URBAN FOREST
# MANAGEMENT PLAN

## COLORADO SPRINGS, COLORADO

OCTOBER | 2020

COLORADO
SPRINGS
OLYMPIC CITY USA

PLANIT GEO™
mapping a greener future

*(This page left intentionally blank)*

# URBAN FOREST
# MANAGEMENT PLAN

## PHASE 2 PRIMARY FRAMEWORK

## COLORADO SPRINGS, COLORADO

### ACKNOWLEDGMENTS

# CITY FORESTER

In the immortal words of astrophysicist Carl Sagan, "We are all made of star stuff". This declaration of course includes trees in addition to humans as trees are made of the same basic elements: hydrogen, oxygen, carbon, iron and many others. This illustrates why people are so inextricably linked to trees; it's in our shared DNA and in the very foundations of our existence.

Our City's founder, General William Jackson Palmer, innately understood this relationship. He knew that people needed trees in his new community of Colorado Springs. He knew that trees are essential to a community's wellbeing for shade, shelter, wildlife habitat, and peace of mind. And yet the town was established in a treeless void.

So 148 years ago, Palmer planted the first street trees— 600 cottonwoods along Cascade and other residential streets. City Forestry was created by ordinance in 1910 and the office of City Forester was first occupied by Fred McKown, a position he held for 47 years! Their legacy survives to this day as an urban forest of many hundreds of thousands of trees of incalculable aesthetic value that provide literally millions of dollars in ecosystem services and other community benefits.

This management plan was crafted to promote a healthy and sustainable urban forest that grows in value over time, benefits the community at large, and is managed with an eye towards protection, renewal and a legacy that reaches out to and serves future generations of the City of Colorado Springs.

Dennis Will
City Forester, September 2020

Karen Palus
Director of Parks, Recreation and Cultural Services

Kurt Schroeder
Program Manager, Parks, Recreation and Cultural Services

# A VISION FOR COLORADO SPRINGS'
# URBAN FOREST

*"Our City's trees, forests, and other natural resources are recognized as integral to sustaining life and health for all City residents. A healthy, thriving, and sustainable urban forest is a community priority, to be thoughtfully managed and cared for by partnerships between the City and its residents to maximize public safety and benefits that include a thriving ecosystem, vibrant economy, and livable communities shared by all who live, work, and play in Colorado Springs."*

# TABLE OF
# CONTENTS

# PLAN
# APPENDICES

*Disclaimer: Appendices IV and V regarding code and rules & regulations have not been formally adopted by City Council pending revision and have been removed from this version of the Urban Forest Management Plan.*

**LIST OF TABLES**

# LIST OF FIGURES

*(This page left intentionally blank)*

*(This page left intentionally blank)*

# EXECUTIVE SUMMARY

The urban forest for many cities across the nation includes remnants from naturally forested areas, but Colorado Springs' urban forest was, with a few exceptions, planted as the City developed and expanded. The City's urban forest continues to be created, modified, and removed primarily by people, and sustaining it will require ongoing human intervention. The goal of this intervention is a sustainable urban forest— an urban forest that optimizes the benefits of trees while meeting established safety and economic goals. Achieving this requires robust and diverse funding, adequate staffing and levels of service, appropriate and effective policies, and management actions consistent with best practices.

A sustainable urban forest can be defined as "the naturally occurring and planted trees in cities which are managed to provide the inhabitants with a continuing level of economic, social, environmental and ecological benefits today and into the future" (Clark and Matheny et al. 1997). Urban forests are increasingly important to urbanized areas and the people who live and work in these built landscapes. Trees offer many benefits, some of which are directly identifiable and quantifiable, and others that are experienced. Colorado Springs' urban forest canopy is living infrastructure that shades over **17 percent** of the community and provides economic, environmental, and aesthetic benefits: **$100 million** annually in air filtration, **$900 thousand** in stormwater

retention, **$2 million** in carbon sequestration, and incalculable moments of beauty and serenity. The City's legacy of trees is 150 years old and continues to grow. Caring for Colorado Springs' urban forest is an important part of growing a sustainable, healthy, and vibrant city.

Urban forests and community health are inextricably linked; the better an urban forest, the greater a community's health. A community that is engaged with its urban forest will responsibly plant, care for, and nurture its trees, while inspiring others to do the same and supporting the City's urban forest management program. A thriving urban forest is only possible through a civic commitment and partnerships shared by all.

A team of urban forestry planners was assembled to develop the City of Colorado Springs' Urban Forest Management Plan (the Plan) to direct City resources towards the mission of growing a better Colorado Springs for all. This Urban Forest Management Plan supported by the City and its residents advises growth as it relates to the protection and enhancement of trees and associated benefits along streets and trails, parks and open space, riparian areas, and, to an extent, the trees on private property throughout Colorado Springs. Through the planning process, a shared vision for a healthy and thriving urban forest was established and supported by the City, its partners, and constituents.



*Photo courtesy of the Colorado Springs Chamber of Commerce.*

## CITY FORESTRY'S MISSION

*To manage our urban forest in a healthy, safe, and sustainable state, which maintains our original forest legacy, manages risk, and increases the canopy coverage for shade, stormwater retention, and property value.*

## A VISION FOR COLORADO SPRINGS' URBAN FOREST

*Our City's trees, forests, and other natural resources are recognized as integral to sustaining life and health for all City residents. A healthy, thriving, and sustainable urban forest is a community priority, to be thoughtfully managed and cared for by partnerships between the City and its residents to maximize public safety and benefits that include a thriving ecosystem, vibrant economy, and livable communities shared by all who live, work, and play in Colorado Springs*

The purpose of this Urban Forest Management Plan is to achieve this vision and to implement the Forestry Mission Statement by addressing best management practices toward sustainability of the City's urban forest. This plan should follow the recommended strategies and policies outlined in the City's Comprehensive Plan and as summarized in the Urban Forest Management Plan's Research Summary.

The overriding goals of the Urban Forest Management Plan and the Division of Forestry focus on preserving, maintaining, and managing the urban forest to ultimately benefit the residents of Colorado Springs. This plan outlines recommendations, projections, and procedures to achieve these goals for various management scenarios depending on resources.

## URBAN FOREST MANAGEMENT PLAN GOALS

**I. Tree Policies:** *Strengthen the foundation for sustainable urban forest management.*

**II. Staffing:** *Improve staffing levels for a healthy urban forest benefiting all citizens.*

**III. Budget and Funding:** *Secure adequate funding for proactive management.*

**IV. Assessments and Plans:** *Understand trends and risks to the urban forest.*

**V. Green Asset Management:** *Provide efficient management of the resource.*

**VI. Community Engagement:** *Develop community-wide urban forestry support.*



As the City continues to grow exponentially, the demand-loads on Forestry are untenable. According to research, to properly manage an urban forest, each tree should be pruned approximately every seven years. Colorado Springs has an estimated public tree population of 270,000 trees. This means approximately 38,600 trees per year should have maintenance performed on them. In recent years, City staff have been able to maintain less than 1,700 trees per year with current staffing, and another 2,000 with contracted services. Additional staffing is critical in order to increase the care provided to the growing urban forest. In addition to under-staffing there are budget shortcomings compared to the needs of the public trees and industry standards. A common budget comparison and measure is to look at the proportion of staff to public trees as well as the budget distributed across the public tree population. The results of this comparison are provided in Table 1 on the next page.

## RESOURCES FOR COLORADO SPRINGS' URBAN FOREST

*Table 1. Summary of Forestry's current and recommended staffing and budget. (FTEs refers to full-time employees.)*

|  | CURRENT | RECOMMENDED | DIFFERENCE |
|---|---|---|---|
| **STAFFING** | 11 FTEs | 27 FTEs | 16 FTEs |
|  | 1 staff per 24,545 trees | 1 staff per 10,000 trees | 16 FTEs |
| **BUDGET** | $1.6 million | $7.4 million | $5.8 million |
|  | $5.77 per tree | $27.41 per tree | $21.64 per tree |

Due to the current disparity between City Forestry resources and industry standards, a series of management scenarios were developed for this Urban Forest Management Plan. Each scenario considers the level of funding and service to provide objectives and action steps to achieve the urban forestry goals.

## URBAN FOREST MANAGEMENT PLAN SCENARIOS

*Table 2. Summary of the urban forest management scenarios respresenting different levels of service.*

| MANAGEMENT SCENARIO A | MANAGEMENT SCENARIO B | MANAGEMENT SCENARIO C | MANAGEMENT SCENARIO D |
|---|---|---|---|
| (MSA) | (MSB) | (MSC) | (MSD) |
| "Baseline Conditions" | "Additional but Insufficient Funding" | "Tree Maintenance Responsibility Transfer" | "Optimal Support" |
| Minimum service level, reactive management | Improved service level, reactive and proactive management | High service level, proactive management | High service level, proactive management |

▶ **Management Scenario A:** The minimum service level, or reactive management is characterized by responding only to emergencies and high priority complaints. At this level, known safety risks are addressed and the financial demands are the lowest, but it is the least efficient means of service delivery in the long run, generates low citizen satisfaction, does not comprehensively address risks, and usually is a result of the lack of a coherently developed urban forestry program.

▶ **Management Scenario B:** An improved service level, or varied management approach, addresses emergency and request-driven work, but also has some resources to begin routine tree maintenance and scheduled planting programs.

▶ **Management Scenario C or D:** A high service level, or proactive management, provides for frequent preventive tree maintenance cycles, a high level of tree planting, comprehensive emergency response and clean-up services, pest and disease treatment programs, and public outreach and education. This level has the highest annual costs but generally results in safer, more sustainable urban forests with less storm damage potential and insect and disease threats, maximum tree benefits, and the greatest level of citizen satisfaction.

*Disclaimer: Management scenarios A-D were created as alternatives for consideration; no alternative is favored or recommended over another and other feasible scenarios may arise in the future.*

## CALL TO ACTION

Trees are an integral part of the community and the ecological systems in which they exist. They provide significant economic, social, and ecological benefits, such as carbon sequestration, reduction of the urban heat island effect, energy savings, reduction of stormwater runoff, improvement of water quality, provide healing and calming qualities, and increase the value of business and residential properties. Planting and maintaining trees help Colorado Springs become more sustainable and reduce the negative impacts on the ecosystem from urban development. Trees are as necessary as water, infrastructure, and energy to sustaining healthy communities.

Implementation of the strategic actions by management scenario in this Plan will achieve the urban forestry goals and associated co-benefits desired by the City and its residents to the extent possible with available resources. To be successful, plan implementation is heavily dependent upon engagement between the City and its residents. Each management scenario contains goals, objectives, targets, and actions to improve urban forest sustainability, management, and equity. The framework of this strategic plan allows the City to take actions that build on previous work, effectively monitor progress, and efficiently adapt in an everchanging environment.

It is City Forestry's responsibility to facilitate the implementation of the Urban Forest Management Plan based on the status of resources and funding. Actions provided in each management scenario are prioritized based on resources needed, level of effort, co-benefits achieved, and implementation year(s) to propel the urban forestry program towards improved management. Successful implementation of one of the improved management scenarios in the Plan will bring Colorado Springs' trees and forests to a higher level of service that is more equitably distributed across the City to benefit present and future generations.



*Photo courtesy of the City of Colorado Springs.*

*(This page left intentionally blank)*

*(This page left intentionally blank)*

PLAN PURPOSE AND
# FRAMEWORK

## A Plan for Colorado Springs' Urban Forest

*"Without a plan, the governments and individuals responsible for taking care of an urban forest will not be effective in meeting the true needs of the trees and the community. A plan establishes a clear set of priorities and objectives related to the goal of maintaining a productive and beneficial community forest."*
*- American Public Works Association, 2007*

## PLAN PURPOSE

Understanding the benefits and functions of the urban forest, the City has developed this Urban Forest Management Plan. Many city planning and management actions, especially those that occur during redevelopment, have a large impact on the character and condition of the urban forest. A thriving and well-maintained public tree population provides a wide variety of benefits to the community. A healthy urban forest contributes to the economic vitality of Colorado Springs, provides environmental stability, and provides a better quality of life. Care for the natural environment by the City, contractors, citizens, and volunteers is necessary to maintain and enhance the quality and benefits of the urban forest to which all residents are entitled.

To help ensure Colorado Springs' urban forest will continue to prosper, the City has developed this long-term Urban Forest Management Plan ("Plan") to account for the needs of trees in the urban environment. To develop and maintain desired urban forest resource and program conditions, necessary management actions need to be executed in a timely manner. This Plan provides actions for urban forest management based on possible scenarios to assist the City in maximizing the benefits of the urban forest within the confines of available resources. This approach is implemented to successfully:

▶ Establish a baseline assessment of the urban forest resource, resources for management, and the community engagement framework.

▶ Provide management options based on the availability of resources or changes in tree maintenance.

▶ Provide analyses of urban forest management criteria to assist City Forestry in achieving greater levels of service.

▶ Provide the criteria for achieving goals of sustainable urban forest management in a phased approach based on available resources.

▶ Be a living document by providing the framework and guidance for adaptive management.

## GUIDING PRINCIPLES OF THE PLAN

The Urban Forest Management Plan will adhere to the following guiding principles:

▶ Recognize that the trees of the urban forest are more than aesthetic enhancements.

▶ Recognize trees as the backbone of the urban ecosystem and an essential part of the community's green infrastructure.

▶ Promote the health and growth of the urban forest by following scientifically established best management practices for tree selection, planting, watering, and pruning.

▶ Promote a robust urban forest through policies and practices that reduce its vulnerability to known diseases or pest infestations, and future threats, including the anticipated effects of climate change.

▶ Engage in a continuous process of long-range planning for the growth and maintenance of the urban forest.

▶ Promote public appreciation of the urban forest through educational outreach programs.

▶ Support local businesses, institutions, organizations, and individuals in their efforts to grow and maintain the urban forest through community education.

▶ Proceed in a manner that is inclusive and transparent.

## PLAN FRAMEWORK

The optimal approach to managing an urban forest is to develop an organized, proactive program using information to set goals and measure progress. This information can be utilized to establish priorities, plan strategically, draft cost-effective budgets, and ultimately minimize the need for costly, reactive solutions to crises or urgent risk mitigation. Based on the results of the **Phase 1 Research Summary**, incremental steps to achieve these improvements were developed that can be applied as the City continues to progress. The following outline provides the framework of the Plan:

▸ Four urban forest management scenarios: were developed:

    A. Implement the actions for **Management Scenario A, Baseline Conditions** to build the case for the alternative scenarios.

    B. Secure additional funding and continue to implement actions for **Management Scenario B, Additional but Insufficient Funding**.

    C. Implementation of Management Scenario A sets the stage for **Management Scenario C, Tree Maintenance Responsibility Transfer**.

    D. Actions in Management Scenario A, B, or C provide the information for pursuing **Management Scenario D, Optimal Support**.

*Disclaimer: Management scenarios A-D were created as alternatives for consideration; no alternative is favored or recommended over another and other feasible scenarios may arise in the future.*

▸ The scenarios and framework of this Plan follow a 20-year planning horizon.

▸ An overview, recommendations, limitations, opportunities, and service levels for each scenario are provided.

▸ Goals, targets, and actions to be implemented for each management scenario are provided. Targets are established to measure progress as the City's resources and funding change.

▸ Actions are ranked by priority and level of effort with an assignment of implementation lead and target year for completion.

▸ Case studies and research to support progression towards improved management.

## SCENARIOS AND LEVELS OF SERVICE

Many city agencies, particularly public works agencies, are familiar with using the "level of service" concept when determining annual budgets. Based on the characteristics of the infrastructure components, mandated and desired services, and other department responsibilities, budget decisions are often made on levels of service delivery. The focus of these budget determinations is on getting results rather than determining a single, fixed budget level. In this Plan, the management scenarios describe the urban forestry goals and objectives that can be achieved based on various levels of service and budgets. Multiple budget scenarios can be expressed as the funding amount necessary to provide minimum to adequate to high levels of urban forestry services. This can also be expressed as reactive, routine, and proactive management.

▸ The minimum service level, or reactive management (**Management Scenario A**) is characterized by responding only to emergencies and high priority complaints. At this level, known safety risks are addressed and the financial demands are the lowest, but it is the least efficient means of service delivery in the long run, generates low citizen satisfaction, does not comprehensively address risks, and is usually a result of the lack of a coherently developed urban forestry program.

▸ An improved service level, or varied management approach (**Management Scenario B**), addresses emergency and request-driven work, but also has resources to begin routine tree maintenance and scheduled planting programs.

▸ A high service level, or proactive management (**Management Scenario C or D**), provides for frequent preventive tree maintenance cycles, a high level of tree planting, comprehensive emergency response and clean-up services, pest and disease treatment programs, and public outreach and education. This level has the highest annual costs but generally results in safer, more sustainable urban forests with less storm damage potential and insect and disease threats, maximum tree benefits, and the greatest level of citizen satisfaction.

Once the appropriate level of funding is determined based on the needs of the urban forest and the level of service the community desires, the source or combination of sources for that funding can vary. This Plan provides the framework to build the case for enhanced funding and approaches to secure a diverse and sustainable funding portfolio to achieve the desired levels of service.

## GOAL AND ACTION FRAMEWORK

The goals of the Urban Forest Management Plan focus on preserving, maintaining, and enhancing the urban forest to ultimately benefit the residents of Colorado Springs. The framework for this Plan supports the urban forestry vision:

*"Our City's trees, forests, and other natural resources are recognized as integral to sustaining life and health for all City residents. A healthy, thriving, and sustainable urban forest is a community priority, to be thoughtfully managed and cared for by partnerships between the City and its residents to maximize public safety and benefits that include a thriving ecosystem, vibrant economy, and livable communities shared by all who live, work, and play in Colorado Springs."*

▸ **Goals:**

Goals supporting the urban forest vision are provided based on strengths and opportunities identified during the development of the Phase 1 Research Summary. Each goal is supported by objectives, targets, and actions the City and partners will use to attain the goal. These goals are listed in the table on the following page.

▸ **Objectives:**

Key planning elements and themes to guide Plan actions for accomplishing goals.

▸ **Targets:**

Targets are performance standards and measurable values of specific indicators that enable monitoring of the actions to determine attainment of the actions and goals.

▸ **Actions:**

Actions are Specific, Measurable, Achievable, Relevant, and Time-bound to be implemented to acquire the goals of each planning theme. These actions include recommended timeframes or "target year(s)" based on a starting date of November 2020 and the lead department or partner(s) for implementation. Each action is rated based on the priority, level of effort and/or resources required, and the efficacy of the action.

▸ **Evaluation:**

Using the Urban Forest Audit System described in the Phase 1 Research Summary and the Plan targets, implementation progress and success can be evaluated and annually reported. The evaluation using the audit provides the information necessary for adaptive management.

## CO-BENEFITS OF PLAN IMPLEMENTATION

Each action is accompanied by a graphic depiction of co-benefits, illustrating added value that comes with achieving that action and respective goal. For example, a neighborhood with dense tree canopied streets and landscape may have cooler summer temperatures that lead to fewer heat illnesses reported. Each action impacts four different co-benefits at various levels; the greatest relative level of impact is indicated by the presence of one or more of the following graphics in the Plan's action tables.

**Community**
Actions that engage the public.

**Equity**
Opportunities to satisfy essential needs and achieve full potential.

**Human Health**
Provides physical benefits to local residents.

**Environment**
Benefits of air quality, water quality, and habitat.

## OVERVIEW OF MANAGEMENT SCENARIOS

Each of the four management scenarios will include the following information in their respective Plan sections:

▸ **Management Scenarios (MS)**

A. Management Scenario A (MSA): Baseline Conditions

B. Management Scenario B (MSB): Additional but Insufficient Funding

C. Management Scenario C (MSC): Tree Maintenance Responsibility Transfer

D. Management Scenario D (MSD): Optimal Support

▸ **Overview**

Provides background on the management scenario.

▸ **Recommended Actions**

A summary of the actions to implement within the confines of the management scenario.

▸ **Limitations**

The consequences of the management approach within the scenario.

▸ **Levels of Service**

The allocation of resources within the management scenario described as follows:

Service Level 1) The minimum service level, or reactive management;

Service Level 2) An adequate service level, or routine management;

Service Level 3) A high service level, or proactive management.

A detailed description of levels of service is provided in the Plan Framework section.

▸ **Timeline**

Timeframe for implementing the actions in this Plan.

# URBAN FOREST MANAGEMENT PLAN GOAL FRAMEWORK

*Table 3. Summary of the six goals that guided the objectives, targets, actions, and timelines in the Plan.*

**I. TREE POLICIES:** *Strengthen the foundation for sustainable urban forest management.*

| | | TARGETS | ACTIONS |
|---|---|---|---|
| A | Code Language | | |
| B | Code Enforcement | | |
| C | Define Code Standards | | |
| D | General Policy | | |

**II. STAFFING:** *Improve staffing levels for a healthy urban forest benefiting all citizens.*

| | | TARGETS | ACTIONS |
|---|---|---|---|
| A | Levels of Service | | |
| B | Defining Authority | | |
| C | Communications | | |
| D | Workflows | | |
| E | Training | | |

**III. BUDGET AND FUNDING:** *Secure adequate funding for proactive management.*

| | | TARGETS | ACTIONS |
|---|---|---|---|
| A | Assessment | | |
| B | Budget Planning | | |
| C | Funding | | |

**IV. ASSESSMENTS AND PLANS:** *Understand trends and risks to the urban forest.*

| | | TARGETS | ACTIONS |
|---|---|---|---|
| A | Tree Inventory | | |
| B | Canopy Assessment | | |
| C | Plans | | |

**V. GREEN ASSET MANAGEMENT:** *Provide efficient management of the resource.*

| | | TARGETS | ACTIONS |
|---|---|---|---|
| A | Tree Tracking | | |
| B | Tree Maintenance Prioritization | | |
| C | Tree Maintenance Regime | | |
| D | Storm Response | | |
| E | Biomass Utilization | | |
| F | Wildland-Urban Interface | | |
| G | Young Tree Pruning | | |
| H | Integrated Pest Management | | |
| I | Tree Maintenance Specifications and Standards | | |
| J | Tree Watering | | |
| K | Tree Planting | | |

**VI. COMMUNITY ENGAGEMENT:** *Develop community-wide urban forestry support.*

| | | TARGETS | ACTIONS |
|---|---|---|---|
| A | Education and Outreach | | |
| B | Partnerships | | |
| C | Volunteers | | |

## MANAGEMENT SCENARIO A
# BASELINE CONDITIONS



*Photo courtesy of the City of Colorado Springs.*

| MANAGEMENT SCENARIO A (MSA) | MANAGEMENT SCENARIO B (MSB) | MANAGEMENT SCENARIO C (MSC) | MANAGEMENT SCENARIO D (MSD) |
|---|---|---|---|
| "Baseline Conditions" | "Additional but Insufficient Funding" | "Tree Maintenance Responsibility Transfer" | "Optimal Support" |

*Disclaimer: Management scenarios A-D were created as alternatives for consideration; no alternative is favored or recommended over another and other feasible scenarios may arise in the future.*

## MANAGEMENT SCENARIO A OVERVIEW

This management scenario provides guidance for City Forestry to continue operations and services under baseline conditions with no changes to resources. It uses the planning elements from the Phase 1 Research Summary to provide a strategic road map for efficient management based on available resources to achieve interim goals of urban forest management, sustainability, and equity. The recommendations implemented with this approach strengthen or build the foundation from which the urban forest management program can grow with future additional funding and support.

## RECOMMENDED ACTIONS

Based on the available resources and the research conducted as part of the Urban Forest Management Plan project, the following overview of recommendations for urban forest management under baseline conditions ("business as usual") are provided. The complete set of actions for Management Scenario A begin on page 18.

*Table 4. Summary of recommended actions under baseline conditions in Management Scenario A.*

### I. Tree Policies

❖ (I.A-D): Strengthen City Code as it relates to urban forestry.

### II. Staffing

❖ (II.A): Evaluate staff and resource needs for a public tree population of over 270,000 trees. It is estimated that of the total public tree population, there are approximately 250,000 public street trees and 20,000 public park trees.

❖ (II.B): Establish or clarify tree maintenance authority and responsibility.

❖ (II.C-E): Create or update communication processes, Standard Operating Procedures, and training opportunities.

### III. Budget and Funding

❖ (III.A-B): Develop business cases for additional budget and resources.

❖ (III.C): Establish dedicated funding sources summarized in a sustained funding report.

### IV. Assessments and Plans

❖ (IV.A-B): Update, manage, and utilize available public tree data.

❖ (IV.C): Develop supporting, localized urban forestry plans and update the Citywide plan.

### V. Green Asset Management

❖ (V.A): Manage tree inventory data connected to the service request system and other City asset management programs.

❖ (V.B-C): Maintain the current tree maintenance regime by responding to citizen service requests, completing preventative pruning for 4,000 trees in prioritized areas using in-house and contracted services annually, and removing 400 City-owned hazardous trees annually.

❖ (V.C): Evaluate costs and benefits of a phased relinquishment of public street tree maintenance responsibility.

❖ (V.D-K): Evaluate and update procedures for storm preparation and response, biomass utilization, wildland-urban interface management, young tree pruning, integrated pest management, implementing standards and best practices, tree irrigation, and planting.

### VI. Community Engagement

❖ (VI.A): Provide education to the public on urban forestry topics such as ecosystem benefits, tree maintenance authority, outcomes from this Plan, tree planting and care, and pest monitoring through various approaches such as the City website, social media, fliers, surveys, workshops, and trainings.

❖ (VI.B): Strengthen the community partner network with conventional and non-conventional partnerships that represent demographics and regions across the City.

❖ (VI.C): Amplify community volunteerism efforts through education and events such as the Arbor Day Foundation Tree City USA awards tree planting celebration and awards for exemplary urban forest stewardship.

## LIMITATIONS (CONSEQUENCES)

The following provides an overview of the shortcomings to this baseline approach to urban forest management:

▶ Reactive management causing reduced efficiency, unbalanced levels of service, and increased long-term costs.

▶ Increased risk of property damage and injuries due to reactive management.

▶ Backlogged service requests and reduced comprehensive urban forest planning.

▶ Postponed management of landscapes such as open space, natural resource areas (forested), parks, and riparian areas.

▶ Inadequate structural pruning of young trees to prevent future increased costs.

▶ Inadequate management of invasive trees and nuisance trees in public areas.

## OPPORTUNITIES

▶ An understanding of the required resources for improved urban forest management.

▶ Urban forest management supported by stronger up-to-date policy.

▶ An understanding of priorities within the constraints of limited staffing and budget.

▶ Increased awareness and understanding of tree maintenance responsibility.

▶ Increased awareness and support for urban forest management.

## LEVELS OF SERVICE

▶ The City will operate at Service Level 1, minimum service, or reactive management.

▶ Based on the U.S. Forest Service's Urban Forest Sustainability and Management Audit system, the City is currently operating at 67 percent in terms of urban forest management and sustainability. The ranking is based on an evaluation of 11 categories of urban forest management containing over 120 performance indicators. The Plan's actions recommend reevaluations of the program using the audit system to monitor changes and adapt for continuous improvement in urban forest management.

▶ Current Tree Maintenance Budget (2020): $1,558,037

▶ Staff per public tree: 1 staff for every 24,545 trees (11 staff[1])— a shortage of 16 FTEs according to industry standards and recommendations.

▶ Funding per public tree: $5.77, an $18.81 to $21.64 shortage based on industry standards.

*1. In 2020, the Forestry Division had a total of 13 full-time employees, 11 of which perform Forestry tasks.*

## TIMELINE

▶ The actions should be implemented based on priority and resources available.

▶ Actions implemented for this management scenario will support advancement to alternative scenarios.

▶ If no significant changes to City Forestry's budget occur, the actions and targets provided in this Plan will still support incremental improvements to the program.

## FRAMEWORK OF PLAN TARGETS

The following tables provide planning targets consisting of desired conditions, metrics, and indicators to allow stakeholders to track progress in achieving the associated goal. Implementation of the actions provided in this Plan will lead to successful achievement of the listed targets. The targets are listed in incremental stages across a 20-year planning horizon; 1-year, 2-year, 5-year, 10-year, 20-year— indicating the timeframe for accomplishing the relative target. Each target includes a reference to the Plan action(s) that will support achievement of the target. The following depicts the layout of the Plan Targets:



*Figure 1. An example of the Targets tables found in this Plan including the goal theme, goal objective, action reference, targets, and target milestones.*

Each target includes a reference to the action(s) that supports its accomplishment. For example, to update City Code within the 2-year target milestone, actions I.A.2 and I.A.3 need to be implemented as shown in the table excerpt below. As the table shows, each action in Management Scenario A's action table includes an action number. This number is referenced in parentheses within each target.

| Priority | Effort | Co-benefit | ▷ | I. TREE POLICY ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|---|
| | | | **A. CODE LANGUAGE** | | |
| **I.A.2** Priority | Effort | 🌳 | | Review with the City the recommended Code changes in Appendix V regarding weed maintenance (permissions, restrictions, responsibility), weed prevention (volunteer sprouts), and unauthorized plantings. | **PRCS**, PWD, PDD, NSD, CSU  **TARGET YEAR:** 2020 |
| **I.A.3** Priority | Effort | 🌳 | | Review with the City the recommended Code changes in Appendix V regarding inconsistencies found in Chapter 7 (Landscape Code) and Chapter 4 (Forestry) i.e. tree spacing, minimum number of trees, maintenance responsibilities, location of trees. | **PRCS**, PWD, PDD  **TARGET YEAR:** 2020 |

*Figure 2. An example of the Actions tables found in this Plan including the goal theme and objective, priority and effort rankings, co-benefits, lead, and target year.*

*Table 5. Complete list of targets, by goal, for Management Scenario A.*

## PLAN TARGETS: MANAGEMENT SCENARIO A

### I. TREE POLICIES

| | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. Code Language** | (I.A-C)City Council receives Code amendments <br> (I.A.1)Forestry Rules and Regulations (FRR) updated | (I.A.2-3)City Code updated | (I.A.1)Landscape Code and Policy Manual (LCPM) updated | (I.A.1)FRR updated | (I.A.1)FRR updated |
| **B. Code Enforcement** | (I.A-C)City Council receives Code amendments <br> (I.A.1)FRR updated | (I.B.1)FRR in City Code <br> (I.B.2-6)Enforcement amendments in City Code | (I.B.2-6)Enforcement revenue summary | | (I.B.5)2 Certified Arborists in other departments |
| **C. Define Code Standards** | (I.A-C)City Council receives Code amendments <br> (I.A.1)FRR updated <br> (I.C.7)Significant Tree candidate trees increases | (I.C.3-5,10)Tree maintenance authority documented in FRR <br> (I.C.3-5,10)Final tree transfer plan case study | (I.C.7)The Significant Tree Program expands | (I.C.7)Volunteer private tree Significant Tree Program | |
| **D. General Policy** | | (I.D.1)Urban Forest Management Plan (UFMP) updated | (I.D.1)FRR referenced in City plans | (I.D.1)Urban Forest Management Plan updated | |

*Table 5. continued: Complete list of targets, by goal, for Management Scenario A.*

## PLAN TARGETS: MANAGEMENT SCENARIO A

### II. STAFFING

| | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. Levels of Service** | (II.A.1)Tree maintenance staffing business case | (II.A.1)Additional staffing business case prepared (II.A.2-3) Standard Operating Procedures (SOP) for contractors | (II.A.1)Business case for 4 Forestry divisions | | |
| **B. Defining Authority** | (II.B.4)Maintenance authority for trees listed in FRR | | (II.B.4)Tree maintenance authority updated in FRR | | (II.B.4)Tree maintenance authority updated in FRR |
| **C. Communications** | (II.C.1)Business license SOP with City Clerk's Office | (II.C.4)Storm response SOP | | | |
| **D. Workflows** | | | (II.D.1)SOPs updated (II.D.2)Staff hours per activity within +/- 5% of job description | | |
| **E. Training** | (II.E.1)One-third of all current certified staff acquire necessary CEU's to maintain certification (II.E.2)At least 1 safety or industry training is held per quarter | | (II.E.1)All Forestry staff are International Society of Arboriculture (ISA) Certified Arborists, 1 TRAQ Qualified, 3 Municipal Specialists, 2 Society of American Foresters (SAF) Certified Foresters (II.E.2)2 annual City department urban forestry trainings | (II.E.2)2 ISA Board Certified Master Arborists, 2 SAF Certified Foresters | |

*Table 5. continued: Complete list of targets, by goal, for Management Scenario A.*

## PLAN TARGETS: MANAGEMENT SCENARIO A

### III. BUDGET AND FUNDING

| | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. Assessment** | (III.A.1)Funding enables 50% of public trees to be inventoried<br><br>(III.A.1)Public tree maintenance business case prepared | (III.A.1)Funding enables 100% of public trees to be inventoried | (III.A.1)Public tree maintenance business case updated | (III.A.1)Public tree maintenance business case updated | (III.A.1)Public tree maintenance business case updated |
| **B. Budget Planning** | (III.B.1)Tree maintenance funding request prepared | (III.B.1)Tree maintenance funding request updated | (III.B.1)Tree maintenance funding request updated | (III.B.1)Tree maintenance funding request updated | (III.B.1)Tree maintenance funding request updated |
| **C. Funding** | (III.C.1-16)Tree transfer case study funding options finalized | (III.C.5) Grant applications submitted for all relevant urban forestry applications (inventory, operations, etc.)<br><br>(III.C.1-16)Pursuing 25% of alternative funding options | (III.C.1-15)3 new funding streams secured<br><br>(III.C.16)Sustained funding report developed | (III.C.1-16)A dedicated funding stream for public trees | (III.C.1-16)Funding sources diversified: private, General Fund, grants, taxes, donations |

*Table 5. continued: Complete list of targets, by goal, for Management Scenario A.*

## PLAN TARGETS: MANAGEMENT SCENARIO A

| IV. ASSESSMENTS AND PLANS | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| A. TREE INVENTORY | (IV.A.1)50% of public trees inventoried | (IV.A.1)100% of public trees inventoried (IV.A.1)All tree activities tracked in software (IV.A.2)Cost-benefit analysis completed for trees | (IV.A.3)City and partner tree plantings tracked in software (IV.A.4)Risk assessment program implemented | (IV.A.1)Second phase public tree inventory | (IV.A.1)Entire public tree inventory completed |
| B. CANOPY ASSESSMENT | | | | (IV.B.1)Canopy change assessment to establish canopy goals | |
| C. PLANS | | (IV.C.2)UFMP is updated | (IV.C.2)UFMP is updated (IV.C.3)Technical and educational support results in 2 academic institution UFMPs (IV.C.3)Technical support results in HOA, SIMD, or neighborhood UFMP | (IV.C.2)UFMP is updated (IV.C.3)10% of academic institutions have a UFMP (IV.C.4)An urban forest audit is completed | (IV.C.2)UFMP is updated (IV.C.3)25% of academic institutions have a UFMP (IV.C.3)2 corporations, 25% of healthcare facilities have a UFMP (IV.C.3)25% of HOAs, SIMDs, neighborhoods have a UFMP (IV.C.4)An urban forest audit is completed |

*Table 5. continued: Complete list of targets, by goal, for Management Scenario A.*

## PLAN TARGETS: MANAGEMENT SCENARIO A

| V. GREEN ASSET MANAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. TREE TRACKING** | (V.A.1)Service requests connected to tree software | (V.A.2)Tree software integrated with City asset software | (V.A.2)100% of applicable CIP projects use tree software | | (V.A.2)Forestry updates tools to reflect technology changes |
| **B. TREE MAINTENANCE PRIORITIZATION** | (V.B.1)Preventative pruning prioritization maps created | (V.B.1)Preventative pruning prioritization maps updated | | | (V.B.1)Preventative pruning prioritization maps updated |
| **C. TREE MAINTENANCE REGIME** | (V.C.1)2,000 trees pruned; 2,000 trees contracted | (V.C.1)2,000 trees pruned; 2,000 trees contracted | (V.C.1)Tree maintenance and removal regimen is maintained | (V.C.1)At least 4,000 trees are pruned annually with in-house arborist crew and contracted services | (V.C.1)Tree maintenance and removal regimen is maintained |
| | (V.C.2)400 hazardous trees removed | (V.C.2)400 hazardous trees removed | | (V.C.2)400 hazardous trees are removed annually based on assessments and prioritization | |
| | (V.C.6)Management of non-natives and unauthorized trees SOP | (V.C.4-5)Pruning rotation and tree maintenance responsibility transfer cost-benefit analysis | | | |
| **D. STORM RESPONSE** | (V.D.1)Storm response SOP | (V.D.2)Past winter storm service request backlog reduced by 50% | (V.D.2)Past winter storm service request backlog reduced by 50% | | |

*Table 5. continued: Complete list of targets, by goal, for Management Scenario A.*

## PLAN TARGETS: MANAGEMENT SCENARIO A

| V. GREEN ASSET MANAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| E. Biomass Utilization | (V.E.1)City wood debris used for playgrounds and other areas up 10% | (V.E.1)City wood debris used for playgrounds and other areas up 25% | (V.E.1)City wood debris used for playgrounds and other areas up 50% | (V.E.1)City wood debris used for playgrounds and other areas up 75% | (V.E.1) Repurposing City wood debris program for firewood, lumber, furniture |
| F. Wildland-Urban Interface (WUI) | | | (V.F.2)5% of fire risk acres in WUI areas maintained | | |
| G. Young Tree Pruning | (V.G.1)Young tree care plan for City-led projects | (V.G.1)City Code and FRR updated with young tree care standards | | (V.G.1)Young public tree maintenance plan | |
| H. Integrated Pest Management | (V.H.2)Response to ash tree service requests follows a consistent management approach | (V.H.2)Emerald ash borer plan implemented; (V.H.3)Tree susceptibility report | | (V.H.2)Partial completion of emerald ash borer plan actions | |
| I. Tree Specs and Standards | ← (V.I.1)City tree maintenance adheres to standards and best practices → | | | | |
| J. Tree Watering | | (V.J.2)Planting and watering plan | (V.J.5)Modified water plan for trees in drought | (V.J.4)75% of trees planted are site appropriate | (V.J.4)Updated tree species list and planting plan |

*Table 5. continued: Complete list of targets, by goal, for Management Scenario A.*

## PLAN TARGETS: MANAGEMENT SCENARIO A

| V. Green Asset Management | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **K. Tree Planting** | (V.K.1)Tree species list updated | (V.K.5)18,071 "COS 150 Tree Challenge Program" trees planted (public and private) | (V.K.7)Trees are a best management practice (BMP) in stormwater management plan | | |

*Table 5. continued: Complete list of targets, by goal, for Management Scenario A.*

## PLAN TARGETS: MANAGEMENT SCENARIO A

| VI. COMMUNITY ENGAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. EDUCATION AND OUTREACH** | (VI.A.1-16)Public outreach strategy developed<br><br>(VI.A.6)Forestry articles (1 per quarter) on social media, other platforms | (VI.A.8)Forestry public survey (biannually) | (VI.A.9-15)6 topic-specific messages created for 4 audiences (residential, businesses, institutions, youth) | (VI.A.16)Trained tree stewards representing multiple neighborhoods | (VI.A.1-16)City tree organizations host multiple events, trainings |
| **B. PARTNERSHIPS** | (VI.B.1)UFMP information shared with all partners including City Fire Department | (VI. B.9)Office of Innovation aids multi-department planning | (VI.B.3)Support establishment of non-profit or non-governmental organization<br><br>(VI.B.5)Partners represent all neighborhoods and cultures<br><br>(VI.B.6)2 Academic institutions have UFMPs | (VI.B.6)50% of academic institutions have a UFMP<br><br>(VI.B.7)Tree giveaway programs expand due to demand | |
| **C. VOLUNTEERS** | (VI.C.2,5)City-hosted planting event | (VI.C.1)Forestry volunteers increase by 10% | (VI.C.1)Forestry volunteers increase by 50%<br><br>(VI.C.3)Volunteers represent all neighborhoods and demographics | (VI.C.1)Forestry volunteers increase by 75%<br><br>(VI.C.5)Tree City USA award for 53rd consecutive year | (VI.C.1)Forestry volunteers increase by 100%<br><br>(VI.C.5)Tree City USA award for 63rd consecutive year |

## FRAMEWORK OF PLAN ACTIONS

The following tables provide the actions to implement as part of Management Scenario A, Baseline Conditions. The actions and recommendations listed in the alternative management scenarios (B-D) reference the actions for Management Scenario A which are linked to the targets provided for each management scenario. Actions for alternative management scenarios should be implemented based on changes to program funding and tree maintenance responsibility.

For Management Scenario A, actions are organized by Urban Forest Management Plan goal and objective. Each action describes the necessary instructions to achieve the related goal and objective. The level of priority and degree of effort is provided for each action as well as the responsible department(s) or partner(s). Based on the priority, effort, resources needed, and goals of the Urban Forest Management Plan, the target year(s) for implementing or completing the action is provided. The layout for the action tables is provided below:



*Figure 3. An example of the Actions tables found in this Plan including the goal theme and objective, priority and effort rankings, co-benefits, lead, and target year.*

*Each action includes the responsible entity for implementation indicated by the following abbreviations:

▸ CD-Communications Department
▸ CDD-Community Development Department
▸ CSFD-Colorado Springs Fire Department
▸ CSU-Colorado Springs Utilities
▸ HOAs-Homeowners' Associations
▸ NSD-Neighborhood Services Department
▸ OEM-Office of Emergency Management
▸ PDD-Planning and Development Department
▸ PRCS-Parks, Recreation and Cultural Services Department
▸ PWD-Public Works Department
▸ SIMDs-Special Improvement Maintenance Districts

Actions may include the following abbreviations or acronyms:

▸ ANSI-American National Standards Institute
▸ BID-Business Improvement District
▸ BMPs-Best Management Practices
▸ CIP-Capital Improvement Program
▸ FRR-Forestry Rules and Regulations
▸ ISA-International Society of Arboriculture
▸ LCPM-Landscape Code and Policy Manual
▸ SAF-Society of American Foresters
▸ SOP-Standard Operating Procedure
▸ TOPS-Trails, Parks, and Open Space
▸ UFMP-Urban Forest Management Plan
▸ 2C-Ballot item 2C sales tax for paving

**The primary **co-benefit** is listed at the bottom of each column. Any co-benefit symbol added above the bottom symbol indicates a slightly lesser degree of co-benefit significance.

