crossing at State Street and Gregson Avenue.** In addition to the pedestrian crossing installed at this intersection a few years ago, additional efforts are needed to enhance Gregson as a trail connector, including painted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(top right) A painted bike lane, (bottom left) patterned sidewalks, and (bottom right) painted crosswalks can create engaging spaces that help separate pedestrians from traffic and support safer movement for those traveling outside of a car.

bike lanes and enhanced trail signage. A more robust pedestrian crossing should also be considered in the medium term.

- **Visualize the creek's path in paint.** In places where Mill Creek passes under a roadway or is buried under asphalt, painted surfaces can call to mind the wandering stream below. Colorful, fanciful, artistic, or even simple, painted surfaces can assist with trail navigation, enhance pedestrian crossings at streets, and elevate the presence of the stream to those who may be driving the roadway and not be aware that Mill Creek crosses below.

Organizations like UrbanRivers.org can provide additional insights, research, and ideas for volunteer events that can support the health and visibility of Mill Creek.

COURTESY OF BLOOMBERG PHILANTHROPIES

COURTESY OF BLOOMBERG PHILANTHROPIES / ELYSSA LEININGER, JODI LIGHTNER, ELLEY SWAN

GOOGLE EARTH / ULI PANEL

(Top) In South Salt Lake, where bridges over Mill Creek are indistinguishable from the rest of the roadway, painted crosswalks can call to mind and draw attention to the stream channeled below.

(Middle) These before and after images show how painted asphalt can complete change the nature of the roadway, bringing the city's mural scene to the groundplane and honoring the riparian environment. More information can be found in the Asphalt Art Guide.

(Bottom) The image to the right is the panel's rendering of how a painted bike lane on Gregson Avenue can more clearly delineate the space for bikes on the street. It also makes abundantly clear how and where to follow the bike trail.

Creek Enhancements, Recommendations

Understanding the value Mill Creek brings to the community and recognizing the Sponsors' desire to create more opportunities for community connection to the creek, the panel identified a series of enhancements for the creek and its immediate surroundings within each of the three creek contexts.

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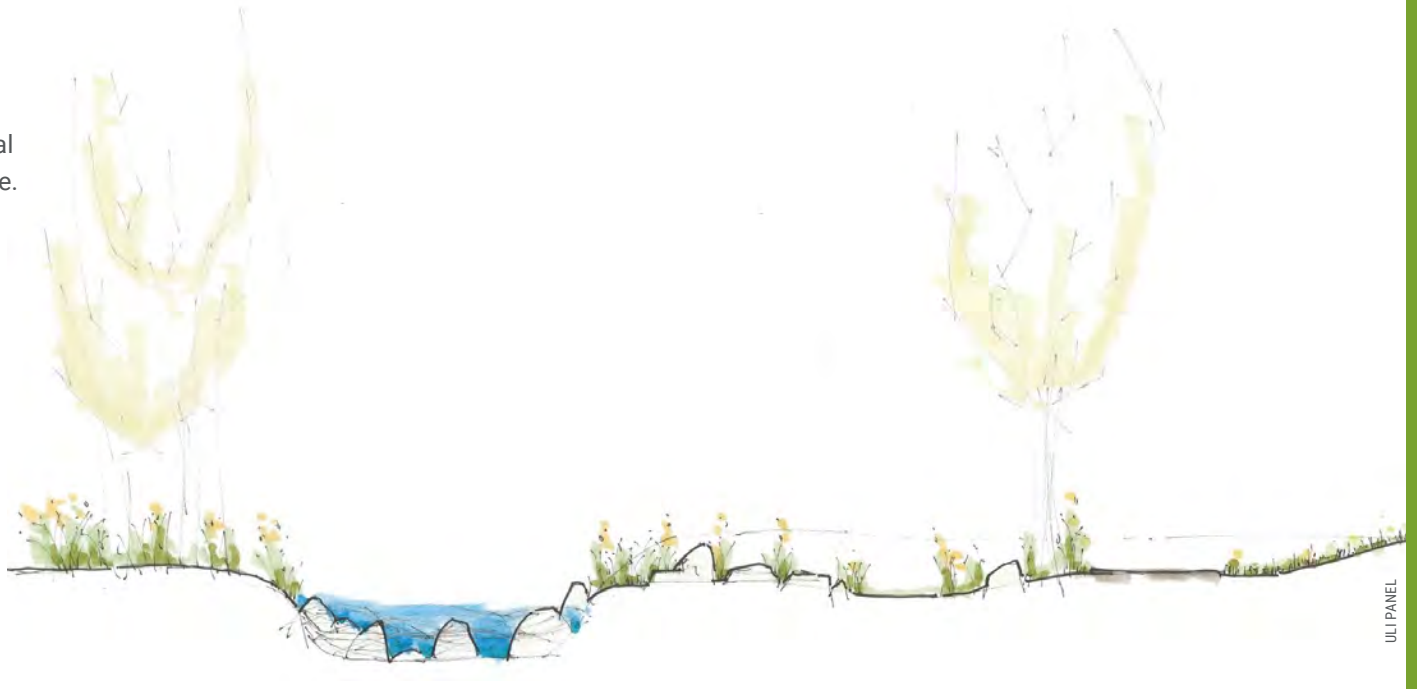
Naturalistic State Enhancements

As Mill Creek flows through Kaleidoscope and Fitts parks, it is in a state that is close to natural, yet the following improvements can create an even more accessible experience and assist with high water events.

- **Lower the creek banks.** By lowering the creek banks and creating a more gentle slope to the creek, the waterway becomes more visible to park visitors, the water is easier to navigate down to, and more space is allowed for additional water flow when flooding concerns arise.
- **Add additional rock material.** In areas where the public is tempted or even encouraged to navigate down to the water, additional creekside stones can provide footing for humans and places for wildlife to hide and find summer shade.



ULI PANEL

Enhancements to Channelized Areas

Moving closer to State Street and the commercial areas, Mill Creek is pushed into a channelized environment where concrete, riprap walls, and gabion baskets keep the water well-contained.

- **Lower the walls and open the channel.** While fencing is generally in place to keep people from interacting with the creek in these spaces, there might be opportunities to lower the surrounding walls, create paths along the water, and actually allow people to get closer to and move along the waterway. Trail crossings at street intersections, outdoor amenity spaces, and the activity nodes are all good places to modify the creekside environment, allowing some access and visibility to the waterway below.
- **Consider a boardwalk installation.** If full access to the creek is not possible, if the channel is too deep in places, a boardwalk along the channel could provide people with an opportunity to walk along the waterway and see and listen to its activity.

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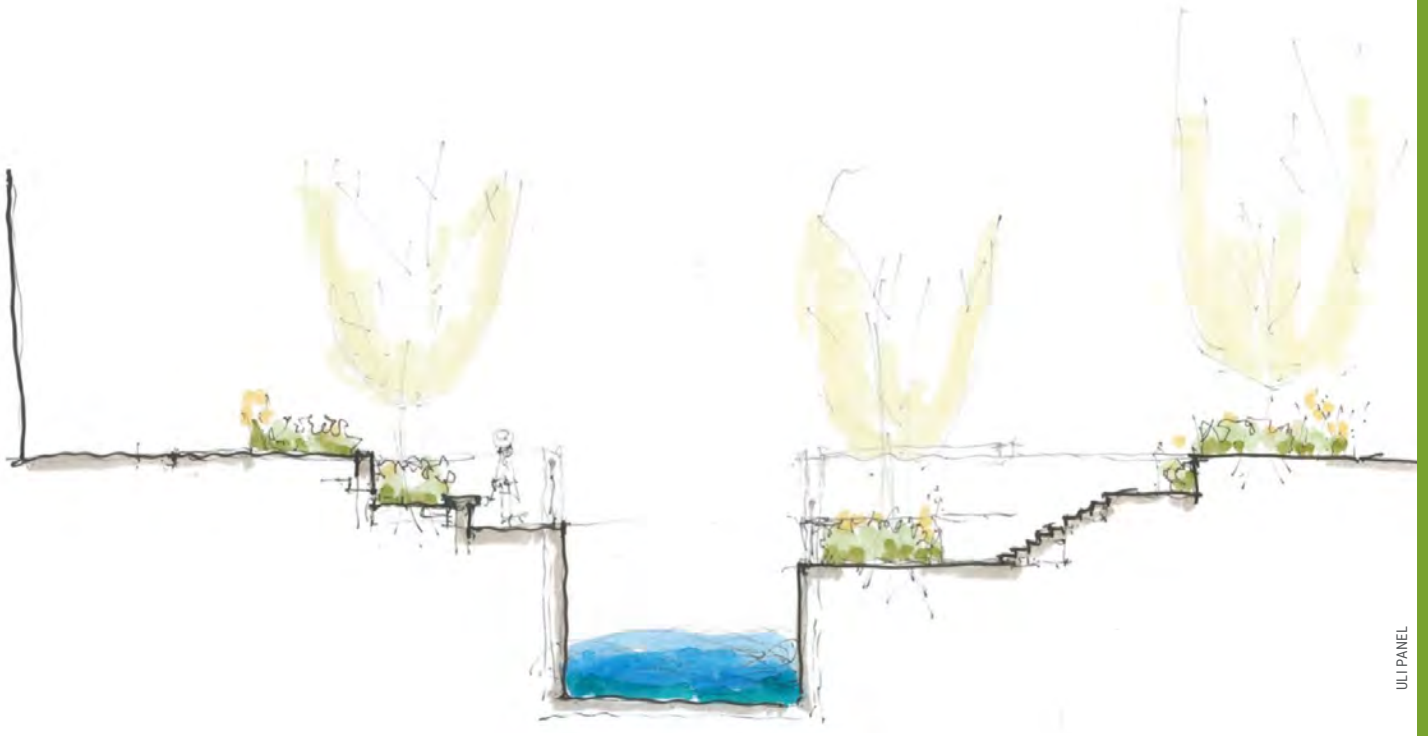
AUDUBON



ULI PANEL

- **Develop guidelines or a toolkit for private property owners.** For those property owners with land abutting the creek, a toolkit could assist them in making improvements to their property that will enhance the riparian environment while enhancing their private property. These guidelines will need to take the varying creekside conditions into account, identifying improvements for areas near a naturalistic state, the channelized areas, and even spaces where the creek runs underground, such as under a parking lot.

ULI

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SALT LAKE CITY ARTS COUNCIL / LOGAN SORENSON

ULI PANEL

Rezoning and Overlay Potential

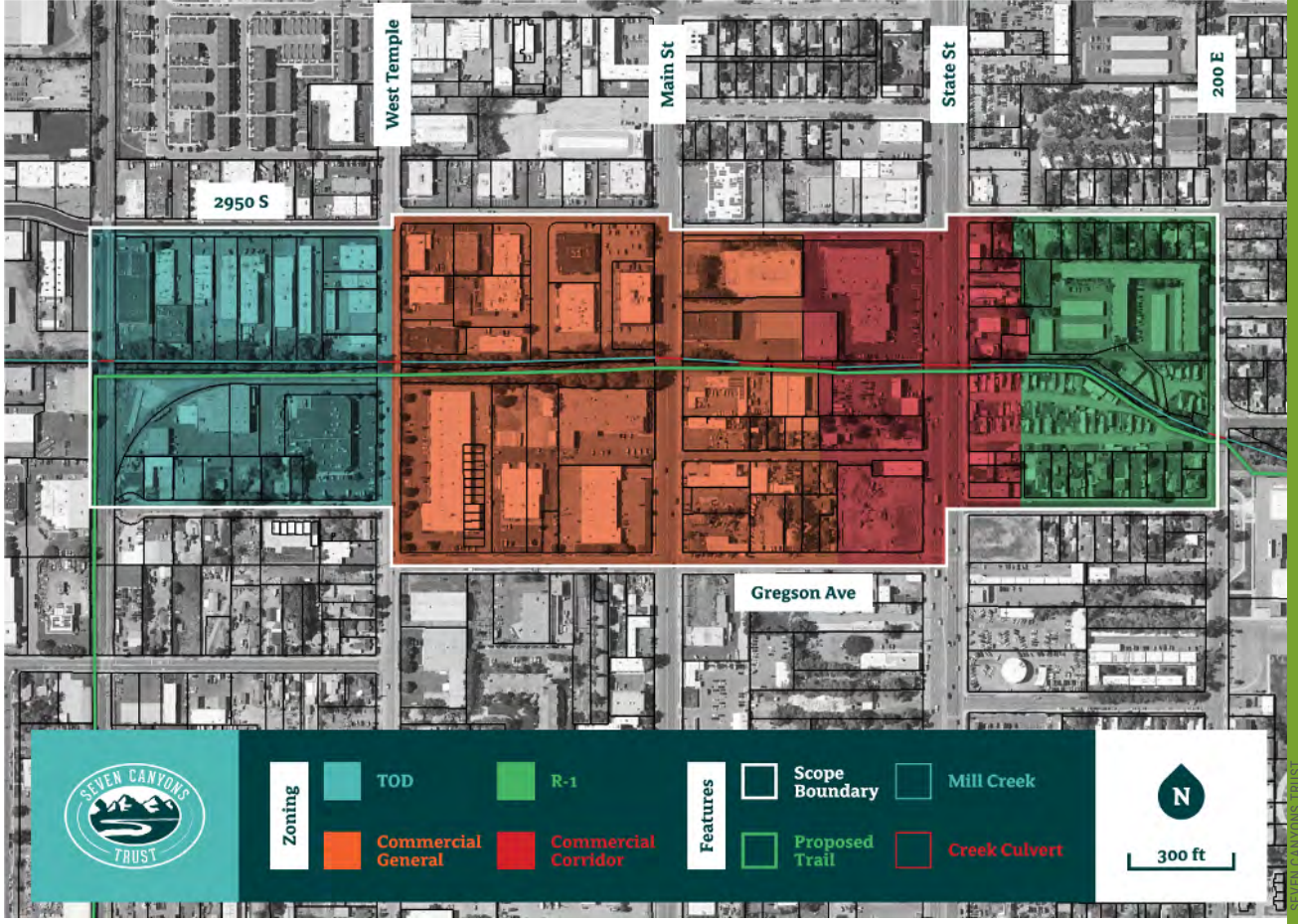
The panel was also charged with the task of incentivizing development along the Mill Creek corridor. This task, along with the enhancements to the creekside environment, can be supported through zoning tools and an overlay that very carefully protects and preserves Mill Creek. The goal of the panel's recommendations in this section is to incentivize development and protect Mill Creek, catalyzing private development while providing for environmental preservation.

In addition to its residential and commercially zoned areas, the City has updated its zoning ordinances to now include transportation-oriented development (TOD) around the TRAX lines. This update has served the city well, yet with the additional focus on the Mill Creek corridor, a comprehensive zoning analysis for South Salt Lake is in order. This analysis, which would include the TOD study that is currently underway, would help the City more fully identify the zoning regulations that are currently working (and not) in South Salt Lake.

Specifically, the zoning updates would center around two major components:

- Rezoning the study area bounded by State Street and 200 West to mixed-use, and
- Establishing a riparian overlay for the area that bounds Mill Creek.

The combination of these two updates provides the City with the best of both worlds—incentives for development and creek preservation.



Current zoning for the study area.

Mixed-Use Zoning

Mixed-use zoning is a planning tool that permits a complementary mix of residential, commercial, and/or industrial uses in a single district. It is not a new concept and in fact calls to mind a time, long before zoning ordinances, when it was common for shopkeepers to live above their stores in village centers. South Salt Lake already has mixed-use zoning in certain areas, and the panel recommends expanding it to the Mill Creek corridor.

Mixed-use zoning allows for the maximized use of available land while also allowing for more open and green spaces. Non-residential uses are often subject to a higher level of control, often manifested in design standards, which helps blend those uses into a district where residential and commercial uses feel natural together.

Mixed-use developments combine a mix of uses in one area or one building. This could include apartment buildings with ground floor retail space, commercial offices topped by condominiums, and even light industrial uses which could be blended with residential, e.g., allowing artisans to live above their fabrication studio. The scale of these developments varies wildly and fits easily into small neighborhoods as well as larger downtown districts.

Mixed Use Benefits

Mixed-use zoning provides communities and property owners with a variety of benefits and generally encourages a more active and vibrant environment. Notably, mixed-use zoning provides the following:

- The mix of uses allows the co-existence of commercial and residential spaces in the same district or building, activating the environment throughout the day and into the evening.
- Mixed-use zoning helps spur redevelopment with a wider range of potential uses for one building or parcel.
- This broader zoning also provides a greater degree of housing opportunities and options thus expanding residents' ability to find housing of a size and price that fits their households' needs.
- With a mix of uses in any one area, people are more likely to walk or bike between destinations rather than drive, which can also help promote a sense of place and community.
- Economic investment is also stimulated by mixed-use zoning as the range of potential uses is wider and a wider array of potential businesses might find the space suitable. Mixed-use areas also tend to experience stronger increases in property values.

Other Mixed-Use Examples

As stated, mixed-use zoning is not new to South Salt Lake, yet it may be worthwhile to explore how other communities are creatively using mixed-use zoning to spark additional development and streamline and improve their development processes.

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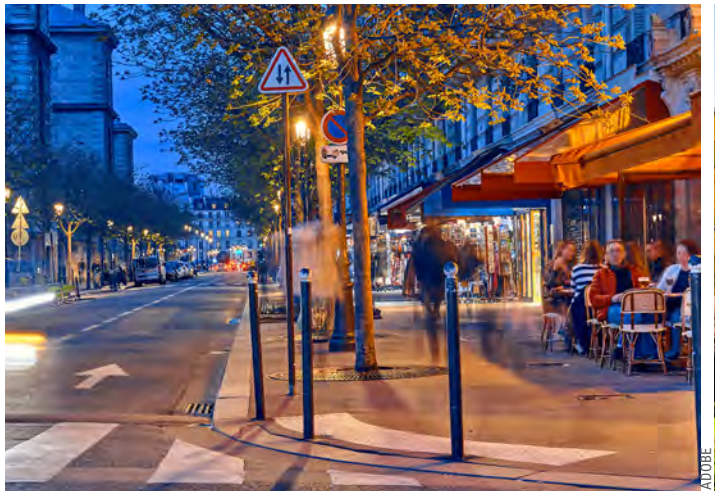

ADOBE


ADOBE

Salt Lake City. Home to several mixed-use zones, including residential mixed-use districts, gateway mixed-use districts, and form-based mixed-use zones, Salt Lake City recently consolidated up to 27 existing mixed-use and commercial zoning districts into just six new districts. This consolidation retained the benefits of the various zoning measures yet streamlined the review and approval process, making it easier for everyone to understand and follow the codes. The result encourages a mix of residential, commercial, and office uses while creating a more manageable zoning code that is easier for everyone to understand.

The six mixed use (MU) zoning districts are based on building type with each building meeting specific regulations, rather than the same standards applying to all buildings.

Magna, Utah. This municipality to the west is similar in size to South Salt Lake and recently established mixed-use zones, including a Downtown Historic District (DH) Mixed Use Zone, a Neighborhood Mixed Use Zone, and a Corridor Mixed Use Zone. These zones become the tools the City and developers can use to implement the vision identified in the Magna General Plan (2021) for the Historic Preservation Future Land Use Area.

Sugar House Business District. "The purpose of the CSHBD Sugar House Business District is to promote a walkable community with a transit-oriented, mixed-use town center that can support a twenty-four-hour population. The CSHBD provides for residential, commercial, and office use opportunities, with incentives for high-density residential land use in a manner compatible with the existing form and function of the Sugar House master plan and the Sugar House Business District." This classification includes retail, entertainment, office, residential, and some manufacturing and warehouse uses. The intention of the ordinance is to create a safe, aesthetically pleasing commercial environment. Supporting the code is the Sugar House Business District Design Guidelines Handbook, which puts the guidance in an easy-to-follow format and categorized for easier reference.

Riparian Overlay

Cities use riparian overlays to provide additional protections for stream corridors and water quality by guiding, and at times limiting, the types of uses and materials that can fall within the overlay footprint. The overlay creates a creek buffer, typically by designating the distance from the creekbank that structures can be built, and often addressing neighboring building heights and setbacks for new construction. Building design standards and landscaping standards are also often included in riparian overlays.

A riparian overlay along Mill Creek would apply to permitting new uses and construction along the corridor and existing uses and buildings would be grandfathered into the overlay.

Together with zoning ordinances, a riparian overlay provides incentives, such as density bonuses or adjustments to parking ratios, to induce property owners to voluntarily improve their creekside property. The property improvements are generally those that enhance the creekside environment through landscaping and other features, such as art (e.g., murals, sculpture), rather than additional structures or new impervious surfaces. To be clear, existing structures are grandfathered in and the overlay will only apply to changes or new improvements.

Finally, the overlay allows for varying creek typology, which is important for Mill Creek and its wide-ranging environments, and identifies those entities who are responsible for creek maintenance. Conversations with stakeholders brought to light the challenges associated with maintaining Mill Creek, as the City is responsible in some instances, the County in others, and the adjacent property owners also hold certain maintenance responsibilities.

Benefits of Riparian Zones

The key feature of a riparian zone is the protection of the aquatic environment, including the animals, plants, and water quality.

- Water quality in a riparian zone is supported by the additional filtering provided by the pervious surfaces and plant materials that line the waterway and naturally filter out pollutants as the water moves through on its way to the streambed.
- The waterway creates a community amenity marked by the sounds of the water moving across rocks and through grasses. The waterway also supports the surrounding vegetation, providing green and open spaces and supporting a tree canopy that helps cool the space in the summertime and reduces the urban heat island effect.
- Creeks enhance the community's biodiversity by creating and supporting a wildlife habitat. Whether it is ducks in the creek, migratory birds following the tree line to the river, fish swimming in its depths, or any manner of mammal that uses the creek for hydration, the creek is a hive of activity.
- When put in place, a riparian overlay can help to stabilize stream banks and mitigate flooding events.
- A riparian overlay for Mill Creek can help support the city's recreational spaces and provide important connections between the city's green spaces.
- Property owners with land adjacent to the creek often enjoy higher property values than those land owners whose parcels do not adjoin the waterway. Managing that connection point and enhancing it with an overlay can have additional positive impacts on property values as the experience of the creek is improved.

Examples of Riparian Overlays

Communities and entities in the Salt Lake valley have already identified the benefits of riparian overlays and put them to use.

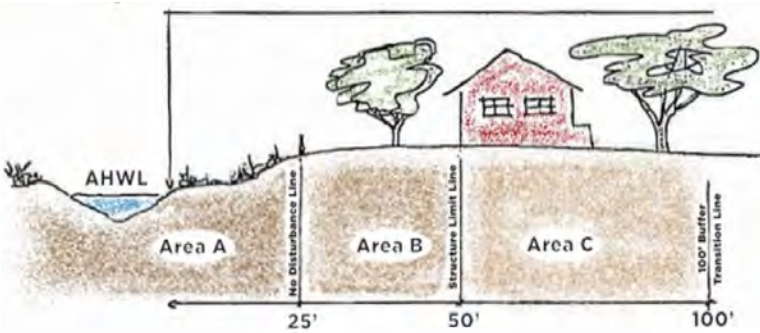
Jordan River Commission. The Jordan River Commission has published guidelines for municipal planners across the state. Riparian Ordinance Toolkit, A Guideline for City Planners across the State of Utah outlines in very clear and easy-to-follow language for jurisdictions wanting to use riparian overlays and buffers to guide development and redevelopment along their community's waterways.

Seven Greenways Vision Final Plan. The final plan created for the Seven Greenways Vision points to a number of interventions along Mill Creek, including its "Big Idea" of creating a linear park in the TAP study area. The riparian buffer noted in this plan will play a significant role in the future health of the creek.

Municipal Ordinances. Salt Lake City, Lehi City, and Cottonwood Heights have created riparian ordinances, with Cottonwood Heights folding the ordinance into its Sensitive Lands Evaluation and

THOMAS VALENTINO

Even flowing through this industrial area, this stream, boardwalk, and plant material creates a beautiful and inviting environment.



Although a 100-foot riparian corridor will likely be too wide for Mill Creek, this sample guidance from the Jordan River Commission outlines what type of structure can be built within each of the three zoned areas.

JORDAN RIVER COMMISSION

Development Standards ordinance. Salt Lake City's Riparian Corridor Fact Sheet (see pp i-iii) may prove particularly helpful with messaging to property owners.

Land Use Recommendations

The panel suggests the Sponsors pursue the following land use recommendations in the near to medium term to address the mixed-use zoning updates and adoption of a riparian overlay for the Mill Creek corridor.

Mixed Use

- Move forward with a comprehensive zoning analysis for South Salt Lake, including the TOD study underway, to pull all of the updates together.
- Establish mixed-use zoning in the study area and consider expanding it into other parts of the city.

Riparian

- Establish a riparian overlay for the Mill Creek corridor. Customize South Salt Lake's overlay to the scale of its city blocks and size of the buffer zone. Use the Jordan River and City of Salt Lake overlay ordinances for reference points. Ensure that existing property owners' structures and current property improvements are grandfathered.
- Create compelling incentives for property owners who are improving or changing their property. These incentives could include density bonuses for new development, lower parking requirements, and funding (grants) for murals, art installations, and landscaping.

Funding Opportunities

Money Matters

While many of the recommendations from the panel can be implemented in the near term with a small capital investment, other measures, particularly infrastructure improvements along the Mill Creek corridor, may require new sources of funding.

Establish a Community Reinvestment Agency (CRA). A CRA can provide the type of organizational infrastructure a greenway corridor needs. Its strength lies in its foundation as a public-private partnership. This same broad partnership base also presents a challenge as all property owners must vote to approve the formation of the CRA at the start. The process takes time.

- The CRA footprint would likely include the areas around the creek from State Street to the TRAX line and would thus involve those adjacent property owners.
- Once established, the CRA can help pay for creek restoration and the types of public infrastructure that will be required for greenway and trail build-out.

Overlay a Public Infrastructure District (PID). A PID, which also requires property owner consent, becomes a taxing agency for the area and has the power to finance the public infrastructure needs of the greenway through the addition of a new tax in the district. PIDs are led by a board that would be separate from the CRA, and its funding can also be used to incentivize additional development within its geography.

Look for Co-Benefits

The panel also outlined a host of additional funding sources, from fees to state grants to new local programs, that the Sponsors should explore as potential funding sources for creek corridor improvements. The efforts would typically be led by the public sector or supported by the public sector and executed by private property owners. In all instances, the panel strongly encourages South Salt Lake to look for opportunities to combine efforts with partners, apply jointly for funding, and leverage proximate initiatives in order to boost the impact of any funding.

- **Asphalt Art Initiative.** Supported by the Bloomberg Foundation, this initiative funds visual art on roadways and other public infrastructure in order to improve pedestrian safety and activate underutilized public spaces. Funding closed for the 2025 cycle in January, so planning should begin for 2026.
- **Partnerships for Aquatic and Watershed Restoration (PAWR).** This USDA Forest Service program supports aquatic and watershed restoration needs and helps empower local communities and partners to assist with the implementation of restoration activities. Applications for 2025 closed on February 7, so planning should begin for the 2026 grant cycle.
- **Community Planning and Green Infrastructure.** Supported by the US EPA, community planning and green infrastructure grants, particularly those encouraging watershed restoration, are worth exploring and are typically project-based.
- **Utah Outdoor Recreation Grant (UORG).** The UORG supports new outdoor recreation infrastructure projects that enhance local economic development, tourism, and quality of life. Eligible applicants include municipalities, state and federal agencies, non-profits, and tribal governments. Funding tiers range from $30,000-$1,000,000 and applications for the 2026 grant cycle will open soon.
- **Recreation Restoration Infrastructure Grant (RRI).** The RRI grant focuses on restoring, repairing, or replacing aging or degraded outdoor recreation infrastructure on public lands. Municipalities, state and federal agencies, non-profits, and tribal governments are eligible. Funding tiers

> “Because green infrastructure projects offer multiple benefits, they can qualify for a variety of federal, nonprofit, and local funding sources.
>
> –US EPA

range from $5,000-$250,000, and applications for the 2026 grant cycle will open soon.

- **Community Parks and Recreation Grant (CPR).** This new grant program provides funding to aid in the rehabilitation and construction of assets such as community parks, sports fields, pools, and playgrounds. CPR grants range from $5,000-200,000 and applications for the 2026 grant cycle will open soon.
- **Rails to Trails.** As a portion of the study area and potential trail network runs along an abandoned rail line, there may be potential for accessing the federal Rails to Trail program.
- **Other potential revenue sources.** The panel also suggested the Sponsors explore a few other potential sources of revenue including a Stormwater Franchise Fee, a US EPA Sewer Overflow Stormwater Reuse Municipal Grant, or US EPA Brownfield Program.
- **Riparian "Facade" Grants.** Commercial districts often offer small ($5,000-10,000) facade grants to encourage business owners to better maintain or upgrade their building facades. Similar small grants could be offered to creekside property owners to make improvements that could be seen and appreciated by those moving along the creek and greenway.

