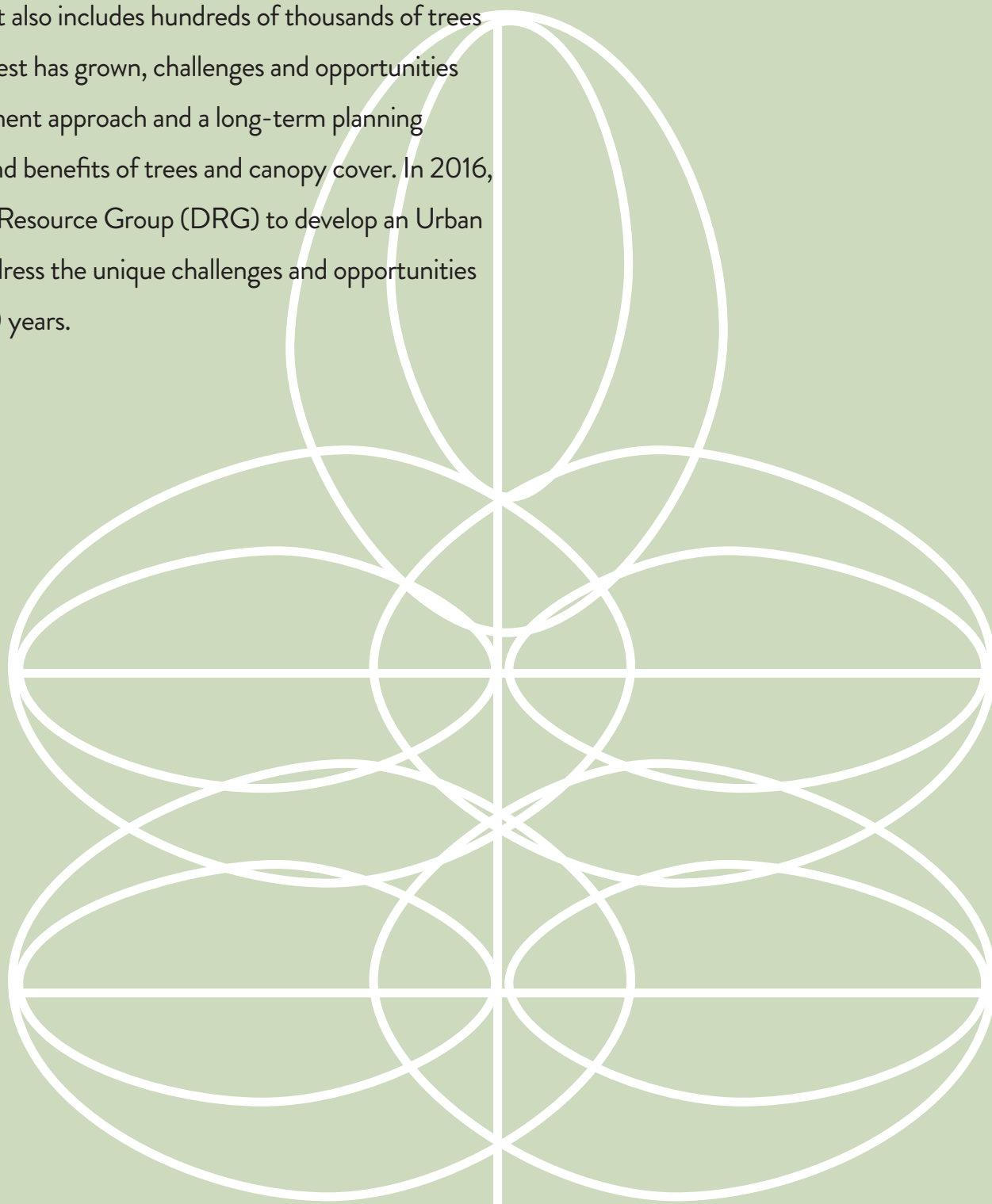


CREATING AN URBAN FOREST STRATEGIC PLAN

Boulder's community urban forest includes approximately 50,725 inventoried public street and park trees, managed by the City of Boulder, primarily by the City Forestry Division. These trees are a subset of the overall urban forest that also includes hundreds of thousands of trees on public and private property. As the urban forest has grown, challenges and opportunities have emerged that require a proactive management approach and a long-term planning strategy to preserve the health, sustainability, and benefits of trees and canopy cover. In 2016, the City of Boulder contracted with the Davey Resource Group (DRG) to develop an Urban Forest Strategic Plan (UFSP) to specifically address the unique challenges and opportunities Boulder's urban forest will face over the next 20 years.