**Community**
Actions that engage the public.

**Equity**
Opportunities to satisfy essential needs and achieve full potential.

**Human Health**
Provides physical benefits to local residents.

**Environment**
Benefits of air quality, water quality, and habitat.

*Table 6. Complete list of actions, by goal, for Management Scenario A.*

| Priority / Effort / Co-benefit | I. TREE POLICY ACTIONS | LEAD*/YEAR |
|---|---|---|
| | **A. CODE LANGUAGE** | |
| **I.A.1** (Priority / Effort) | Update the Forestry Rules and Regulations based on recommendations provided in Appendix V of the 2020 Urban Forest Management Plan (UFMP). Update the Landscape Code and Policy Manual, as necessary. | **PRCS**, PDD, PWD  TARGET YEAR: 2021 |
| **I.A.2** (Priority / Effort) | Review with the City the recommended Code changes in Appendix V regarding weed maintenance (permissions, restrictions, responsibility), weed prevention (volunteer sprouts), and unauthorized plantings. | **PRCS**, PWD, PDD, NSD, CSU  TARGET YEAR: 2020 |
| **I.A.3** (Priority / Effort) | Review with the City the recommended Code changes in Appendix V regarding inconsistencies found in Chapter 7 (Landscape Code) and Chapter 4 (Forestry) i.e. tree spacing, minimum number of trees, maintenance responsibilities, location of trees. | **PRCS**, PWD, PDD  TARGET YEAR: 2020 |
| | **B. CODE ENFORCEMENT** | |
| **I.B.1** (Priority / Effort) | Develop an ordinance proposal to update Code to reference the new Forestry Rules and Regulations. Update the Landscape Code and Policy Manual, as necessary, and use Appendix V as guidance. | **PRCS**  TARGET YEAR: 2021 |
| **I.B.2** (Priority / Effort) | Develop a proposal to update enforcement procedures in Code regarding Duty to Prune (4.4.104). See private hazard trees (4.4.202E) procedures in City Code and Appendix V for guidance. | **PRCS**, PWD, PDD, NSD, CSU  TARGET YEAR: 2021 |
| **I.B.3** (Priority / Effort) | Establish enforcement requirements in City Code for tree protection/planting in development plans (i.e. tree bonds). Use Appendix V as guidance. | **PDD**, PRCS, PWD, NSD, CDD, CSU  TARGET YEAR: 2021 |
| **I.B.4** (Priority / Effort) | Develop a proposal for establishing tree survival and tree health requirements in Code for development projects where applicable. Use Appendix V as guidance to update City Code and policies. | **PDD**, PRCS, PWD, NSD, CDD, CSU  TARGET YEAR: 2021 |
| **I.B.5** (Priority / Effort) | Develop a proposal to update Code to mandate contacting City Forestry for construction within proximity to City trees. Use Appendix V as guidance. | **PRCS**, PWD, PDD, NSD, CDD, CSU  TARGET YEAR: 2021 |
| **I.B.6** (Priority / Effort) | Review the recommended Code changes provided in Appendix V regarding policy enforcement, repercussions, and restitution relating to urban forestry. Develop a final proposal of requested changes by working with City departments. | **PRCS**, PWD, PDD, NSD, CDD, CSU  TARGET YEAR: 2021 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▷ I. TREE POLICY ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **C. DEFINE CODE STANDARDS** | |
| I.C.1 | | 🌳 | Establish the permitted growing space and medium for trees in downtown areas through a formal proposal. Use Appendix V as guidance to update City Code and policies. | **PRCS**, PWD, PDD, NSD, CDD, CSU <br><br> **TARGET YEAR:** 2021 |
| I.C.2 | | 🌳 | Develop a proposal for updating tree protection and replacement standards for trees within 2C contracts in City Code and policies. Use Appendix V as guidance. | **PRCS**, PWD, PDD, NSD, CDD, CSU <br><br> **TARGET YEAR:** 2021 |
| I.C.3 | | 🌳 | Work with City to determine authority, limitations, and differences between City Code and the Forestry Rules and Regulations. | **PRCS** <br><br> **TARGET YEAR:** 2021 |
| I.C.4 | | 🌳 | Define authority for tree maintenance in alleyways in City Code and policy (i.e. the adjacent property owner is responsible for vegetation maintenance in the alleys and CSU only conducts line clearance maintenance). Use Appendix V as guidance. | **PRCS**, CSU, NSD <br><br> **TARGET YEAR:** 2021 |
| I.C.5 | | 🌳 | Define tree maintenance and removal standards and authority in City Codes and policy for trees under utilities within the rights-of-way. Note, it is currently City Forestry's responsibility, but Forestry is not permitted to prune within 10-feet of electrical lines. Use Appendix V as guidance. | **PRCS**, CSU, NSD <br><br> **TARGET YEAR:** 2021 |
| I.C.6 | | 🌳 | Establish future guidelines in City Code and policy regarding subdivision development plans and landscaping/tree maintenance responsibility. Use Appendix V as guidance. | **PRCS**, PDD, PWD, NSD, CDD, CSU <br><br> **TARGET YEAR:** 2021 |
| I.C.7 | | 🏠 🌳 | Strengthen the Significant Tree Program for public trees. Use Appendix V as guidance to update City Code and policies. | **PRCS**, PWD, PDD, NSD <br><br> **TARGET YEAR:** 2021 |
| I.C.8 | | 🌳 | Provide additional options (i.e. alternative solutions) for future development plans and adequate tree growing space. Use Appendix V and Appendix IX as guidance to update City Code, policies, and manuals. | **PRCS**, PWD, PDD, NSD, CDD, CSU <br><br> **TARGET YEAR:** 2025 |
| I.C.9 | | 🌳 | Update standards and best practices relating to the reduction of irrigation in rights-of-way and the effects on existing and new trees. Use Appendix V as guidance to update City Code, policies, manuals, and standards. | **PRCS**, PWD, PDD <br><br> **TARGET YEAR:** 2023 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▷ **I. TREE POLICY ACTIONS** | **LEAD*/YEAR** |
|---|---|---|---|---|
| | | | **C. DEFINE CODE STANDARDS (CONTINUED)** | |
| **I.C.10** Priority | Effort | 🌳 | State the responsibility for tree failures due to severely pruned trees under utilities by updating City Code and policies. Use Appendix V as guidance. | **PRCS**, CSU  **TARGET YEAR:** 2025 |
| | | | **D. GENERAL POLICY** | |
| **I.D.1** Priority | Effort | ⚖ ⊕ 🏠 🌳 | City Forestry staff should engage in City department planning including updates to the City's comprehensive plan, PlanCOS, by integrating information and actions in the 2020 Urban Forest Management Plan. | **PRCS**, PDD  **TARGET YEAR:** 2024 |
| **I.D.2** Priority | Effort | ⚖ ⊕ 🏠 🌳 | Prepare a proposal for all proposed ordinances and amendments to be enacted into City Code. Update the Landscape Code and Policy Manual, as necessary. Use Appendix V as guidance. | **PRCS**  **TARGET YEAR(S):** 2021, 2025 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority / Effort / Co-benefit | II. STAFFING ACTIONS | LEAD*/YEAR |
|---|---|---|
| **A. LEVELS OF SERVICE** | | |
| **II.A.1** — Priority / Effort (with house, scales, tree icons) | Strengthen a needs-assessment for the arborist crew(s) by developing a business case to propose at next budget cycle for crew support (including new northeast office) and to inform future decisions about public tree maintenance responsibility. Use the guidance in Appendix I and Appendix II to demonstrate staffing and levels of service needs for 270,000 public trees. | **PRCS**, PWD, PDD <br><br> **TARGET YEAR:** 2020 |
| **II.A.2** — Priority / Effort (with scales, plus, house, tree icons) | Strengthen the Standard Operating Procedure for use of contractors for tree maintenance and administration guidance. Align these procedures with current tree maintenance responsibility. | **PRCS**, PWD, PDD <br><br> **TARGET YEAR:** 2021 |
| **II.A.3** — Priority / Effort (with scales, plus, house, tree icons) | Strengthen the Standard Operating Procedure and continue to use seasonal workers aligned with current tree maintenance responsibility defined in the 2020 Urban Forest Management Plan. Identify monthly and annual priorities and clarify administrative guidance. | **PRCS**, PWD, PDD <br><br> **TARGET YEAR:** 2021 |
| **B. DEFINING AUTHORITY** | | |
| **II.B.1** — Priority / Effort (with tree icon) | Develop a Standard Operating Procedure that defines the planting and maintenance responsibility of HOAs and developers. Update with changes to public tree maintenance responsibilities. | **PRCS**, PDD, NSD, PWD <br><br> **TARGET YEAR:** 2021 |
| **II.B.2** — Priority / Effort (with tree icon) | Define, in a Standard Operating Procedure, the planting and maintenance authority for trees between the City and Special Improvement Maintenance Districts. | **PRCS**, PDD, NSD, PWD <br><br> **TARGET YEAR:** 2021 |
| **II.B.3** — Priority / Effort (with tree icon) | Define, in a Standard Operating Procedure, the planting and maintenance authority for trees between City Forestry and the Downtown Business Improvement District. | **PRCS**, PDD, NSD, PWD <br><br> **TARGET YEAR:** 2021 |
| **II.B.4** — Priority / Effort (with scales, plus, house, tree icons) | Organize all Standard Operating Procedures for tree planting and maintenance into a manual that includes current authority, ownership, and responsibility for all entities (City Forestry, HOA, Metro District, SIMD, Downtown BID, Utilities, existing subdivisions). | **PRCS**, PDD, NSD, PWD <br><br> **TARGET YEAR:** 2022 |
| **C. COMMUNICATIONS** | | |
| **II.C.1** — Priority / Effort (with tree icon) | Coordinate procedures and communications with City Clerk officers regarding business licenses and the guidance/review of tree planting and protection requirements. | **PRCS**, PDD, NSD, PWD <br><br> **TARGET YEAR:** 2025 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▶ II. STAFFING ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **C. COMMUNICATIONS (CONTINUED)** | |
| II.C.2 Priority Effort | | 🏠 🌳 | Coordinate procedures and communications with Neighborhood Services regarding noncompliance of private tree maintenance. | **PRCS**, PDD, NSD, PWD TARGET YEAR: 2022 |
| II.C.3 Priority Effort | | 🏠 🌳 | Define, document, and educate on the appropriate procedure for citizens to contact Colorado Springs Utilities (CSU) regarding trees needing maintenance around wires. Coordinate with CSU and City legal. | **PRCS**, CSU TARGET YEAR: 2023 |
| II.C.4 Priority Effort | | ⊕ 🏠 🌳 | Clarify roles of City personnel for coordination, communication, pruning/removal of public trees, and debris cleanup management in the event of wind or snow storms or other local natural disasters causing major damage to trees. | **PRCS**, PWD, CSU, PDD, NSD TARGET YEAR: 2023 |
| | | | **D. WORKFLOWS** | |
| II.D.1 Priority Effort | | ⚖ ⊕ 🏠 🌳 | Establish/update Standard Operating Procedures for changes and clarifications to roles and responsibilities as actions in the 2020 Urban Forest Management Plan are implemented. | **PRCS**, PDD, PWD, CSU TARGET YEAR: 2025 |
| II.D.2 Priority Effort | | ⚖ ⊕ 🏠 🌳 | Utilize a continuous improvement framework to improve operational workflows in urban forest management. | **PRCS** TARGET YEAR: ANNUAL |
| | | | **E. TRAINING** | |
| II.E.1 Priority Effort | | 🌳 | Provide and permit staff to acquire ISA and SAF certification and maintain certification through CEU's administered online and at industry conferences. | **PRCS** TARGET YEAR: ANNUAL |
| II.E.2 Priority Effort | | 🌳 | Provide, at minimum, annual in-house or consultant training on tree care safety and first aid. | **PRCS** TARGET YEAR: ANNUAL |
| II.E.3 Priority Effort | | ⊕ 🏠 🌳 | Stay current with industry research, science, and technology through various platforms. An example includes management of current and potential exotic tree pest and disease threats. | **PRCS**, PWD, PDD TARGET YEAR: ANNUAL |
| II.E.4 Priority Effort | | 🌳 | Provide and support other applicable training. | **PRCS**, PWD, PDD, CSU, NSD, CDD TARGET YEAR: ANNUAL |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▷ III. BUDGET AND FUNDING ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **A. ASSESSMENT** | |
| III.A.1 Priority | Effort | ⚖ ⊕ 🏠 🌳 | Use the guidance provided in Appendix I and Appendix II to build a business case for the funding required to manage 270,000 street and park trees. | **PRCS** <br><br> TARGET YEAR: 2020 |
| III.A.2 Priority | Effort | ⊕ 🏠 🌳 | Use the guidance provided in Appendix I and Appendix II to build a business case for the funding required to manage the wildland-urban interface (WUI) for approximately 10,000 acres of forested open space. | **PRCS**, CSFD <br><br> TARGET YEAR: 2020 |
| | | | **B. BUDGET PLANNING** | |
| III.B.1 Priority | Effort | ⚖ ⊕ 🏠 🌳 | Develop a business case to propose at future budget cycles for increased arborist crew and include a request for increased annual urban forest management funding (including City partners) that incrementally aligns more closely with Western U.S. rates and the 270,000 public tree population (see Appendix I and Appendix II). | **PRCS**, PWD, PDD, NSD <br><br> TARGET YEAR: 2020 |
| III.B.2 Priority | Effort | ⚖ ⊕ 🏠 🌳 | Use the tree planting prioritization information in Appendix X to appropriately budget for annual tree plantings. | **PRCS**, PWD, PDD <br><br> TARGET YEAR: 2025 |
| III.B.3 Priority | Effort | ⚖ ⊕ 🏠 🌳 | Determine and budget for adequate number of trees to plant per year based on current staffing, partners, the 2018 Tree Canopy Assessment and 2019 report, and the 2020 Urban Forest Management Plan. | **PRCS**, PWD, PDD, NSD <br><br> TARGET YEAR: 2021 |
| III.B.4 Priority | Effort | 🌳 | Develop an annual education and training budget for City Forestry and supporting staff that supports one-third of staff attending CEU accrediting seminars, workshops, and conferences each year. | **PRCS**, PWD, PDD, CSU <br><br> TARGET YEAR: ANNUAL |
| III.B.5 Priority | Effort | 🌳 | Determine and prepare a business case for budgeting urban forestry equipment and personal protective gear. Prepare the business case based on current staffing and tree maintenance responsibility. | **PRCS**, PWD, PDD, <br><br> TARGET YEAR: 2021 |
| III.B.6 Priority | Effort | 🌳 | Determine and prepare a business case for budgeting tree inventory equipment needs for the upcoming budget planning sessions. | **PRCS**, PWD <br><br> TARGET YEAR: 2021 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | III. BUDGET AND FUNDING ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **C. FUNDING** | |
| **III.C.1** Priority / Effort | | ⚖ ⊕ 🏠 🌳 | Establish a dedicated, sustained funding source beyond the current departmental budget for City Forestry operations to increase the level of service to meet the community's high standards. Use Appendix I and Appendix VIII as guidance. | **PRCS**, PWD, PDD, NSD<br><br>**TARGET YEAR:** ANNUAL |
| **III.C.2** Priority / Effort | | ⚖ ⊕ 🏠 🌳 | Provide non-financial support for the establishment of a non-profit or non-governmental organization that advocates, coordinates volunteers and events, educates, and fundraises for the City's urban forest. | **PRCS**, NSD<br><br>**TARGET YEAR:** 2024 |
| **III.C.3** Priority / Effort | | ⚖ ⊕ 🏠 🌳 | Use the data from the Assessments and Plans actions (i.e. tree maintenance needs, tree planting needs, ecosystem services) to support budget and funding increases. | **PRCS**, PWD, PDD,<br><br>**TARGET YEAR:** 2023 |
| **III.C.4** Priority / Effort | | ⚖ ⊕ 🏠 🌳 | Evaluate the opportunities for urban forestry funding within the current tax structure of improvement districts (i.e. efficient use of Special Improvement Maintenance Districts' or SIMDs' landscaping fee). | **PRCS**, PDD<br><br>**TARGET YEAR:** 2021 |
| **III.C.5** Priority / Effort | | ⚖ ⊕ 🏠 🌳 | Continue to seek and acquire funding from organizations such as the Colorado State Forest Service, U.S. Forest Service, Front Range Urban Forestry Council, and others. | **PRCS**, NSD<br><br>**TARGET YEAR:** ANNUAL |
| **III.C.6** Priority / Effort | | 🏠 🌳 | Working with the City's TOPS Working Committee, support Trails and Open Space Committee's goal of increasing TOPS (Trails Open Space and Parks) 0.10 percent sales tax as recommended in PlanCOS. | **PRCS**, NSD<br><br>**TARGET YEAR(S):** 2021-2025 |
| **III.C.7** Priority / Effort | | ⚖ ⊕ 🏠 🌳 | Explore funding sources such as voter-supported bonds to fund capital projects for improved infrastructure and streetscaping along arterials and improved future maintenance including fuels mitigation treatments in the wildland-urban interface (WUI). | **PRCS**, PWD, PDD, NSD<br><br>**TARGET YEAR:** 2023 |
| **III.C.8** Priority / Effort | | 🌳 | Evaluate the procedures and benefits of reinstating the Street Tree Fund or similar program. Explore donation programs to fund tree activities. | **PRCS**, PDD, PWD, NSD<br><br>**TARGET YEAR:** 2023 |
| **III.C.9** Priority / Effort | | 🌳 | Evaluate current real estate taxes, utility taxes, stormwater fees, motor fuel taxes, and development and permitting fees as opportunities for urban forestry funding. | **PRCS**, PDD, PWD, NSD<br><br>**TARGET YEAR:** 2023 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | III. BUDGET AND FUNDING ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **C. FUNDING (CONTINUED)** | |
| **III.C.10** Priority | Effort | | Evaluate current and potential uses of funds acquired through City Code violations relating to urban forest management. Estimate the potential funds to be acquired as a result of the implementation of the policy enforcement actions listed in the Tree Policies actions. | **PRCS**, PDD, PWD, NSD  **TARGET YEAR:** 2023 |
| **III.C.11** Priority | Effort | | Explore opportunities for funding through a new home tree fund and/or property transfer tax. | **PRCS**, CDD, PDD, NSD  **TARGET YEAR:** 2023 |
| **III.C.12** Priority | Effort | | Evaluate tax increment financing as a subsidy for redevelopment, infrastructure, and other City-improvement projects by selling bonds backed by a development's future taxes. | **PRCS**, CDD, PDD, NSD  **TARGET YEAR:** 2023 |
| **III.C.13** Priority | Effort | | Identify options for short-term funding to manage emergency response for tree damage after storm events, including debris management. | **PRCS**, PWD, PDD, NSD  **TARGET YEAR:** 2023 |
| **III.C.14** Priority | Effort | | Explore wood utilization opportunities for reducing costs and potentially increasing urban forestry budget. | **PRCS**, PWD  **TARGET YEAR:** 2023 |
| **III.C.15** Priority | Effort | | Research the ability to use urban forest planting and/or preservation projects to earn carbon credits and create an additional funding source. | **PRCS**  **TARGET YEAR:** 2026 |
| **III.C.16** Priority | Effort | | Based on the exploration of funding opportunities provided in Appendix I and Appendix VIII, develop a sustained funding report that details the opportunities and approaches for sustained, dedicated, and diversified funding. | **PRCS**  **TARGET YEAR:** 2025 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▷ IV. ASSESSMENTS AND PLANS ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **A. TREE INVENTORY** | |
| **IV.A.1** Priority Effort | | 🏠 🌳 | Manage and update the tree inventory database and track service requests. | **PRCS**, PWD, PDD  **TARGET YEAR(S):** 2022, ANNUAL |
| **IV.A.2** Priority Effort | | 🏠 🌳 | Quantify the ecosystem benefits and appropriate appraisal values of public trees to conduct a cost-benefit analyses of public trees. This informs maintenance recommendations and raises public awareness of the urban forest benefits. | **PRCS**  **TARGET YEAR:** 2022 |
| **IV.A.3** Priority Effort | | 🌳 | Monitor tree loss and gain through annual tree removal and planting permit reporting. Track all City-led tree plantings and tree plantings conducted by partners. | **PRCS**, PWD, PDD, CSU  **TARGET YEAR:** ANNUAL |
| **IV.A.4** Priority Effort | | ⊕ 🏠 🌳 | Conduct inventories and assessments for tree risk in priority areas based on service requests, tree age, road corridor, neighborhood, and capital projects. | **PRCS**, CDD, PDD, NSD, HOAs, SIMDs  **TARGET YEAR:** 2025 |
| | | | **B. CANOPY ASSESSMENT** | |
| **IV.B.1** Priority Effort | | 🌳 | Use the 2018 Tree Canopy Assessment and 2019 report to guide planting and preservation (use Appendix X as guidance). | **PRCS**, PWD, PDD, HOAs, SIMDs  **TARGET YEAR(S):** 2022, ANNUAL |
| **IV.B.2** Priority Effort | | 🌳 | Conduct an updated high-resolution tree canopy assessment and determine canopy cover gains and losses by comparing to the 2018 Tree Canopy Assessment and 2019 report. | **PRCS**, PDD, PWD  **TARGET YEAR(S):** 2030, 2040 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▷ IV. ASSESSMENTS AND PLANS ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **C. PLANS** | |
| **IV.C.1** Priority | Effort | 🌳 | Develop or update plans specific to riparian areas, open space, forests, and parks by coordinating with Water Resource Engineers, Streets and Public Works, Planning, and other entities with mutually beneficial attributes. | **PRCS**, CDD, PDD, NSD <br><br> **TARGET YEAR:** 2025 |
| **IV.C.2** Priority | Effort | 🏠 🌳 | Update the 2020 Urban Forest Management Plan based on the tree inventory data and changes to tree maintenance responsibility. | **PRCS** <br><br> **TARGET YEAR:** 2025 |
| **IV.C.3** Priority | Effort | 🏠 🌳 | Support academic institutions, corporations, healthcare facilities, HOAs, and SIMDs in a technical and educational capacity to develop urban forest management plans. | **PRCS** <br><br> **TARGET YEAR:** 2025 |
| **IV.C.4** Priority | Effort | 🌳 | Complete an urban forest audit using similar criteria as the 2020 audit is completed to evaluate improvements in urban forest management and adapt strategies. | **PRCS**, PWD, PDD, CSU <br><br> **TARGET YEAR(S):** 2025, 2030, 2040 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | V. GREEN ASSET MANAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **A. TREE TRACKING** | |
| **V.A.1** Priority Effort | | 🏠 🌳 | Connect the tree inventory system to citizen requests relating to tree maintenance and removal. | **PRCS**, PDD, PWD, CSU<br><br>**TARGET YEAR:** 2020 |
| **V.A.2** Priority Effort | | 🌳 | Integrate the tree inventory software program with other City asset management programs and data to align project planning, construction, and maintenance efforts with urban forest management strategies. | **PRCS**, PDD, PWD, CSU<br><br>**TARGET YEAR:** 2020 |
| **V.A.3** Priority Effort | | 🏠 🌳 | Conduct tree service request prioritization and evaluate the efficiency and effectiveness of the online service system. Update the City website with frequently asked questions and resources. | **PRCS**, PDD, PWD, CD<br><br>**TARGET YEAR:** 2021 |
| | | | **B. TREE MAINTENANCE PRIORITIZATION** | |
| **V.B.1** Priority Effort | | ⚖️ ⊕ 🏠 🌳 | Identify proactive maintenance corridors. Begin in areas north and east of downtown (including SIMDs) with trees primarily in the 8-16" diameter size class to reduce future maintenance needs. Tree care for these larger trees allows local area management such as SIMDs to conduct young tree pruning (trees less than 6" diameter) and clearance pruning. Prioritize young tree structural pruning of City-maintained trees to prevent surges of large tree pruning demands as seen with the north and east areas. This will reduce long-term costs. | **PRCS**, PWD, PDD, CSU, NCS<br><br>**TARGET YEAR:** 2021 |
| | | | **C. TREE MAINTENANCE REGIME** | |
| **V.C.1** Priority Effort | | 🏠 🌳 | Maintain the current tree maintenance approach (2,000 trees pruned in-house and 2,000 trees pruned with contracted services) that is prioritized by the tree inventory data, prioritized service requests, contracted services, and actions provided in the 2020 Urban Forest Management Plan. | **PRCS**, PWD, CSU<br><br>**TARGET YEAR:** ANNUAL |
| **V.C.2** Priority Effort | | ⊕ 🌳 | Complete the removal of at least 400 City-owned hazardous trees annually. | **PRCS**, PDD, PWD<br><br>**TARGET YEAR:** ANNUAL |
| **V.C.3** Priority Effort | | 🌳 | Identify locations for limited area preventative pruning of at least 1,000 trees annually in addition to citizen requests that can be addressed with additional funding described in Management Scenario B. | **PRCS**, PDD, PWD<br><br>**TARGET YEAR:** ANNUAL |
| **V.C.4** Priority Effort | | ⚖️ ⊕ 🏠 🌳 | Estimate the costs-benefits of expanding tree maintenance to all public trees on a 7-year pruning rotation. Use Appendix I as guidance. | **PRCS**, PDD, PWD<br><br>**TARGET YEAR:** 2020 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▷ V. GREEN ASSET MANAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **C. TREE MAINTENANCE REGIME (CONTINUED)** | |
| **V.C.5** Priority Effort | | 🌳 | Conduct a cost-benefit analysis of phased relinquishment of City Forestry's public tree maintenance responsibility. Use Appendix I as guidance. | **PRCS**, PWD, PDD **TARGET YEAR:** 2020 |
| **V.C.6** Priority Effort | | 🏠 🌳 | Develop a Standard Operating Procedure for reactive maintenance of volunteer trees and non-native undesirable trees in the public rights-of-way. | **PRCS**, PWD, CSU, PDD **TARGET YEAR:** 2023 |
| | | | **D. STORM RESPONSE** | |
| **V.D.1** Priority Effort | | ⊕ 🏠 🌳 | Implement storm response practices based on Standard Operating Procedures developed from the Staffing actions in this Plan. | **PRCS**, PWD, CSU, OEM **TARGET YEAR:** 2023 |
| **V.D.2** Priority Effort | | ⊕ 🏠 🌳 | Continue to address backlogged service requests relating to storm damage and apply lessons learned to current maintenance and response regime. | **PRCS**, PWD, CSU **TARGET YEAR:** 2025 |
| **V.D.3** Priority Effort | | 🏠 🌳 | Evaluate the tree inventory data to determine potential impacts of severe storms. | **PRCS**, CSU, OEM **TARGET YEAR:** 2027 |
| | | | **E. BIOMASS UTILIZATION** | |
| **V.E.1** Priority Effort | | ⊕ 🏠 🌳 | Explore the cost effectiveness and safe use of utilizing urban forest biomass in playgrounds and other City properties. | **PRCS**, PWD, NCS **TARGET YEAR:** ANNUAL |
| **V.E.2** Priority Effort | | 🏠 🌳 | Expand options for biomass utilization to include tree debris management, wood (biomass) utilization, and wood waste diversion for storm response, routine tree maintenance, and removals. | **PRCS** **TARGET YEAR:** 2030 |
| | | | **F. WILDLAND-URBAN INTERFACE (WUI)** | |
| **V.F.1** Priority Effort | | ⊕ 🏠 🌳 | Evaluate the extent of the WUI to determine current and future forest health and fuels treatments that gradually return forest stand conditions to a historic range of variability. | **PRCS**, CSFD **TARGET YEAR:** 2030 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▷ V. GREEN ASSET MANAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **F. WILDLAND-URBAN INTERFACE (CONTINUED)** | |
| **V.F.2** Priority / Effort | | ✚ ⌂ 🌳 | Continue to adhere to policies and guidelines in the Colorado Springs Fire Department (CSFD) Ignition Resistant Construction Design Manual (2020) with proper tree selection, tree maintenance, and debris disposal. | **PRCS**, CSU, HOAs, SIMDs, CSFD  **TARGET YEAR:** ANNUAL |
| | | | **G. YOUNG TREE PRUNING** | |
| **V.G.1** Priority / Effort | | 🌳 | To build the case for additional funding (Management Scenario B), develop a process to standardize and assign follow-up work and structural prunes on young trees (trees planted in the last 0-10 years or less than 6 inches in diameter). | **PRCS**, PDD, PWD, HOAs, SIMDs  **TARGET YEAR:** 2023 |
| | | | **H. INTEGRATED PEST MANAGEMENT** | |
| **V.H.1** Priority / Effort | | 🌳 | Use Citywide tree inventory data and best available science for long-term planning and management of existing and future tree pests and diseases impacting the City's urban forest. | **PRCS**  **TARGET YEAR:** ANNUAL |
| **V.H.2** Priority / Effort | | ⌂ 🌳 | Continue to research the threat of emerald ash borer for public and private ash trees and implement actions provided in the Tree Pest and Disease Plan for prevention, response, treatment, mitigation, and wood utilization. | **PRCS**  **TARGET YEAR:** ANNUAL |
| **V.H.3** Priority / Effort | | 🌳 | Use the tree inventory analysis to identify tree species susceptibility to pests and diseases, the costs for treatment, and the potential loss of ecosystem services. | **PRCS**  **TARGET YEAR(S):** 2024, ANNUAL |
| | | | **I. TREE MAINTENANCE SPECIFICATIONS AND STANDARDS** | |
| **V.I.1** Priority / Effort | | 🌳 | Annually revisit contract specifications and in-house policies and directives to ensure that tree care operations adhere to current industry standards, including ANSI A300 Standards for Tree Care Operations, ANSI Z133.1-2012 for Arboricultural Operations Safety Requirements, and ISA Series Best Management Practices (BMPs). | **PRCS**, CSU, HOAs, SIMDs  **TARGET YEAR:** ANNUAL |
| **V.I.2** Priority / Effort | | 🌳 | Educate and train City staff to adhere to Best Management Practices for the maintenance of all diseased/infested City trees. Provide education to the public for the proper care of trees on property. | **PRCS**, PDD, PWD, NSD, HOAs, SIMDs  **TARGET YEAR:** 2025 |
| | | | **J. TREE WATERING** | |
| **V.J.1** Priority / Effort | | 🌳 | Using data from past droughts and other dry periods, prioritize public trees based upon species, size, contribution to the site and overall value to the community to maintain adequate tree canopy. | **PRCS**, HOAs, SIMDs  **TARGET YEAR:** 2030 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | ▷ V. GREEN ASSET MANAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **J. TREE WATERING (CONTINUED)** | |
| **V.J.2** Priority | Effort | 🌳 | Determine which areas of street tree and park landscapes should be irrigated to preserve highest priority trees based on drought severity and duration and use appropriate amount and timing of irrigation for species preservation in line with water conservation goals. | **PRCS**, PDD, PWD, HOAs, SIMDs <br><br> **TARGET YEAR:** 2022 |
| **V.J.3** Priority | Effort | 🌳 | Provide adequate water for trees in median areas during periods of mild to moderate drought to the extent possible with existing resources. | **PRCS**, HOAs, SIMDs <br><br> **TARGET YEAR:** ANNUAL |
| **V.J.4** Priority | Effort | 🌳 | Consider watering regimens for drought conditions when designing future park irrigation systems. | **PRCS**, PDD <br><br> **TARGET YEAR:** ANNUAL |
| **V.J.5** Priority | Effort | 🌳 | Establish temporary modified water budgets for parks during periods of drought and when establishing new landscapes when original landscapes were impacted by natural hazard. | **PRCS** <br><br> **TARGET YEAR:** 2030 |
| | | | **K. TREE PLANTING** | |
| **V.K.1** Priority | Effort | ⊕ ⌂ 🌳 | Establish a suitable tree list based on the tree inventory, climate change projections, site suitability, drought tolerance, ecosystem services, among other factors. | **PRCS**, CSU <br><br> **TARGET YEAR:** 2021 |
| **V.K.2** Priority | Effort | ⊕ ⌂ 🌳 | Evaluate opportunities and partners for developing a neighborhood-specific tree planting plan. | **PRCS**, HOAs, SIMDs, NSD, PDD, new developments <br> **TARGET YEAR:** 2022 |
| **V.K.3** Priority | Effort | ⚖ ⊕ ⌂ 🌳 | Use the 2018 Tree Canopy Assessment and 2019 report for prioritizing tree plantings based on low existing tree cover and enhancing benefits provided by trees. Use Appendix X as guidance. | **PRCS**, HOAs, SIMDs <br><br> **TARGET YEAR:** ANNUAL |
| **V.K.4** Priority | Effort | ⚖ ⊕ ⌂ 🌳 | Develop a more strategic approach to tree species and site selection to ensure the resilience and optimize ecosystem service provision of Colorado Springs' urban forest. | **PRCS**, PDD, developers <br><br> **TARGET YEAR:** 2022 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | V. GREEN ASSET MANAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **K. TREE PLANTING (CONTINUED)** | |
| **V.K.5** Priority / Effort | | ⊕ ⌂ 🌳 | Coordinate with other City departments to maximize the number of trees planted through Capital Improvement Program projects. Establish procedures for replacing damaged trees during infrastructure replacement projects. | **PRCS**, PDD, PWD, CDD, CSU, NSD  **TARGET YEAR:** ANNUAL |
| **V.K.6** Priority / Effort | | ⊕ ⌂ 🌳 | Increase the planting of large maturing, drought tolerant species on all public projects requiring improved tree diversity. | **PRCS**, PDD  **TARGET YEAR:** ANNUAL |
| **V.K.7** Priority / Effort | | 🌳 | Continue to align tree planting and canopy goals with the watershed assessment, green stormwater infrastructure plans, and other planning efforts by providing technical assistance for the goals of water conservation, stormwater management, improved water quality. | **PRCS**, PWD, PDD  **TARGET YEAR:** ANNUAL |
| **V.K.8** Priority / Effort | | 🌳 | Address species diversity thresholds and increased plantings concern (more plantings = less diversity) by providing guidance on diversity levels at smaller scales (i.e. street segments, road corridors, neighborhoods, land use). | **PRCS**  **TARGET YEAR:** 2022 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | VI. COMMUNITY ENGAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **A. EDUCATION AND OUTREACH** | |
| **VI.A.1** Priority Effort | | | Formalize clear and consistent design and language for City Forestry outreach materials. | **PRCS**, CD, NSD, HOAs, SIMDs<br><br>**TARGET YEAR:** 2020 |
| **VI.A.2** Priority Effort | | | Coordinate the outreach strategy as Citywide rather than a departmental effort. | **PRCS**, CD, NSD, PDD, PWD, CDD, CSFD, OEM, HOAs, SIMDs<br>**TARGET YEAR:** 2020 |
| **VI.A.3** Priority Effort | | | Respond to citizen and other department concerns within 5 business days | **PRCS**<br><br>**TARGET YEAR:** ANNUAL |
| **VI.A.4** Priority Effort | | | Update the City's website and brochures based on information from the 2020 Urban Forest Management Plan. | **PRCS**, CD<br><br>**TARGET YEAR:** 2020 |
| **VI.A.5** Priority Effort | | | Provide information and education regarding tree maintenance responsibility. Use the outcomes of the 2020 Urban Forest Management Plan to address areas further from downtown core where tree maintenance responsibility is shared. | **PRCS**, CD, CSU, HOAs, SIMDs<br><br>**TARGET YEAR:** 2022 |
| **VI.A.6** Priority Effort | | | Every quarter, share informative urban forestry and tree-related content to a social media, City website, and other communication platforms. | **PRCS**, CD<br><br>**TARGET YEAR:** ANNUAL |
| **VI.A.7** Priority Effort | | | As funding permits, conduct annual urban forestry events, or partner-events—especially involving youth—relating to tree planting and pruning to increase capacity for the care of public trees led by citizen tree stewards. | **PRCS**, CD, NSD, CDD, CSU, HOAs, SIMDs<br><br>**TARGET YEAR:** ANNUAL |
| **VI.A.8** Priority Effort | | | Conduct biannual community surveys to gauge public viewpoints and receive feedback on implementation of the 2020 Urban Forest Management Plan and program success. Survey responses should inform future urban forest decision making. | **PRCS**, CD, NSD, HOAs, SIMDs<br><br>**TARGET YEAR:** BIANNUAL |
| **VI.A.9** Priority Effort | | | As funding permits, provide information and educational workshops and materials about the proper tree species for given sites and conditions. | **PRCS**, CD, PDD, NSD, HOAs, SIMDs<br><br>**TARGET YEAR:** ANNUAL |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority / Effort / Co-benefit | ▷ VI. COMMUNITY ENGAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|
| | **A. EDUCATION AND OUTREACH (CONTINUED)** | |
| **VI.A.10** Priority / Effort | Provide education to the broad public and within priority areas (via materials, workshops, etc.) about proper young tree pruning as funding allows. Expand on these efforts with additional funding secured as detailed in Management Scenario B. | **PRCS**, CD, NSD, HOAs, SIMDs<br><br>**TARGET YEAR:** ANNUAL |
| **VI.A.11** Priority / Effort | Provide education about City Forestry and Colorado Springs Utilities responsibilities and roles relating to urban forestry. | **PRCS**, CD, CSU<br><br>**TARGET YEAR:** 2022 |
| **VI.A.12** Priority / Effort | Continue to provide education about the importance of tree watering and drought-resistant tree species where appropriate. | **PRCS**, CD, NSD, PDD, HOAs, SIMDs<br><br>**TARGET YEAR:** ANNUAL |
| **VI.A.13** Priority / Effort | Increase public outreach and notification so residents are aware of the full scope of emerald ash borer impact and urgency and what they can do to support and sustain the urban canopy. | **PRCS**, CD, NSD, PDD, HOAs, SIMDs<br><br>**TARGET YEAR:** ANNUAL |
| **VI.A.14** Priority / Effort | Continue to provide information regarding unauthorized tree plantings, invasives, and management of volunteer trees. | **PRCS**, CD, NSD, PDD, HOAs, SIMDs<br><br>**TARGET YEAR:** ANNUAL |
| **VI.A.15** Priority / Effort | Work with environmental non-profit organizations and other partners to provide resources and annual training regarding tree pest and disease management as well as invasive species management. Provide resources to private landholders on an as-needed basis. | **PRCS**, CD, NSD, CSU, HOAs, SIMDs<br><br>**TARGET YEAR:** ANNUAL |
| **VI.A.16** Priority / Effort | Offer trainings and support the free online urban forestry courses such as eLearn Urban Forestry to develop a network of trained tree stewards. Expand on these efforts with additional funding secured, described in Management Scenario B. | **PRCS**<br><br>**TARGET YEAR:** ANNUAL |
| | **B. PARTNERSHIPS** | |
| **VI.B.1** Priority / Effort | Continue to strengthen partnerships with civic groups, Homeowners' Associations, volunteers, military, internal, City Council, neighborhoods, and improvement districts (e.g. SIMDs). | **PRCS**, CD, NSD, CSU, HOAs, SIMDs<br><br>**TARGET YEAR:** ANNUAL |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | VI. COMMUNITY ENGAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **B. PARTNERSHIPS (CONTINUED)** | |
| **VI.B.2** Priority / Effort | | 🏠⚖️ | Develop strategies to remove barriers to participation for all community members. | **PRCS**, CD, NSD, HOAs, SIMDs<br><br>**TARGET YEAR:** 2021 |
| **VI.B.3** Priority / Effort | | 🏠🌳 | Provide (non-financial) support for the establishment of a non-governmental agency or non-profit organization with a mission to serve as tree stewards and advocates in the City. | **PRCS**, NSD, HOAs, SIMDs<br><br>**TARGET YEAR:** 2022 |
| **VI.B.4** Priority / Effort | | ⚖️🌳🏠 | Support and sustain partnerships with local and regional participatory organizations. Encourage and support horizontal volunteer collaboration between organizations. Increase the number of community volunteers annually. | **PRCS**, CD, NSD, CSU, HOAs, SIMDs<br><br>**TARGET YEAR:** 2025 |
| **VI.B.5** Priority / Effort | | 🏠⚖️ | Establish non-conventional partnerships that serve single and/or multiple City neighborhoods. At minimum, all neighborhoods should be represented in partnerships. | **PRCS**, CD, NSD, HOAs, SIMDs<br><br>**TARGET YEAR:** 2025 |
| **VI.B.6** Priority / Effort | | 🏠🌳 | Encourage and support sustainable urban forest planning and practices on all academic institutions through approval of an institution-specific Urban Forest Management Plan or adoption of relevant strategies and actions in the 2020 Urban Forest Management Plan. Academic institutions should conduct a tree inventory and actively contribute to City tree canopy goals. | **PRCS**, HOAs, SIMDs<br><br>**TARGET YEAR(S):** 2025, ANNUAL |
| **VI.B.7** Priority / Effort | | 🌳⚖️🏠 | Explore options to facilitate and/or subsidize tree planting for private property owners through tree-giveaways. Support local, regional (CSU), and national programs (Arbor Day Foundation) that provide such giveaways. | **PRCS**, CD, NSD, HOAs, SIMDs<br><br>**TARGET YEAR:** 2025 |
| **VI.B.8** Priority / Effort | | 🌳 | Collaborate with nurseries to propagate a more diverse palette of trees that meets the City's tree diversity requirements and updated planting recommendations. | **PRCS**, HOAs, SIMDs<br><br>**TARGET YEAR:** 2026 |
| **VI.B.9** Priority / Effort | | 🏠🌳 | Work with the Office of Innovation to improve organizational processes, implement creative solutions, and ensure a sustainable and resilient future for the City by integrating tree planning into Public Works and City Planning projects to maximize urban forest benefits and address issues of sustainability on a larger scale (climate change, urban heat islands, public health, and stormwater). | **PRCS**, PWD, PDD, CDD<br><br>**TARGET YEAR:** 2022 |

*Table 6. continued: Complete list of actions, by goal, for Management Scenario A.*

| Priority | Effort | Co-benefit | VI. COMMUNITY ENGAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **C. VOLUNTEERS** | |
| VI.C.1 | Priority / Effort | | Increase and foster volunteerism using the information provided in the 2020 Urban Forest Management Plan. | **PRCS**, CD, NSD, HOAs, SIMDs <br><br> **TARGET YEAR:** ANNUAL |
| VI.C.2 | Priority / Effort | | Continue to engage neighborhoods with volunteer tree planting events. Prioritize those areas with lower urban tree canopy or those expected to be greatly impacted by emerald ash borer. | **PRCS**, CD, NSD, HOAs, SIMDs <br><br> **TARGET YEAR:** ANNUAL |
| VI.C.3 | Priority / Effort | | Diversify the types of volunteers using outreach and education about the benefits and importance of trees. Utilize partnerships with neighborhood organizations. | **PRCS**, CD, NSD, HOAs, SIMDs <br><br> **TARGET YEAR:** ANNUAL |
| VI.C.4 | Priority / Effort | | Support volunteer training opportunities as feasible. Expand on these as additional funding is secured as described in Management Scenario B. | **PRCS**, CD, NSD, HOAs, SIMDs <br><br> **TARGET YEAR:** ANNUAL |
| VI.C.5 | Priority / Effort | | Continue to track and annually report urban forestry activities of all partners to apply to budget change requests and continue to maintain Arbor Day Tree City USA designation. | **PRCS**, CSU, CD, NSD, HOAs, SIMDs <br><br> **TARGET YEAR:** ANNUAL |
| VI.C.6 | Priority / Effort | | Recognize exemplary urban forest stewards and volunteers representing youth, residents, organizations, and business owners. Consider a tree donation or tree fund framework for costs associated with this program. | **PRCS**, CD, NSD, PDD, HOAs, SIMDs <br><br> **TARGET YEAR:** ANNUAL |

*Each action includes the responsible entity for implementation indicated by the following abbreviations:
- ▶ CD-Communications Department
- ▶ CDD-Community Development Department
- ▶ CSFD-Colorado Springs Fire Department
- ▶ CSU-Colorado Springs Utilities
- ▶ HOAs-Homeowners' Associations
- ▶ NSD-Neighborhood Services Department
- ▶ OEM-Office of Emergency Management
- ▶ PDD-Planning and Development Department
- ▶ PRCS-Parks, Recreation and Cultural Services Department
- ▶ PWD-Public Works Department
- ▶ SIMDs-Special Improvement Maintenance Districts

Actions may include the following abbreviations or acronyms:
- ▶ ANSI-American National Standards Institute
- ▶ BID-Business Improvement District
- ▶ BMPs-Best Management Practices
- ▶ CIP-Capital Improvement Program
- ▶ FRR-Forestry Rules and Regulations
- ▶ ISA-International Society of Arboriculture
- ▶ LCPM-Landscape Code and Policy Manual
- ▶ SAF-Society of American Foresters
- ▶ SOP-Standard Operating Procedure
- ▶ TOPS-Trails, Parks, and Open Space
- ▶ UFMP-Urban Forest Management Plan
- ▶ 2C-Ballot item 2C sales tax for paving

**The primary **co-benefit** is listed at the bottom of each column. Any co-benefit symbol added above the bottom symbol indicates a slightly lesser degree of co-benefit significance.

**Community**
Actions that engage the public.

**Equity**
Opportunities to satisfy essential needs and achieve full potential.

**Human Health**
Provides physical benefits to local residents.

**Environment**
Benefits of air quality, water quality, and habitat.

## MANAGEMENT SCENARIO B
# ADDITIONAL BUT INSUFFICIENT FUNDING



*Photo courtesy of the City of Colorado Springs.*

| MANAGEMENT SCENARIO A (MSA) | MANAGEMENT SCENARIO B (MSB) | MANAGEMENT SCENARIO C (MSC) | MANAGEMENT SCENARIO D (MSD) |
|---|---|---|---|
| "Baseline Conditions" | "Additional but Insufficient Funding" | "Tree Maintenance Responsibility Transfer" | "Optimal Support" |

*Disclaimer: Management scenarios A-D were created as alternatives for consideration; no alternative is favored or recommended over another and other feasible scenarios may arise in the future.*

## MANAGEMENT SCENARIO B OVERVIEW

With the implementation of the Urban Forest Management Plan and use of the public tree inventory data, additional funding for City Forestry can be pursued. This management scenario considers additional funding acquired but the amount is still insufficient based on industry standards, benchmarking research, and desired levels of service. This management scenario adjusts priorities and actions from other scenarios to enable efficient and effective urban forest management based on acquired resources.

The City Forestry budget for 2020 amounted to $1,558,037 specifically for public tree management of 270,000 trees ($5.77 per tree). As described in the Research Summary and the case study for MSC, Tree Maintenance Responsibility Transfer (see Appendix I), this amount is greatly insufficient for Citywide tree maintenance. Based on industry standards, benchmarking research, and data analyses, the total recommended budget for City Forestry amounts to approximately $7.4 million (a 375-percent increase). It is understandable that an increase this substantial is unlikely in the short term and that incremental increases in Forestry budget are more feasible. Options for funding the Forestry program are provided in Appendix I and Appendix VIII. This scenario provides the recommendations for improved urban forest management based on feasible budget increase increments shown in Table 7 below:

*Table 7. Summary of potential budget increases to support Management Scenario B.*

| 2020 Forestry Budget | % Increase | Increase Amount | Final Budget |
|---|---|---|---|
| $1,558,037 | 1% | $15,580 | $1,573,617 |
| $1,558,037 | 5% | $77,902 | $1,635,939 |
| $1,558,037 | 10% | $155,804 | $1,713,841 |
| $1,558,037 | 15% | $233,706 | $1,791,743 |
| $1,558,037 | 20% | $311,607 | $1,869,644 |
| $1,558,037 | 25% | $389,509 | $1,947,546 |
| $1,558,037 | 50% | $779,019 | $2,337,056 |

## RECOMMENDED ACTIONS

Implement actions provided in this management scenario based on the budget increase amount, the priority, and level of funding required as described in the actions table. The primary focus of this management scenario is to align the budget enhancement with the desired levels of service and staffing to support improvements to the management of the urban forest.

## LIMITATIONS (CONSEQUENCES)

The following provides an overview of the shortcomings from receiving additional but insufficient funding for the City Forestry program:

- ▶ An increase in the budget will only support certain recommended activities.
- ▶ Forestry must choose the management activities to fund and the activities to postpone.
- ▶ Results in a failure to implement a comprehensive urban forest management program.

## OPPORTUNITIES

- ▶ Improved urban forest management compared to baseline conditions in MSA.
- ▶ Evaluations of staffing levels, new facilities, program structure, tree maintenance priorities, planting, and tree inventory data will support future budget requests and Management Scenario C and D.
- ▶ Improved management of tree inventory data and urban forest resiliency.
- ▶ Increased awareness and support for urban forest management.

## LEVELS OF SERVICE

- ▶ The City will continue to operate at Service Level 1, minimum service, also referred to as reactive management. Additional funding does not achieve higher levels of service to qualify the program as Service Level 2, adequate service level or routine management.
- ▶ Based on the U.S. Forest Service's Urban Forest Sustainability and Management Audit system, the City is currently operating at 67 percent in terms of urban forest management and sustainability. The ranking is based on an evaluation of 11 categories of urban forest management containing over 120 performance indicators. The Plan's actions recommend reevaluations of the program using the audit system to monitor changes and adapt for continuous improvement in urban forest management.
- ▶ Current Forestry Program budget (2020): $1,558,037.
- ▶ Potential insufficient budget increase: 1 percent to 50 percent ($16,000 to $780,000 increase, respectively).
- ▶ 2020 Forestry staff per public tree: 1 staff for every 24,545 trees.
- ▶ Forestry staff per public tree under MSB depends on funding but an ideal staff per tree ratio is 1:10,000, or 27 total full-time Forestry employees for Colorado Springs.

## TIMELINE

- ▶ The actions for MSA should be implemented upon adoption of this Plan based on priority and resources available.
- ▶ Implement recommended staffing levels as described in Appendix II.
- ▶ Actions implemented for MSA will support this Management Scenario (B).
- ▶ If no significant changes to City Forestry's budget occur, the actions for MSA should be implemented to support incremental improvements to the program.

## FRAMEWORK OF PLAN TARGETS

The following tables provide planning targets consisting of desired conditions, metrics, and indicators to allow stakeholders to track progress in achieving the associated goal. Implementation of the actions provided in this Plan will lead to successful achievement of the listed targets. The targets are listed in incremental stages across a 20-year planning horizon; 1-year, 2-year, 5-year, 10-year, 20-year— indicating the timeframe for accomplishing the relative target. Each target includes a reference to the Plan action(s) that will support achievement of the target. The following depicts the layout of the Plan Targets:



**PLAN TARGETS: MANAGEMENT SCENARIO B**

| I. TREE POLICIES | 1-YEAR | 2-YEAR | 5-YEAR | 10-YEAR | 20-YEAR |
|---|---|---|---|---|---|
| **A. Code LANGUAGE** | (I.A-C)City Council receives Code amendments<br>(I.A.1)Forestry Rules and Regulations (FRR) updated | (I.A.2-3)City Code updated | (I.A.1)Landscape Code and Policy Manual (LCPM) updated | (I.A.1)FRR updated | (I.A.1)FRR updated |

*Figure 4. An example of the Targets tables found in this Plan including the goal theme, goal objective, action reference, targets, and target milestones.*

Each target includes a reference to the action(s) that supports its accomplishment. For example, to update City Code within the 2-year target milestone, actions I.A.2 and I.A.3 need to be implemented as shown in the table excerpt below. As the table shows, each action in Management Scenario A's action table includes an action number. This number is referenced in parentheses within each target.

| Priority | Effort | Co-benefit | ▷   **I. TREE POLICY ACTIONS** | **LEAD\*/YEAR** |
|---|---|---|---|---|
| | | | **A. CODE LANGUAGE** | |
| **I.A.2** | | | Review with the City the recommended Code changes in Appendix V regarding weed maintenance (permissions, restrictions, responsibility), weed prevention (volunteer sprouts), and unauthorized plantings. | **PRCS**, PWD, PDD, NSD, CSU |
| Priority | Effort | 🌳 | | **TARGET YEAR:** 2020 |
| **I.A.3** | | | Review with the City the recommended Code changes in Appendix V regarding inconsistencies found in Chapter 7 (Landscape Code) and Chapter 4 (Forestry) i.e. tree spacing, minimum number of trees, maintenance responsibilities, location of trees. | **PRCS**, PWD, PDD |
| Priority | Effort | 🌳 | | **TARGET YEAR:** 2020 |

*Figure 5. An example of the Actions tables found in this Plan including the goal theme and objective, priority and effort rankings, co-benefits, lead, and target year.*

*Table 8. Complete list of targets, by goal, for Management Scenario B.*

## Plan Targets: Management Scenario B

| I. Tree Policies | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. Code Language** | (I.A-C)City Council receives Code amendments; (I.A.1)Forestry Rules and Regulations (FRR) updated | (I.A.2-3)City Code updated | (I.A.1)Landscape Code and Policy Manual (LCPM) updated | (I.A.1)FRR updated | (I.A.1)FRR updated |
| **B. Code Enforcement** | (I.A-C)City Council receives Code amendments; (I.A.1)FRR updated | (I.B.1)FRR in City Code; (I.B.2-6) Enforcement amendments in City Code | (I.B.2-6)Enforcement revenue summary; (I.B.2-6)Enforcement revenue matches known violations; (I.B.5)75% of construction-tree projects reviewed | (I.B.5)100% of construction-tree projects reviewed | (I.B.5)2 Certified Arborists in other departments |
| **C. Define Code Standards** | (I.A-C)City Council receives Code amendments; (I.A.1)FRR updated; (I.C.7)Significant Tree candidate trees increases | (I.C.3-5,10)Tree maintenance authority documented in FRR; (I.C.3-5,10)Final tree transfer plan case study | (I.C.1)2C/PRRTA and CIP alternative solutions toolkit; (I.C.7)The Significant Tree Program expands | (I.C.7)Volunteer private tree Significant Tree Program | |
| **D. General Policy** | (I.D.1)Urban Forest Management Plan (UFMP) updated | | (I.D.1)FRR referenced in City plans | (I.D.1)Urban Forest Management Plan updated | |

*Table 8. continued: Complete list of targets, by goal, for Management Scenario B.*

## PLAN TARGETS: MANAGEMENT SCENARIO B

### II. STAFFING

| | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. Levels of Service** | (II.A.1)Tree maintenance staffing business case | (II.A.2-3) Standard Operating Procedures (SOP) for contractors | (II.A.1)Business case for 4 Forestry divisions | | |
| **B. Defining Authority** | (II.B.4)Maintenance authority for trees listed in FRR | (II.B.4)Tree maintenance authority updated in FRR | | | (II.B.4)Tree maintenance authority updated in FRR |
| **C. Communications** | (II.C.1)Business license SOP with City Clerk's Office | (II.C.1)25% of business licenses reviewed; (II.C.4)Storm response SOP | (II.C.1)33% of business licenses reviewed; (II.C.4)Storm response improved- less service requests, less costs | (II.C.1)50% of business licenses reviewed; (II.C.4)Storm-related service requests addressed in 30 days | |
| **D. Workflows** | | | (II.D.1)SOPs updated; (II.D.2)Staff hours per activity within +/- 10% of job description | | |
| **E. Training** | (II.E.1)One-third of all current certified staff acquire necessary CEU's to maintain certification; (II.E.2)At least 1 safety or industry training is held per quarter | (II.E.1)At least 2 Forestry staff obtain pesticide applicator license | (II.E.1)All Forestry staff are International Society of Arboriculture (ISA) Certified Arborists, 1 TRAQ Qualified, 3 Municipal Specialists, 2 Society of American Forester (SAF) Certified; (II.E.2)2 annual City department urban forestry trainings | (II.E.1)2 ISA Board Certified Master Arborists, 2 SAF Certified Foresters | |

*Table 8. continued: Complete list of targets, by goal, for Management Scenario B.*

## PLAN TARGETS: MANAGEMENT SCENARIO B

| III. BUDGET AND FUNDING | 1-YEAR | 2-YEAR | 5-YEAR | 10-YEAR | 20-YEAR |
|---|---|---|---|---|---|
| **A. ASSESSMENT** | (III.A.1)Funding enables 50% of public trees to be inventoried<br><br>(III.A.1)Public tree maintenance business case prepared | (III.A.1)Funding enables 100% of public trees to be inventoried<br><br>(III.A.1)5% of funding request is fulfilled | | (III.A.1)Second phase public tree inventory<br><br>(III.A.1)25% of funding request fulfilled | |
| **B. BUDGET PLANNING** | (III.B.1)Tree maintenance funding request prepared | | | | |
| **C. FUNDING** | (III.C.1-16)Tree transfer case study funding options finalized | (III.C.5) Grant applications submitted for all relevant urban forestry applications (inventory, operations, etc.)<br><br>(III.C.1-16) Pursuing 25% of alternative funding options | (III.C.1-15)2 new funding streams secured<br><br>(III.C.16)Sustained funding report developed | (III.C.1-16)A dedicated funding stream for public trees | (III.C.1-16)Funding sources diversified: private, General Fund, grants, taxes, donations |

*Table 8. continued: Complete list of targets, by goal, for Management Scenario B.*

## PLAN TARGETS: MANAGEMENT SCENARIO B

| IV. ASSESSMENTS AND PLANS | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| A. TREE INVENTORY | (IV.A.1)50% of public trees inventoried | (IV.A.1)100% of public trees inventoried; (IV.A.1)50% of tree activities tracked in software; (IV.A.2)Cost-benefit analysis completed for trees | (IV.A.3)City and partner tree plantings tracked in software; (IV.A.4)Risk assessment program implemented | (IV.A.1)Second phase public tree inventory | (IV.A.1)Entire public tree inventory completed; (IV.A.3)Residents and developers can voluntarily add trees planting on private property to an online system |
| B. CANOPY ASSESSMENT | | | | (IV.B.1)Canopy change assessment to establish canopy goals | (IV.B.1)Updated canopy goals |
| C. PLANS | | (IV.C.2)UFMP is updated | (IV.C.1)Forest management plans created for parks, trails, open space, and riparian areas; (IV.C.2)UFMP is updated; (IV.C.3)Technical support results in 2 academic institution UFMPs; (IV.C.3)Technical support results in HOA, SIMD, or neighborhood UFMP | (IV.C.2)UFMP is updated; (IV.C.3)33% of academic institutions have a UFMP; (IV.C.4)An urban forest audit is completed | (IV.C.2)UFMP is updated; (IV.C.3)50% of academic institutions have a UFMP; (IV.C.3)Technical support results in 1 UFMP for healthcare property or corporation; (IV.C.3)50% of HOAs, SIMDs, neighborhoods have a UFMP; (IV.C.4)An urban forest audit is completed |

*Table 8. continued: Complete list of targets, by goal, for Management Scenario B.*

## PLAN TARGETS: MANAGEMENT SCENARIO B

| V. GREEN ASSET MANAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. TREE TRACKING** | (V.A.1)Service requests connected to tree software | (V.A.2)Tree software integrated with City asset software | (V.A.2)50% of applicable CIP projects use tree software | | (V.A.2)Forestry updates tools to reflect technology changes |
| **B. TREE MAINTENANCE PRIORITIZATION** | (V.B.1)Preventative pruning prioritization maps created | (V.B.1)Preventative pruning prioritization maps updated | | | (V.B.1)Preventative pruning prioritization maps updated |
| **C. TREE MAINTENANCE REGIME** | (V.C.1)2,000 trees pruned; 2,000 trees contracted; (V.C.2)400 hazardous trees removed; (V.C.3)Preventative pruning completed for 1,000 additional trees annually; (V.C.6)Management of non-natives and unauthorized trees SOP | (V.C.1)2,000 trees pruned; 2,000 trees contracted; (V.C.2)400 hazardous trees removed; (V.C.3)Preventative pruning completed for 1,000 additional trees annually; (V.C.4-5)Pruning rotation and tree maintenance responsibility transfer cost-benefit analysis | (V.C.1)Non-storm related service request backlog reduced by 50%; (V.C.6)Right-of-way (ROW) tree sprouts, unauthorized trees reduced by 5%; (V.C.1)Forest management on 500 acres of open space (100 acres per year) | (V.C.1.3)Tree maintenance regimen is maintained; (V.C.6)Volunteer, unauthorized trees in ROW reduced by 10% | (V.C.1.3)Tree maintenance regimen is maintained; (V.C.6)Volunteer, unauthorized trees in ROW reduced by 25% |
| **D. STORM RESPONSE** | (V.D.1)Storm response SOP | (V.D.2)Past winter storm service request backlog reduced by 25% | (V.D.2)Past winter storm service request backlog reduced by 50% | (V.D.1)25% improvement for storm response relative to past storms | (V.D.1)50% improvement for storm response relative to past storms |

*Table 8. continued: Complete list of targets, by goal, for Management Scenario B.*

# Plan Targets: Management Scenario B

| V. Green Asset Management | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **E. Biomass Utilization** | (V.E.1)City wood debris used for playgrounds and other areas up 10% | (V.E.1)City wood debris used for playgrounds and other areas up 25% | (V.E.1)City wood debris used for playgrounds and other areas up 50% | (V.E.1)City wood debris used for playgrounds and other areas up 75% | (V.E.1) Repurposing City wood debris program for firewood, lumber, furniture |
| **F. Wildland-Urban Interface (WUI)** | | | (V.F.2)10% of fire risk acres in WUI areas maintained | (V.F.2)25% of fire risk acres in WUI areas maintained | (V.F.2)50% of fire risk acres in WUI areas maintained |
| **G. Young Tree Pruning** | (V.G.1)Young tree care plan for City-led projects | (V.G.1)City Code and FRR updated with young tree care standards | (V.G.1)10% of City-maintained young trees structurally pruned (estimated 19,000 trees total) | (V.G.1)50% of City-maintained young trees structurally pruned within 5 years of planting | (V.G.1)Young public tree maintenance plan results in 75% of City-maintained young trees pruned |
| **H. Integrated Pest Management** | (V.H.2)Response to ash tree service requests follows a consistent management approach | (V.H.2)Emerald ash borer plan implemented; (V.H.3)Tree susceptibility report | (V.H.2)Partial completion of emerald ash borer plan actions | (V.H.1)Early pest detection, minimal treatments | (V.H.1)Early pest detection, increased treatments |
| **I. Tree Specs and Standards** | | ← (V.I.1)City tree maintenance adheres to standards and best practices → | | | |
| **J. Tree Watering** | (V.J.1)25% of new City-led tree plantings receive proper watering regimen | (V.J.2)Planting and watering plan | (V.J.3)New City trees dead due to drought reduced by 1%; (V.J.5)Modified water plan for trees in drought | (V.J.3)New City trees dead due to drought reduced by 5%; (V.J.4)75% of trees planted are site appropriate | (V.J.3)New City trees dead due to drought reduced by 10%; (V.J.4)Updated tree species list and planting plan |

*Table 8. continued: Complete list of targets, by goal, for Management Scenario B.*

## PLAN TARGETS: MANAGEMENT SCENARIO B

| V. GREEN ASSET MANAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| K. TREE PLANTING | (V.K.1)Tree species list updated | (V.K.2)Neighborhood tree planting plan pilot project<br><br>(V.K.5)18,071 "COS 150 Tree Challenge Program" trees planted (public and private) | (V.K.7)Trees are a best management practice (BMP) in stormwater management plan | (V.K.4,6-7) Stormwater volume reduced from increasing trees planted by 20% annually since 2022<br><br>V.K.3)Citywide planting plan developed | (V.K.3)Trees planted to achieve desired ecosystem benefits and functions to the community |

*Table 8. continued: Complete list of targets, by goal, for Management Scenario B.*

## PLAN TARGETS: MANAGEMENT SCENARIO B

### VI. COMMUNITY ENGAGEMENT

| | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. EDUCATION AND OUTREACH** | (VI.A.1-16)Public outreach strategy developed<br><br>(VI.A.6)Forestry articles (1 per quarter) on social media, other platforms | (VI.A.3)Service request response within 10 business days<br><br>(VI.A.8)Forestry public survey (biannually) | (VI.A.7)Public forestry event (1 per year)<br><br>(VI.A.9-15)6 topic-specific messages created for 4 audiences (residential, businesses, institutions, youth) | (VI.A.16)Trained tree stewards in 50% of neighborhoods | (VI.A.1-16)City tree organizations host multiple events, trainings |
| **B. PARTNERSHIPS** | (VI.B.1)UFMP information shared with all partners including City Fire Department | (VI. B.9)Office of Innovation aids multi-department planning | (VI.B.3)Support establishment of non-profit or non-governmental organization<br><br>(VI.B.5)Partners represent all neighborhoods and cultures<br><br>(VI.B.6)2 Academic institutions have UFMPs | (VI.B.6)33% of academic institutions have a UFMP<br><br>(VI.B.7)Tree giveaway programs expand due to demand | |
| **C. VOLUNTEERS** | (VI.C.2.5)City-hosted planting event | (VI.C.1)Forestry volunteers increase by 10%<br><br>(VI.C.2.5)City-hosted planting event (2) | (VI.C.1)Forestry volunteers increase by 50%<br><br>(VI.C.3)Volunteers represent all neighborhoods and demographics | (VI.C.1)Forestry volunteers increase by 75%<br><br>(VI.C.4)Train the trainer program<br><br>(VI.C.5)Tree City USA award for 53rd consecutive year | (VI.C.1)Forestry volunteers increase by 100%<br><br>(VI.C.5)Tree City USA award for 63rd consecutive year |

## FRAMEWORK OF PLAN ACTIONS

*See Actions in Management Scenario A for complete details.*

The recommended actions described in this scenario expand on or amend the detailed actions for Management Scenario A, Baseline Conditions, to achieve the possible level of service for this management scenario. Each action includes a scale with three segments (▢▢▢). The more segments color coded on the scale, the greater the funding required. The actions and recommendations listed in this management scenario reference the actions for Management Scenario A which are listed in the targets provided for each management scenario. Actions for alternative management scenarios should be implemented based on changes to program funding and tree maintenance responsibility.

For Management Scenario A, actions are organized by Urban Forest Management Plan goal and objective. Each action describes the necessary instructions to achieve the related goal and objective. The level of priority and degree of effort is provided for each action as well as the responsible department(s) or partner(s). Based on the priority, effort, resources needed, and goals of the Urban Forest Management Plan, the target year(s) for implementing or completing the action is provided. The layout for the action tables is provided below:



*Figure 6. An example of the Actions tables found in this Plan, including the goal theme and objective, priority and effort rankings, co-benefits, lead, and target year.*

\*Each action includes the responsible entity for implementation indicated by the following abbreviations:

- ▶ CD-Communications Department
- ▶ CDD-Community Development Department
- ▶ CSFD-Colorado Springs Fire Department
- ▶ CSU-Colorado Springs Utilities
- ▶ HOAs-Homeowners' Associations
- ▶ NSD-Neighborhood Services Department
- ▶ OEM-Office of Emergency Management
- ▶ PDD-Planning and Development Department
- ▶ PRCS-Parks, Recreation and Cultural Services Department
- ▶ PWD-Public Works Department
- ▶ SIMDs-Special Improvement Maintenance Districts

Actions may include the following abbreviations or acronyms:

- ▶ ANSI-American National Standards Institute
- ▶ BID-Business Improvement District
- ▶ BMPs-Best Management Practices
- ▶ CIP-Capital Improvement Program
- ▶ FRR-Forestry Rules and Regulations
- ▶ ISA-International Society of Arboriculture
- ▶ LCPM-Landscape Code and Policy Manual
- ▶ SAF-Society of American Foresters
- ▶ SOP-Standard Operating Procedure
- ▶ TOPS-Trails, Parks, and Open Space
- ▶ UFMP-Urban Forest Management Plan
- ▶ 2C-Ballot item 2C sales tax for paving

\*\*The primary **co-benefit** is listed at the bottom of each column. Any co-benefit symbol added above the bottom symbol indicates a slightly lesser degree of co-benefit significance.

**Community**
Actions that engage the public.

**Equity**
Opportunities to satisfy essential needs and achieve full potential.

**Human Health**
Provides physical benefits to local residents.

**Environment**
Benefits of air quality, water quality, and habitat.

*Table 9. Recommended Actions for Management Scenario B.*

| | |
|---|---|
| **I. Tree Policies** | |
| | (I.A-D): Strengthen City Code as recommended in Management Scenario A (MSA) in the Urban Forest Management Plan. |
| | (I.A-D): Continue to develop and update standard operating procedures and permitting processes for urban forest management that are aligned with City Code. |
| **II. Staffing** | |
| | (II.A): Use the evaluations of staffing and levels of service from MSA and the additional funding to determine priority staffing support. |
| | (II.A): Use available funding and staffing for evaluating tree and construction conflicts to identify trends, potential impacts, future costs, and alternative solutions. |
| | (II.A): Determine the feasibility and costs to partner with Department and other City staff for additional satellite crew facilities, particularly in the north and east parts of the City. |
| | (II.A): Explore the framework for establishing separate divisions for Streets, Parks, Riparian Areas and Trails, and Open Spaces. |

(II.A): Referring to Appendix II, acquire staff support as funding allows. Staffing should support the following services (not in any particular order of priority but required funding is indicated):

| | |
|---|---|
| | ❖ Respond to new requests for inspections, service, education as feasible. |
| | ❖ Evaluate and prioritize backlog of service requests. |
| | ❖ Arborist crew support for responding to service requests and priority pruning. |
| | ❖ Review of development plans and provide recommended changes such as species and location (particularly in the north and east). |
| | ❖ Monitor and respond to private tree encroachment and line of sight issues. |
| | ❖ Monitor for tree pests and diseases, integrated pest management. |
| | ❖ To the extent feasible, monitor improper plantings in the rights-of-way. |
| | ❖ Incrementally increase tree watering operations for specific park and median trees. Educate homeowners on the importance of and methods for watering. |
| | ❖ To the extent feasible, conduct priority tree maintenance in open space, trail corridors, and riparian areas. |
| | (II.E): Ensure all designated urban forestry staff attain and maintain industry certifications such as ISA Certified Arborist accreditation and other industry qualifications. |

*Table 10. Summary of staffing recommendations for an increase in program funding. (For additional information, see Appendices II and III.)*

| Position | Description | Recommendation |
|---|---|---|
| Staff Forester (FTE) | Additional staff to establish new Division structure (street trees, park trees, riparian, natural resource [open space] management). | ▪ 3 staff (2 for streets and parks, 1 for open space, riparian, natural resource) $86,128 per staff or $258,383 total<br>▪ $111,000 one-time equipment costs |
| Forestry Technician (FTE) | Develop an arborist crew for managing public trees on a seven-year rotation. | ▪ 3 staff at $65,849 per staff or $197,547 total<br>▪ $5,000 one-time equipment costs |
| Front Desk Admin (FTE) | Currently this staff is part-time (29 hours per week). Full-time admin would support service requests, crew tasks, and administrative duties. | ▪ Increase of $31,264 from hourly wage to salary |

*Table 9 continued. Recommended Actions for Management Scenario B.*

### III. Budget and Funding

(III.A-B): Continue to build the business case for acquiring adequate staffing levels, improving program structure, and higher levels of service based on Appendix II.

(III.C): Use the updated public tree inventory data to effectively propose an increase in resources.

(III.C): Continue to secure diverse and sustained funding sources.

### IV. Assessments and Plans

(IV.A): Continue to manage the tree inventory data, update with new tree plantings, and expand the tree database beyond public trees.

(IV.A): Conduct risk assessments as feasible in priority locations.

(IV.B): Continue to use the 2018 Tree Canopy Assessment to prioritize tree plantings.

### V. Green Asset Management

(V.A): Continue to integrate the tree inventory software program with other City asset management programs and data to align project planning, construction, and maintenance efforts with urban forest management strategies.

(V.A): Continue to improve service request tracking and prioritization.

(V.A): Evaluate the tree inventory for Significant Tree candidates.

(V.B): Decrease backlog of citizen request and explore/establish small preventative pruning areas in locations of highest needs.

(V.C): Continue to maintain public trees following MSA (2,000 trees pruned in-house and 2,000 trees pruned via contracted services, 400 hazardous trees removed) and expand preventative pruning to an additional 1,000 trees annually in prioritized areas.

(V.C): Use available funding and staffing for invasive species management in rights-of-way, trails, parks, and open spaces. Prioritize these areas based on service requests and inventories.

(V.D-F): Where feasible, strengthen resources and protocols for storm preparation and response, biomass utilization, and tree management in the wildland-urban interface.

(V.G): Ensure all City-led tree plantings have a young tree maintenance plan.

(V.H): Conduct prioritized, sample, or comprehensive pest and disease monitoring to prioritize treatments with available funding and inform the future development of an integrated pest management program.

(V.I): Continue to adhere to industry standards and best practices and update specifications and manuals according to changes in these guidelines.

(V.J): Provide watering of trees for areas without irrigation (medians and parks often have irrigation but it may be reduced in the future).

(V.K): As opportunities for new tree plantings arise, use the 2018 Tree Canopy Assessment to identify optimal locations for trees to meet a variety of needs and goals.

### VI. Community Engagement

(VI.A): Prepare a minimum of 4 new audience-specific (business owner, developer, resident) urban forest and/or tree-related outreach and education materials based on research from this Plan.

(VI.B): Establish a young adult job training, urban forest stewardship program to facilitate the planting and/or care of City trees.

(VI.A-C): Continue to provide education to the community through social media, events, workshops, and trainings to strengthen partnerships, and increase volunteer stewards.

(VI.C): Maintain the Arbor Day Foundation Tree City USA award.

(VI.C): Establish an awards program for recognizing exemplary urban forest stewardship in the community.

*(This page left intentionally blank)*

*(This page left intentionally blank)*

MANAGEMENT SCENARIO C
# TREE MAINTENANCE RESPONSIBILITY TRANSFER



*Photo courtesy of the City of Colorado Springs.*

| MANAGEMENT SCENARIO A (MSA) | MANAGEMENT SCENARIO B (MSB) | MANAGEMENT SCENARIO C (MSC) | MANAGEMENT SCENARIO D (MSD) |
|---|---|---|---|
| "Baseline Conditions" | "Additional but Insufficient Funding" | "Tree Maintenance Responsibility Transfer" | "Optimal Support" |

*Disclaimer: Management scenarios A-D were created as alternatives for consideration; no alternative is favored or recommended over another and other feasible scenarios may arise in the future.*

## MANAGEMENT SCENARIO C OVERVIEW

City Forestry is responsible for the public trees along streets, in medians, parks, open space, along trails, and on City-maintained facility grounds. It is estimated that this population is well over 270,000 trees. For this Plan and the supporting case studies, the conservative estimates of 270,000 total public trees, consisting of 250,000 street trees, are used.

Recommendations based on industry standards provide estimates on the adequate proportion of public trees and the staff responsible for the maintenance. It is recommended that every 10,000 public trees be represented by one tree maintenance staff. For Colorado Springs, Forestry has a total of 11 full-time employees, equating to one staff for every 24,545 trees; a deficit of 16 full-time staff. To further clarify the disparity, Forestry has seven operations staff specifically conducting maintenance for park and street trees; the remainder are staff foresters which conduct inspections, interface with citizens, and administer tree maintenance contracts.

To operate a comprehensive tree management program for 270,000 trees, it is estimated to cost over $7.4 million annually—$4.5 million specifically for preventative pruning of public trees on a seven-year rotation. The 2020 total budget for Forestry was $1.6 million, requiring a 375 percent ($5.8 million) increase.

Securing a 375 percent budget increase or acquisition of 16 additional full-time positions is not feasible in the short term. Therefore, in order to maintain responsibilities to the citizens and the urban forest, the transfer of street tree maintenance responsibility to the adjacent property owner in a series of phases over 20 years is offered as an option for consideration.

Forestry would continue to implement actions in this Plan and, with assistance from contracted services, would continue to maintain public trees in street medians, parks, maintained areas of open space, and trees along trails. The program would continue to respond to citizen service requests and address emergency issues until a formative preventative pruning cycle is established for public trees (sans street trees with new maintenance responsibility).

## RECOMMENDED ACTIONS

Each recommendation includes a reference to one or more actions provided in Management Scenario A (MSA) or serves as a unique action specific to this Management Scenario (MSC). The primary focus of the actions in this management scenario is to build the case for transferring the public tree maintenance responsibility from Forestry to the adjacent property owner. This transfer of responsibility is considered due to the continuing trend of insufficient resources and funding for Forestry to properly maintain over 270,000 public trees on an industry-recommended rotational pruning cycle.

## LIMITATIONS (CONSEQUENCES)

- ► The change of responsibility requires a health assessment of each tree to be transferred.

- ► An additional burden is placed on property owners.

- ► The oversight of management, health, and outcome of street trees is not directly controlled by Forestry, the agency devoted to the care and enhancement of the trees.

- ► Research conducted on other cities as part of this study has indicated that publicly managed and maintained street trees are more likely to receive regular maintenance than street trees generally left in the domain of private property holders. An overview of communities with adjacent property owners responsible for public tree maintenance is provided in Appendix I.

- ► This responsibility transfer may compromise tree health and stability, public safety, and the social and environmental benefits that street trees provide.

- ► Negative feedback from the citizens of Colorado Springs may be received.

- ► With City Forestry's inability to adequately maintain the existing public tree population, the question of liability due to tree failure or damage exists. The question of liability still remains if the tree maintenance responsibility is transferred to the adjacent property owner. City legal will need to determine the liability for tree failure/ damage due to lack of maintenance from either party.

- ► Staff time may be consumed by appeals, citizen calls, and reviews.

- ► The looming threat of emerald ash borer poses an additional concern and factor for the transfer of responsibility.

## OPPORTUNITIES

- ► The street trees may receive the maintenance that the City budget could not support.

- ► The phased tree responsibility transfer will alleviate demands on Forestry staff enabling staff to conduct comprehensive urban forestry planning, monitoring, and education.

- ► The tree transfer process will raise community awareness about the staffing and budget shortages, the needs of the urban forest, and the consequences of insufficient funding and deferred tree maintenance.

## LEVELS OF SERVICE

- ► The City will operate at Service Level 2, adequate service, also referred to as routine management. This service level is only achieved because of the relinquishment of street tree maintenance responsibility allowing Forestry staff to address other program responsibilities.

- ► Based on the U.S. Forest Service's Urban Forest Sustainability and Management Audit system, the City is currently operating at 67 percent in terms of urban forest management and sustainability. Conducting the audit after the transfer of tree maintenance responsibility will show a dramatic decrease in ranking for Colorado Springs' urban forest management and sustainability levels. This decline will occur because industry standards and research suggest the overall health of an urban forest is better managed with municipally-led programs.

## TIMELINE

- ► Implement actions in MSA to build the case for street tree maintenance responsibility transfer.

- ► Timeline for budget requests and tree transfer plan/proposal delivery dependent on City procedures.

- ► Tree transfer process will be completed in a series of phases—12,500 trees per year for 20 years as described in Appendix I.