Next Steps

The Sponsors of this ULI TAP are each working in their own capacity and together to support the goals for Mill Creek as outlined by the City of South Salt Lake and the Seven Canyons Trust. This work will benefit from a multi-pronged approach executed over a number of years that can leverage the expertise of each organization. Confluence and connection were themes heard across this TAP and those themes continue through the recommendations. There is strength in organizations working together to create physical and cultural connections along the Mill Creek corridor.

Near Term	Medium Term	Long Term
Enhance connectivity by installing designated and painted bicycle lanes, improved and connected sidewalks, and roadway narrowing at intersections ("neckdowns") to improve non-vehicular mobility and support community connectivity. Work with UDOT to focus on State Street painted neckdowns to start.	**Create a new pocket park** on the City-owned land by the junior high to create a continuation of the Mill Creek corridor publicly accessible natural landscape.	**Pursue the Life on State goals** to create a more economically vibrant, mobility-connected, and safe environment for South Salt Lake. The realization of those strategies will take time but align well with the goals and recommendations for the Mill Creek corridor.
Continue street dieting work on Main Street and West Temple south into the study area and beyond.	**Create a street-level trail connection** from Mill Creek using Parleys Trail at 600 West.	**Connect to the Jordan River Trail network** working with partners to establish trust and a shared understanding of the most viable long-term solution.
Enhance community wayfinding with increased signage on Gregson, Main Street, and West Temple to help people find the Mill Creek Greenway.	**Activate the trail along Gregson Street** with larger, more visible signage and a painted bike lane to boost wayfinding assistance north to Mill Creek.	
Create trail loops to connect the community to key amenities and place Mill Creek and its new greenway path at the center of the action.	**Create a CRA** in the Mill Creek corridor. Begin the work now by identifying the specific geography, establishing the unique benefits for property owners, and begin socializing the idea with land owners.	
Pilot water-themed street art and expand the community mural program to the street, celebrating and drawing attention to the creek below. Additional activation—e.g., video installations or pop-up art—will further engage people.	**Implement a riparian overlay** starting with research now into potential model overlays and identifying what will work best for the Mill Creek corridor so that implementation can soon follow.	
	Expand mixed-use zoning by broadening the geography of the City's mixed-use zoning code to include, at a minimum, the Mill Creek corridor.	
	Identify and execute land/easement, starting by identifying the parcels that will most benefit a greenway strategy so that conversations can be had with landowners as they consider their parcels' future use.	
	Embrace public-private partnerships to bring the Mill Creek Greenway to life. Public-private partnerships can provide structure for the types of collaborations that will be needed to support greenway development and catalyze economic development.	

- Community Connectivity
- Mill Creek Trail Actions
- Waterway Visibility
- Policy Updates

Continued Confluence

This work highlights the exciting opportunities that can be found at the intersection of community connectivity, the waterway, and economic opportunity. It is at this intersection where efforts should begin, focusing activation and investment where it can be easily seen, accessed, and experienced, all with the goals of restoring and preserving the creek and stimulating economic development.

The City, the Seven Canyons Trust, and their fellow TAP sponsors are doing tremendous work for the region, for the South Salt Lake community, and for the Mill Creek waterway. These efforts take time, passion, collaboration, and grit—all of which the partners have already demonstrated in spades. By leveraging previous planning efforts and on-the-ground work completed to date, it is possible to create a greenway corridor along Mill Creek that will serve the community and catalyze additional development. ULI and the real estate professionals who participated in this study stand ready to help.

Case Study: Kalispell, Montana

In Kalispell, Montana, a city of approximately 24,000 people, 1.7 miles of abandoned BNSF rail line is slowly transforming into a trail and economic generator for the community. The industrial businesses that once lined the rail line were relocated to an industrial park, creating a nexus of economic activity there. The remaining right-of-way once used for the rail line was then freed up for transformation into a linear park and community trail instead. People are now actively using the trail and new development—featuring uses better aligned with the community's goals for the area—is moving into the area.

ALTA PLANNING

ALTA PLANNING

SNYDER CONSTRUCTION GROUP AND GREENWAY DEVELOPMENT

Mill Creek Visioning
Granite Park Junior High School

At Granite Park Junior High School, an after-school program supported by Promise South Salt Lake, challenged sixth-grade students to envision Mill Creek as they would like to experience it. Equipped with a large mock-up of the creek, adjacent buildings, and rough trail, the students used markers, stickers, and photo cut-outs to depict a vibrant, connected, and active scene. In much the same way the ULI panel outlined how the space could better meet the recreational and mobility needs of the community, the students placed additional paths, bridges, and plant life along the corridor.

As one student said, it is “a place for people who live close, and like the outdoors, but can’t go far.”

Through their work, the students highlighted what is most important to the community and what was the focus of the panel–creating a space where everyone can enjoy nature.

ULI PANEL

ULI PANEL


SEVEN CANYONS TRUST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About the Panel

Molly McCabe

Panel Chair
CEO and Founder
HaydenTanner
Kalispell, Montana

Molly McCabe is the CEO of HaydenTanner, a development and investor advisory firm accelerating impact and sustainability in the built environment. A veteran of commercial real estate finance and capital markets, she serves as a bridge between risk and return, visionary development and the bottom line, to create financially and environmentally resilient buildings and vibrant, sustainable cities. Experienced in leading through complexity, she has also helped launch and guide several start-ups, new ventures, and change management initiatives.

McCabe sits on the boards of The Freshwater Trust and the City Craft Foundation and is co-founder and board member of The Lotus Campaign, providing housing-driven solutions for homelessness. She is past chair of ULI's Responsible Property Investment Council, founder of a venture capital–funded, commercial mortgage–backed securities firm, and manager of an institutional real estate capital markets group. She is author of *Practical Greening: The Bottom Line on Sustainable Property Development and Investment* and "Financing and Driving Value: Responsible and Resilient Property Investing in the New Millennium."

Robert Schmidt

Panel Co-Chair
Managing Director
PEG
Salt Lake City, Utah

Robert Schmidt is a key figure at PEG, where he has been instrumental in advancing the organization's investment and development capabilities. As a Managing Director, Robert ensures that every project is executed with timeliness, accountability, and innovation, always keeping investors' best interests at the forefront.

Robert joined PEG early on, bringing with him a wealth of experience as a licensed Professional Civil Engineer. His technical background allows him to approach each project with a unique methodological perspective, considering safety, functionality, mechanics, traffic, environmental, topographical, and electrical details. This comprehensive approach enables Robert to seamlessly manage the various aspects of development while aligning the interests of partners and stakeholders.

With extensive expertise in site design and layout, city entitlements, construction management, and contract negotiations, Robert's favorite part of his role is witnessing the transformation of projects through each phase. "Each project takes on its own personality, and being part of that process is incredibly rewarding," he says.

Robert holds a BS in Civil Engineering from Utah State University.

Greg Boudrero

Principal
MGB+A Studio

Greg Boudrero is a Principal at MGB+A Studio, a landscape architecture and urban design firm located in downtown Salt Lake City. Greg possesses an unwavering passion for design, striving to infuse every project he undertakes with a unique level of excellence and meticulous attention to detail. He places great value in collaborating with teams comprising diverse fields of expertise, recognizing that open design processes yield optimal solutions. His portfolio encompasses a wide range of projects, from institutional plazas and courtyards to urban plazas and streetscapes, as well as gardens and parks.

Greg's exceptional site planning, graphic and visualization skills enable him to convey two-dimensional and three-dimensional project plans and themes effectively. He fosters solid and personal relationships with clients through direct communication, leading to successful projects and inspiring loyalty among many clients.

Greg holds a BLA in Landscape Architecture and Environmental Planning from Utah State University and sits on the USU LAEP Advancement Board.

Gretchen Milliken

Director of Strategic Planning and Initiatives
Blaser Ventures

Gretchen Milliken is a seasoned architect, urban planner, and strategist known for her innovative problem-solving, cross-functional collaboration, and expertise in managing complex projects. She currently is the Director of Strategic Planning and Initiatives at Blaser Ventures.

Previously, Gretchen was the Planning Director for Park City Municipal, where she oversaw all land-use planning activities, including significant resort development applications, land annexations, and historic district management. Before her tenure in Park City, she spent eight years as the Director of Advanced Planning and Sustainability for Louisville Metro Government in Kentucky. Gretchen also played an active role in the Urban Land Institute (ULI), participating in the prestigious ULI Rose Fellowship and spearheading the creation of the Kentucky ULI District Council.

Gretchen's professional journey began in Stockholm, Sweden, where integrating architecture, urban planning, and sustainable growth profoundly shaped her approach. Her work is guided by a holistic philosophy that places people and their interaction with the natural and built environment at its core. This ensures every project fulfills its functional goals and enhances the well-being and quality of life of the communities it serves.

Mary McCarthy

Real Estate Professional
Jackson, Wyoming

With a blend of formal architectural training and practice, followed by a Wharton MBA in finance, Mary has a 30+ year career in the real estate capital markets, including investment banking and real estate private equity fundraising. Her professional journey included notable tenures at Morgan Stanley and Hines. These experiences have equipped her with a profound understanding of the built environment and the forces that shape it. Today, Mary's love for everything related to the built environment continues to underpin her civic, philanthropic, and private sector board work, which includes service on the Town of Jackson (Wyoming) Design Review Committee, board membership and treasurer for the Grand Teton National Park Foundation, board member for Silicon Couloir (supporting entrepreneurship in the Teton region), and advisory board member for the University of Virginia's White Ruffin Byron Center for Real Estate. Mary's work for real estate funds/firms also includes an advisory board role for a family-office sponsored multifamily fund.

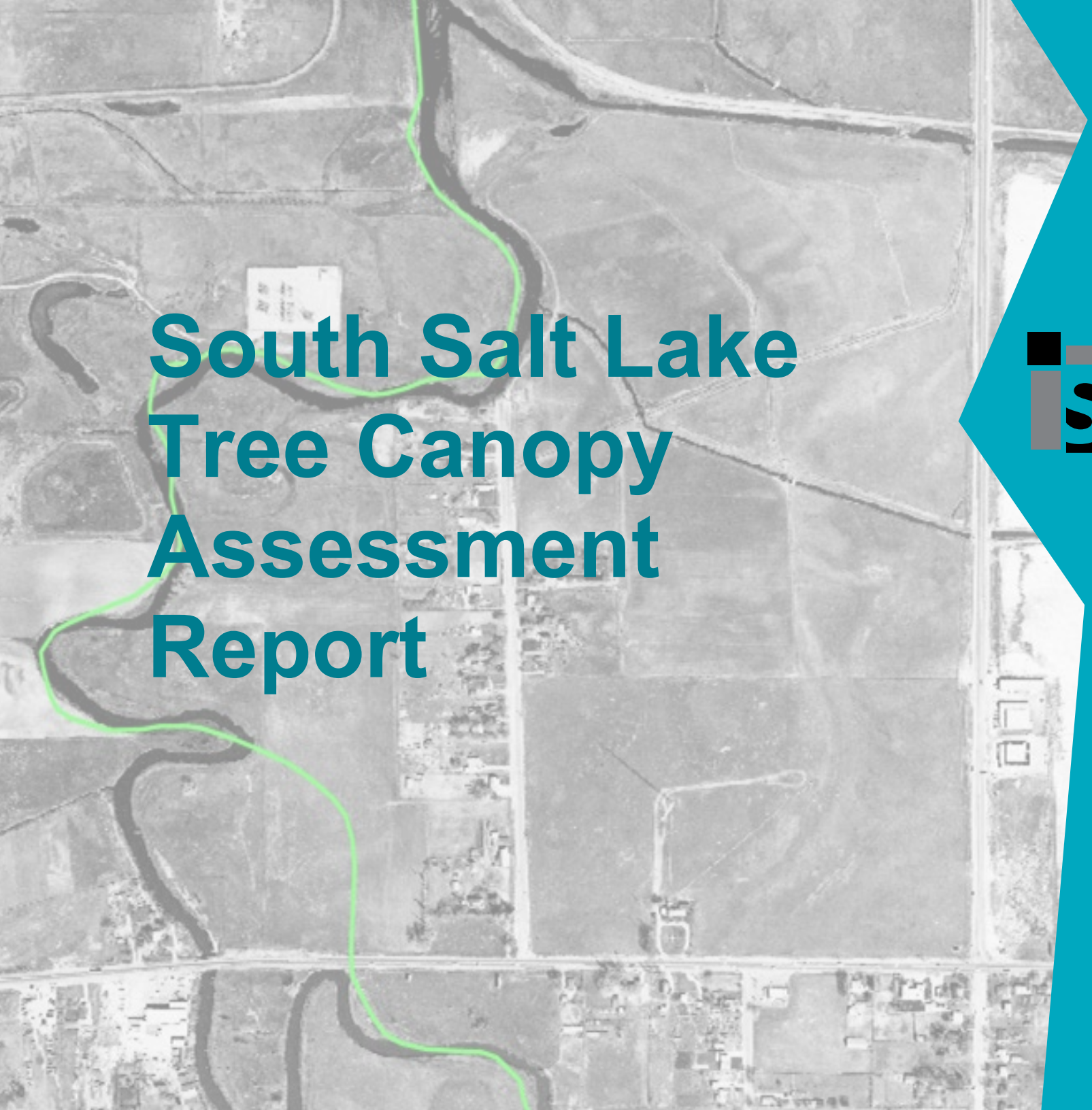
Mary received a BS in Architecture from the University of Virginia and M Arch and MBA degrees from the University of Pennsylvania's graduate schools of design and business (Wharton), respectively.

Diana Rael

Principal
Norris Design
Denver, Colorado

Diana Rael, a licensed landscape architect and principal in the firm, has been with Norris Design since 1992. Working on multi-disciplinary projects, she has been responsible for leading a variety of complex projects using creative solutions. With her background in landscape architecture, extensive planning, and entitlement experience, she works with clients to formulate strategies that can be implemented.

Diana's philosophy is to start each project with the desired results in mind. She understands that the ongoing evaluation of planning and design and its relationship to a project's objectives are critical to achieving success. She believes in creating long-term value through project branding, identity building and the creation of a strong amenity program to meet the needs of the end user. Her strong organization and communication skills allow her to successfully lead project teams with an inclusive approach.



South Salt Lake Tree Canopy Assessment Report

SOUTH SALT LAKE

Eocene℠

DRAFT REPORT

Prepared for: South Salt Lake City

Prepared by: Eocene Environmental Group

2025

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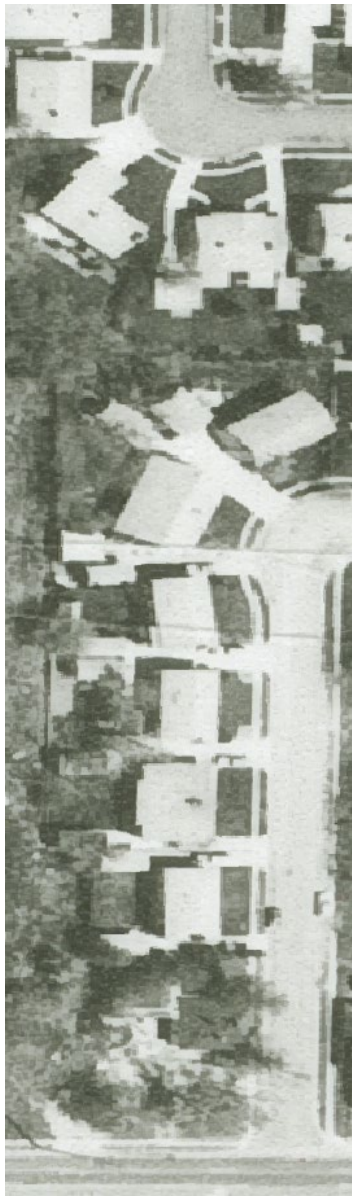


Summary of Findings

A tree canopy assessment was completed for the City of South Salt Lake to determine the percentage of land covered by tree canopy, both currently and in the historic past, analyzed by parcel zoning and neighborhood. The City was compared to neighboring communities for canopy coverage and socio-economic indicators. Plantable areas were identified, and the number of potentially planted trees and tree canopy cover was calculated. The data was analyzed using i-Tree Canopy, which calculated the financial and environmental benefits that the City's trees provide. Below is a summary of findings:

South Salt Lake has been altered from a majority land cover of bare soil (17.7%) and herbaceous plants (53.0%) in 1964, to largely impervious (70.0%) in 2021. Tree canopy coverage increased from 3.9% in 1964 to 8.7% in 2006 as the City was developed and trees were planted in residential areas, then a slight decrease to 7.3% in 2021 as the City was further developed and the population continued to grow.

The decrease in tree canopy from 8.7% (±0.63) in 2006 to 7.3% (±0.58) in 2021 is equal to approximately 64 acres, or an area equal to six times the size of Fitts Park.

Compared to other cities in the Salt Lake Valley, South Salt Lake has one of the lowest percentages of tree canopy coverage and highest percentages of unemployment, people living in poverty and linguistic isolation, and rating highly on a health burden index.

Areas of South Salt Lake with the lowest tree canopy coverage also experienced the highest heat disparity, experiencing temperatures 4°F and higher than areas with higher tree canopy.

Commercial and Industrial zoned parcels make up 52.3% of the City's land and have an average tree canopy coverage of 5.4%. Parcels zoned as Residential or Multihome make up 26.9% of the City's area and have an average tree canopy coverage of 23.1%.

An analysis of potentially plantable areas found that 22,713 trees that could be planted, bringing the City's tree canopy cover up to 12.1%.

South Salt Lake's trees provide an average of $286,462 in ecosystem benefits every year, including pollutant removal and interception, and carbon sequestration.

Based on the data analyzed through a tree canopy assessment, the following recommendations are made:

- Develop a tree canopy goal as a target to guide tree preservation and canopy expansion efforts
- Develop a tree planting plan to focus canopy coverage in areas that need it most
- Identify methods to increase tree canopy coverage on Industrial, Commercial, and School properties
- Provide education & outreach materials to community
- Routinely update tree canopy assessment to understand whether goals are being met

Introduction

As a growing community, South Salt Lake is constantly planning for its future. Moving from its past as an industrial community built in the grasslands of Salt Lake Valley, the City is now embracing a new identity of an urban center where people want to live. As new housing, transportation, and services are established, the City understands that its people also need greenspaces and vegetation to thrive. Trees enhance quality of life by providing environmental, economic, health, and social benefits. And just as built infrastructure needs to be thoughtfully planned out to maximize their usefulness, so too does a community's trees.

South Salt Lake is undergoing a project to understand the current status of its community trees and creating a plan to maintain and grow its tree canopy. A tree canopy assessment provides a perspective of how much land within a geographic area is covered by tree canopy, including on private property.

South Salt Lake's tree canopy assessment was conducted with the following objectives:

- Establish the City's tree canopy cover percentage, with detailed methodology and known accuracy, both in the current time and in the historic past
- Develop ecosystem services benefit estimates for the City's trees
- Identify the potential for future tree planting opportunities
- Utilize project information to inform sound urban forest management policies and plans

What is a Tree Canopy Assessment?

A tree canopy assessment provides a perspective of how much of the land area is covered by trees, including trees on public and private property. Besides tree canopy, the percent of land covered by bare soil, grass, herbaceous plants, impervious surface (e.g., roads), or water is quantified.

What a Tree Canopy Assessment is Not! A tree canopy assessment provides an aerial perspective of what is above the land surface, but it does not collect individual tree attributes. This data is typically collected during a tree inventory, where people visually assess the tree. Employing both approaches provides important information for urban forest planning and management.

The trees that live in South Salt Lake provide a multitude of benefits that residents and visitors enjoy. They improve air and water quality, provide shade and energy savings, and improve mental and physical health. However, their establishment and health need to be balanced against population growth and development. Trees are removed as they age and to make way for infrastructure, which needs to be balanced with new planting efforts. The tree canopy assessment will help quantify the tree canopy loss and/or gain across the City, and complements the information collected in the public tree inventory to make management decisions

Methods

Land Cover Assessment

High-resolution aerial imagery from the United States Department of Agriculture's National Agriculture Imagery Program (NAIP) was used as the basis for the tree canopy assessment. 2021 NAIP data with 60-centimeter resolution was the most current timeframe available at the time of assessment and was used as a proxy for the current tree canopy cover (TCC). The years 2016 and 2006 were assessed using NAIP imagery with 1-meter resolution. The snapshot of tree canopy through history was extended by using orthoimagery from 1984 and 1964, sourced from the Utah Geological Survey. The orthoimages are individual high-resolution photographs taken from a fixed-wing airplane. To capture the entirety of South Salt Lake's city limits, the images were "stitched" to combine and orthorectify the images by referencing common ground points (Figure 1).

A History of Tree Canopy in SSL South Salt Lake's current and historical land cover was estimated through a sample point assessment (Figure 2). With this methodology, geospatial points are randomly generated and then classified by a reviewer. The points were classified as tree, grass, impervious surface, water, or bare soil (Figure 3). To perform the current land cover analysis, 2,000 points were classified using the 2021, 2016, and 2006 NAIP imagery. Using the same sample point methodology, 1,000 points were classified for the time periods of 1985, and 1964. As a quality control accuracy assessment, a secondary evaluator classified a 10% sample of locations. By comparing how the two evaluators classify the land covers, we can determine the accuracy level of the primary evaluator. For this project, we exceeded the desired level of 95%, with a minimum tree identification accuracy of 96.2% for the five time periods.

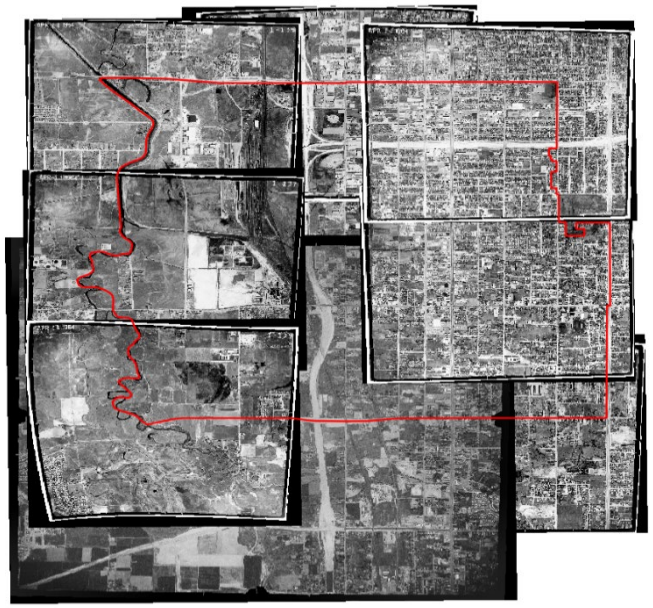


Figure 1. Example orthophotos before rectification.

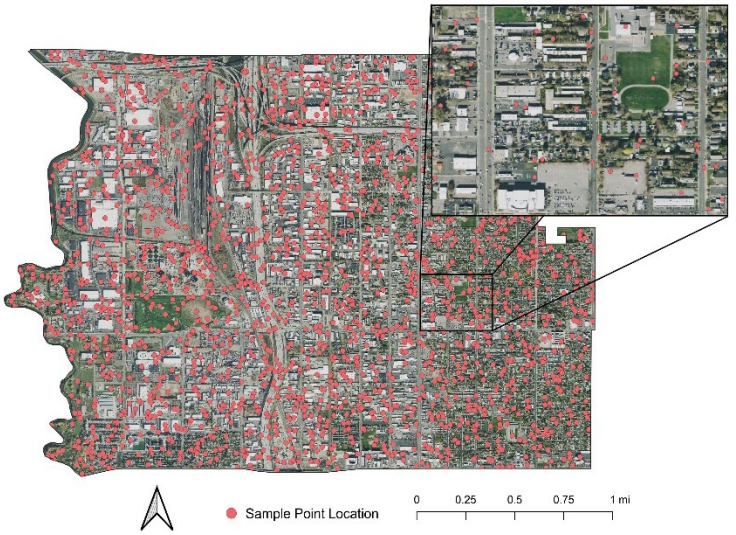


Figure 2. Sample point land cover assessment.

Figure 3. Example land cover classes assessed for the project.

Land Cover Analyses

Geographic Analysis In addition to the City-wide TCA, the land cover assessment for each period was geographically disaggregated into census blocks and neighborhoods. This allowed us to assess how tree canopy differed by geographic area, which can help focus tree planting efforts in the future. In particular, the Tree Equity tool bases its calculations on population demographics at the census block level, so we can compare South Salt Lake's tree canopy data against this tool.

While the sample point method was used for the entire City area, a supervised classification was used to determine canopy coverage for smaller land areas. For this method, a GIS layer was first applied that removed building footprints from the analysis. The GIS program was then trained to recognize tree canopy by calibrating sample points against a human analyst. While not as accurate as the sample point method, this method can efficiently approximate TCC for smaller areas; our calculated alignment between human analyst and computer was 90.95%. Using the supervised classification method, the TCC was determined for land zoning designations including public versus private, and for schools and parks.

Potential Plantable Analysis

The 2021 land cover assessment data was used as the basis to determine potential plantable areas across the City. The sample points where a tree could potentially be planted (grass/herbaceous and bare soil) were separated from the points where tree planting would not be readily feasible (impervious, water, or already existing tree). For the potentially plantable spaces, they were assessed individually to determine if a small, medium, or large tree (<25' tall/15' wide, <40' tall/25' wide, or >40' tall/40' wide at maturity) could be planted there depending on above-and belowground constraints, such as proximity to hardscape and structures, overhead utility conductors, and distance to other trees (Figure 4). Planting site characteristics can be found in Appendix A.

Figure 4. Example plantable and nonplantable locations.

South Salt Lake's Tree Canopy Coverage compared to other Utah cities

South Salt Lake's tree canopy was compared to those of other Utah cities to see if there could be an opportunity to learn from its neighbors. The Tree Equity Score National Explorer was used as the basis to compare TCC between communities. This was chosen since the method by which TCC is calculated is the same across all communities, which is derived from pre-aggregated Google high-resolution tree canopy sourced from Google Environmental Insights Explorer. The values for SSL were compared against other cities in Salt Lake County for which a Tree Equity report was available.

Ecosystem Benefits

South Salt Lake's ecosystem benefits were calculated using i-Tree Canopy (canopy.itreetools.org). Carbon storage and annual values for avoided water runoff, carbon sequestration, and air pollutant removal were developed based on South Salt Lake's 2021 estimated 7.3% tree canopy cover. A 95% confidence interval (CI) and standard error (SE) were also calculated for each ecosystem benefit amount and monetary value. For example, sulfur dioxide pollutant removal was estimated at 0.76 (±0.12) tons annually, or an expected estimate with a 95% chance of being within the range of 0.64 to 0.88 tons a year.

The canopy of this tree shades both the street and the sidewalk.

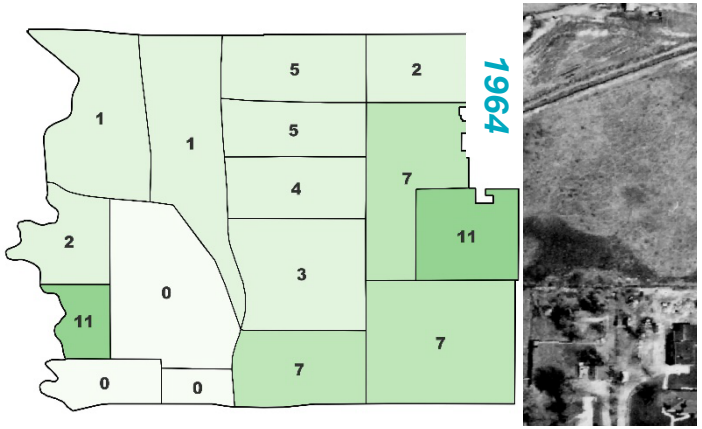
A History of Tree Canopy in South Salt Lake

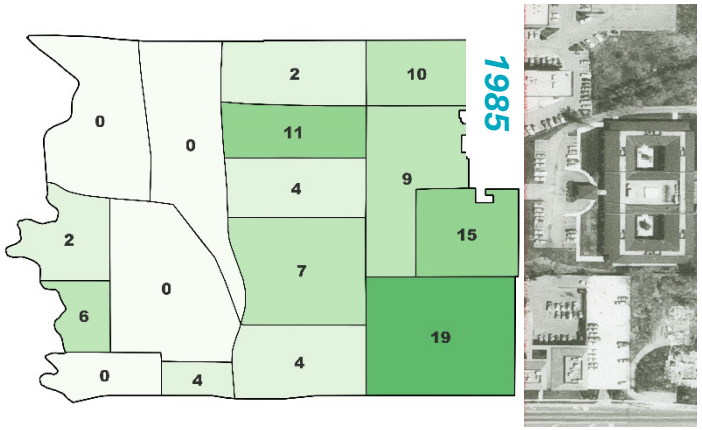
South Salt Lake has seen incredible changes in development and population in the past 50 years. The City's tree canopy assessment was captured at 5 time periods: 1964, 1985, 2006, 2016, and 2021. While the City expanded its boundaries with the annexation of unincorporated county land from 3300 South to 3900 South in 1998, the tree canopy assessment for all time periods uses the current municipal boundary for continuity. What follows is a description of the tree canopy coverage and notable activities in South Salt Lake during the five selected time periods. To the right are maps of canopy coverage (%) by neighborhood, and an image of the same location showing changes in development and tree canopy over time.

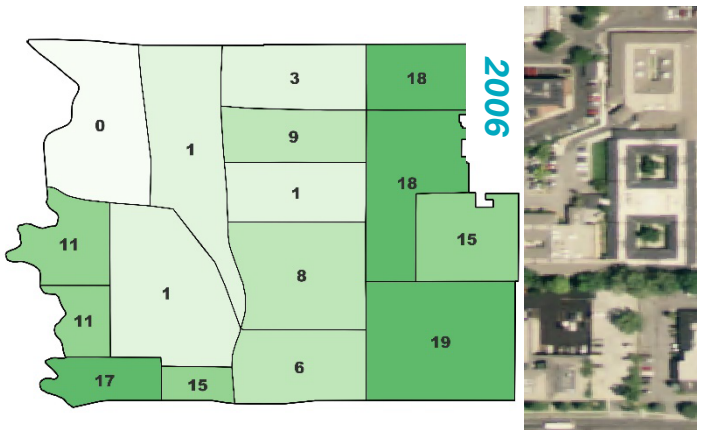
1964 The overall tree canopy is **3.9% (±0.61)**. Neighborhoods in the southwest had the lowest tree canopy (0%) while Fitts Park on the eastern boundary had the highest (11%). The 1960 census reported the population as 9,520. It can be inferred that there was a recent boom in development, since the 1940-1950 censuses reports a 382% population increase from 1,599 to 7,704 people. In 1964, residential developments are seen to be established on the eastern side of the City, especially in the northeast. The area west of the future interstate 15 is largely undeveloped, with the railyard established in the northwest corner. While routes 15 and 80 haven't been completed, their outlines are already sketched across SSL as undeveloped corridors.

1985 At this time, construction of Interstate 80 was well underway, to be completed in 1986. The highway construction made transportation easier but split up neighborhoods and ensured a large part of the City would be permanently paved. The overall tree canopy is **5.7% (±0.73)**, and the 1980 census lists the population as 10,413. West of interstate 15 still has low tree canopy (0-6%), while almost all neighborhoods east of interstate 15 see increases compared to 1964, especially Granite Legacy (7% to 19%). In 1985 the Jordan River's channel has been altered to fit the current western boundary of the City.

2006 This time period saw South Salt Lake's tree canopy at its maximum analyzed: **8.7% (±0.63)**. Neighborhoods on the eastern side saw continued tree canopy expansion, peaking at about 19% coverage in the Granite Legacy neighborhood. A major event occurred in 1998 as the City almost doubled in size to the south with the annexation of county land. The City's population also







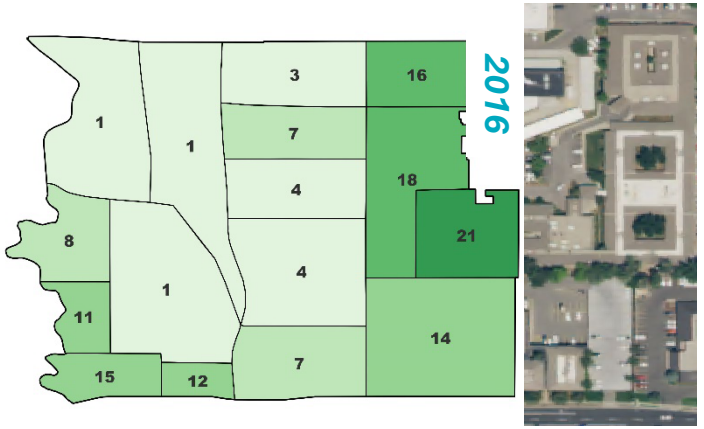
doubled between the 1990 and 2000 censuses, from 10,129 to 22,038. Within the new City boundaries, all neighborhoods saw an increase in tree canopy, most notably the Riverfront neighborhood of 0% to 17%.

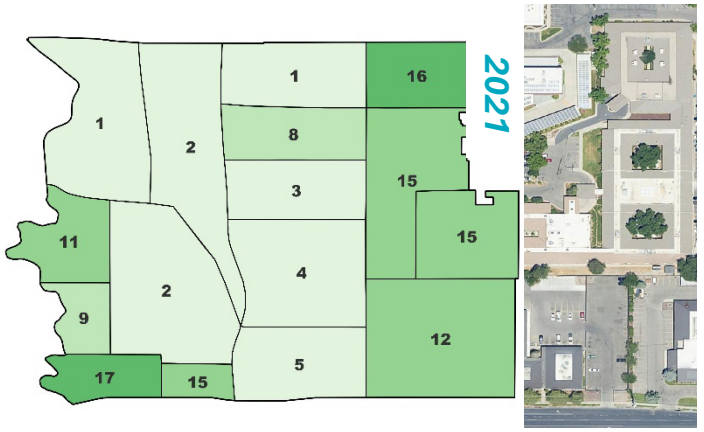
2016

Tree canopy coverage decreased across the city in 2016, to **8.0% (±0.60)**; the population increased 7.2% from the 2000 census, to 23,617 in 2010. The S Line was completed in 2013; alongside its construction, the former warehouse district was rezoned to mixed-use urban development. The only neighborhood to see a marked increase in tree canopy coverage was Fitts Park, from 15% to 21%.

2021

Tree canopy coverage decreased again in 2021, to **7.3% (±0.58), or a total area of 322 acres**. According to the 2020 census, the population grew another 13.4% from the decade prior, to 26,777. Neighborhoods east of interstate 15 mostly decrease in tree canopy coverage, while there are slight gains in the Oxbow (8% to 11%), Riverfront (15% to 17%), and Meadowbrook Place (12% to 15%) neighborhoods.





All land cover changes in South Salt Lake from 1964 to 2021 are seen in Figure 5. In 1964, a majority of land within the current city boundaries was bare soil (17.7%) or grass/herbaceous plants (53.0%). Land covered in bare soil steadily decreased through the decades, to 6.5% in 2021. Land covered by herbaceous plants decreased from 1964 to 1985 (53.0% to 32.0%), then again from 1985 to 2006 (32.0% to 13.7%), before leveling out to 15.2% in 2021. Land covered by impervious surface increased significantly from 24.4% in 1964, to 47.3% in 1985, and then 67.9% in 2006. In 2021, the land covered by impervious surface was at 70.0%, the maximum analyzed. Changes in tree canopy weren't as dramatic, ranging from 3.9% to 8.7% of land cover, but show an increase from 1964 to 2006, then a decrease to 7.3% in 2021.

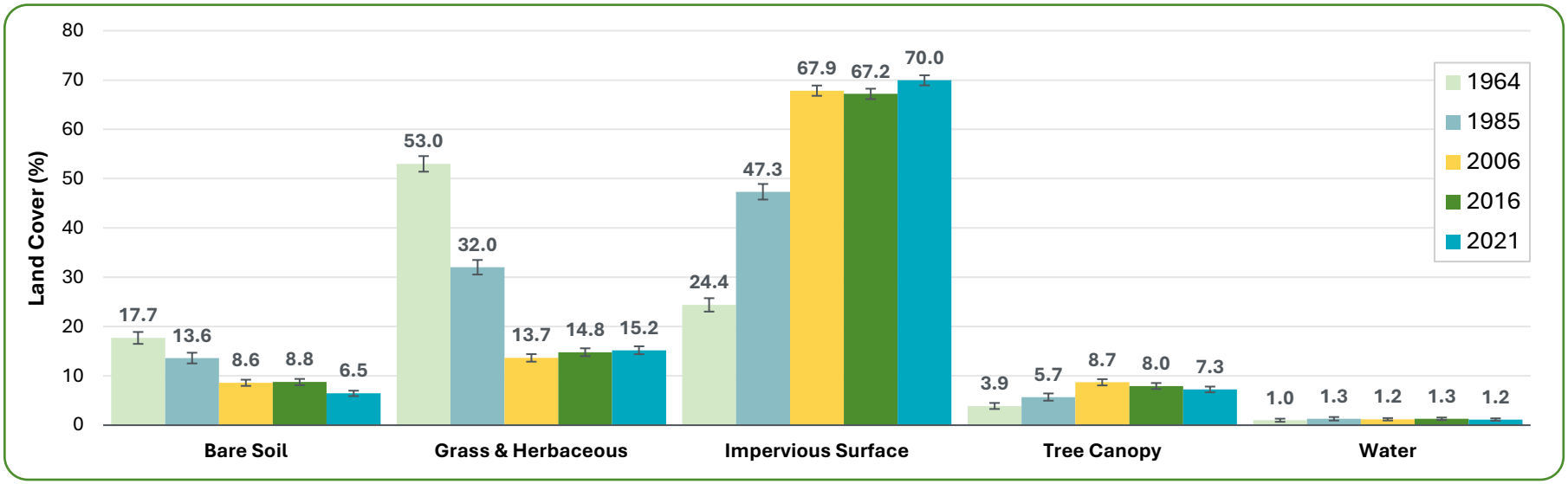
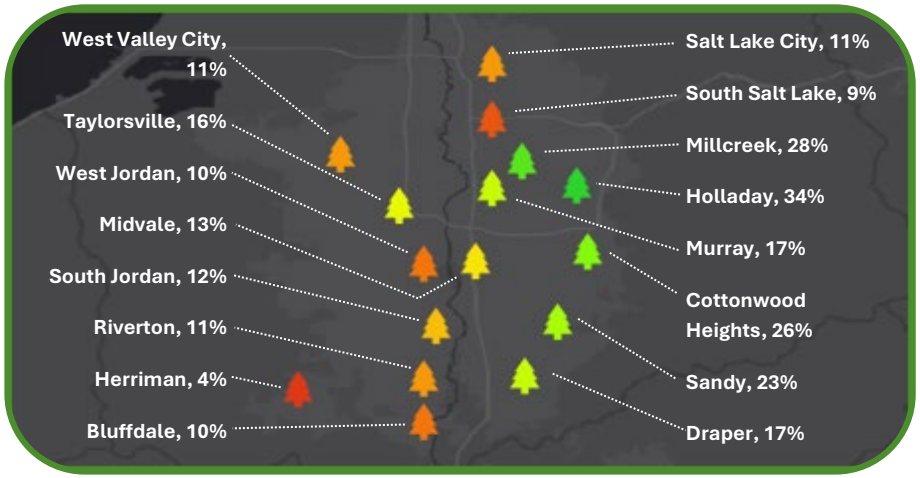


Figure 5. Land cover changes in South Salt Lake,

The relationship between development and tree canopy in South Salt Lake has been intertwined over time. Historians Richard Jackson and Dale Stevens wrote that "the first settlers found most of the (Salt Lake) valley covered with grasses except where streams provided enough extra water for trees..." The historical land cover assessment found that to still be the case in 1964, when 53% (±1.58) of the land was covered by grass and herbaceous plants, and the population was nearing 10,000. As the population grew, so did tree canopy, likely due to the nostalgia for more forested homelands by new immigrants to the valley and the innate social benefits that trees provide. South Salt Lake's population has steadily increased over time, yet the tree canopy coverage peaked in 2006 at 8.7% (±0.63), and then decreased to 7.3% (±0.58) in 2021. The decrease in tree canopy could be due to new developments removing established trees, or due to the removal of trees planted over half a century ago as they naturally age and decline. As South Salt Lake continues to grow, it will need to proactively plan to maintain its green infrastructure to benefit both residents and visitors.

South Salt Lake Compared to Neighboring Communities

South Salt Lake was compared to 15 other communities in Salt Lake County for tree canopy cover and several socioeconomic indicators, using data from the Tree Equity Score National Explorer (TESNE). The methods used in the TESNE indicated a slightly higher tree canopy cover for South Salt Lake, of 9%; this was the second lowest tree canopy cover of all communities included in the analysis, with only Herriman having a lower tree canopy cover (4%). Holladay had the highest percentage, 34%.



The TESNE also looks at socioeconomic indicators to identify locations which may have been historically disadvantaged or currently lack the resources to maintain or grow their community forest. The selected socioeconomic indicators and their status in South Salt Lake compared to neighboring communities are below, with a full table in Appendix A.

People in Poverty The percentage of people living below 200% of the federally-designated poverty line. **South Salt Lake had the highest percentage (43%) of people living in poverty** compared to the 15 other communities, followed by Salt Lake City (33%) and West Valley City (32%). South Jordan had the lowest percentage (9%).

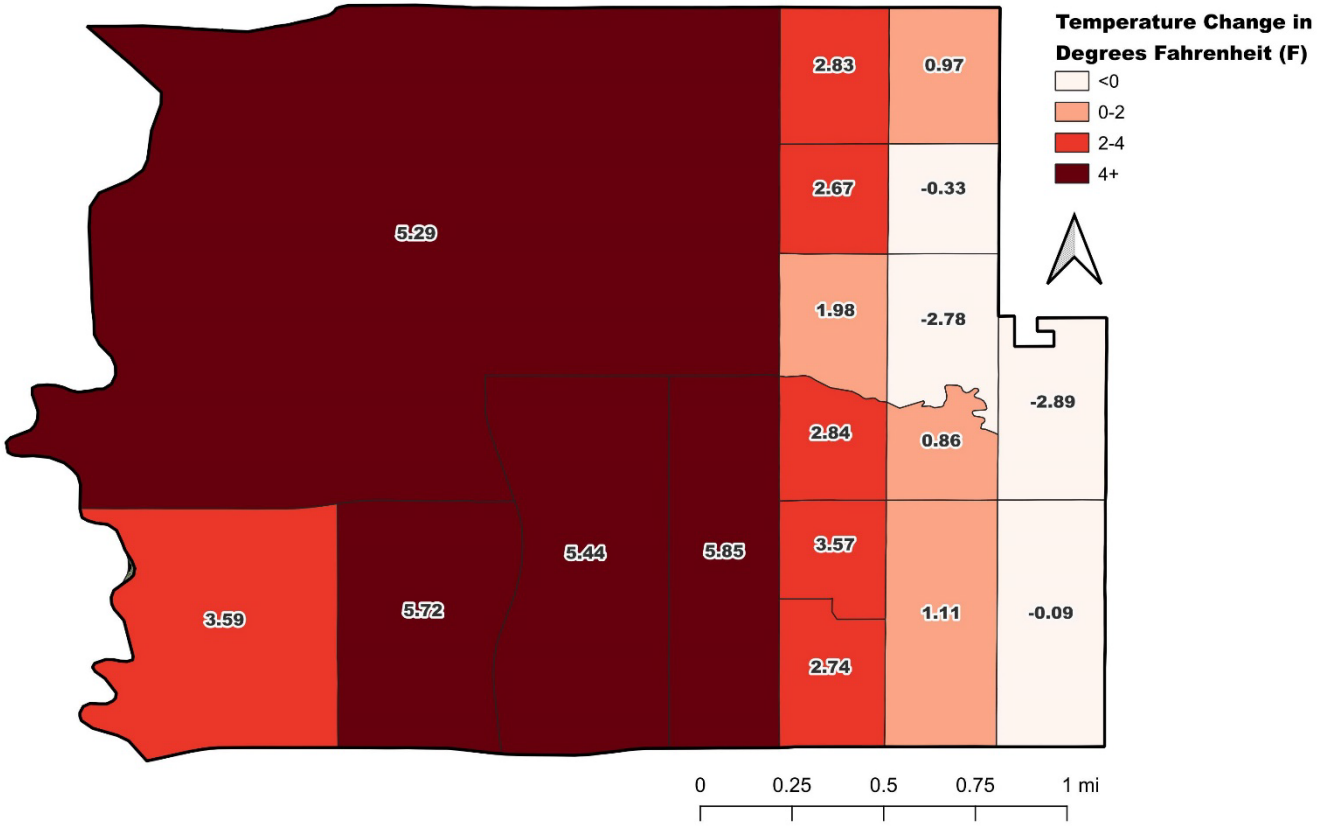
People of Color Percentage of people that are Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, and includes all people classified as Hispanic by the Census Bureau. **South Salt Lake had the second highest percentage of people of color (50%)** after West Valley City (54%). Cottonwood Heights and Holladay had the lowest percent, both 12%.

Unemployment Percentage of the labor force that do not have a job, are available, and looking for one. **South Salt Lake had the highest unemployment (7%)**, followed by Taylorsville (5%). Draper and South Jordan both had the lowest percentage of unemployment (2%).

Linguistic Isolation Percentage of households where no person age 14+ speaks only English, or no person age 14+ who speaks a language other than English speaks English "very well." **South Salt Lake had the highest population percentage experiencing linguistic isolation (9%)**, followed by West Valley City (7%). Bluffdale, Draper, Herriman, and Riverton all had 0% of their population experiencing linguistic isolation.

Average Health Burden Index Self-reported prevalence of poor mental health, poor physical health, asthma and heart disease in an equally weighted index. South Salt Lake had the second highest health burden (56), surpassed only by West Valley City (58). Draper had the lowest Health Burden, with an index value of 28.

The TESNE was also used to determine the heat disparity across South Salt Lake. Average surface temperatures for the hottest days were estimated using 2022 data from the USGS Earth Explorer – Landsat 8 Collection 2 Level 2 Surface Temperature, and averaged by census block group. Heat disparity is measured by comparing average block group heat extremity with the urban area average to measure variance in heat severity across an urban area. For South Salt Lake, the eastern census blocks experienced the lowest heat disparity, while the western census blocks experienced the greatest heat disparity. Higher surface temperatures are linked to higher energy consumption, compromised human health and comfort, increased air pollutants, and impaired water quality. The level of heat disparity roughly correlates to tree canopy coverage across the City, which is corroborated by a 2023 study of the relationship between urban heat islands and parks and green spaces in Salt Lake City.

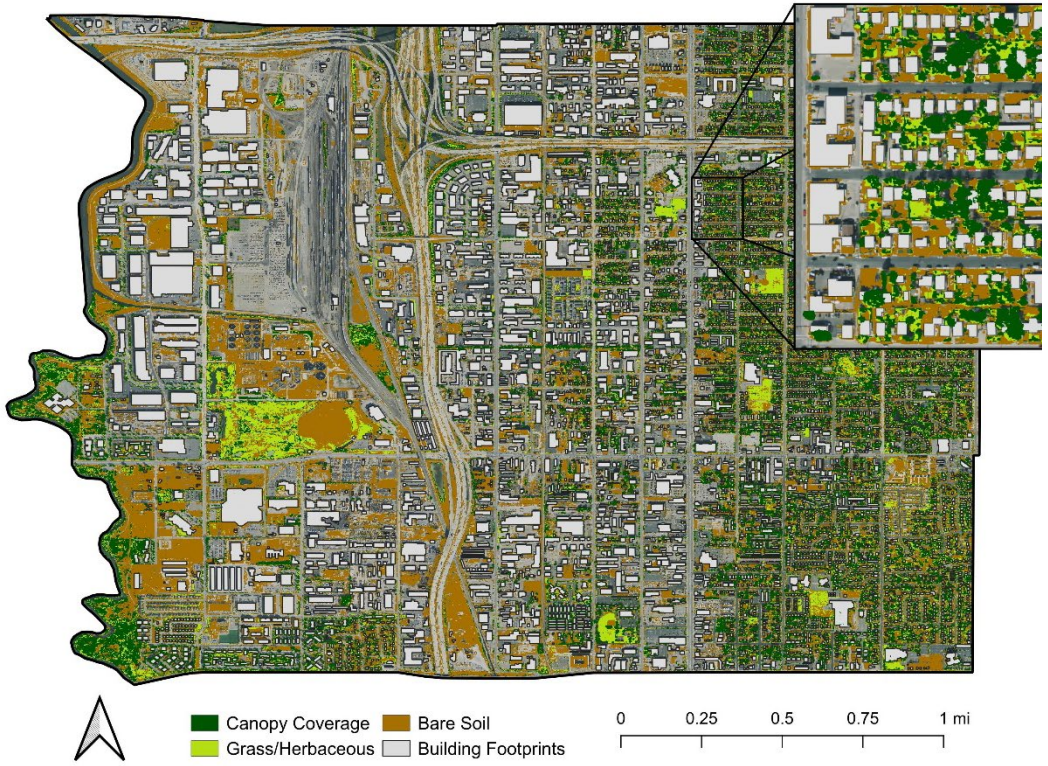


Where are South Salt Lake's Trees?

The map to the right shows the supervised classification of South Salt Lake's land cover, using 2021 NAIP imagery. The dark green areas with higher tree canopy on the eastern side and southwest corner are evident.

Figure 6 shows a breakdown of the different parcel zoning types, with the total area and TCC area for each zoning type, as well as the TCC percentage. Industrial parcels made up the greatest area in the City (2.36 mi^2), yet had only 4.6% TCC. Similarly, Commercially zoned parcels made up a large area (1.27 mi^2), but had a low TCC (6.3%). Residential parcels made up the second largest zoning type by area (1.39 mi^2), but had a much larger TCC (24.9%). Multihome and City properties also had high percentages of TCC, 21.3% and 20.3%, respectively. Schools cover a small area (0.15 mi^2), but only have a TCC of 7.8% All data is listed in Appendix B.

Residential, Multihome, and City properties greatly exceed the City-wide TCC of 7.3%, there may be fewer opportunities to plant additional trees on these parcels, although they should not be ignored, especially since the benefits that trees provide may be more directly experienced. Schools, Commercial, and Industrial properties cover over half of the City's total area, and show great potential for future tree planting.



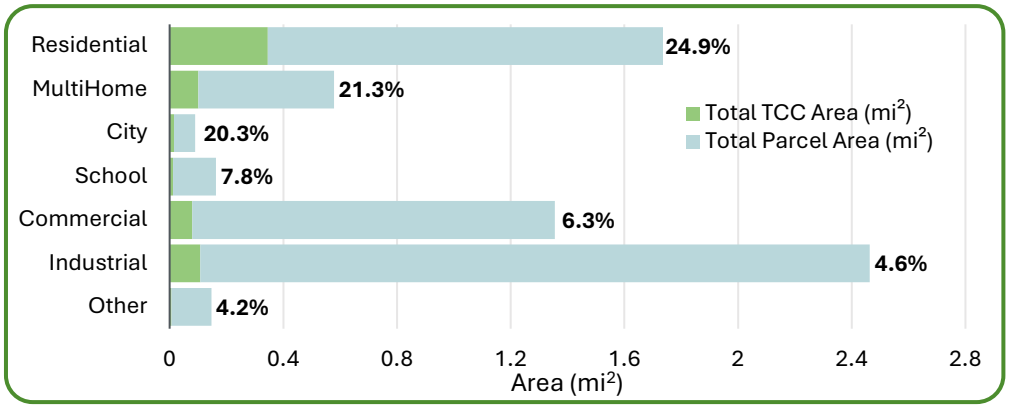
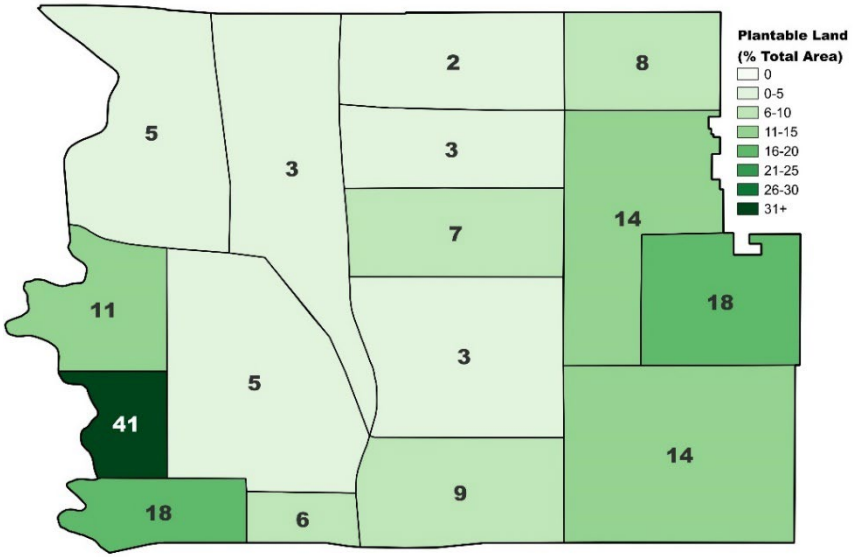


Figure 6. Total parcel and TCC area by parcel zoning in South Salt Lake, with TCC %.

Potential Plantable Areas



The map below shows the percentage of potentially plantable land for each neighborhood. The Jordan River neighborhood had the largest percentage of potentially plantable land, at 41%. Satellite imagery shows that this neighborhood is dominated by large industrial buildings surrounded by grass or soil, with undeveloped areas adjacent to the Jordan River. Other neighborhoods with the largest percentages of potentially plantable land include Riverfront (18%), Fitts Park (18%), Granite Legacy (14%), Central Park (14%), and Oxbow (11%).

Besides knowing the neighborhoods with the greatest availability of planting spaces, it's also important to know the size of trees which can be planted. Available planting spaces were rated for small, medium, and large trees, which have mature heights of <25' tall, 25' to 40' tall, and >40' tall respectively. A site capable of sustaining a large tree can be planted with a medium or small tree, if desired and if there are conditions present which would not benefit a large tree (e.g., shallow or compacted soil). Figure 7 shows the estimated number of each tree size that can be planted in South Salt Lake, with a total of **22,713 trees that could be planted, bringing the City's tree canopy cover up to 12.1%.** A breakdown of the percent of small, medium, and large trees which could be planted by neighborhood is in Appendix D.

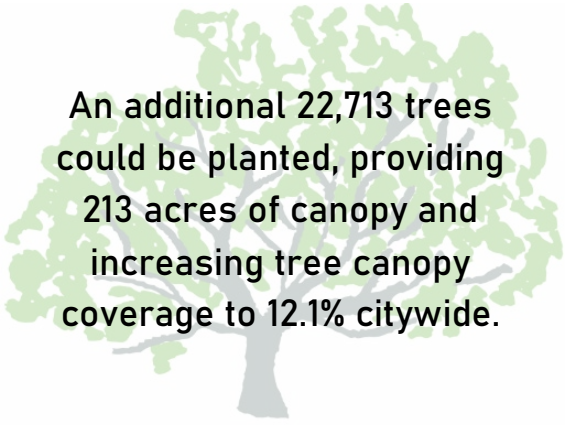


Figure 7. Potentially plantable number of trees and area in South Salt Lake.

Tree Size	Trunk Diameter (in)[a]	Tree Height (ft)[a]	Canopy Spread (ft)	Canopy Area (ft^2)	Total Plantable Area (Acres)	Potential Trees to Plant (#)
Small (10" DSH)	<20	<25	15	177	69	16,955
Medium (18" DSH)	20 to 30	25 to 40	25	491	14	1,270
Large (24" DSH)	>30	>40	40	1257	129	4,488
				Totals	**213**	**22,713**

[a] Projected mean tree diameter at standard height (DSH, 4.5') of planted trees during life span. [b] McPherson, E.G. et. al. (2003) Northern mountain and prairie community tree guide: benefits, costs and strategic planting. Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service. 92p.

Social & Environmental Benefits of Tree Canopy

The social and environmental benefits that South Salt Lake's trees provide were calculated using i-Tree Canopy. The data is based on the 7.3% total TCC calculated using the sample point method. While the calculated totals are an estimate, they provide an idea of the value that a community's trees provide, and supports funding for their preservation and expansion. A table with the full data can be found in Appendix C.

South Salt Lake's trees provide an average of $286,462 in ecosystem benefits every year.

Nitrogen Dioxide and Ozone 1.45 tons of nitrogen dioxide and 7.97 tons of ozone, representing $1,190 and $26,579, is xxx. Nitrogen dioxide is produced by the combustion of fossil fuels, and ozone is a common component of smog. The amount of nitrogen dioxide and ozone present is calculated from locally available pollution and weather data. High levels of these pollutants can cause and worsen respiratory issues, leading to lung damage and death.

Particulate Matter 2.5 and 10 0.31 tons of particulate matter 2.5 ($PM_{2.5}$) and 3.86 tons of particulate matter 10 (PM_{10}), representing $63,444 total, are intercepted annually by South Salt Lake's trees. $PM_{2.5}$ generally comes from combustion: from motor vehicles, factories, and wood-burning. PM10 comes from combustion as well, but also construction dust and industrial and agricultural activities. Inhaling particulate matter can cause breathing issues, worsen other conditions, and increase the risk of heart attacks.