## FRAMEWORK OF PLAN TARGETS

The following tables provide planning targets consisting of desired conditions, metrics, and indicators to allow stakeholders to track progress in achieving the associated goal. Implementation of the actions provided in this Plan will lead to successful achievement of the listed targets. The targets are listed in incremental stages across a 20-year planning horizon; 1-year, 2-year, 5-year, 10-year, 20-year— indicating the timeframe for accomplishing the relative target. Each target includes a reference to the Plan action(s) that will support achievement of the target. The following depicts the layout of the Plan Targets:
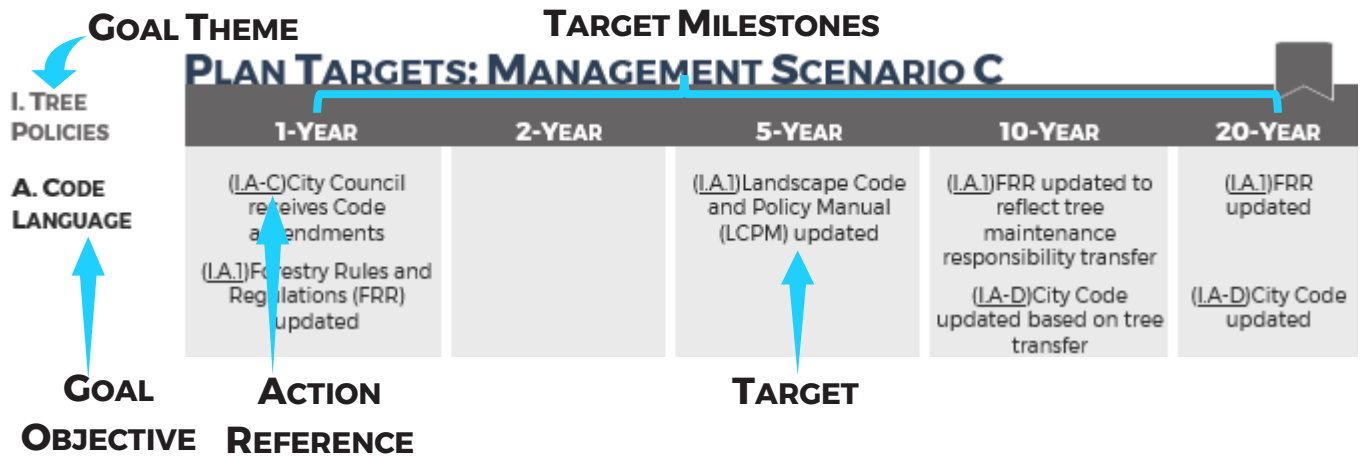


*Figure 7. An example of the Plan Targets tables found in this Plan including the goal theme, goal objective, action reference, targets, and target milestones.*

Each target includes a reference to the action(s) that supports its accomplishment. For example, to update City Code within the 2-year target milestone, actions I.A.2 and I.A.3 need to be implemented as shown in the table excerpt below. As the table shows, each action in Management Scenario A's action table includes an action number. This number is referenced in parentheses within each target.

| Priority | Effort | Co-benefit | I. TREE POLICY ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **A. CODE LANGUAGE** | |
| **I.A.2** Priority Effort | | 🌳 | Review with the City the recommended Code changes in Appendix V regarding weed maintenance (permissions, restrictions, responsibility), weed prevention (volunteer sprouts), and unauthorized plantings. | **PRCS**, PWD, PDD, NSD, CSU **TARGET YEAR:** 2020 |
| **I.A.3** Priority Effort | | 🌳 | Review with the City the recommended Code changes in Appendix V regarding inconsistencies found in Chapter 7 (Landscape Code) and Chapter 4 (Forestry) i.e. tree spacing, minimum number of trees, maintenance responsibilities, location of trees. | **PRCS**, PWD, PDD **TARGET YEAR:** 2020 |

*Figure 8. An example of the Actions tables found in this Plan, including the goal theme and objective, priority and effort rankings, co-benefits, lead, and target year.*

*Table 11. Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO C

| I. TREE POLICIES | 1-YEAR | 2-YEAR | 5-YEAR | 10-YEAR | 20-YEAR |
|---|---|---|---|---|---|
| **A. CODE LANGUAGE** | (I.A-C)City Council receives Code amendments; (I.A.1)Forestry Rules and Regulations (FRR) updated | | (I.A.1)Landscape Code and Policy Manual (LCPM) updated | (I.A.1)FRR updated to reflect tree maintenance responsibility transfer; (I.A-D)City Code updated based on tree transfer | (I.A.1)FRR updated; (I.A-D)City Code updated |
| **B. CODE ENFORCEMENT** | (I.A-C)City Council receives Code amendments; (I.B.2-6)FRR updated with enforcement amendments | | | (I.B.5)2 Certified Arborists in other departments | |
| **C. DEFINE CODE STANDARDS** | (I.A-C)City Council receives Code amendments; (I.C.1-10)FRR updated with Standards and Best Management Practices (BMPs) | | (I.C.1)2C/PRRTA and CIP alternative solutions toolkit; (I.C.3-5.10)Tree maintenance authority documented in FRR | | |
| **D. GENERAL POLICY** | | (I.D.2)Final tree transfer plan case study; (I.D.1)Urban Forest Management Plan (UFMP) updated | (I.D.1)FRR referenced in City plans; (I.D.2)Tree transfer plan presented to City Council and stakeholders | (I.D.2)Tree transfer plan approved; (I.D.1)Urban Forest Management Plan updated | |

*Table 11. continued: Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO C

### II. STAFFING

| | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. Levels of Service** | (II.A.1)Tree maintenance staffing business case | (II.A.1)Additional staffing business case prepared; (II.A.2-3) Standard Operating Procedures (SOP) for contractors and seasonals | (II.A.1)Business case for 4 Forestry divisions; (II.A.2-3)Budget adjusted for tree transfer (contractors, seasonals) | | (II.A.1)4 divisions of Forestry at staff capacity; (II.A.1-3)Tree transfer plan updated |
| **B. Defining Authority** | | (II.B.4)Maintenance authority for trees listed in FRR | | (II.B.4)Authority in FRR updated based on tree transfer | (II.B.4)Tree maintenance authority updated in FRR |
| **C. Communications** | | (II.C.4)Storm response SOP | (II.C.4)Storm response improved- less service requests, reduced costs | (II.C.1-4)The communications procedures are updated based on tree transfer | |
| **D. Workflows** | | | | (II.D.1)SOPs updated for tree transfer | |
| **E. Training** | (II.E.1)One-third of all current certified staff acquire necessary CEU's to maintain certification; (II.E.2)At least 1 safety or industry training is held per quarter | (II.E.1)At least 2 Forestry staff obtain pesticide applicator license | (II.E.1)All Forestry staff are International Society of Arboriculture (ISA) Certified Arborists, 1 TRAQ Qualified, 3 Municipal Specialists, 2 Society of American Foresters (SAF) Certified Foresters; (II.E.2)2 annual City department urban forestry trainings | (II.E.1)2 ISA Board Certified Master Arborists, 2 SAF Certified Foresters | (II.E.1-4)Less than 25% of trees are mismanaged by private property tree pruning responsibility |

*Table 11. continued: Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO C

| III. BUDGET AND FUNDING | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. ASSESSMENT** | (III.A.1)Funding enables 50% of public trees inventoried to determine tree transfer<br><br>(III.A.1)Public tree maintenance business case prepared | (III.A.1)Funding enables 100% of public trees inventoried to determine tree transfer | | | |
| **B. BUDGET PLANNING** | (III.B.1)Tree maintenance funding request prepared | | (III.B)Proposed changes to budget are prepared based on tree maintenance responsibility transfer | (III.B.1)Tree transfer plan adopted, budget change reflects Forestry's new roles | (III.B)Annual budget planning for Forestry's new roles and responsibilities |
| **C. FUNDING** | (III.C.1-16)Tree transfer case study funding options finalized | (III.C.5) Grant applications submitted for all relevant urban forestry applications (inventory, operations, etc.) | (III.C.16)Sustained funding report developed<br><br>(III.C.1-16) Pursuing 25% of alternative funding options | (III.C.1-16)A dedicated funding stream for public trees<br><br>(III.C.1-15)3 new funding streams secured | (III.C.1-16)Funding sources diversified: private, General Fund, grants, taxes, donations |

*Table 11. continued: Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO C

| IV. ASSESSMENTS AND PLANS | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| A. Tree Inventory | (IV.A.1)50% of public trees inventoried | (IV.A.1)100% of public trees inventoried; (IV.A.1)All public tree activities tracked in software; (IV.A.2)Cost-benefit analysis completed for trees | (IV.A.3)City and partner tree plantings tracked in software; (IV.A.4)Risk assessment program implemented to build the case for tree maintenance responsibility transfer | (IV.A.1)Trees are inventoried as maintenance responsibility is transferred in phases | (IV.A.3)Private property owners can voluntarily track maintenance and planting of public trees with online system |
| B. Canopy Assessment | | | | (IV.B.1)WUI canopy assessment; (IV.B.1)Canopy change assessment to establish canopy goals | (IV.B.1)Tree canopy goals established |
| C. Plans | | (IV.C.2)UFMP is updated | (IV.C.1)Forest management plans created for parks, trails, open space, and riparian areas; (IV.C.2)UFMP is updated; (IV.C.3)Technical support results in academic institution UFMPs; (IV.C.3)Technical support results in HOA, SIMD, or neighborhood UFMP | (IV.C.2)UFMP is updated; (IV.C.3)50% of academic institutions have a UFMP; (IV.C.4)An urban forest audit is completed | (IV.C.2)UFMP is updated; (IV.C.3)100% of academic institutions, 2 corporations, and 25% of healthcare facilities have a UFMP; (IV.C.3)75% of HOAs, SIMDs, neighborhoods have UFMP; (IV.C.4)An urban forest audit is completed |

*Table 11. continued: Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO C

| V. GREEN ASSET MANAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| A. Tree Tracking | (V.A.1)Service requests connected to tree software | (V.A.2)Tree software integrated with City asset software | (V.A.2)100% of applicable CIP projects use tree software | | (V.A.2)Forestry updates tools to reflect technology changes |
| B. Tree Maintenance Prioritization | (V.B.1)Preventative pruning prioritization maps created | (V.B.1)Preventative pruning prioritization maps updated | | | (V.B.1)Preventative pruning prioritization maps updated |
| C. Tree Maintenance Regime | (V.C.1)2,000 trees pruned; 2,000 trees contracted (V.C.2)400 hazardous trees removed (V.C.3)Preventative pruning completed for 1,000 additional trees annually (V.C.6)Management of non-natives and unauthorized trees SOP | (V.C.1)2,000 trees pruned; 2,000 trees contracted (V.C.2)400 hazardous trees removed (V.C.3)Preventative pruning completed for 1,000 additional trees annually (V.C.4-5)Pruning rotation and tree maintenance responsibility transfer cost-benefit analysis | (V.C.1)Service request backlog reduced by 90% | (V.C)First phase of tree transfer conducted (12,500 trees) (V.C.1)Non-street tree (parks, trails, open space, facilities, medians) 7-year pruning rotation begins (V.C.1)Forest management on 100 acres of open space per year (V.C.6)Volunteer, unauthorized trees in ROW reduced by 10% annually | (V.C.6)Volunteer, unauthorized trees in ROW reduced by 90% |
| D. Storm Response | (V.D.1)Storm response SOP | (V.D.2)Past winter storm service request backlog reduced by 50% | (V.D.2)Past winter storm service request backlog reduced by 50% | (V.D.1)50% improvement for storm response relative to past storms | (V.D.1)75% improvement for storm response relative to past storms |

*Table 11. continued: Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO C

| V. GREEN ASSET MANAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| E. BIOMASS UTILIZATION | (V.E.1)City wood debris used for playgrounds and other areas up 10% | (V.E.1)City wood debris used for playgrounds and other areas up 25% | (V.E.1)City wood debris used for playgrounds and other areas up 50% | (V.E.1)City wood debris used for playgrounds and other areas up 75% | (V.E.1) Repurposing City wood debris program for firewood, lumber, furniture |
| F. WILDLAND-URBAN INTERFACE (WUI) | | | (V.F.2)5% of fire risk acres in WUI areas maintained | (V.F.2)25% of fire risk acres in WUI areas maintained | (V.F.2)50% of fire risk acres in WUI areas maintained |
| G. YOUNG TREE PRUNING | (V.G.1)Young tree care plan for City-led projects | (V.G.1)City Code and FRR updated with young tree care standards | (V.G.1)10% of young trees structurally pruned (estimated 19,000 trees) | (V.G.1)50% of young trees structurally pruned within 5 years of planting | (V.G.1)Young public tree maintenance plan results in 75% pruned within 5 years of planting |
| H. INTEGRATED PEST MANAGEMENT | (V.H.2)Response to ash tree service requests follows a consistent management approach | (V.H.2)Emerald ash borer plan implemented (V.H.3)Tree susceptibility report | (V.H.2)Partial completion of emerald ash borer plan actions | (V.H.1)Early pest detection, successful treatments | (V.H.1)Integrated Pest Management program for public trees |
| I. TREE SPECS AND STANDARDS | ← (V.I.1)City tree maintenance adheres to standards and best practices → | | | | |
| J. TREE WATERING | (V.J.1)25% of new tree plantings receive proper watering regime | (V.J.2)Planting and watering plan | (V.J.5)Modified water plan for trees in drought | (V.J.3)New City trees dead due to drought reduced by 10% (V.J.4)75% of trees planted are site appropriate | (V.J.3)New City trees dead due to drought reduced by 15% (V.J.4)Updated tree species list and planting plan |

*Table 11. continued: Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO C

| | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **V. GREEN ASSET MANAGEMENT** **K. TREE PLANTING** | (V.K.1)Tree species list updated | (V.K.2)Neighborhood tree planting plan pilot project | (V.K.7)Trees are a best management practice (BMP) in stormwater management plan | (V.K.3)Citywide planting plan developed | (V.K.3)Trees planted to achieve desired ecosystem benefits and functions to the community |
| | | (V.K.5)18,071 "COS 150 Tree Challenge Program" trees planted (public and private) | | (V.K.4,6-7) Stormwater volume reduced from increasing trees planted by 20% annually since 2022 | |

*Table 11. continued: Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO C

| VI. COMMUNITY ENGAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. EDUCATION AND OUTREACH** | (VI.A.1-16)Public outreach strategy developed (VI.A.6)Forestry articles (1 per quarter) on social media, other platforms | (VI.A.3)Service request response within 10 business days (VI.A.7)Public forestry event (1 per year) (VI.A.8)Forestry public survey (biannually) | (VI.A.9-15)6 topic-specific messages created for 4 audiences (residential, businesses, institutions, youth) | (VI.A.16)Trained tree stewards in all neighborhoods (VI.A.5)Tree maintenance responsibility transfer public announcement | (VI.A.1-16)City tree organizations host multiple events, trainings |
| **B. PARTNERSHIPS** | (VI.B.1)UFMP information shared with all partners including City Fire Department | (VI.B.3)Support establishment of non-profit or non-governmental organization (VI.B.9)Office of Innovation aids multi-department planning | (VI.B.5)Partners represent all neighborhoods and cultures (VI.B.6)2 Academic institutions have UFMPs | (VI.B.6)50% of academic institutions have a UFMP (VI.B.7)Tree giveaway programs expand due to demand | (VI.B.8)In-house tree nursery to support planting plans |
| **C. VOLUNTEERS** | (VI.C.2,5)City-hosted planting event | (VI.C.1)Forestry volunteers increase by 10% (VI.C.2,5)City-hosted planting event (2) | (VI.C.1)Forestry volunteers increase by 50% (VI.C.3)Volunteers represent all neighborhoods and demographics | (VI.C.1)Forestry volunteers increase by 75% (VI.C.4)Train the trainer program (VI.C.5)Tree City USA award for 53rd consecutive year (VI.C.6)4 annual awards to tree stewards (youth, resident, organization, business) | (VI.C.1)Forestry volunteers increase by 100% (VI.C.5)Tree City USA award for 63rd consecutive year (VI.C.6)60+ awards for youth, resident, organization, and business tree stewardship |

## FRAMEWORK OF PLAN ACTIONS

*See Actions in Management Scenario A for complete details.*

The recommended actions described in this scenario expand on or amend the detailed actions for Management Scenario A, Baseline Conditions, to achieve the possible level of service for this management scenario. The actions and recommendations listed in this management scenario reference the actions for Management Scenario A which are listed in the targets provided for each management scenario. Actions for alternative management scenarios should be implemented based on changes to program funding and tree maintenance responsibility.

For Management Scenario A, actions are organized by Urban Forest Management Plan goal and objective. Each action describes the necessary instructions to achieve the related goal and objective. The level of priority and degree of effort is provided for each action as well as the responsible department(s) or partner(s). Based on the priority, effort, resources needed, and goals of the Urban Forest Management Plan, the target year(s) for implementing or completing the action is provided. The layout for the action tables is provided below:



*Figure 9. An example of the Actions tables found in this Plan including the goal theme and objective, priority and effort rankings, co-benefits, lead, and target year.*

*Each action includes the responsible entity for implementation indicated by the following abbreviations:

- CD-Communications Department
- CDD-Community Development Department
- CSFD-Colorado Springs Fire Department
- CSU-Colorado Springs Utilities
- HOAs-Homeowners' Associations
- NSD-Neighborhood Services Department
- OEM-Office of Emergency Management
- PDD-Planning and Development Department
- PRCS-Parks, Recreation and Cultural Services Department
- PWD-Public Works Department
- SIMDs-Special Improvement Maintenance Districts

Actions may include the following abbreviations or acronyms:

- ANSI-American National Standards Institute
- BID-Business Improvement District
- BMPs-Best Management Practices
- CIP-Capital Improvement Program
- FRR-Forestry Rules and Regulations
- ISA-International Society of Arboriculture
- LCPM-Landscape Code and Policy Manual
- SAF-Society of American Foresters
- SOP-Standard Operating Procedure
- TOPS-Trails, Parks, and Open Space
- UFMP-Urban Forest Management Plan
- 2C-Ballot item 2C sales tax for paving

**The primary **co-benefit** is listed at the bottom of each column. Any co-benefit symbol added above the bottom symbol indicates a slightly lesser degree of co-benefit significance.

**Community**
Actions that engage the public.

**Equity**
Opportunities to satisfy essential needs and achieve full potential.

**Human Health**
Provides physical benefits to local residents.

**Environment**
Benefits of air quality, water quality, and habitat.

*Table 12. Recommended Actions for Management Scenario C.*

### I. Tree Policies – II. Staffing – III. Budget and Funding

❖ (I-III): Implement actions in Management Scenario A and B (MSA, MSB).

❖ (II.A): Use the case study provided in this Plan that evaluates tree inventory data, necessary policy changes, staffing requirements, costs of deferred maintenance, costs of preventative pruning, and program funding options (Appendix I).

❖ (MSC): Update the case study (Appendix I) with tree inventory data and other local data to prepare a proposal for the relinquishment of tree maintenance responsibility.

❖ (MSC): Update the draft Tree Transfer Plan provided in the Urban Forest Management Plan (Appendix I).

❖ (MSC): Deliver the proposal and Tree Transfer Plan.

❖ (MSC): Conduct community outreach and education regarding the proposed tree transfer.

❖ (MSC): Use the newly acquired citizen attention to encourage support for a program budget that enables full City responsibility of tree maintenance.

### IV. Assessments and Plans

❖ (IV.A): Complete a comprehensive inventory of public trees (primarily street trees) to use the data for the tree transfer selection criteria.

❖ (IV.A, II.A): Use the inventory data to update the case study provided in this Plan (Appendix I).

❖ (IV.A): Continue to inventory and manage tree information. Track maintenance records for all public trees.

### V. Green Asset Management

❖ (MSC): Implement MSD, Optimal Support if program funding is received, or, operate the program under MSC if no additional funding is received.

❖ (II.A): If no additional funding is received, continue to evaluate necessary staffing levels, funding, and priorities to build support. Use Appendix I and Appendix II as guidance.

❖ (V.C): Continue to respond to citizen service requests, emergencies, and preventative pruning with available resources.

❖ (V.H.2): Implement actions provided in the Tree Pest and Disease Plan for prevention, response, treatment, mitigation, and wood utilization; specifically, for emerald ash borer.

### VI. Community Engagement

❖ (VI.A-C): Continue to improve community outreach and education by following the actions in MSA and MSB.

MANAGEMENT SCENARIO D
# OPTIMAL SUPPORT



*Photo courtesy of the City of Colorado Springs.*

| **MANAGEMENT SCENARIO A (MSA)** | **MANAGEMENT SCENARIO B (MSB)** | **MANAGEMENT SCENARIO C (MSC)** | **MANAGEMENT SCENARIO D (MSD)** |
|---|---|---|---|
| **"Baseline Conditions"** | **"Additional but Insufficient Funding"** | **"Tree Maintenance Responsibility Transfer"** | **"Optimal Support"** |

*Disclaimer: Management scenarios A-D were created as alternatives for consideration; no alternative is favored or recommended over another and other feasible scenarios may arise in the future.*

## MANAGEMENT SCENARIO D OVERVIEW

By implementing Management Scenarios A-C, resources and information may lead Forestry towards Management Scenario D, Optimal Support. In this scenario, the budget allows Forestry to obtain adequate staffing levels and funding to maintain the growing 270,000 public tree population. This includes preventative tree maintenance on a rotation, equipment and facilities for efficient service, enhanced community outreach and education, routine monitoring and management of tree pests and diseases, assessing and mitigating tree risk, review of development plans and tree preservation, enforcement of tree policies, and comprehensive urban forestry planning.

## RECOMMENDED ACTIONS

The actions provided for this management scenario can be implemented with optimal support in terms of funding, resources, staffing, and community engagement. The primary focus of this management scenario is to provide advanced levels of service for all public trees. Optimal support allows Forestry to meet the needs and expectations of the community while growing a healthy and sustainable urban forest.

## LIMITATIONS (CONSEQUENCES)

▶ City residents may lose a sense of ownership and value when tree maintenance is solely the responsibility of the City.

▶ What is considered optimal support for the Forestry program must be evaluated annually to determine any changes in budget required.

▶ The City's urban forest and human population continue to grow, and the budget must be adjusted to reflect changes.

▶ Urban forests are constantly changing as are the potential risks (pests, disease, climate, storms). A budget deemed optimal may not be sufficient for unforeseen events.

## OPPORTUNITIES

▶ Optimal support coincides with community support. The citizens must value the urban forest for a program to receive optimal funding.

▶ Adequate funding for tree maintenance reduces tree risk, improves public safety, reduces long-term costs, and improves public opinion.

▶ A program with adequate funding and resources can conduct comprehensive urban forestry planning for canopy expansion, tree preservation, and resiliency strengthening.

▶ Improved levels of service, quicker response time to requests, and an equitable distribution of tree benefits and services can result from a well-funded program.

▶ Partnerships and community volunteers can be expanded and strengthened.

▶ Forestry staff will have the capacity for improved community engagement and educational activities.

▶ Colorado Springs will have a healthy and vibrant urban forest that will benefit citizens and visitors for generations.

## LEVELS OF SERVICE

▶ The City will operate at Service Level 3, high service, also referred to as proactive management.

▶ Based on the U.S. Forest Service's Urban Forest Sustainability and Management Audit system, the City is currently operating at 67 percent in terms of urban forest management and sustainability. Conducting the audit years after the budget and resources have reached optimal levels will show progression towards 100 percent in terms of urban forest management and sustainability.

▶ This is the highest level of service the City can provide to its citizens and urban forest. This level has the highest annual costs but generally results in safer, more sustainable urban forests with less storm damage potential and insect and disease threats, maximum tree benefits, and the greatest level of citizen satisfaction.

▶ This management scenario has the highest annual costs but will reduce long-term costs with regard to storm clean up, pruning costs, and increased longevity of the urban forest.

## TIMELINE

▶ Implement actions in MSA and MSB to build the case for increases in budget and resources.

▶ Use the case studies (Appendix I and Appendix II) to provide a proposal that describes the allocation of funding for preventative pruning and other urban forestry activities. Include the costs of deferred maintenance, potential risks to the urban forest, and benefits the urban forest provides.

## FRAMEWORK OF PLAN TARGETS

The following tables provide planning targets consisting of desired conditions, metrics, and indicators to allow stakeholders to track progress in achieving the associated goal. Implementation of the actions provided in this Plan will lead to successful achievement of the listed targets. The targets are listed in incremental stages across a 20-year planning horizon; 1-year, 2-year, 5-year, 10-year, 20-year— indicating the timeframe for accomplishing the relative target. Each target includes a reference to the Plan action(s) that will support achievement of the target. The following depicts the layout of the Plan Targets:
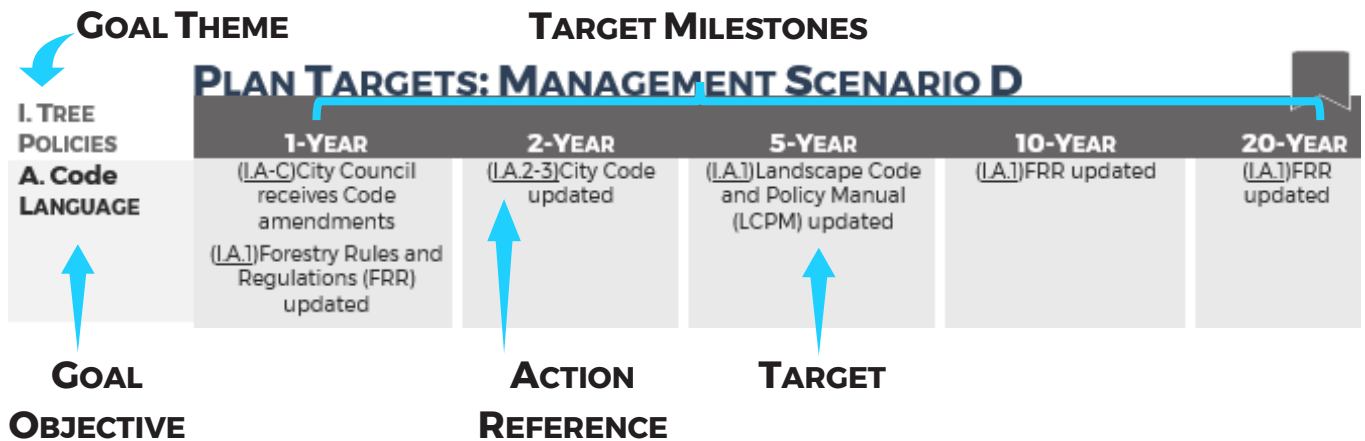


*Figure 10. An example of the Plan Targets tables found in this Plan including the goal theme, goal objective, action reference, targets, and target milestones.*

Each target includes a reference to the action(s) that supports its accomplishment. For example, to update City Code within the 2-year target milestone, actions I.A.2 and I.A.3 need to be implemented as shown in the table excerpt below. As the table shows, each action in Management Scenario A's action table includes an action number. This number is referenced in parentheses within each target.

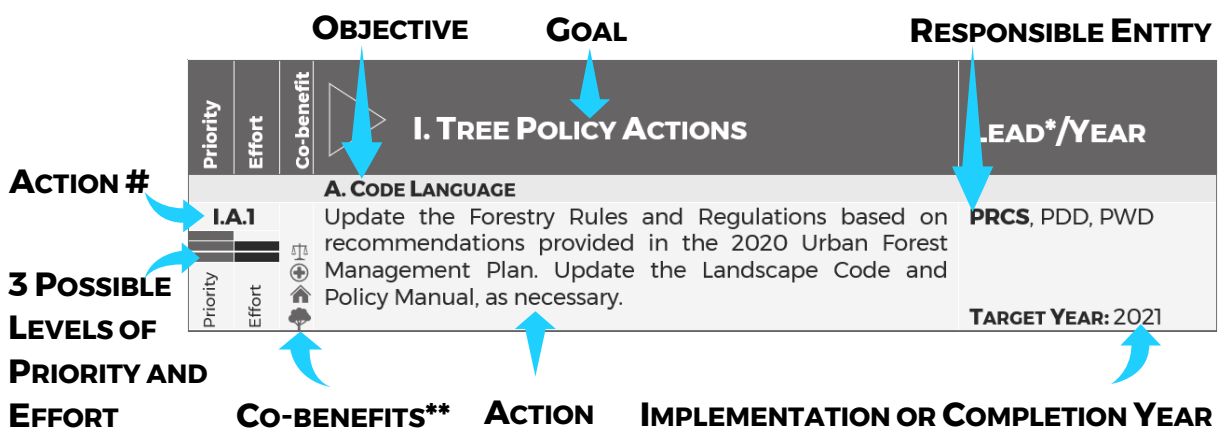| Priority | Effort | Co-benefit | ▷ I. TREE POLICY ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **A. CODE LANGUAGE** | |
| **I.A.2** Priority | Effort | 🌳 | Review with the City the recommended Code changes in Appendix V regarding weed maintenance (permissions, restrictions, responsibility), weed prevention (volunteer sprouts), and unauthorized plantings. | **PRCS**, PWD, PDD, NSD, CSU<br><br>**TARGET YEAR:** 2020 |
| **I.A.3** Priority | Effort | 🌳 | Review with the City the recommended Code changes in Appendix V regarding inconsistencies found in Chapter 7 (Landscape Code) and Chapter 4 (Forestry) i.e. tree spacing, minimum number of trees, maintenance responsibilities, location of trees. | **PRCS**, PWD, PDD<br><br>**TARGET YEAR:** 2020 |

*Figure 11. An example of the Actions tables found in this Plan including the goal theme and objective, priority and effort rankings, co-benefits, lead, and target year.*

*Table 13. Complete list of targets, by goal, for Management Scenario C.*

## PLAN TARGETS: MANAGEMENT SCENARIO D

| I. TREE POLICIES | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. Code Language** | (I.A-C)City Council receives Code amendments; (I.A.1)Forestry Rules and Regulations (FRR) updated | (I.A.2-3)City Code updated | (I.A.1)Landscape Code and Policy Manual (LCPM) updated | (I.A.1)FRR updated | (I.A.1)FRR updated |
| **B. Code Enforcement** | (I.B.2-6)FRR updated with enforcement amendments | (I.B.1)FRR in City Code; (I.B.2-6) Enforcement amendments in City Code | (I.B.2-6)Enforcement revenue summary; (I.B.2-6)Enforcement revenue matches known violations; (I.B.5)75% of construction-tree projects reviewed | (I.B.5)100% of construction-tree projects reviewed | (I.B.5)2 Certified Arborists in other departments |
| **C. Define Code Standards** | (I.A-C)City Council receives Code amendments; (I.C.1-10)FRR updated with Standards and Best Management Practices (BMPs); (I.C.7)Significant Tree candidate trees increases | (I.C.3-5,10)Tree maintenance authority documented in FRR | (I.C.1)2C/PRRTA and CIP alternative solutions toolkit; (I.C.7)The Significant Tree Program expands | (I.C.7)Volunteer private tree Significant Tree Program | |
| **D. General Policy** | | (I.D.1)Urban Forest Management Plan (UFMP) updated | (I.D.1)FRR referenced in City plans | (I.D.1)Urban Forest Management Plan updated | |

*Table 13. continued: Complete list of targets, by goal, for Management Scenario D.*

## PLAN TARGETS: MANAGEMENT SCENARIO D

| II. STAFFING | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. Levels of Service** | (II.A.1)Tree maintenance staffing business case | (II.A.2-3) Standard Operating Procedures (SOP) for contractors and seasonals | (II.A.1)Business case for 4 Forestry divisions | (II.A.1)Northeast office in operation | (II.A.1)4 divisions of Forestry at staff capacity |
| **B. Defining Authority** | (II.B.4)Maintenance authority for trees listed in FRR | (II.B.4)Tree maintenance authority updated in FRR | | | (II.B.4)Tree maintenance authority updated in FRR |
| **C. Communications** | | (II.C.3)Utility tree service requests reduced by 25%<br><br>(II.C.4)Storm response SOP | (II.C.3)Utility service requests reduced by 90%<br><br>(II.C.4)Storm response improved- less service requests, less costs | (II.C.4)Storm-related service requests addressed in 30 days | |
| **D. Workflows** | | | (II.D.1)SOPs updated<br><br>(II.D.2)Staff hours per activity within +/- 5% of job description | | |
| **E. Training** | (II.E.1)One-third of all current certified staff acquire necessary CEU's to maintain certification<br><br>(II.E.2)At least 1 safety or industry training is held per quarter | (II.E.1)At least 2 Forestry staff obtain pesticide applicator license | (II.E.1)All Forestry staff are International Society of Arboriculture (ISA) Certified Arborists, 1 TRAQ Qualified, 3 Municipal Specialists, 2 Society of American Foresters (SAF)-certified<br><br>(II.E.2)2 annual City department urban forestry trainings | (II.E.1)2 (ISA) Board Certified Master Arborists, 2 SAF Certified Foresters | (II.E.1-4)Injuries and claims reduced by 90%.<br><br>(II.E.1-4)Less than 1% of trees are mismanaged |

*Table 13. continued: Complete list of targets, by goal, for Management Scenario D.*

## PLAN TARGETS: MANAGEMENT SCENARIO D

| III. BUDGET AND FUNDING | 1-YEAR | 2-YEAR | 5-YEAR | 10-YEAR | 20-YEAR |
|---|---|---|---|---|---|
| **A. ASSESSMENT** | (III.A.1)Funding enables 50% of public trees to be inventoried<br><br>(III.A.1)Public tree maintenance business case prepared | (III.A.1)Funding enables 100% of public trees inventoried | | (III.A.1)Second phase public tree inventory to inform future budget enhancements based on tree population and needs | |
| **B. BUDGET PLANNING** | (III.B.1)City Forestry funding request prepared | (II.B)50% of funding request is fulfilled | (II.B)100% of funding request fulfilled | (II.B)100% of funding request remains fulfilled | (II.B)100% of funding request remains fulfilled |
| **C. FUNDING** | | (III.C.5) Grant applications submitted for all relevant urban forestry applications (inventory, operations, etc.)<br><br>(III.C.1-16) Pursuing 25% of alternative funding options | (III.C.1-15)3 new funding streams secured<br><br>(III.C.16)Sustained funding report developed | (III.C.1-16)A dedicated funding stream for public trees | (III.C.1-16)Funding sources diversified: private, General Fund, grants, taxes, donations |

*Table 13. continued: Complete list of targets, by goal, for Management Scenario D.*

## PLAN TARGETS: MANAGEMENT SCENARIO D

| IV. ASSESSMENTS AND PLANS | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. TREE INVENTORY** | (IV.A.1)50% of public trees inventoried | (IV.A.1)100% of public trees inventoried<br>(IV.A.1)All tree activities tracked in software<br>(IV.A.2)Cost-benefit analysis completed for trees | (IV.A.3)City and partner tree plantings tracked in software<br>(IV.A.4)Risk assessment program implemented | (IV.A.1)Second phase public tree inventory<br>(IV.A.3)50% of private tree plantings tracked | (IV.A.1)Entire public tree inventory completed<br>(IV.A.3)75% of private tree plantings tracked |
| **B. CANOPY ASSESSMENT** | (IV.B.1)Citywide canopy goal, planting targets | (IV.B.1)Canopy goals by planning areas | (IV.B.1)WUI canopy assessment | (IV.B.1)Canopy change assessment to establish canopy goals | (IV.B.1)New canopy goals |
| **C. PLANS** | | (IV.C.2)UFMP is updated | (IV.C.1)Forest management plans created for parks, trails, open space, and riparian areas<br>(IV.C.2)UFMP is updated<br>(IV.C.3)2 academic institutions have a UFMP<br>(IV.C.3)UFMP for HOA, SIMD, or neighborhood completed | (IV.C.2)UFMP is updated<br>(IV.C.3)50% of academic institutions have a UFMP<br>(IV.C.4)An urban forest audit is completed<br>(IV.C)Develop an Urban Forest Master Plan that addresses private trees and extensive community engagement | (IV.C.2)UFMP is updated<br>(IV.C.3)100% of academic institutions have a UFMP<br>(IV.C.3)2 corporations, 25% of healthcare facilities have a UFMP<br>(IV.C.3)25% of HOAs, SIMDs, neighborhoods have UFMP<br>(IV.C.4)An urban forest audit is completed |

*Table 13. continued: Complete list of targets, by goal, for Management Scenario D.*

## PLAN TARGETS: MANAGEMENT SCENARIO D

| V. GREEN ASSET MANAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. TREE TRACKING** | (V.A.1)Service requests connected to tree software | (V.A.2)Tree software integrated with City asset software | (V.A.2)100% of applicable CIP projects use tree software | | (V.A.2)Forestry updates tools to reflect technology changes |
| **B. TREE MAINTENANCE PRIORITIZATION** | (V.B.1)Preventative pruning prioritization maps created | (V.B.1)Preventative pruning prioritization maps updated | | | (V.B.1)Preventative pruning prioritization maps updated |
| **C. TREE MAINTENANCE REGIME** | (V.C.1)2,000 trees pruned; 2,000 trees contracted (V.C.2)400 hazardous trees removed (V.C.3)Preventative pruning completed for 1,000 additional trees annually (V.C.6)Management of non-natives and unauthorized trees SOP | (V.C.1)38,600 public trees pruned annually with in-house and contracted services (V.C.2)Hazardous trees are removed based on assessments and funding | (V.C.1)Pruning rotations for public trees continues (V.C.1)Service request backlog reduced by 90% (V.C.6)Right-of-way (ROW) tree sprouts, unauthorized trees reduced by 10% (V.C.1)Forest management on 500 acres of open space (100 acres per year) | (V.C.1)Pruning rotations for public trees continues (V.C.6)Volunteer, unauthorized trees in ROW reduced by 50% | (V.C.6)Volunteer, unauthorized trees in ROW reduced by 90% |
| **D. STORM RESPONSE** | (V.D.1)Storm response SOP | (V.D.2)Past winter storm service request backlog reduced by 50% | (V.D.2)Past winter storm service request backlog reduced by 100% | (V.D.1)50% improvement for storm response relative to past storms | (V.D.1)75% improvement for storm response relative to past storms |

*Table 13. continued: Complete list of targets, by goal, for Management Scenario D.*

## PLAN TARGETS: MANAGEMENT SCENARIO D

| V. GREEN ASSET MANAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| E. BIOMASS UTILIZATION | (V.E.1)City wood debris used for playgrounds and other areas up 10% | (V.E.1)City wood debris used for playgrounds and other areas up 25% | (V.E.1)City wood debris used for playgrounds and other areas up 50% | (V.E.1)City wood debris used for playgrounds and other areas up 75% | (V.E.1) Repurposing City wood debris program for firewood, lumber, furniture |
| F. WILDLAND-URBAN INTERFACE (WUI) | | | (V.F.2)25% of fire risk acres in WUI areas maintained | (V.F.2)75% of fire risk acres in WUI areas maintained | (V.F.2)90% of fire risk acres in WUI areas maintained |
| G. YOUNG TREE PRUNING | (V.G.1)Young tree care plan for City-led projects | (V.G.1)City Code and FRR updated with young tree care standards | (V.G.1)50% of young trees structurally pruned (estimated 19,000 trees) | (V.G.1)90% of young trees structurally pruned within 5 years of planting | (V.G.1)Young public tree maintenance plan |
| H. INTEGRATED PEST MANAGEMENT | (V.H.2)Response to ash tree service requests follows a consistent management approach | (V.H.2)Emerald ash borer plan implemented; (V.H.3)Tree susceptibility report | (V.H.2)Partial completion of emerald ash borer plan actions | (V.H.1)Early pest detection, successful treatments; (V.H.1)Canopy cover is resilient to pests | (V.H.1)Integrated Pest Management program for public trees |
| I. TREE SPECS AND STANDARDS | ← (V.I.1)City tree maintenance adheres to standards and best practices → | | | | |
| J. TREE WATERING | (V.J.1)New tree plantings receive proper watering regime | (V.J.2)Planting and watering plan | (V.J.3)New City trees dead due to drought reduced by 25%; (V.J.5)Modified water plan for trees in drought | (V.J.3)New City trees dead due to drought reduced by 50%; (V.J.4)75% of trees planted are site appropriate | (V.J.3)New City trees dead due to drought reduced by 75%; (V.J.4)Updated tree species list and planting plan |

*Table 13. continued: Complete list of targets, by goal, for Management Scenario D.*

## PLAN TARGETS: MANAGEMENT SCENARIO D

| | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **V. GREEN ASSET MANAGEMENT**<br>**K. TREE PLANTING** | (V.K.1)Tree species list updated | (V.K.2)Neighborhood tree planting plan pilot project<br><br>(V.K.3)Citywide planting plan developed<br><br>(V.K.5)18,071 "COS 150 Tree Challenge Program" trees planted (public and private) | (V.K.7)Trees are a best management practice (BMP) in stormwater management plan | (V.K.4,6-7) Stormwater volume reduced from increasing trees planted by 20% annually since 2022 | (V.K.3)Trees planted to achieve all canopy goals and equitable benefits to the community |

*Table 13. continued: Complete list of targets, by goal, for Management Scenario D.*

## PLAN TARGETS: MANAGEMENT SCENARIO D

| VI. COMMUNITY ENGAGEMENT | 1-Year | 2-Year | 5-Year | 10-Year | 20-Year |
|---|---|---|---|---|---|
| **A. EDUCATION AND OUTREACH** | (VI.A.1-16)Public outreach strategy developed; (VI.A.6)Forestry articles (1 per quarter) on social media, other platforms | (VI.A.3)Service response request in 5 business days; (VI.A.5)Tree maintenance responsibility public announcement; (VI.A.7)Annual public event; (VI.A.8)Forestry public survey (biannually) | (VI.A.9-15)6 topic-specific messages created for 4 audiences (residential, businesses, institutions, youth) | (VI.A.16)Trained tree stewards in all neighborhoods | (VI.A.1-16)City tree organizations host multiple events, trainings |
| **B. PARTNERSHIPS** | (VI.B.1)UFMP information shared with all partners including City Fire Department | (VI.B.3)Tree non-profit established; (VI.B.9)Office of Innovation aids multi-department planning | (VI.B.5)Partners represent all neighborhoods; (VI.B.6)2 Academic institutions have UFMPs | (VI.B.6)50% of academic institutions have a UFMP; (VI.B.7)Tree giveaways expand | (VI.B.8)In-house tree nursery to support planting plans |
| **C. VOLUNTEERS** | (VI.C.2,5)City-hosted planting event | (VI.C.1)Forestry volunteers increase by 10%; (VI.C.2,5)City-hosted planting event (2) | (VI.C.1)Forestry volunteers increase by 50%; (VI.C.3)Volunteers represent all neighborhoods; (VI.C.6)4 awards to tree stewards (youth, resident, organization, business) | (VI.C.1)Forestry volunteers increase by 75%; (VI.C.4)Train the trainer program; (VI.C.5)Tree City USA award for 53rd consecutive year | (VI.C.1)Forestry volunteers increase by 100%; (VI.C.5)Tree City USA award for 63rd consecutive year; (VI.C.6)60+ awards for youth, resident, organization, and business tree stewardship |

## FRAMEWORK OF PLAN ACTIONS

*See Actions in Management Scenario A for complete details.*

The recommended actions described in this scenario expand on or amend the detailed actions for Management Scenario A, Baseline Conditions, to achieve the possible level of service for this management scenario. The actions and recommendations listed in this management scenario reference the actions for Management Scenario A which are listed in the targets provided for each management scenario. Actions for alternative management scenarios should be implemented based on changes to program funding and tree maintenance responsibility.

For Management Scenario A, actions are organized by Urban Forest Management Plan goal and objective. Each action describes the necessary instructions to achieve the related goal and objective. The level of priority and degree of effort is provided for each action as well as the responsible department(s) or partner(s). Based on the priority, effort, resources needed, and goals of the Urban Forest Management Plan, the target year(s) for implementing or completing the action is provided. The layout for the action tables is provided below:



*Figure 12. An example of the Actions tables found in this Plan including the goal theme and objective, priority and effort rankings, co-benefits, lead, and target year.*

*Each action includes the responsible entity for implementation indicated by the following abbreviations:

- ► CD-Communications Department
- ► CDD-Community Development Department
- ► CSFD-Colorado Springs Fire Department
- ► CSU-Colorado Springs Utilities
- ► HOAs-Homeowners' Associations
- ► NSD-Neighborhood Services Department
- ► OEM-Office of Emergency Management
- ► PDD-Planning and Development Department
- ► PRCS-Parks, Recreation and Cultural Services Department
- ► PWD-Public Works Department
- ► SIMDs-Special Improvement Maintenance Districts

Actions may include the following abbreviations or acronyms:

- ► ANSI-American National Standards Institute
- ► BID-Business Improvement District
- ► BMPs-Best Management Practices
- ► CIP-Capital Improvement Program
- ► FRR-Forestry Rules and Regulations
- ► ISA-International Society of Arboriculture
- ► LCPM-Landscape Code and Policy Manual
- ► SAF-Society of American Foresters
- ► SOP-Standard Operating Procedure
- ► TOPS-Trails, Parks, and Open Space
- ► UFMP-Urban Forest Management Plan
- ► 2C-Ballot item 2C sales tax for paving

**The primary **co-benefit** is listed at the bottom of each column. Any co-benefit symbol added above the bottom symbol indicates a slightly lesser degree of co-benefit significance.

**Community**
Actions that engage the public.

**Equity**
Opportunities to satisfy essential needs and achieve full potential.

**Human Health**
Provides physical benefits to local residents.

**Environment**
Benefits of air quality, water quality, and habitat.

*Table 14. Recommended Actions for Management Scenario D.*

### I. Tree Policies

❖ (I.A-D): Update City Code and the Forestry Rules and Regulations to reflect changes in maintenance responsibility, tree preservation, authority, enforcement, standard procedures, and other components completed as part of Management Scenario A and B (MSA, MSB).

❖ (I.C): Strengthen standard operating procedures regarding tree maintenance responsibility and authority between City, HOAs, special districts (SIMDs), CSU, and other entities involved in the care of trees.

❖ (MSD, I.C.7): Continue to expand the public tree Significant Tree Program for the preservation of healthy trees that qualify based on criteria such as size, height, age, species, location, history, and function.

❖ (MSD, I.C.8): Update City Code and procedures with alternative solutions for tree and sidewalk/construction conflicts. Develop an alternative solutions toolkit within a tree and construction operations plan. Use Appendix X as guidance.

### II. Staffing

❖ (MSD): Establish separate but equal divisions within Forestry consisting of Streets, Parks, Riparian Areas and Trails, and Open Spaces.

❖ (MSD): Conduct staff operations under new division sections by utilizing objectives outlined in Appendix II.

❖ (MSD): Establish additional offices and facilities, particularly in the northeast area of the City, to support Citywide public tree management and community support.

### III. Budget and Funding

❖ (MSD): Allocate the funding based on management activity; 7-year pruning cycles for 270,000 public trees, management of 10,000 wildland-urban interface acres of forested open space. Use Appendix I as guidance.

❖ (MSD): Continue to expand the Forestry program with supporting resources as the public tree population grows.

### IV. Assessments and Plans

❖ (MSD, IV.A): Complete the comprehensive inventory of public trees, manage the data, and collect information on private tree plantings and established trees.

❖ (MSD, IV.A): Establish a program to conduct comprehensive Significant Tree inventories and evaluations.

❖ (MSD, IV.A): Establish and complete routine comprehensive tree risk assessments.

❖ (MSD, IV.A): Continue to quantify urban forest benefits based on tree inventory and canopy assessment data to maintain funding support.

*Table 14. continued: Recommended Actions for Management Scenario D.*

❖ (MSD, IV.B): Conduct a high-resolution tree canopy assessment Citywide and by planning boundaries by 2030 to track canopy gains and losses and to inform future tree plantings and preservation.

❖ (MSD): Update the Plan based on maintenance responsibility changes and outcomes from the urban forest audit system. Update the entire Plan every 10 years at minimum.

❖ (MSD, IV.C): Complete management plans for riparian areas, open space, forests, wildland-urban interface areas, and parks.

❖ (MSD), IV.C): Complete a comprehensive plan for the urban forest that specifically addresses climate change, economic impact, and stormwater management.

❖ (MSD), IV.C): Complete an Urban Forest Master Plan that builds on this Plan and provides guidance beyond the public tree population by addressing private trees.

❖ (MSD, IV.C): Complete or support urban forest management plans for HOA properties and special districts (i.e. SIMDs).

❖ (MSD, IV.C): Complete or support at least one neighborhood- or academic institution-level urban forestry plan each year.

### V. Green Asset Management

❖ (MSD): Implement preventative pruning cycles for the 270,000 public trees based on tree maintenance history and other criteria. Use Appendix I as guidance.

❖ (MSD): Use funding for trail, open space, park, and riparian area tree management.

❖ (MSD): Conduct proactive management of pests and diseases. Response to pests and diseases extends beyond removal (monitoring, treatments, prevention, replacement).

❖ (MSD): Implement the Tree Pest and Disease Plan for emerald ash borer (EAB) that systematically removes or treats ash trees based on criteria established in the plan. Develop a more comprehensive tree pest and disease plan that considers all existing and potential threats as feasible.

❖ (V.A.2): Continue to integrate the tree inventory software program with other City asset management programs and data to align project planning, construction, and maintenance efforts with urban forest management strategies.

❖ (MSD): Plant trees in prioritized areas to achieve tree canopy goals and planting targets. Use Appendix X as guidance. Provide information support for private tree plantings.

### VI. Community Engagement

❖ (VII.A-C): Implement all actions provided in Management Scenario A and B.

❖ (VII.A-C): Build a strong network of partnerships and tree stewards representing all neighborhoods, sectors, demographics, and cultures through events, workshops, training, educational materials, City website content, social media platforms, and supporting organizations.

URBAN FOREST MANAGEMENT
# PLAN CONCLUSION

Trees are an integral part of the community and the ecological systems in which they exist. They provide significant economic, social, and ecological benefits, such as carbon sequestration, reduction of the urban heat island effect, energy savings, reduction of stormwater runoff, improvement of water quality, provide healing and calming qualities, and increase the value of business and residential properties. Planting and maintaining trees help Colorado Springs become more sustainable and reduce the negative impacts on the ecosystem from urban development. Trees are as necessary as water, infrastructure, and energy to sustaining healthy communities. The health of the urban forest is directly linked to the health of the region.

The goal framework in Colorado Springs' Urban Forest Management Plan is based on outcomes of the audit system and in alignment with existing plans to allow the City to incrementally implement, effectively monitor progress, and efficiently adapt in an everchanging environment. Successful implementation of management scenarios in this Plan will bring Colorado Springs to a higher level of service that is more equitably distributed across the City resulting in a sustainable and thriving urban forest that benefits all residents and future generations.



*Photo courtesy of the City of Colorado Springs.*

# APPENDICES

*Disclaimer: Appendices IV and V regarding code and rules & regulations have not been formally adopted by City Council pending revision and have been removed from this version of the Urban Forest Management Plan.*

# APPENDIX I: TREE MAINTENANCE RESPONSIBILITY TRANSFER CASE STUDY (MANAGEMENT SCENARIO C)

## BUILD THE CASE

### TREE INVENTORY

To consider the transfer of tree maintenance responsibility, Forestry must understand the public street tree population. Data such as location, tree species, size, condition, maintenance needs, and maintenance history should be used as part of the criteria for selecting trees for transfer.

This information can be gathered by conducting a comprehensive street tree inventory. Due to Forestry's current workload and available resources, it is recommended to acquire consultants to conduct the inventory. The consultants must be Certified Arborists accredited by the International Society of Arboriculture (ISA) in order to accurately identify tree species and identify tree condition and maintenance needs. The training of citizen volunteers, while affordable, may result in inconsistent assessments of condition and maintenance needs.

An alternative to a comprehensive inventory completed by ISA Certified Arborists is the use of survey imagery tools (i.e. Cartegraph) to be utilized as part of the City's Public Works pavement program. To acquire information necessary to determine trees for transfer, it is recommended the consultant analyzing survey imagery data include tree species identification, condition assessment, and trunk diameter by size class. Based on a July 2020 estimate from a consultant, this method may cost Forestry approximately $268,000* which should be included in the 2021 budget of unfunded requests.

Either method of collecting public street tree data must include a plan for managing the information. Tree size, condition, maintenance needs, and presence of a tree may change over time as phases of the tree transfer process are implemented. The selection of trees must be based on up-to-date tree information to reduce disputes and maintain transparency and equity. In addition, research and tools are available to quantify the benefits provided by the public trees inventoried. This information can be used to address equity, secure grant funding, garner community stewardship, and advocate for increases in City Forestry's budget.

### SUMMARY

**A comprehensive inventory of public trees will inform the process for selecting trees as part of the tree maintenance responsibility transfer. Street trees in good condition that have been pruned recently are one of the first tiers in the selection criteria. The inventory of public trees and, specifically, street trees, provides Forestry with the information to update other sections of this case building process such as staffing shortages, budget deficiencies, recommended pruning rotations and costs, and funding options.**

*Based on a memo provided by City of Colorado Springs Department of Public Works GIS Supervisor (July 2020).*

## POLICY CHANGES

To implement a transfer of public tree maintenance responsibility, the City Code must be updated. The following provides an overview of the recommended changes to City Code relating to the maintenance of public street trees. The complete language recommended for the updates to City Code are provided in Appendix IV and Appendix V. This information should be reviewed by Forestry and presented to City departments and the appropriate agencies responsible for ordinances and amendments to City Code. A proposal for policy changes should include the final language for tree maintenance responsibility transfer.

*Current Code:*

4.4.105: MAINTENANCE OF PUBLIC RIGHTS OF WAY, B. Trees, 2. "Within the rights of way, the City shall provide maintenance (insect and disease control, pruning and removal) of trees only. Prior to any maintenance, the City shall attempt to notify contiguous property owners. The City shall not, however, be liable for failure to give notice."

*Proposed Amendment to City Code:*

4.4.105: MAINTENANCE OF PUBLIC RIGHTS OF WAY, B. Trees – Amendments (see Appendix IV for complete language):

    (a)    Responsibilities of Property Owners.

    (b)    Responsibilities of City Forestry.

    (c)    City Forestry Inventory and Publication of Street Tree Responsibilities.

    (d)    City Forestry Relinquishment of Street Tree Maintenance.

PLANTING AND REMOVAL OF STREET TREES (amended)

    (a) Planting and Removal by the Department.

        (1)  Planting.
        (2) Removal of Street Trees.
        (3) Appeal of Tree Removal.
        (4) Removal of Hazard Street Trees.

    (b) Emergency Removal. Planting and Removal by Persons Other Than City Forestry.

        (1)  Planting and Removal Permits.
        (2) Planting.
        (3) Removal.

            (A) Permits for Property Owner.

                (i)    Tree Removal Permit.
                (ii)   Additional Fees.
                (iii)  Fee Review and Adjustment.
            (B) Notices.

    (c) Planting and Removal by City Agencies, Commissions, or Other Departments.

---

### SUMMARY

**The existing language in Colorado Springs' City Code needs to be updated as recommended in Appendix IV and Appendix V. In addition, to implement the transfer of tree maintenance responsibility, amendments to Code and ordinances need to be conducted. These changes include amendments to tree maintenance responsibility, processes for planting and removing street trees, processes for transferring maintenance responsibilities, updates to Forestry's roles and responsibilities, and enforcement or appeal processes.**

## STAFFING

As part of the 2020 Urban Forest Management Plan project, a Research Summary was completed to provide baseline conditions of the Forestry program. Based on the analysis of current staffing levels, cross-examined with regional and industry standards, insufficient staffing has been found for the care and enhancement of public street trees across Colorado Springs.

Forestry is responsible for the maintenance of over 270,000 public trees, of which, approximately 250,000 are street trees and 20,000 are park trees. One measure of city tree program efficacy is the proportion of staff and number of trees that are the responsibility of the staff. Based on 2020 staffing, City Forestry has a total of 11 full-time employees (FTEs) for the care of public trees. This equates to one staff member for every 24,545 public trees and, specifically for street trees, one staff member for every 22,727 trees. **To describe Colorado Springs' situation more accurately, of the 11 FTEs, four operations personnel in parks physically maintain park trees and two of the remaining seven personnel are staff foresters—one is the City Forester and one is a supervisor. This means there are <u>only three operations personnel who are physically managing the 250,000 street tree population</u>—equating to one staff for every 83,333 trees.** Industry standards recommend staffing levels of one staff for every 10,000 trees and thus, Colorado Springs is greatly understaffed for a community that is growing in population and trees.

The staffing shortage, insufficient funding, and other factors resulted in the development of the tree maintenance responsibility transfer scenario. While it is preferred for city agencies to have complete responsibility of public tree maintenance, it is not feasible for Colorado Springs based on current and projected budgets. In order to provide the necessary care to all public trees, the responsibility to maintain public street trees would be transferred to the private property owner in a series of carefully planned phases.

*Table A-1. Summary of Colorado Springs staffing compared to industry recommendations.*

|  | Street Trees | Park Trees | Total Public Trees |
|---|---|---|---|
| **Colorado Springs Public Trees** | 250,000 trees | 20,000 trees | 270,000 |
| **City Forestry Staff** | 11 Full-Time Employees (FTEs) | | |
| **Staff Per Trees Ratio (staff:trees)** | 1:22,727 | 1:1,818 | 1:24,545 |
| **Recommended Staff Ratio (staff:trees)** | 1:10,000 | 1:10,000 | 1:10,000 |
| **Additional Staff Required** | 14 FTEs | N/A | 16 FTEs |

Table A-1, above, summarizes Forestry's staff levels in proportion to the total public tree population. Industry standards recommend one staff member for every 10,000 trees within the responsibility of the agency. Forestry is understaffed to maintain the entire public tree population of more than 270,000 trees and, specifically for street trees, is understaffed by 14 full-time employees to attain this level of service. To properly manage an urban forest, each tree should be pruned approximately every seven years.

In addition to the acquisition of more staff, equipment and administrative support would also be needed. The 2020 Urban Forest Management Plan provides an overview of the recommended staffing structure if Forestry had optimal resources and budget (see Appendix II). In an effort to empower the citizens to provide proper tree maintenance, the transfer of tree maintenance responsibility is proposed as a solution.

During this transfer process, Forestry staff would continue to uphold the responsibilities of comprehensive urban forest management, public education and outreach, response to emergency situations, tree planting and watering, tree monitoring, tree inventory data management, and tree maintenance in public medians, parks, open space, trails, and facilities.

## ADJACENT PROPERTY OWNER TREE MAINTENANCE RESPONSIBILITY CASE STUDIES

The following communities place the responsibility of public tree maintenance on the adjacent property owner based on 2020 research by urban forestry consultants for this project.

**Denver, Colorado:** Property owners are responsible for maintaining the city trees within the right-of-way adjacent to their property. Chapter 57 of Denver's municipal code makes it illegal to remove a right-of-way tree without first obtaining an approved permit from the City Forester. There are currently no requirements for permits to prune private property or public right-of-way trees. City code does require that all pruning of right-of-way trees be done to industry standards. The City has created Forestry Inspection Districts with staff assigned to each district to review tree removal requests and to monitor public trees for improper pruning and removals.

*Sec. 57-18. Responsibility for maintenance of trees on public right-of-way or other public place: (b) The responsible party of property abutting the public right-of-way shall have the duty to maintain trees on the abutting portion of the public right-of-way. (Ord. No. 121-02, § 1, 2-19-02)* See www.tinyurl.com/DenverChapter57Code for more information.

**Arvada, Colorado:** Article VI, Sec. 38-241. - Authority of the city regarding trimming or removal of trees and shrubs. See https://tinyurl.com/ArvadaChapter38CityCode for more information.

**Greeley, Colorado:** 18.44.060. - Maintenance of landscape areas and 13.42.130 - Parkway tree or shrub trimming and care. For more information see https://tinyurl.com/GreeleyCh13-18CityCode.

**Pueblo, Colorado:** Chapter 2 Sec. 10-2-4. - Duties of owners of abutting property. See https://tinyurl.com/PuebloChapter2CityCode for more information.

**Thornton, Colorado:** Sec. 18-556. - Maintenance requirements. See https://tinyurl.com/ThorntonCh18CityCode for more information.

Communities outside of Colorado include Oklahoma City (OK), Albuquerque (NM), and Portland (OR).

## CITY TREE MAINTENANCE RESPONSIBILITY CASE STUDIES

The following communities place the responsibility of public tree maintenance on the City based on 2020 research by urban forestry consultants for this project.

**Aurora, Colorado:** Aurora's Forestry Division cares for nearly 35,000 city street trees as a service to residents. The City is delineated by Pruning Grids, pruning trees on a rotation, and residents can access the interactive online map to see what grids are actively being pruned.