Water Runoff 5.93 million gallons, representing $52,991, is intercepted annually by South Salt Lake's trees. Water runoff comes from precipitation events and includes the pollutants that it picks up as it makes its way through the water cycles. Trees intercept water runoff, either directly through their roots or by promoting its infiltration with their leaves, branches, and trunk. Water runoff is typically treated by a community's stormwater system; the financial savings represents the water that trees intercept that doesn't need to be treated.

Carbon Sequestration 330.60 tons of carbon, representing $143,201, are sequestered annually by South Salt Lake's trees. Trees sequester carbon as they put on annual new growth, and the amount sequestered increases with the size and health of the tree. Sequestering carbon is associated with improved air and soil quality, and with mitigating the effects of climate change.

Conclusions & Recommendations

The presence of trees of South Salt Lake has been dictated by its history: naturally a grassy plain with treed riverbanks, the City was originally built out as a industrial center with a sizeable rail yard. The City became more residential after the World Wars and the population grew. As houses and apartments were built, trees were also planted to provide a pleasant landscape for the residents. The tree canopy peaked at 8.7% in the 2000's as trees reached maturity, and declined to 7.4% in 2021 as the City was further developed and aged trees were removed.

Currently, South Salt Lake has one of the lowest tree canopy coverages in the Salt Lake Valley, and has high percentages of people living in poverty, unemployment, and linguistic isolation, as well as ranking high on a health burden index. While it is unfortunately common for historically disinvested communities to experience a lower tree canopy coverage and the benefits that are associated with it, looking at other communities in the Salt Lake Valley show that a higher tree canopy coverage is possible.

South Salt Lake is currently in an exciting period of redefining itself, with the introduction of the S Line, new residential developments, and a diverse growth in the population. As the gray infrastructure is built out, the City needs to decide if focusing on growing its green infrastructure is a priority. The presence of trees in an urban community has been shown to provide numerous benefits to the people who experience them, including decreased urban heat effects and the associated energy savings, improved mental and physical health, and increased property values. However, trees need to be thought of as infrastructure, with planned installation and maintenance considerations to maximize benefits and cost effectiveness.

Through a tree canopy assessment, this report lays out the history of trees in South Salt Lake, the benefits they provide, how the City compares to its neighbors, and a forecast of future tree planting. Based on the information collected and analyzed on South Salt Lake's public tree population, the following are recommended:

Develop a tree canopy goal. The City's current tree canopy coverage is 7.3%; a tree canopy goal would help the City balance tree planting and maintenance initiatives against continued development. To create the goal, the City could look to neighboring communities with similar population densities and development practices. The goal should take into consideration the potential tree canopy coverage created with additional tree plantings, and the loss of trees through removals.

Develop a tree planting plan. In order to grow its tree canopy, the City needs to prioritize tree planting. A tree planting plan would focus activities where they are most needed, depending on the availability of planting spaces. The current tree canopy

assessment identified the potential for tree planting at a neighborhood level; this could be combined with an understanding of where additional tree plantings would provide maximum benefits. These could be areas with the greatest density of residences, or where people typically spend time outside such as walking routes to schools and downtown shopping areas. The planting plan could set targets for the number of trees to plant per year and a recommendation for the species of trees to plant. The planting plan could also incorporate recommendations to remove impervious surfaces and install areas to plant trees using structural soils to increase the potential tree canopy coverage.

Identify methods to increase tree canopy coverage on Industrial, Commercial, and School properties. The tree canopy assessment identified Industrial, Commercial, and School properties as making up over half of the area of the City while having low tree canopy coverages, therefore having a high potential for tree plantings. The 2024 inventory of trees and planting spaces in public areas identified only 473 planting sites; to increase the City-wide tree canopy, trees need to be planted outside of public spaces. School properties should be prioritized due to the benefits that trees provide to human health and the cooling effects they have on buildings. Tree plantings at Commercial and Industrial properties would need to balance against the use of the property and whether alternative uses, such as solar installations, would be more beneficial. Increasing tree plantings at School properties would require buy-in from the community, a City-led initiative, and training of school maintenance staff. For Commercial and Industrial properties, ordinance changes could be considered to promote tree plantings.

Education & outreach. While a tree canopy goal and planting initiatives provide steps for the City to follow, the community also needs to be involved in their implementation. The City should consider community education and outreach when planning any tree planting activity. Doing so creates buy-in and allows for greater involvement and pride in the community. It also fosters long-term momentum in tree planting and maintenance, which will be necessary over the extended lifetimes of trees.

Routinely update tree canopy assessment. A tree canopy assessment is a snapshot in time. In order to determine whether South Salt Lake is meeting its tree canopy goals, the City will need to update its tree canopy assessment in the future. As one approach, updates could coincide with the release of new NAIP imagery. The City could either update the tree canopy assessment itself, using i-Tree Canopy or ArcGIS, or contract it out.

South Salt Lake's tree canopy assessment allows us to understand the historical and current status of the City's tree canopy coverage, so that planting and maintenance recommendations can be developed. This report and the companion Public Tree Assessment Report provide the backbone on which the Management Plan's recommendations are based.

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Appendix A – Comparison of Socioeconomic Indicators in South Salt Lake to Neighboring Communities

Municipality	Urban Area Population[i]	Tree Canopy Cover	People in Poverty[ii]	People of Color[2]	Unemployment[ii]	Linguistic Isolation[ii,iii]	Average Health Burden Index[iv,v]
South Salt Lake	29,093	9%	43%	50%	7%	9%	56
Salt Lake City	203,985	11%	33%	35%	4%	4%	46
Bluffdale	16,298	10%	19%	13%	3%	0%	31
Cottonwood Heights	33,470	26%	15%	12%	3%	1%	36
Draper	50,390	17%	12%	18%	2%	0%	28
Herriman	52,604	4%	12%	16%	4%	0%	29
Holladay	31,485	34%	16%	12%	3%	1%	39
Midvale	34,600	13%	29%	35%	4%	4%	51
Millcreek	63,415	28%	22%	20%	4%	2%	41
Murray	47,904	17%	22%	22%	4%	2%	51
Riverton	46,205	11%	14%	13%	3%	0%	35
Sandy	108,992	23%	15%	19%	3%	2%	41
South Jordan	76,647	12%	9%	18%	2%	1%	34
Taylorsville	63,731	16%	28%	38%	5%	6%	53
West Jordan	127,170	10%	20%	33%	4%	3%	44
West Valley City	136,785	11%	32%	54%	4%	7%	58

[i]Data source: Census 2020

[ii]Data source: American Community Survey 2017-2021

[iii]Percentage of households where no person age 14+ speaks only English or speaks English very well

[iv]Data source: Center for Disease Control CDC PLACES 2022

[v]Self-reported prevalence of poor mental health, poor physical health, asthma and heart disease in an equally weighted index.

Appendix B – Tree Planting Space Decision Criteria

Decision Criteria for Tree Size (Units in Feet)	Maximum Tree Height/Width[a,d] at Maturity		
	Small (<25'/15')	Medium (<40'/25')	Large (40'+/40')
Overhead wires[a]	Acceptable	Unacceptable	Unacceptable
Minimum Horizontal distance from wires[b]	Adjacent	> 25 ft+	> 50'+
Distance between sidewalk and curb[a]	3 to < 5 ft	5 to <8 ft	8 +
Total planting area[c]	50 to 150 ft^2	>150 to 300 ft^2	> 300 ft^2+
Minimum distance from infrastructure[c]	6 ft	8 ft	10 ft+

[a] City of Millcreek, Utah. *Millcreek City Center Urban Forestry Standard*. September, 2020. Millcreek City Community Development and VODA Landscape + Planning.

[b] Olsen, S; Gunnell, J; Kuhns, M; Barnhill, A. *Small Trees for Planting Near Power Lines*. July, 2009. Utah State University Cooperative Extension. https://extension.usu.edu/forestry/files/trees-cities-towns/tree-selection/small-trees-planting-near-powerlines.pdf

[c] University of Florida. *Planting area guidelines*. University of Florida, Landscape Plants. https://hort.ifas.ufl.edu/woody/planting-guidelines.shtml.

[d] Salt Lake City. *Choosing the Right Tree for the Right Place*. Salt Lake City Urban Forestry, SLC.gov. https://www.slc.gov/urban-forestry/2024/06/14/selecting-a-tree/#:~:text=30'%20from%20commercial%20driveway%20and,(less%20than%2030'%20tall)

Appendix C – Total Area, Tree Canopy Cover Area, and Tree Canopy Cover % by Parcel Zoning

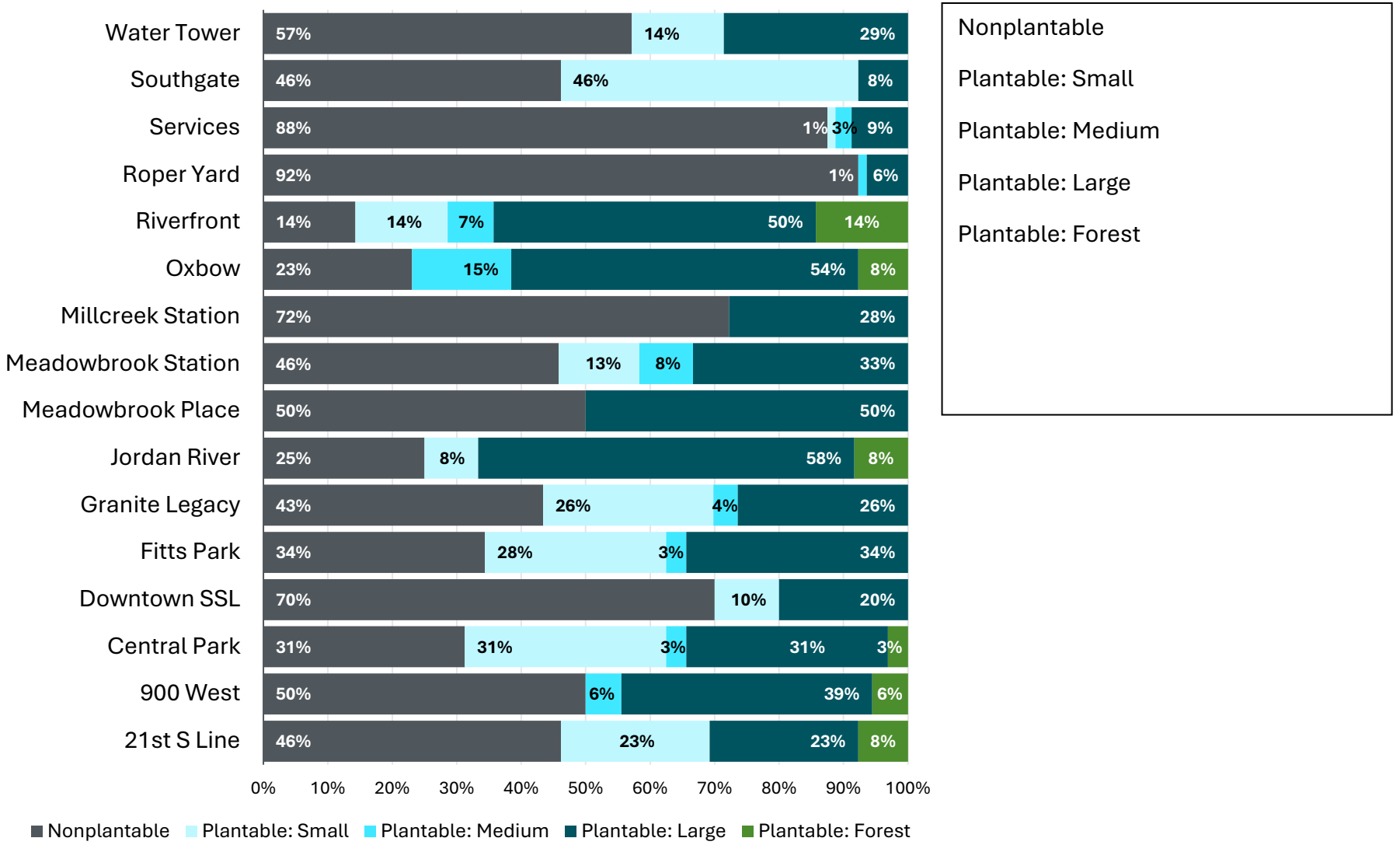
Land Use	Total Tree Canopy Cover Area (mi^2)	Standard Error (%)	Total Parcel Area (mi^2)	Average % Canopy Cover
Other	0.01	0.46	0.14	4.2%
Industrial	0.11	0.46	2.36	4.6%
Commercial	0.08	0.46	1.27	6.3%
School	0.01	0.46	0.15	7.8%
City	0.02	0.46	0.07	20.3%
MultiHome	0.10	0.46	0.48	21.3%
Residential	0.35	0.46	1.39	24.9%

Appendix D – Annual Ecosystem Benefits and Monetary Value of South Salt Lake's Trees, Calculated by i-Tree Canopy

Annual Removal or Runoff Rates	Amount[1]	Standard Error (±)	95% Confidence Interval (±)	Value	Standard Error (±)	95% Confidence Interval (±)
Carbon Monoxide	0.09	0.01	0.01	$114	9.09	17.82
Nitrogen Dioxide	1.45	0.12	0.23	$1,190	95.21	186.61
Ozone	7.97	0.64	1.25	$25,389	2030.59	3,979.96
Sulfur Dioxide	0.76	0.06	0.12	$133	10.67	20.91
Particulate Matter 2.5	0.31	0.02	0.05	$39,244	3138.64	6,151.73
Particulate Matter 10	3.86	0.31	0.61	$24,200	1935.47	3,793.51
Water Runoff	5.93	0.47	0.93	$52,991	4238.12	8,306.71
Carbon Sequestration	330.60	26.44	51.82	$143,201	11453.00	22,447.88
			Annual Total	**$286,462**		

[1] Units in tons except water runoff in millions of gallons

Appendix E – Percent of Each Tree Size in Potentially Plantable Locations by Neighborhood



Nonplantable

Plantable: Small

Plantable: Medium

Plantable: Large

Plantable: Forest

The source data used for the mapping came from the City of South Salt Lake, the Utah Geological Survey, and the United States Department of Agriculture's National Agriculture Imagery Program.

The project was funded by a grant from SSL to provide.

SOUTH SALT LAKE

Anthony Biamont – Parks Project Manager

Sharen Hauri – Director of Neighborhoods

Joaquin Garcia – Parks & Facility Manager

Eocene℠

Rich Hauer – Subject Matter Expert

Sarah Lilley – Project Manager

Liz Lingo – Urban Forestry Consultant

Matt Johns – GIS Analyst

Paola Nansel – Urban Forestry Associate

South Salt Lake Public Tree Assessment Report

Prepared for: South Salt Lake City

Prepared by: Eocene Environmental Group

February 2025

Acknowledgements

We'd like to thank the South Salt Lake project team for their assistance and enthusiasm, which was vital to the project's success. Also, the community of South Salt Lake is to be commended for investing in their trees in the present, so that their benefits can be enjoyed for generations to come.

South Salt Lake Project Team

Anthony Biamont – Parks Project Manager

Sharen Hauri – Director of Neighborhoods

Joaquin Garcia – Parks Manager

Eocene Project Staff

Rich Hauer – Subject Matter Expert

Sarah Lilley – Project Manager

Liz Lingo – Urban Forestry Consultant

Luke Wohltmann – Inventory Arborist

Matt Johns – GIS Analyst

Paola Nansel – Urban Forestry Associate

Grant Information

The funding for this project is derived in part from a federal award of the U.S. Forest Service, Department of Agriculture, subawarded by the Utah Division of Forestry, Fire and State Lands. This award includes funds authorized by the Inflation Reduction Act of 2022.

Timeline

Data was collected in September and October 2024 and summarized into this report in February 2025.

Disclaimer

Tree inventory data collected by Eocene Environmental Group is based on visual observations recorded at the time of inspection. Observations were made from the ground, with no specialized equipment used, and during standard weather conditions. Eocene is not responsible for conditions that were not visually observable at the time of inspection. Tree inventory data may not remain accurate after inspection due to tree growth, decline, and damage caused by environmental and anthropogenic factors. The provided tree risk ratings and maintenance recommendations are up to the client to act upon.

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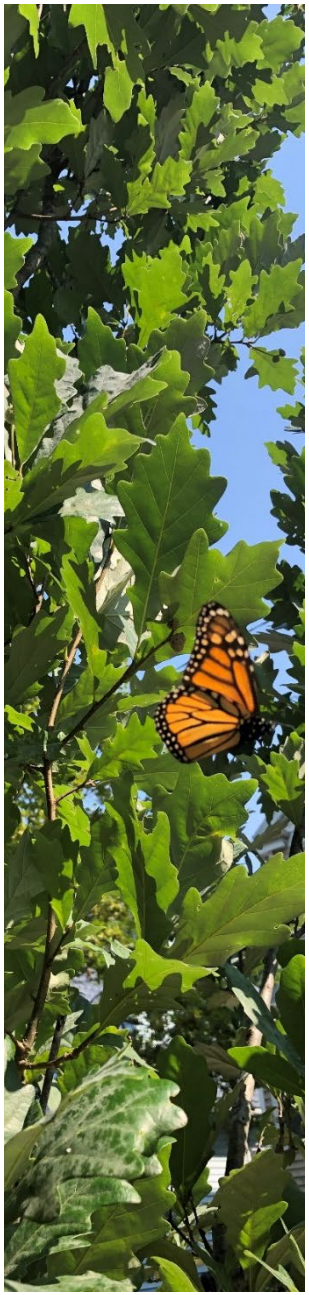
Appendixes



Introduction

South Salt Lake is a dynamic community in the center of Salt Lake County, Utah, with a population of twenty-six thousand residents and growing. Historically dominated by warehouses and railyards, South Salt Lake is growing into its 21st century identity as a welcoming and vibrant place for diverse families to call home, with the S Line Streetcar and new building developments leading the way. And as the community grows, it's prioritizing its trees and public spaces. With its industrial background, tree planting has not been consistent across many parts of the city. As the city continues to redevelop, previously under-shaded areas are being transformed into mixed-use and residential neighborhoods, increasing the demand for an expanded tree canopy. This need, along with growing public interest in environmental sustainability and the broad benefits of trees, recent planting programs have been well-received. This assessment is part of comprehensive actions that the City is taking to improve tree planting and maintenance.

A community's trees provide many services, both ecologic and economic. Trees serve the local ecosystem by intercepting stormwater, decreasing erosion, and providing wildlife habitat. In this time of changing climate, trees provide shade, filter air pollutants, and can reduce a home's energy needs. While there are cost savings associated with the ecological services that trees provide, they also have been shown to increase property values, provide traffic calming measures, reduce noise pollution, and are associated with lower crime rates. Beyond the tangible value of trees, they also create a sense of social cohesion and civic engagement, making the community a place that residents are proud of and that visitors and business patrons want to visit.

South Salt Lake is undergoing a project to understand the current status of its community trees and creating a plan to maintain and grow its tree canopy. This project will result in three outputs, the first of which is this report. In this Public Tree Assessment Report, the findings from an inventory of public trees completed in 2024 will be presented. The second and third outputs will be a City Tree Canopy Assessment Report and a Tree Management Plan.

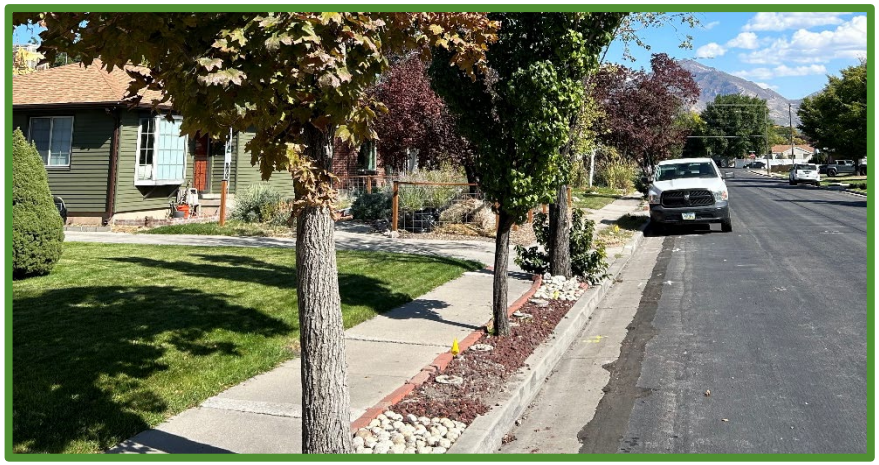


Figure 1 Trees planted in a tree strip in the public right-of-way.

2024 Tree Inventory

Data was collected on trees and stumps located within the public right-of-way along streets, and at parks and public facilities, in the months of September and October, 2024. Collected tree data attributes included species, size, health, risk rating, and site conditions. A full list of collected data attributes can be found in Appendix A. The majority of inventoried trees were in maintained areas, in close proximity to public activities. Sites suitable for tree planting were identified, with a recommendation made for the appropriate tree size (Appendix A). All tree data was collected by an arborist certified by the International Society of Arboriculture, and qualified in Tree Risk Assessment.

In total, 3,264 trees, 83 stumps and 473 planting sites were inventoried (Figure 2). Looking at the quantity of trees/stumps and planting sites by neighborhood, the greatest number were identified in the Granite Legacy Neighborhood, with 616 and 157, respectively, followed by Central Park and Fitts Park. The Jordan River neighborhood had the lowest number of trees (1) and planting sites (0) identified.

The majority of trees/stumps (n=2,039, 60.9%) and planting sites (n=316, 66.8%) are located in park strips, the plantable space located between a sidewalk and street (Figure 1, Figure 3). Open sites, which may be next to a street but otherwise unbounded by hardscape, was the second most common, followed by paved park strips.

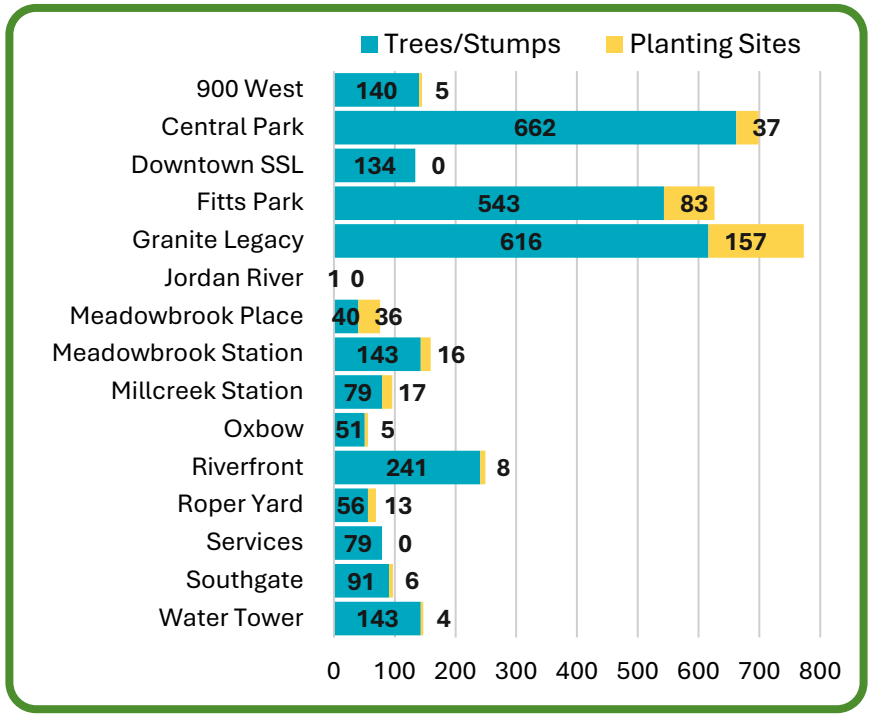


Figure 2 Total number of trees and planting sites inventoried, by neighborhood, in South Salt Lake.

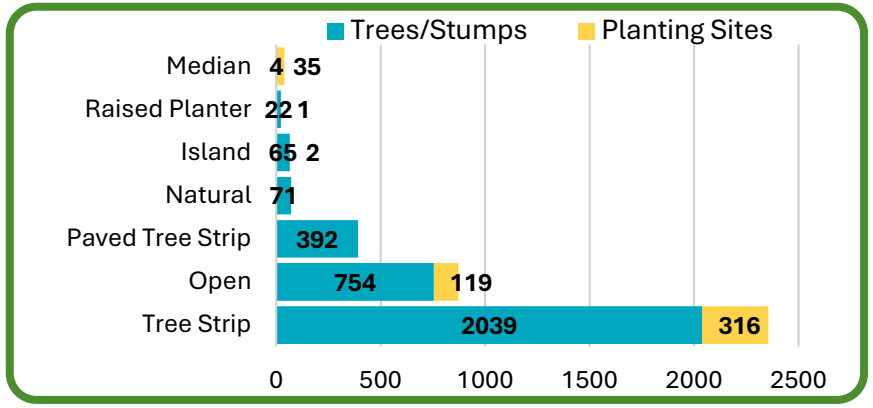


Figure 3 Types of spaces where public trees are located, by frequency.

Species Composition and Diversity

It's important to have a diversity of tree species represented in a community forest to promote resiliency against pests, storms, and changes in climate. In total, **118 species of trees** were identified in South Salt Lake's public areas. A general urban forestry guideline, known as the 10-20-30 rule, is that no more than 10% of a community's trees should be of one species, 20% of one genus, and 30% of one family (Santamour 1990). The most common species of trees was Callery Pear at 15.7% of the tree population, followed by Honeylocust and Crabapples (Figure 4). Callery pear is part of the *Pyrus* genus, which was the most common (16.6% of population), followed by *Acer* (maples) and *Ulmus* (elms). *Rosaceae* (pears, apples, plums, cherries) was the most common Family of trees represented, at 33.5% of the population, followed by *Ulmaceae* (elms, zelkova) and *Sapindaceae* (maples). A full list of the species, genus, and families of tree identified in South Salt Lake, with their frequency, is found in Appendix B.

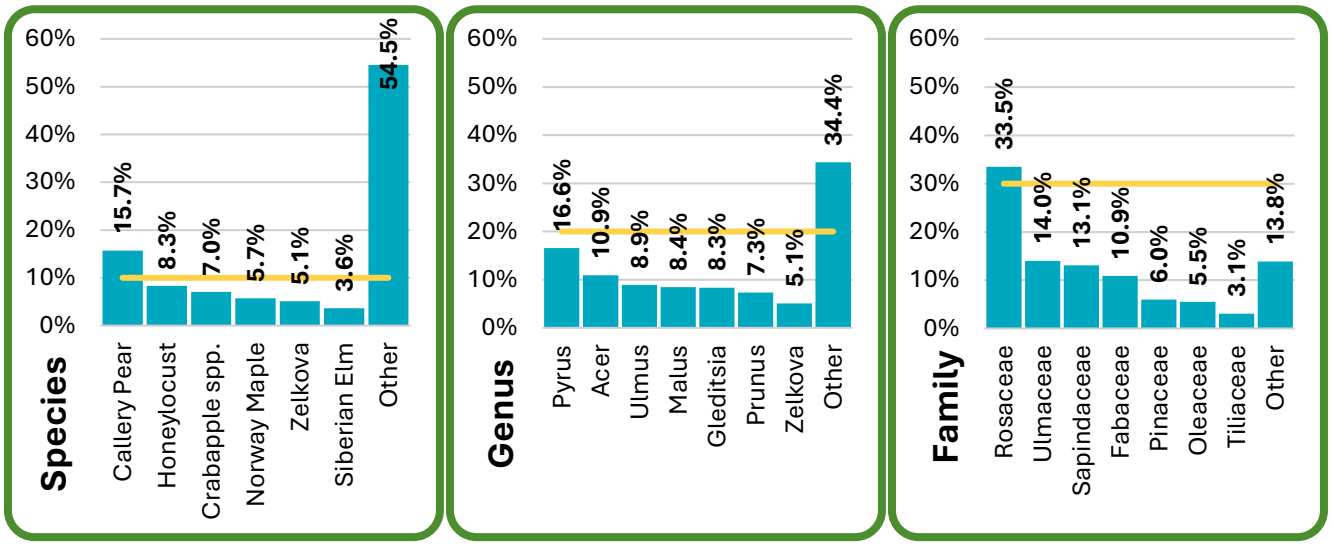


Figure 4 Diversity of South Salt Lake's public trees by Species (left), Genus (center), and Family (right), with target lines at 10%, 20%, and 30%.

Figure 5 A row of Honeylocust shading a South Salt Lake sidewalk.

Based on these results, it's recommended to limit the planting of trees in the *Rosaceae* familiy, especially the Callery pear

which has invasive qualities and is prohibited as a street tree in South Salt Lake along with the rest of the Pyrus genus. Honeylocust (Figure 5) is another extremely popular street tree due to its ability to weather harsh urban environments, but is close to making up 10% of the tree population in South Salt Lake and should only be used where other species wouldn't survive.