**Boulder, Colorado:** Boulder Forestry manages approximately 51,000 public trees in city parks and street rights-of-way. For more information visit www.bouldercolorado.gov/forestry/about-boulder-forestry.

**Fort Collins, Colorado:** Fort Collins' Forestry Division maintains over 54,500 trees along streets and in parks, cemeteries, golf courses and other City facilities or property.

Other Colorado communities include Longmont, Lakewood, Golden, and Brighton.

---

### SUMMARY

**It is estimated that the City has over 270,000 public trees of which, an estimated 250,000 are street trees. Currently, Forestry is understaffed to maintain this tree population based on industry standards and local comparisons. To maintain the entire public tree population, it is estimated that 16 additional full-time employees are required or 14 full-time employees to manage only the street tree population. Because of the significant increase required, the option to transfer maintenance responsibility of street trees is provided.**

---

## BUDGET

The Research Summary produced by the 2020 Urban Forest Management Plan project summarizes the Colorado Springs budget for urban forest management. Based on current budgets as well as the historical and forecasted budgets, insufficient funding for the 270,000 public trees will continue unless the Plan is implemented. Because of the budget and staffing shortcomings, the tree maintenance responsibility transfer scenario is provided as an alternative to achieve the goals of a properly maintained public street tree population.

*Table A-2. Summary of City Forestry funding per public tree and the recommended budgets based on industry and regional standards.*

| Year | Tree Maintenance Expenditures* | # of Public Trees (est.) | Budget per tree | Recommended $ per tree** | Deficit | Recommended Budget | Budget Increase |
|---|---|---|---|---|---|---|---|
| 2016 | $1,685,729 | 213,600 | $7.89 | $24.58 | ($16.69) | $5,250,288 | $3,564,559 |
| 2017 | $1,843,776 | 227,700 | $8.10 | $24.58 | ($16.48) | $5,596,866 | $3,753,090 |
| 2018 | $1,084,013 | 241,800 | $4.48 | $24.58 | ($20.10) | $5,943,444 | $4,859,431 |
| 2019 | $1,590,175 | 255,900 | $6.21 | $24.58 | ($18.37) | $6,290,022 | $4,699,847 |
| 2020 | $1,558,037 | 270,000 | $5.77 | $24.58 | ($18.81) | $6,636,600 | $5,078,563 |

*Tree Maintenance Expenditures based on Tree City USA reporting, 2019 expenditures are estimated, 2020 budget provided by City.

**Based on a city population of 250k - 500k people (from Hauer et al. 2014, page 17 ). Note, the City's population is about 473,000 (2018).

Table A-2 above summarizes the budget shortages from 2016 through 2020 for managing Colorado Springs' public tree population. Based on a census of community forestry programs summarized in the 2014 report by Hauer et al.[2], a community should have an urban forestry budget that equates to approximately $24.58 for every public tree maintained. For Colorado Springs, the past five years have shown a deficit in program funding ranging from $16.48 to $20.10 below the recommended funding proportion. Specifically, for the 2020 year, Colorado Springs' budget provides $5.77 for every public tree (270,000+ trees)—a deficit of $18.81. To provide adequate tree care for the public tree population, an increase in the budget in the amount of $5,078,563 would need to be secured— a 326 percent increase (375 percent increase needed based on the rotational pruning budget analysis). This substantial increase to the Forestry program is an unlikely scenario in the short term. Therefore, the relinquishment of maintenance responsibility is provided for consideration.

## ENHANCEMENT TO THE CITY FORESTRY PROGRAM BUDGET

To provide adequate tree pruning and overall urban forest management of the City's public trees, a program budget that equates to approximately $24.58 per public tree is recommended. For a public tree population of more than 270,000 trees, the recommended maintenance budget equates to $6.6 million or $24.58 per public tree. Table A-3 describes the budget allocation by urban forest management activity. This recommendation does not account for the costs of a comprehensive preventative tree pruning program that maintains all 270,000+ public trees in a rotation (i.e. seven years). A more in-depth analysis is summarized in the Costs of Pruning and Not Pruning section and provides an accurate assessment of funding needs for the recommended budget used in the 2020 Urban Forest Management Plan.

2. Hauer, R.J., Peterson, W., et al. (2014). Municipal Tree Care and Management in the United States: A 2014 Urban & Community Forestry Census of Tree Activities.

*Table A-3. Recommendations for enhancing the budget (pre-pruning rotation analysis) based on benchmarking research and the City's budget records.*

| Budget Category | % | Amount | $/Tree |
|---|---|---|---|
| Recommended Tree Maintenance Budget | 100% | $6,636,600 | $24.58 |
| **Urban Forest Maintenance Activity** | **%** | **Amount** | |
| Pruning | 35% | $2,322,810 | |
| Removals | 20% | $1,327,320 | |
| Storm Response | 20% | $1,327,320 | |
| Planting | 5% | $331,830 | |
| Admin (management, inspections) | 10% | $663,660 | |
| Other (e.g. education) | 10% | $663,660 | |
| **TOTAL** | **100%** | **$6,636,600** | |

Based on industry recommendations, approximately 30 percent of the budget should be allocated to tree pruning, 28 percent to removals, 14 percent to tree planting, 8 percent to management, and 12 percent to other activities such as public education (see Figure A-1 below). The recommended budget for Colorado Springs is adjusted to account for the deferred maintenance of trees and to more closely align with the estimated annual pruning costs on a seven-year pruning rotation ($4.5 million per year) as summarized in Table A-5 of the Applying the Research for Colorado Springs' Rotational Pruning section. This recommended total maintenance budget would distribute funding across the public tree population at a rate of $24.58 per tree—more closely aligning with industry recommendations.
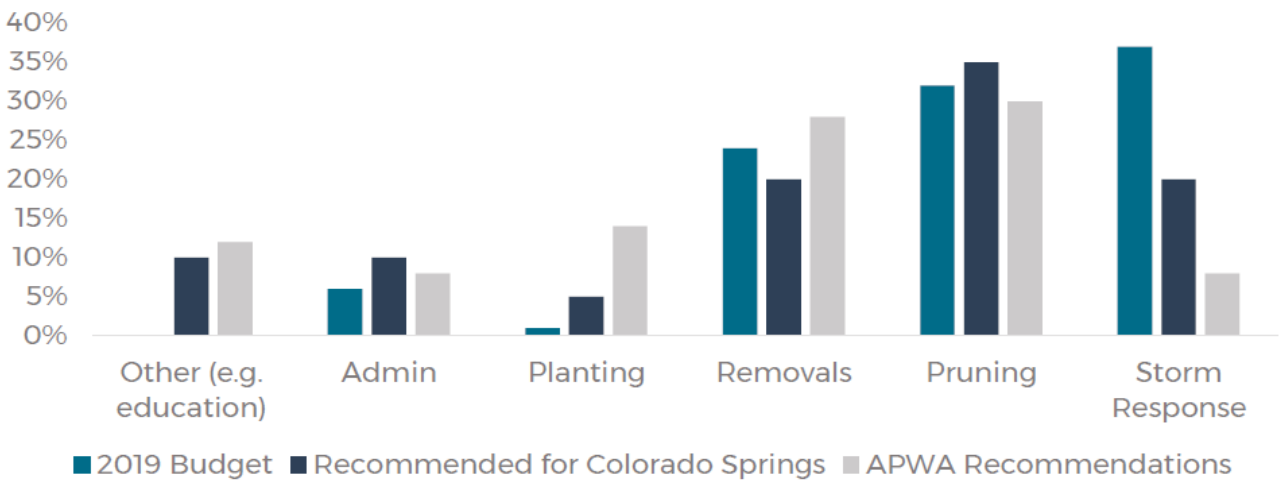


*Figure A-1. Summary of industry recommendations for budget allocation and budget enhancement for Colorado Springs.*

**SUMMARY**

**It is estimated that the City has over 270,000 public trees of which, an estimated 250,000 are street trees. Currently, Forestry is understaffed to maintain this tree population based on industry standards and local comparisons. To maintain the entire public tree population, it is estimated that 16 additional full-time employees are required or 14 full-time employees to manage only the street tree population. Because of the significant increase required, the option to transfer maintenance responsibility of street trees is provided.**

## THE COSTS OF PRUNING AND NOT PRUNING TREES

Another scenario to consider is the option to not prune public trees. Numerous studies have shown the detrimental effects this can have on a community's tree population as well as the increased risks to public safety. For Colorado Springs specifically, tree maintenance has been deferred for over a decade. The following data provides the information for Forestry to use when building a case for either an enhanced budget for City tree maintenance or the transfer of maintenance responsibility to the property owners adjacent to public street trees.

Not pruning street trees, also known as deferring maintenance, has been closely examined by researchers. Maintenance can be linked to tree success both at the beginning and end of its lifespan. Early in a tree's life, during the establishment and immature (i.e., juvenile) phases, maintenance must be adequate to ensure early survival and establishment in the urban landscape. Presumably, any post-planting maintenance performed on a tree that improves its chances of survival to maturity or lengthens the time that tree spends in its mature phase (where benefits are produced in the greatest amount) increases the monetary value of that tree. The cost of not maintaining trees early in life may translate to greater maintenance costs down the road; this is deferring maintenance (and its costs) to the future in order to save on maintenance costs today. Later in a tree's life, maintenance may aim to extend the tree's lifespan or prevent tree failure. In this way, late-stage maintenance can defer removal costs. If maintenance does prolong a tree's useful life (i.e., delays the onset of senescence and a tree's removal), it increases the amount of benefits it produces over its lifespan. Alternatively, removing the low-hanging limbs on an aging tree can prevent these limbs from failing and damaging people or property, and thereby avoid subsequent repair- or liability-related costs. Tree pruning to remove high-risk limbs and removal of the entire tree can be considered a type of maintenance that potentially saves money due to avoided litigation costs.

With a complete inventory of the public tree population, Forestry should determine the costs and optimal schedule for pruning all public trees, specifically street trees, on a rotation. The following provides a case study for Forestry to utilize in building the case for either additional funding or the transfer of maintenance responsibility.
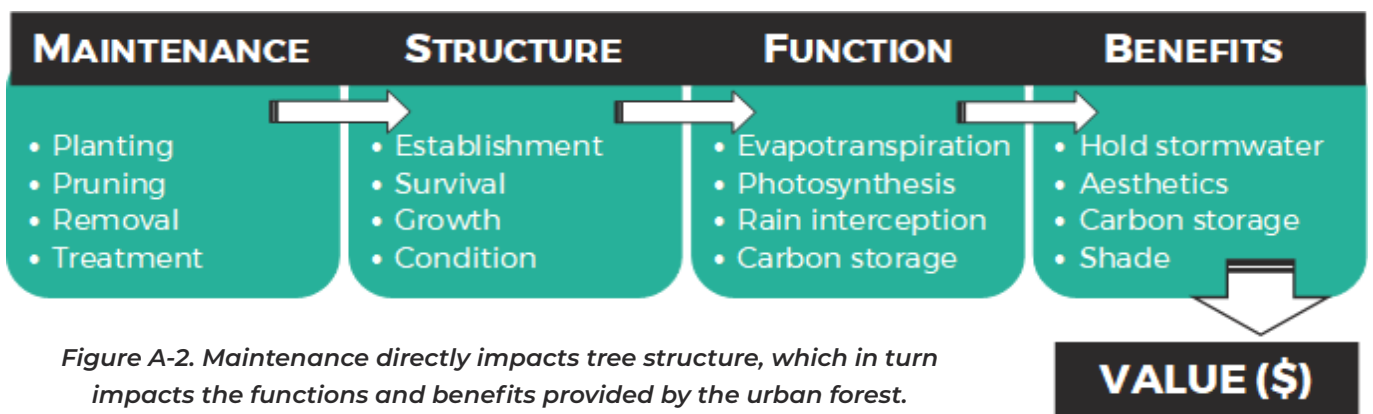


*Figure A-2. Maintenance directly impacts tree structure, which in turn impacts the functions and benefits provided by the urban forest.*

### Milwaukee, Wisconsin Tree Pruning Rotation Case Study

This case study demonstrates the decreased health of the public tree population and inefficiencies resulting from a tree maintenance program lacking scheduled rotational pruning. Currently, Colorado Springs responds to citizen service requests and does not conduct preventative pruning on a rotation. As a result, tree maintenance has been deferred for over a decade and the health of the urban forest is declining as the costs for tree maintenance increase.

A study (Miller et al. 2015[3]) was conducted for Milwaukee, Wisconsin to determine the optimum pruning cycle by comparing the marginal cost of pruning to its marginal return. For example, a portion of Milwaukee, Wisconsin was inventoried and recorded tree condition and calculated tree value. Since condition class influences tree value, the date of last pruning and average condition class for each work unit inventoried was subjected to regression analysis.

3. Miller, R. W., Hauer, R. J., & Werner, L. P. (2015). *Urban Forestry: Planning and Managing Urban Greenspaces, Third Edition.*

This analysis determines the relationship between pruning and condition class (see figure below providing condition class and number of years since last pruning). Marginal costs were calculated based on the loss of tree value, using condition classes, for each one-year extension of the pruning cycle. Marginal returns are the savings in pruning costs for each one-year extension of the pruning cycle (see Table A-4 on next page). For Milwaukee, the relationship between marginal cost and return indicates that the optimum pruning cycle for the city is five years, assuming the management goal is to provide the highest-value tree population for dollars expended.



$$\hat{Y} = 76.7 + 0.196X - 0.074X^2{*}$$
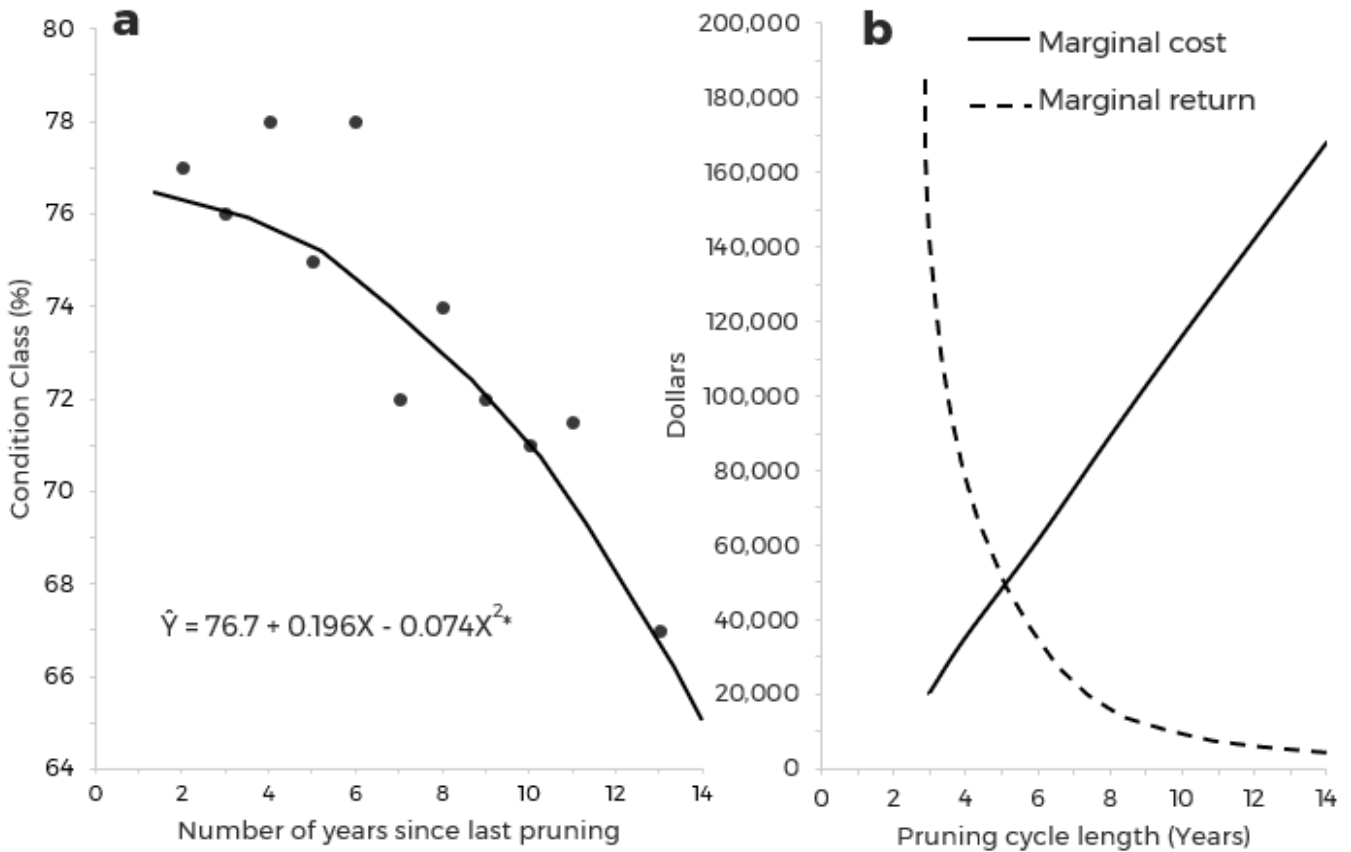
*Figure A-3. Description: a) Relationship between pruning cycle length (number of years since last pruning) and condition class rating. Asterisk (\*) indicates regression is significant at the 0.05 level. b) Marginal cost (loss of tree value) and marginal return (savings in pruning costs) for pruning cycle lengths. Figure recreated from Miller and Sylvester (1981). - The Costs of Maintaining and Not Maintaining the Urban Forest: A Review of the Urban Forestry and Arboriculture Literature (Jess Vogt, Richard J. Hauer, and Burnell C. Fischer, 2015).*

Based on the figures above, as the pruning cycle increases in the length, the savings from an increased time period since a tree was last pruned becomes increasingly smaller. In contrast, the reduction in tree value becomes greater. The point at which the marginal lines intersect is the optimal cycle, or the point at which savings from delaying pruning equal the value lost in the tree population due to a lower tree condition. For Milwaukee, the figures above determine that optimal period to be five years.

A cycle of five to seven years is reasonable for most communities, especially if there is not an abundance of young trees. Young trees often need more frequent pruning than do mature species to establish a desirable structure at maturity and to keep streets and sidewalks clear of obstructions. The length of a pruning cycle is ultimately the City's decision based on the specific tree population, management priorities, and budgetary constraints.

The following table provides a breakdown of marginal costs and marginal returns based on the pruning cycle and average tree condition class for Milwaukee.

*Table A-4. Example of tree value and pruning costs for various pruning cycles\*.*

| Pruning Cycle (yr) | Average Condition Class** (%) | Tree Value** | Marginal Cost | Annual Pruning Cost** | Marginal Return |
|---|---|---|---|---|---|
| 2 | 76.8 | $20,381,000 | | $337,000 | |
| 3 | 76.7 | $20,358,000 | $23,000 | $224,000 | $113,000 |
| 4 | 76.6 | $20,321,000 | $37,000 | $168,000 | $56,000 |
| 5 | 76.4 | $20,272,000 | $49,000 | $135,000 | $33,000 |
| 6 | 76.2 | $20,210,000 | $62,000 | $112,000 | $23,000 |
| 7 | 75.9 | $20,134,000 | $76,000 | $96,000 | $16,000 |
| 8 | 75.5 | $20,046,000 | $88,000 | $84,000 | $12,000 |
| 9 | 75.2 | $19,944,000 | $102,000 | $75,000 | $9,000 |
| 10 | 74.7 | $19,829,000 | $115,000 | $67,000 | $8,000 |
| 11 | 74.2 | $19,702,000 | $127,000 | $61,000 | $6,000 |
| 12 | 73.7 | $19,561,000 | $141,000 | $56,000 | $5,000 |
| 13 | 73.1 | $19,407,000 | $154,000 | $52,000 | $4,000 |
| 14 | 72.5 | $19,239,000 | $168,000 | $48,000 | $4,000 |

\*Based on 40,808 street trees in Milwaukee, WI. Assume average pruning cost of $16.50 per tree in 1981.

\*\*Per specified pruning cycle.

Source: Miller & Sylvester 1981 study within the Urban Forestry: Planning and Managing Urban Greenspaces, Third Edition. 343-346. Miller, R. W., Hauer, R. J., & Werner, L. P. (2015).

Assuming a 100 percent condition class, the 40,808 trees used in this case study have a value of $26,539,000 (based on the inventory). Using this value as a base, values were calculated using the average condition class for all trees having pruning cycles of two to fourteen years (Table A-4). The loss in tree value resulting from extending the pruning cycle by one year is the marginal cost attributed to postponing an additional year. Annual pruning costs are determined by dividing the total number of trees by the number of years in the pruning cycle. This is multiplied by $16.50, the average pruning cost per tree in Milwaukee at the time of this 1981 study (Table A-4). The savings associated with extending the pruning cycle by an additional year is the marginal return associated with reduced pruning the next year (Table A-4). Comparison of the additional loss in tree value versus the additional savings in pruning costs indicates the optimum pruning cycle to be between four and five years for the City of Milwaukee. For Colorado Springs, the average pruning cost per tree should be applied to these calculations.

The length of the pruning cycle has a significant effect on tree value. Longer pruning cycles result in reduced tree value, with the decline in value accelerating over time. Savings to the city may be realized by longer pruning cycles, but only at a loss in tree value. This loss in value exceeds savings once the pruning cycle is extended to and beyond five years. This provides a strong argument in favor of frequent pruning, with a pruning cycle of between four and five years being optimum for the City of Milwaukee. While this may be a convincing argument to city foresters, it remains the task of the city forester to convince city government officials.

### Applying the Research for Colorado Springs' Rotational Pruning

For Colorado Springs, the total number of trees and the distribution of these trees within diameter classes is unknown. It is estimated that the public tree population is well over 270,000 trees—of which 250,000 trees are estimated to be street trees. Using the 2005 street tree inventory and 2013 park tree inventory datasets, tree counts by diameter class were extrapolated for the entire public street and park tree population in order to provide an estimate of the costs by diameter class and recommended seven-year pruning cycle.
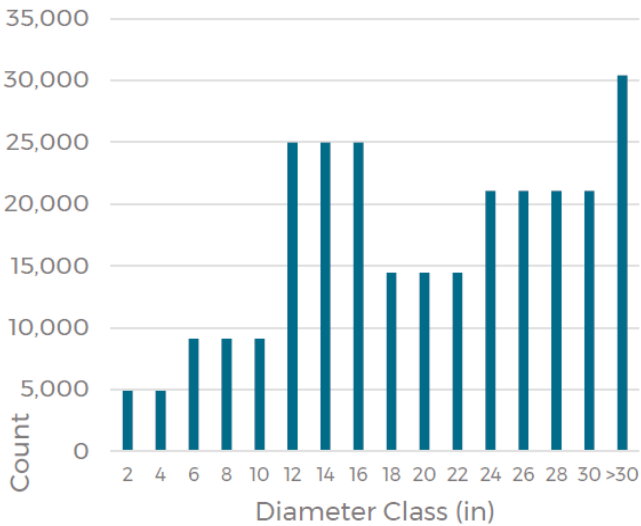


**Figure A-4. Estimated tree counts by diameter class for 270,000 public trees in Colorado Springs, CO.**
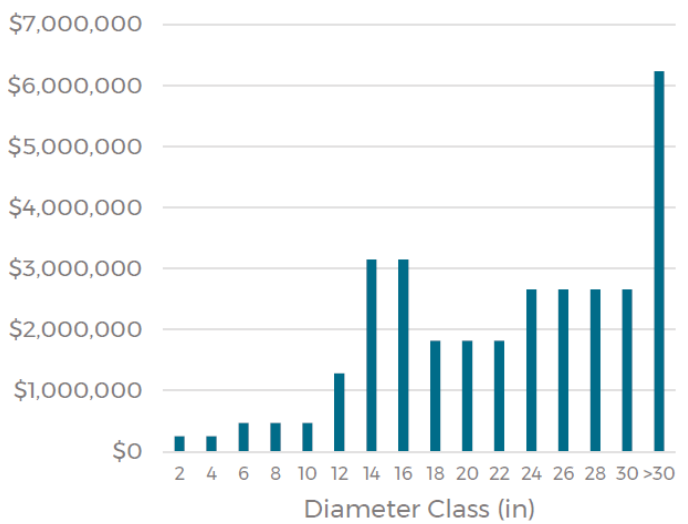
**Figure A-5. Estimated tree pruning costs by diameter class for 270,000 public trees in Colorado Springs, CO.**

Based on the estimates, Colorado Springs' public tree population has the highest concentration of trees greater than 30 inches in diameter at breast height (DBH, measured at 4.5 feet from surface) with over 30,000 trees (11 percent). There is also a high concentration of trees in the 12, 14, and 16-inch diameter class, each comprising an estimated 9 percent of the population. Trees in the 24 to 30-inch diameter class each comprise 8 percent of the population whereas the 2 and 4-inch diameter classes each comprise 2 percent of the population.

Using the research by Miller et al. (1981) which was adapted by Miller et al. in 2015, the pruning costs per diameter class were estimated for Colorado Springs' public tree population (see Table A-5). Based on the estimates, the total cost to prune all public trees is $31.8 million. The highest estimated pruning costs are expected for the 24- to 30-inch diameter class with costs of over $2.5 million and costs for trees greater than 30 inches in diameter are over $6 million. Applying the recommended seven-year pruning cycle results in an annual cost of $4.5 million assuming trees of various size classes are pruned each year.

It should be noted that the pruning costs per tree in Table A-5 are based on 2019 grid pruning rates from an industry-leading tree care company that provides services to a community on a routine pruning cycle. Costs to prune trees that have been regularly maintained (i.e. not on a rotational pruning cycle) will generally be higher than the estimates provided in Table A-5. Forestry should apply this process once the comprehensive tree inventory is completed. The actual number of trees per diameter class and actual pruning costs per tree can be used to determine rotational pruning costs that more closely represent real-world conditions and the necessary funding.

*Table A-5. Colorado Springs pruning costs by estimated tree count per diameter class to establish a pruning rotation for 270,000 public trees\*\* (250,000 street trees).*

| Diameter Class (in) | Number of Trees | % Distribution | Pruning Cost per Tree | Pruning Cost by Diameter Class* |
|---|---|---|---|---|
| 2 | 4,891 | 2% | $52 | $251,865 |
| 4 | 4,891 | 2% | $52 | $251,865 |
| 6 | 9,112 | 3% | $52 | $469,243 |
| 8 | 9,112 | 3% | $52 | $469,243 |
| 10 | 9,112 | 3% | $52 | $469,243 |
| 12 | 24,955 | 9% | $52 | $1,285,187 |
| 14 | 24,955 | 9% | $126 | $3,144,341 |
| 16 | 24,955 | 9% | $126 | $3,144,341 |
| 18 | 14,430 | 5% | $126 | $1,818,124 |
| 20 | 14,430 | 5% | $126 | $1,818,124 |
| 22 | 14,430 | 5% | $126 | $1,818,124 |
| 24 | 21,080 | 8% | $126 | $2,656,123 |
| 26 | 21,080 | 8% | $126 | $2,656,123 |
| 28 | 21,080 | 8% | $126 | $2,656,123 |
| 30 | 21,080 | 8% | $126 | $2,656,123 |
| >30 | 30,410 | 11% | $205 | $6,233,978 |
| **Total Trees** | **270,000** | **100%** | | |
| **Total Cost for 270,000 public trees** | | | | **$31,798,171** |
| **Public Tree Preventative Pruning (7-year) Program cost  (per year) for 270,000 trees** | | | | **$4,542,596** |

\*Number of trees x pruning cost per tree. Pruning cost per tree estimates are based on the 2019 rates provided by West Coast Arborists to a community. Costs per diameter class are less due to ongoing rotational pruning. Communities with deferred maintenance could see higher rates per size class.

\*\*Tree numbers by Diameter Class are estimated based on the 2005 street tree inventory (79,790 trees) and the 2013 park tree inventory (19,386 trees) which provided tree counts by 6 size classes. Estimates for the 2-inch increment DBH were made by evenly distributing across the increments for each of the six size classes.

For the purposes of requesting budget enhancements in the future, this **Public Tree Preventative Pruning (7-year) Program** was established as a case study. This program includes the estimated 270,000 total public trees and would operate under a seven-year rotation meaning each tree within the program is maintained on a rotation within a seven-year timespan.

Compared to the recommended budget based on the benchmarking analysis and research (Table A-3) from the 2014 community forestry census (Hauer et al. 2014), there is additional funding required for pruning 270,000 public trees as shown in the comparison table (Table A-6). It should be noted that 61 percent of the budget is allocated to tree pruning, greater than the industry recommended allocation of 30 percent to account for the prolonged deferred maintenance. To appropriately allocate funding to all program activities based on industry standards[4]  while supporting a seven-year pruning rotation, an estimated $15.1 million would be required. For this study, the final recommended budget is $7.4 million of which $4.5 million is required annually for rotational pruning.

*4. Urban Forestry Best Management Practices for Public Works Managers, Budgeting & Funding, APWA (2007).*

*Table A-6. Budget recommendations for the City Forestry program.*

| Budget Recommendation Categories | Benchmarking Analysis Budget Recommendation Amount | Rotational Pruning Budget (270k trees) Amount | Final Recommended Budget Amount |
|---|---|---|---|
| Recommended Budget: | $6,636,600 | $4,542,596 | $7,400,650 |
| **Urban Forest Maintenance Activity** | | | |
| Pruning | $2,322,810 | $4,542,596 | $4,542,596 |
| Removals | $1,327,320 | | $1,110,098 |
| Storm Response | $1,327,320 | | $740,065 |
| Planting | $331,830 | | $370,033 |
| Admin (management, inspections) | $663,660 | | $370,033 |
| Other (e.g. education) | $663,660 | | $267,827 |
| **TOTAL** | **$6,636,600** | **$4,542,596** | **$7,400,650** |

Adjusting the benchmarking budget recommendation to account for the rotational tree pruning program of 270,000 public trees results in a total recommended annual budget of $7.4 million for the Forestry program. The remaining budget after allocating funds to the rotational pruning program is distributed based on industry recommendations. The pruning rotation cost scenario is an estimate based on available data. It should be updated as a comprehensive public tree inventory is completed using Cartegraph imagery interpretation or a field inventory by ISA Certified Arborists. The broad estimate of costs should be further analyzed to determine the appropriate pruning cycles for young and mature trees. Young trees (0-6-inch DBH) often require a more frequent pruning cycle of every three years, whereas, mature trees should be pruned every seven years based on industry standards.

Forestry currently responds to citizen requests and does not have a preventative pruning cycle for street trees. To prune every public tree on a seven-year rotation in the City, approximately 38,600 trees per year require pruning. In recent years, City staff has been able to maintain less than 1,700 trees per year with current staffing and another 2,000 with contracted services.

**SUMMARY**

**Without additional resources, the tree population will not receive the maintenance needed to maintain tree health and public safety. The Milwaukee, Wisconsin case study provides the framework for evaluating the costs of a rotational tree pruning program for Colorado Springs' street trees. The study demonstrates the decline in tree condition as the years between pruning increases and the relationship between marginal cost and return determines the optimum pruning cycle for a community. Based on the study, a pruning cycle of seven years is recommended, but currently, only 1.4 percent (3,700 trees) of the public tree population is addressed per year, equal to a 73-year rotation. A pruning program that addresses all public trees (street, park, trail, open space, medians, facilities) requires an estimated $4.5 million annual budget (does not include removals, storm response, planting, or administration) compared to the 2020 budget of $1.6 million for tree maintenance. Due to the budget requirements and current pruning inadequacies, an option for transferring street tree maintenance responsibility is provided for consideration.**

## FUNDING OPTIONS CONSIDERED

In addition to considering the option for transferring the responsibility of street tree maintenance to adjacent private property owners, a thorough analysis of potential funding options was completed. A description of these funding options as well as additional funding streams for consideration are provided below.

### Special Assessment Districts

Many properties in Colorado Springs are included in unique special financing districts of different types, especially in newer or redeveloping areas of the City. Altogether, there are about eighty of these districts, although some are inactive. These districts are ordinarily initiated by the developer of a property but are approved by City Council. The purposes of these districts may include financing of public improvements, ongoing maintenance and operations, or a combination. In general, these districts either serve to reimburse the developer for public improvements they are required to provide or to augment public facilities and services which might not otherwise be available to most City residents. Most districts obtain their revenue via a property tax, although some may also charge fees or collect assessments. Residential districts have an eventual time limit for debt service, but in some cases, they may operate more or less in perpetuity to provide maintenance and/or services. Under current City policy, City Council must determine whether proposed district bond issues are compliant with approved district plans, prior to issuance.[5]

In Colorado Springs, several special assessment districts exist, including Business Improvement Districts (BIDs), General Improvement Districts (GIDs), Special Improvement Maintenance Districts (SIMDs), and Local Improvement Districts (LIDs). Others include water districts, fire protection districts, sanitation districts, and parks and recreation districts.

Focusing on areas with higher concentrations of street trees or maintenance needs, such as business districts, may capture property owners who are more willing to pay for tree care. This approach may be more politically palatable and could potentially lead to a citywide special assessment district where existing districts could be consolidated and organized into separate benefit zones, each with its own budget.

## REQUIREMENTS FOR A COMPREHENSIVE STREET TREE PROGRAM

Special assessments are usually calculated per linear foot, based on the idea that benefits to property owners are directly related to street frontage. In some cases, special assessments include additional metrics such as building and/or lot square footage to account for the added benefit associated with larger buildings that have more occupants. However, this study evaluated street frontage as a simplified approach for two scenarios: 1) Public Tree Preventative Pruning (7-year) Program funding to cover rotational pruning of 270,000 public trees, and, 2) Comprehensive City Forestry Program Funding scenario to cover the entire recommended budget for the City Forestry Program.

Colorado Springs currently has nearly 5,700 miles of paved roads that equates to a potential 60 million linear feet of frontage Citywide.[6]   The City would need to levy $0.08 per linear foot per year to cover the costs of the Public Tree Preventative Pruning (7-Year) Program scenario and $0.12 per linear foot to cover the total costs of the Comprehensive City Forestry Program Funding scenario (Table A-7). In other words, a 25-foot wide lot would be assessed approximately $3.00 per year for all costs associated with public trees under the Comprehensive City Forestry Program scenario. It should be noted that the total City frontage is estimated, and an update is needed to more accurately estimate mill levies.

One option would be to create a special assessment district specifically for operations and maintenance (O&M) activities, which would reduce the burden on property owners and potentially make the option more palatable. The recommended annual O&M budget amounts to approximately $4.5 million under the Public Tree Preventative Pruning (7-year) scenario and $5.3 million under the Comprehensive City Forestry Program Funding scenario. These O&M costs are estimates for pruning 270,000 on a seven-year rotation or funding the entire City Forestry program, respectively. Based on this approach, the City would need to levy $0.08 per linear foot per year to cover the O&M costs of the Public Tree Preventative Pruning (7-year) Program and $0.09 per linear foot per year for the Comprehensive City Forestry Program Funding scenario as shown in Table A-7 on the next page.

---

*Table A-7. Estimated tax levied from Citywide special assessment district to fund rotational tree pruning programs and entire City Forestry program\*.*

|  | **Public Tree Preventative Pruning (7-year) Program Scenario** | **Comprehensive City Forestry Program Funding** |
|---|---|---|
| Paved Roads (miles) | 5,688 | 5,688 |
| Potential Frontage (linear feet) | 60,066,000 | 60,066,000 |
| Recommended Budget | $4,542,596 | $7,400,650 |
| Citywide District Frontage Tax | $0.08 | $0.12 |
| Operations & Maintenance (O&M) Budget (Rotational 7-year Pruning) | $4,542,596 | $5,307,056 |
| Citywide District Frontage Tax for O&M only | $0.08 | $0.09 |

## Parcel Tax

A parcel tax is a special tax levied for the provision of special benefits. Revenues from special taxes must be used for the specific purpose for which they are intended, so a parcel tax would create a dedicated funding stream for street trees. Similar to a special assessment, a parcel tax cannot be based on the value of property; however, the amount levied on each parcel does not need to be directly related to the benefits provided. Cities have the flexibility to levy parcel taxes as they see fit, but they are typically based on lot square footage or levied as a flat tax, with the same amount per parcel.

Parcel taxes are designed to encompass entire cities and therefore, are good candidates for a citywide street tree program, as opposed to the district-level approach that often occurs under special assessments. Parcel taxes typically fund more than just street trees. For example, a tree maintenance tax per parcel may include provisions for the maintenance of parks and open space and improvements to recreation facilities.

A parcel tax requires strong public support, as it must be approved by voters, rather than just the majority of property owners, as with a special assessment. Because a parcel tax must be voted on in a general election, rather than via mail-in ballot, it is likely to receive heightened political attention. However, general elections capture the votes of renters, who may be more apt to approve a tax borne by property owners.

## REQUIREMENTS FOR A COMPREHENSIVE STREET TREE PROGRAM

A parcel tax for urban forestry operations and maintenance (O&M) may be levied as a flat tax, or it may be based on lot size (square footage). This study evaluated the parcel tax amount required to finance a City-operated street tree program according to both approaches.

Colorado Springs currently has approximately 163,100 parcels Citywide (source: El Paso County, Colorado, 2020). In the case of a flat parcel tax, the City would need to levy approximately $28 per parcel per year to cover the full costs of the Public Tree Preventative Pruning (7-year) Program scenario. To fund the Comprehensive City Forestry Program Funding scenario, a flat parcel tax would increase to approximately $45 per parcel per year.

Colorado Springs' parcels total approximately 6.2 billion square feet (source: El Paso County, Colorado, 2020). A parcel tax levied according to lot size would translate to an annual tax of $0.00073 per square foot under the Public Tree Preventative Pruning (7-year) Program scenario and $0.00119 under the Comprehensive City Forestry Program Funding scenario (Table A-8). For a typical 2,500-square foot lot (25 feet wide and 100 feet deep), a parcel tax based on lot size would amount to $1.82 to fund the pruning program. These figures would increase to $2.97 under the Comprehensive City Forestry Program Funding scenario (Table A-8).

Another approach to consider is the average parcel lot area of 38,191 square feet ($27.85 - $45.38 per year depending on program) or classifications of parcels by counts within area (square feet) ranges as shown in Appendix VII.

Considerations and adjustments to these numbers must be made for properties with multiple right-of-way trees, HOA-managed trees, and maintenance responsibility stated in plat plans.

*Table A-8. Parcel tax options and provisions for Colorado Springs' City Forestry program.*

| | Public Tree Preventative Pruning (7-year) Program Scenario | Comprehensive City Forestry Program Funding |
|---|---|---|
| # of Parcels | 163,100 | 163,100 |
| Recommended Budget | $4,542,596 | $7,400,650 |
| Flat Tax (budget by parcel) | $28 | $45 |
| Parcel Square Feet (sq. ft.) | 6,228,915,294 | 6,228,915,294 |
| Tax by Lot Size | $0.00073 | $0.00119 |
| Typical Parcel (2,500 sq. ft.) Annual Tax | $1.82 | $2.97 |
| Average Parcel Size (sq. ft.) | 38,191 | 38,191 |
| Average Parcel Size Annual Tax | $27.85 | $45.38 |
| Tax by Parcel Area Range | See Appendix VII | See Appendix VII |

## General Obligation Bonds

Local governments commonly use General Obligation (GO) bonds to fund the construction and improvement of projects involving real property (e.g., buildings, infrastructure and parks). GO bonds typically carry low interest rates, making them attractive for capital projects, which may include tree planting. However, funding is available for discrete projects, often over a limited time rather than an extended period. In addition, ongoing maintenance is ineligible for GO bond funding pursuant to federal tax law. Colorado cities may pay debt service from GO bonds through property taxes (in proportion to the estimated value of the goods or transaction concerned), where assessments are based on property value. As a result, the issuance of GO bonds requires majority voter approval.

GO bonds may be a tool for financing the planting of street trees in Colorado Springs as part of a larger package of capital improvements, as bonds are typically issued for large amounts. For example, voters may approve a Road Repair and Street Safety Bond, with funds designated for streetscape and street safety improvements that included street tree planting. GO bonds may include tree planting among streetscape improvements through street enhancement programs such as "complete streets" programs. However, these bonds may allocate funding for street tree planting to the streets program, rather than the City's Forestry program. A bond specifically focused on a major street tree planting effort may be appropriate in the future.

## REQUIREMENTS FOR A COMPREHENSIVE STREET TREE PROGRAM

Because GO bonds only fund capital costs, they could only be used to finance tree planting and establishment activities under a comprehensive city-operated street tree program. Based on 2020 data, the planting and establishment budget for Forestry was $15,902 and $40,000 in LART (Lodgers and Automobile Rental Tax) funding (Capital Improvement Program) for the Sesquicentennial (150th anniversary) tree planting.

The 2C (Ballot Item 2C approved sales tax for City paving program) item funding should be evaluated to determine possible funds for tree replacement, i.e. returning the site to the original conditions. When conducting curb and gutter repairs, this currently applies to a homeowner's landscaping (rock, timbers, irrigation) but not trees.

## Additional Financing Options
### Parking Benefit District

Parking Benefit Districts (PBDs) generate revenue within a special district for improvements and services related to streets, streetscapes, and landscapes. Because revenue derives from parking meters, visitors to PBDs fund the majority of improvements. As a result, local governments may create PBDs via ordinance without requiring a vote of property owners, setting them apart from other special assessment districts. Although only commercial areas with parking meters provide revenue, improvements may be implemented beyond PBD boundaries. The ordinance that creates the PBD determines the share

of revenue that must be applied to improvements within the district, known as the "local return" portion. A committee of residents, property owners, and business owners advises the local agency administering the PBD on how to expend revenue. Adjustments to City policy regarding the agency receiving excess meter revenue may be required to enable the use of this financing option for a street tree program.

While activities may include street tree planting and maintenance, a PBD is likely to cover other improvements related to neighborhood beautification. It is possible to create a dedicated funding stream for improvements, including street tree planting, sidewalk maintenance, and the installation of street furniture and light fixtures. This may present an opportunity to finance a portion of Colorado Springs' street tree maintenance costs; however, this strategy requires additional analysis to determine the likely amount of revenue to be generated for street trees, along with the potential for adding parking meters in new areas of the City.

### General Fund

Colorado Springs' General Fund has historically funded a share of street tree planting, establishment, and maintenance activities through the Capital Improvement Plan (CIP). However, appropriations have declined significantly in recent years, straining Forestry's ability to care for street trees and giving rise to the consideration for relinquishment of tree maintenance responsibility to property owners. Because the General Fund is not a dedicated funding stream with a consistent budget amount and is subject to changing economic conditions and political support, the General Fund is a volatile funding source. Nonessential services are the first target for cuts when expenditures exceed revenues, and there is no guarantee that one year's appropriations will equal the next, as the City's current reduction and/or inadequate funding for street trees demonstrates. Given the current status, reliance on Colorado Springs' General Fund is not ideal for long-term planning of a program that will require a substantial commitment of resources (e.g. new staff, funding for partners).

A mixed General Fund and Special Assessment model is often considered an appropriate compromise but can lead to decreases in General Fund budget allocations over time, as the assessment bears a large share of the burden of maintenance.

### Carbon Offsets

Colorado has committed to reduce its net greenhouse gas (GHG) emissions to 26 percent below 2005 levels by 2025, 50 percent below 2005 levels by 2030, and 90 percent below 2005 levels by 2050 through House Bill 19-1261, signed into law in May 2019.[7]

Despite committing to numerous policies to reduce future GHG emissions, a "cap-and-trade" program has not been formalized for the state. Under such a program, a cap on GHG emissions would be placed and emissions allowances would be auctioned to major emitters of GHGs (e.g. power plants, industrial facilities). Regulated entities can then trade allowances with entities that emit fewer GHGs than permitted who are then able to sell credits to those who exceed their allowances. An offset program would allow projects that reduce GHG emissions or sequester carbon to count towards compliance with cap-and-trade requirements. In addition, the North American voluntary carbon market exists. Both markets could include forest and urban forest projects, and therefore, may present opportunities for financing a portion of Colorado Springs' street tree program in the future.

Progress is being made in the State of Colorado. Initiated by the Colorado Energy Office in 2008, the Colorado Carbon Fund (CCF) is the first voluntary, state-based program to help individuals and businesses offset their greenhouse gas emissions. According to a CCF statement, over 1,000 individuals and 74 Colorado organizations have used the program to reduce their emissions, producing 39,000 certified carbon offsets.

Later, the Colorado Energy Office appointed The Climate Trust (TCT) as administrator of the initiative after CFF was no longer able to support it. In 2015, The Climate Trust launched The Carbon Investment Fund to design and build carbon offset projects in specific fields like forestry and grasslands to use in compliance carbon markets.[8] A cap-and-trade program applied specifically to urban tree planting has yet to be implemented though it is anticipated that programs like the CCF and TCT will develop the framework in the coming years.

An example can be found in California. The sale of carbon offset credits requires registration with the California Air

---

7. Hafstead, M. (2020). Decarbonizing Colorado. Evaluating Cap and Trade Programs to Meet Colorado's Emissions Targets. Report 20-06. Resources for the Future.
8. Barrett, K. (2016). Ecosystem Marketplace. Colorado's Home-Grown Voluntary Carbon Offset Program Now Gets Home-Grown Management. www.ecosystemmarketplace.com.

Resources Board (ARB) or the Climate Action Reserve. Both entities follow a similar protocol for urban forestry, which sets forth rigorous requirements for project approval and the quantification, monitoring and reporting of carbon sequestered.[9] Eligible projects must plant at least 1,000 trees in new sites (not replacement trees), as offset projects require the sequestration of additional carbon. In addition, all projects must undergo independent verification every six years to ensure protocol compliance.[9] The requirements state that an upfront investment and a strong commitment to regular maintenance is required to guarantee a permanent (100-year) increase in carbon sequestered. The sale of carbon credits alone would not likely cover the transaction costs of participating in an offset program, unless it involved planting a large number of trees (at least 5,000), to leverage the benefits of economies of scale. In California, it is likely possible to undertake a multi-year planting plan that adds trees over time, subject to approval by ARB or the Climate Action Reserve.

While the creation of a cap-and-trade program allowing the sale of carbon credits may help subsidize the cost of a municipal street tree program in Colorado Springs, it would, in effect, create two types of street trees, with those qualified for offsets in need of higher oversight.

### *Partnerships*
A number of opportunities for partnerships exist to help implement a municipal street tree program in Colorado Springs and cover a portion of the costs. Continued collaboration with the Colorado Tree Coalition, Colorado State Forest Service, and the City-led COS 150 Tree Challenge would advance the City's planting agenda, particularly if Forestry does not have the resources to conduct all the work. In addition, Colorado Springs Utilities offers free "energy-saving" trees, and neighborhood associations in Colorado Springs like the Middle Shooks Run Neighborhood Association offer trees to neighborhood residents at a reduced price. Associations and civic groups like these across the City provide opportunities for partnerships.

Many communities across the country partner with local non-profit organizations (NPOs) that conduct tree planting. Based on conclusions from the Research Summary completed for the 2020 Urban Forest Management Plan, a non-profit organization devoted to the planting and stewardship of public and private trees in Colorado Springs does not exist. The Urban Forest Management Plan provides recommendations and

action steps to pursue in an effort to establish additional partners and support from entities such as NPOs.

Public agencies, such as the U.S. Forest Service and regional air quality management districts, may also provide grant funding, although these are typically one-time contributions rather than a sustainable funding source. As an alternative or addition to NPOs and public agencies, corporate partnerships may present an opportunity for financing a share of Colorado Springs' street tree planting and maintenance activities. Communities often establish adopt-a-tree programs and a corresponding fund that accepts donations for street tree activities, but a formal corporate partnership program could be a component of corporate social responsibility programs, particularly for Colorado Springs-based businesses. In particular, large goals like increasing the City's tree canopy may attract corporate partners interested in environmental stewardship and a positive public image. Emphasizing the benefits of street trees, such as clean air and water, may expand the pool of funders to areas like public health. For example, large health or fitness corporations may contribute substantial funds for projects and programs that promote increased access to trails for fitness purposes. Development of a corporate partnership program would likely require significant fundraising and outreach efforts on Forestry's part and may place the City in competition with NPOs with highly organized fundraising programs based in Colorado Springs such as conservancies and park foundations. Some funders may prefer to contribute to NPOs, and therefore, it may benefit the City to partner closely with the NPO or support the establishment of an NPO. Ideally, corporate contributions would be consistent so that the City could rely on a sustainable funding stream.

### *Street Tree Fund*
In section 4.4.103 "Duty to Replace" of City Code, it states that a person is liable to the City if a public tree is removed, damaged, or destroyed and is based on the appraised value of the tree. City Code also states that all monies received in restitution for damage to public trees are deposited into a Tree City USA fund per ordinance (Ord.) 82-54; Ord. 88-155; Ord. 01-42. As of 2020, the City does not have a Tree City USA fund. Rather, these monies reside in the City's Gift Trust Account. The process for monitoring and enforcing this policy needs to be assessed as does the amount of restitution. In addition, fees for tree removal permits should be considered. The recommended language for updating City Code to reflect a transfer of maintenance responsibility is provided in Appendix IV and includes the recommended permit fee amounts based on industry standards and

9. *California Environmental Protection Agency, Air Resources Board. (2011). Compliance Offset Protocol Urban Forest Projects.*

local needs. Updating the Duty to Replace policy and the permit fees will provide additional funding to the Forestry program to support a street tree funding option. Additional revenue for this funding option could also include donations and memorial tree programs supported by the citizens.

The City also collects fees at the time a building permit is issued. In the past, the City would match the fees to fund planting and caring for new trees in previously underdeveloped lots. This program is currently defunct but reinstating it should be considered. Another tree fund consideration is the revenue spending plans for the stormwater fee included in utility bills where residential properties pay $5 a month and non-residential properties pay $30 per acre or some other value to be decided upon by the City.

### Sales Tax

The City's comprehensive plan, PlanCOS, identifies street trees and the entire urban forest as an essential asset that requires adequate care and funding. The first goal in Chapter 7, Majestic Landscapes (Goal ML-1) of the plan seeks to "Provide for accessible, safe, engaging, and sustainable parks and open space systems and facilities for all city residents and visitors." Within that goal, the first policy (Policy ML-1.A) addresses funding for parks, recreation, urban forest, and

open space assets with a strategy (Strategy ML-1.A-2) to "consider an increase of the TOPS (Trails, Open Space, and Parks) sales tax from the current 0.10 percent."

TOPS is part of the Colorado Springs City government that administers the TOPS tax spending. The TOPS ordinance allocates sales tax funding for trails, open spaces, and parks. Each year, the TOPS sales tax generates about $6 million in revenue. With support from the Trails and Open Space Coalition (TOSC), the TOPS sales tax was approved in 1997.[10]

Colorado Springs has one of the lowest TOPS tax structure in the front range; Denver's open space tax is set at 0.25 percent as well as Westminster[11] — a city with a third of the acres of open space compared to Colorado Springs. The TOSC in Colorado Springs is spearheading the campaign to renew TOPS and to increase the tax. The TOSC is working to put this initiative on the ballot for fall of 2021 to increase funding for the City's trails, open space, and parks.[10]

The TOPS tax can only be used in TOPS funded properties. However, the same principle could apply to a small sales tax to be collected much like TOPS that would supplement forestry operations. This could also occur through a utilities tax though utilities are managed through an enterprise which causes complications.

10. The Trails and Open Space Coalition. (2020). www.trailsandopenspaces.org.

11. City of Westminster, Colorado. (2014). Open Space Stewardship Plan.

*Table A-9. Financing options for Colorado Springs' urban forest (continued on next page).*

| Financing Options | Attributes | Process | Opportunities | Challenges |
|---|---|---|---|---|
| **Feasible Options** | | | | |
| Special Assessment Districts | Special assessment for landscaping, open space improvements, acquisition, and maintenance. | City agency / property owners initiate via petition, City agency administers; based on benefits calculated in engineer's report; >50% of property owners in proposed district must approve via (mail) ballot. | Citywide district possible for all street trees; individual districts more feasible in areas with many trees, high maintenance needs, and/or political support. | Typically funds more than just street trees. |
| Parcel Tax | Assessment levied independent of property value, can be equal amount per parcel or dependent on lot size. | 2/3 of voters (not just property owners) must approve via election ballot. | Tax can be directly related to program costs; maintenance taxes deductible for property owners. | 2/3 voter approval; potential competition from other services (e.g. schools); flat tax distributes cost inequitably. |
| General Obligation (GO) Bond | Low-interest loan for capital projects; repaid by levying tax revenue. | 2/3 voter approval required. | Frequently used tool in municipal government. | Funding provided for set period; maintenance ineligible for funding. |

*Table A-9 continued. Financing options for Colorado Springs' urban forest.*

| Additional Options | | | | |
|---|---|---|---|---|
| Parking Benefit District (PBD) | Revenue from parking meters for range of right-of-way improvements and maintenance. | Enacted via local ordinance specifying boundaries, rates, use of funds; City administers with input from advisory committee. | No ballot approval required; visitors bear burden over residents; revenue can be expended beyond district boundaries. | Adjustments will need to be made based to the agency overseeing excess meter revenue; typically funds more than trees. |
| General Fund | City's primary funding pool for wide range of municipal services. | Annual budget via City's legislative process. | History of funding for tree planting and establishment. | Not a guaranteed source or amount of funding; funds at risk if budget shortfalls arise. |
| Partnerships | Non-profits, corporate partners, grant funding; for tree planting and establishment. | Various, depends on City's processes. | Decrease costs, increase capacity, develop a tree steward organization and program. | Union resistance, sustainable funding stream required. |

## BUILDING THE CASE SUMMARY

*Table A-10. Summary outcomes from the tree maintenance responsibility transfer case study.*

| | Current | Recommended | Difference |
|---|---|---|---|
| Total Public Trees | 270k trees | 270k trees | 0 |
| Staffing | 11 FTEs | 27 FTEs | 16 FTEs |
| **Total Maintenance Budget** | **$1,558,037** | **$7,400,650** | **$5,842,613** |
| Maintenance Budget per Tree | $5.77 | $27.41 | $21.64 |
| *Operations & Maintenance (O&M) Costs* | | | |
| Tree Pruning Budget | $498,572 (32%) | $4,542,596 (61%) | $4,044,024 |
| Tree Removal Budget | $373,929 (24%) | $1,110,098 (15%) | $736,169 |
| Storm Response Budget | $576,474 (37%) | $740,065 (10%) | $163,591 |
| Subtotal | $1,448,974 | $6,392,759 | $4,943,785 |
| *Capital Costs* | | | |
| Planting Budget | $15,580 (1%) | $370,033 (5%) | $354,453 |
| Admin (inspections) Budget | $93,482 (6%) | $370,033 (5%) | $276,551 |
| Other (i.e. education) Budget | $0 (0%) | $267,827 (4%) | $267,827 |
| Subtotal | $109,063 | $1,007,893 | $898,830 |
| Maintenance Budget Update Total | $1,558,037 | $7,400,650 | $5,842,613 |
| Trees Pruned Per Year | 3,700 (1.4%) | 38,571 (14%) | 34,871 |
| Pruning Cycle | 73 years | 7 years | -66 years |

*Building the Case Key Objectives*

The primary objective of this study is to evaluate components of the Forestry program to provide conclusions from which the transfer of street tree maintenance responsibility from Forestry to the adjacent property owner may be considered. This case study does not favor one outcome over any other possible outcome but provides information to build a case for the transfer of responsibility if no viable alternative funding options are secured. Additional studies and data are required for a formal business case though this case study provides the framework and information to launch such an effort. In any outcome, it is Forestry's desire and mission to serve the citizens of Colorado Springs and to foster a healthy, vibrant, and sustainable urban forest benefiting all who live, work, and play in the City.

Specifically, this case study provides:

▸ An assessment of urban forest resource data and data needs.

▸ Recommendations for changes to tree policy.

▸ An evaluation of current staffing and levels of service.

▸ A review of the budget and budget needs to manage the public tree population.

▸ An impact assessment on deferred maintenance and preventative pruning.

▸ An evaluation of potential funding options to support the care of public trees.

*Key Findings*

**A municipal street tree program results in net benefits for Colorado Springs residents** but the current staffing and budget does not support a comprehensive program that effectively maintains all public trees in a reasonable timeframe. Under a comprehensive municipal street tree program, property owners would not be responsible to maintain trees in the rights-of-way.

**With the transfer of street tree maintenance responsibility, the burden of maintenance costs is placed on the adjacent property owner.** Street trees would not receive a comprehensive and regular assessment from qualified City staff and the proven-effective method of rotational pruning cycles would not be implemented. Sporadic tree maintenance void of systematic programming will result and property owners will not benefit from economies of scale, as efficiencies associated with the City

caring for all street trees would drive costs down. A comprehensive street tree program led by the City would entail not just maintenance, but would expand Colorado Springs' urban forest, benefitting residents Citywide.

**Routine maintenance is more efficient and cost effective.** The majority of Forestry's current street tree work involves responding to service calls and emergencies, with routine pruning addressing only about 1.4 percent of the public tree population each year. By relinquishing responsibility for all trees in the public right-of-way, the savings and efficiencies of block and neighborhood pruning are not seen. Routine maintenance would reduce Forestry's per tree maintenance costs with block pruning rather than the current approach of responding to emergencies and service requests, thus providing only spot maintenance. Preventive maintenance also translates into fewer emergencies, which are more labor intensive and therefore more costly than routine pruning. Routine maintenance would further reduce costs by releasing the City from a portion of claims payments because it can effectively argue that it took all necessary precautions to assess and maintain trees. The City's risk would further decline with sufficient funding to perform routine inspections.

For Colorado Springs, a seven-year rotation is recommended for a preventative tree pruning program. This means, a total of 38,600 total public trees (streets, medians, and parks) require pruning per year. Currently, the City and contracted services prune approximately 3,700 public trees per year—a 73-year rotation (for 270,000+ trees). Unfortunately, with the current budget, the relinquishment of tree maintenance responsibility must be considered an option to maintain the valuable urban forest resource.

**Resources for comprehensive urban forest management are insufficient.** It is estimated that the City has over 270,000 public trees of which, an estimated 250,000 are street trees. Currently, Forestry is understaffed to maintain this tree population based on industry standards, local comparisons, and extensive program research as part of the Urban Forest Management Plan project. To maintain the entire public tree population, it is estimated that 16 additional full-time employees are required. This does not account for Forestry's current structure where street tree maintenance staff are also responsible for trees in open space, medians, parks, along trails, and on facility grounds.

Funding for the Forestry program has been insufficient compared to industry recommendations and the requirements for maintaining a healthy and thriving urban forest. For public tree maintenance, there is a budget deficit of nearly $19 per tree and a 375 percent increase in overall program budget is required to meet the industry-recommended budget for public trees and rotational pruning goals. Specifically, for the preventative tree pruning program, to prune every public tree (270,000 trees) within the recommended seven-year timespan, the pruning budget is estimated at $4.5 million. Compared to the 2020 tree maintenance budget of $1.6 million, significant changes to the budget and funding options are required, leading to the consideration for the transfer of tree maintenance responsibility.

*Recommendations*

▸ **Complete the City's street tree inventory**. Forestry has included the tree inventory as an unfunded request in recent budget planning cycles and the City will be contracting imagery survey services to gather information on the location of the trees and other selected attributes. The decision for attributes to collect should be based on strengthening this case study by providing information on the number of trees by location, the condition of trees, and the size. The data should be managed in a system that will allow tracking of maintenance activities which will inform the tree selection process if a transfer of maintenance responsibility is enacted. This information will also update the tree pruning rotation estimates for future budget considerations.

▸ **Update tree policies**. Regardless of changes to tree maintenance responsibility, the policies pertaining to or impacting urban forestry should be amended based on guidance provided in this case study and the 2020 Urban Forest Management Plan.

▸ **Evaluate funding options**. As described in this case study, the General Fund provides a significant portion of the funding for Forestry though this source is unstable and not guaranteed. Existing and potential special maintenance assessment districts should be evaluated as well as the potential for changes to general obligation bonds, parcel tax, and sales tax. A crucial consideration is the strengthening

or establishment of partnerships with non-profit organizations and corporations while continuing to pursue grants from public agencies.

▸ **Undertake a comprehensive public outreach campaign**. By aligning actions provided in the 2020 Urban Forest Management Plan, awareness should be elevated on the importance of Colorado Springs' urban forest and of the consequences associated with the status quo. A well-funded urban forestry program to provide care to all public trees on a rotational cycle represents a dynamic shift from the current approach. Awareness of the alternatives, the transfer of tree maintenance responsibility, should also be addressed to provide citizens with an understanding of the potential changes and impacts without financial support. An educational campaign that explains the municipal program, the benefits to the urban forest and property owners, and the challenges associated with the current approach can help build support for Colorado Springs' urban forest. Citizens should be made aware of the current funding situation. The already limited public tree maintenance funding is threatened every year by unforeseen storms requiring resources for immediate response to tree service requests and emergencies. Property owners who currently benefit from City maintenance of street trees would be burdened with the responsibility to maintain them if funding does not change. Other cities that have successfully increased funding for their urban forestry programs, including funding from property owners, have relied upon public outreach as an essential tool for success. This is a crucial step before launching any campaign to change maintenance responsibility or levy additional funds from Colorado Springs residents, as it will not only communicate the funding required from the public but also illustrate the benefits to all residents.

▸ **Finalize the tree transfer plan**. If the recommended staffing levels and budget increases are not in the forecast, an alternative for the care of street trees needs to be secured. The Tree Maintenance Responsibility Transfer plan, supported by the aforementioned recommendations, should be adapted and implemented.

## DEVELOP THE TREE MAINTENANCE TRANSFER PLAN

Most public tree maintenance in Colorado Springs is the responsibility of the City Forestry Division ("Forestry") though some areas such as in planned neighborhoods and in proximity to overhead utility lines are not directly Forestry's responsibility. Of the estimated 270,000 public trees, an estimated 250,000 trees are street trees that are the responsibility of Forestry. In various planned neighborhoods like special improvement districts and homeowners' associations (HOAs) across the City, agreements were established that describe the managing entity as responsible for the maintenance of trees in the public rights-of-way. Other instances of shared responsibility are 1) trees under utility lines, and 2) trees that are called out as required landscaping per development plans, for which tree maintenance responsibility is defined in 7.4.319 of City Code. Recommendations to update City Code are provided in Appendix V.

Of the 270,000 public trees, 20,000 trees are in maintained areas of neighborhood or community parks. The number of trees maintained by homeowners' associations and special improvement maintenance districts (SIMDs) remains unknown.

*Table A-11. Summary of the tree maintenance responsibility by location and entity.*

| Entity and Tree Location | Estimated Trees |
|---|---|
| Privately Maintained Street Trees | Unknown |
| City Forestry Maintained Street Trees | 250,000 |
| City Forestry Maintained Park Trees | 20,000 |
| HOA and SIMD-Maintained Trees | Unknown |
| **Total** | **270,000 trees** |

Results of the Tree Maintenance Transfer Plan:

▸ Street and park trees should be pruned every 7 years.

▸ With current resources, Forestry does not have a routine pruning cycle to properly maintain public tree health and public safety. Based on current maintenance records, it is projected that the rotation would currently be 70+ years for public trees.

▸ Lack of maintenance causes trees to threaten safety and property, including sidewalk damage.

▸ The transfer of maintenance responsibility will align Forestry's assets with available resources.

▸ Responsibility will be allocated more equitably to property owners.

▸ Trees may be maintained more regularly and aligned with industry standards.

▸ Public safety is maintained.

Under Chapter 4 Article 4 of the Colorado Springs City Code, Forestry has jurisdiction over all trees in the public right-of-way, and is charged with managing the urban forest to realize the benefit of trees for City residents. Forestry believes a healthy urban forest enhances the quality of life, and reduces water, air and noise pollution. Management includes planning, planting, maintenance, and removal of trees in the public right-of-way. Forestry cares for public street trees and enforces the code for street trees to the extent the resources allow. Because of insufficient funding, Forestry is not able to care for all the trees which are currently the Division's responsibility. The transfer of maintenance responsibility to property owners, while not ideal, is necessary to meet responsibilities under City Code.

In order to sustain a healthy urban forest, Forestry is proposing to standardize maintenance responsibility such that, in general, property owners will be responsible for the maintenance of street trees in the public right-of-way (ROW).

Implementation of this transfer will not commence until a thorough understanding of the public tree population is acquired by completing a street tree inventory. The location, species, size, condition, ownership, responsibility, and other attributes will be collected to appropriately phase the transfer of maintenance responsibility.

## Why does the City need to transfer responsibility to property owners?

### *Aligning Assets with Available Resources*

City Forestry does not have the resources to prune and maintain trees at a frequency recommended by tree care industry experts. Over the past years, Forestry has had to help balance the budget through cost saving measures by protecting core services. The current budget includes an arborist crew of between 3-5 personnel that are responsible for maintaining street trees and responding to tree calls and requests from the public. Currently, Forestry is responsible for over 250,000 street trees, 20,000 park trees, and responds to nearly 2,500 calls every year. During and after storm events, Forestry can receive over 500 calls a week.

Forestry is responsible for addressing citizen concerns and is backlogged with service requests and inundated with priority tree maintenance or removals following storm events. In addition, trees that are not queued in the service request system remain unaddressed while posing a potential hazard. The City does not have a preventative maintenance cycle because of the overwhelming requests from citizens and storm response.

### *Safety*

Lack of maintenance can cause limb failures which can threaten public safety and damage property. Tree issues not requested by citizens or brought to Forestry's attention may be overlooked.

### *Equitable Allocation of Tree Maintenance Responsibility*

Public trees that are currently maintained by special improvement districts, planned neighborhoods, and homeowner associations will maintain this structure. Most citizens residing in these neighborhoods currently pay an added fee for the care of landscaping.

The maintenance responsibility of street trees located elsewhere throughout the City will be transferred through a series of phases over a 20-year process based on criteria such as location, tree size, maintenance history, condition, and frequency. Transfer of maintenance will occur for trees that have recently been pruned and Forestry will continue its maintenance program until full transfer is completed. Criteria will be strengthened/established for prioritizing service requests as a means to prevent an influx of requests given this transfer plan.

## City Tree Maintenance Responsibility

The City will continue to maintain street trees on the street medians and those on City property with one arborist crew. The crew will also be responsible for responding to all emergency related tree calls and requests from the public. It is anticipated that the citizen service requests will increase upon announcement of the maintenance responsibility transfer. It is likely that citizens will want to utilize City resources for tree maintenance rather than their own personal finances prior to the responsibility transfer for their specific trees. It is recommended that the City establish a system to monitor service requests that are made in response to upcoming responsibility transfer and the protocols for evaluating tree maintenance and removal needs. This information should be made available to the public and communicated during citizen interactions relating to tree maintenance requests.

### *Trees Selected for Transfer*

Forestry will transfer 12,500 trees Citywide as part of the first phase of the 20-year process. Trees selected for maintenance responsibility by property owners will be in good condition and recently established or pruned.

*Table A-12. Summary of street tree transfer phases.*

| Phases | Trees Transferred per Phase | Total Trees Transferred |
|---|---|---|
| 20 years | 12,500 trees per year | 250,000 trees total |

### *Determining Tree Maintenance Responsibility*

Forestry will follow the procedures in the proposed Urban Forestry Ordinance (Appendix IV) and inspect all trees before transfer, to ensure they are healthy and properly pruned. Notices will be posted on trees and property owners will be notified by mail of the transfer plan. A tree care packet with information about how to properly care and maintain trees with pruning standards and details on how to request a public hearing will also be provided to property owners. Some property owners may be responsible for multiple trees adjacent to their property. Forestry will update the City website for tree questions and concerns.

*Recommended Criteria for Street Tree Maintenance Responsibility Transfer*

The following provides the recommended criteria for selecting 12,500 trees each phase for maintenance responsibility transfer (Table A-13). The criteria will be adapted for the final transfer plan, but this approach emphasizes selection of trees that are qualified as to not overburden the adjacent property owner with extensive maintenance. It also considers ongoing City projects where tree maintenance can be conducted by the City in tandem to align resources for efficiency. Trees will be rated on a point scale up to 100; those with higher points will be among the first to be transferred (Table A-14).

*Table A-13. Tree selection criteria for street tree maintenance responsibility transfer.*

| # | Theme | Criteria | Action | Points |
|---|-------|----------|--------|--------|
| A | Tree Maintenance History | Street trees pruned by the City within the last 5-10 years (depending on tree species). | Include in selection | 10 |
| B | Relative Tree Age | Street trees planted within the last 5-10 years that are less than 6 inches DBH and/or less than 30 feet in height. | Include in selection | 10 |
| C | Condition | Tree health and condition is rated as "Good" by ISA Certified Arborists. Condition rating provided within 3 years of tree transfer selection process. | Include in selection | 10 |
| D | Tree Species | Trees are not in the genus *Fraxinus* due to the concern of emerald ash borer. | Include in selection | 10 |
| E | Location | Trees are in one of the ~78 City neighborhoods and are not part of a homeowners' association, special improvement district, and/or Colorado Springs Utilities' tree maintenance program. | Include in selection | 10 |
| F | Equity | Trees are not in underserved areas based on the U.S. Census Bureau data. | Include in selection | 10 |
| G | Volunteered | Property owner volunteers for maintenance responsibility. | Include in selection | 10 |
| H | Resource Efficiency | Street trees are not in project areas designated as planned 2C-funded paving or similar program. | Include in selection | 10 |
| I | City Responsibility | Street trees are not within planned Colorado Springs Utilities construction projects. | Include in selection | 10 |
| J | Unauthorized Trees | Street trees that are - not authorized / not planted - or naturally growing "volunteer" trees. | Include in selection | 10 |

*Tree Selection Based on Recommended Criteria*

The following provides illustrations of the process for selecting trees for each transfer phase. Forestry will work with City GIS and partners to establish the final criteria and selected trees for each phase of the 20-year transfer program.

*Table A-14. Implementation of phases based on tree selection criteria.*

| Phases | Approach |
|--------|----------|
| Phase 1 – Phase 5 | 12,500 trees each year scoring a 70 or greater |
| Phase 6 – Phase 10 | 12,500 trees each year scoring a 50 or greater |
| Phase 11 – Phase 17 | 12,500 trees each year scoring a 10 or greater |
| Phase 18 – Phase 20 | 12,500 trees each year scoring a 0 or greater |

*Figure A-6. Composite map showing areas to exclude from the selection of trees for the tree transfer process as well as the eligible trees based on the 2005 tree inventory data (51,370 trees that aren't Fraxinus of the 91,320 total trees of the 120,742 total data points). For additional maps, see Appendix VI.*

Special districts, parkland, and Census Tracts with >25% of population below poverty level
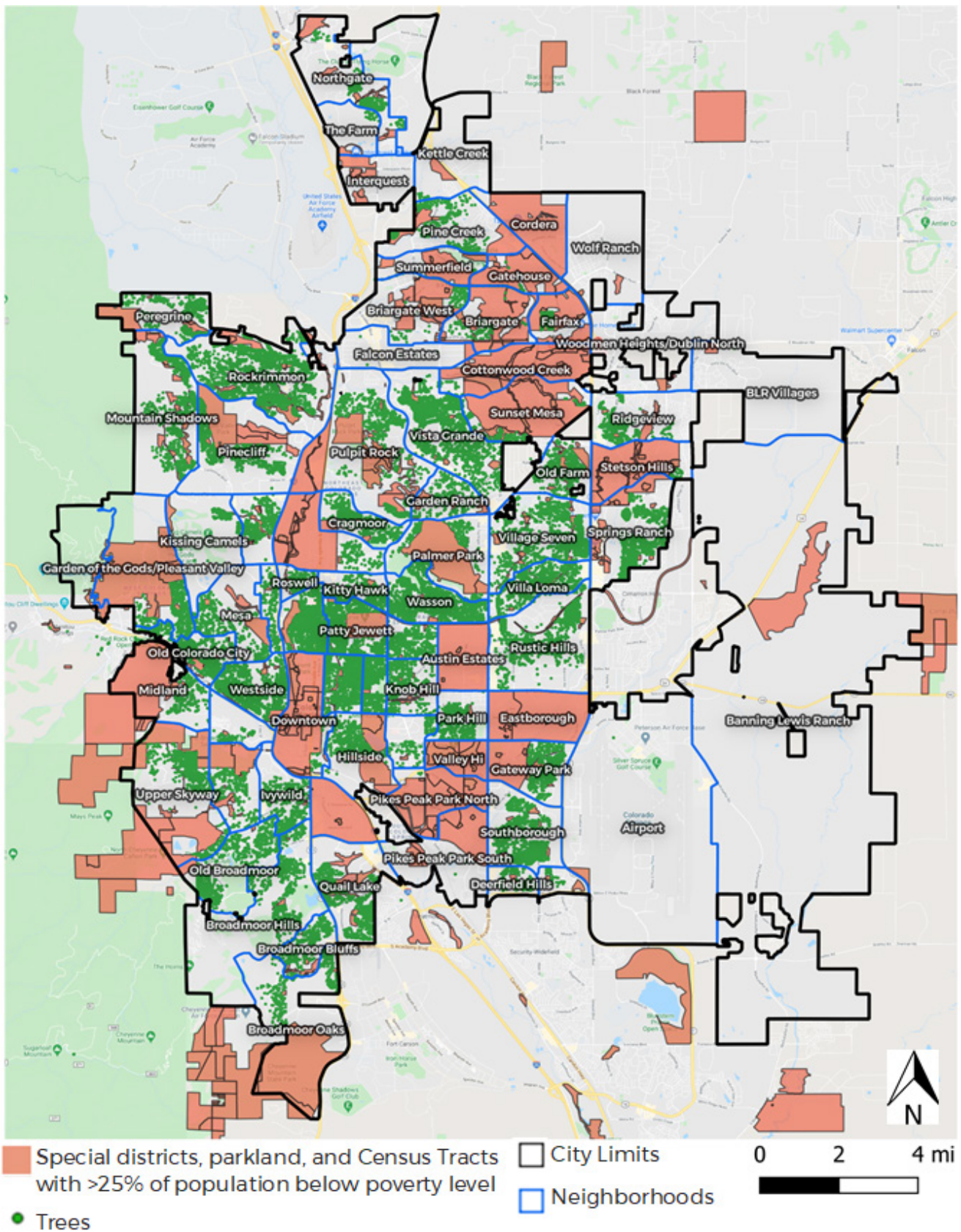
City Limits
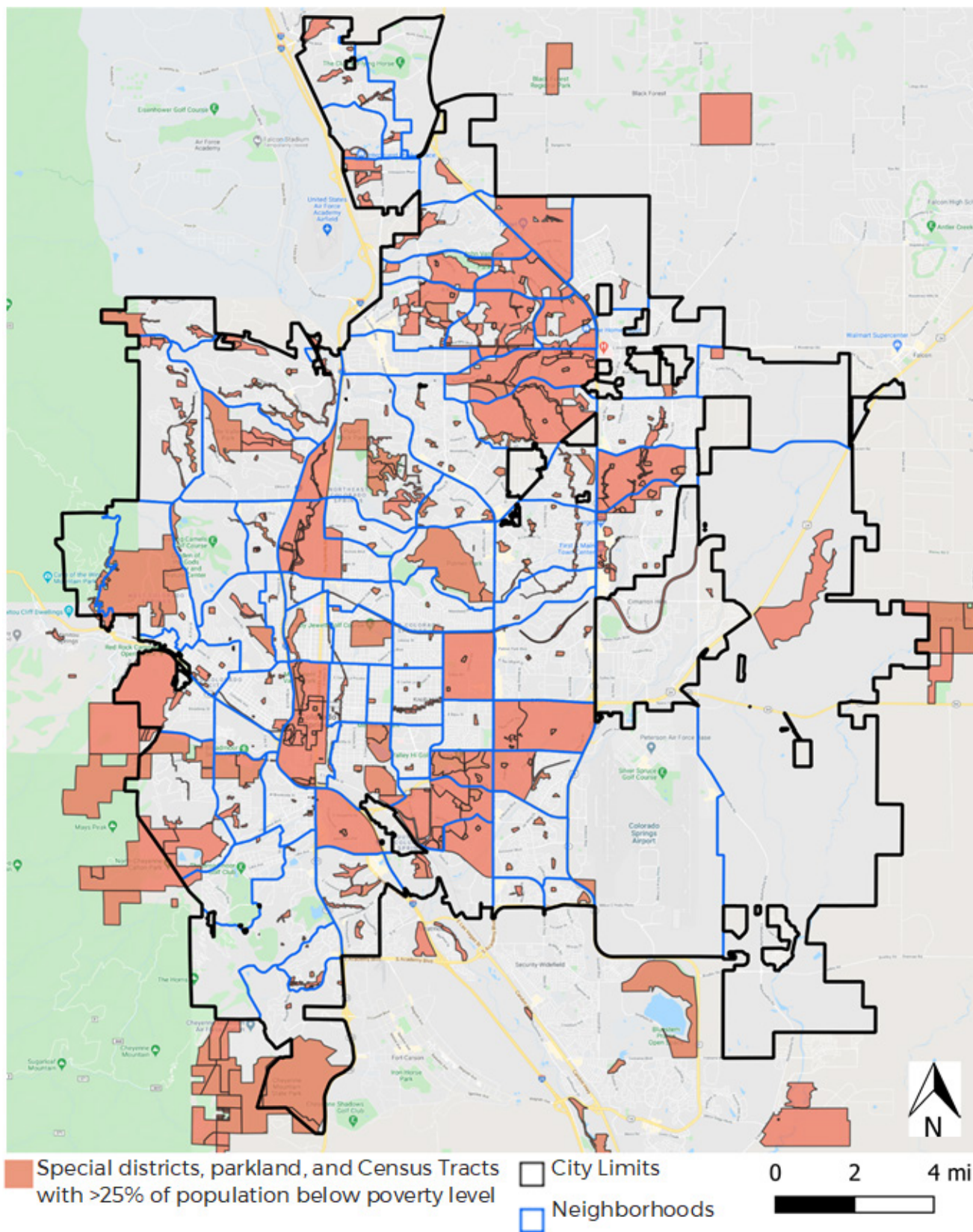
Neighborhoods

0 2 4 mi

N

*Figure A-7. Composite map showing areas to exclude from the selection of trees for the tree transfer process. Areas shaded in light red are either special districts (Special Improvement Maintenance District), parkland, or Census Tracts with more than 25% of the population below poverty level. For additional maps, see Appendix VI.*

*Changes to City Forestry's Services*

As each phase of the transfer plan is implemented, Forestry staff will have more time and resources to care for public trees in the medians, trees on City-maintained property, and trees in maintained areas of parks and open space. This includes the planting, watering, maintenance, monitoring, and removal of trees as necessary. Forestry staff will also oversee emergency tree service requests, storm events, City Code enforcement, public outreach and education, tree inventory data collection, pest and disease monitoring, City projects, development design and plans, and the partnership/stakeholder network. This adjustment in responsibilities enables Forestry to provide Colorado Springs with a comprehensive urban forest management program.

Specific to storm response, the City should establish policies and standard operating procedures to determine the extent of response. For instance, the extent of maintenance after a storm event should be determined. Perhaps the storm-caused tree damage will solely be addressed (i.e. removal of hanging/ broken limb) whereas in other cases, the entire tree may be managed while mitigating storm damage (i.e. providing tree limb clearance while responding to a broken/damaged limb). Related to storm damage, Forestry must work with City legal to determine any changes of liability resulting from the tree maintenance responsibility transfer.

It is recommended that Forestry acquire an additional staff position to manage the tree maintenance responsibility transfer. This includes addressing the public, managing data, updating the inventory database, among other tasks.

## What This Means for the Citizens of Colorado Springs
### Estimated Cost

Depending on the type and size of tree, pruning and maintenance costs can vary. A general range for tree maintenance is between $300 to $1,000 for mature trees. Residents are encouraged to contact certified arborists for an estimate. Forestry will provide resources and tips on how to properly maintain trees. It is the City's hope that the fronting property owners, through their stewardship, will do their part to keep this critical aspect of the City's infrastructure maintained.

*Reactions to the Tree Maintenance Responsibility Transfer and the Response*

Throughout the nation, communities are faced with budget decisions and the maintenance of trees is included in this process. Numerous examples of communities that tried to transfer the tree maintenance responsibility have shown citizen resistance and lack of support. As a result of this resistance, some of the urban forestry programs in these communities received citizen support for adjusting program budgets to fund a complete urban forest maintenance program rather than place the burden on the private property owners. It is possible that the citizens of Colorado Springs will dispute the tree transfer plan and the City should prepare for alternative solutions. This alternative may be funding the Forestry tree maintenance program with the General Fund.

The City's last-resort relinquishment policy is an attempt to give the urban forest the care it needs but the care that Forestry cannot provide with the current resources. The public street trees in Colorado Springs should be on a routine pruning schedule of five to seven years to reduce long-term costs, reduce risk, and improve the health of the trees. Instead, because of budget and staffing shortages, the street tree population is on a schedule of approximately 70 years—meaning each tree is maintained once every 70 years. In this timespan, trees can have low hanging limbs, broken limbs, pest or disease issues, and die for years before the trees are queued for maintenance. Other times, citizen requests are addressed while trees posing a higher risk or concern are left unattended. With a shortage of arborist staff, reduced in size due to budget cuts over the years, Forestry must spend most of the time responding to emergencies, preventing any routine or scheduled tree maintenance. As a result, the health of Colorado Springs' urban forest has declined, creating a stigma for a city that takes great pride in its natural environment.

But given the myriad benefits of trees—among them sequestering carbon emissions to fight climate change, absorbing rainwater to reduce localized flooding, reducing temperature extremes and the urban heat island effect, improving human health, providing habitat for wildlife and increasing property values—alternatives to tree maintenance responsibility transfer should be explored, propelled by the uptick in citizen awareness and response to the tree transfer plan. Forestry should partner with

other departments and community groups to build the case for the need for a sustainable funding stream to take care of the street trees. With the announcement of the tree transfer plan, Forestry will have numerous proponents for City tree maintenance funding who dispute the alternative—private property owner responsibility.

The comprehensive research, baseline conditions analyses, benchmarking research to compare conditions to industry and regional standards, evaluations of community viewpoints, and an audit of the City's program as it relates to urban forest sustainability and management provided in the 2020 Urban Forest Management Plan should be utilized by Forestry. This Urban Forest Management Plan describes the precarious state of Colorado Springs' street tree population largely caused by insufficient funding to care for the public tree population. It showcases proven best practices to protect, maintain, and manage the urban forest and decisively concludes that steady funding is vital.

Using the 2020 Plan, Forestry and its partners should build political support to secure the needed funding. This support can be raised through polling, focus groups, and extensive outreach to determine the best approach for securing funding for proper tree maintenance over the long term.

Financing options for the tree maintenance program should be evaluated. Options include existing and potential special assessment districts, parcel taxes, general obligation bonds, and General Fund adjustments. For more information on financing options and analysis, see the Tree Maintenance Responsibility Transfer Case Study section (Appendix I). After a decision is made for financing the public tree maintenance program, the case should be brought to City Council in the form of a proposal where voters will be able to determine the responsibility and future of the urban forest. These voters are potentially responsible for the care of street trees—if no decision for City funding is passed—giving citizens a greater incentive to thoughtfully vote on a decision.

If a ballot is approved to fund the City's tree maintenance program in its entirety, Forestry should follow the recommendations provided in the 2020 Urban Forest Management Plan for Management Scenario D, "Optimal Support". Forestry will need to raise awareness about the maintenance responsibility, address priority tree issues, develop a routine pruning cycle, and conduct ongoing program responsibilities such as education, training, tree planting, tree watering, monitoring, and citizen service requests.



*Photo courtesy of the City of Colorado Springs.*

# APPENDIX II: STAFFING THE URBAN FOREST

The following provides an overview of the unfunded requests provided by City Forestry staff for the 2021 City Budget.

## STAFF FORESTERS

In its purest state, Forestry should have four divisions: Urban Street Tree Management, Park Tree Management, Riparian Forest Management and Natural Resource (open spaces) Management. Each of these divisions require very specialized skill sets as vegetative cover types, usage by the citizens, ecological benefits, threats against each resource and the unintended consequences of mismanagement are all vastly different from each other. Currently, Forestry has two Staff Foresters who are Certified Arborists that manage the street trees. The City Forester has four job responsibilities: management of public street trees, trees in open spaces, park trees, and riparian vegetation management.

Each Forester is responsible for tree inspections, contract administration, tree inventory, tree appraisals, code review and rewrite, working with 2C and PPRTA, reviewing development plans, coordinating planting projects, insect and disease diagnostics, coordination with other City entities, presentations, storm response, data entry, website content development, phone communication, and walk-ins, among many other services and tasks. At an estimated net worth of nearly one billion dollars, the City must fund urban forest infrastructure management and growth.

## FORESTRY TECH I'S

In 2019 a long-time forestry goal of creating a three-tiered organizational structure for Forestry arborist staff was achieved; Senior Forestry Techs and Forestry Tech IIs and Is. Fortunately, last year the top two tiers were filled with extremely competent staff however the Tech I positions remain unfilled as of 2020. The new structure was created to strengthen a lineage of beginning level unskilled arborists to competent and certified arborists with many years of experience.

As the community continues on an exponential growth-path, demand-loads on the three Forestry crews are untenable. According to the International Society of Arboriculture, to properly manage an urban forest, each tree should be pruned approximately every seven years. For Colorado Springs this means approximately 38,600 trees per year should have maintenance performed on them. In recent years, City staff has been able to maintain fewer than 1,700 trees per year with current staffing and another 2,000 with contracted services. Additional staffing is critical in order to increase the care provided to the growing urban forest. With the addition of entry level arborists, the crews would operate more efficiently, maintain a safer work zone and manage more trees per year.

## 2021 HOURLY

Hourly staff are essential to Forestry's successful operation. Currently Forestry employs one hourly for front desk administration, one hourly staff for Staff Forester support, and two hourly staff for operations. Forestry requires an additional three hourly staff and an increase in pay for existing staff.

## FRONT DESK ADMINISTRATION

Presently this position is funded as an hourly, limited to 29 hours per week. Forestry should elevate this to a full-time position as it is a critical interface with the community (especially during Citywide storm events). This position assigns crew tasks within Cartegraph and Accela, accepts walk-ins, and conducts other administrative duties.

## FRONT DESK ADMIN, STAFF FORESTER ASSISTANT, OPERATIONS AND R.O.W. HOURLIES

Five of the six hourly positions could be eliminated if they were elevated to FTE (full-time employee) status; front desk admin (Senior Office Specialist), staff forester assistant (Staff Forester) and three operations hourlies (hourly to Forestry Tech I).

If the aforementioned positions are not reclassified then the hourly budget must be increased to allow for additional positions that have not been filled in years and for modest increases in salary for longtime hourly employees.

## STAFFING REQUESTS BY MANAGEMENT SCENARIO

### Management Scenario A, Baseline Conditions

With no changes to funding or resources, Forestry should focus on the following:

▶ Maintain existing staffing structure, acquire equipment and PPE (personal protective equipment) support, maintain seasonals and part-time staff, continue to build the case for more funding and staffing.

## Management Scenario B, Additional but Insufficient Funding

### Staff Foresters:

Forestry should request three staff foresters— two street tree/parks ISA Certified Arborists and one open space/riparian/natural resource SAF Certified Forester.

Estimated one-time costs:
- $100,000 for vehicles.
- $6,000 for laptops.
- $5,000 for tools and PPE.

Salary costs:
- Individual salary is $86,131 including benefits
- Total costs for three staff foresters: $258,393

### Forestry Tech Is:

With the addition of three entry level arborists, the crews would operate more efficiently, maintain a safer work zone, and manage more trees per year.

Estimated one-time costs:
- $5,000 for tools and PPE.
- There are no vehicle, laptop, or phones expenses.

Salary costs:
- Individual salary is $65,849 including benefits
- Total costs for three Forestry Tech Is: $197,547

### Hourly Staff:

Funding should be requested for an addition of three hourly staff and an increase in pay for our existing staff.

### Front Desk Admin:

Funding should change the hourly position to a full-time salary position to interface with the community and assign crew tasks.

Salary costs for a Senior Office Specialist:
- Individual salary is $54,200 including benefits.
- The current salary of $22,936 creates an offset of $31,264.
- There are no one-time charges.

### Conversion of Hourly Staff to Full-Time Employees: Five of the six hourly positions could be eliminated if they were elevated to FTE status; front desk admin (Senior Office Specialist), staff forester assistant (Staff Forester) and three hourly operations staff (hourly to Forestry Tech I).

If the aforementioned positions are not reclassified then the hourly budget must be increased to allow for additional positions that have not been filled in years and for modest increases in salary for long-time hourly employees.

Current budget for all hourly staff:
- $86,815

Requested budget for all hourlies including salary increases, benefits and additional positions:
- $150,845 (an offset of $64,030)

## Management Scenario C, Tree Maintenance Responsibility Transfer

As tree maintenance responsibility is transferred, more time and resources will be available to Forestry staff to address the following:

- Maintain existing staffing structure, acquire equipment and PPE support, maintain seasonals and part-time staff.
- Address citizen requests in a timely manner.
- Prioritize maintenance of trees selected for responsibility transfer.
- Remove hazardous trees as resources allow.
- Inventory and monitor public trees.
- Implement the Tree Pest and Disease Plan targeting ash tree management for emerald ash borer.
- Manage park trees and trees in open spaces, along trails, in riparian and forested areas as resources allow.

## Management Scenario D, Optimal Support

With adequate funding, the following staffing structure is recommended:

- Establish four divisions within Forestry: Street Tree Management, Park Tree Management, Riparian Forest Management and Natural Resource (open spaces) Management.
- Assign a Staff Forester for each division with appropriate certifications and licenses.
- Fulfill all positions recommended in the Management Scenario B section of this appendix as well as additional staff to support four new divisions and responsibilities.
  - Staff Foresters, Forestry Tech Is, Front Desk Admin, Hourly Staff.

- Arborist Crew:

  - The arborist crew should be established based on the ability to prune all public trees on a seven-year rotation. This requires approximately 38,600 trees to be pruned per year.

    - If a street tree takes 45 minutes to prune on average, approximately 10 trees can be pruned per day. Out of the 261 working days, approximately 2,610 trees can be pruned in a year per crew. For 38,600 trees to be pruned in a year, at least 15 arborist crews (two staff per crew) are required.

      - Individual salary is $65,849 including benefits.

      - 15 crews with 2 staff each requires 30 Forestry Tech Is.

      - As of 2020, one arborist crew exists, therefore, 14 crews of 2 staff are required.

      - 28 Forestry Tech Is salaries equate to $1,843,772 including benefits.

      - $22,000 for tools and PPE.

- Other considerations:

  - Inspectors, GIS technicians

  - Inventory specialists

  - PPRTA and 2C management

  - Code enforcement, tree planting technicians

  - Tree watering technicians

  - Plant health care technicians

  - Volunteer coordinators

  - Community outreach specialists



*Photo courtesy of the City of Colorado Springs.*

# APPENDIX III: ADDITIONAL UNFUNDED REQUESTS

## INVENTORY

Forestry's street tree (and park tree) inventory is all-but completely outdated; the most current information available is a partial inventory from 2018 of only 5,000 trees. Beyond that, the next best information is from 2007. A properly implemented street tree inventory can provide a current record of resources being managed and its value, assist in scheduling maintenance and developing budgets, garner public support for the forestry program, and provide long-term assessment and monitoring of the urban forest. An inventory of public trees is crucial to the Tree Pest and Disease Plan and any considerations for tree maintenance responsibility transfer.

Forestry intends to utilize information gathered during the Streets Department's pavement assessment originally planned for the summer and fall of 2020. At that time, a contractor will simultaneously record GIS information of every tree and its location in the entire City. Further analysis by a subcontractor of the imagery can identify tree species, size and relative health of the tree; all essential data necessary for proper urban forest management. This one-time cost is an extreme estimation only. At the time of the survey, an unknown number of trees will be counted and evaluated. Estimations range from 200,000 to 300,000 trees and more. An estimate provided to City of Colorado Springs Department of Public Works GIS Supervisor in July 2020 amounted to approximately $268,000 to obtain the necessary tree data.

## TRAINING

With the growth of Forestry staff and more accurate cost estimation, it was found that the current budget for training, memberships, and dues is greatly underfunded. Professional certifications such as Certified Forester from the Society of American Foresters and Certified Arborist from the International Society of Arboriculture (ISA) require acquisition of 60 and 30 CEUs respectively on a three year rotation. Costs of the seminars have risen with time as well as travel and per diem expenses. Other qualifications required for Forestry positions are the various levels of the CDL licensing. Still more staff have certifications in line clearance, pesticide application and ISA Municipal Arborist accreditation.

Current total costs for a one year period is approximately $17,000 per year, for all personnel including professional memberships, seminar registration fees, travel and per diem expenses, training classes such as first aid/CPR and dues. Certifications have a three year rotation. Therefore, $5,666 per year is required to obtain the $17,000 amount. Forestry's current budgets are $2,500 in the 5121 category and $500 in the 5122 category. This is a total offset of $2,666.

## SAFETY EQUIPMENT

In anticipation of adding three Forestry Tech I positions and one hourly position in the right-of-way (ROW) crew (per Management Scenario B), the safety equipment budgets in the 5121 and 5122 categories are underfunded. Currently, the steel toe boot purchases alone require nearly 50 percent of the budget. Other safety items necessary for operations include leather gloves, nitrile and rubber coated gloves, safety glasses, ear plugs, boots, chaps, Class 3 vests, regular hardhats, hardhats with communications devices, cones, miscellaneous signs, caution tape and others. The current safety budget in category 5121 is $4,035 and in category 5122 it is $450. Forestry should request an additional $2,000 in category 5121 and $500 in category 5122 for the next budget planning cycle.
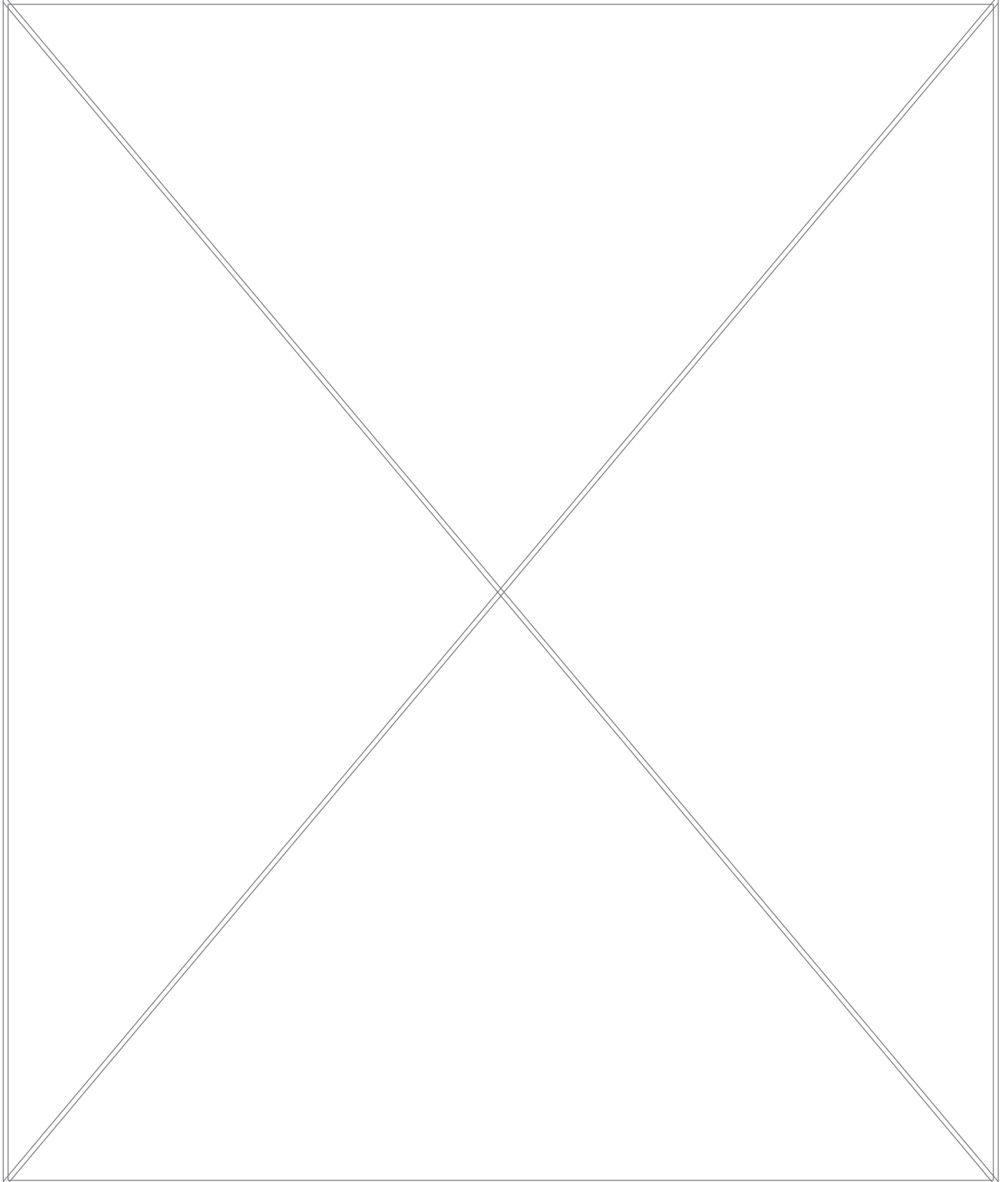
## MASTER PLAN

The Forestry Division is continuing strategic efforts to more effectively manage its $900 thousand street and park tree infrastructure. This includes contracting with PlanIT Geo to write an "Urban Forest Master Plan" which will be a road map which provides information, recommendations, and resources needed to effectively and proactively manage and grow Colorado Spring's tree canopy beyond the 2020 Urban Forest Management Plan. The overarching goals of the Urban Forest Master Plan are to proactively address growing environmental challenges, create a coordinated vision, practice and model efficiency and cooperation, create baseline metrics and clear goals for Colorado Spring's urban forest and to develop long-term advocates and increase civic participation. Forestry received an estimate of $80,000 in 2019 to complete an Urban Forest Master Plan.

## CONTRACT TREE REMOVAL

As a result of the October 2019 and the April 2020 weather events, tens of thousands of urban street trees have expired from freeze damage. As time progresses, more of these dead trees will manifest themselves to citizen addresses where the trees reside. Forestry is receiving a vast amount of calls regarding dead tree removals. Presently the 2020 contract budget for removals is $120,000, which will only remove approximately 120 trees. Forestry crew removals approach another 700. At this rate, dead trees will be evident throughout the City for years. Forestry should request additional funding to at least double the contract numbers to $720,000 in the next budget planning cycle.

# APPENDICES IV-V:

*Appendices IV and V regarding code and rules & regulations have not been formally adopted by City Council pending revision and have been removed from this version of the Urban Forest Management Plan.*

**APPENDIX IV: PROPOSED AMENDMENT TO CITY CODE FOR TREE RESPONSIBILITY TRANSFER (MANAGEMENT SCENARIO C)**

# APPENDIX VI:

## MAPS DEMONSTRATING THE TREE SELECTION PROCESS FOR TREE RESPONSIBILITY TRANSFER (MANAGEMENT SCENARIO C)

**Inventoried Trees in Colorado Springs with <6" DBH**
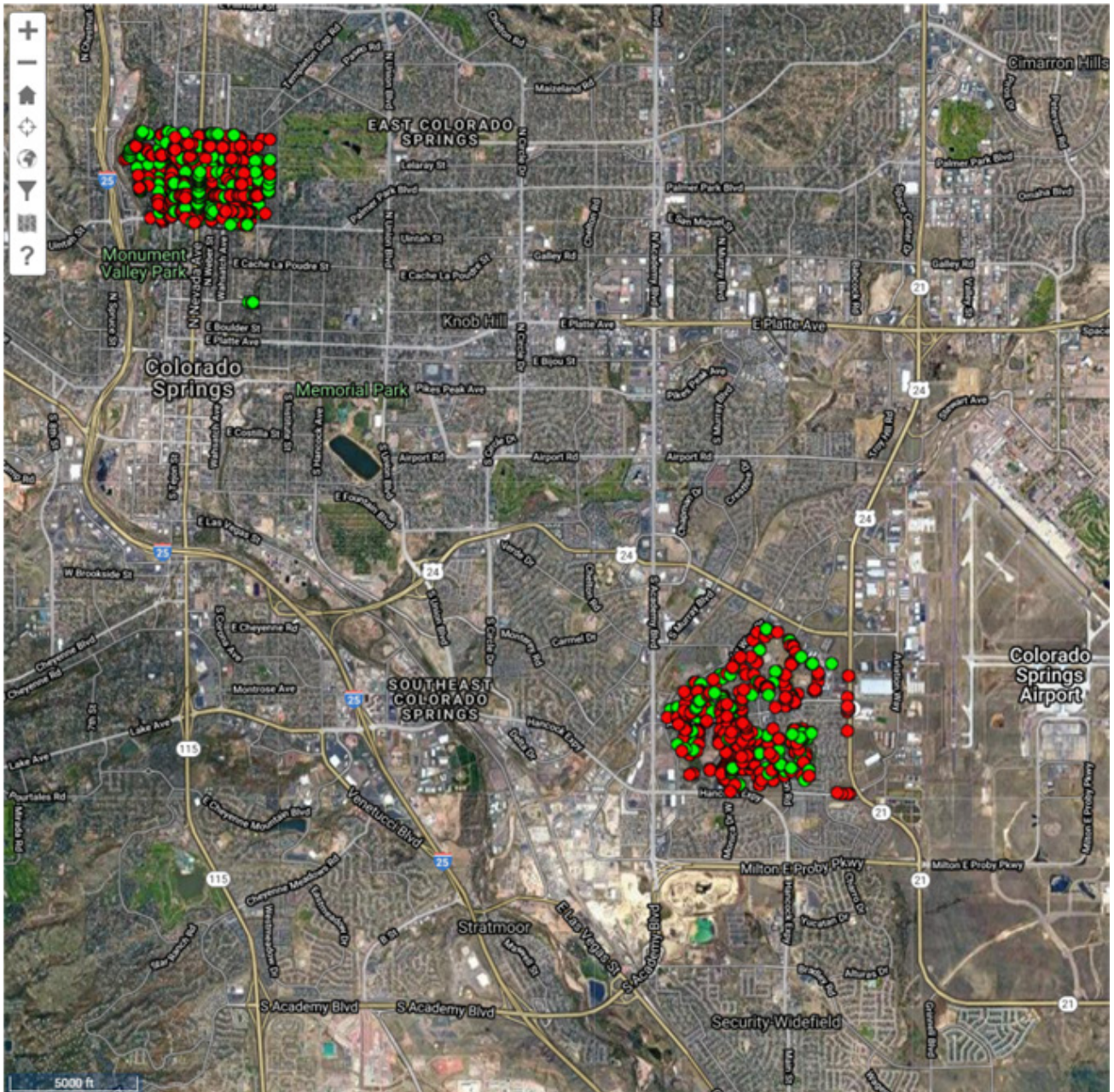


**Tree Diameter (DBH)**

🟢 0-3in (336)

🔴 3-6in (531)

*Figure A-8. Trees less than 6 inches DBH (diameter at breast height, ~4.5') based on available data within Colorado Springs for tree transfer consideration (Themes B and C).*

## Inventoried Trees in Colorado Springs by Condition (above) and Neighborhood (below)
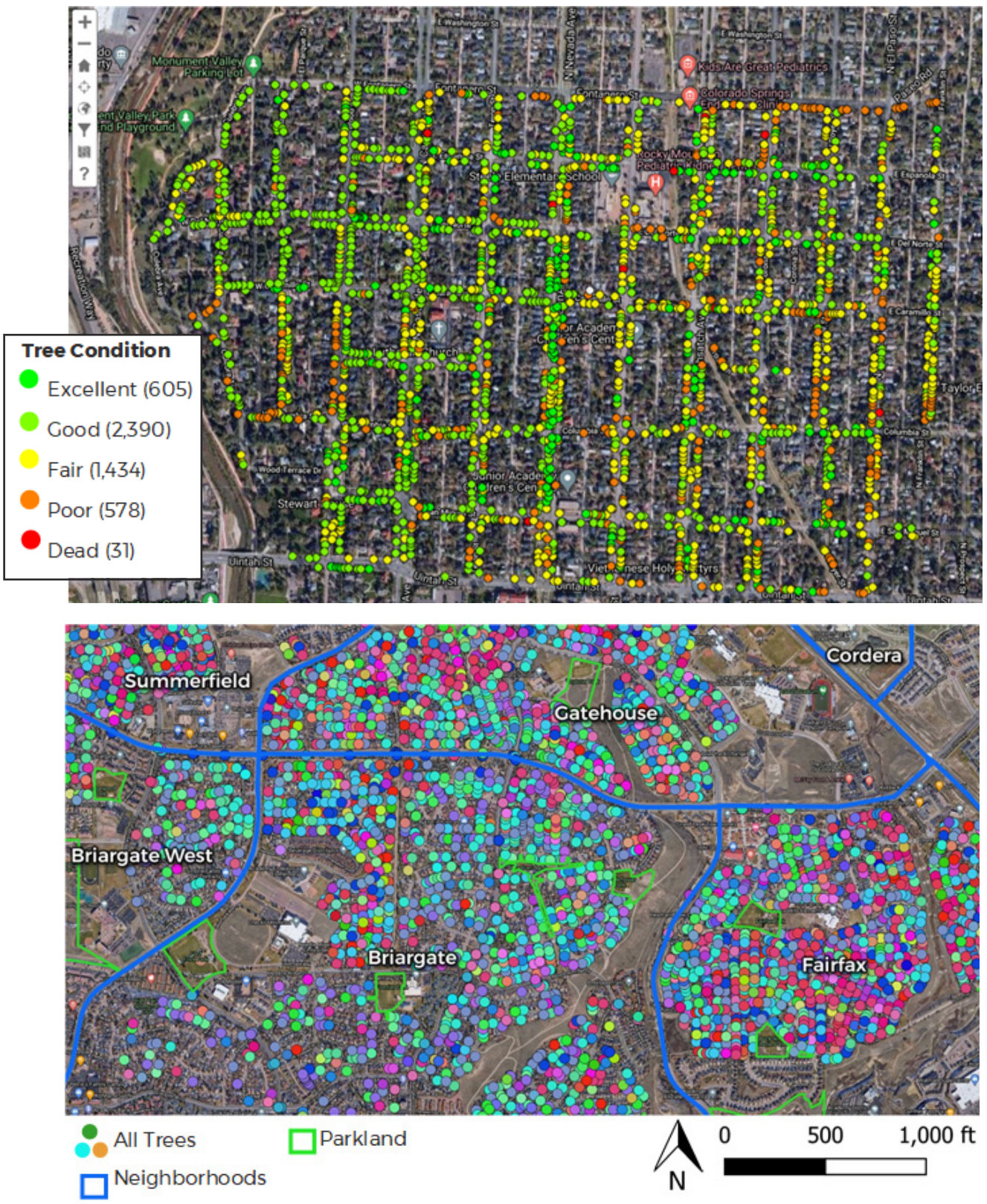


*Figure A-9. The condition of all trees based on available data within Colorado Springs for tree transfer consideration (above, Theme C) and close-up view of 2005 tree inventory within Colorado Springs neighborhoods and parkland for consideration in tree transfer selection (below).*

## Ash Trees in Colorado Springs (2005 street tree inventory)
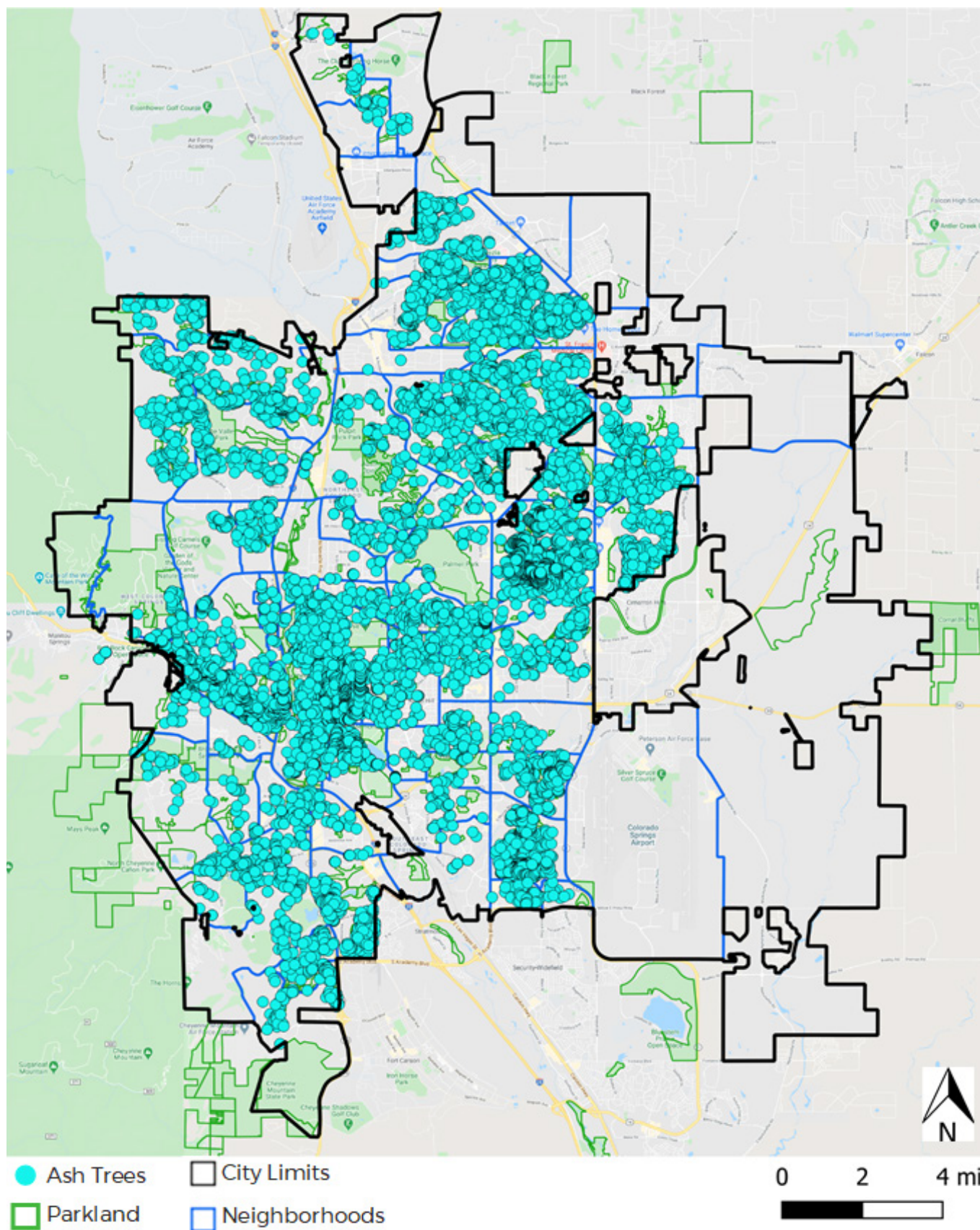


*Figure A-10. 2005 tree inventory of ash (Fraxinus) within Colorado Springs for exclusion from tree transfer (Theme D).*

## Special Districts in Colorado Springs Compared to 2005 Street Tree Inventory
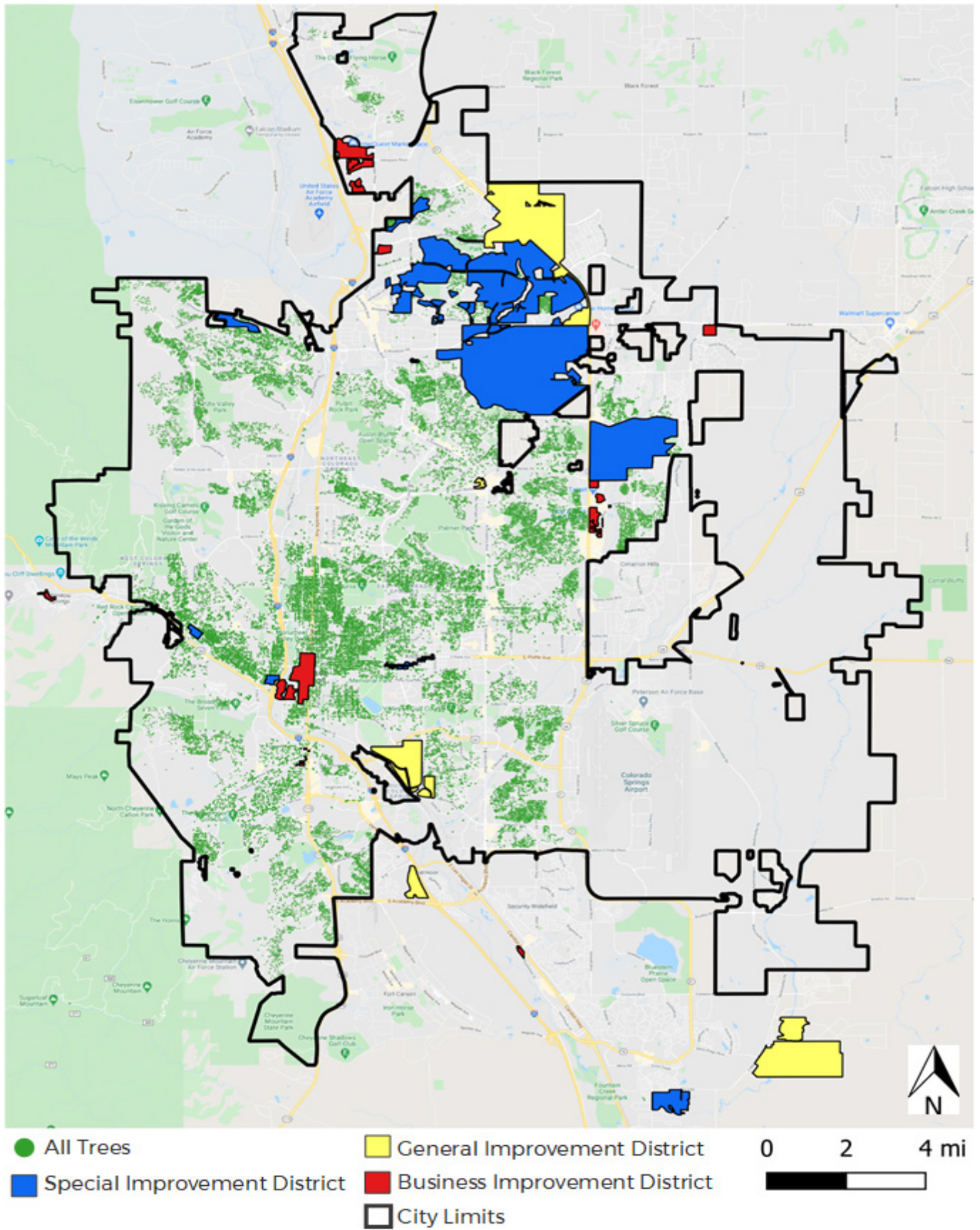


*Figure A-11. 2005 tree inventory and the special districts within Colorado Springs (Theme E).*

## Neighborhoods in Colorado Springs Compared to 2005 Street Tree Inventory
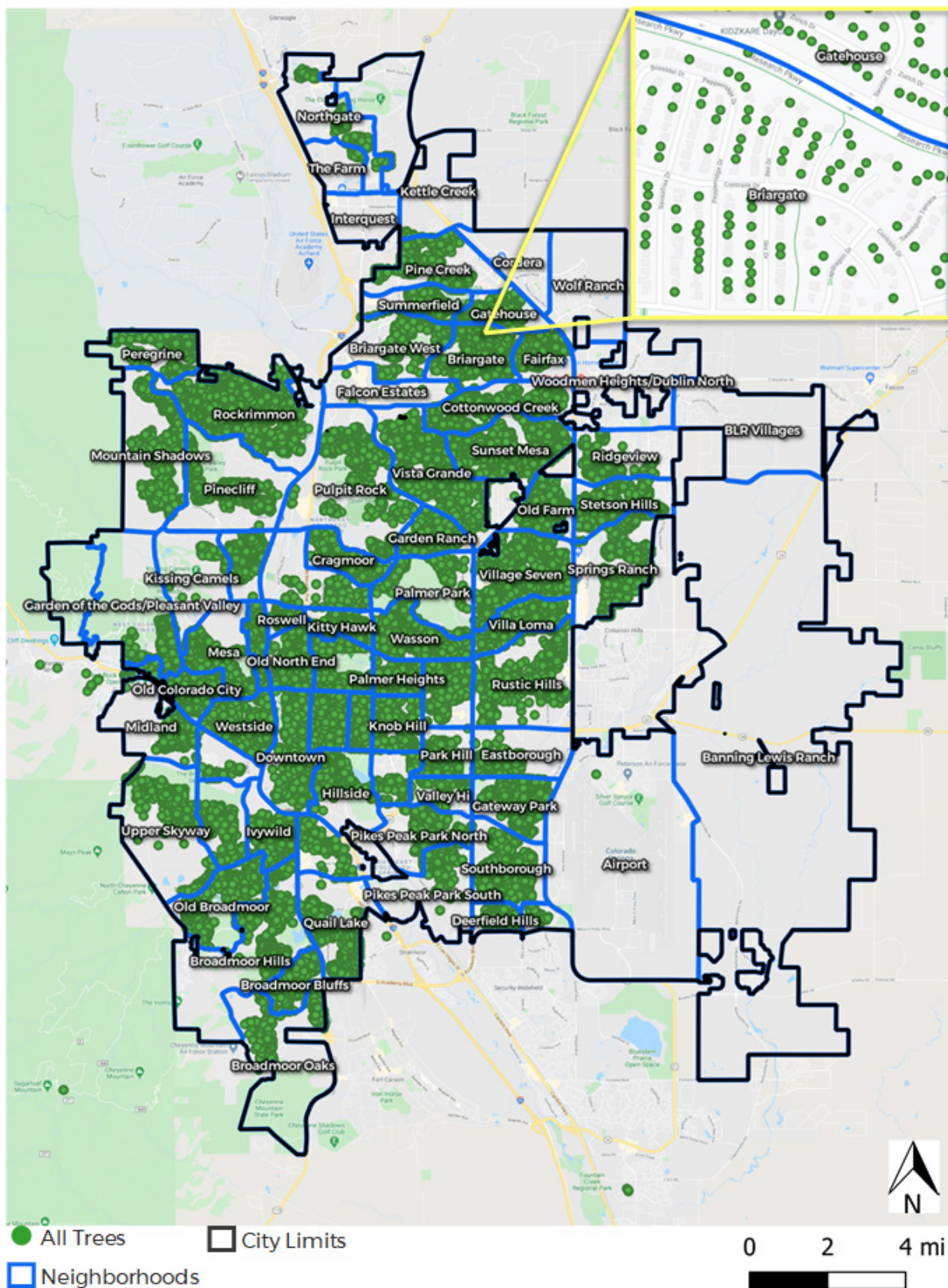


*Figure A-12. 2005 tree inventory and the neighborhoods within Colorado Springs (Theme E).*