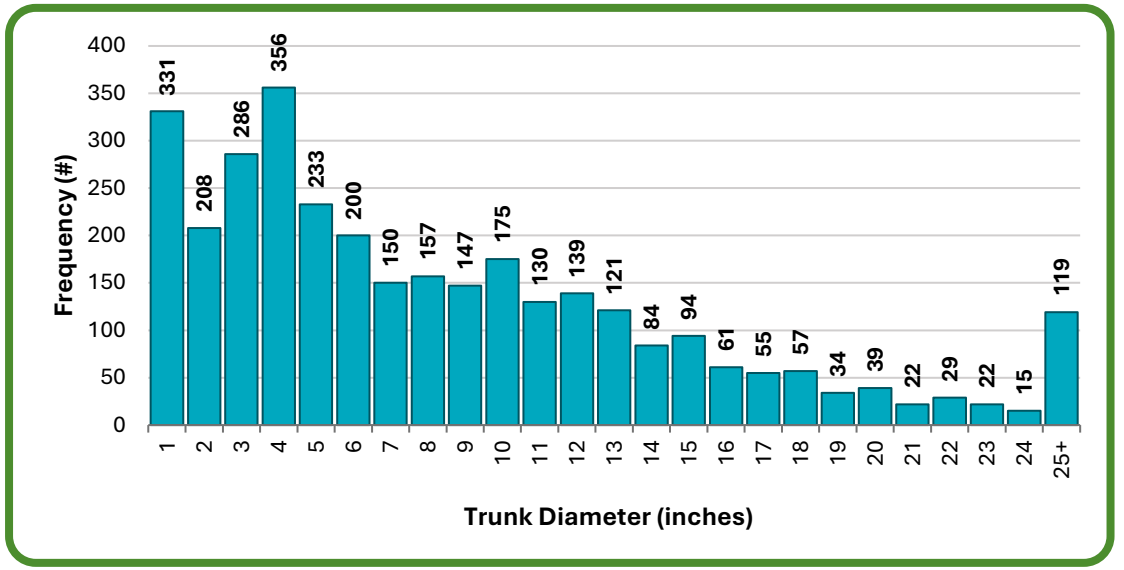


Figure 6 Diameter distribution of public trees inventoried in South Salt Lake.

Age Distribution

The diameter of a tree's trunk is used to represent its age, since a tree adds rings of wood to its trunk over time. The measurement is known as diameter at breast height (4.5' feet above the ground), or DBH, and each tree was measured with forester's diameter tape to the nearest inch. From the results seen in Figure 6, the largest number of trees have a diameter of 4" (n=356) followed by 1" (n=331). Since new trees are typically planted when they are 1"-2" in diameter, the data indicates that there was a large tree planting effort a few years ago which then ramped down, and then increased in the last year or two. South Salt Lake should continue planting trees to maintain its tree canopy, and increase the number of trees planted annually to reach its canopy expansion goals.

Overall Condition and Health

Tree condition was assessed to gauge the overall health of a tree, based on the structure and health of the root system, tree

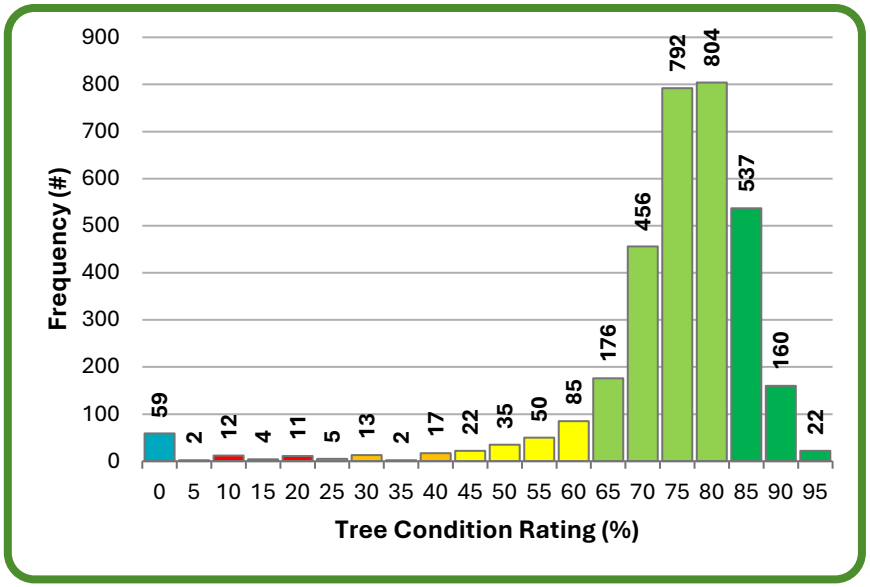


Figure 7 South Salt Lake public tree condition ratings using CTLA version 9 methodology.

trunk, main branches, twigs, foliage, and buds. Tree condition was rated using the Council of Tree and Landscape Appraisers (CTLA) version 9 method, which assigns a condition from 0 to 100 percent (Council of Tree and Landscape Appraisers 2000). Trees were rated into 5% categories, where 0% is dead and 100% is excellent with few to no observable health defects.

Looking at the condition ratings of South Salt Lake's public trees (Figure 7), 59 trees (1.8%) were found to be completely dead, but the majority of trees (84.9%) were rated 70% or higher; the average condition rating is 74.0%. The target overall tree condition rating is approximately 75%. With an average tree condition rating of 74.0%, South Salt Lake is showing that it is mostly proactive in its tree maintenance. The condition rating will improve towards the 75% benchmark as dead trees are removed, and maintenance practices are upheld and improved upon.

Up to three observed conditions of concern were documented for each tree (Figure 8). The majority of trees (75.8%) had no observed conditions of concern. This is a reflection of a young tree population free of defects that accumulate over time, and a well-managed tree population. The most frequently observed condition of concern was decay (n=404), followed by weak branch unions (n=170) and severed/damaged roots (n=99). 73 trees were documented as dead or with dead limbs, which are recommended for removal.

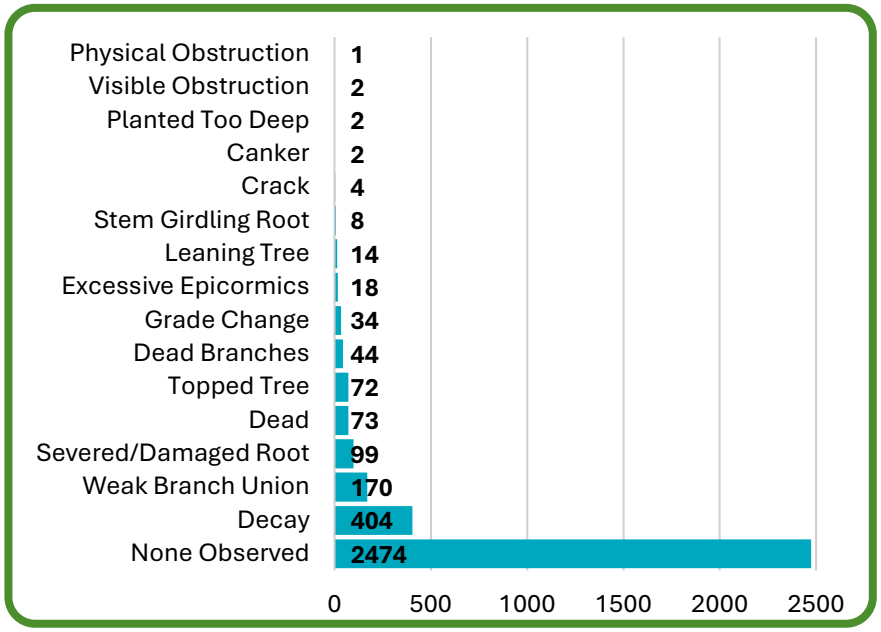


Figure 8 Conditions of concern observed in 2024. Note: trees could have multiple observed conditions.

Recommended Maintenance

The majority of inventoried trees (n=2,708, 81%) were not prescribed any recommended maintenance at the time of observation. Of those trees recommended for maintenance, the largest number (n=277) required clearance pruning for vehicle/pedestrian traffic or away from lights, signs, or other structures (Figure 9).

An almost equal number of trees were recommended for immediate removal or routine pruning (n=91 and 88, respectively), and 83 stumps were identified for removal. 65 trees did not have a maintenance assigned to them, but

exhibited characteristics which should be monitored for changes.

Whether or not a tree was recommended for maintenance, all trees should be cyclically inspected for changes to condition which would require action. Beyond routine inspections, trees should be assessed following major storm events to identify failures requiring immediate remediation.

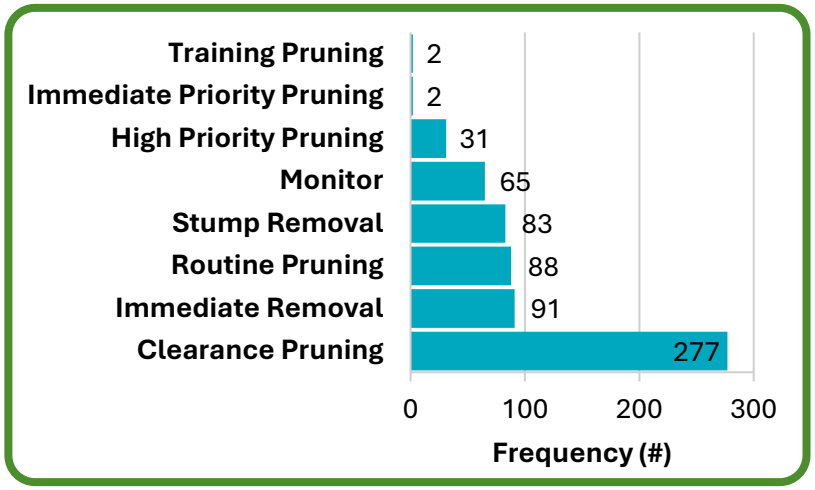


Figure 9 Recommended maintenance for inventoried trees. Note: 2,708 trees were not recommended maintenance at the time of inspection.

Utility Conflicts

80% of South Salt Lake's public trees had no conflict with utilities, or hardscape (95%), such as sidewalks, pavement, or curbs (Figure 10). Utility conflicts were identified either when visually observed in the field, by the presence of overhead conductors or access points to underground utilities, and by comparing inventoried tree points to an underground utility GIS layer. Since over 95% of the inventoried trees/stumps were located in the park strip or adjacent to a roadway (Figure 3), where both overhead and underground utilities are also commonly located, it is recommended to continue monitoring for utility and hardscape conflicts. In addition, it is recommended to adopt the "right tree, right place" approach to avoid conflicts in the future. This includes incorporating tree planting standards like space and soil volume minimums in future streetscape developments.

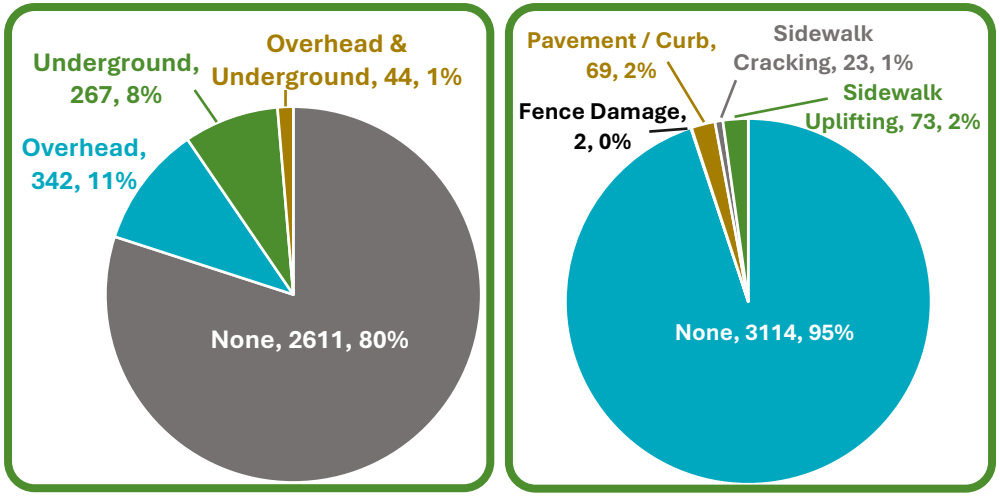


Figure 10 Breakdown of utility conflicts (left) and hardscape conflicts (right) observed with South Salt Lake's public trees.

Stocking Level

The stocking level refers to the proportion of existing street trees to the total number of potential street trees:

Stocking Level	=	Existing Street Trees	÷	Potential Street Trees	x	100%

Where Existing Street Trees are those located within park strips, open spaces adjacent to streets, medians, islands, and raised planters, and Potential Street Trees includes Existing Street Trees, inventoried planting sites, and inventoried locations with a stump.

From the 2024 inventory data, there are 3,193 Existing Street Trees and 3,749 Potential Street Trees (Existing Street Trees + 83 stumps + 473 identified planting sites), for a **Stocking Level of 85.2%**. A national municipal forestry survey found an average street tree stocking level of 81.5% ± 1.4 SEM (Hauer and Peterson 2016). The same survey also found an average of 0.27 ± 0.1 SEM street trees per capita. With a population of 26,777, South Salt Lake has an average of 0.12 street trees per capita and a maximum of 0.14 street trees per capita if all Potential Street Tree sites were filled. So while South Salt Lake is doing well at planting trees within the available planting sites along streets, there are not many available places to plant trees, per capita, when compared to other communities.

i-Tree Eco Analysis

Trees provide both ecological and aesthetic benefits, which can be quantified and balanced against the cost to maintain them. The i-Tree software suite analyzes an urban forest's extent and measured benefits to its community (USDA Forest Service n.d.); the software is provided free by the USDA Forest Service and is peer-reviewed by academics and forestry practitioners. Besides providing justification for tree management funding needs, an i-Tree Eco analysis also provides a snapshot against whether the forest or its associated benefits are growing or shrinking over time.

The 3,264-tree population was analyzed using i-Tree Eco V6.0.35. As a population, the inventoried trees in South Salt Lake's public areas have an estimated **$5.23 million replacement value** (Table 1). This means that to replace the tree population with a similar set of trees would cost approximately this amount. The inventoried public trees **intercept approximately 155.2 thousand gallons of storm water and help remove 821.2 pounds of air pollution annually**. A summary of results is seen in Table 1, and the full i-Tree Eco report is provided in Appendix C. The i-Tree report provides descriptions of additional benefits, potential tree pests, and a more in-depth look at South Salt Lake's public tree population.

Table 1. The functional and structural value of 3,264 public trees in South Salt Lake, as calculated by i-Tree Eco V6.0.35.

Ecosystem Metric	i-Tree Generated Value	Description	Method for Calculation
Tree Cover	20.81 acres	Amount of land covered by tree canopy.	Estimate generated from quantity of each tree species and tree size.
Pollution Removal	821.2 pounds/year ($1.42 thousand/ year)	Quantity and value of air pollutants removed from the atmosphere, including ozone, carbon monoxide, nitrogen dioxide, particulate matter <2.5 microns, particulate matter between 2.5 and 10 microns, and sulfur dioxide.	Estimated using field data and recent available pollution and weather data for the region.
Carbon Storage	860.2 tons ($147 thousand)	Carbon stored in a tree over its lifetime and released when it dies.	Quantity, species, and size of trees.
Carbon Sequestration	17.88 tons ($3.05 thousand/year)	Carbon sequestered as trees put on annual new growth, increases with the size and health of the tree.	Quantity, species, and size of trees.
Oxygen Production	47.68 tons/year	Creation of oxygen through photosynthesis.	Directly related to carbon sequestration, which is based on tree biomass.
Avoided Runoff	155.2 thousand gallons/year ($1.39 thousand/year)	Precipitation and its associated pollutants which enters waterways or is treated as wastewater. Trees intercept precipitation and promote its infiltration and storage in soil.	Estimated from tree biomass and local weather patterns.
Replacement Value	$5.23 million	Cost to replace trees with the same species, size, and condition.	Estimated based on local species factors, average replacement cost, transplantable size, and replacement prices

Summary

Public trees and tree planting sites along streets, in parks, and at city facilities in South Salt Lake were inventoried, with information collected on their species, size, and condition. In total, 3,264 trees, 83 stumps and 473 planting sites were inventoried. The Granite Legacy neighborhood had the highest number of trees, and the Jordan River neighborhood had the fewest. Callery pear were shown to be overplanted, making up over 15% of the tree population. An analysis of the tree population's age, represented by DBH (Diameter at Breast Height), shows that 36% of the trees are quite young with a DBH of 4" or less and that 84.9% had a CTLA condition rating of 70% or more. South Salt Lake has a street tree stocking level of 85.2%, but this may indicate an overall low number of suitable planting spaces.

An i-Tree Eco analysis revealed that the inventoried trees provided 20.81 acres of canopy coverage and have a $5.23 million replacement value. Annually, these trees produce 47.68 tons of oxygen (a $147,000 yearly value), sequester 17.88 tons of carbon (a $3,050 yearly value), and capture 155,200 gallons of storm runoff (a $1,390 yearly value).

Based on the information collected and analyzed on South Salt Lake's public tree population, the following are recommended:

- Increase the diversity of public tree plantings: avoid planting Callery pear, and plant honeylocust and crabapples only when other species are incompatible with the site.
- Continue planting and maintaining trees to increase canopy coverage, prioritizing areas with low canopy coverage, and replace trees as they decline and are removed.
- Identify how tree planting should be prioritized and set planting goals: by ease of planting, quality of planting site, heat index equality, or other metrics.
- Expand identification of locations to plant trees: planting sites along the public right-of way may not be sufficient to meet tree planting goals.

The inventory and assessment of South Salt Lake's public trees are an excellent start to understanding the status of the community forest. The companion Tree Canopy Assessment Report and Management Plan provide further insights into the extent of the community forest, and the best practices to manage it for the future.

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Appendix A – Tree and Planting Site Inventory Data Attributes

	Data Attribute	Description
Location Information	Site ID	Unique identifier composed of numbers and letters, assigned by software.
	Street Address	Street address of tree location; autopopulated from GIS file provided by the City.
	Latitude/Longitude	GPS coordinates of each tree's location.
	Planting Space Type	Description of the space: tree strip, paved tree strip, open, natural (unmaintained), median, island.
	Utility Conflicts	Presence of overhead and underground utilities within dripline of tree, as observed visually or by comparing to City-provided underground utility GIS layer.
	Hardscape Damage	≥½ inch damage: sidewalk cracking, sidewalk uplifting, fence damage, pavement/curb damage.
	Other Location Data	Autopopulated from City-provided GIS file: ▪ Neighborhood ▪ City property name (if applicable) ▪ Census tract ▪ Block group ▪ Zoning designation ▪ Council district
	Tree Planting Area Size[1]	Occular estimate, in ft^2, "999" entered if the site is open.
	Recommended Tree Size for Planting[1]	Using guidelines shared by the Salt Lake City Public Lands Department (Salt Lake City 2024): ▪ Small (<25' at maturity): overhead conductors ok, parkstrip ≥5' wide, no other above- or belowground space constraints ▪ Medium (<50' at maturity): no overhead conductors, parkstrip 5-8' wide ▪ Large (>50' at maturity): no overhead conductors, parkstrip ≥8' wide
Tree Information[2]	Common Name	Common name of the tree.
	Species, Genus, Family	Taxonomic name of the tree.
	DBH	Tree stem diameter measured at breast height (4.5' above the ground), measured with d-tape or Biltmore stick to the nearest inch.
	Crown Spread	Ocular estimate of crown width in two directions, in 5-foot increments.
	Height	Height of the tree, ocular estimate, in feet.
	Tree Condition	Rated 0-100% in 5% increments, following CTLA version 9 guidelines, where 0% = dead tree.
	Conditions of Concern	Significant health or structural defects: decay, crack, severed/damaged root, stem girdling root, planted too deep, grade change, weak branch union, canker, leaning, topped, excessive epicormics, dead, visible obstruction (of sign, traffic signal, streetlight), physical obstruction (of vehicles/pedestrians).

	Data Attribute	Description
Tree Information[2]	Recommended Maintenance	▪ Immediate removal (within 30 days) ▪ Immediate priority pruning (within 30 days) ▪ High priority pruning (within 1-6 months) ▪ Routine pruning (6-12 months) ▪ Training pruning: structural pruning of young trees ▪ Clearance pruning: clear limbs to 6' above sidewalks and 14' above streets ▪ Stump Removal ▪ Monitor: assess annually and after storm events ▪ No maintenance currently recommended
	TRAQ Risk Rating (Dunster, et al. 2017)	Likelihood of condition of concern to fail: improbable, possible, probable, imminent Likelihood of tree/part impacting target: very low, low, medium, high Consequence of failure: negligible, minor, significant, severe Tree risk rating: calculated from the above inputs and rated as low, moderate, high, or extreme
	Comments	Used as needed for documentation.

[1] Data attributes collected only for planting sites.

[2] Data attributes collected only for trees.

Appendix B – Frequency of Inventoried Trees by Species, Genus, and Family

Species (Common Name)	Frequency (#)	% of Total
Total	**3264**	**100**
Apple	45	1.4
Apricot	7	0.2
Arborvitae	25	0.8
Ash, Arizona	1	0.0
Ash, European	13	0.4
Ash, Green	78	2.4
Ash, White	51	1.6
Aspen	38	1.2
Baldcypress	2	0.1
Beech, European	8	0.2
Birch, European White	1	0.0
Birch, Western Water	1	0.0
Boxelder	35	1.1
Buckeye, Red	1	0.0
Buckthorn, Alder	4	0.1
Catalpa	17	0.5
Cedar, Atlas	1	0.0
Cedar, Deodar	20	0.6
Cedar, Rocky Mountain	12	0.4
Cherry sp.	1	0.0
Cherry, Japanese Flowering	57	1.7
Chokecherry	53	1.6
Corneliancherry Dogwood	1	0.0
Cottonwood, Eastern	14	0.4
Cottonwood, Fremont	15	0.5
Cottonwood, Plains	1	0.0

Species (Common Name)	Frequency (#)	% of Total
Crabapple species	230	7.0
Cypress sp.	1	0.0
Desertwillow	1	0.0
Douglas-fir	2	0.1
Elm Species	30	0.9
Elm, American	48	1.5
Elm, English	24	0.7
Elm, Frontier	50	1.5
Elm, Lacebark	21	0.6
Elm, Siberian	119	3.6
European Mountain-Ash	1	0.0
Giant Sequoia	6	0.2
Ginkgo	2	0.1
Goldenrain	70	2.1
Hackberry, Common	40	1.2
Hawthorn sp.	26	0.8
Hazelnut sp.	1	0.0
Holly	1	0.0
Honeylocust	272	8.3
Hornbeam, American	10	0.3
Hornbeam, European	2	0.1
Horsechestnut	7	0.2
Horsechestnut, Red	1	0.0
Incense-Cedar	1	0.0
Japanese Pagoda Tree	8	0.2
Japanese Tree Lilac	18	0.6
Juniper, Rocky Mountain	9	0.3

Species (Common Name)	Frequency (#)	% of Total
Kentucky Coffeetree	8	0.2
Lilac, Common	14	0.4
Lilac, Peking	6	0.2
Linden, American	26	0.8
Linden, Littleleaf	74	2.3
Locust, Black	12	0.4
London Plane	72	2.2
Magnolia species	3	0.1
Maple, Amur	41	1.3
Maple, Bigtooth	25	0.8
Maple, Freeman	24	0.7
Maple, Hedge	1	0.0
Maple, Japanese	14	0.4
Maple, Norway	186	5.7
Maple, Red	8	0.2
Maple, Rocky Mountain	1	0.0
Maple, Shantung	2	0.1
Maple, Silver	5	0.2
Maple, State Street Miyabe	11	0.3
Maple, Sugar	3	0.1
Maple, Vine	1	0.0
Mimosa	1	0.0
Mulberry, Fruitless	23	0.7
Oak, Bur	11	0.3
Oak, Chinquapin	5	0.2
Oak, English	2	0.1
Oak, Gambel	3	0.1

Species (Common Name)	Frequency (#)	% of Total
Oak, Northern Red	4	0.1
Oak, Pin	1	0.0
Oak, Swamp White	5	0.2
Oak, Valley	1	0.0
Peach	11	0.3
Pear Species	30	0.9
Pear, Callery	511	15.7
Persimmon	1	0.0
Pine, Austrian	82	2.5
Pine, Japanese Black	1	0.0
Pine, Lodgepole	6	0.2
Pine, Mugo	6	0.2
Pine, Pinyon	3	0.1
Pine, Ponderosa	8	0.2
Pine, Scots	6	0.2
Pine, White	2	0.1
Plum sp.	27	0.8
Plum, Purpleleaf	83	2.5
Poplar, Lombardy	1	0.0
Redbud, Eastern	53	1.6
Serviceberry	12	0.4
Smoketree	7	0.2
Spanish Broom	2	0.1
Spruce, Blue	47	1.4
Spruce, Engelmann	1	0.0
Spruce, Norway	21	0.6
Spruce, White	11	0.3
Sweetgum	9	0.3
Tree of Heaven	22	0.7
Tulip Poplar	11	0.3

Species (Common Name)	Frequency (#)	% of Total
Walnut, Black	1	0.0
Willow, Bay	2	0.1
Willow, Bebbs	1	0.0
Willow, Weeping	2	0.1
Willow, White	20	0.6
Yew, Japanese	2	0.1
Zelkova	166	5.1
Stumps	83	N/A

Genus	Frequency (#)	% of Total
Total	**3264**	**100.0**
Acer	357	10.9
Aesculus	9	0.3
Ailanthus	22	0.7
Albizia	1	0.0
Amelanchier	12	0.4
Betula	2	0.1
Calocedrus	1	0.0
Carpinus	12	0.4
Catalpa	17	0.5
Cedrus	21	0.6
Celtis	40	1.2
Cercis	53	1.6
Chamaecyparis	1	0.0
Chilopsis	1	0.0
Cornus	1	0.0
Corylus	1	0.0
Cotinus	7	0.2
Crataegus	26	0.8
Diospyros	1	0.0

Genus	Frequency (#)	% of Total
Fagus	8	0.2
Frangula	4	0.1
Fraxinus	143	4.4
Ginkgo	2	0.1
Gleditsia	272	8.3
Gymnocladus	8	0.2
Ilex	1	0.0
Juglans	1	0.0
Juniperus	21	0.6
Koelreuteria	70	2.1
Liquidambar	9	0.3
Liriodendron	11	0.3
Magnolia	3	0.1
Malus	275	8.4
Morus	23	0.7
Picea	80	2.5
Pinus	114	3.5
Platanus	71	2.2
Platanus	1	0.0
Populus	69	2.1
Prunus	239	7.3
Pseudotsuga	2	0.1
Pyrus	541	16.6
Quercus	32	1.0
Robinia	12	0.4
Salix	25	0.8
Sequoiadendron	6	0.2
Sorbus	1	0.0
Spartinum	2	0.1
Styphnolobium	8	0.2

Genus	Frequency (#)	% of Total
Syringa	38	1.2
Taxodium	2	0.1
Taxus	2	0.1
Thuja	25	0.8
Tilia	100	3.1
Ulmus	292	8.9
Zelkova	166	5.1
Stump	83	N/A

Family	Frequency (#)	% of Total
Total	**3264**	**100.0**
Anacardiaceae	7	0.2
Aquifoliaceae	1	0.0
Betulaceae	15	0.5
Bignoniaceae	18	0.6
Cannabaceae	40	1.2
Cornaceae	1	0.0
Cupressaceae	69	2.1
Ebenaceae	1	0.0
Fabaceae	356	10.9
Fagaceae	40	1.2
Ginkgo	2	0.1
Hamamelidaceae	9	0.3
Hippocastanaceae	9	0.3
Juglandaceae	1	0.0
Magnoliaceae	14	0.4
Moraceae	23	0.7
Oleaceae	181	5.5
Pinaceae	196	6.0
Plantanaceae	72	2.2
Rhamnaceae	4	0.1
Rosaceae	1094	33.5
Salicaceae	94	2.9
Sapindaceae	427	13.1
Simaroubaceae	22	0.7
Taxaceae	2	0.1
Taxodiaceae	8	0.2
Tiliaceae	100	3.1
Ulmaceae	458	14.0
Stump	83	N/A

Appendix C: i-Tree Eco Report

i-Tree
Ecosystem Analysis

SSL 2024 Tree Inventory

Urban Forest Effects and Values
December 2024

Summary

Understanding an urban forest's structure, function and value can promote management decisions that will improve human health and environmental quality. An assessment of the vegetation structure, function, and value of the SSL 2024 Tree Inventory urban forest was conducted during 2024. Data from 3264 trees located throughout SSL 2024 Tree Inventory were analyzed using the i-Tree Eco model developed by the U.S. Forest Service, Northern Research Station.