**Underserved Areas (U.S. Census Tracts) in Colorado Springs Compared to 2005 Street Tree Inventory**
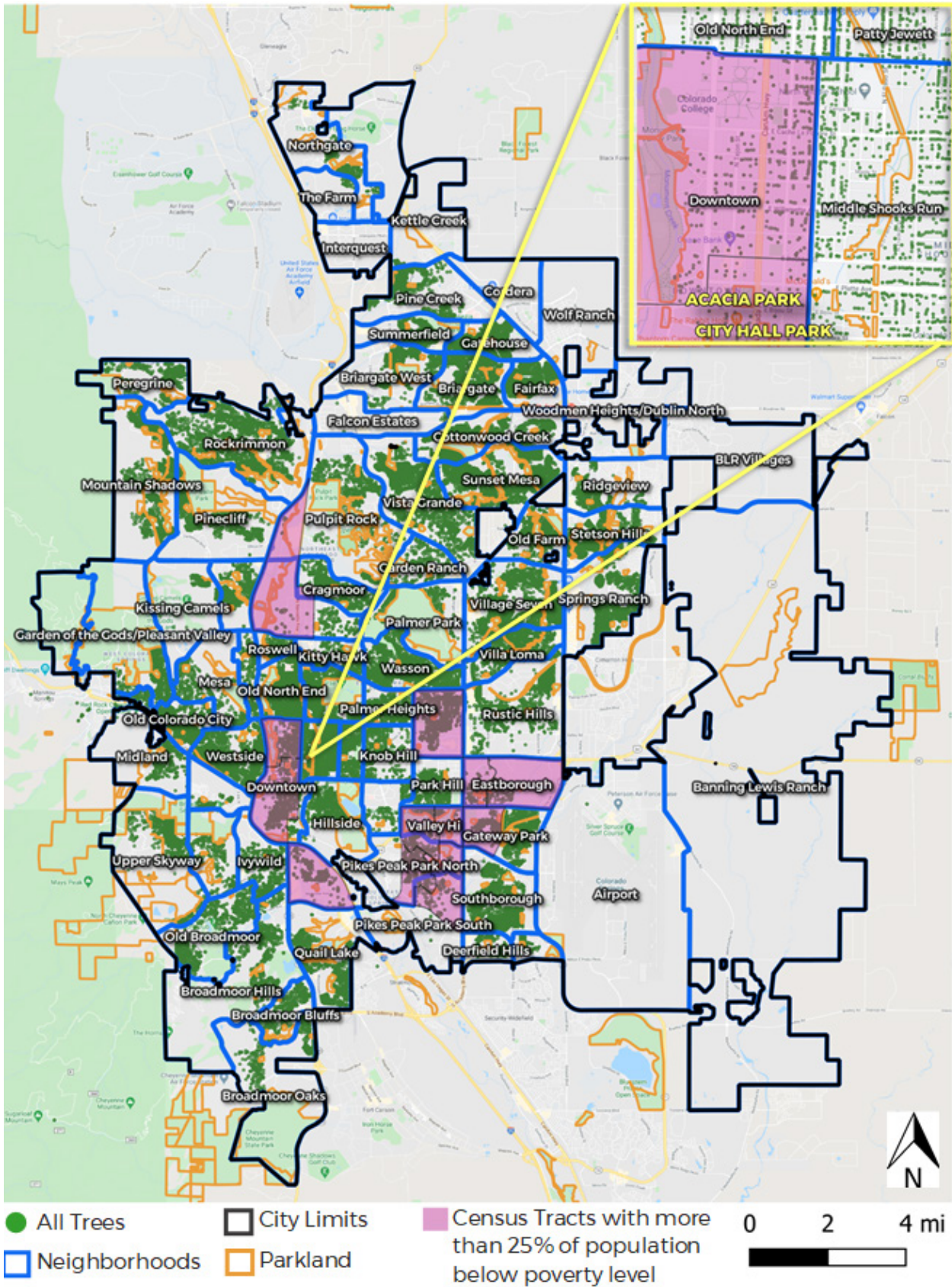


*Figure A-13. 2005 tree inventory within Colorado Springs' underserved populations (Census Tracts with >25% of population with income below the poverty level) based on the U.S. Census Bureau's Census Tract demographic data (Theme F).*

# Colorado Springs Urban Forest Management Plan
## Exclusions for Street Tree Care Relinquishment

**PLANIT GEO**

N

### Legend
- City of Colorado Springs
- Parks
- Business Improvement District
- General Improvement District
- Special Improvement District
- Census Tracts with >25% Poverty

0    1.5    3    6
Miles

July 2020

*This map was produced for the Colorado Springs Urban Forest Management Plan. Data provided by the City of Colorado Springs. Basemap provided by Esri.*

*Figure A-14. All areas recommended for exclusion from Colorado Springs' Forestry Division tree maintenance responsibility transfer (Management Scenario C).*

# APPENDIX VII: PARCEL CLASSIFICATION FOR TAX FUND

*Table A-15. Classification of parcels by area for tree pruning rotation funding via tax fund (continued on next page).*

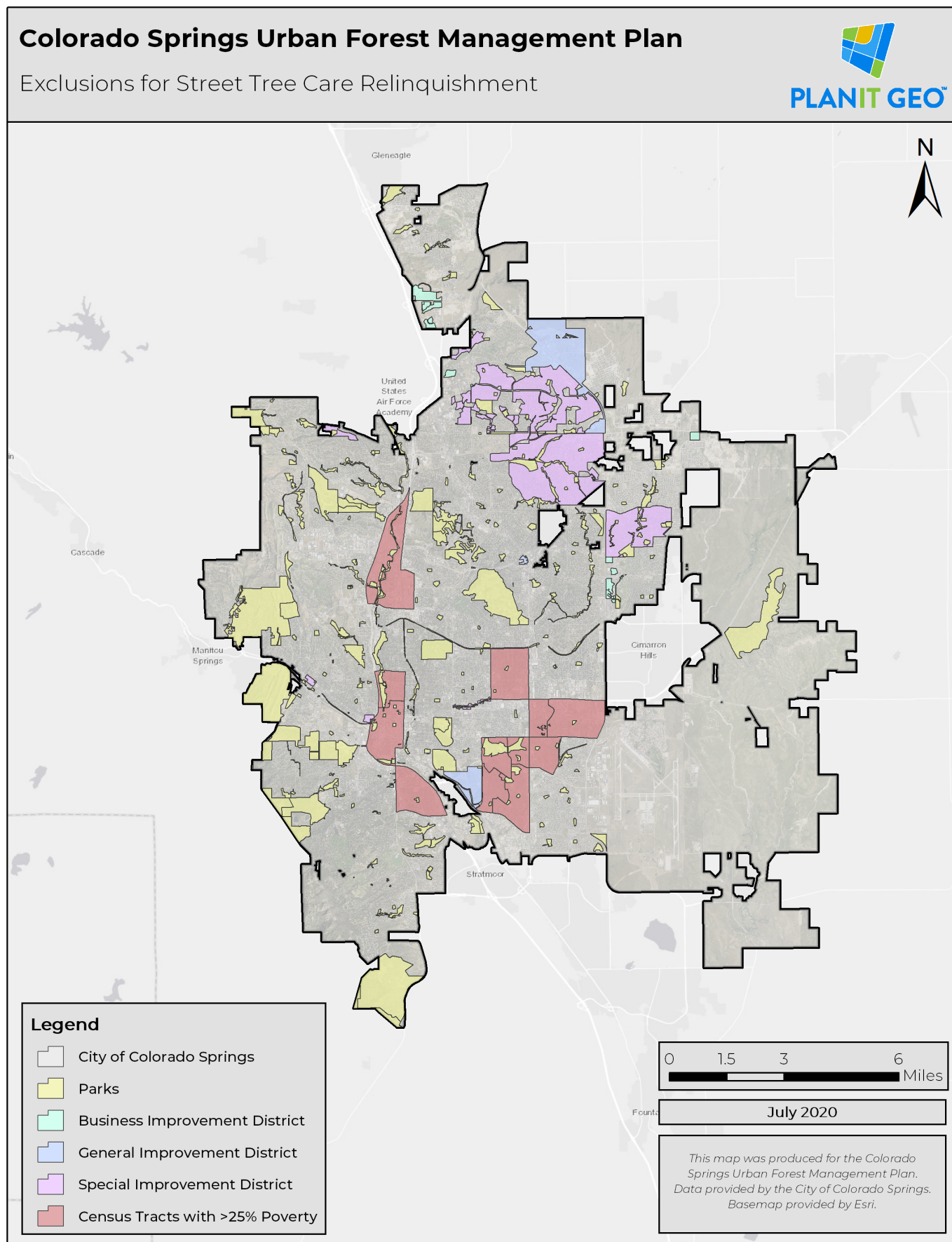| Parcel Square Foot Range | # of parcels | Average Size of Lot within Range | Public Tree Preventative Pruning (7-year) Program Scenario | Amount | Comprehensive City Forestry Program Funding | Amount |
|---|---|---|---|---|---|---|
| 0 - 1,006 | 10,882 | $503 | $0.37 | $3,996 | $0.60 | $6,514 |
| 1,006 - 2,949 | 10,940 | $1,978 | $1.44 | $15,793 | $2.35 | $25,744 |
| 2,949 - 4,701 | 10,802 | $3,825 | $2.79 | $30,162 | $4.55 | $49,168 |
| 4,701 - 5,709 | 10,884 | $5,205 | $3.80 | $41,355 | $6.19 | $67,415 |
| 5,709 - 6,279 | 10,875 | $5,994 | $4.38 | $47,585 | $7.13 | $77,570 |
| 6,279 - 6,849 | 10,870 | $6,564 | $4.79 | $52,086 | $7.81 | $84,907 |
| 6,849 - 7,339 | 10,885 | $7,094 | $5.18 | $56,369 | $8.44 | $91,890 |
| 7,339 - 7,763 | 10,867 | $7,551 | $5.51 | $59,901 | $8.99 | $97,647 |
| 7,763 - 8,314 | 10,886 | $8,039 | $5.87 | $63,880 | $9.57 | $104,133 |
| 8,314 - 9,025 | 10,855 | $8,670 | $6.33 | $68,698 | $10.32 | $111,988 |
| 9,025 - 9,946 | 10,873 | $9,486 | $6.92 | $75,289 | $11.29 | $122,732 |
| 9,946 - 11,640 | 10,869 | $10,793 | $7.88 | $85,636 | $12.84 | $139,598 |
| 11,640 - 15,715 | 10,871 | $13,678 | $9.98 | $108,542 | $16.28 | $176,939 |
| 15,715 - 30,568 | 10,874 | $23,142 | $16.89 | $183,698 | $27.54 | $299,452 |
| 30,568 - 100,000 | 6,917 | $65,284 | $47.66 | $329,646 | $77.69 | $537,368 |
| 100,000 - 150,000 | 1,232 | $125,000 | $91.25 | $112,420 | $148.75 | $183,260 |
| 150,000 - 200,000 | 553 | $175,000 | $127.75 | $70,646 | $208.25 | $115,162 |

*Table A-16 continued. Classification of parcels by area for tree pruning rotation funding via tax fund.*

| Parcel Square Foot Range | # of parcels | Average Size of Lot within Range | Public Tree Preventative Pruning (7-year) Program Scenario | Amount | Comprehensive City Forestry Program Funding | Amount |
|---|---|---|---|---|---|---|
| 200,000 - 250,000 | 512 | $225,000 | $164.25 | $84,096 | $267.75 | $137,088 |
| 250,000 - 300,000 | 237 | $275,000 | $200.75 | $47,578 | $327.25 | $77,558 |
| 300,000 - 350,000 | 203 | $325,000 | $237.25 | $48,162 | $386.75 | $78,510 |
| 350,000 - 400,000 | 126 | $375,000 | $273.75 | $34,493 | $446.25 | $56,228 |
| 400,000 - 500,000 | 251 | $450,000 | $328.50 | $82,454 | $535.50 | $134,411 |
| 500,000 - 600,000 | 148 | $550,000 | $401.50 | $59,422 | $654.50 | $96,866 |
| 600,000 - 700,000 | 99 | $650,000 | $474.50 | $46,976 | $773.50 | $76,577 |
| 700,000 - 800,000 | 86 | $750,000 | $547.50 | $47,085 | $892.50 | $76,755 |
| 800,000 - 900,000 | 64 | $850,000 | $620.50 | $39,712 | $1,011.50 | $64,736 |
| 900,000 - 1,000,000 | 37 | $950,000 | $693.50 | $25,660 | $1,130.50 | $41,829 |
| 1,000,000 - 2,000,000 | 185 | $1,500,000 | $1,095.00 | $202,575 | $1,785.00 | $330,225 |
| 2,000,000 - 3,000,000 | 64 | $2,500,000 | $1,825.00 | $116,800 | $2,975.00 | $190,400 |
| 3,000,000 - 10,000,000 | 104 | $6,500,000 | $4,745.00 | $493,480 | $7,735.00 | $804,440 |
| 10,000,000 - 66,000,000 | 47 | $38,000,000 | $27,740.00 | $1,303,780 | $45,220.00 | $2,125,340 |
| 66,000,000 - 310,000,000 | 7 | $188,000,000 | $137,240.00 | $960,680 | $223,720.00 | $1,566,040 |
| 310,000,000 - 495,000,000 | 2 | $402,500,000 | $293,825.00 | $587,650 | $478,975.00 | $957,950 |
| **TOTAL** | 163,107 | | | | | $9,106,439 |

# APPENDIX VIII: OPTIONS FOR FUNDING THE URBAN FOREST

Additional information provided in the Tree Maintenance Responsibility Transfer section.

*Table A-16. Summary of financing options for Colorado Springs' urban forest.*

| Financing Options | Attributes | Process | Opportunities | Challenges |
|---|---|---|---|---|
| **Feasible Options** | | | | |
| Special Assessment Districts | Special assessment for landscaping, open space improvements, acquisition, and maintenance. | City agency / property owners initiate via petition, City agency administers; based on benefits calculated in engineer's report; >50% of property owners in proposed district must approve via (mail) ballot. | Citywide district possible for all street trees; individual districts more feasible in areas with many trees, high maintenance needs, and/or political support. | Typically funds more than just street trees. |
| Parcel Tax | Assessment levied independent of property value, can be equal amount per parcel or dependent on lot size. | 2/3 of voters (not just property owners) must approve via election ballot. | Tax can be directly related to program costs; maintenance taxes deductible for property owners. | 2/3 voter approval; potential competition from other services (e.g. schools); flat tax distributes cost inequitably. |
| General Obligation (GO) Bond | Low-interest loan for capital projects; repaid by levying tax revenue. | 2/3 voter approval required. | Frequently used tool in municipal government. | Funding provided for set period; maintenance ineligible for funding. |
| **Additional Options** | | | | |
| Parking Benefit District (PBD) | Revenue from parking meters for range of right-of-way improvements and maintenance. | Enacted via local ordinance specifying boundaries, rates, use of funds; City administers with input from advisory committee. | No ballot approval required; visitors bear burden over residents; revenue can be expended beyond district boundaries. | Adjustments will need to be made based to the agency overseeing excess meter revenue; typically funds more than trees. |
| General Fund | City's primary funding pool for wide range of municipal services. | Annual budget via City's legislative process. | History of funding for tree planting and establishment. | Not a guaranteed source of funding; no guaranteed funding amount; funds at risk if budget shortfalls. |

| | | | | |
|---|---|---|---|---|
| Partnerships | Non-profits, corporate partners, grant funding; for tree planting and establishment. | Various, depends on City's processes. | Decrease costs, increase capacity, develop a tree steward organization and program. | Union resistance, sustainable funding stream required. |
| Carbon Offsets | A cap-and-trade program in Colorado would create a cap on greenhouse gas emissions trading options. | The State's Climate Trust continues to build the Carbon Investment Fund. The City should be involved in designing project (i.e. tree planting) requirements and tracking. | In California, projects must plant at least 1,000 trees as offset projects to enable the sale of carbon credits. | Many trees (5,000+) must be planted to cover costs of an offset program. Creates two types of street trees, offset program trees require higher oversight. Not yet available in Colorado. Does not support tree maintenance. |
| Tree Fund | City Code 4.4.103 "Duty to Replace" monies go towards Tree City USA fund, building permit fees received, and stormwater fees could all contribute to a Tree Fund. | Enforcement of the Code generates monies from restitution. Building permit and stormwater fees would need evaluated and adjusted to accommodate supporting a Tree Fund. | Additional staffing to monitor Code violations would generate revenue for the Tree Fund. Potential use of funds for tree maintenance. The City is growing and revenue from building permit fees and stormwater could benefit the Tree Fund. | Forestry staffing levels are currently inadequate to monitor Code violations. Fees would need evaluated, adjusted, and approved. Funds used for tree maintenance does not directly affect all contributors to the fee programs. |
| Sales Tax | A 0.10 percent sales tax is in place for TOPS. | City TOPS Working Committee and the TOSC increase the TOPS sales tax to a reasonable level compared to City's open space land area and use and other city open space taxes. | An increase in the sales tax for TOPS provides opportunities for Forestry such as tree planting and maintenance and supporting staff. The City's TOPS tax is much lower relative to other cities, providing justification for increase. | Requires a vote from the citizens and the 0.10 percent sales tax is in place until 2025. |

# APPENDIX IX: TREES AND SIDEWALKS OPERATIONS PLAN

## DECISION MATRIX

The development of the Colorado Springs Urban Forest Management Plan identified the need to clarify the decision process to address tree and sidewalk or construction conflicts. A clear decision matrix can help to reduce inter- and inner-department uncertainty and establish or adhere to consistency and fairness. The City's departments have standard operating procedures and checklists for evaluating conflicts at a project site, but these traditionally have not been available to the public. To make the decision process around the retention or removal of trees more transparent and consistent, a clarified process, decision matrix, and solution toolkit should be developed to highlight the key decision points.

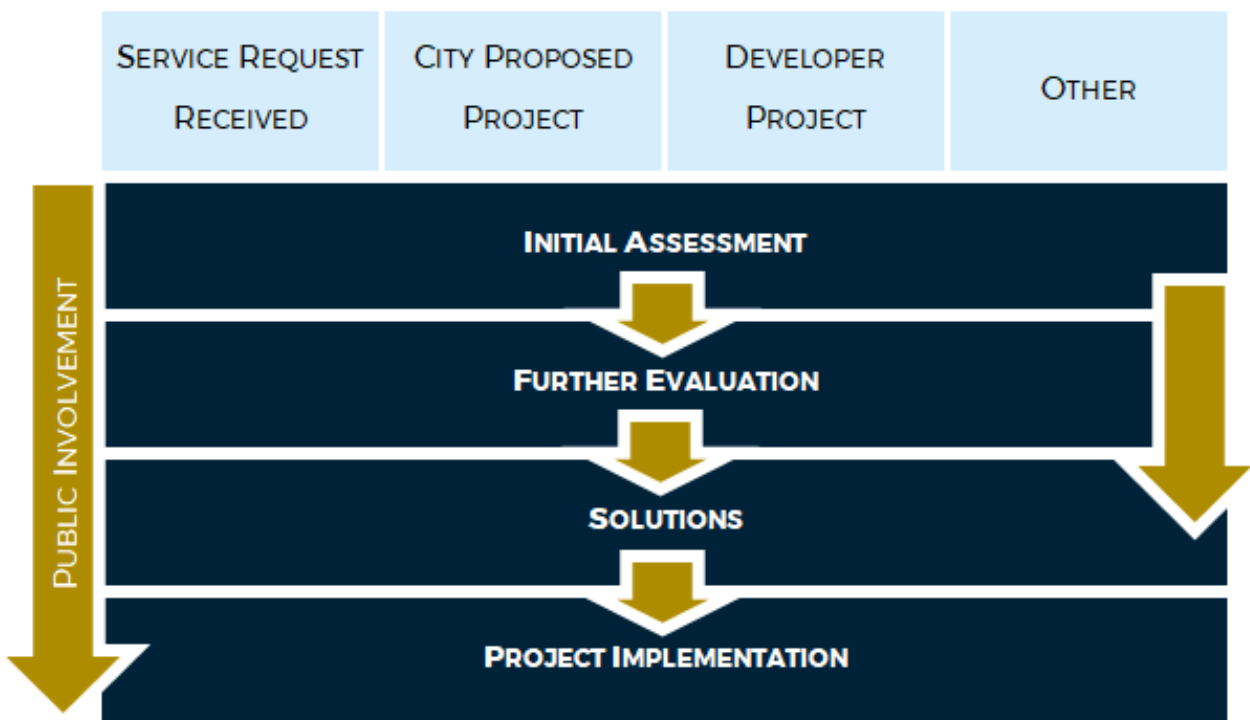## PROPOSED DECISION MATRIX FOR TREE AND CONSTRUCTION/SIDEWALK CONFLICTS



*Figure A-15. Tree and construction project decision matrix.*

## INITIAL ASSESSMENT

The following applies to tree removal requests and proposed projects.

The initial assessment of trees, sidewalks (or other infrastructure), and site at the service request location or project location provides consistency and predictability by collecting the appropriate information. It is recommended to have Forestry involved in the initial assessment process and/or a City staff member with an International Society of Arboriculture Certified Arborist accreditation.

▸ **Tree Preservation Potential**. What is the tree quality or health, and is it worth preserving? Is the tree part of the City's Significant Tree Program?

▸ **Tree Mitigation Exploration**. If the request to remove the tree is a result of infrastructure damage and the tree exhibits poor health or vigor, can the tree's health or vigor be mitigated by any means other than removal?

► **Public Safety Risk**. Is the tree a potential hazard that cannot be mitigated by any means other than removal? This includes any tree or tree part that poses a high risk of damage to persons or property located in public places. Use the International Society of Arboriculture's tree risk evaluation standards.

► **Initial Assessment Timing**. It is recommended that the initial assessment be conducted within 3-4 weeks of receiving a service request for removal. If the assessment is required due to a proposed project, the assessment should occur no later than 30% design or equivalent of design effort (e.g. during the Environmental Assessment period).

► **Tracking**. Consider tracking service requests in the City's TreePlotter tree inventory software or similar program.

For an example Initial Assessment Checklist, see the Example Initial Assessment Checklist further below.

## INITIAL TREE DECISION

If the tree removal request was made due to the condition of the tree or other reason not relating to the damage or impediment of infrastructure such as sidewalk, the City Forester or representative may conduct the initial tree decision. If infrastructure is part of the assessment and/or the tree removal request was initiated for a proposed project, the City Engineer or appropriate staff should also be part of the initial tree decision. The appropriate staff will visit the tree and/or proposed project location and assess the tree (and sidewalk, if applicable) conditions. The following actions will result from the assessment:

► **Remove Tree.** The tree removal request was made not as a result of the tree impacting or damaging infrastructure and the tree is identified as unhealthy or unsafe with no remediation possible.

  ► Remove the tree and consider the "no net loss" policy of replacing the tree. Some cities implement a 2:1 replacement to removal ratio. The replacement policy should be based on City Code, the Forestry Rules and Regulations, and the Landscape Code and Policy Manual. Replacement of trees can occur on site, same street, or City-approved location. A fee in-lieu should also be considered as an option as described in City Code.

  ► Removal of the tree should be prioritized based on other work orders, the risk assessment of the tree, and other factors.

  ► The service request, decision, work order, tree information, and tree removal information should be tracked in the City's TreePlotter software or similar program.

► **Retain Tree.** Based on the assessment, the tree is not in decline or the issues can be remediated. Alternatively, if the tree in question is part of the Significant Tree Program, the tree may be preserved depending on the tree condition and presence of hazards or risks as described in the Forestry Rules and Regulations.

  ► Document the decision, inform the property owner or project developer.

  ► Conduct the remediation activity to the tree if needed.

  ► Prioritize and track this information in the TreePlotter or similar program.

  ► Conduct follow-ups with the property owner and monitor the tree if necessary.

► **Remove Tree and Replace Sidewalk.** The service request or proposed project identifies a tree that is causing sidewalk conflicts and the tree has been deemed unhealthy and no remediation is possible. The City should reference City Code as to what is defined as unhealthy or hazardous.

▸ Remove the tree and consider the "no net loss" policy of replacing the tree. Some cities implement a 2:1 replacement to removal ratio. The requirement to replace the tree will be the City and City Forester's discretion. The replacement policy should be based on City Code, the Forestry Rules and Regulations, and the Landscape Code and Policy Manual. Replacement of trees can occur on site, same street, or City-approved location. A fee in-lieu should also be considered as an option as described in City Code.

▸ Removal of the tree should be prioritized based on other work orders, the risk assessment of the tree, and other factors.

▸ The service request, decision, work order, tree information, and tree removal information should be tracked in the City's TreePlotter software or similar program.

▸ Replace the sidewalk using appropriate design standards and materials and consider designing according to standards that will protect any replacement trees and provide ample soil volume and root space for the new or existing trees.

▸ **Retain Tree and Maintain Sidewalk.** A tree in question is in conflict with infrastructure and the assessment determined that the tree is to be retained and the infrastructure (i.e. sidewalk) is to be corrected. The sidewalk will be of standard width and a tree pit of standard width (at minimum) can be installed or retained.

  ▸ Coordinate with the adjacent property owner the timing and approach for maintaining the sidewalk. Some cities offer incentives or funding to support sidewalk maintenance when the issue causing the sidewalk damage has been identified to be caused by a City-owned right-of-way tree. Be sure to inform the property owner of alternative sidewalk amendments such as width reduction, alternative materials, among other solutions.

  ▸ If any root pruning is needed to amend the sidewalk, Forestry and/or a Certified Arborist hired by the property owner or a certified consultant/contractor hired by the City should evaluate to determine the appropriate root pruning, branch pruning, soil amendments, and other maintenance required.

  ▸ Documentation in TreePlotter or similar software as stated before is recommended.

▸ **Evaluate Tree and/or Sidewalk Further.** During the initial tree decision, it is not appropriate for extensive explorations of pavement, soils, or tree root systems. There are limitations to the initial assessment and decision. The purpose of the initial assessment is to identify where these future actions are required so that the appropriate schedule and funding can be determined.

  ▸ Documentation in TreePlotter or similar software as stated before is recommended.

## FURTHER EVALUATION

The team conducting further evaluation may include an arborist, landscape architect, engineer, or other professionals with expertise relevant to the project details and situation. In addition to collecting information about the trees and infrastructure (i.e. sidewalk) the following additional items may be considered: Level of impact, future risks, cost/benefit, anticipated sidewalk maintenance if the tree is kept, public/ environmental benefit, community values, policy guidance, neighborhood context, historic districts, planned construction, funding forecasts.

## SOLUTIONS

The following best practices and approaches are provided as examples. The City should review and update these as new or improved practices and materials emerge.

► **If Tree Removed, Obtain Valuation.** If the tree must be removed, the City should provide guidelines to replace the removed tree. Guidelines should be based on City Code, the Forestry Rules and Regulations, and the Landscape Code and Policy Manual. Ideally, the tree would be replaced at the same location if the site is suitable for trees in the first place. If not possible, the City should have a procedure in place for the relocation of replacement trees.

► **If Tree is Retained, Determine Management Approach.** Since the initial assessment offered the opportunity to closely examine the tree and the site, future management approaches and decisions should be discussed and documented. These include future tree replacement species for when the tree does over mature and decline or conduct corrective actions to provide clearance for pedestrians, vehicles, utilities, and signs.

► **Identify Potential Sidewalk Solutions.** The Alternative Solutions Toolkit Overview section provides information and resources regarding sidewalk solution options. Information gathered during the initial assessment and subsequent site visits will support the selection of options that should be presented to the property owner, developer, or City staff to ensure goals of sidewalk repair and tree preservation are kept.

► **Identify Opportunities to Improve Conditions for New Trees.** When trees are planted by the City, the appropriate tree species for the location should be determined and the City should adhere to best practices in site and tree pit preparation to provide enough soil volume to support tree root growth and minimize future pavement damage by roots. If a tree is being planted at or near where the tree removal request was made, an evaluation of why the request was made should be considered. This may include such things as inadequate soil volume, insufficient growing space, tree leaf litter, messy fruit, poor structure, allergies, screening of shade-intolerant garden or landscape vegetation, or a combination of factors.

## PROJECT IMPLEMENTATION

Whether the sidewalk repair is occurring at a location where the tree is retained or removed, the sidewalk must adhere to the Americans with Disabilities Act (ADA) requirements and City standards and is the responsibility of the adjacent property owner. Tree repaving projects, curb and gutter repairs, and other Capital Projects should also adhere to this evaluation process. All matters relating to the removal or remediation of the tree will be conducted by the City unless the responsibility of tree maintenance in public rights-of-way changes.

Regarding tree maintenance, mitigation, or removal, the City should involve the public by:

► Providing a public notice prior to the initial tree assessment.

► Sharing the results of the initial assessment.

► Sharing the solution decision.

# EXAMPLE INITIAL ASSESSMENT CHECKLIST FOR TREE CONFLICTS

This resource can be adapted for the City of Colorado Springs to make decisions regarding tree removals and tree and hardscape (i.e. sidewalks) conflicts.



*Figure A-16. Example of a tree conflict assessment checklist. Source: Seattle Department of Transportation.*

**SDOT**
*Seattle Department of Transportation*

SvR

**SDOT Trees and Sidewalks Operations Plan**
**Initial Street Tree and Sidewalk Assessment**
Page 2 of 2

5.  **Public Safety Hazard—Does the tree present a public safety hazard that cannot be mitigated by any means other than removal?**
    *   Does the tree location obstruct the visibility for pedestrians, cyclists, and/or cars at an intersection?
    *   Is the tree impacting a curb ramp such that it no longer meets City of Seattle ADA requirements?
    *   Is the tree potentially impacting private property?

    **Yes** ☐ **No -**☐
    Use this space to draw a sketch of the location. Identify existing clearances from nearby infrastructure.

*Recommendation for this tree:*

☐ **—Remove Tree / Replace Sidewalk**
A tree is identified to be removed if it is not healthy or if it is hazardous as identified in the Street Tree Ordinance.

☐ **—Keep Tree and Maintain Sidewalk**
A tree will be kept and the sidewalk will be maintained if a sidewalk of standard width and a tree pit of standard width (at a minimum) can be installed or retained around a healthy tree.

☐ **—Evaluate Sidewalk and/or Tree Further**
SDOT views trees and sidewalks as important public infrastructure assets. SDOT intends to keep healthy trees and have accessible sidewalks. If standard widths cannot be met then SDOT will take the time and resources to evaluate if alternative approaches (such as sidewalk width reduction, alternative sidewalk materials, adjustments to the tree pit and/or tree root pruning) can be used to retain a tree and provide an accessible sidewalk at problem locations.

**NEXT STEPS**
*If Tree is REMOVED* –Replace the removed tree with the minimum 2:1 replacement ratio. Identify if the replacement trees can be located in the same location or on the same street as the removed tree. If not, replacements should be planted as close to the removal as geographically feasible. Identify the estimated cost to remove the tree(s), repair the sidewalk, and plant replacement trees.

*If Tree is KEPT* –Estimate the cost of the sidewalk repair that would achieve the desired lifecycle for the repair. Estimate sidewalk and tree maintenance needs/costs and any maintenance to the tree that is being retained (e.g., root pruning, branch pruning, soil amendments).

*If EVALUATE Further* – Use Tree and Sidewalk Evaluation Form (IN DEVELOPMENT) and/or the tree risk assessment should follow ISA TRAQ guidelines:
http://www.isa-arbor.com/education/onlineresources/basictreeriskassessmentform.aspx

| Arborist | Engineer |
|----------|----------|
| Title | Title |
| Date | Date |

*Figure A-16 continued. Example of a tree conflict assessment checklist. Source: Seattle Department of Transportation.*

## ALTERNATIVE SOLUTIONS TOOLKIT OVERVIEW

*Table A-17. Description of possible alternative solutions for tree and construction conflicts.*

| TOOL TYPE | TOOLS | PROACTIVE | RESPONSIVE | COST* $  $$  $$$  $$$$ | | | | EXPECTED USEFUL LIFE | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Month | Year | Decade | Century |
| **MATERIAL** | **PAVING AND OTHER SURFACE MATERIALS** | | | | | | | | | | |
| | Asphalt | P | R | $-$$$ | | | | M | Y | D | C |
| | Expansion Joints | P | R | $ | | | | M | Y | D | C |
| | Pavers | P | R | $$-$$$ | | | | M | Y | D | C |
| | Pervious Concrete | P | R | $$$-$$$$ | | | | M | Y | D | C |
| | Reinforced or Thicker Slab | P | R | $$-$$$ | | | | M | Y | D | C |
| | Rockery / Wall | P | R | $$-$$$$ | | | | M | Y | D | C |
| | Beveling | P | R | $-$$ | | | | M | Y | D | C |
| | Porous Asphalt | P | R | $-$$$ | | | | M | Y | D | C |
| | Shims | P | R | $ | | | | M | Y | D | C |
| | Tree Guards and Tree Rails | P | R | $$-$$$ | | | | M | Y | D | C |
| | Decomposed Granite | P | R | $-$$ | | | | M | Y | D | C |
| | Mudjacking (Concrete Leveling) | P | R | $$-$$$$ | | | | M | Y | D | C |
| **DESIGN** | **INFRASTRUCTURE-BASED DESIGN SOLUTIONS** | | | | | | | | | | |
| | Monolithic Sidewalk | P | R | $$$ | | | | M | Y | D | C |
| | Pavement Thickness | P | R | $$$ | | | | M | Y | D | C |
| | Tree Pit Sizing | P | R | $ | | | | M | Y | D | C |
| | Bridging | P | R | $$$$ | | | | M | Y | D | C |
| | Curb Bulbs | P | R | $$$-$$$$ | | | | M | Y | D | C |
| | Curb Realignment | P | R | $$$-$$$$ | | | | M | Y | D | C |
| | Curving or Offset Sidewalk | P | R | $$-$$$ | | | | M | Y | D | C |
| | Easement | P | R | $-$$$ | | | | M | Y | D | C |
| | Suspended Pavement Systems | P | R | $$$-$$$$ | | | | M | Y | D | C |
| | Lowered Sites | P | R | $$$-$$$$ | | | | M | Y | D | C |
| | Soil Volume | P | R | $-$$$ | | | | M | Y | D | C |

*Table A-18 continued. Description of possible alternative solutions for tree and construction conflicts.*

| TOOL TYPE | TOOLS | PROACTIVE | RESPONSIVE | COST* $  $$  $$$  $$$$ | EXPECTED USEFUL LIFE Month | Year | Decade | Century |
|---|---|---|---|---|---|---|---|---|
| **ROOT** | **ROOTZONE-BASED MATERIALS** | | | | | | | |
| | Mulch | P | R | $ | M | Y | D | C |
| | Root Barriers | P | R | $ | M | Y | D | C |
| | Continuous Trenches | P | R | $$$ | M | Y | D | C |
| | Foam Underlay | P | R | $-$$ | M | Y | D | C |
| | Modified Gravel Layer | P | R | $ | M | Y | D | C |
| | Root Paths | P | R | $-$$ | M | Y | D | C |
| | Soil Modification | P | R | $-$$ | M | Y | D | C |
| | Steel Plates | P | R | $$-$$$ | M | Y | D | C |
| | Structural Soils | P | R | $$-$$$ | M | Y | D | C |
| | Subsurface Aeration / Irrigation | P | R | $$ | M | Y | D | C |
| **TREE** | **TREE-BASED SOLUTIONS** | | | | | | | |
| | City Forestry Street Tree List | P | R | $ | M | Y | D | C |
| | Corrective Pruning | P | R | $-$$ | M | Y | D | C |
| | Root Pruning | P | R | $-$$ | M | Y | D | C |

*General cost notes:
- Sidewalk material costs, when given in linear feet, assume 6-foot sidewalk width
- Costs are planning-level costs and will vary for actual construction
- Costs do not include design, permitting, or other "soft" costs
- Costs not included in tool costs but which would be necessary with use of some solutions include:
  - Drainage structure and connection
  - Curb ramps

**MATERIAL** — **Paving and Other Surface Materials**
These materials can be used to create a walkable surface or to delineate space for people and/or the tree.

**DESIGN** — **Infrastructure-Based Design Solutions**
These design considerations can be employed to support a tree and/or sidewalk.

**ROOT** — **Rootzone-Based Materials**
These tools can support tree health and guide tree growth below ground.

**TREE** — **Tree-Based Solutions**
These solutions are focused on tree selection and tree maintenance.

## Alternative Solutions for Tree and Construction Conflicts



*Figure A-17. Examples of alternative solutions for tree and construction conflicts.*

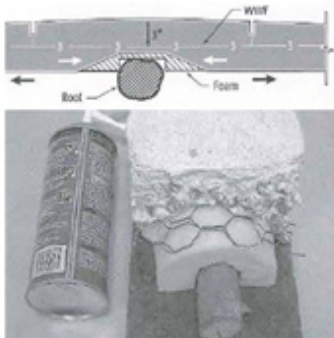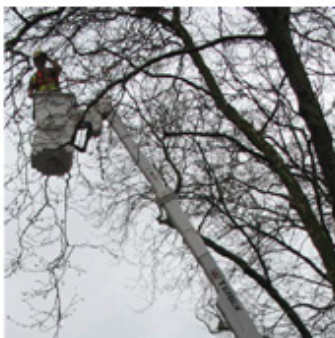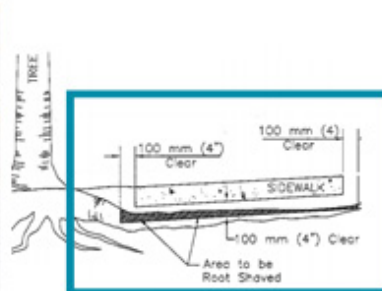## Alternative Solutions for Tree and Construction Conflicts



Figure A-18. Additional examples of alternative solutions for tree and construction conflicts.

# APPENDIX X: TREE PLANTING PRIORITIZATION GUIDANCE

The Forestry Division and its partners should use the 2018 Tree Canopy Assessment and 2019 report to identify areas for tree preservation and planting. As funding allows, Forestry should use this information to achieve goals of increased tree canopy, equitable tree canopy across all neighborhoods, sustained ecosystem benefits, and improved quality of life. The following summaries are derived from the 2018 Tree Canopy Assessment and the City's TreePlotter CANOPY software application (www.pg-cloud.com/ColoradoSpringsCO).



Legend:
- ■ Urban Tree Canopy
- ■ Possible Planting Area
- ■ Total Unsuitable Areas

17%
29%
54%

*Figure A-19. 2018 Tree Canopy Assessment results.*

The tree canopy metrics tables (Tables A- 19-21) provide an overview of the existing tree canopy and the proportion of land area potentially available for tree planting. One of the first prioritization tiers for Forestry to implement is the low existing tree canopy and high possible planting area scenario. From the Council Districts metrics (Table A-20), Council District 6 has the lowest existing tree canopy percentage (4 percent) but has the highest possible planting area percentage (36 percent). Theoretically, this Council District has space available for tree plantings though other factors must be considered to determine what areas are feasible from the potential and possible areas. Table A-19 shows the highest percentage of tree canopy exists on low-density residential areas (37 percent). As expected, vacant lands, parks-trails-open space, and drainage easements have the highest percentage of possible planting area with over 40 percent though intended use of the open space must be included in the tree planting decision process. Public right-of-way (ROW) areas have 21 percent possible planting area. Several of the zip codes listed in Table A-21 have nearly no tree canopy but contain over 50 percent possible planting area (zip codes 80831, 80929, and 80938). The maps on the subsequent pages provide illustrations of the priority planting process to be used in tandem with the 2019 Tree Canopy Assessment database and other data sources.

**Table A-18. Land Use 2018 tree canopy metrics.**

| Land Use | Urban Tree Canopy | | Possible Planting Area | |
|---|---|---|---|---|
| | *Acres* | % | *Acres* | % |
| Commercial | 341 | 8% | 353 | 8% |
| Drainage Easement | 203 | 21% | 402 | 41% |
| Golf Course/Cemetery | 433 | 19% | 651 | 29% |
| High-Density Residential | 589 | 21% | 322 | 12% |
| Industrial | 295 | 8% | 445 | 12% |
| Institution | 319 | 4% | 1,314 | 15% |
| Low-Density Residential | 4,668 | 37% | 2,916 | 23% |
| Medium-Density Residential | 5,101 | 33% | 2,709 | 17% |
| Office | 236 | 13% | 260 | 14% |
| Other | 79 | 14% | 189 | 32% |
| Parking | 23 | 8% | 45 | 16% |
| Parks, Trails, Open Space | 3,051 | 30% | 4,929 | 48% |
| Police/Fire | 7 | 10% | 18 | 26% |
| Private Common Residential | 698 | 31% | 821 | 36% |
| ROW | 89 | 10% | 193 | 21% |
| School | 391 | 12% | 1,082 | 34% |
| Vacant | 2,457 | 7% | 17,138 | 46% |
| **Totals** | **18,980** | **18%** | **33,787** | **31%** |

*Table A-19. Council Districts 2018 tree canopy metrics.* (*Refer to the 2019 Tree Canopy Assessment report for a map of the Council Districts.)

| Council Districts* | Urban Tree Canopy | | | Possible Planting Area | | |
|---|---|---|---|---|---|---|
| | *Acres* | *%* | *Dist.* | *Acres* | *%* | *Dist.* |
| Council District 1 | 5,276 | 25% | 25% | 6,034 | 29% | 17% |
| Council District 2 | 2,098 | 11% | 10% | 5,285 | 28% | 15% |
| Council District 3 | 7,336 | 34% | 34% | 5,666 | 26% | 16% |
| Council District 4 | 1,398 | 15% | 7% | 1,613 | 18% | 5% |
| Council District 5 | 3,519 | 29% | 17% | 2,012 | 17% | 6% |
| Council District 6 | 1,701 | 4% | 8% | 14,948 | 36% | 42% |
| **Totals** | **21,327** | **17%** | **100%** | **35,558** | **29%** | **100%** |

*Table A-20. Zip Code 2018 tree canopy metrics.*

| ZIP Code | Urban Tree Canopy | | Possible Planting Area | |
|---|---|---|---|---|
| | *Acres* | *%* | *Acres* | *%* |
| 80831 | 4 | 0% | 562 | 47% |
| 80903 | 749 | 29% | 289 | 11% |
| 80904 | 2,070 | 27% | 2,632 | 34% |
| 80905 | 814 | 24% | 742 | 22% |
| 80906 | 4,558 | 40% | 2,807 | 25% |
| 80907 | 1,450 | 23% | 1,211 | 19% |
| 80908 | 185 | 7% | 752 | 28% |
| 80909 | 1,549 | 28% | 840 | 15% |
| 80910 | 809 | 19% | 875 | 20% |
| 80911 | 0 | 0% | 15 | 20% |
| 80914 | 77 | 8% | 129 | 14% |
| 80915 | 477 | 24% | 377 | 19% |
| 80916 | 599 | 6% | 1,124 | 12% |
| 80917 | 968 | 28% | 693 | 20% |
| 80918 | 2,028 | 28% | 1,566 | 21% |
| 80919 | 1,984 | 25% | 2,455 | 31% |
| 80920 | 1,089 | 15% | 1,750 | 24% |
| 80921 | 361 | 9% | 1,199 | 29% |
| 80922 | 321 | 12% | 653 | 23% |
| 80923 | 333 | 9% | 903 | 24% |
| 80924 | 72 | 2% | 1,384 | 40% |
| 80925 | 70 | 1% | 1,824 | 37% |
| 80926 | 528 | 35% | 849 | 57% |
| 80927 | 7 | 0% | 484 | 24% |
| 80929 | 28 | 0% | 4,535 | 52% |
| 80938 | 16 | 0% | 1,769 | 51% |
| 80939 | 134 | 4% | 1,691 | 56% |
| 80951 | 52 | 2% | 1,472 | 47% |
| **Totals** | **21,330** | **17%** | **35,582** | **29%** |

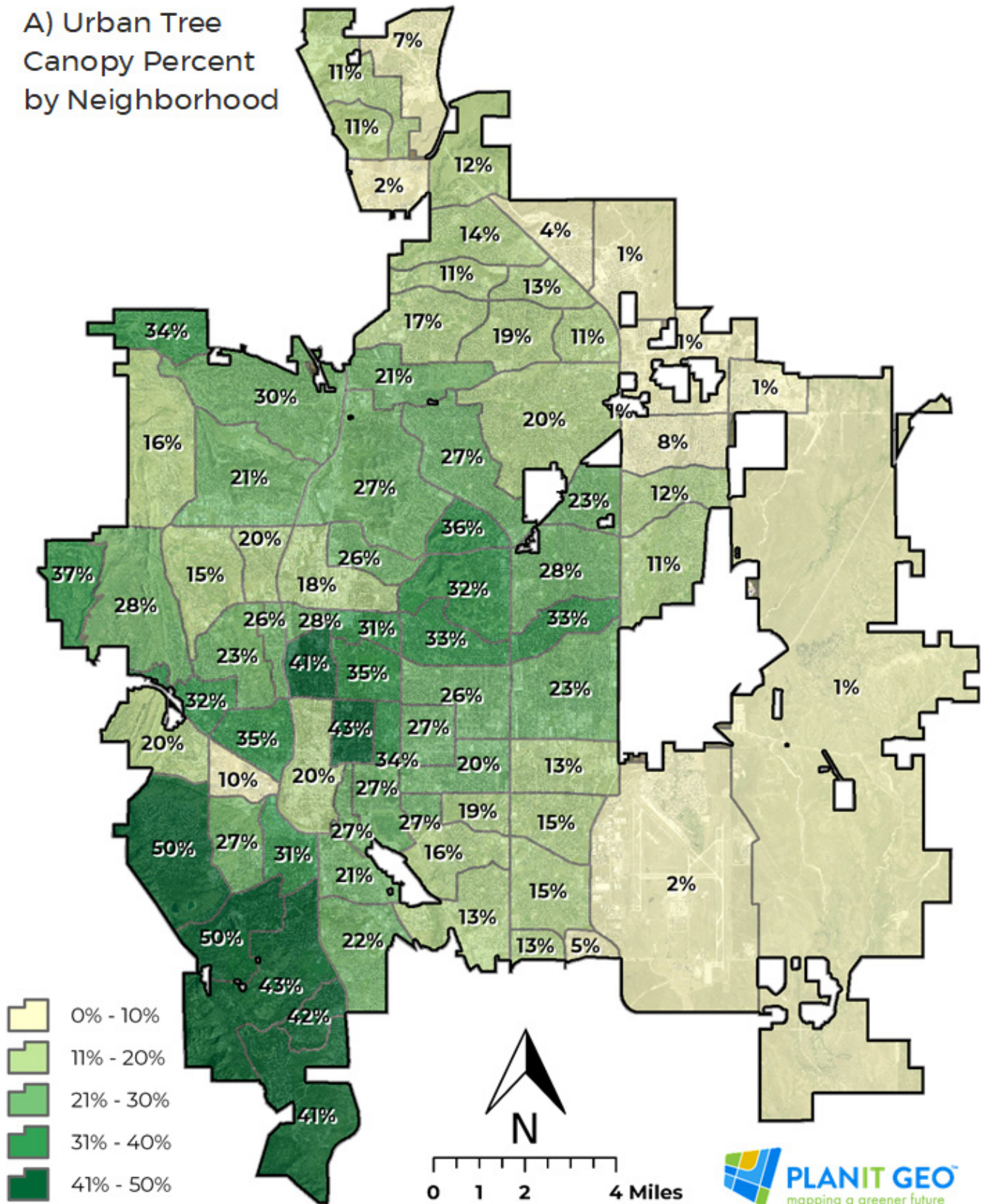**Existing Urban Tree Canopy (2018 Tree Canopy Assessment)**



*Figure A-20. Existing urban tree canopy in Colorado Springs. Source: 2019 Tree Canopy Assessment.*

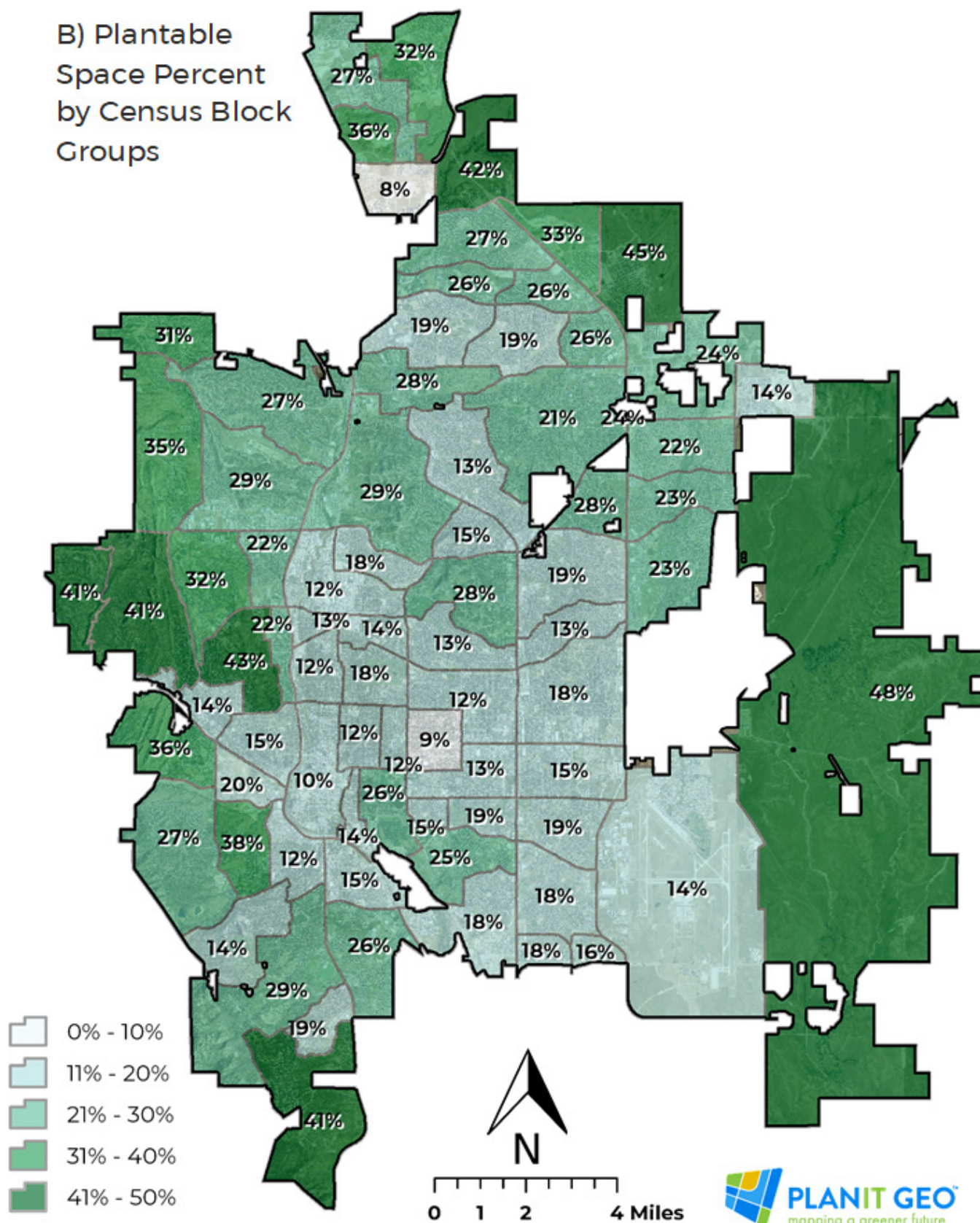## Potential Tree Canopy (2018 Tree Canopy Assessment)



Figure A-21. Potential urban tree canopy ("plantable space") in Colorado Springs. Source: 2019 Tree Canopy Assessment.

## Existing Tree Canopy Compared to Underserved Areas
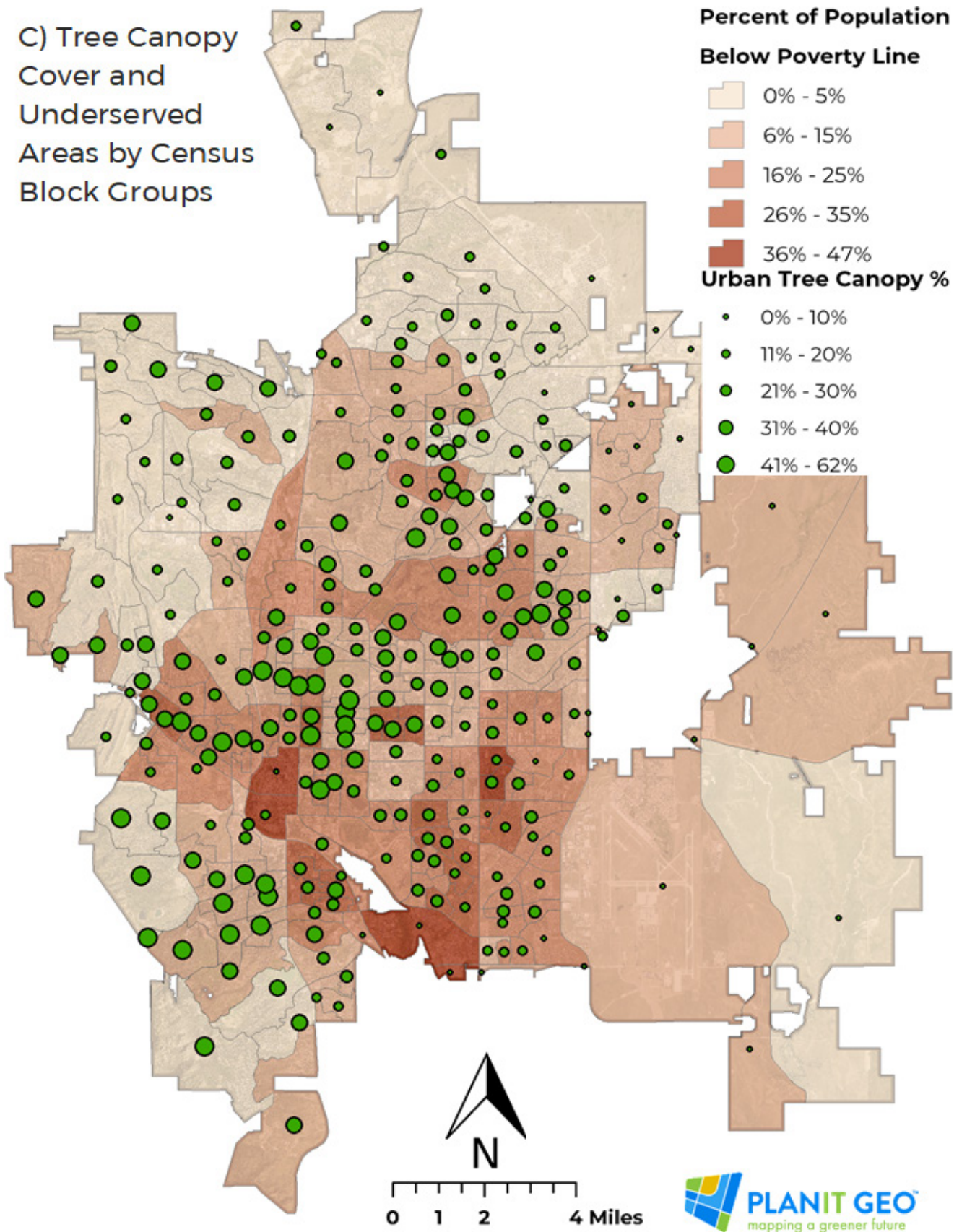


*Figure A-22. Comparison of urban tree canopy with underserved populations. Source: 2019 Tree Canopy Assessment.*

**Potential Tree Canopy Compared to Areas with Low Existing Tree Canopy**

## D) Possible Planting Areas in Neighborhoods with Less Than City UTC Percent (17 Percent)
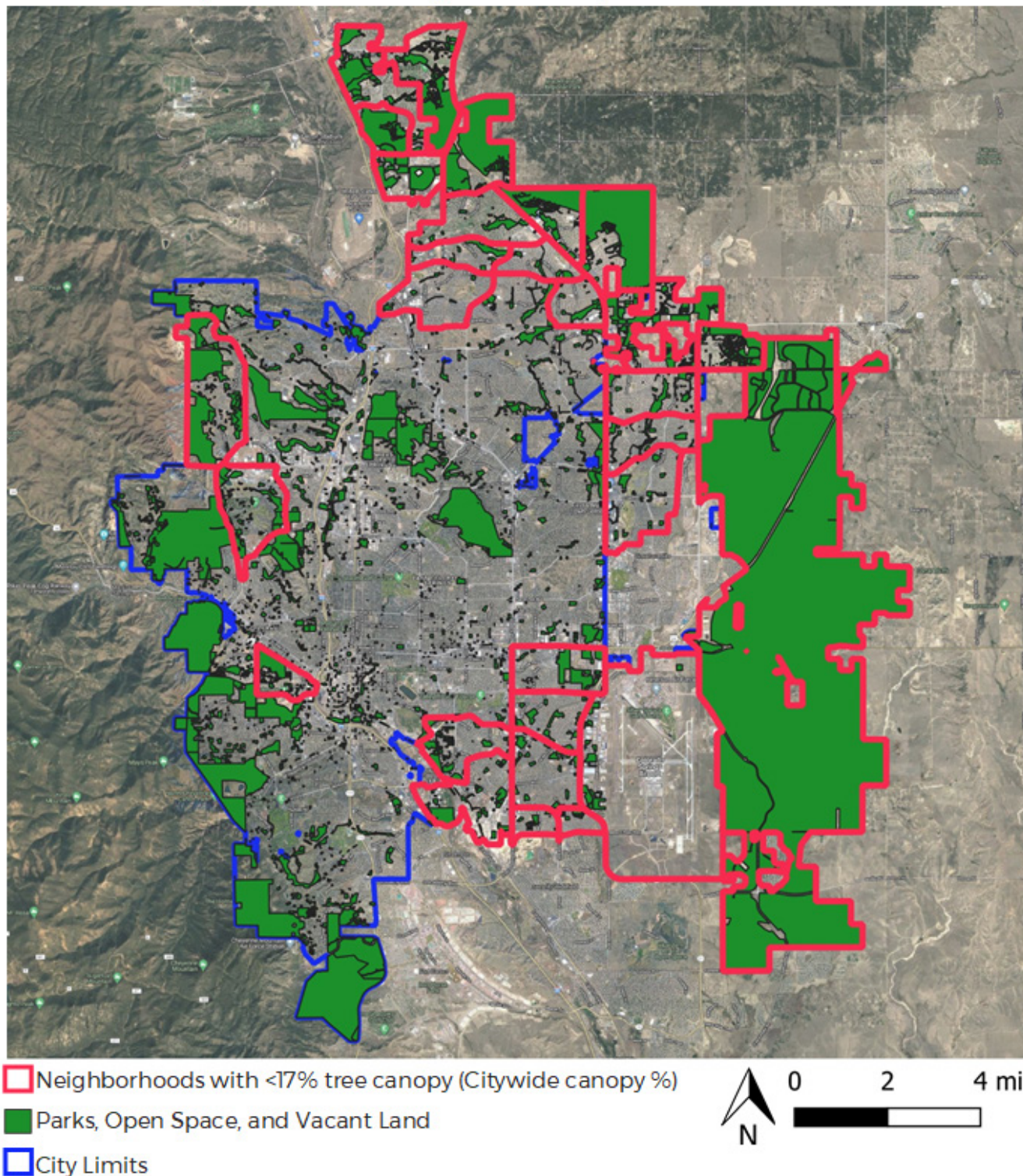


Figure A-23. *Priority planting map for neighborhoods with less than 17 percent tree cover. Source: 2019 Tree Canopy Assessment.*

**TreePlotter CANOPY Priority Planting Map for Energy Savings**



*Figure A-24. Priority planting map from the City's TreePlotter CANOPY software application. (www.pg-cloud.com/ColoradoSpringsCO)*

**TreePlotter CANOPY Priority Planting Map for Stormwater Reduction**



*Figure A-25. Priority planting map from the City's TreePlotter CANOPY software application. (www.pg-cloud.com/ColoradoSpringsCO)*

## TreePlotter CANOPY Priority Planting Map for Rights-of-Way



*Figure A-26. Priority planting map from the City's TreePlotter CANOPY software application. (www.pg-cloud.com/ColoradoSpringsCO)*

**TreePlotter CANOPY Priority Planting Map for Property Value Improvement**



*Figure A-27. Priority planting map from the City's TreePlotter CANOPY software application. (www.pg-cloud.com/ColoradoSpringsCO)*