- Number of trees: 3,264
- Tree Cover: 20.81 acres
- Most common species of trees: Callery pear, Honeylocust, European crabapple
- Percentage of trees less than 6" (15.2 cm) diameter: 49.3%
- Pollution Removal: 821.2 pounds/year ($1.42 thousand/year)
- Carbon Storage: 860.2 tons ($147 thousand)
- Carbon Sequestration: 17.88 tons ($3.05 thousand/year)
- Oxygen Production: 47.68 tons/year
- Avoided Runoff: 155.2 thousand gallon/year ($1.39 thousand/year)
- Building energy savings: N/A – data not collected
- Avoided carbon emissions: N/A – data not collected
- Replacement values: $5.23 million

Ton: short ton (U.S.) (2,000 lbs)
Monetary values $ are reported in US Dollars throughout the report except where noted.
Ecosystem service estimates are reported for trees.
With Complete Inventory Projects, oxygen production is estimated from gross carbon sequestration and does not account for decomposition. Oxygen production in Plot Inventory Projects is estimated from net carbon sequestration.

For an overview of i-Tree Eco methodology, see Appendix I. Data collection quality is determined by the local data collectors, over which i-Tree has no control.

Table of Contents

I. Tree Characteristics of the Urban Forest

The urban forest of SSL 2024 Tree Inventory has 3,264 trees with a tree cover of Callery pear. The three most common species are Callery pear (15.7 percent), Honeylocust (8.3 percent), and European crabapple (7.0 percent).

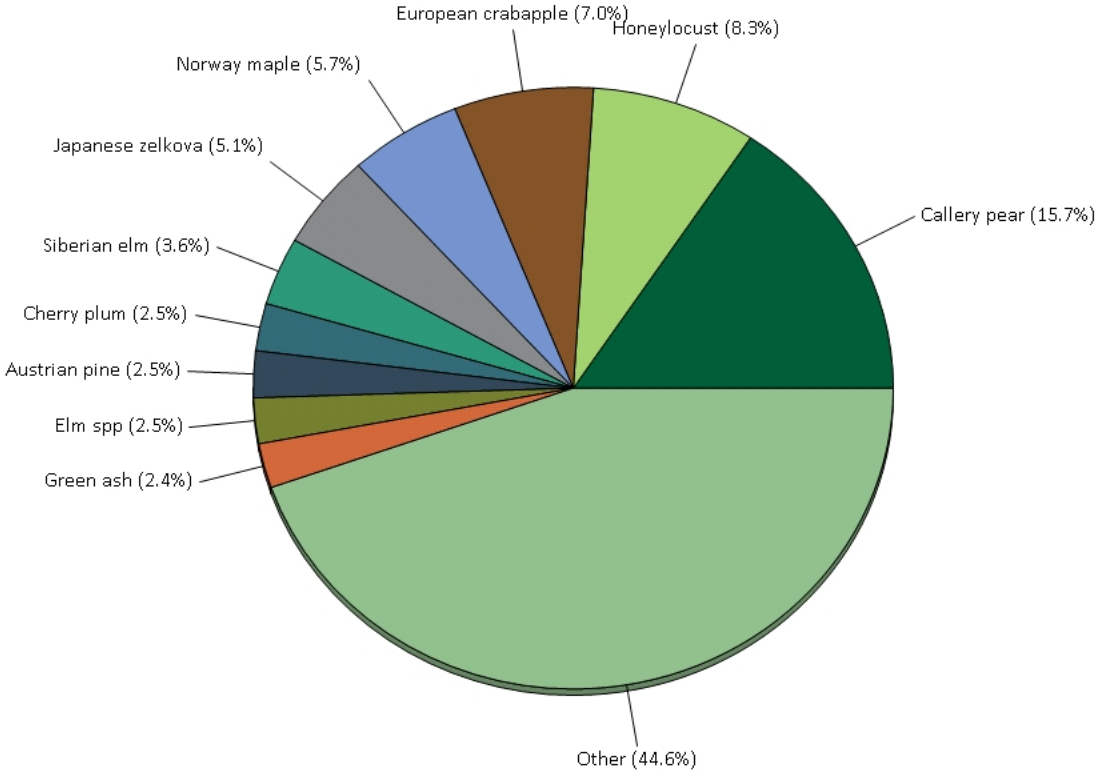


Figure 1. Tree species composition in SSL 2024 Tree Inventory

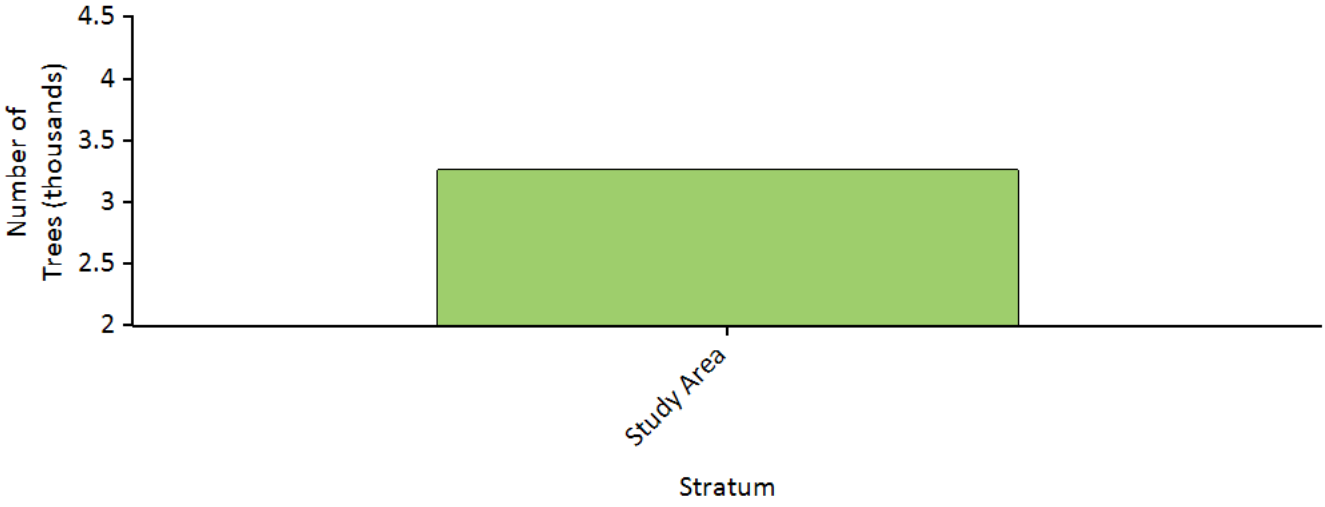


Figure 2. Number of trees in SSL 2024 Tree Inventory by stratum

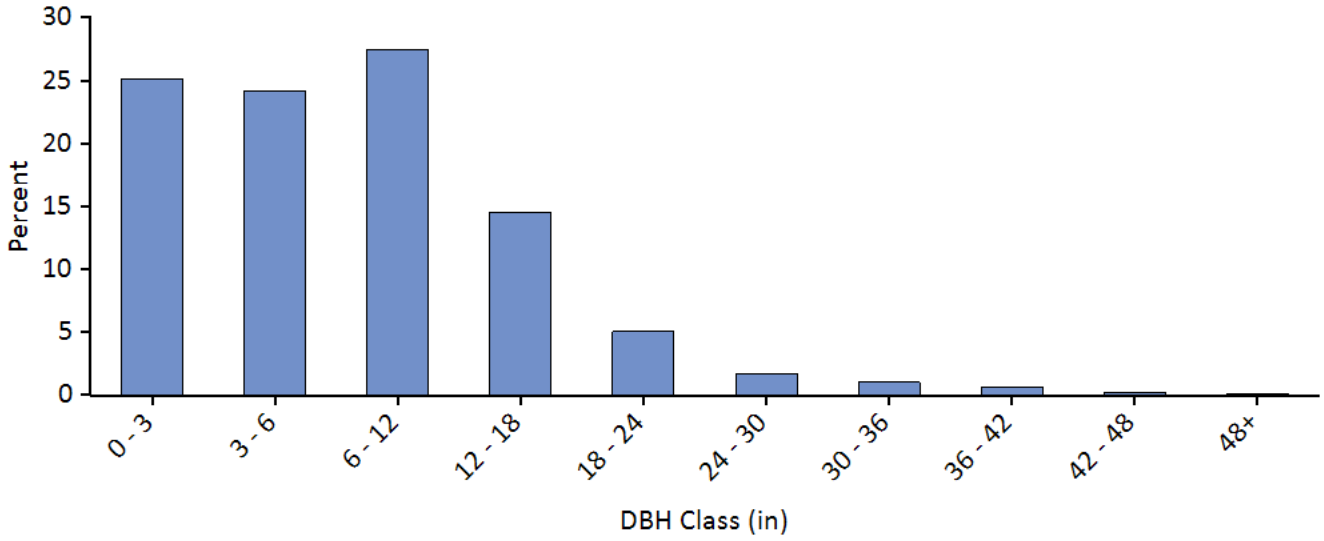


Figure 3. Percent of tree population by diameter class (DBH - stem diameter at 4.5 feet)

Urban forests are composed of a mix of native and exotic tree species. Thus, urban forests often have a tree diversity that is higher than surrounding native landscapes. Increased tree diversity can minimize the overall impact or destruction by a species-specific insect or disease, but it can also pose a risk to native plants if some of the exotic species are invasive plants that can potentially out-compete and displace native species. In SSL 2024 Tree Inventory, about 33 percent of the trees are species native to North America, while 10 percent are native to Utah. Species exotic to North America make up 67 percent of the population. Most exotic tree species have an origin from Asia (35 percent of the species).

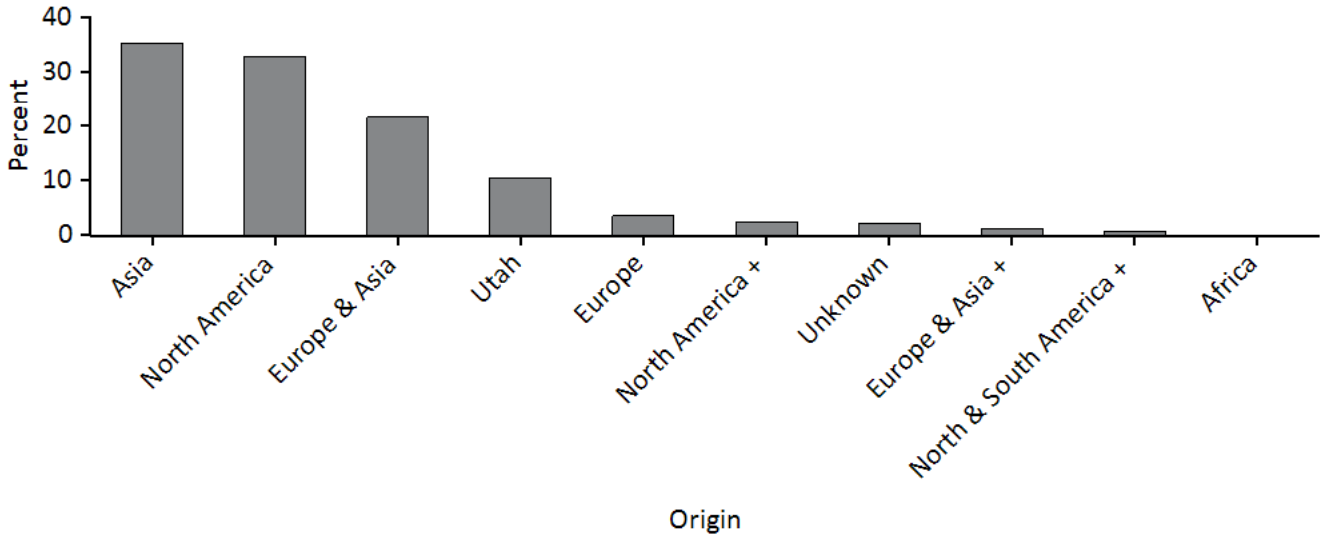


Figure 4. Percent of live tree population by area of native origin, SSL 2024 Tree Inventory

The plus sign (+) indicates the tree species is native to another continent other than the ones listed in the grouping.

Invasive plant species are often characterized by their vigor, ability to adapt, reproductive capacity, and general lack of natural enemies. These abilities enable them to displace native plants and make them a threat to natural areas. One of the 114 tree species in SSL 2024 Tree Inventory are identified as invasive on the state invasive species list (Arizona Wildland Invasive Plant Working Group 2005; Colorado Weed Management Association; Stoddard et al). This invasive species (Siberian elm) comprises 3.6 percent of the tree population though it may only cause a minimal level of impact (see Appendix V for a complete list of invasive species).

II. Urban Forest Cover and Leaf Area

Many tree benefits equate directly to the amount of healthy leaf surface area of the plant. Trees cover about 20.81 acres of SSL 2024 Tree Inventory and provide 88.6 acres of leaf area.

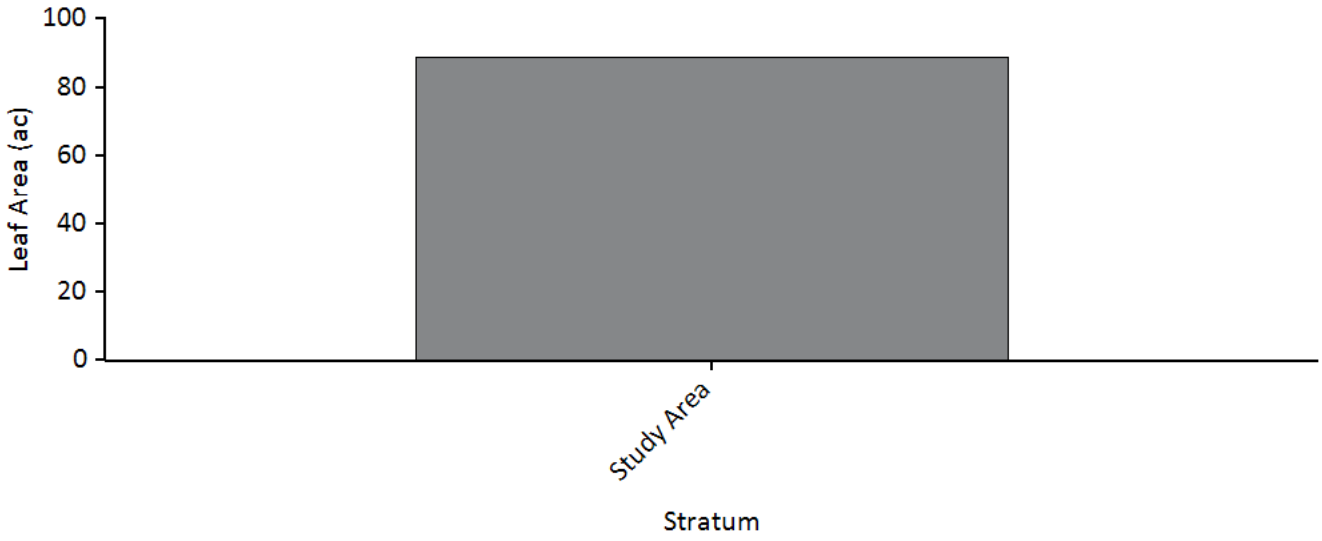


Figure 5. Leaf area by stratum, SSL 2024 Tree Inventory

In SSL 2024 Tree Inventory, the most dominant species in terms of leaf area are Callery pear, Honeylocust, and Green ash. The 10 species with the greatest importance values are listed in Table 1. Importance values (IV) are calculated as the sum of percent population and percent leaf area. High importance values do not mean that these trees should necessarily be encouraged in the future; rather these species currently dominate the urban forest structure.

Table 1. Most important species in SSL 2024 Tree Inventory

Species Name	*Percent Population*	*Percent Leaf Area*	*IV*
Callery pear	15.7	15.5	31.2
Honeylocust	8.3	13.8	22.2
Green ash	2.4	11.0	13.4
Siberian elm	3.6	9.6	13.3
Norway maple	5.7	3.7	9.4
European crabapple	7.0	2.2	9.3
Japanese zelkova	5.1	2.0	7.1
Austrian pine	2.5	4.3	6.8
Littleleaf linden	2.3	2.9	5.2
Goldenrain tree	2.1	2.7	4.9

Common ground cover classes (including cover types beneath trees and shrubs) in SSL 2024 Tree Inventory are not available since they are configured not to be collected.

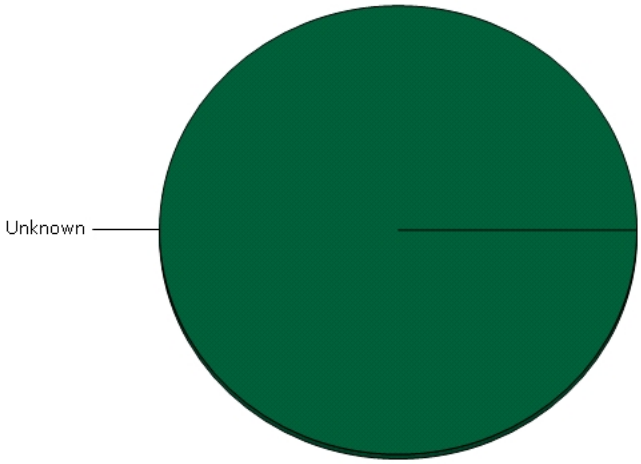


Figure 6. Percent of land by ground cover classes, SSL 2024 Tree Inventory

III. Air Pollution Removal by Urban Trees

Poor air quality is a common problem in many urban areas. It can lead to decreased human health, damage to landscape materials and ecosystem processes, and reduced visibility. The urban forest can help improve air quality by reducing air temperature, directly removing pollutants from the air, and reducing energy consumption in buildings, which consequently reduces air pollutant emissions from the power sources. Trees also emit volatile organic compounds that can contribute to ozone formation. However, integrative studies have revealed that an increase in tree cover leads to reduced ozone formation (Nowak and Dwyer 2000).

Pollution removal[1] by trees in SSL 2024 Tree Inventory was estimated using field data and recent available pollution and weather data available. Pollution removal was greatest for ozone (Figure 7). It is estimated that trees remove 821.2 pounds of air pollution (ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), particulate matter less than 2.5 microns (PM2.5), particulate matter less than 10 microns and greater than 2.5 microns (PM10*)[2], and sulfur dioxide (SO2)) per year with an associated value of $1.42 thousand (see Appendix I for more details).

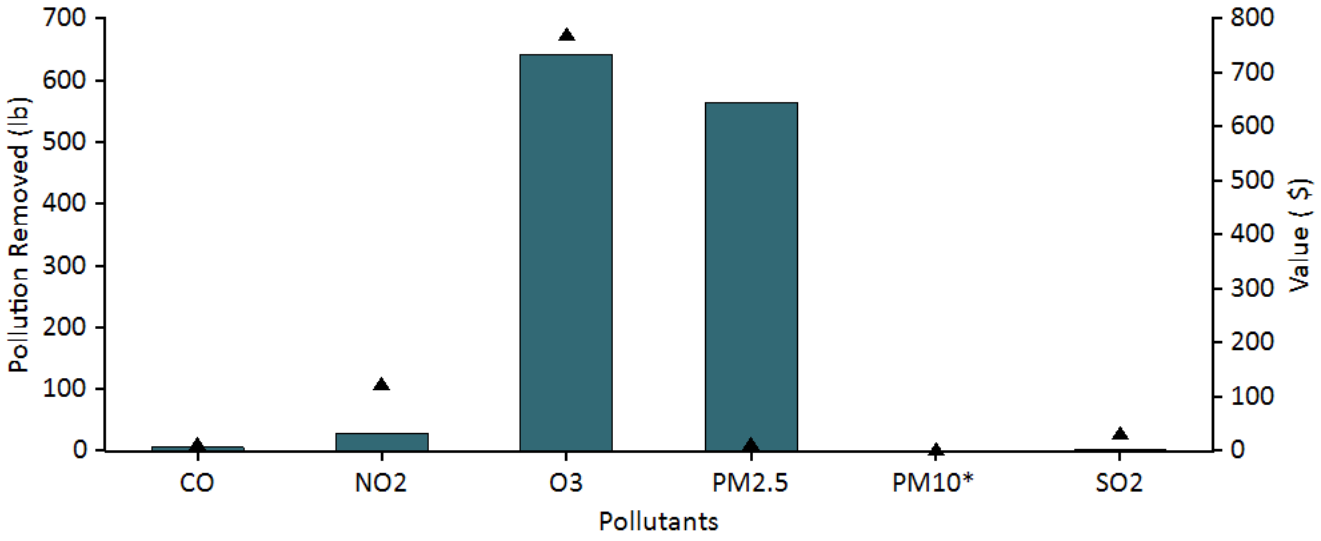


Figure 7. Annual pollution removal (points) and value (bars) by urban trees, SSL 2024 Tree Inventory

[1] PM10* is particulate matter less than 10 microns and greater than 2.5 microns. PM2.5 is particulate matter less than 2.5 microns. If PM2.5 is not monitored, PM10* represents particulate matter less than 10 microns. PM2.5 is generally more relevant in discussions concerning air pollution effects on human health.

[2] Trees remove PM2.5 and PM10* when particulate matter is deposited on leaf surfaces. This deposited PM2.5 and PM10* can be resuspended to the atmosphere or removed during rain events and dissolved or transferred to the soil. This combination of events can lead to positive or negative pollution removal and value depending on various atmospheric factors (see Appendix I for more details).

In 2024, trees in SSL 2024 Tree Inventory emitted an estimated 379 pounds of volatile organic compounds (VOCs) (151.6 pounds of isoprene and 227.3 pounds of monoterpenes). Emissions vary among species based on species characteristics (e.g. some genera such as oaks are high isoprene emitters) and amount of leaf biomass. Twenty- three percent of the urban forest's VOC emissions were from Blue spruce and White willow. These VOCs are precursor chemicals to ozone formation.[3]

General recommendations for improving air quality with trees are given in Appendix VIII.

[3] Some economic studies have estimated VOC emission costs. These costs are not included here as there is a tendency to add positive dollar estimates of ozone removal effects with negative dollar values of VOC emission effects to determine whether tree effects are positive or negative in relation to ozone. This combining of dollar values to determine tree effects should not be done, rather estimates of VOC effects on ozone formation (e.g., via photochemical models) should be conducted and directly contrasted with ozone removal by trees (i.e., ozone effects should be directly compared, not dollar estimates). In addition, air temperature reductions by trees have been shown to significantly reduce ozone concentrations (Cardelino and Chameides 1990; Nowak et al 2000), but are not considered in this analysis. Photochemical modeling that integrates tree effects on air temperature, pollution removal, VOC emissions, and emissions from power plants can be used to determine the overall effect of trees on ozone concentrations.

IV. Carbon Storage and Sequestration

Climate change is an issue of global concern. Urban trees can help mitigate climate change by sequestering atmospheric carbon (from carbon dioxide) in tissue and by altering energy use in buildings, and consequently altering carbon dioxide emissions from fossil-fuel based power sources (Abdollahi et al 2000).

Trees reduce the amount of carbon in the atmosphere by sequestering carbon in new growth every year. The amount of carbon annually sequestered is increased with the size and health of the trees. The gross sequestration of SSL 2024 Tree Inventory trees is about 17.88 tons of carbon per year with an associated value of $3.05 thousand. See Appendix I for more details on methods.

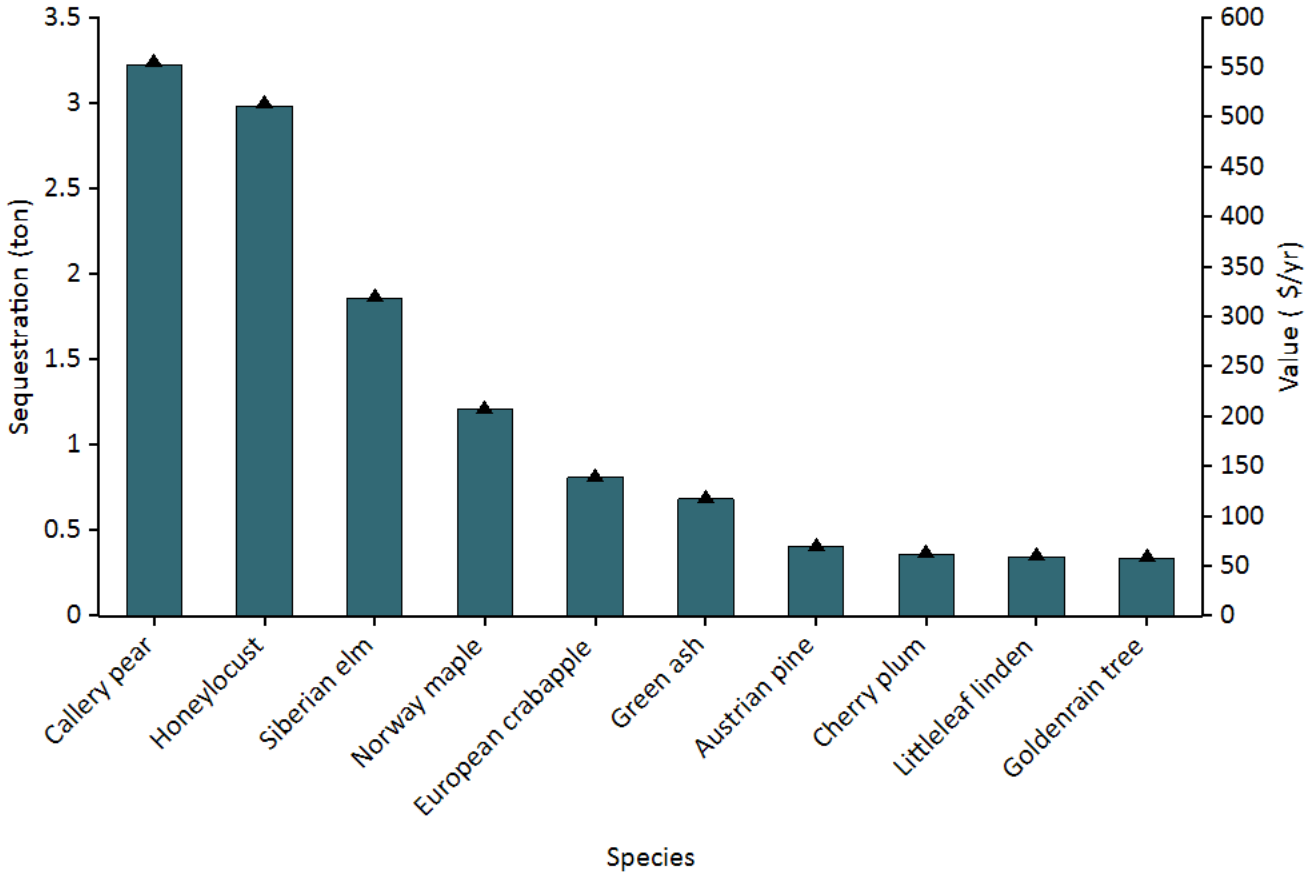


Figure 8. Estimated annual gross carbon sequestration (points) and value (bars) for urban tree species with the greatest sequestration, SSL 2024 Tree Inventory

Carbon storage is another way trees can influence global climate change. As a tree grows, it stores more carbon by holding it in its accumulated tissue. As a tree dies and decays, it releases much of the stored carbon back into the atmosphere. Thus, carbon storage is an indication of the amount of carbon that can be released if trees are allowed to die and decompose. Maintaining healthy trees will keep the carbon stored in trees, but tree maintenance can contribute to carbon emissions (Nowak et al 2002c). When a tree dies, using the wood in long-term wood products, to heat buildings, or to produce energy will help reduce carbon emissions from wood decomposition or from fossil-fuel or wood-based power plants.

Trees in SSL 2024 Tree Inventory are estimated to store 860 tons of carbon ($147 thousand). Of the species sampled,

Siberian elm stores the most carbon (approximately 17.2% of the total carbon stored) and Callery pear sequesters the most (approximately 18.1% of all sequestered carbon.)

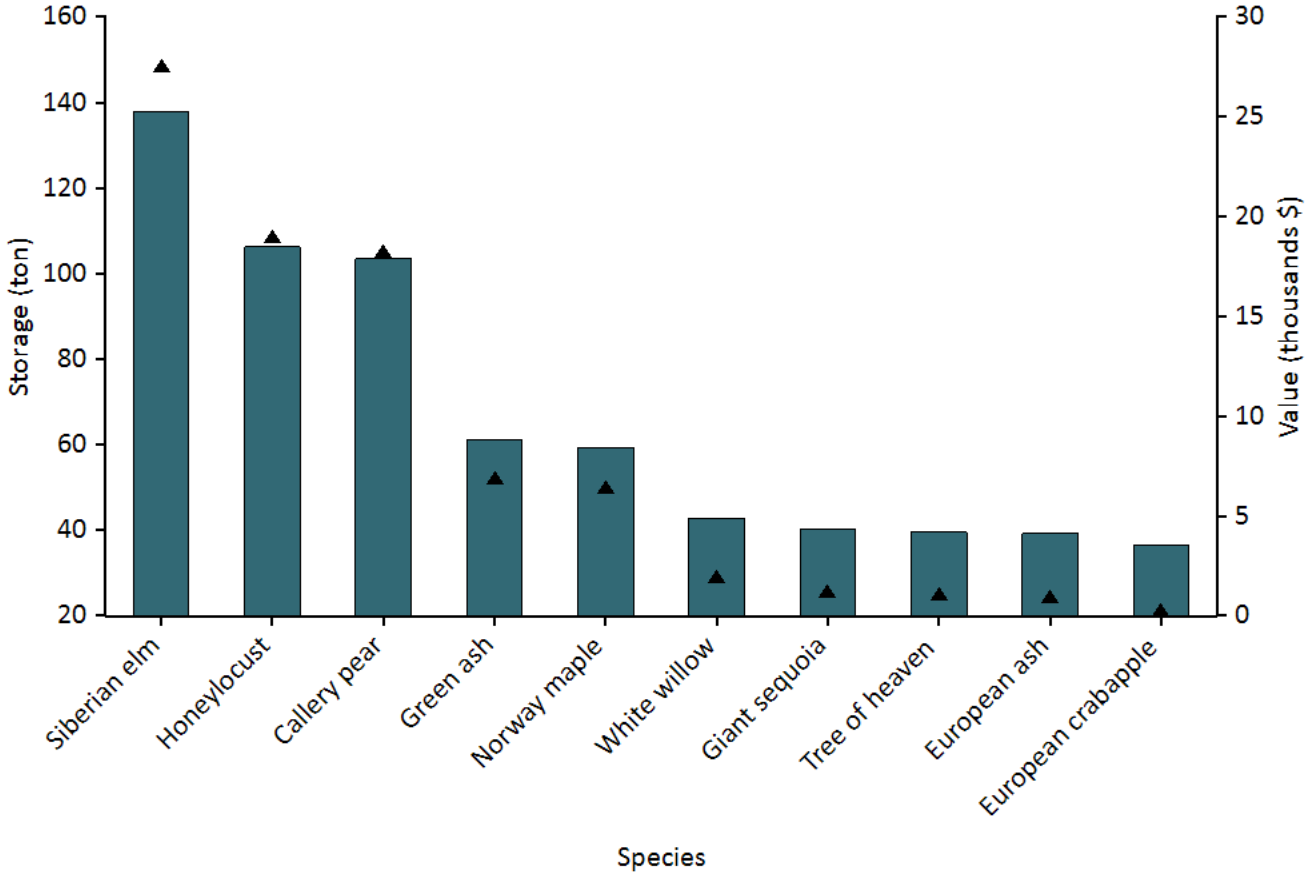


Figure 9. Estimated carbon storage (points) and values (bars) for urban tree species with the greatest storage, SSL 2024 Tree Inventory

V. Oxygen Production

Oxygen production is one of the most commonly cited benefits of urban trees. The annual oxygen production of a tree is directly related to the amount of carbon sequestered by the tree, which is tied to the accumulation of tree biomass.

Trees in SSL 2024 Tree Inventory are estimated to produce 47.68 tons of oxygen per year.[4] However, this tree benefit is relatively insignificant because of the large and relatively stable amount of oxygen in the atmosphere and extensive production by aquatic systems. Our atmosphere has an enormous reserve of oxygen. If all fossil fuel reserves, all trees, and all organic matter in soils were burned, atmospheric oxygen would only drop a few percent (Broecker 1970).

Table 2. The top 20 oxygen production species.

Species	*Oxygen (ton)*	*Gross Carbon Sequestration (pound/yr)*	*Number of Trees*	*Leaf Area (acre)*
Callery pear	8.63	6,468.87	511	13.77
Honeylocust	7.99	5,991.87	272	12.25
Siberian elm	4.97	3,726.97	119	8.52
Norway maple	3.23	2,422.55	186	3.29
European crabapple	2.17	1,627.94	230	1.96
Green ash	1.83	1,372.50	78	9.73
Austrian pine	1.09	817.50	82	3.80
Cherry plum	0.97	727.90	83	1.42
Littleleaf linden	0.93	695.12	74	2.57
Goldenrain tree	0.91	681.28	70	2.41
White mulberry	0.84	631.11	23	1.44
European ash	0.83	621.60	13	1.58
White willow	0.72	537.66	20	1.51
American elm	0.66	493.41	48	1.11
London planetree	0.61	456.82	72	2.28
Tree of heaven	0.59	442.92	22	0.95
Japanese zelkova	0.56	422.48	166	1.80
Boxelder	0.55	415.77	35	0.99
Common chokecherry	0.53	396.82	53	0.31
Blue spruce	0.51	379.35	47	1.85

VI. Avoided Runoff

Surface runoff can be a cause for concern in many urban areas as it can contribute pollution to streams, wetlands, rivers, lakes, and oceans. During precipitation events, some portion of the precipitation is intercepted by vegetation (trees and shrubs) while the other portion reaches the ground. The portion of the precipitation that reaches the ground and does not infiltrate into the soil becomes surface runoff (Hirabayashi 2012). In urban areas, the large extent of impervious surfaces increases the amount of surface runoff.

Urban trees and shrubs, however, are beneficial in reducing surface runoff. Trees and shrubs intercept precipitation, while their root systems promote infiltration and storage in the soil. The trees and shrubs of SSL 2024 Tree Inventory help to reduce runoff by an estimated 155 thousand gallons a year with an associated value of $1.4 thousand (see Appendix I for more details). Avoided runoff is estimated based on local weather from the user-designated weather station. In SSL 2024 Tree Inventory, the total annual precipitation in 2021 was 15.4 inches.

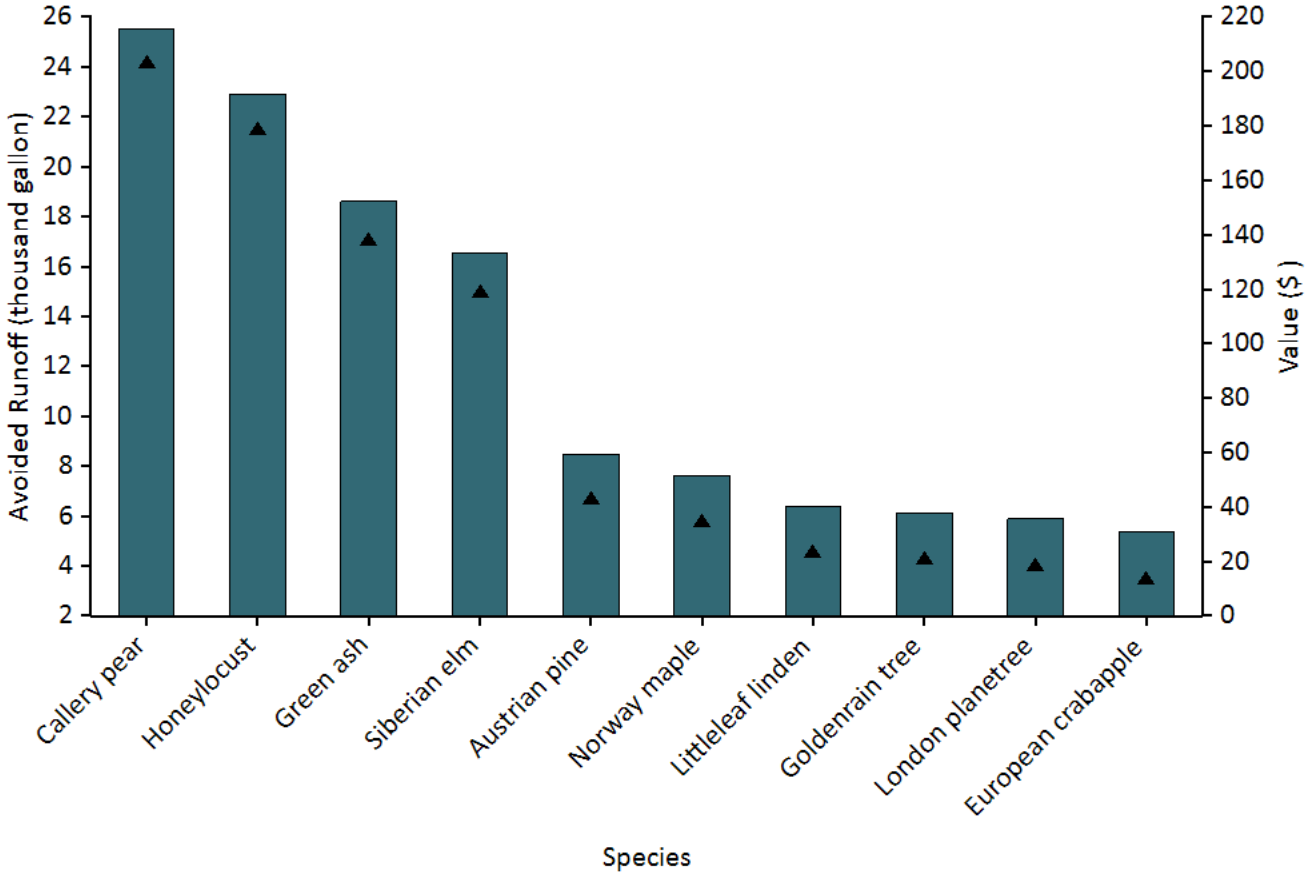


Figure 10. Avoided runoff (points) and value (bars) for species with greatest overall impact on runoff, SSL 2024 Tree Inventory

VII. Trees and Building Energy Use

Trees affect energy consumption by shading buildings, providing evaporative cooling, and blocking winter winds. Trees tend to reduce building energy consumption in the summer months and can either increase or decrease building energy use in the winter months, depending on the location of trees around the building. Estimates of tree effects on energy use are based on field measurements of tree distance and direction to space conditioned residential buildings (McPherson and Simpson 1999).

Because energy-related data were not collected, energy savings and carbon avoided cannot be calculated.

Table 3. Annual energy savings due to trees near residential buildings, SSL 2024 Tree Inventory

	Heating	*Cooling*	*Total*
MBTU[a]	0	N/A	0
MWH[b]	0	0	0
Carbon Avoided (pounds)	0	0	0

[a]MBTU - one million British Thermal Units

[b]MWH - megawatt-hour

Table 4. Annual savings [a]($) in residential energy expenditure during heating and cooling seasons, SSL 2024 Tree Inventory

	Heating	*Cooling*	*Total*
MBTU[b]	0	N/A	0
MWH[c]	0	0	0
Carbon Avoided	0	0	0

[b]Based on the prices of $103.5 per MWH and $9.37580002624597 per MBTU (see Appendix I for more details)

[c]MBTU - one million British Thermal Units

[c]MWH - megawatt-hour

[5] Trees modify climate, produce shade, and reduce wind speeds. Increased energy use or costs are likely due to these tree-building interactions creating a cooling effect during the winter season. For example, a tree (particularly evergreen species) located on the southern side of a residential building may produce a shading effect that causes increases in heating requirements.

VIII. Replacement and Functional Values

Urban forests have a replacement value based on the trees themselves (e.g., the cost of having to replace a tree with a similar tree); they also have functional values (either positive or negative) based on the functions the trees perform.

The replacement value of an urban forest tends to increase with a rise in the number and size of healthy trees (Nowak et al 2002a). Annual functional values also tend to increase with increased number and size of healthy trees. Through proper management, urban forest values can be increased; however, the values and benefits also can decrease as the amount of healthy tree cover declines.

Urban trees in SSL 2024 Tree Inventory have the following replacement values:

- Replacement value: $5.23 million
- Carbon storage: $147 thousand

Urban trees in SSL 2024 Tree Inventory have the following annual functional values:

- Carbon sequestration: $3.05 thousand
- Avoided runoff: $1.39 thousand
- Pollution removal: $1.42 thousand
- Energy costs and carbon emission values: $0

(Note: negative value indicates increased energy cost and carbon emission value)

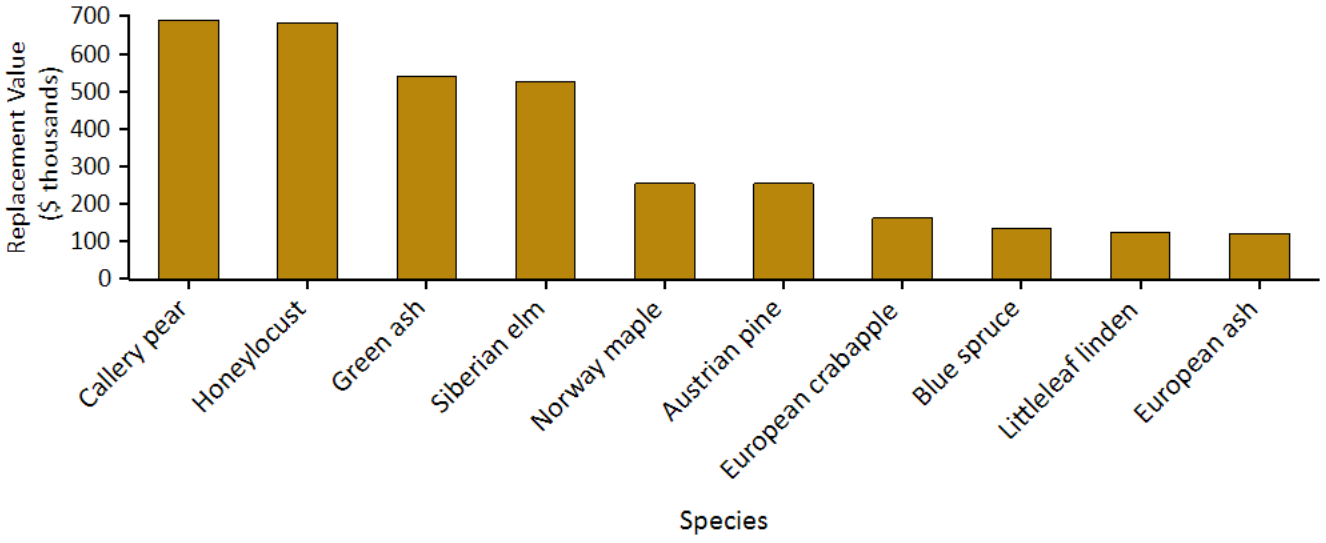


Figure 11. Tree species with the greatest replacement value, SSL 2024 Tree Inventory

IX. Potential Pest Impacts

Various insects and diseases can infest urban forests, potentially killing trees and reducing the health, replacement value and sustainability of the urban forest. As pests tend to have differing tree hosts, the potential damage or risk of each pest will differ among cities.Fifty-three pests were analyzed for their potential impact and compared with pest range maps (Forest Health Technology Enterprise Team 2014) for the conterminous United States to determine their proximity to Salt Lake County. Fourteen of the fifty-three pests analyzed are located within the county. For a complete analysis of all pests, see Appendix VII.

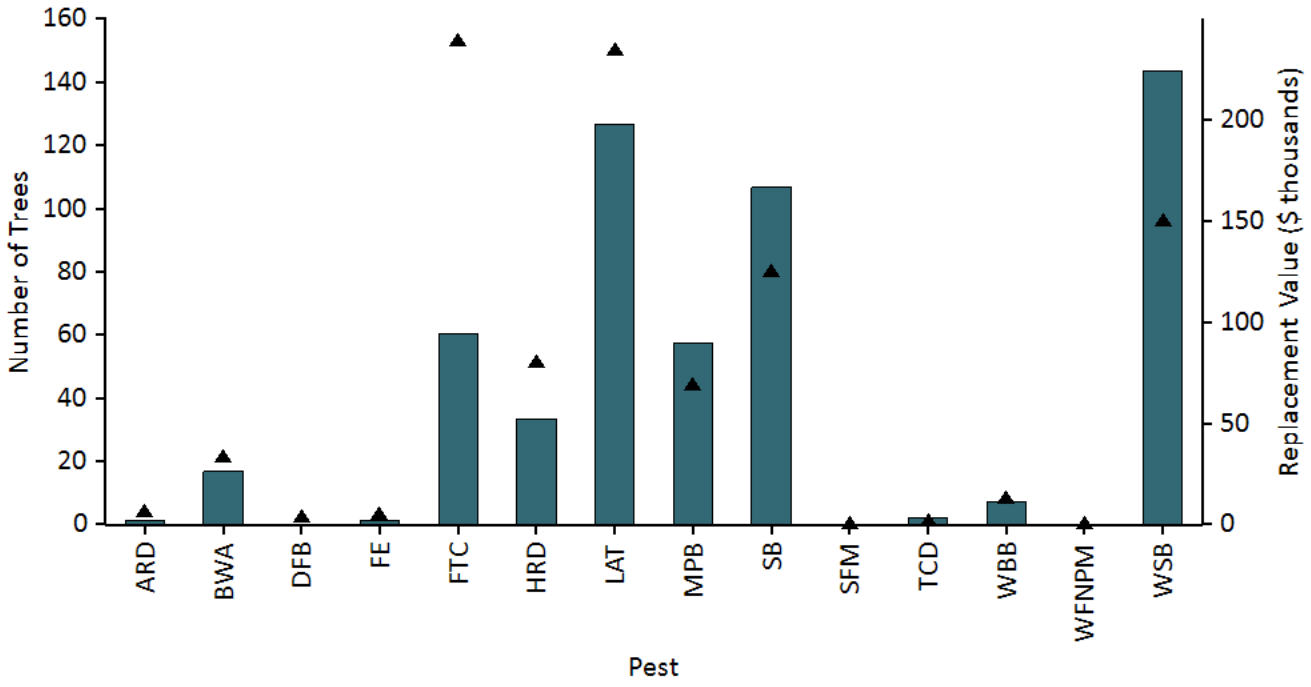


Figure 12. Number of trees at risk (points) and associated compensatory value (bars) for most threatening pests located in the county, SSL 2024 Tree Inventory

Armillaria Root Disease (ARD) poses a threat to 0.1 percent of the SSL 2024 Tree Inventory urban forest, which represents a potential loss of $1.93 thousand in replacement value.

Balsam woolly adelgid (BWA) (Ragenovich and Mitchell 2006) is an insect that has caused significant damage to the true firs of North America. SSL 2024 Tree Inventory could possibly lose 0.6 percent of its trees to this pest ($26.3 thousand in replacement value).

Douglas-fir beetle (DFB) (Schmitz and Gibson 1996) is a bark beetle that infests Douglas-fir trees throughout the western United States, British Columbia, and Mexico. Potential loss of trees from DFB is 0.1 percent ($200 in replacement value).

One common pest of white fir, grand fir, and red fir trees is the fir engraver (FE) (Ferrell 1986). FE poses a threat to 0.1 percent of the SSL 2024 Tree Inventory urban forest, which represents a potential loss of $1.89 thousand in replacement value.

Forest Tent Caterpillar (FTC) poses a threat to 4.7 percent of the SSL 2024 Tree Inventory urban forest, which represents

a potential loss of $94.1 thousand in replacement value.

Heterobasidion Root Disease (HRD) poses a threat to 1.6 percent of the SSL 2024 Tree Inventory urban forest, which represents a potential loss of $52.3 thousand in replacement value.

Quaking aspen is a principal host for the defoliator, large aspen tortrix (LAT) (Ciesla and Kruse 2009). LAT poses a threat to 4.6 percent of the SSL 2024 Tree Inventory urban forest, which represents a potential loss of $198 thousand in replacement value.

Mountain pine beetle (MPB) (Gibson et al 2009) is a bark beetle that primarily attacks pine species in the western United States. MPB has the potential to affect 1.3 percent of the population ($89.8 thousand in replacement value).

Spruce beetle (SB) (Holsten et al 1999) is a bark beetle that causes significant mortality to spruce species within its range. Potential loss of trees from SB is 2.5 percent ($167 thousand in replacement value).

Subalpine Fir Mortality (SFM) poses a threat to 0.0 percent of the SSL 2024 Tree Inventory urban forest, which represents a potential loss of $0 in replacement value.

Thousand canker disease (TCD) (Cranshaw and Tisserat 2009; Seybold et al 2010) is an insect-disease complex that kills several species of walnuts, including black walnut. Potential loss of trees from TCD is 0.0 percent ($3.05 thousand in replacement value).

Western Bark Beetle (WBB) poses a threat to 0.2 percent of the SSL 2024 Tree Inventory urban forest, which represents a potential loss of $11.2 thousand in replacement value.

Western Five-Needle Pine Mortality (WFNPM) poses a threat to 0.0 percent of the SSL 2024 Tree Inventory urban forest, which represents a potential loss of $0 in replacement value.

Western spruce budworm (WSB) (Fellin and Dewey 1986) is an insect that causes defoliation in western conifers. This pest threatens 2.9 percent of the population, which represents a potential loss of $224 thousand in replacement value.

Appendix I. i-Tree Eco Model and Field Measurements

i-Tree Eco is designed to use standardized field data and local hourly air pollution and meteorological data to quantify urban forest structure and its numerous effects (Nowak and Crane 2000), including:

- Urban forest structure (e.g., species composition, tree health, leaf area, etc.).
- Amount of pollution removed hourly by the urban forest, and its associated percent air quality improvement throughout a year.
- Total carbon stored and net carbon annually sequestered by the urban forest.
- Effects of trees on building energy use and consequent effects on carbon dioxide emissions from power sources.
- Replacement value of the forest, as well as the value for air pollution removal and carbon storage and sequestration.
- Potential impact of infestations by pests, such as Asian longhorned beetle, emerald ash borer, spongy moth, and Dutch elm disease.

Typically, all field data are collected during the leaf-on season to properly assess tree canopies. Typical data collection (actual data collection may vary depending upon the user) includes land use, ground and tree cover, individual tree attributes of species, stem diameter, height, crown width, crown canopy missing and dieback, and distance and direction to residential buildings (Nowak et al 2005; Nowak et al 2008).

During data collection, trees are identified to the most specific taxonomic classification possible. Trees that are not classified to the species level may be classified by genus (e.g., ash) or species groups (e.g., hardwood). In this report, tree species, genera, or species groups are collectively referred to as tree species.

Tree Characteristics:

Leaf area of trees was assessed using measurements of crown dimensions and percentage of crown canopy missing. In the event that these data variables were not collected, they are estimated by the model.

An analysis of invasive species is not available for studies outside of the United States. For the U.S., invasive species are identified using an invasive species list (Arizona Wildland Invasive Plant Working Group 2005; Colorado Weed Management Association; Stoddard et al)for the state in which the urban forest is located. These lists are not exhaustive and they cover invasive species of varying degrees of invasiveness and distribution. In instances where a state did not have an invasive species list, a list was created based on the lists of the adjacent states. Tree species that are identified as invasive by the state invasive species list are cross-referenced with native range data. This helps eliminate species that are on the state invasive species list, but are native to the study area.

Air Pollution Removal:

Pollution removal is calculated for ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, particulate matter less than 2.5 microns, and particulate matter less than 10 microns and greater than 2.5 microns. PM2.5 is generally more relevant in discussions concerning air pollution effects on human health.

Air pollution removal estimates are derived from calculated hourly tree-canopy resistances for ozone, and sulfur and nitrogen dioxides based on a hybrid of big-leaf and multi-layer canopy deposition models (Baldocchi 1988; Baldocchi et al 1987). As the removal of carbon monoxide and particulate matter by vegetation is not directly related to transpiration, removal rates (deposition velocities) for these pollutants were based on average measured values from the literature (Bidwell and Fraser 1972; Lovett 1994) that were adjusted depending on leaf phenology and leaf area. Particulate removal incorporated a 50 percent resuspension rate of particles back to the atmosphere (Zinke 1967). Recent updates (2011) to air quality modeling are based on improved leaf area index simulations, weather and pollution processing and interpolation, and updated pollutant monetary values (Hirabayashi et al 2011; Hirabayashi et al 2012;

Hirabayashi 2011).

Trees remove PM2.5 and PM10* when particulate matter is deposited on leaf surfaces (Nowak et al 2013). This deposited PM2.5 and PM10* can be resuspended to the atmosphere or removed during rain events and dissolved or transferred to the soil. This combination of events can lead to positive or negative pollution removal and value depending on various atmospheric factors. Generally, PM2.5 and PM10* removal is positive with positive benefits. However, there are some cases when net removal is negative or resuspended particles lead to increased pollution concentrations and negative values. During some months (e.g., with no rain), trees resuspend more particles than they remove. Resuspension can also lead to increased overall PM2.5 and PM10* concentrations if the boundary layer conditions are lower during net resuspension periods than during net removal periods. Since the pollution removal value is based on the change in pollution concentration, it is possible to have situations when trees remove PM2.5 and PM10* but increase concentrations and thus have negative values during periods of positive overall removal. These events are not common, but can happen.

For reports in the United States, default air pollution removal value is calculated based on local incidence of adverse health effects and national median externality costs. The number of adverse health effects and associated economic value is calculated for ozone, sulfur dioxide, nitrogen dioxide, and particulate matter less than 2.5 microns using data from the U.S. Environmental Protection Agency's Environmental Benefits Mapping and Analysis Program (BenMAP) (Nowak et al 2014). The model uses a damage-function approach that is based on the local change in pollution concentration and population. National median externality costs were used to calculate the value of carbon monoxide removal (Murray et al 1994).

For international reports, user-defined local pollution values are used. For international reports that do not have local values, estimates are based on either European median externality values (van Essen et al 2011) or BenMAP regression equations (Nowak et al 2014) that incorporate user-defined population estimates. Values are then converted to local currency with user-defined exchange rates.

For this analysis, pollution removal value is calculated based on the prices of $1,488 per ton (carbon monoxide), $2,189 per ton (ozone), $611 per ton (nitrogen dioxide), $95 per ton (sulfur dioxide), $134,389 per ton (particulate matter less than 2.5 microns), $0 per ton (particulate matter less than 10 microns and greater than 2.5 microns).

Carbon Storage and Sequestration:

Carbon storage is the amount of carbon bound up in the above-ground and below-ground parts of woody vegetation. To calculate current carbon storage, biomass for each tree was calculated using equations from the literature and measured tree data. Open-grown, maintained trees tend to have less biomass than predicted by forest-derived biomass equations (Nowak 1994). To adjust for this difference, biomass results for open-grown urban trees were multiplied by 0.8. No adjustment was made for trees found in natural stand conditions. Tree dry-weight biomass was converted to stored carbon by multiplying by 0.5.

Carbon sequestration is the removal of carbon dioxide from the air by plants. To estimate the gross amount of carbon sequestered annually, average diameter growth from the appropriate genera and diameter class and tree condition was added to the existing tree diameter (year x) to estimate tree diameter and carbon storage in year x+1.

Carbon storage and carbon sequestration values are based on estimated or customized local carbon values. For international reports that do not have local values, estimates are based on the carbon value for the United States (U.S. Environmental Protection Agency 2015, Interagency Working Group on Social Cost of Carbon 2015) and converted to local currency with user-defined exchange rates.

For this analysis, carbon storage and carbon sequestration values are calculated based on $171 per ton.

Oxygen Production:

The amount of oxygen produced is estimated from carbon sequestration based on atomic weights: net O2 release (kg/yr) = net C sequestration (kg/yr) × 32/12. To estimate the net carbon sequestration rate, the amount of carbon sequestered as a result of tree growth is reduced by the amount lost resulting from tree mortality. Thus, net carbon sequestration and net annual oxygen production of the urban forest account for decomposition (Nowak et al 2007). For complete inventory projects, oxygen production is estimated from gross carbon sequestration and does not account for decomposition.

Avoided Runoff:

Annual avoided surface runoff is calculated based on rainfall interception by vegetation, specifically the difference between annual runoff with and without vegetation. Although tree leaves, branches, and bark may intercept precipitation and thus mitigate surface runoff, only the precipitation intercepted by leaves is accounted for in this analysis.

The value of avoided runoff is based on estimated or user-defined local values. For international reports that do not have local values, the national average value for the United States is utilized and converted to local currency with user-defined exchange rates. The U.S. value of avoided runoff is based on the U.S. Forest Service's Community Tree Guide Series (McPherson et al 1999; 2000; 2001; 2002; 2003; 2004; 2006a; 2006b; 2006c; 2007; 2010; Peper et al 2009; 2010; Vargas et al 2007a; 2007b; 2008).

For this analysis, avoided runoff value is calculated based on the price of $0.01 per gallon.

Building Energy Use:

If appropriate field data were collected, seasonal effects of trees on residential building energy use were calculated based on procedures described in the literature (McPherson and Simpson 1999) using distance and direction of trees from residential structures, tree height and tree condition data. To calculate the monetary value of energy savings, local or custom prices per MWH or MBTU are utilized.

For this analysis, energy saving value is calculated based on the prices of $103.50 per MWH and $9.38 per MBTU.

Replacement Values:

Replacement value is the value of a tree based on the physical resource itself (e.g., the cost of having to replace a tree with a similar tree). Replacement values were based on valuation procedures of the Council of Tree and Landscape Appraisers, which uses tree species, diameter, condition, and location information (Nowak et al 2002a; 2002b). Replacement value may not be included for international projects if there is insufficient local data to complete the valuation procedures.