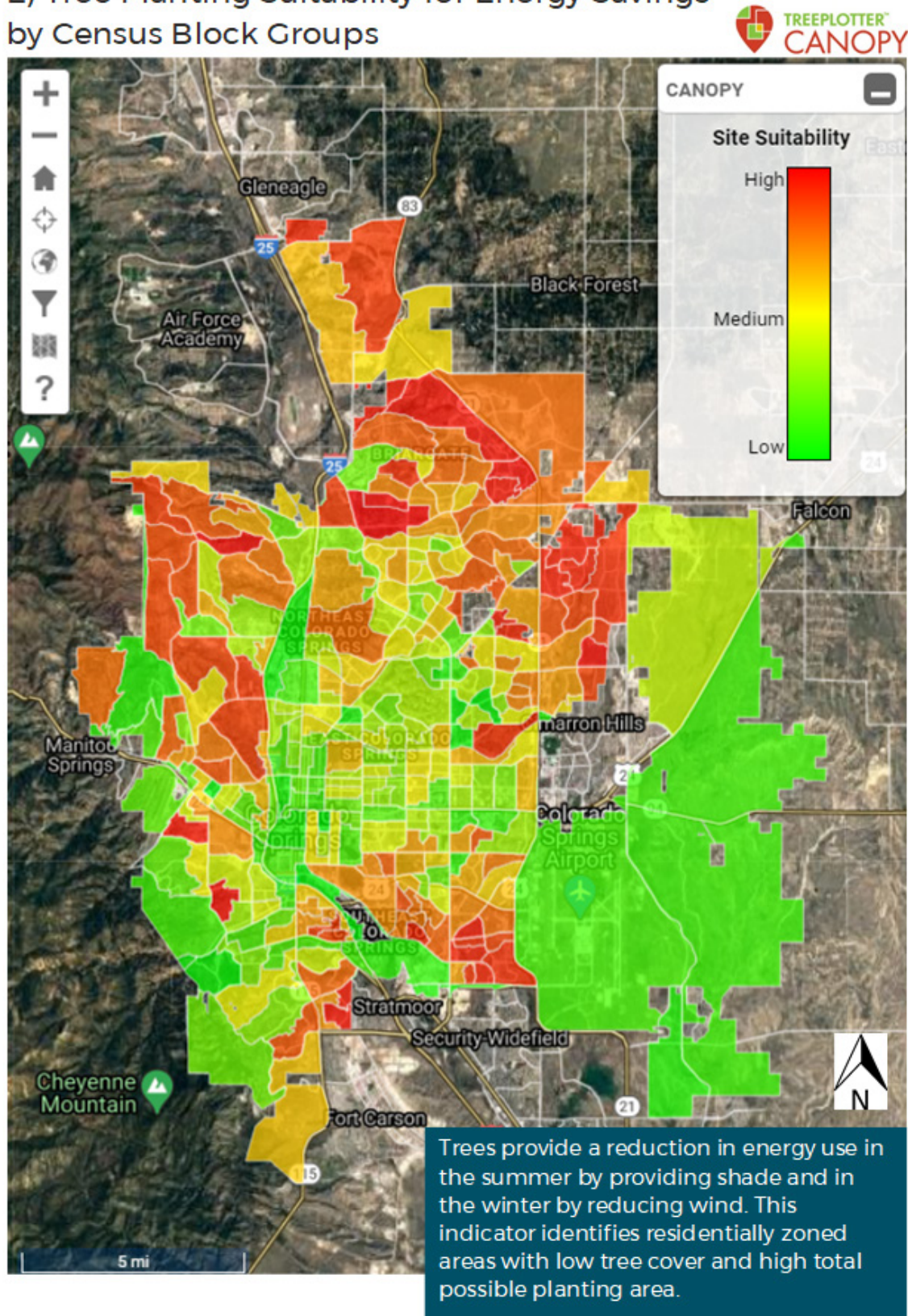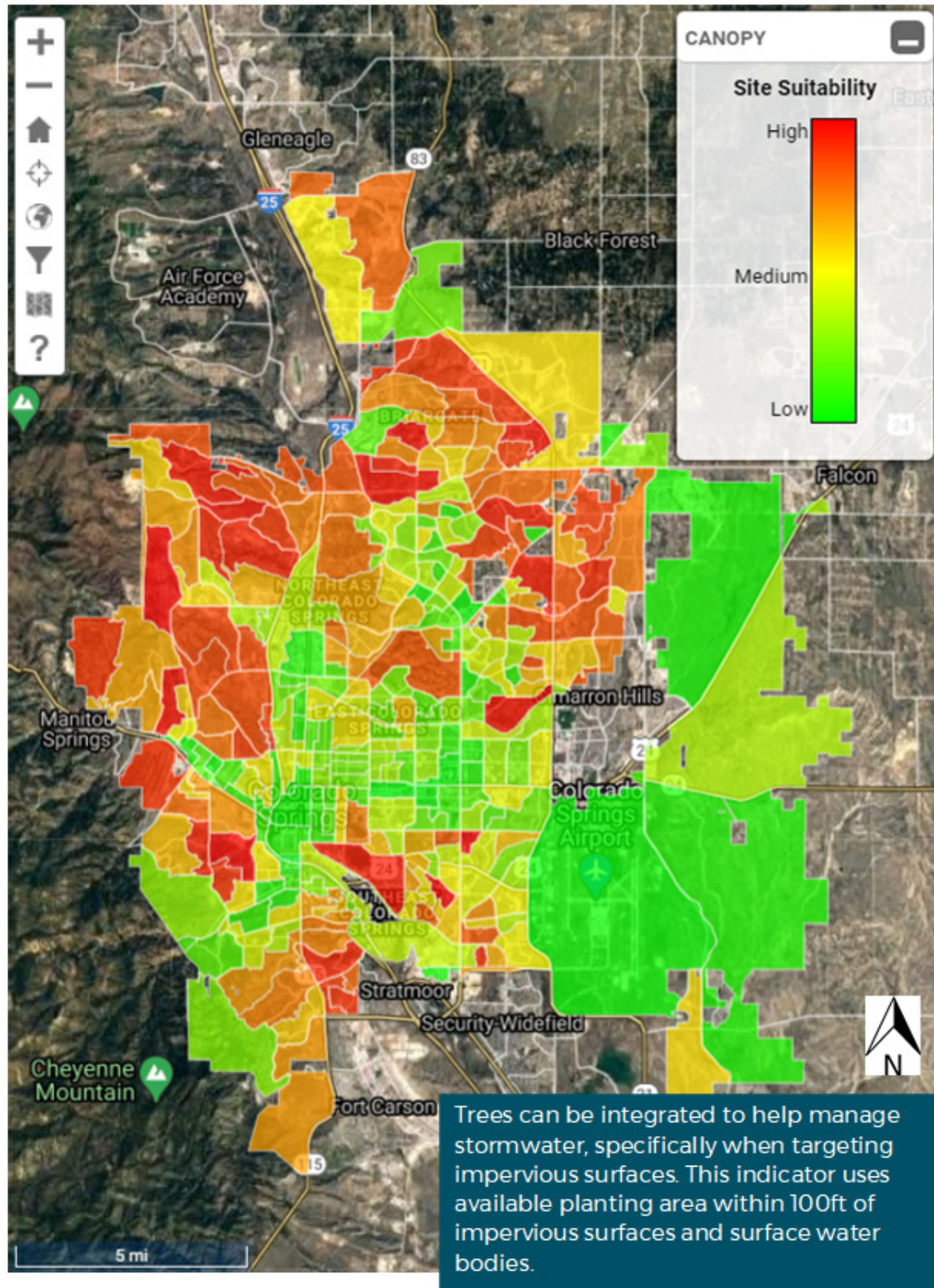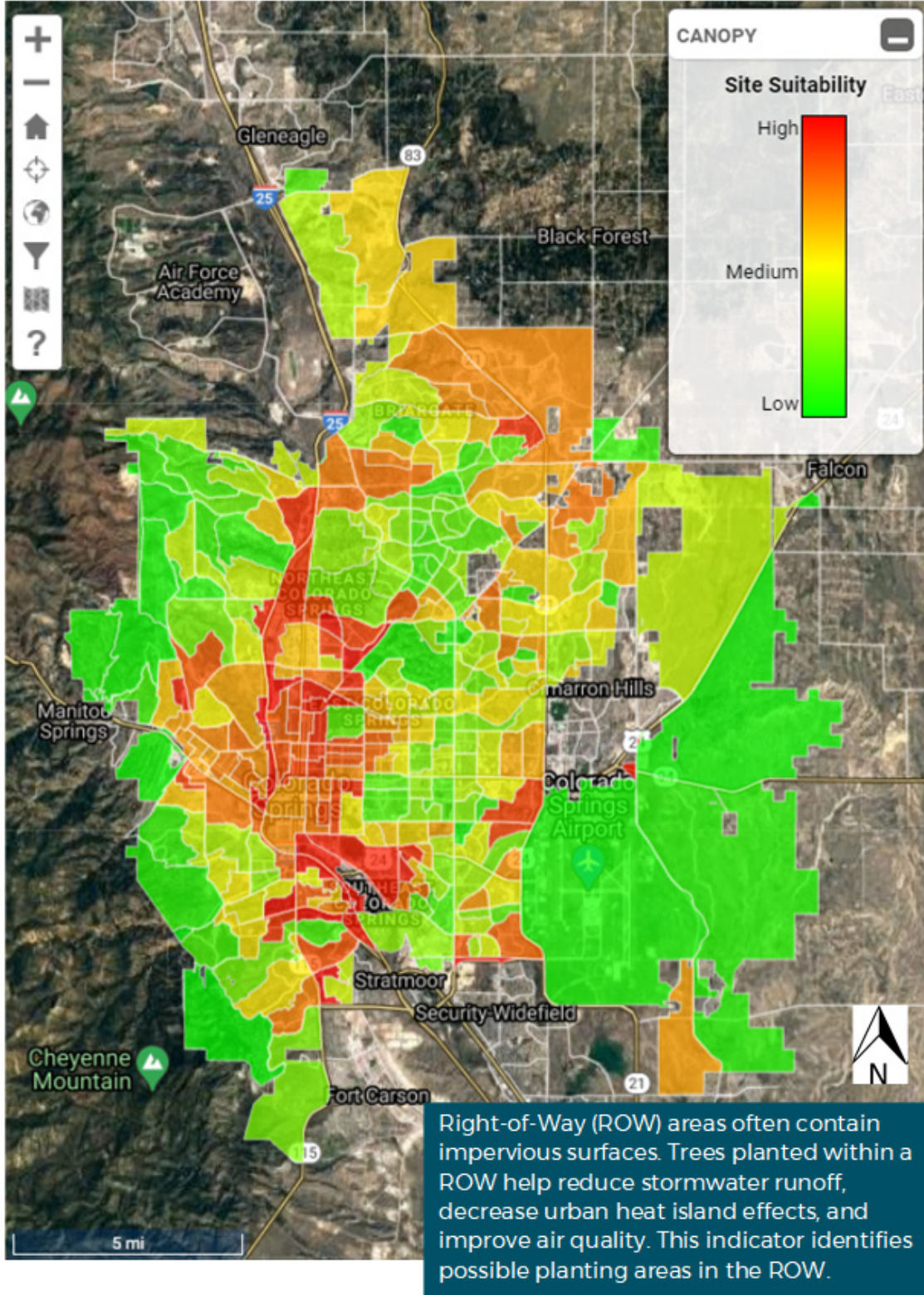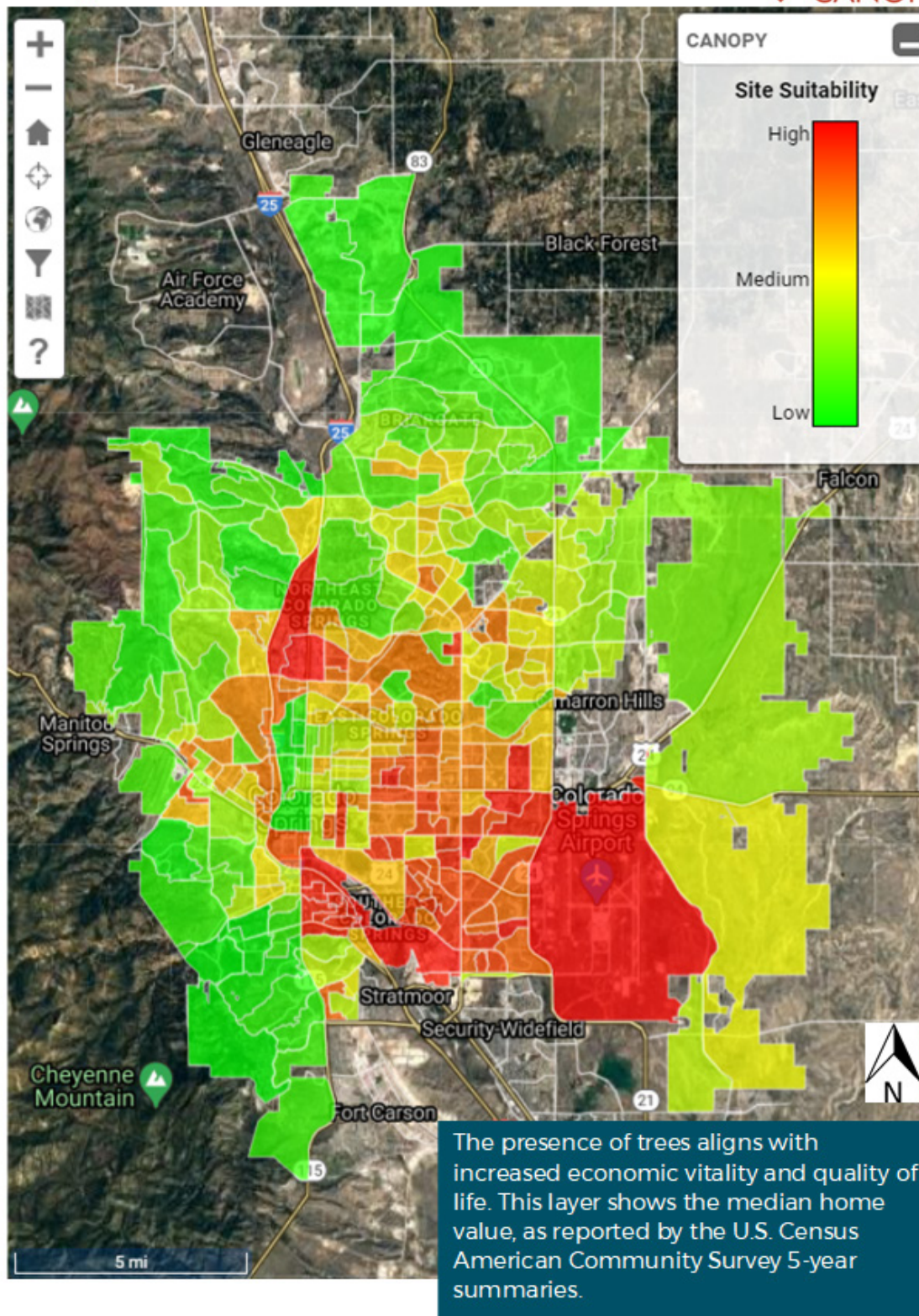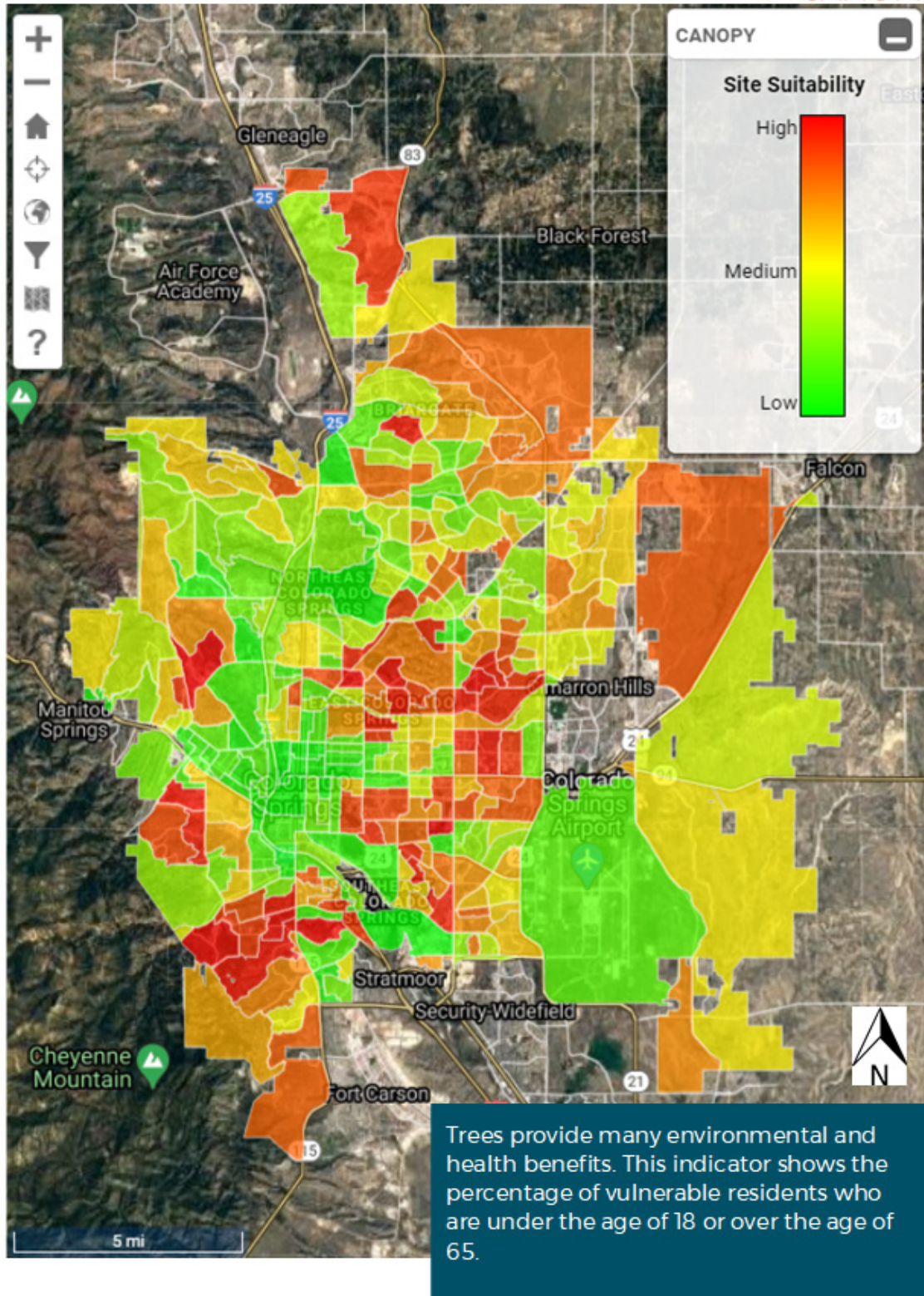## TreePlotter CANOPY Priority Planting Map for Vulnerable Populations



*Figure A-28. Priority planting map from the City's TreePlotter CANOPY software application. (www.pg-cloud.com/ColoradoSpringsCO)*

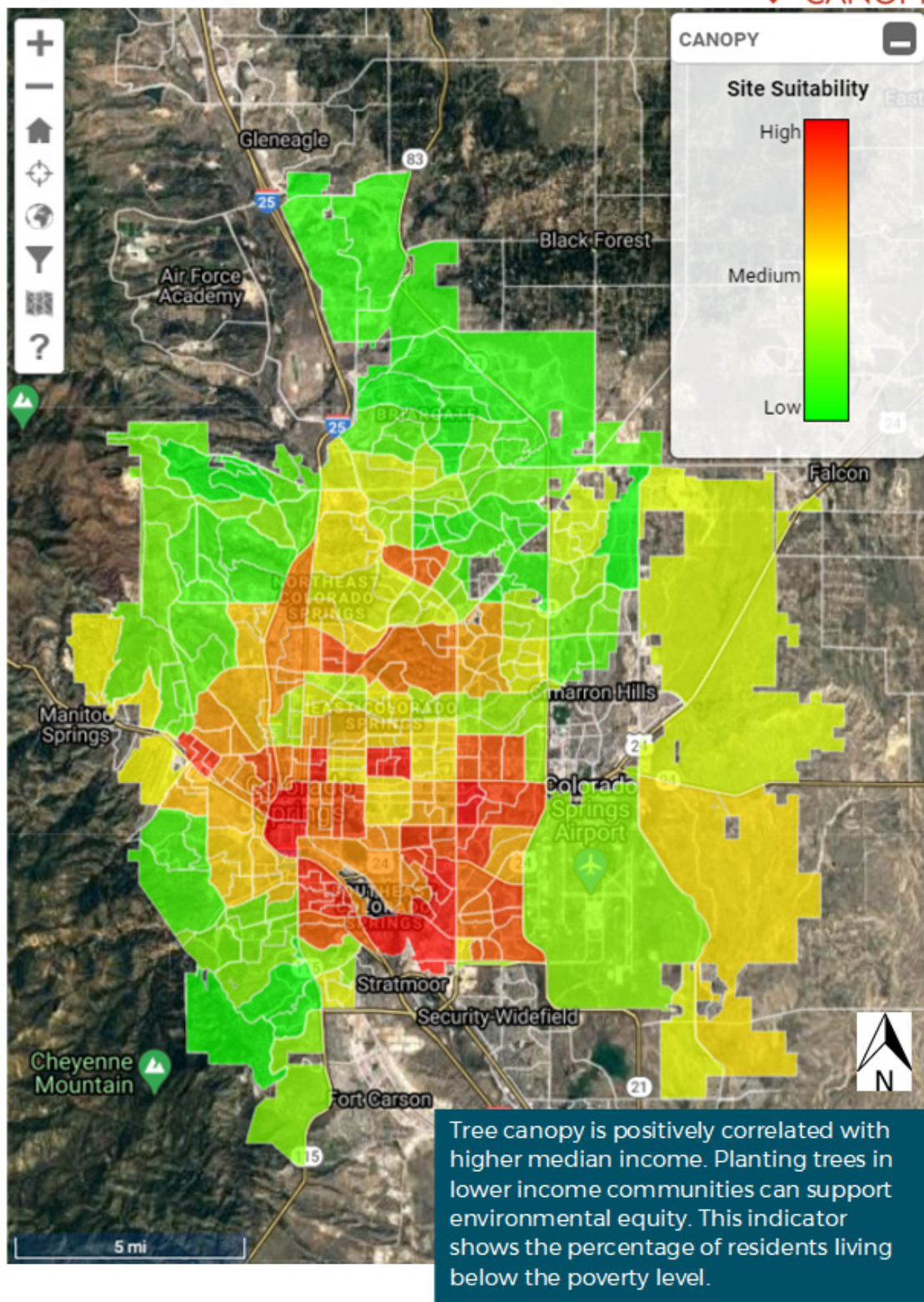**TreePlotter CANOPY Priority Planting Map for Underserved Populations**



*Figure A-29. Priority planting map from the City's TreePlotter CANOPY software application.*
*(www.pg-cloud.com/ColoradoSpringsCO)*

The table below provides a demonstration of the necessary trees to achieve large-scale canopy goals. Forestry should refine these canopy goals and planting targets with partners and additional data. For the modeled scenarios in Table A-22, achieving 20 percent canopy Citywide would require over 215,000 trees but would provide an added annual benefit of over $893,000. The next tier to consider for canopy goals is the neighborhood level. In the modeled scenario, 26 neighborhoods have less tree canopy than the Citywide canopy cover of 17 percent. To bring all neighborhoods (excluding the airport and Banning Lewis Ranch neighborhood) to at least 20 percent canopy, it would require over 181,000 trees. These trees are projected to provide over $754,000 in annual benefits.

*Table A-21. Modeled tree canopy and planting goals Citywide and in low canopy neighborhoods.*

| Metric | Citywide | Neighborhoods less than City UTC %** |
|---|---|---|
| Existing Canopy % | 17% | <17% |
| Modeled Canopy % | 20% | 20% |
| Trees Needed* | 215,006 trees | 181,540 trees |
| Added Overall Benefit | $893,027 | $754,029 |

*Average tree crown diameter of 30 feet at maturity
**City urban tree canopy (UTC) percent is 17%. Excludes the airport and the Banning Lewis Ranch neighborhood

The following table provides a summary of the trees required for all land uses to contain at least 20 percent tree canopy. This scenario is for demonstration purposes only. Tree canopy goals and planting targets should be based on priorities as shown in maps A-J in Figures A- 20-28, resources available, and limitations of each land use type. Tree canopy goals for land uses can be achieved through partnerships and a community-wide commitment. For example, the scenario modeled in Table A-23 shows a total of 2,200 trees required for the Neighborhood Commercial land use to reach 20 percent tree canopy. Partnerships with businesses and residents to plant trees annually on neighborhood commercial properties can achieve this goal. Considerations must be made for proper young tree planting and maintenance as well as the species to maintain a diverse and resilient urban forest. If all land uses were to achieve 20 percent tree canopy, a total of over 503,000 trees would need to be planted and survive to maturity. If successful, these additional trees would provide nearly $2.1 million in additional benefits.

*Table A-22. Modeled tree canopy and planting goals by land use.*

| Land Use | Existing Canopy % | Modeled Canopy % | Trees Needed | Added Overall Benefit |
|---|---|---|---|---|
| Vacant Land | 7 | 20 | 309,520 | $1,285,591 |
| Airport/Military Installa | 2 | 20 | 84,751 | $352,013 |
| General Commercial | 7 | 20 | 23,865 | $99,122 |
| Warehouse/Wholesale | 8 | 20 | 17,271 | $71,734 |
| Primary/Secondary School | 7 | 20 | 15,416 | $64,030 |
| General Industrial | 8 | 20 | 9,533 | $39,594 |
| Unspecified Office | 13 | 20 | 8,311 | $34,520 |
| Utility Easement/ROW/Faci | 8 | 20 | 3,955 | $16,427 |
| High Density Resid. ( Condo/Townhome) | 15 | 20 | 3,738 | $15,524 |
| Golf Course | 17 | 20 | 3,284 | $13,640 |
| Commercial Services | 14 | 20 | 3,071 | $12,756 |
| Minor Public Assembly | 14 | 20 | 2,453 | $10,187 |
| Sports Complex | 5 | 20 | 2,277 | $9,457 |
| Neighborhood Commercial | 8 | 20 | 2,200 | $9,137 |
| Hospital | 4 | 20 | 1,792 | $7,443 |
| Neighborhood Park | 17 | 20 | 1,546 | $6,423 |
| Agriculture | 3 | 20 | 1,436 | $5,966 |
| Arterial Street ROW | 3 | 20 | 1,435 | $5,958 |

| Land Use | Existing Canopy % | Modeled Canopy % | Trees Needed | Added Overall Benefit |
|---|---|---|---|---|
| Parking/Vacant | 8 | 20 | 986 | $4,095 |
| Highway-oriented Commerci | 9 | 20 | 975 | $4,048 |
| Parking lot/black top | 9 | 20 | 875 | $3,634 |
| Undefinable | 8 | 20 | 802 | $3,331 |
| High Density Residential ( 25+) | 12 | 20 | 763 | $3,171 |
| Office-Industrial Park/R& | 11 | 20 | 501 | $2,082 |
| Unnamed | 5 | 20 | 438 | $1,817 |
| Unspecified ROW/Easement | 16 | 20 | 384 | $1,596 |
| Police | 5 | 20 | 263 | $1,093 |
| Detention Center | 13 | 20 | 219 | $910 |
| Fire Station | 13 | 20 | 200 | $831 |
| Parking structure | 9 | 20 | 126 | $522 |
| Undefined Public Use | 1 | 20 | 117 | $486 |
| Undefined Park | 19 | 20 | 116 | $482 |
| Undefined Institutional U | 14 | 20 | 99 | $411 |
| Community Commercial | 13 | 20 | 88 | $368 |
| Private Street ROW | 2 | 20 | 83 | $345 |
| Library | 14 | 20 | 63 | $264 |
| Office Low | 13 | 20 | 52 | $217 |
| Med. Density Resid. (Unspec. Density) | 3 | 20 | 31 | $127 |
| Office Medium | 0 | 20 | 29 | $120 |
| Unnamed | 19 | 20 | 11 | $48 |
| Collector Street ROW | 0 | 20 | 0 | $0 |
| Museum | 21 | 20 | 0 | $0 |
| Undefined Street ROW | 23 | 20 | 0 | $0 |
| University/Conference Cen | 20 | 20 | 0 | $0 |
| Unnamed | 21 | 20 | 0 | $0 |
| Other Public Street ROW | 25 | 20 | 0 | $0 |
| Mining | 24 | 20 | 0 | $0 |
| Drainage Easement, etc. | 21 | 20 | 0 | $0 |
| Trail | 25 | 20 | 0 | $0 |
| Major Public Assembly | 30 | 20 | 0 | $0 |
| Cemetery | 38 | 20 | 0 | $0 |
| High Density Residential ( 12.0-24.99) | 31 | 20 | 0 | $0 |
| High Density Residential ( 8.0-11.99) | 25 | 20 | 0 | $0 |
| Community Park | 28 | 20 | 0 | $0 |
| Medium Density Residential ( 3.5-7.99) | 24 | 20 | 0 | $0 |
| Common Residential Area | 31 | 20 | 0 | $0 |
| Open Space | 30 | 20 | 0 | $0 |
| Regional Park | 34 | 20 | 0 | $0 |
| Low Density Residential ( 2.0-3.49) | 40 | 20 | 0 | $0 |
| Low Density Residential ( 0-1.99) | 36 | 20 | 0 | $0 |
| Medium Density Residential ( 3.5-7.99) | 38 | 20 | 0 | $0 |
| **Total** | | | **503,075** | **$2,089,520** |

**APPENDIX X: TREE PLANTING PRIORITIZATION GUIDANCE**

# APPENDIX XI: TREE PEST AND DISEASE PLAN
## A PLAN FOR THE MANAGEMENT OF EMERALD ASH BORER

This pest and disease plan supports the vision of the Colorado Springs Forest Division:

> ## A VISION FOR COLORADO SPRINGS' URBAN FOREST
> *Our City's trees, forests, and other natural resources are recognized as integral to sustaining life and health for all City residents. A healthy, thriving, and sustainable urban forest is a community priority, to be thoughtfully managed and cared for by partnerships between the City and its residents to maximize public safety and benefits that include a thriving ecosystem, vibrant economy, and livable communities shared by all who live, work, and play in Colorado Springs*

This pest and diease plan is also supported by the following actions in the primary UFMP framework:

***Table A-23. List of Plan actions supporting the Colorado Springs EAB pest and disease plan.***

| Action | |
|---|---|
| **V.H.2** | Continue to research the threat of emerald ash borer for public and private ash trees and implement actions provided in the tree pest and disease plan for prevention, response, treatment, mitigation, and wood utilization. |
| **VI.A.13** | Increase public outreach and notification so residents are aware of the full scope of emerald ash borer impact and urgency and what they can do to support and sustain the urban canopy. |
| **VI.C.2** | Continue to engage neighborhoods with volunteer tree planting events. Prioritize those areas with lower urban tree canopy or those expected to be greatly impacted by emerald ash borer. |

## BACKGROUND AND INTRODUCTION

The Tree Pest and Disease Plan for the City of Colorado Springs provides information for various existing and potential tree pest and disease concerns but focuses on the emerald ash borer. The framework provided for the management of emerald ash borer can be amended and applied to other tree pests and diseases based on recommended approaches, budgets, and data.

Emerald ash borer (EAB) is an extremely destructive insect of ash trees (*Fraxinus* species). The emerald ash borer (*Agrilus plannipennis*) is a wood boring beetle of Asian origin that has become established in many parts of the United States and Canada where native and urban ash are found. Ash tree species such as green and white ash are very common in Colorado landscape settings. It is far more damaging to urban trees than any other insect that has previously been found in the state. As populations of this insect increase in the infested areas, all untreated ash trees will die as a direct result of EAB.

This pest is not very damaging in its native land due to naturally occurring biological control organisms and the natural development of EAB resistance within the native ash populations. Unfortunately, native ash trees in the U.S. have zero resistance to EAB with the small exception of blue ash in the southeast states. In the Midwest and eastern areas of North America, where this insect has been present for several years, EAB has already killed many millions of ash trees resulting in losses of over $4 billion worth of resources. An estimated 15 percent or more of Colorado's urban and community trees are ash, accounting for over 30 percent of urban tree canopy in the state, and many of these trees are located on private property.[12] Experts agree that EAB has a strong potential to ultimately kill every unprotected susceptible ash tree presently growing in North America. Furthermore, if preventative treatments are not implemented within a community it has the capacity to kill every ash tree within a given community inside ten years.

Evidence suggests that this insect was introduced into North America in the late 1980's or early 1990s, probably through wooden shipping or packaging materials originating in China. However, it went undetected until it was discovered in southern Michigan in 2002. It has since spread rapidly and by the end of 2015 had been detected in 25 states and two Canadian provinces.

*12. Colorado State Forest Service, Emerald Ash Borer: A Green Menace, www.csfs.colostate.edu, 2019.*

This insect was first found in Colorado in the City of Boulder in late September of 2013, making Colorado the 22nd state to detect EAB. As of 2020, EAB has been confirmed in the cities of Boulder, Gunbarrel, Longmont, Lafayette, Lyons, Superior, Broomfield, Westminster, Arvada, and just north of Fort Collins.[13]  While it has yet to be detected in Colorado Springs, EAB continues to spread as illustrated in the figure below.

13. Colorado State Forest Service, Emerald Ash Borer: A Green Menace, www.csfs.colostate.edu, 2019.





*Figure A-30.    (above) Emerald Ash Borer (Agrilus plannipennis) insect and preferred host tree, ash (Fraxinus species).*
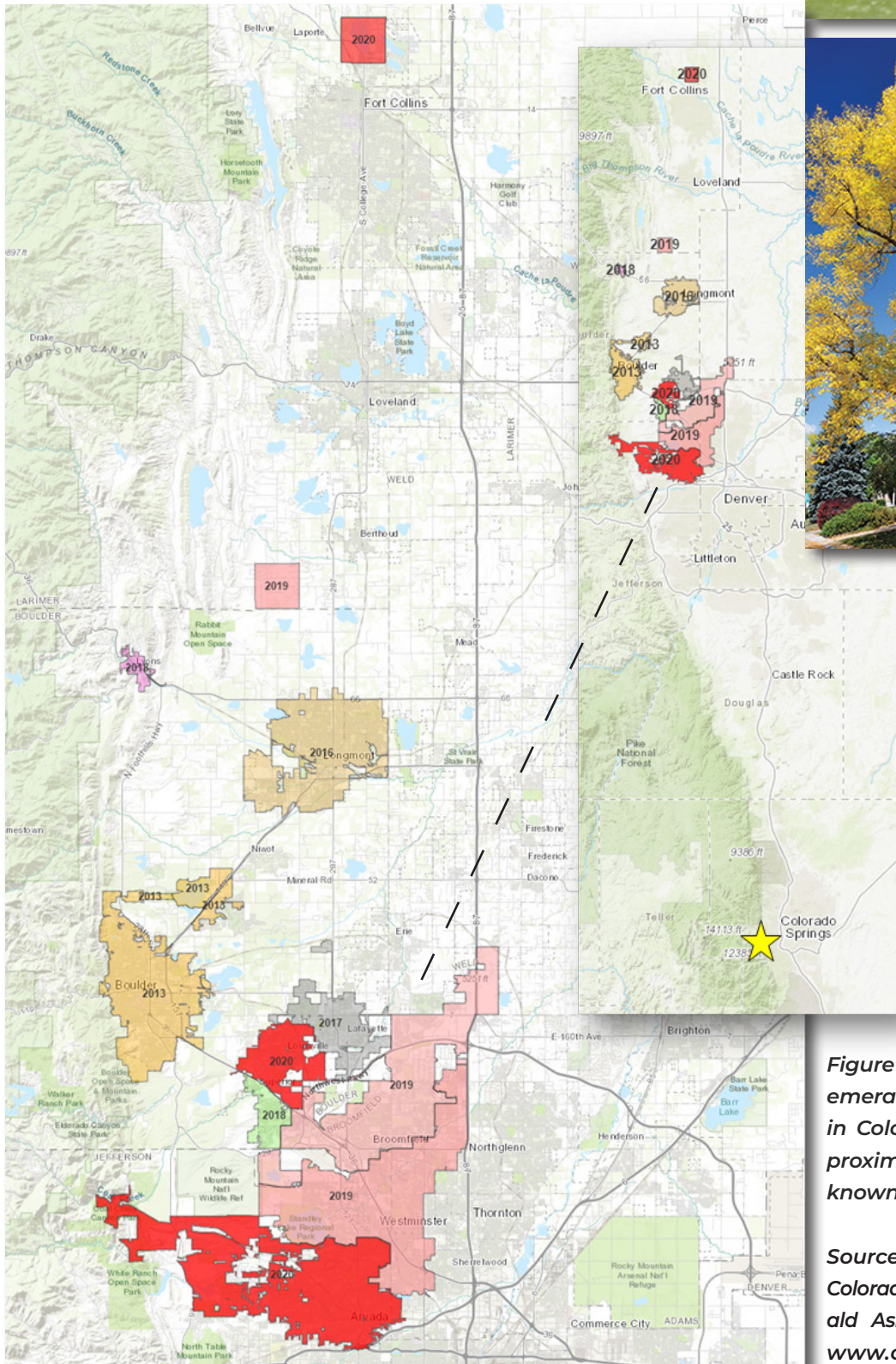
*Figure A-31.  (left) Cities and year emerald ash borer was detected in Colorado's front range. Inset: proximity of Colorado Springs to known EAB locations in Colorado.*

*Source for Figures A-30 and 31: Colorado State Forest Service, Emerald Ash Borer: A Green Menace, www.csfs.colostate.edu, 2019*

## PEST AND DISEASE PLAN PURPOSE

Trees— and collectively the urban forest —are major capital assets in cities across the United States. Just as streets, sidewalks, and public buildings are a part of a community's infrastructure, so are publicly-owned trees. The quality of life of the citizens in any community depends on the urban forest, as trees make a vital and affordable contribution to the sense of community, pedestrian-friendly neighborhoods, energy savings, and air quality. The City's Forestry program ("Forestry") is critical to meeting the City's commitment to climate change mitigation and adaptation, carbon sequestration, water conservation, wildlife habitat enhancement, and stormwater reduction. Trees are one of the few infrastructure investments that, if properly maintained, will grow in value over time.

The Parks, Recreation and Cultural Services' Forestry Division is responsible for the care and management of approximately 270,000 trees in City parks and public street rights-of-way that contribute to the quality of life of all who live, work, and visit Colorado Springs.

Colorado Springs' urban forest canopy includes trees on public and private properties. This living infrastructure shades over 17 percent of the community and provides economic, environmental, and aesthetic benefits: $100 million annually in air filtration, $900 thousand in stormwater retention, $2 million in carbon sequestration, and incalculable moments of beauty and serenity. Our legacy of trees is 150 years old and continues to grow.[14]

A healthy urban forest properly managed for existing and potential tree pests and diseases will provide the City of Colorado Springs with benefits such as shade, water conservation, aesthetics, and a sense of community as the City continues to develop and grow. The 2020 Urban Forest Management Plan (UFMP) for Colorado Springs identified emerald ash borer as an immediate concern and provided actions relating to the implementation of this Tree Pest and Disease Plan as shown in the tables on the next page.

Colorado Springs' efforts to manage emerald ash borer and other pests will have a large impact on the character, health, and sustained benefits of the urban forest. A thriving and well-maintained tree population provides a wide variety of services and benefits to the community. A healthy urban forest contributes to the economic vitality of the City, provides environmental stability, and provides

a better quality of life. Routine care of public trees by the City, contractors, citizens, and volunteers is necessary to maintain and enhance the quality of the natural environment. All residents are entitled to the benefits of a healthy urban forest.

The City of Colorado Springs' tree canopy is threatened by a myriad of native and non-native insect pests including spruce ips and EAB, respectively. To help ensure a prospering urban forest, the City has developed the Tree Pest and Disease Plan to address these threats— particularly EAB. To maintain desired urban forest resource conditions, necessary pest management actions need to be executed in a timely manner. This plan provides goals and actions for EAB management to assist the City in minimizing impacts and maximizing the benefits of the urban forest.

The intent of this plan is to guide the City in the mitigation of the disruption to the urban forest caused by the pending infestation of emerald ash borer; to develop strategies that will effectively distribute the costs of the infestation over a period of time; and to lessen the social and economic impact that such an extensive loss would have on the property values and quality of life in the community.

This plan will apply to all ash trees currently growing on City properties (along streets and trails, in parks, medians, and open space, and facility grounds) as well as ash trees growing on private properties that have the potential to adversely impact adjacent private properties, public rights-of-way, or other public properties. The actions recommended in this plan are in addition to the actions provided in the 2020 Urban Forest Management Plan. The Tree Pest and Disease Plan supports the operations of the tree maintenance programs that are currently in place for the management of Colorado Springs' urban forest, but additional personnel and financial resources will be required to enact these additional actions.

The emerald ash borer management strategy's goals and actions are focused on the pre-detection, early infestation, rapidly increasing mortality phase, late infestation stages, and recovery efforts in response to the pest. This document must remain dynamic and sensitive to current conditions, research updates, and planning resources (such as the Steps to an EAB Management Plan in development) as they become available.

*14. City of Colorado Springs, Colorado.*

*Table A-24. Summary of 2020 Urban Forest Management Plan actions relating to EAB.*

| Priority | Effort | *Co-benefit | ▷ V. GREEN ASSET MANAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **H. INTEGRATED PEST MANAGEMENT** | |
| **V.H.2** Priority | Effort | 🏠🌳 | Continue to research the threat of emerald ash borer for public and private ash trees and implement actions provided in the tree pest and disease plan for prevention, response, treatment, mitigation, and wood utilization. | **PRCS** **TARGET YEAR:** ANNUAL |

| Priority | Effort | Co-benefit | ▷ VI. COMMUNITY ENGAGEMENT ACTIONS | LEAD*/YEAR |
|---|---|---|---|---|
| | | | **A. EDUCATION AND OUTREACH (CONTINUED)** | |
| **VI.A.13** Priority | Effort | 🌳🏠 | Increase public outreach and notification so residents are aware of full scope of emerald ash borer impact and urgency and what they can do to support and sustain the urban canopy. | **PRCS**, CD, NSD, PDD, HOAs, SIMDs **TARGET YEAR:** ANNUAL |
| | | | **C. VOLUNTEERS** | |
| **VI.C.2** Priority | Effort | 🌳⚖️🏠 | Continue to engage neighborhoods with volunteer tree planting events. Prioritize those areas with lower urban tree canopy or those expected to be greatly impacted by emerald ash borer. | **PRCS**, CD, NSD, HOAs, SIMDs **TARGET YEAR:** ANNUAL |

*Table A-25. Summary of 2020 Urban Forest Management Plan targets relating to EAB.*

| V. GREEN ASSET MANAGEMENT | PLAN TARGETS: MANAGEMENT SCENARIO A | | | | |
|---|---|---|---|---|---|
| | **1-Year** | **2-Year** | **5-Year** | **10-Year** | **20-Year** |
| **H. INTEGRATED PEST MANAGEMENT** | | (V.H.2)Emerald ash borer plan implemented (V.H.3)Tree susceptibility report | | (V.H.2)Partial completion of emerald ash borer plan actions | |

## INVENTORY OF ASH TREES

It is estimated that Colorado Springs has nearly 25,000 ash trees within City parks and along streets in the public right-of-way. This is nearly 9 percent of the total public tree population of 270,000 trees. This rough estimate is based on inventories from 2005 through 2018 in various locations across the City (Old North End, Southeast, Village 7, street trees, and park trees).

Extrapolating the ash tree data from the sample inventory datasets provides an estimate of nearly 25,000 public ash trees Citywide. Based on the sample data, it is estimated the ash tree population is primarily composed of trees in the 24-30-inch diameter class (31 percent) and the 12-18-inch diameter class (28 percent) shown in Figure A-32.

*Table A-26. Estimated total public ash tree population.*

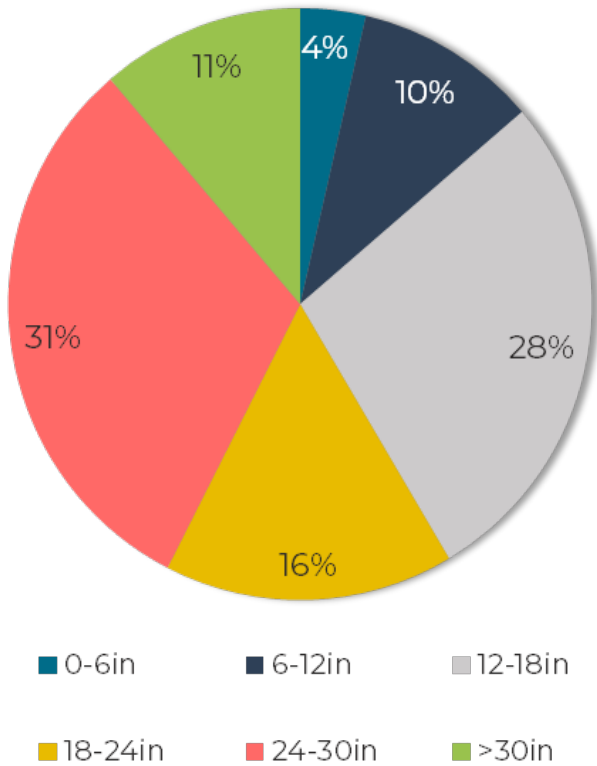| Inventory | |
|---|---|
| Old North End (2018 inventory) | 639 ash trees |
| Southeast (2018 inventory) | 390 ash trees |
| Village 7 (2014 inventory) | 618 ash trees |
| Street Trees (2005 inventory) | 10,591 ash trees |
| Park Trees (2013 inventory) | 403 ash trees |
| TOTAL ASH INVENTORIED | 12,641 ash trees |
| TOTAL INVENTORIED TREES | 137,763 trees |
| % ASH | 9% ash trees |
| TOTAL PUBLIC TREE POPULATION | 270,000 trees |
| **ESTIMATED TOTAL ASH POPULATION** | **25,000 ash trees** |



*Figure A-32. Estimated diameter class distribution for public ash trees in Colorado Springs.*
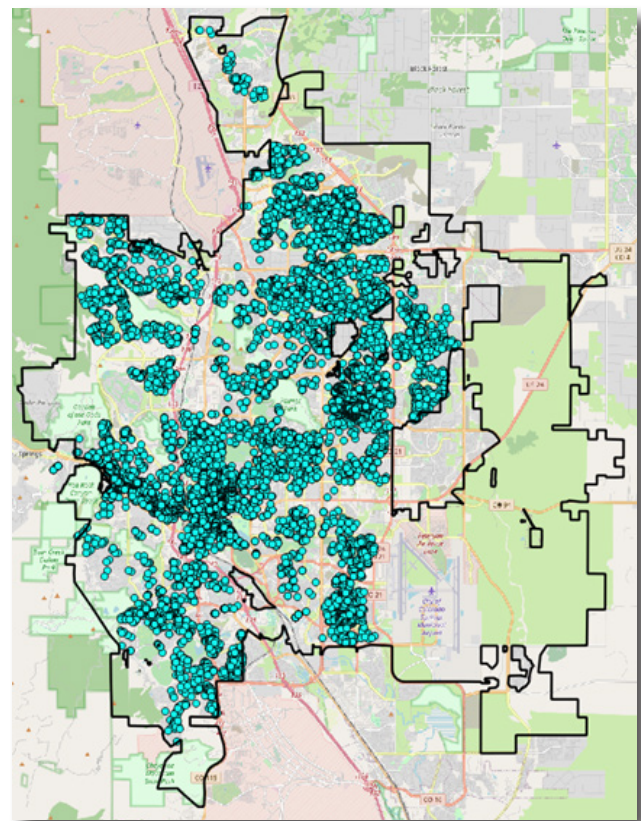


*Figure A-33. Map displaying the location of ash trees inventoried from 2005 – 2018.*

## EAB AND ASH TREE IDENTIFICATION

Early EAB detection protocols are critical to management strategies and budgetary planning. City Forestry's limited resources and staff make this effort difficult, but Forestry should explore options for early detection.

Signs of EAB infestation include:

► Sparse leaves or branches in the upper part of the tree

► D-shaped exit holes approximately one-eighth-inch wide

► New sprouts on the lower trunk or lower branches

► Vertical splits in the bark

► Winding, S-shaped tunnels under the bark

► Increased woodpecker activity

Emerald ash borer has a life cycle that normally takes one year to complete. During winter, the life stage present is a full grown larva that lives within a chamber cut into the outer sapwood of a host tree. In the spring it will transform to a pre-pupal phase and then continue into the pupal stage. It will transition from a pupa into the adult beetle form which will then emerge from the ash. During low population levels, this life cycle may take two years to complete.

Adults emerge from the tree by cutting through the bark, producing a D-shaped exit hole. In Colorado, emerald ash borer will normally begin to emerge in early to mid-May, with peak emergence in June. However, some beetle emergence could extend into midsummer.

After emergence, adults move to the crown of an ash tree (flight season) where they feed on leaves. After about a week of feeding, the now mature adults will begin to mate. A few days after mating the females will begin to lay eggs on the surface of the bark. Females typically live for about a month and during this time will lay several dozen eggs.

Eggs hatch in about a week and the tiny, newly hatched larvae burrow through the bark to feed on the tissues underneath which includes the phloem, cambium, and outer sapwood. This is the primary cause of death to ash trees.



*Figure A-34. Ash (Fraxinus) trees have opposite buds, diamond-shaped ridged bark, five to nine leaflets on each stalk, and paddle-shaped seeds. Adult beetles are approximately one-half inch long and have an emerald-green head and back, a coppery reddish purple abdomen, create D-shaped exit holes, and S-shaped galleries when entering the tree in the larval stage. Source of photos: Colorado State Forest Service.*

# EAB MANAGEMENT STRATEGY

## GOAL 1: CREATE AND MAINTAIN AN ACCURATE TREE ASSESSMENT, MAINTAIN RECORDS, AND UPDATE CITY CODE

As with all infrastructure, maintenance is essential to maximize benefits, yet many cities lack the ability to track the maintenance and replacement needs of their urban forest. Management strategies for ash trees should be based on their condition, size, value, location, and ownership. Categories of ash tree populations include forests, public and private trees, high- and low-quality trees, and high- and low-priority areas.

*Public Tree Inventory:* Forestry has several incomplete datasets of tree information describing the location, species, size, condition, and maintenance needs of public trees at varying levels of detail. In July 2020, Forestry received cost estimates for completing a Citywide right-of-way tree inventory as part of the City Public Works Department's repaving project. Costs to map the location of trees and identify the tree species amount to approximately $268,000. Alternatively, the City may contract tree inventory services Citywide to gather data on the entire public tree population (approximately 270,000 trees) or specifically inventory ash trees (25,000 ash trees estimated). Costs for International Society of Arboriculture (ISA) Certified Arborists to inventory 270,000 trees may range from $800,000 to $1.1 million whereas an ash tree inventory may range between $75,000 and $125,000 (based on 2020 estimates).

A current and accurate tree inventory of City-owned trees is vital to any effort in preparing for an EAB invasion. The inventory should provide current data on the number, size, condition, and placement of all ash trees on developed City-owned properties. This data is vital in determining the value of public ash within the City and should allow Forestry to develop cost/benefit analysis estimates for various treatment or control options. An inventory allows Forestry to identify the condition of individual ash trees. From this, Forestry can determine which trees are worth treating and which are not. It is estimated that Forestry is responsible for 270,000 trees on City property and 9 percent of all those trees are ash (25,000 total ash trees on City property).

If budget or time constraints prevent a comprehensive tree inventory, the first priority is to assess ash trees located in high-priority areas, which are areas within clear view from public lands and rights-of-way. An updated inventory of ash trees with information about each tree's size, condition, and location would allow Forestry to estimate the values and contributions that City-owned ash trees make to the community in terms of property values, stormwater management, carbon storage, energy savings, water savings and other beneficial factors.
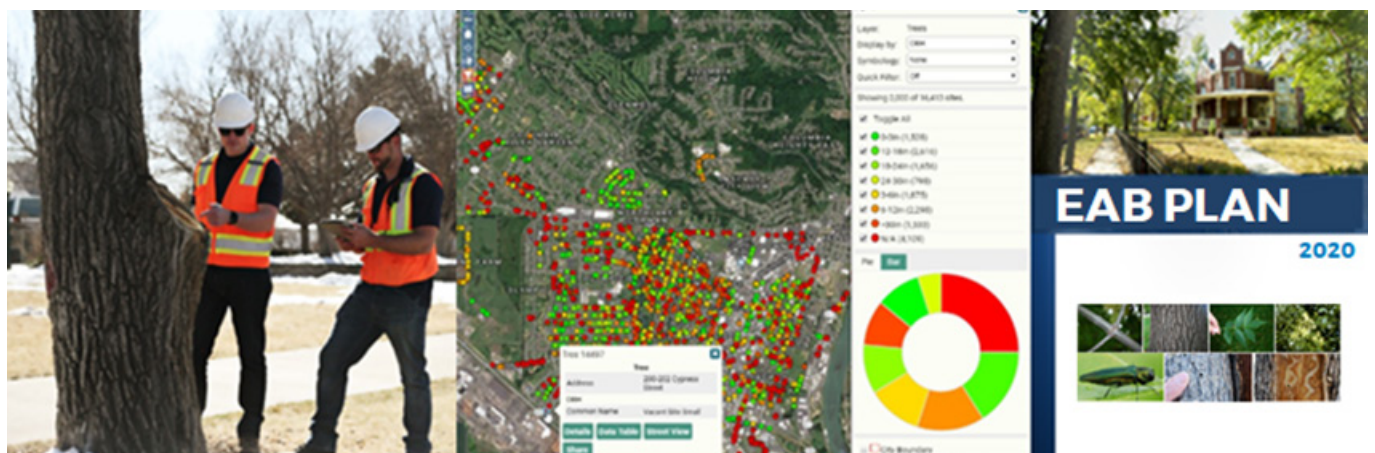


*Figure A-35. An update to this plan should integrate data from an ash tree inventory and analysis. Images: PlanIT Geo.*

***Private Tree Survey***: The ash tree population on private property should not be ignored. Most often in cities, the largest percentage of ash trees reside on private property. While City staff may not inventory on private property, many cities throughout the region, specifically, Fort Collins, have contracted services to complete an i-Tree Eco[15] analysis of private trees. This process involves 200 randomized plots distributed across a city to estimate the number of ash trees on private property within the City. In addition to estimating the total private tree ash population, size, and condition, an analysis of the data can estimate the total ecological benefits that the private ash tree population provides each year. Forestry should obtain estimates of private trees based on surveys with a high degree of accuracy to know the extent of their influence. This information would provide an estimation of the total overall impacts that EAB will have on Colorado Springs' urban forest.

***Record Keeping:*** As the actions in this plan are implemented, the tree inventory database should be regularly updated to reflect tree growth, removals, and replanting.

***Updating City Code:*** The infestation of emerald ash borer will likely require updates to City Code in the following ways:

▶ <u>Nuisance Language</u>: Specific language regarding the control of tree infections and infestations as well as declared tree nuisances, control measures, and control areas should be included in updates to City Code.

▶ <u>Upgrading Landscape Requirements in the Zoning Code</u>: At a time when it is important to maximize tree canopy as a major strategy to mitigate the effects of climate change, EAB will destroy thousands of trees. To take advantage of every opportunity to plant trees, the City can harness the power of the private sector through the development review process. The zoning code needs to incorporate all the best practices that maximize tree benefits.

▶ <u>Ash Tree Treatments</u>: Amend City Code to give Forestry the authority to allow the option of an approved chemical treatment, rather than removal, in ash trees showing less than 30 percent crown damage due to EAB. Code language stating the "Notice to Remove" should be changed to "Notice to Remove or Treat". This would only be used early in the infestation as an effort to slow the spread of EAB in the City.

▶ <u>Trap Trees</u>: Forestry should be permitted to allow EAB infested trees referred to as "trap trees" to remain standing if they pose minimal risk to people and property.

15. i-Tree Eco (www.itreetools.org) is software application designed to use field data from single trees, complete inventories, or random plots throughout a study area to quantify forest structure, environmental effects, and value.

## Goal 1 Actions Summary

The following summary provides an overview of actions and the anticipated timeline for completion. The timeline is an estimate and should be adjusted when new information is gathered regarding the timing of EAB infestation in the City. These recommendations support the actions in the 2020 UFMP.

*Table A-27. Summary of EAB plan actions to support Goal 1.*

| Year | Action |
|------|--------|
| **2020** | Build the business case to secure funding for the comprehensive or sample tree inventory specifically to gather an understanding of the public ash tree population. |
| **2021** | Complete the tree inventory with an emphasis on collecting information about the public ash tree population. |
| **2021** | Include City Code language updates relating to EAB management with the proposed Code amendments provided in the 2020 UFMP. |
| **2022** | Secure funding and a partner or consulting firm to sample private properties to establish an estimate of ash tree populations on private property. |

## GOAL 2: EARLY INFESTATION DETECTION AND SUPPRESSION

Monitoring to increase the chances of early EAB detection is another important goal for Forestry in terms of tree pest and disease management. Possible detection methods include visual inspections/ surveys, branch sampling and peeling, trap trees, rearing cages, and attractant traps. Research is ongoing to determine more effective ways to trap and monitor for EAB. The Emerging Pests In Colorado (EPIC) committee and the Colorado EAB Response Team are in continual contact with national and international experts regarding improved ways to conduct sampling. One method is to girdle live ash trees and let stand ("trap trees") during the flight periods of EAB. This method has proven to be slightly more effective than the purple or delta traps at attracting EAB. Forestry should determine whether the creation and use of trap trees could help as the City searches and monitors for EAB.

*Early Infestation Detection and Suppression Approach*

A. Education: Educate City staff through:

- ▸ EAB University Sessions (www.emeraldashborer.info/eabu.php).

- ▸ Seminars and workshops.

- ▸ Hands-on training in Colorado Springs.

- ▸ Other opportunities as they arise.

B. Inspection: As feasible, Forestry field crews should inspect for EAB in any ash tree they work on.

C. Community Education: Educate and encourage local, licensed arborists to be trained and inspect every ash they work on. This includes tree managers for City HOAs and special districts. Ask them to report directly to Forestry any suspicious trees or samples they encounter.

- ▸ Can occur through local interaction with tree managers for these entities.

- ▸ It is also recommended to host (in-person or virtual) annual licensed arborist meetings where EAB detection can be discussed.

D. Sampling: Forestry should follow sampling parameters as established by researchers:

1. Create a 1-mile by 1-mile grid system and overlay in GIS. Forestry should sample 5 random City-owned ash trees within each grid. With limited resources, Forestry may consider sampling in only high-value areas or high-risk neighborhoods. Either sampling approach should use the following recommended protocol:

    a. Remove 2 branches, ranging from 2 to 6 inches in diameter, from mid to upper crown on the south side of each tree. It is not recommended to sample ash trees during the summer due to risk of spreading EAB through movement of infested materials.

    b. Look closely in the branch union areas and at the leaders of sampled trees.

    c. Select trees that appear to be stressed (rationale is that stressed trees are more attractive than healthy trees when EAB are at low population levels). Stressed trees may be found in:

        i. Downtown areas and parking lots.
        ii. Distribution centers and large commercial properties.

    d. Catalog each sample for tracking purposes.

    e. Peel the bark and into the outer rings of sapwood following established protocol. Two options include:

        i. Bring branch samples to the Forestry Operations Center (FOC) and peel. If it is during EAB flight risk season then the samples will need to be kept in a closed container during transport.
        ii. Peel the samples in the field utilizing a truck mounted vice or similar device to stabilize the samples.

E. <u>Traps</u>: Place and monitor traps based on APHIS recommendations.

F. <u>Trap Trees or Girdled Trees</u>: Determine if using trap trees is advisable for Colorado Springs in 2021 and 2022. This is a process where existing ash trees are girdled and left standing during the flight season of EAB to serve as "sinks". The terms "sink trees" and "trap trees" are used interchangeably. Preferably, trees that are in moderate to poor condition would be used.

   1. Certain nurseries may have stock they would donate for this purpose.

   2. Identify potential trap trees when doing grid survey work.

   3. Girdling of trees in sunny locations are highly attractive to adult beetles in locations where EAB populations are relatively low. Girdled trees organized in a grid pattern are very effective for detection and assessment. The tree girdling strategy can assess beetle distribution also known as larval density as well as serve as beetle population "sinks" to concentrate and eliminate adult beetles before they can disperse and reproduce. Tree girdling considerations include:

      a. If tree cutting and removal of wood debris and EAB food/nesting source is not a viable option, then creating lethal trap trees should be considered.

      b. Girdled trees deployed in a systematic survey grid can concurrently serve as sinks for the subsequent generation of EAB.

      c. Clustering three or four girdled trees creates a more powerful attraction for EAB adults than isolated single girdled trees in areas with low-density populations.

      d. There is evidence to suggest that at very low EAB population levels, the location of sink trees can influence how beetles disperse. Sink trees will pull some beetles towards them as EAB adults respond to the presence of artificially damaged trees. Placing clusters of sink trees inside the core of an outbreak versus outside the outer edges could pull dispersing beetles away from the edges and potentially reduce spread rates.[16]

      e. Although all native ash trees will attract EAB adults, some species are more attractive than others. If different ash species are present, select by priority, from most to least preferred: (1) green ash, (2) black ash, (3) white ash, and (4) blue ash.

G. <u>Timing for Girdled Trees</u>: Dates for girdling trap trees or setting traps and debarking trees or retrieving traps should be based on accumulated degree days (see Appendix for definitions) for the local area since adults predictably fly at the same time each year.

H. <u>Removal of Infested Trees</u>: The timing for girdling trap trees or setting traps and debarking trees or retrieving traps should be based on the timing of adult EAB flight periods. These occur generally at the same time each year. Girdled trees should be felled and debarked or destroyed in the fall, winter or early spring following their establishment to ensure that larvae die before completing development.

I. <u>Distant Infestation</u>: The following guidelines apply if the closest known infestation is more than 15 miles away:

   1. Forest Detection Trees: Detection trees should be girdled in early spring in accessible areas of forests, ideally in a grid pattern. Focus on areas closest to the expected wave front (area facing the likely origin of EAB). Let trees die in place.

   2. High-Priority Area Detection Trees: Same as above but only girdle low-quality trees and remove them when they risk becoming hazard trees.

J. <u>Proximate Infestation</u>: The following guidelines apply if the infestation is within 15 miles or already within the City:

   1. Forest Trap Trees: Girdle trap trees in the spring in accessible areas of forests, ideally in a grid pattern. Focus on areas closest to the wave front. Remove or process dead trees before adults can emerge in the spring.

   2. High-Priority Area Trap Trees: Girdle low-quality trees in the spring and remove before adults can emerge in the spring.

K. <u>Citizen Requests</u>: Conduct inspections on any suspicious trees reported by citizens or other sources.

16. Hafner, J.M, Orange, J.M, (2015). Model Emerald Ash Borer Management Plan.

*Figure A-36. Public information, traps, sampling techniques, and girdled trees for early EAB detection and suppression. Source: Colorado State Forest Service.*

## Goal 2 Actions Summary

The following summary provides an overview of actions and the anticipated timeline for completion. The timeline is an estimate and should be adjusted when new information is gathered regarding the timing of EAB infestation in the City. These recommendations support the actions in the 2020 UFMP.

*Table A-28. Summary of EAB plan actions to support Goal 2.*

| Year | Action |
|------|--------|
| 2020 | Educate City staff and departments on this EAB plan and potential management strategies. |
| Annual | Educate local licensed arborists and tree managers for HOAs and special districts on this EAB plan, detection methods, and management options. |
| 2021 | Establish ash tree sampling protocols and procedures. |
| 2022 | Develop a removal and trap tree strategy based on sampling results and other data. |
| Annual | When responding to citizen requests relating to ash trees and ash tree maintenance or removal, inspect trees for EAB. |

## GOAL 3: POSTPONE AND DECREASE PEAK ASH MORTALITY

Not all ash trees should be preserved. This Tree Pest and Disease Plan for emerald ash borer incorporates an important strategy intended to reduce the overall intensity of the infestation, also known as the pest pressure. Past strategies in other cities have included the removal of lowvalue ash trees to reduce the food supply. For ash trees in forested areas and in low-priority areas, a policy of "benign neglect" or noninterference allows the EAB to kill the trees so the natural forest canopy can grow into the gaps. The issue with the noninterference approach is that it allows EAB populations to increase exponentially wherever ash trees are left untreated. This increases overall pest pressure and hastens its spread. The following best practices are provided to reduce overall pest pressure and to postpone or decrease ash mortality to allow Forestry to proactively manage the infestation. These practices prevent or reduce overwhelming numbers of dead, often hazardous trees.

*Approach to Postpone and Decrease Peak Ash Mortality*

A.  Preemptive Removals and Ash Utilization: The first priority for low-quality trees in high-priority areas is for these trees to serve as detection or trap trees. Trees in low-priority areas can be preemptively removed for ash biomass utilization and to reduce available food for EAB. The removal of other trees can be staged as convenient over time.

    Large ash trees can potentially produce hundreds to thousands of EAB adults, but small ash trees produce relatively few, even when the small trees are abundant. Removing a few large trees can sometimes eliminate much of the available food for EAB larvae. Landowners may recognize some economic benefits by targeted harvests of large ash trees for lumber or firewood. Reducing the ash phloem by itself is unlikely to slow spread. In some cases, local EAB spread rates may increase because beetles are forced to fly further to locate a suitable host tree. An integrated approach that combines ash reduction (e.g. removing selected trees) with insecticide treatments or girdling and sinks will be more effective than simply reducing ash trees. This approach has been termed the SLAM approach or SLow Ash Mortality approach.[17]

    According to the SLAM study, ash trees are often common along road, railroad, utility, or trail rights-of-way, and that these types of corridors enhance EAB dispersal and spread. Therefore, they are excellent, accessible trees for preemptive removals and, if girdled, to serve as valuable sink trees.

B.  Reducing Pest Pressure during Moderate and Peak Periods: As the infestation builds, it may be economically preferable to invest in reducing pest pressure near high-quality trees. Strategies include additional preemptive removals of low-quality trees (to reduce the food supply) and the use of trap trees. Lethal trap trees can be used by treating trap trees with insecticide a few weeks before girdling (see Table A-37 for treatment options).

17. McCullough, D.G., Mercader, R.J., (2012). Evaluation of potential strategies to SLow Ash Mortality (SLAM) caused by emerald ash borer (Agrilus planipennis): SLAM in an urban forest. International Journal of Pest Management, Vol. 58, No. 1, January – March 2012, 9-23.



*Figure A-37. Ash trees in Toledo, Ohio in 2006 (left) and 2009 (right), after emerald ash borer arrived. Credit: D. Herms.*

The effectiveness of girdled trees to function as traps or sinks appears to diminish as EAB densities build in an area, according to studies. The SLAM study has shown that achieving minimum overall treatment rates in an area (10-20 percent of all ash trees) can significantly reduce pest pressure. However, accomplishing these seemingly low overall rates will still require public investment in the management of trees in the early years of the infestation before the beetles kill most of the untreated ash trees.

C. <u>Strategies during Low Pest Pressure</u>: Strategies to reduce pest pressure, such as girdling and removing trap trees, can be expensive. Since ash trees can tolerate low levels of pest pressure, the best strategy is likely to invest only in inspections and treatments of high-quality trees closest to the likely wave front.

D. <u>Encouraging Natural Enemies of EAB</u>: The SLAM study found that treatments may increase the likelihood that beetle parasites and other natural enemies (e.g. beetle eating wasps and woodpeckers) can decrease beetle densities. Woodpeckers remain the most important natural enemy of EAB larvae, but woodpecker predation is not consistent.

## Goal 3 Actions Summary

The following summary provides an overview of actions and the anticipated timeline for completion. The timeline is an estimate and should be adjusted when new information is gathered regarding the timing of EAB infestation in the City. These recommendations support the actions in the 2020 UFMP.

*Table A-29. Summary of EAB plan actions to support Goal 3.*

| Year | Action |
|---|---|
| **2021** | Use the inventory data and local knowledge to identify low-quality ash trees in high-priority areas to serve as detection and trap trees. |
| **2022** | Identify low-quality ash trees near high-quality ash trees to remove or serve as trap trees. Align efforts with citizen requests and maintenance actions in the UFMP. |
| **Annual** | Support habitat and conditions for natural predators such as woodpeckers. |

## GOAL 4: PRESERVE THE MOST VALUABLE ASH TREES

For Colorado Springs, it is recommended to treat important ash trees with emamectin benzoate every three years to preserve them though other treatments are available (see Table A-37).
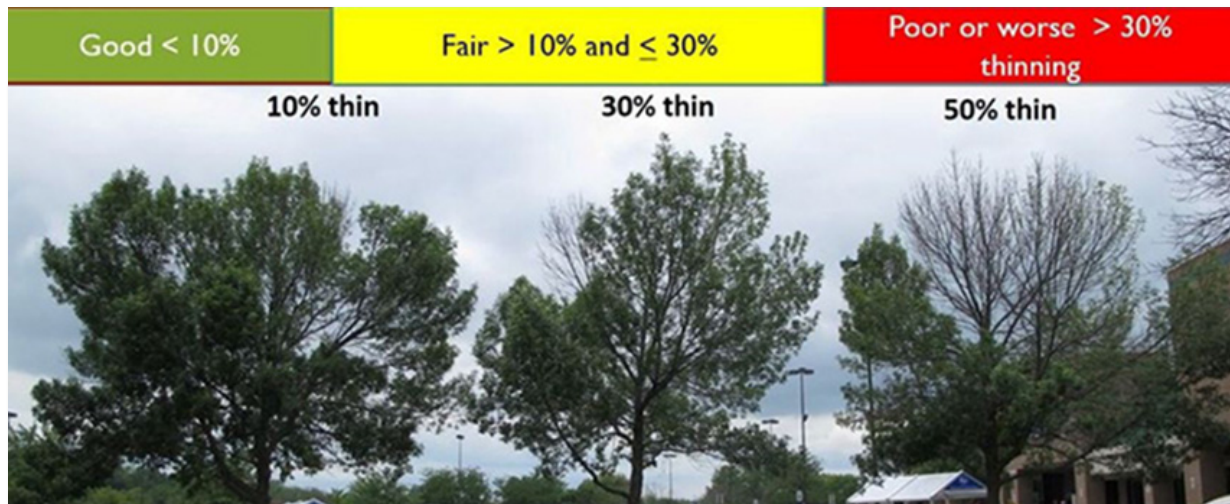


*Figure A-38. Trees that have lost more than 30% of their canopy should not be saved with insecticides because too much of the tree is already dead. Source: Purdue University Entomology Extension, https://extension.entm.purdue.edu/EAB/Management.html.*

*Approach to Preserving the Most Valuable Ash Trees*

A. Identify High-Value or High-Quality Ash Trees: Using the tree inventory data, sample surveys, and Forestry institutional knowledge, high-value or high-quality ash trees should be selected and prioritized for treatment in a series of phases. Treatment options and number of trees ultimately depends on funding but a systematic approach to high-value ash tree selection will provide supporting information to acquire funding. Quantifying the ecosystem benefits of these high-value ash trees to counter the costs of treatment argument is another effective measure. Criteria for selecting high-value ash trees may include:

1. Location: Trees along major arterial roads, pedestrian-heavy districts, major parks and trails, City properties, and trees most seen by the public eye may be prime candidates for treatment if they meet other criteria.

2. Size: Based on the existing tree inventory, approximately 86 percent of public ash trees are greater than 12 inches in diameter. Generally, it is recommended to consider trees greater than 12 inches for treatment though it can depend on other factors described in this section. The costs for treatment increase with the tree's diameter which is another factor to consider.

3. Condition: Trees in good health with less than 30 percent dieback due to EAB can be considered for treatment though other factors must be evaluated. These include the estimated lifespan of the tree, the growing site, tree structure, and any signs or symptoms indicating the tree's health may decline.

4. Significance: Ash trees planted in memoriam or in honor of an individual, group, event, etc. should be considered for treatment if the trees are in healthy condition overall. Trees of cultural and historical value should also be considered.

B. Evaluate Costs and Options: Forestry should use the tree inventory data or estimates of public ash tree populations to estimate potential costs for various management scenarios. Using the estimate of 25,000 public ash trees and estimated distributions of ash trees by diameter class, costs can be simulated by scenario. An example of this can be found in Table A-36 of this plan. The management scenarios to consider include:

1. Remove all ash trees, remove all ash trees with 100 percent tree planting replacements, treat all ash trees, selective ash treatment (high-quality scenario), among other scenarios depending on available budget and desired outcomes. Remove 2 branches, ranging from 2 to 6 inches in diameter, from mid to upper crown on the south side of each tree. It is not recommended to sample ash trees during the summer due to risk of spreading EAB through movement of infested materials.

C. <u>Insecticide Treatments</u>: Insecticide treatments should be used for these public trees:

1. <u>Aggressive Treatment Protocol – Years 1 to 13</u>: Treat 100 percent of high-quality trees beginning with those closest to the infestation wave front, if known. Since trees can tolerate three or more years of low-to-moderate infestation, treat one-third of the trees each year to even out demands on crews, equipment, and budgets. Emamectin benzoate treatments are effective for three years or more.[18]

2. <u>Maintenance Treatment Protocol – Years 13 and beyond</u>: Inspect 100 percent of high-quality trees in Year 13. Treat (and track) those trees that show 30 percent or greater canopy decline thereafter. Implement SLAM study practices by randomly selecting 20 percent of high quality trees for treatment in Year 13. Thereafter, treat 20 percent of randomly selected trees that had not been treated during the prior three years. Field research and the SLAM study confirm that treatments using emamectin benzoate will keep trees completely free of pests for the first two years after the injection, and that it takes three to four years after the start of an infestation for trees to decline to the degree they show at least 30 percent canopy loss and require removal.

D. <u>Staging for Removal and Use of Trap Trees</u>: Where large numbers of ash trees are likely to need removal during the peak of the EAB infestation, Forestry may wish to treat trees so that they can survive long enough to be removed after the main wave of the infestation has passed. Continued inspection can determine when canopy loss exceeds 30 percent, after which they can be treated again to postpone removal or girdled to serve as trap trees and then removed the following spring.

18. *Herms, D., Systemic Insecticide Technology for Tree Care, Department of Entomology, Ohio State University, Ohio Agricultural Research and Development Center.*

## Goal 4 Actions Summary

The following summary provides an overview of actions and the anticipated timeline for completion. The timeline is an estimate and should be adjusted when new information is gathered regarding the timing of EAB infestation in the City. These recommendations support the actions in the 2020 UFMP.

*Table A-30. Summary of EAB plan actions to support Goal 4.*

| Year | Action |
|------|--------|
| **2021** | Complete an inventory of ash trees on public property. |
| **2021** | Establish protocols for identifying high-value and high-quality public ash trees. |
| **2021** | Analyze tree inventory data and local area knowledge to identify high-value and high-quality public ash trees. |
| **2022** | Establish the management strategy for staging ash removals, trap trees, trees to treat, and trees to disregard. |
| **2022** | Mark ash trees for treatment or management in a tree inventory database, add signage, and alert the adjacent property owner where applicable. |
| **Annual** | Prior to EAB arrival and during infestation, implement insecticidal treatments based on the City's decision for application method(s), selected trees, and priorities. |

## GOAL 5: EXPAND TREE CANOPY AND IMPROVE TREE DIVERSITY

The tree diversity guideline known as the "10-20-30 rule" is an arboriculture guideline to reduce the risk of catastrophic loss due to pests like EAB. This means no more than 10 percent of any tree species, 20 percent of any tree genus, or 30 percent of any tree family should exist in a given tree population. In Colorado Springs, there are a limited range of tree species suitable for the region, especially in harsh urban environments. Therefore, the City should allow flexibility with this rule and perhaps apply the rule on a smaller scale. Additionally, Forestry should continue to experiment with non-conventional street tree options supported by research. Flexibility should also be considered in the use of native and nonnative trees to enable the City to achieve more appropriate levels of tree species diversity.

In Colorado Springs, there exists no comprehensive inventory to determine the exact distribution of ash trees throughout the City's public areas. It is estimated that approximately 9 percent of the public tree population is comprised of ash trees (below the 10-20-30 threshold). The inevitable loss of virtually all untreated ash trees will reduce this population and allow replacement trees to diversify forest and urban tree populations.

This opportunity to diversify the urban forest is countered with the years of progress that will be lost due to EAB. Losing large-canopied trees and replacing with new trees that may take 20 years to mature interrupts the flow of ecosystem services and benefits provided by mature trees. Also, new trees may experience challenges in establishment based on water restrictions and trends toward xeriscaping, especially in the ROW. Therefore, considerations for treating large-canopied ash trees must be made in addition to a robust tree replacement program.

***Approach to Expanding Tree Canopy and Improving Tree Diversity***

A. Increase Species Diversity: Over the past several years, City Forestry has been proactive in anticipation of the arrival of emerald ash borer. This has included removal of ash trees in poor condition when responding to citizen requests as a preemptive measure and placing a ban on planting ash on any new City projects and on City rights-of-way in new developments.

B. Replacement Trees: The City should establish a policy that replaces trees in high-priority areas with at least a one-to-one ratio from a diversified list of eligible trees. Part of this strategy is to use an updated inventory to identify ash on City property that are rated as being in poor condition. Forestry can begin the process of phasing these trees out and getting replacement trees planted now rather than waiting for the pest to become established. Taking such action will help distribute the overall impact of EAB in the community over a longer period of time. The economic and workload implications of spreading out the impact of tree losses and replacements over a longer period of time are substantial. With additional funding, the City can be more proactive compared to applying for emergency funding or diverting all maintenance funds after EAB is detected.

C. Education: In order to spread pertinent information, public outreach and education efforts should increase. The overall message should include the need to improve species diversity within the urban forest by:

   1. Eliminating ash from the planting palette in design plans, tree nurseries, and big-box stores.

   2. Encouraging property owners or managers to rate the value and condition of their existing ash trees so they can make informed management decisions regarding whether to treat for EAB.

   3. Recommending the use of multiple tree species that will perform well in the City to plant in place of ash.

Outreach efforts should include citizens, HOAs, special districts, nurseries, garden centers and other entities including local arborists, County Extension agents and the Colorado State Forest Service. Coordinating efforts with nearby communities may also be advisable.

## Goal 5 Actions Summary

The following summary provides an overview of actions and the anticipated timeline for completion. The timeline is an estimate and should be adjusted when new information is gathered regarding the timing of EAB infestation in the City. These recommendations support the actions in the 2020 UFMP.

*Table A-31. Summary of EAB plan actions to support Goal 5.*

| Year | Action |
|------|--------|
| **Annual** | Continue to evaluate ash tree removal when responding to citizen service requests. |
| **Annual** | Continue to ban the planting of ash trees for City projects and new developments. |
| **Annual** | Discourage private property owners from planting ash trees. |
| **Annual** | Plant suitable trees as replacements when removing public ash trees. |
| **Annual** | Encourage private property owners to assess trees on their property and identify any ash trees. |

## GOAL 6: MINIMIZE PUBLIC COSTS

This EAB management strategy provided in the Tree Pest and Disease Plan is significantly less expensive and more effective than a remove-and-replace approach; and it preserves tree canopy and tree benefits. For the cost of removing and replacing two average 17-inch diameter trees, five mature trees can be preserved with treatments for over a decade.[18]

*Approach to Minimize Public Costs*

A. Budget Balancing: The following provides an approximate budgetary breakout by groups of best practices. It is intended to inform specific EAB management approaches for the City as inventory data becomes available and Forestry continues to gather more information regarding EAB spread and treatment options. During the implementation of this plan, allocations should be expected to vary according to conditions on the ground. The percentage breakouts do not account for the costs of inventorying and estimating tree populations.

   ▸ Cost of detection activities and the management of pest pressure: Approximately 15 percent of EAB management plan budget.

   ▸ Cost of treatments, removals, and replacements: Approximately 80 percent of EAB management plan budget.

   ▸ Cost of public outreach efforts: Approximately 5 percent of EAB management plan budget.

B. Record Keeping: The City must obtain more information about the population of ash trees on public property either through a comprehensive tree inventory or sampling approach. Proper record keeping over the course of the infestation will produce data that will be invaluable to Forestry as well as other government officials and the scientific community as the knowledge base expands on how best to manage this infestation. It is an essential tool to battle the EAB infestation as well as future infestations and diseases. A wide variety of software programs exist for urban forest management, complete with standardized reports and the ability to customize them for EAB data recordation and evaluation. Colorado Springs currently has the TreePlotter software application (www.pg-cloud.com/ColoradoSpringsCO) that should be utilized for this effort. The data needed to evaluate the EAB management program include the following:

   1. High-Quality Ash Trees in Public Areas: Data should include geographic location, setting (street, public yard, park, etc.), condition, size, management protocol (treatment in this case), treatment data (pesticide, treatment method, date of treatment, dosage), inspection history, date of removal.

   2. Low-Priority and Low-Quality Ash Trees in Public Areas: Same as above.

   3. Detection and Trap Trees: Data should include geographic location, setting, management protocol (girdling and removal).

   4. Costs: All program costs must be logged and tracked.

   5. Public Outreach History: Records should include the program description, activity descriptions, and costs.

F. Program Evaluation: Accurate and consistent record keeping will provide the data for Forestry to compare the results on the ground with the predictions in this plan. If higher-than-predicted canopy loss occurs after treatments, the records will indicate changes needed to the dosage, frequency, timing, and/or tree criteria. A practice of early investments in detection and lowering pest pressure (i.e. through detection and trap trees) should be weighed against investing in treatments.

G. Establish an Ash Tree Waste Yard: Forestry currently has a location for storing and processing wood and tree debris from normal, non-EAB tree management activities. All ash material would have to be kept separate from other woody waste. Consider local woodworking operations to utilize wood waste for furniture, lumber, and landscape centerpieces. Encourage the use of proper storage, handling, and disposal of wood materials to prevent the spread of EAB.

H. Explore the Possibility of Adding Staff and Equipment: The workload for the Forestry Division will increase dramatically once emerald ash borer becomes established in Colorado Springs. Consideration should be given toward adding extra staff and equipment. EAB response and management activities will take time and resources away from normal Forestry functions such as pruning, other removal work, citizen requests, and education. Additional staff would help mitigate the impact EAB will have on Forestry operations.

The 2020 Urban Forest Management Plan (UFMP) provided four management approaches based on funding and tree maintenance authority scenarios. The intensity of EAB management will be based on the level of funding secured by implementing the UFMP.

The following table was developed for the UFMP to describe the recommended funding and staffing levels to achieve improvements in urban forest management. These values are based on industry standards, benchmarking comparisons, and analyses of City data. It is recommended for Forestry to have a total of 27 full-time employees (FTEs)— an addition of 16 staff based on 2020 staffing levels. The recommended budget to maintain 270,000 public trees on a pruning rotation is $3.1 million. This does not include the management of trees for EAB. The recommended tree removal annual budget of $1.1 million would allow for the removal of approximately 1,300 trees per year which can be applied to the removal of ash trees though other species of trees may also need to be removed depending on citizen requests and priorities. In summary, the current budget may be utilized to manage pests and diseases as available though it is recommended to secure separate funding specifically for EAB management.

*Table A-32. Table from 2020 Urban Forest Management Plan: Summary outcomes from the tree maintenance responsibility transfer case study.*

| | Current | Recommended | Difference |
|---|---|---|---|
| Total Public Trees | 270k trees | 270k trees | 0 |
| Staffing | 11 FTEs | 27 FTEs | 16 FTEs |
| **Total Maintenance Budget** | **$1,558,037** | **$7,400,650** | **$5,842,613** |
| Maintenance Budget per Tree | $5.77 | $27.41 | $21.64 |
| *Operations & Maintenance (O&M) Costs* | | | |
| Tree Pruning Budget | $498,572 (32%) | $3,086,860 (42%) | $2,588,288 |
| Tree Removal Budget | $373,929 (24%) | $1,110,098 (15%) | $736,169 |
| Storm Response Budget | $576,474 (37%) | $1,110,098 (15%) | $533,624 |
| Subtotal | $1,448,974 | $5,307,056 | $3,858,082 |
| *Capital Costs* | | | |
| Planting Budget | $15,580 (1%) | $370,033 (5%) | $354,453 |
| Admin (inspections) Budget | $93,482 (6%) | $888,078 (12%) | $794,596 |
| Other (i.e. education) Budget | $0 (0%) | $835,485 (11%) | $835,485 |
| Subtotal | $109,063 | $2,093,596 | $1,984,533 |
| Maintenance Budget Update Total | $1,558,037 | $7,400,650 | $5,842,613 |
| Trees Pruned Per Year | 3,700 (1.4%) | 38,571 (14%) | 34,871 |
| Pruning Cycle | 73 years | 7 years | -66 years |
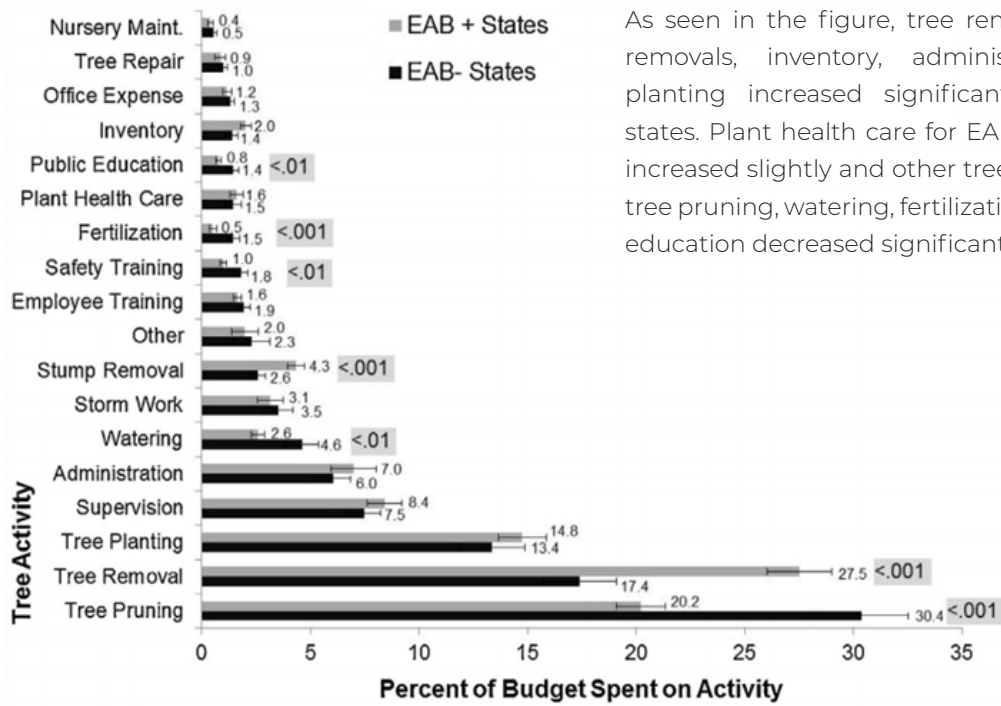
As seen in the figure, tree removals, stump removals, inventory, administration, and planting increased significantly for EAB+ states. Plant health care for EAB+ states only increased slightly and other tree activities like tree pruning, watering, fertilization, and public education decreased significantly.

*Figure A-39. (Left) Percent of 2014 forestry budget spent on tree activities in states with a confirmed EAB case (EAB+) and states without a confirmed EAB case (EAB-) at the time of this study (2017). Source: Hauer, R.J., Peterson, W.D. (2017) Landscape and Urban Planning 157, 98-105.*

## Goal 6 Actions Summary

The following summary provides an overview of actions and the anticipated timeline for completion. The timeline is an estimate and should be adjusted when new information is gathered regarding the timing of EAB infestation in the City. These recommendations support the actions in the 2020 UFMP.

*Table A-33. Summary of EAB plan actions to support Goal 6.*

| Year | Action |
|------|--------|
| 2020 | Collect and maintain ash tree inventory data. Record information pertaining to the management of EAB and public outreach. |
| 2021 | Complete the actions in the 2020 UFMP regarding the analysis of resources to inform the tree maintenance responsibility transfer. |
| 2022 | Secure a budget for EAB management with the following allocations: 15 percent for detection, 80 percent for management, and 5 percent for public outreach. |
| 2022 | Establish or amend protocols for collecting, transporting, and storing ash wood waste and debris of both public and private trees. |
| 2025 | Evaluate the plan's effectiveness based on data, records, and new information. |

## GOAL 7: ENLIST PRIVATE TREE OWNERS

A coordinated approach in the City will require a strong commitment to public outreach and education, especially in the years preceding the EAB infestation and during peak years.

*Approach to Enlist Private Tree Owners*

A.  Education and Communication: Colorado Springs should use all communication tools available to promulgate the goals and best practices in this Tree Pest and Disease Plan, and to ensure that the owners of private ash trees manage their trees consistent with the plan. Educational and communication tools include the City's website, newsletters, utility billings, and press releases. Community meetings are an excellent way to collaborate with those property owners most interested in preserving their ash trees. In addition to these methods, the City should consider the following:

    1.  Direct citizens and interested parties to the Colorado State Forest Service (CSFS) EAB website: www.csfs.colostate.edu/forest-management/emerald-ash-borer.

    2.  Hold educational workshops or meetings (in-person or virtual) to emphasize impact and train attendees on the monitoring and inspection processes.

        a.  Inter-Agency: Colorado Department of Agriculture (CDOA), El Paso County, CSFS, university extension services.

        b.  Intra-Agency: Departments, Council, Boards and Committees, managers.

        c.  Citizens and Businesses: Arborists, landscape companies, tree nurseries, citizens, neighborhood associations, HOAs, special districts.



*Source: The City of Colorado Springs.*

B.  Public Subsidy for Private Trees: Only with a significant increase in funding can Forestry decide to subsidize treatments for certain ash trees on private property in order to help suppress pest pressure and to preserve certain trees. Only high-quality trees located in high-priority areas on streets where the loss of private ash trees would have a significant effect should be eligible for public subsidy. The tree inventory will provide the information needed to craft definitions for eligibility that will be most effective and enforceable. A private tree sample survey conducted through contracted services or neighborhood organizations can better inform this process. Budgetary constraints will determine the percent of the treatment costs to be subsidized. The subsidy should be contingent upon the property owner complying with the best practices described in this Tree Pest and Disease Plan and should end after the third treatment when the peak of the infestation should have already occurred and the wave front will have moved on by the time the trees may need another treatment. Forestry will have to clarify roles and responsibilities as it relates to ash trees managed by HOAs and special districts. Large landowners such as academic institutions need to be included in this discussion.

C. <u>Pesticide Safety</u>: The increasing concerns regarding the overreliance on pesticides is acknowledged in this Tree Pest and Disease Plan. Neonicotinoids and their effects on pollinators, such as bees, and soil-applied products that have the potential to reach stormwater or ground water have all been highly publicized.

The pesticide recommended in this plan, emamectin benzoate (EB), is not a neonicotinoid and is injected into the trunks of the trees. Ash trees are wind pollinated, they are not a substantial nectar source for bees, and they flower early in the growing season and only for a limited number of days. It is highly unlikely that bees would be exposed to systemic insecticides applied to ash. EB has a low toxicity rating for mammals, a low bioaccumulation potential within ecosystems, and is immobile in soil. This means that the insecticide will not build up levels within an ecosystem and will be minimally harmful to people and animals that might encounter tree debris.[19]

While there are valid concerns regarding the overuse of pesticides, those concerns should be aimed at reducing pesticide use where fewer benefits result. The environmental consequences of losing millions of ash trees are vastly greater than the minimal risk associated with inoculating high-quality ash trees to protect them from certain death.

F. <u>Treatment or Removal of Ash Trees in Preparation for Tree Responsibility Transfer</u>: In the event that Forestry transfers the responsibility of public tree maintenance to the adjacent property owner, ash trees will need to be evaluated. Most likely, ash trees will not be a part of the selected trees in the transfer phases and ash trees in public rights-of-way will continue to be Forestry's responsibility. Thus, management approaches described in this plan will continue to apply.

*19. Hahn, J., Herms, D.A., McCullough, D.G., (2011). Frequently Asked Questions Regarding Potential Side Effects of Systemic Insecticides Used to Control Emerald Ash Borer, University of Minnesota Extension.*

## Goal 7 Actions Summary

The following summary provides an overview of actions and the anticipated timeline for completion. The timeline is an estimate and should be adjusted when new information is gathered regarding the timing of EAB infestation in the City. These recommendations support the actions in the 2020 UFMP.

***Table A-34. Summary of EAB plan actions to support Goal 7.***

| Year | Action |
|---|---|
| **2020** | Update the City's website with information about this plan, EAB, and contact information. |
| **2020** | Add EAB Plan information flier in utility bill to raise public awareness. |
| **2020** | Identify partner network for sharing information and resources. |
| **2021** | Disseminate EAB information to partners. |
| **Annual** | Provide or support educational workshops and meetings for partners and the community. |
| **2021** | Explore protocols and options for public subsidy of private trees. |
| **Annual** | Stay informed of updates in treatment options and the spread of EAB. |
| **2021** | Complete the actions in the 2020 UFMP regarding the analysis of resources to inform the tree maintenance responsibility transfer. |

## DEFINING MANAGEMENT STRATEGIES

With a comprehensive inventory of public ash trees, Forestry will be better equipped to estimate EAB management budgets and prioritize trees for removal and treatments. As a product of this Tree Pest and Disease Plan, an EAB Management Cost Worksheet was provided to the City. This worksheet allows Forestry to enter estimated or actual ash tree numbers by diameter class for various management strategies: removals, replanting, and treatments. It uses the average cost of emamectin benzoate treatments ($8.50 per DBH-inch) based on the Emerald Ash Borer Cost Calculator tool and research provided by Purdue University's Entomology Extension Service. A more comprehensive calculator tool can be found on Purdue University Extension's website (www.int.entm.purdue.edu/ext/treecomputer/).

The figure below provides an overview of the worksheet developed by PlanIT Geo using Purdue's research. Table A-36 provides estimated costs for four scenarios based on the 25,000 public ash tree estimate. These summaries are provided only as a demonstration and for talking points and should be updated by Forestry with new information and data.



*Figure A-40. A screenshot of the EAB Management Cost Worksheet provided to the City.*
*Note: These numbers and values are for demonstration purposes only.*

*Table A-35. Scenarios for EAB management. Source: PlanIT Geo's EAB Cost Calculator Module, Purdue University, and local estimates.*

| | Remove All Ash | | All Ash Remove & Replant | | Treat All Ash | | Treat 10% Ash >12" DBH | |
|---|---|---|---|---|---|---|---|---|
| Timespan (years) | 10 | | 10 | | 10 | | 10 | |
| Total Trees Removed | 24,775 | | 24,775 | | 0 | | 0 | |
| **Total Removal Cost** | **$29,631,000** | | **$29,631,000** | | **$0** | | **$0** | |
| **Total Planting Cost** | **$0** | | **$7,432,500** | | **$0** | | **$0** | |
| **Total Removal & Planting Cost** | **$29,631,000** | | **$37,063,500** | | **$0** | | **$0** | |
| **Total Treatment Cost** | **$0** | | **$0** | | **$13,571,800** | | **$1,292,850** | |
| **Tree Removal Summaries (costs include stump grinding costs)** | | | | | | | | |
| Tree Removal Costs by DBH Class | *$/Tree* | *Cost* | *$/Tree* | *Cost* | *$/Tree* | *Cost* | *$/Tree* | *Cost* |
| 0-3in | $100 | $44,900 | $100 | $44,900 | $100 | $0 | $100 | $0 |
| 3-6in | $175 | $78,575 | $175 | $78,575 | $175 | $0 | $175 | $0 |
| 6-12in | $300 | $752,400 | $300 | $752,400 | $300 | $0 | $300 | $0 |
| 12-18in | $850 | $5,839,500 | $850 | $5,839,500 | $850 | $0 | $850 | $0 |
| 18-24in | $1,275 | $5,064,300 | $1,275 | $5,064,300 | $1,275 | $0 | $1,275 | $0 |
| 24-30in | $1,550 | $11,992,350 | $1,550 | $11,992,350 | $1,550 | $0 | $1,550 | $0 |
| >30in | $2,100 | $5,859,000 | $2,100 | $5,859,000 | $2,100 | $0 | $2,100 | $0 |
| **Total Removal Cost** | | **$29,631,025** | | **$29,631,025** | | **$0** | | **$0** |
| **Tree Planting Summaries** | | | | | | | | |
| Planting Costs per Tree | $0 | | $300 | | $0 | | $0 | |
| % Removals to Replant | 0% | | 100% | | 0% | | 0% | |
| Total Trees to Plant | 0 | | 24,775 | | 0 | | 0 | |
| Total Cost per Year | $0 | | $743,250 | | $0 | | $0 | |
| **Total Planting Cost** | **$0** | | **$7,432,500** | | **$0** | | **$0** | |
| **Tree Treatment Summaries** | | | | | | | | |
| Timespan (years) | 10 | | 10 | | 10 | | 10 | |
| Insecticide Cost ($/DBH) | $0 | | $0 | | $8.50 | | $8.50 | |
| Frequency or Cycle (year) | 0 | | 0 | | 3 | | 3 | |
| Total Applications | 0 | | 0 | | 3 | | 3 | |
| Total Trees Treated | 0 | | 0 | | 24,775 | | 2,137 | |
| Treatment Cost per Application | 0 | | 0 | | $4,523,930 | | $430,950 | |
| **Total Treatment Cost** | **$0** | | **$0** | | **$13,571,800** | | **$1,292,850** | |
| Treatment Cost per DBH Class | 0-3in | $0 | 0-3in | $0 | 0-3in | $5,725 | 0-3in | $0 |
| | 3-6in | $0 | 3-6in | $0 | 3-6in | $17,174 | 3-6in | $0 |
| | 6-12in | $0 | 6-12in | $0 | 6-12in | $191,862 | 6-12in | $0 |
| | 12-18in | $0 | 12-18in | $0 | 12-18in | $875,925 | 12-18in | $87,593 |
| | 18-24in | $0 | 18-24in | $0 | 18-24in | $709,002 | 18-24in | $70,865 |
| | 24-30in | $0 | 24-30in | $0 | 24-30in | $1,775,642 | 24-30in | $177,633 |
| | >30in | $0 | >30in | $0 | >30in | $948,600 | >30in | $94,860 |
| **Total Cost per Treatment Cycle** | | **$0** | | **$0** | | **$4,523,930** | | **$430,950** |

*Table A-36. Insecticide options for protecting ash trees from emerald ash borer. Source: Herms D.A., McCullough D.G., et al. 2019. North Central IPM Center Bulletin. 3rd Edition. 16 pp.*

| Insecticide Formulation | Active Ingredient | Application Method | Recommended Timing |
|---|---|---|---|
| Products Intended for Sale to Professional Applicators | | | |
| Merit® (75WP, 75WSP, 2F) | Imidacloprid | Soil injection or drench | Early to mid spring or mid fall |
| Safari™ (20 SG) | Dinotefuran | Soil injection or drench | Mid to late spring |
| Transtect™ (70WSP) | Dinotefuran | Soil injection or drench | Mid to late spring |
| Xylam® Liquid Systemic Insecticide | Dinotefuran | Soil injection or drench | Mid to late spring |
| Xytect™ (2F, 75WSP) | Imidacloprid | Soil injection or drench | Early to mid spring or mid fall |
| Azasol™ | Azadirachtin | Trunk injection | Mid- to late spring after trees have leafed out |
| Arbormectin™ | Emamectin benzoate | Trunk injection | Mid- to late spring after trees have leafed out |
| Imicide® | Imidacloprid | Trunk injection | Mid- to late spring after trees have leafed out |
| TREE-äge™ | Emamectin benzoate | Trunk injection | Mid- to late spring after trees have leafed out |
| TreeAzin® | Azadirachtin | Trunk injection | Mid- to late spring after trees have leafed out |
| Safari™ (20 SG) | Dinotefuran | Systemic basal bark spray | Mid- to late spring after trees have leafed out |
| Transtect (70 WSP) | Dinotefuran | Systemic basal bark spray | Mid- to late spring after trees have leafed out |
| Zylam® Liquid Systemic Insecticide | Dinotefuran | Systemic basal bark spray | Mid- to late spring after trees have leafed out |
| Astro® | Permethrin | Preventive trunk, branch, and foliage cover sprays | Two applications at 4-week intervals; first spray should occur at 450–550 growing degree days (50°F, Jan.1) |
| Onyx™ | Bifenthrin | | |
| Tempo® | Cyfluthrin | | |
| Sevin® SL | Carbaryl | | |
| Products Intended for Sale to Homeowners | | | |
| Bayer Advanced™ Protect and Feed II | Clothianidin + Imidacloprid | Soil drench | Early to mid spring |
| Bayer Advanced™ Tree & Shrub Insect Control | Imidacloprid | Soil drench | Early to mid spring |
| Optrol™ | Imidacloprid | Soil drench | Early to mid spring |
| Ortho Tree and Shrub Insect Control Ready to Use Granules® | Dinotefuran | Granules | Mid to late spring after trees have leafed out |

*Table A-37. Considerations for application methods for EAB management.*

| Application Method | Benefits | Considerations |
|---|---|---|
| Soil Injection | ▪ Minimized excess runoff<br>▪ Direct contact with roots | ▪ Soil injection equipment<br>▪ Uptake may be slow<br>▪ Dilution in soil<br>▪ Compaction issues |
| Drench | ▪ No equipment | ▪ Runoff<br>▪ Bind to other plant material<br>▪ Dilution |
| Trunk Injection | ▪ Good uptake<br>▪ No dilution from wet areas<br>▪ 2-year treatment | ▪ Causes tree wounds<br>▪ Equipment needed |
| Trunk Sprays | ▪ Quick and easy to apply<br>▪ No wounds to tree | ▪ Not always absorbed<br>▪ Time for absorption<br>▪ Wasted materials<br>▪ Multiple applications |
| Canopy Spray | ▪ Quick and easy to apply<br>▪ No wounds | ▪ Multiple applications<br>▪ Wasted material<br>▪ Multiple applications |

As summarized in Table A-36, different management strategies have varying costs and approaches. Using the 25,000 public ash tree estimate, a "remove all ash tree" scenario would cost over $29.6 million with the costs most likely distributed over multiple years. To remove all ash trees and replant at a 1:1 ratio, the removal costs would be the same ($29.6 million) and the planting costs would amount to approximately $7.4 million. To demonstrate costs on an extreme level, to treat all 25,000 ash trees would cost a total of $13.6 million— a highly unlikely strategy but less than the cost of removing all ash trees. To demonstrate a strategy that aims to treat only high-value ash trees, the scenario of treating 10 percent of all ash trees greater than 12 inches in diameter was applied to Table A-35. This amounts to 2,137 theoretical high-value ash trees to treat at a cost of $431,000 per treatment application or $1.3 million over a ten-year timespan (requires three treatment applications).

The summaries provided in Table A-36 serve as a demonstration of potential costs to remove, treat, and/ or replant the urban forest in response to EAB. Forestry should gather additional information such as the total public ash tree counts and finalize treatment methods based on the information provided in Table A-37 and Table A-38. Securing a budget specific to EAB management and completing and inventory of ash trees will enable Forestry to develop accurate management scenarios using the EAB Management Cost Worksheet provided as part of this tree pest and disease planning effort.

In any approach, community education is essential as is proper bookkeeping and training to stay up-to-date on the spread of EAB and management options. The arrival of EAB is inevitable for Colorado Springs but proper detection, sampling, and early management can reduce the overall financial burden and the loss of ecosystem benefits provided to the community.

*Table A-38. Summary of Tree Pest and Disease Plan actions and implementation timeframe.*

| **Annual Actions** | |
|---|---|
| Goal 2 | Educate local licensed arborists and tree managers for HOAs and special districts on this EAB plan, detection methods, and management options. |
| Goal 2 | When responding to citizen requests relating to ash trees and ash tree maintenance or removal, inspect trees for EAB. |
| Goal 3 | Support habitat and conditions for natural predators such as woodpeckers. |
| Goal 4 | Prior to EAB arrival and during infestation, implement insecticidal treatments based on the City's decision for application method(s), selected trees, and priorities. |
| Goal 5 | Continue to evaluate ash tree removal when responding to citizen service requests. |
| Goal 5 | Continue to ban the planting of ash trees for City projects and new developments. |
| Goal 5 | Discourage private property owners from planting ash trees. |
| Goal 5 | Plant suitable trees as replacements when removing public ash trees. |
| Goal 5 | Encourage private property owners to assess trees on their property and identify any ash trees. |
| Goal 7 | Provide or support educational workshops and meetings for partners and the community. |
| Goal 7 | Stay informed of updates in treatment options and the spread of EAB. |
| **2020 Actions** | |
| Goal 1 | Build the business case to secure funding for the comprehensive or sample tree inventory specifically to gather an understanding of the public ash tree population. |
| Goal 2 | Educate City staff and departments on this EAB plan and potential management strategies. |
| Goal 6 | Collect and maintain ash tree inventory data. Record information pertaining to the management of EAB and public outreach. |
| Goal 7 | Update the City's website with information about this plan, EAB, and contact information. |
| Goal 7 | Add EAB Plan information flier in utility bill to raise public awareness. |
| Goal 7 | Identify partner network for sharing information and resources. |

*Table A-39 continued. Summary of Tree Pest and Disease Plan actions and implementation timeframe.*

| 2021 Actions | |
| --- | --- |
| Goal 1 | Complete the tree inventory with an emphasis on collecting information about the public ash tree population. |
| Goal 1 | Include City Code language updates relating to EAB management with the proposed Code amendments provided in the 2020 UFMP. |
| Goal 2 | Establish ash tree sampling protocols and procedures. |
| Goal 3 | Use the inventory data and local knowledge to identify low-quality ash trees in high-priority areas to serve as detection and trap trees. |
| Goal 4 | Complete an inventory of ash trees on public property. |
| Goal 4 | Establish protocols for identifying high-value and high-quality public ash trees. |
| Goal 4 | Analyze tree inventory data and local area knowledge to identify high-value and high-quality public ash trees. |
| Goal 6 | Complete the actions in the 2020 UFMP regarding the analysis of resources to inform the tree maintenance responsibility transfer. |
| Goal 7 | Same as above; Complete the actions in the 2020 UFMP regarding the analysis of resources to inform the tree maintenance responsibility transfer. |
| Goal 7 | Disseminate EAB information to partners. |
| Goal 7 | Explore protocols and options for public subsidy of private trees. |
| **2022 Actions** | |
| Goal 1 | Secure funding and a partner or consulting firm to sample private properties to establish an estimate of ash tree populations on private property. |
| Goal 2 | Develop a removal and trap tree strategy based on sampling results and other data. |
| Goal 3 | Identify low-quality ash trees near high-quality ash trees to remove or serve as trap trees. Align efforts with citizen requests and maintenance actions in the UFMP. |
| Goal 4 | Establish the management strategy for staging ash removals, trap trees, trees to treat, and trees to disregard. |
| Goal 4 | Mark ash trees for treatment or management in a tree inventory database, add signage, and alert the adjacent property owner where applicable. |
| Goal 6 | Secure a budget for EAB management with the following allocations: 15 percent for detection, 80 percent for management, and 5 percent for public outreach. |
| Goal 6 | Establish or amend protocols for collecting, transporting, and storing ash wood waste and debris of both public and private trees. |
| **2025 Actions** | |
| Goal 6 | Evaluate the plan's effectiveness based on data, records, and new information. |

## OTHER TREE PEST AND DISEASE CONCERNS

Plans may be developed for other tree pests and diseases that exist in or are a threat to Colorado Springs' urban forest. The extent of management depends on the pest or disease, the City's budget, and the count of pest- or disease-preferred tree species. This section provides an overview of common tree pest and disease concerns for the City, beyond emerald ash borer.

### Scale Insects:

The most common scales are found on shade trees, typically on the twigs rather than the leaves. The oystershell scale (*Lepidosaphes ulmi*) is an armored scale that is highly damaging to deciduous trees, specifically aspen, ash, willow, and lilacs. The pine needle scale (*Chionaspis pinifoliae*) feeds on evergreen needles of pines, spruce, and fir. Primary control for scale involves systemic insecticides prior to the crawler stage so timing is critical. Cultural methods include conserving natural scale predators.



### Aphids:

Aphids feed by sucking sap from plants. When the number of aphids on a tree are very high for an extended period, their feeding can cause wilting and sometimes even dieback of shoots and buds. Some aphids can cause leaf curling when the insect infests emerging leaves. The honeydew secreted from the aphid while feeding can be a sticky nuisance for vehicles, sidewalks, benches, and other structures. Insecticide soaps have proven most effective for aphids.

*Source of two images above: Rocky Mountain Chapter ISA.*

### Dutch Elm Disease:

Dutch elm disease (DED) is an aggressive fungal disease of elms that are native to America. The fungus (*Ophiostoma novo-ulmi*) is spread from tree to tree via the European elm bark beetle. As the beetles tunnel in to lay eggs, the fungus enters the plants' water-conducting system. Once inside the tree, the fungus begins to plug the vascular system. As a result, leaves wilt and the affected tree dies within a few months to a year. DED was devastating to American elms (*Ulmus americana*) but the disease has since declined due to a lack of host trees and other factors. The best control for DED is to plant resistant elms and cultivars.



*Source of image above: USDA Forest Service.*

### Ips Beetles:

Ips beetles, also known as "engraver beetles," are bark beetles that damage pine and spruce trees. Mature ips beetles enter trees and tunnel, producing a yellowish- or reddish-brown boring dust. The affected parts of the tree discolor and die. Small round holes in the bark of infested trees indicate the beetles have completed development in that part of the tree and have exited. Symptoms include needle color changing from green to yellow and bright red to brown. The presence of woodpeckers, a common predator of the ips beetle, may indicate infestation. These symptoms are similar to mountain pine beetle. The best control is prevention by maintaining healthy trees, preventive insecticides, and removing infected woody material.

### Mountain Pine Beetle:

Mountain pine beetle (*Dendroctonus ponderosae*) activity subsided and remained low with a total of 5,000 acres of active mountain pine beetle infestation detected in the state in 2015. The epidemic has ended in many areas of Colorado as mature pine trees have been depleted following the outbreak that impacted more than 3.4 million-acres of Colorado forestland from 1996-2013. Many of the pine forests impacted by the outbreak look vastly different due to the large numbers of dead trees. Trap trees, removal of infected woody material, and preventive insecticide sprays are the best controls.





### Lilac Ash Borer:

In addition to the emerald ash borer (EAB), the lilac/ash borer (*Podosesia syringae*) is a common wood borer associated with ash throughout Colorado and a species that is native to North America. Damage is caused by the larvae which tunnel into the trunks and lower branches of ash trees. Almost all larval feeding activity occurs in the lower trunk, particularly around the soil line. External evidence of lilac/ash borer activity in trees can include irregularly round (unlike the D-shaped holes of EAB) exit holes of about a quarter-inch diameter on trunks. Lilac/ash borer can be easily controlled by spraying the trunk and lower branches in spring with an insecticide during the time when adult females lay eggs on the trunk and the newly hatched caterpillars begin to tunnel into the wood.

*Source of images on this page: Colorado State University Extension.*

**Western Spruce Budworm:**

Western spruce budworm (*Choristoneura freemani*), a native insect, feeds upon and defoliates Douglas-fir, true fir (e.g. subalpine fir and white fir) and spruce trees. Damage is caused by larvae feeding on the buds and current year's foliage, causing a reddish-brown hue in the tips of branches and treetops. The best controls are insecticides and natural predators.



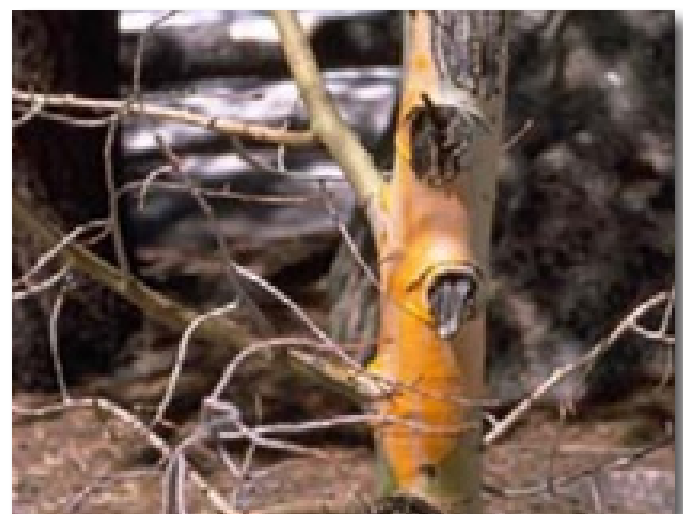*Source of four images above: Colorado State Forest Service.*



**Spruce Beetles:**

Spruce beetles (*Dendroctonus rufipennis*) are native bark beetles that infest Engelmann spruce (*Picea engelmannii*) and occasionally Colorado blue spruce (*P. pungens*) in high elevation forests in Colorado. The spruce beetle typically completes a generation in one to three years, with a two-year life cycle being the most common in spruce trees growing above 9,000 feet. Adults fly to seek new hosts in late May through July, preferring large diameter trees until they are depleted from the forest. Trap trees, removal of infected woody material, and preventive insecticide sprays are the best controls.

**Cytospora Canker:**

Cytospora canker is caused by various species of the fungus *Cytospora*. This pathogen can affect trees such as aspen, cottonwood, poplars, fruit trees, birch, maple, honeylocust, willow, mountain ash, spruce, and Siberian elm. The symptoms of this disease are yellow or orange-brown to black discolored areas on the bark of the trunk and branches. Liquid ooze and cankers or sunken dead areas of bark with black pinhead-sized speckling or pimples may be evident depending on the *Cytospora* species. The most effective preventative measure is to keep trees healthy and undamaged (by mowers, string trimmers). If a tree is infected with the pathogen, removal of infected plant parts and sanitation are effective practices.



*Source of two images above: Colorado State University Extension.*

**Bacterial Wetwood:**

Bacterial wetwood can be caused by a variety of bacteria such as *Enterobacter*, *Klebsiella*, and *Pseudomonas*. These bacteria are most prevalent in trees such as elm, cottonwood, and aspen, but can affect ash, maple, sycamore, poplar, and more. Symptoms include a yellow-brown discoloration of the wood in the center of the trunk. The affected wood is wetter than surrounding wood due to high internal pressure. This pressure causes a foul-smelling ooze to exit the tree. The bacteria are common in soil and enter primarily through root wounds. The best control for wetwood is prevention of damage to tree roots and stems.
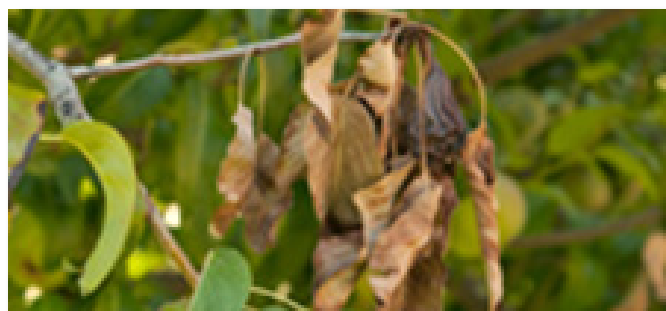




**Fire Blight:**

Fire blight is a bacterial disease (*Erwinia amylovora*) that affects certain tree species such as apple, pear, and crabapple. Symptoms include wet blossoms, light brown to blackened leaves, crooked twigs, and dried fruits. The bacteria can spread by insects, rain splash, and contaminated pruning tools. Controls include resistant varieties, cultural practices, pruning, and preventive sprays.

**Thyronectria Canker and Tubercularia Canker:**

Thyronectria canker (pictured) is caused by the fungus *nectrid (Thyronectrie) austro-americana* and Tubercularia canker is caused by the fungus *Tubercularia ulmea*. Both of these fungus affect honeylocust trees and kill living bark and outer wood. Symptoms include dieback of affected branches, reduced foliage, and early leaf drop. Cankers can be found on branches and trunks of honeylocust. The best control for cankers is to prevent wounds and promote tree vigor.
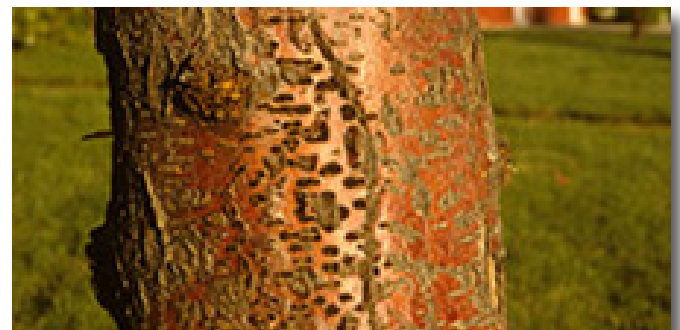


**Aspen and Poplar Leaf Spots:**

The fungus *Marssonina* (image A) causes the most common foliage disease on aspens and poplars. The fungus creates dark brown spots or flecks often with yellow halos. Other leaf spots include septoria leaf spot (*Septoria* fungus, image B), ink spot of aspen (*Ciborinia* fungus, image C), leaf and shoot blight (*Venturia* fungus, image D), and leaf rusts (*Melampsora*, image E). Proper identification of the leaf spot is crucial to determine treatment and control options to align with the fungus lifecycle.
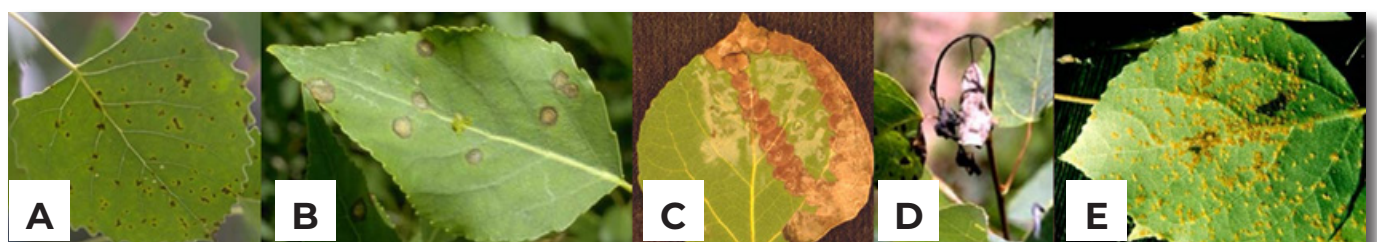


*Source of images on this page: Colorado State University Extension.*

## EAB MANAGEMENT PLAN SUMMARY

The City of Colorado Springs can choose to proactively manage the inevitable infestation of emerald ash borer or delay management until the beetles arrive and cause tension in an already strained budget. EAB has been in the U.S. since 2002 and the research shows that the best management strategy is a holistic, landscape-based response that is centrally managed resulting in minimized costs and maximized value of the remaining urban forest. This approach not only saves money, it reduces liabilities. A city that delays action or relies on a removals-only approach will be overwhelmed with public hazard trees and potentially the lawsuits that will follow. The time to act is now— before the infestation exponentially increases in population, and tree deaths escalate as seen in other cities. As the pest population increases and a greater number of trees die, the number of management options goes down.

The City should immediately act by conducting an inventory of ash trees that includes sampling and, preferably, the entire public tree population should be inventoried because of future pest and disease concerns for other tree species. From the inventory, Forestry should develop management scenarios and identify the necessary budget for various management intensities. Proper record keeping and up-to-date information is essential to adaptive management for EAB and future pests and diseases. Adequate staffing and resources to monitor trees and to educate the public for a shared commitment to the health of the urban forest is the only viable approach for a sustainable urban forest in Colorado Springs.

## DEFINITIONS

▶ **Trap trees**: Trees that are not removed and serve as a nesting and feeding location for pests such as emerald ash borer (EAB). These trees concentrate the pests in a more preferred location rather than impacting high-quality or high-value trees. The concentration of pests to the attractive trap trees reduces or slows the spread of the pest, specifically EAB.

▶ **Sink trees**: These trees are also referred to as trap trees. The terms are used interchangeably to describe the method of girdling standing trees to kill the tree and induce pheromone release that is attractive to pests such as the emerald ash borer (EAB).

▶ **Girdling**: Also called ring-barking, this process involves the complete removal of a strip of bark from around the entire circumference of either a branch or trunk of a woody plant. Girdling results in the death of the area above the girdle over time by cutting off the flow of nutrients.

▶ **Growing Degree-Day**: Measure of heat accumulation used by horticulturists, gardeners, and farmers to predict plant and animal development rates such as the date that a flower will bloom, an insect will emerge from dormancy, or a crop will reach maturity. Unless stressed by other environmental factors like moisture, the development rate from emergence to maturity for many plants depends upon the daily air temperature. Because many developmental events of plants and insects depend on the accumulation of specific quantities of heat, it is possible to predict when these events should occur during a growing season regardless of differences in temperatures from year to year. Growing degrees (GDs) is defined as the number of temperature degrees above a certain threshold base temperature, which varies among plant species.

## REFERENCES

12. State of Colorado, Emerald Ash Borer Response Team FAQs, 2015.
13. Colorado State Forest Service, Emerald Ash Borer: A Green Menace, www.csfs.colostate.edu, 2019.
14. City of Colorado Springs, Colorado
15. i-Tree Eco (www.itreetools.org) is software application designed to use field data from single trees, complete inventories, or random plots throughout a study area to quantify forest structure, environmental effects, and value.
16. Hafner, J.M, Orange, J.M, (2015). Model Emerald Ash Borer Management Plan
17. McCullough, D.G., Mercader, R.J., (2012). Evaluation of potential strategies to SLow Ash Mortality (SLAM) caused by emerald ash borer (*Agrilus planipennis*): SLAM in an urban forest. International Journal of Pest Management, Vol. 58, No. 1, January – March 2012, 9-23.
18. Herms, D., Systemic Insecticide Technology for Tree Care, Department of Entomology, Ohio State University, Ohio Agricultural Research and Development Center.
19. Hahn, J., Herms, D.A., McCullough, D.G., (2011). Frequently Asked Questions Regarding Potential Side Effects of Systemic Insecticides Used to Control Emerald Ash Borer, University of Minnesota Extension.

# URBAN FOREST
# MANAGEMENT PLAN
## COLORADO SPRINGS, COLORADO | OCTOBER 2020

COLORADO
SPRINGS
OLYMPIC CITY USA

PLANIT GEO™
mapping a greener future