Potential Pest Impacts:

The complete potential pest risk analysis is not available for studies outside of the United States. The number of trees at risk to the pests analyzed is reported, though the list of pests is based on known insects and disease in the United States.

For the U.S., potential pest risk is based on pest range maps and the known pest host species that are likely to experience mortality. Pest range maps for 2012 from the Forest Health Technology Enterprise Team (FHTET) (Forest Health Technology Enterprise Team 2014) were used to determine the proximity of each pest to the county in which the urban forest is located. For the county, it was established whether the insect/disease occurs within the county, is within 250 miles of the county edge, is between 250 and 750 miles away, or is greater than 750 miles away. FHTET did not have pest range maps for Dutch elm disease and chestnut blight. The range of these pests was based on known

occurrence and the host range, respectively (Eastern Forest Environmental Threat Assessment Center; Worrall 2007).

Relative Tree Effects:

The relative value of tree benefits reported in Appendix II is calculated to show what carbon storage and sequestration, and air pollutant removal equate to in amounts of municipal carbon emissions, passenger automobile emissions, and house emissions.

Municipal carbon emissions are based on 2010 U.S. per capita carbon emissions (Carbon Dioxide Information Analysis Center 2010). Per capita emissions were multiplied by city population to estimate total city carbon emissions.

Light duty vehicle emission rates (g/mi) for CO, NOx, VOCs, PM10, SO2 for 2010 (Bureau of Transportation Statistics 2010; Heirigs et al 2004), PM2.5 for 2011-2015 (California Air Resources Board 2013), and CO2 for 2011 (U.S. Environmental Protection Agency 2010) were multiplied by average miles driven per vehicle in 2011 (Federal Highway Administration 2013) to determine average emissions per vehicle.

Household emissions are based on average electricity kWh usage, natural gas Btu usage, fuel oil Btu usage, kerosene Btu usage, LPG Btu usage, and wood Btu usage per household in 2009 (Energy Information Administration 2013; Energy Information Administration 2014)

- CO2, SO2, and NOx power plant emission per KWh are from Leonardo Academy 2011. CO emission per kWh assumes 1/3 of one percent of C emissions is CO based on Energy Information Administration 1994. PM10 emission per kWh from Layton 2004.
- CO2, NOx, SO2, and CO emission per Btu for natural gas, propane and butane (average used to represent LPG), Fuel #4 and #6 (average used to represent fuel oil and kerosene) from Leonardo Academy 2011.
- CO2 emissions per Btu of wood from Energy Information Administration 2014.
- CO, NOx and SOx emission per Btu based on total emissions and wood burning (tons) from (British Columbia Ministry 2005; Georgia Forestry Commission 2009).

Appendix II. Relative Tree Effects

The urban forest in SSL 2024 Tree Inventory provides benefits that include carbon storage and sequestration, and air pollutant removal. To estimate the relative value of these benefits, tree benefits were compared to estimates of average municipal carbon emissions, average passenger automobile emissions, and average household emissions. See Appendix I for methodology.

Carbon storage is equivalent to:

- Amount of carbon emitted in SSL 2024 Tree Inventory in 3 days
- Annual carbon (C) emissions from 609 automobiles
- Annual C emissions from 249 single-family houses

Carbon monoxide removal is equivalent to:

- Annual carbon monoxide emissions from 0 automobiles
- Annual carbon monoxide emissions from 0 single-family houses

Nitrogen dioxide removal is equivalent to:

- Annual nitrogen dioxide emissions from 8 automobiles
- Annual nitrogen dioxide emissions from 3 single-family houses

Sulfur dioxide removal is equivalent to:

- Annual sulfur dioxide emissions from 141 automobiles
- Annual sulfur dioxide emissions from 0 single-family houses

Annual carbon sequestration is equivalent to:

- Amount of carbon emitted in SSL 2024 Tree Inventory in 0.1 days
- Annual C emissions from 0 automobiles
- Annual C emissions from 0 single-family houses

Appendix III. Comparison of Urban Forests

A common question asked is, "How does this city compare to other cities?" Although comparison among cities should be made with caution as there are many attributes of a city that affect urban forest structure and functions, summary data are provided from other cities analyzed using the i-Tree Eco model.

I. City totals for trees

City	*% Tree Cover*	*Number of Trees*	*Carbon Storage (tons)*	*Carbon Sequestration (tons/yr)*	*Pollution Removal (tons/yr)*
Toronto, ON, Canada	26.6	10,220,000	1,221,000	51,500	2,099
Atlanta, GA	36.7	9,415,000	1,344,000	46,400	1,663
Los Angeles, CA	11.1	5,993,000	1,269,000	77,000	1,975
New York, NY	20.9	5,212,000	1,350,000	42,300	1,676
London, ON, Canada	24.7	4,376,000	396,000	13,700	408
Chicago, IL	17.2	3,585,000	716,000	25,200	888
Phoenix, AZ	9.0	3,166,000	315,000	32,800	563
Baltimore, MD	21.0	2,479,000	570,000	18,400	430
Philadelphia, PA	15.7	2,113,000	530,000	16,100	575
Washington, DC	28.6	1,928,000	525,000	16,200	418
Oakville, ON , Canada	29.1	1,908,000	147,000	6,600	190
Albuquerque, NM	14.3	1,846,000	332,000	10,600	248
Boston, MA	22.3	1,183,000	319,000	10,500	283
Syracuse, NY	26.9	1,088,000	183,000	5,900	109
Woodbridge, NJ	29.5	986,000	160,000	5,600	210
Minneapolis, MN	26.4	979,000	250,000	8,900	305
San Francisco, CA	11.9	668,000	194,000	5,100	141
Morgantown, WV	35.5	658,000	93,000	2,900	72
Moorestown, NJ	28.0	583,000	117,000	3,800	118
Hartford, CT	25.9	568,000	143,000	4,300	58
Jersey City, NJ	11.5	136,000	21,000	890	41
Casper, WY	8.9	123,000	37,000	1,200	37
Freehold, NJ	34.4	48,000	20,000	540	22

II. Totals per acre of land area

City	*Number of Trees/ac*	*Carbon Storage (tons/ac)*	*Carbon Sequestration (tons/ac/yr)*	*Pollution Removal (lb/ac/yr)*
Toronto, ON, Canada	64.9	7.8	0.33	26.7
Atlanta, GA	111.6	15.9	0.55	39.4
Los Angeles, CA	19.6	4.2	0.16	13.1
New York, NY	26.4	6.8	0.21	17.0
London, ON, Canada	75.1	6.8	0.24	14.0
Chicago, IL	24.2	4.8	0.17	12.0
Phoenix, AZ	12.9	1.3	0.13	4.6
Baltimore, MD	48.0	11.1	0.36	16.6
Philadelphia, PA	25.1	6.3	0.19	13.6
Washington, DC	49.0	13.3	0.41	21.2
Oakville, ON , Canada	78.1	6.0	0.27	11.0
Albuquerque, NM	21.8	3.9	0.12	5.9
Boston, MA	33.5	9.1	0.30	16.1
Syracuse, NY	67.7	10.3	0.34	13.6
Woodbridge, NJ	66.5	10.8	0.38	28.4
Minneapolis, MN	26.2	6.7	0.24	16.3
San Francisco, CA	22.5	6.6	0.17	9.5
Morgantown, WV	119.2	16.8	0.52	26.0
Moorestown, NJ	62.1	12.4	0.40	25.1
Hartford, CT	50.4	12.7	0.38	10.2
Jersey City, NJ	14.4	2.2	0.09	8.6
Casper, WY	9.1	2.8	0.09	5.5
Freehold, NJ	38.3	16.0	0.44	35.3

Appendix IV. General Recommendations for Air Quality Improvement

Urban vegetation can directly and indirectly affect local and regional air quality by altering the urban atmosphere environment. Four main ways that urban trees affect air quality are (Nowak 1995):

- Temperature reduction and other microclimate effects
- Removal of air pollutants
- Emission of volatile organic compounds (VOC) and tree maintenance emissions
- Energy effects on buildings

The cumulative and interactive effects of trees on climate, pollution removal, and VOC and power plant emissions determine the impact of trees on air pollution. Cumulative studies involving urban tree impacts on ozone have revealed that increased urban canopy cover, particularly with low VOC emitting species, leads to reduced ozone concentrations in cities (Nowak 2000). Local urban management decisions also can help improve air quality.

Urban forest management strategies to help improve air quality include (Nowak 2000):

Strategy	*Result*
Increase the number of healthy trees	Increase pollution removal
Sustain existing tree cover	Maintain pollution removal levels
Maximize use of low VOC-emitting trees	Reduces ozone and carbon monoxide formation
Sustain large, healthy trees	Large trees have greatest per-tree effects
Use long-lived trees	Reduce long-term pollutant emissions from planting and removal
Use low maintenance trees	Reduce pollutants emissions from maintenance activities
Reduce fossil fuel use in maintaining vegetation	Reduce pollutant emissions
Plant trees in energy conserving locations	Reduce pollutant emissions from power plants
Plant trees to shade parked cars	Reduce vehicular VOC emissions
Supply ample water to vegetation	Enhance pollution removal and temperature reduction
Plant trees in polluted or heavily populated areas	Maximizes tree air quality benefits
Avoid pollutant-sensitive species	Improve tree health
Utilize evergreen trees for particulate matter	Year-round removal of particles

Appendix V. Invasive Species of the Urban Forest

The following inventoried tree species were listed as invasive on the Utah invasive species list (Arizona Wildland Invasive Plant Working Group 2005; Colorado Weed Management Association; Stoddard et al):

Species Name[a]	*Number of Trees*	*% of Trees*	*Leaf Area (ac)*	*Percent Leaf Area*
Siberian elm	119	3.6	8.5	9.6
Total	**119**	**3.65**	**8.52**	**9.61**

[a]Species are determined to be invasive if they are listed on the state's invasive species list

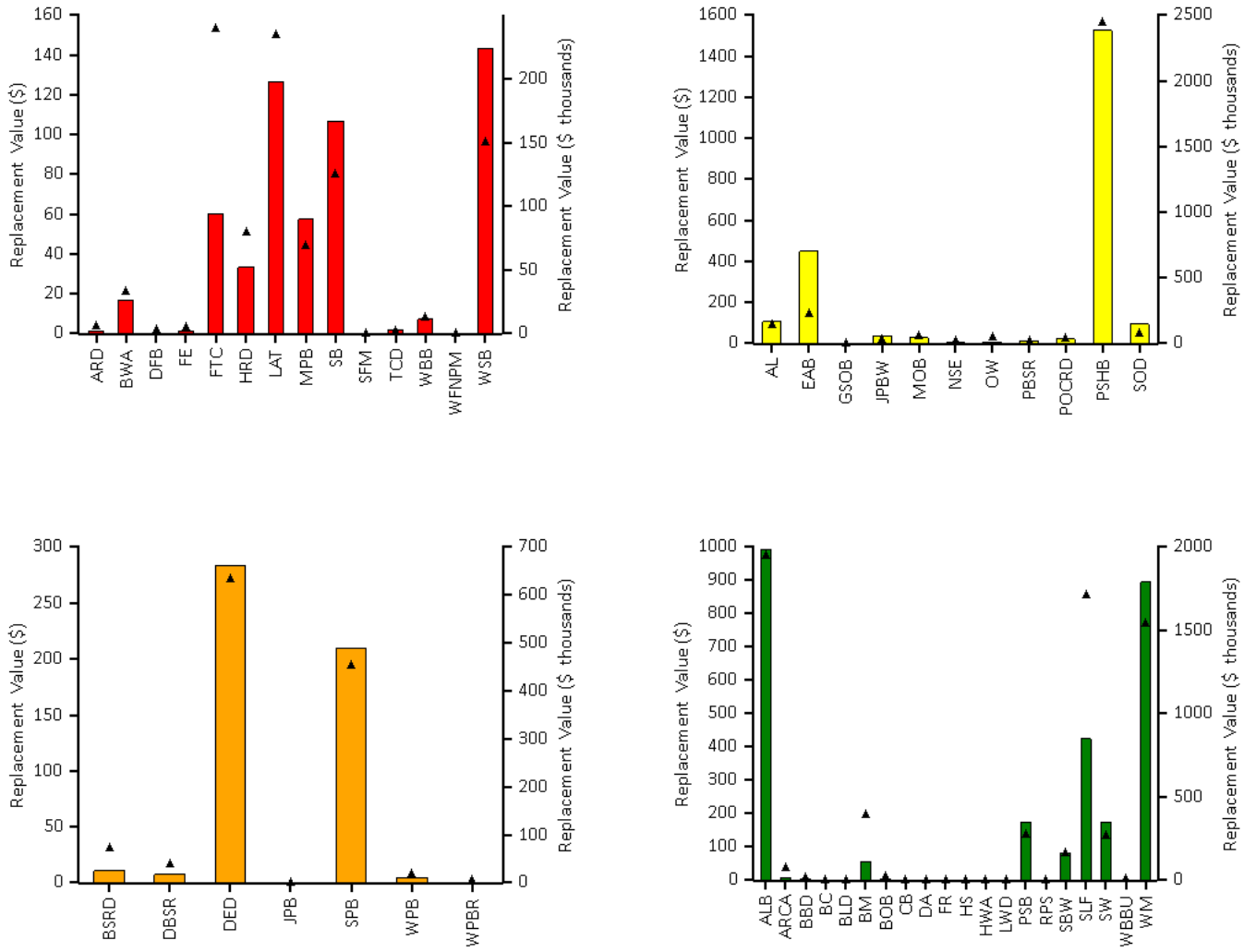
Appendix VI. Potential Risk of Pests

Fifty-three insects and diseases were analyzed to quantify their potential impact on the urban forest. As each insect/ disease is likely to attack different host tree species, the implications for {0} will vary. The number of trees at risk reflects only the known host species that are likely to experience mortality.

Code	Scientific Name	Common Name	Trees at Risk (#)	Value ($ thousands)
AL	Phyllocnistis populiella	Aspen Leafminer	91	167.73
ALB	Anoplophora glabripennis	Asian Longhorned Beetle	975	1,987.00
ARCA	Neodothiora populina	Aspen Running Canker	38	17.22
ARD	Armillaria spp.	Armillaria Root Disease	4	1.93
BBD	Neonectria faginata	Beech Bark Disease	8	7.27
BC	Sirococcus clavigignenti juglandacearum	Butternut Canker	1	3.05
BLD	Litylenchus crenatae mccannii	Beech Leaf Disease	0	0.00
BM	Euproctis chrysorrhoea	Browntail Moth	195	114.05
BOB	Tubakia iowensis	Bur Oak Blight	11	7.87
BSRD	Leptographium wageneri	Black Stain Root Disease	31	25.06
BWA	Adelges piceae	Balsam Woolly Adelgid	21	26.32
CB	Cryphonectria parasitica	Chestnut Blight	0	0.00
DA	Discula destructiva	Dogwood Anthracnose	1	0.13
DBSR	Leptographium wageneri var. pseudotsugae	Douglas-fir Black Stain Root Disease	16	17.68
DED	Ophiostoma novo-ulmi	Dutch Elm Disease	271	662.31
DFB	Dendroctonus pseudotsugae	Douglas-Fir Beetle	2	0.20
EAB	Agrilus planipennis	Emerald Ash Borer	143	701.71
FE	Scolytus ventralis	Fir Engraver	3	1.89
FR	Cronartium quercuum f. sp. Fusiforme	Fusiform Rust	0	0.00
FTC	Malacosoma disstria	Forest Tent Caterpillar	153	94.09
GSOB	Agrilus auroguttatus	Goldspotted Oak Borer	0	0.00
HRD	Heterobasidion irregulare/ occidentale	Heterobasidion Root Disease	51	52.30
HS	Neodiprion tsugae	Hemlock Sawfly	0	0.00
HWA	Adelges tsugae	Hemlock Woolly Adelgid	0	0.00
JPB	Dendroctonus jeffreyi	Jeffrey Pine Beetle	0	0.00
JPBW	Choristoneura pinus	Jack Pine Budworm	20	57.24
LAT	Choristoneura conflictana	Large Aspen Tortrix	150	197.68
LWD	Raffaelea lauricola	Laurel Wilt	0	0.00
MOB	Xyleborus monographus	Mediterranean Oak Borer	34	43.06
MPB	Dendroctonus ponderosae	Mountain Pine Beetle	44	89.78
NSE	Ips perturbatus	Northern Spruce Engraver	12	7.17
OW	Ceratocystis fagacearum	Oak Wilt	29	13.68
PBSR	Leptographium wageneri var. ponderosum	Pine Black Stain Root Disease	14	17.48
POCRD	Phytophthora lateralis	Port-Orford-Cedar Root Disease	25	32.89
PSB	Tomicus piniperda	Pine Shoot Beetle	137	349.78

Code	Scientific Name	Common Name	Trees at Risk (#)	Value ($ thousands)
PSHB	Euwallacea nov. sp.	Polyphagous Shot Hole Borer	1,564	2,383.14
RPS	Matsucoccus resinosae	Red Pine Scale	1	0.40
SB	Dendroctonus rufipennis	Spruce Beetle	80	166.79
SBW	Choristoneura fumiferana	Spruce Budworm	81	165.31
SFM	subalpine fir mortality summary	Subalpine Fir Mortality	0	0.00
SLF	Lycorma delicatula	Spotted Lanternfly	855	850.47
SOD	Phytophthora ramorum	Sudden Oak Death	49	148.33
SPB	Dendroctonus frontalis	Southern Pine Beetle	194	490.06
SW	Sirex noctilio	Sirex Wood Wasp	135	349.58
TCD	Geosmithia morbida	Thousand Canker Disease	1	3.05
WBB	Dryocoetes confusus	Western Bark Beetle	8	11.19
WBBU	Acleris gloverana	Western Blackheaded Budworm	2	0.20
WFNPM	western five-needle pine mortality summary	Western Five-Needle Pine Mortality	0	0.00
WM	Operophtera brumata	Winter Moth	769	1,789.27
WPB	Dendroctonus brevicomis	Western Pine Beetle	8	11.19
WPBR	Cronartium ribicola	White Pine Blister Rust	2	1.14
WSB	Choristoneura occidentalis	Western Spruce Budworm	96	223.95

In the following graph, the pests are color coded according to the county's proximity to the pest occurrence in the United States. Red indicates that the pest is within the county; orange indicates that the pest is within 250 miles of the county; yellow indicates that the pest is within 750 miles of the county; and green indicates that the pest is outside of these ranges.



Note: points - Number of trees, bars - Replacement value

Based on the host tree species for each pest and the current range of the pest (Forest Health Technology Enterprise Team 2014), it is possible to determine what the risk is that each tree species in the urban forest could be attacked by an insect or disease.

Spp. Risk	Risk Weight	Species Name	AL	ALB	ARCA	ARD	BBD	BC	BLD	BM	BOB	BSRD	BWA	CB	DA	DBSR	DED	DFB	EAB	FE	FR	FTC	GSOB	HRD	HS	HWA	JPB	JPBW	LAT	LWD	MOB	MPB	NSE	OW	PBSR
	32	Ponderosa pine																																	
	31	Douglas fir																																	
	28	Engelmann spruce																																	
	26	Norway spruce																																	
	23	Lodgepole pine																																	
	21	White spruce																																	
	15	Quaking aspen																																	
	15	Scots pine																																	
	15	Eastern white pine																																	
	12	Blue spruce																																	
	12	Plum spp																																	
	12	Pinyon pine																																	
	10	Elm spp																																	
	10	White willow																																	
	8	English elm																																	
	8	Northern red oak																																	
	8	Glossy buckthorn																																	
	8	European white birch																																	
	8	Bebb willow																																	
	7	American elm																																	
	7	European beech																																	
	7	Swiss mountain pine																																	
	7	Sugar maple																																	
	7	Weeping willow																																	
	7	Laurel willow																																	
	7	Black walnut																																	
	7	Pin oak																																	
	6	Common chokecherry																																	
	6	European ash																																	
	6	Bur oak																																	
	6	Water birch																																	
	6	Japanese black pine																																	
	5	Siberian elm																																	
	5	Austrian pine																																	
	5	Boxelder																																	
	5	California white oak																																	
	4	Green ash																																	
	4	London planetree																																	
	4	American basswood																																	
	4	Freeman maple																																	
	4	Japanese maple																																	
	4	Peach																																	

Spp. Risk	Risk Weight	Species Name	AL	ALB	ARCA	ARD	BBD	BC	BLD	BM	BOB	BSRD	BWA	CB	DA	DBSR	DED	DFB	EAB	FE	FR	FTC	GSOB	HRD	HS	HWA	JPB	JPBW	LAT	LWD	MOB	MPB	NSE	OW	PBSR
	4	English oak																																OW	
	4	Persian silk tree		ALB																															
	4	Incense cedar				ARD																													
	3	Norway maple		ALB																															
	3	Japanese zelkova																																	
	3	Japanese flowering cherry																																	
	3	White ash																	EAB																
	3	Pear spp		ALB						BM																									
	3	Northern white cedar																																	
	3	White mulberry																																	
	3	Tree of heaven																																	
	3	Chinese elm		ALB																															
	3	Fremont cottonwood																																	
	3	Common lilac																																	
	3	Tulip tree																																	
	3	Red maple		ALB																															
	3	Pagoda tree																																	
	3	Horse chestnut		ALB																															
	3	Silver maple		ALB																															
	3	Swamp white oak																																OW	
	3	Chinkapin oak																																OW	
	3	Japanese persimmon																																	
	2	Callery pear																																	
	2	Honeylocust																																	
	2	Goldenrain tree																																	
	2	Bigtooth maple		ALB																															
	2	Northern catalpa																																	
	2	Eastern cottonwood		ALB																															
	2	Sweetgum																																	
	2	Magnolia spp																																	
	2	European hornbeam																													MOB				
	2	Baldcypress																																	
	2	Rocky mountain maple		ALB																															
	2	Atlas cedar																																	
	2	Arizona ash																	EAB																
	1	Amur maple		ALB																															
	1	Northern hackberry		ALB																															
	1	Black locust																																	
	1	American hornbeam																																	
	1	Apricot																																	
	1	Gambel oak																																	
	1	Purple blow maple		ALB																															
	1	Hedge maple		ALB																															
	1	Vine maple		ALB																															
	1	Red horsechestnut		ALB																															

Spp. Risk	Risk Weight	Species Name	AL	ALB	ARCA	ARD	BBD	BC	BLD	BM	BOB	BSRD	BWA	CB	DA	DBSR	DED	DFB	EAB	FE	FR	FTC	GSOB	HRD	HS	HWA	JPB	JPBW	LAT	LWD	MOB	MPB	NSE	OW	PBSR
	1	Red buckeye																																	
	1	American hazelnut																																	
	1	Cornelian cherry																																	
	1	Plains cottonwood																																	

Spp. Risk	Risk Weight	Species Name	POCRD	PSB	PSHB	RPS	SB	SBW	SFM	SLF	SOD	SPB	SW	TCD	WBB	WBBU	WFNPM	WM	WPB	WPBR	WSB
	32	Ponderosa pine																			
	31	Douglas fir																			
	28	Engelmann spruce																			
	26	Norway spruce																			
	23	Lodgepole pine																			
	21	White spruce																			
	15	Quaking aspen																			
	15	Scots pine																			
	15	Eastern white pine																			
	12	Blue spruce																			
	12	Plum spp																			
	12	Pinyon pine																			
	10	Elm spp																			
	10	White willow																			
	8	English elm																			
	8	Northern red oak																			
	8	Glossy buckthorn																			
	8	European white birch																			
	8	Bebb willow																			
	7	American elm																			
	7	European beech																			
	7	Swiss mountain pine																			
	7	Sugar maple																			
	7	Weeping willow																			
	7	Laurel willow																			
	7	Black walnut																			
	7	Pin oak																			
	6	Common chokecherry																			
	6	European ash																			
	6	Bur oak																			
	6	Water birch																			
	6	Japanese black pine																			
	5	Siberian elm																			
	5	Austrian pine																			
	5	Boxelder																			
	5	California white oak																			
	4	Green ash																			
	4	London planetree																			
	4	American basswood																			

Spp. Risk	Risk Weight	Species Name	POCRD	PSB	PSHB	RPS	SB	SBW	SFM	SLF	SOD	SPB	SW	TCD	WBB	WBBU	WFNPM	WM	WPB	WPBR	WSB
	4	Freeman maple																			
	4	Japanese maple																			
	4	Peach																			
	4	English oak																			
	4	Persian silk tree																			
	4	Incense cedar																			
	3	Norway maple																			
	3	Japanese zelkova																			
	3	Japanese flowering cherry																			
	3	White ash																			
	3	Pear spp																			
	3	Northern white cedar																			
	3	White mulberry																			
	3	Tree of heaven																			
	3	Chinese elm																			
	3	Fremont cottonwood																			
	3	Common lilac																			
	3	Tulip tree																			
	3	Red maple																			
	3	Pagoda tree																			
	3	Horse chestnut																			
	3	Silver maple																			
	3	Swamp white oak																			
	3	Chinkapin oak																			
	3	Japanese persimmon																			
	2	Callery pear																			
	2	Honeylocust																			
	2	Goldenrain tree																			
	2	Bigtooth maple																			
	2	Northern catalpa																			
	2	Eastern cottonwood																			
	2	Sweetgum																			
	2	Magnolia spp																			
	2	European hornbeam																			
	2	Baldcypress																			
	2	Rocky mountain maple																			
	2	Atlas cedar																			
	2	Arizona ash																			
	1	Amur maple																			
	1	Northern hackberry																			
	1	Black locust																			
	1	American hornbeam																			
	1	Apricot																			
	1	Gambel oak																			
	1	Purple blow maple																			

Spp. Risk	Risk Weight	Species Name	POCRD	PSB	PSHB	RPS	SB	SBW	SFM	SLF	SOD	SPB	SW	TCD	WBB	WBBU	WFNPM	WM	WPB	WPBR	WSB
	1	Hedge maple																			
	1	Vine maple																			
	1	Red horsechestnut																			
	1	Red buckeye																			
	1	American hazelnut																			
	1	Cornelian cherry																			
	1	Plains cottonwood																			

Note:
Species that are not listed in the matrix are not known to be hosts to any of the pests analyzed.

Species Risk:

- Red indicates that tree species is at risk to at least one pest within county
- Orange indicates that tree species has no risk to pests in county, but has a risk to at least one pest within 250 miles from the county
- Yellow indicates that tree species has no risk to pests within 250 miles of county, but has a risk to at least one pest that is 250 and 750 miles from the county
- Green indicates that tree species has no risk to pests within 750 miles of county, but has a risk to at least one pest that is greater than 750 miles from the county

Risk Weight:
Numerical scoring system based on sum of points assigned to pest risks for species. Each pest that could attack tree species is scored as 4 points if red, 3 points if orange, 2 points if yellow and 1 point if green.

Pest Color Codes:

- Red indicates pest is within Salt Lake county
- Red indicates pest is within 250 miles county
- Yellow indicates pest is within 750 miles of Salt Lake county
- Green indicates pest is outside of these ranges

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RESOLUTION NO. R2026-____

A RESOLUTION OF THE SOUTH SALT LAKE CITY COUNCIL ACKNOWLEDGING RECEIPT OF THE INDEPENDENT AUDITOR'S REPORT FOR FISCAL YEAR 2024-25 AND DIRECTING THAT NOTICE BE PUBLISHED PURSUANT TO SECTION 10-6-152 OF THE UTAH CODE

WHEREAS, Utah Code Sections 10-6-151, 51-2a-201, 51-2a-202, as amended, require the City to have, at least annually, an independent financial audit of its accounts by a certified public accountant; and

WHEREAS, pursuant to Utah Code § 10-6-152, within ten (10) days following the receipt of the auditor's report the City is required to publish notice advising the public that the report is complete and available for inspection; and

WHEREAS, the City retained Squire & Company, certified public accountants, to perform an independent financial audit of the City's accounts for fiscal year 2024-25; and

WHEREAS, Squire & Company has presented the audit report draft to the City Council; and

WHEREAS, the South Salt Lake City Council desires to acknowledge receipt of the audit report and direct that notice be published pursuant to Utah Code § 10-6-152.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SOUTH SALT LAKE AS FOLLOWS:

It hereby acknowledges that the audit report of the City's accounts for fiscal year 2024-25 has been completed by Squire & Company and submitted to the South Salt Lake City Council. The City Recorder is directed to publish notice advising the public that the audit report is complete and available for inspection.

(Signatures on next page; remainder of page intentionally left blank)

DATED this _____ day of January, 2026.

BY THE CITY COUNCIL:

_____
Sharla Bynum, Council Chair

ATTEST:

_____
Ariel Andrus, City Recorder

City Council Vote as Recorded:

Bynum	_____
deWolfe	_____
Huff	_____
Mitchell	_____
Thomas	_____
Williams	_____