Boulder Parks & Recreation

Tree Speak Open House | March 9, 2017 | Boulder Urban Forest Strategic Plan
Project lead: Kathleen Alexander, 303-441-4406

THE PROCESS

PRE-PLANNING (completed)

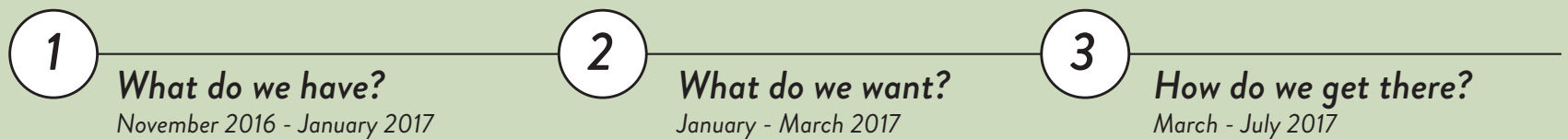


In response to recent and potential impacts to Boulder’s urban tree canopy, Boulder’s Parks and Recreation Department will complete a broader scope Urban Forest Strategic Plan. The plan will capitalize on the recently completed public tree inventory and make recommendations for urban tree management for city parks and street rights-of-way. The Urban Forest Strategic Plan (UFSP) will also allow for a more comprehensive community-wide discussion of the following topics:

Establishment of a baseline figure for urban tree canopy and long term canopy goals;

- Tree diversification goals;
- Urban heat island mitigation;
- Prioritization of tree planting activities;
- Pesticide use guidelines for public trees;
- Appropriate pesticide use guidelines for private property owners treating public street trees;
- Placement and selection of tree species that are compatible with optimizing rooftop solar capture capacity;
- Public outreach and education regarding the benefits of the urban canopy

PLAN DEVELOPMENT (IN PROGRESS)



Phase I of the development process for the Urban Forest Strategic Plan (UFSP) included a comprehensive review of the history of Boulder’s urban forest, including establishment, management, and regulatory policies, as well as interviews with key stakeholders (internal and external). In addition, Davey Resource Group (DRG) examined organizational structure along with staffing, equipment, and funding resources.

The Summary Report will inform the development of the UFSP, specifically identifying and discussing the existing urban forest resource and management structure, including:

- Structure and condition of urban forest resources
- Environmental and socio-economic benefits from the urban forest
- Ordinances, regulations, and policies
- Community vision and priorities
- Staffing and funding
- Stakeholder input

Next Steps

Phase 2:

Evaluate and prioritize goals. Establish a working group of community members to submit feedback and recommendations

Phase 3:

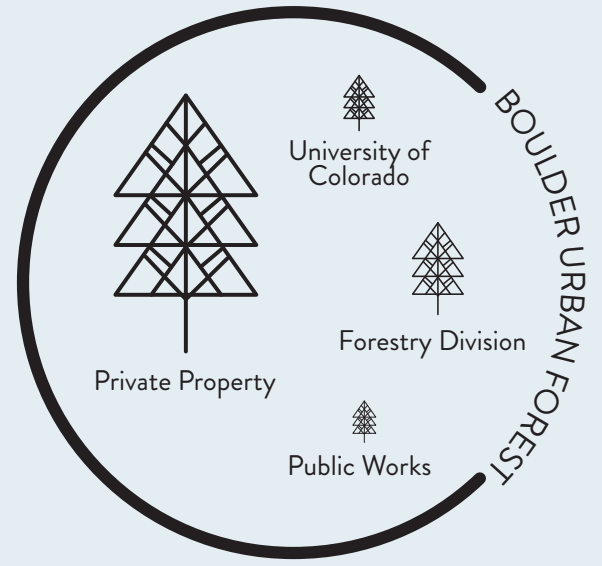
Based on outcomes of Phase 2, create action items and initiatives along with a timeline to execute Strategic Plan

The Boulder Forestry Division has contracted Davey Resource Group (technical) and Two Forks Collective (community outreach) to assist in the completion of the Urban Forest Strategic Plan.



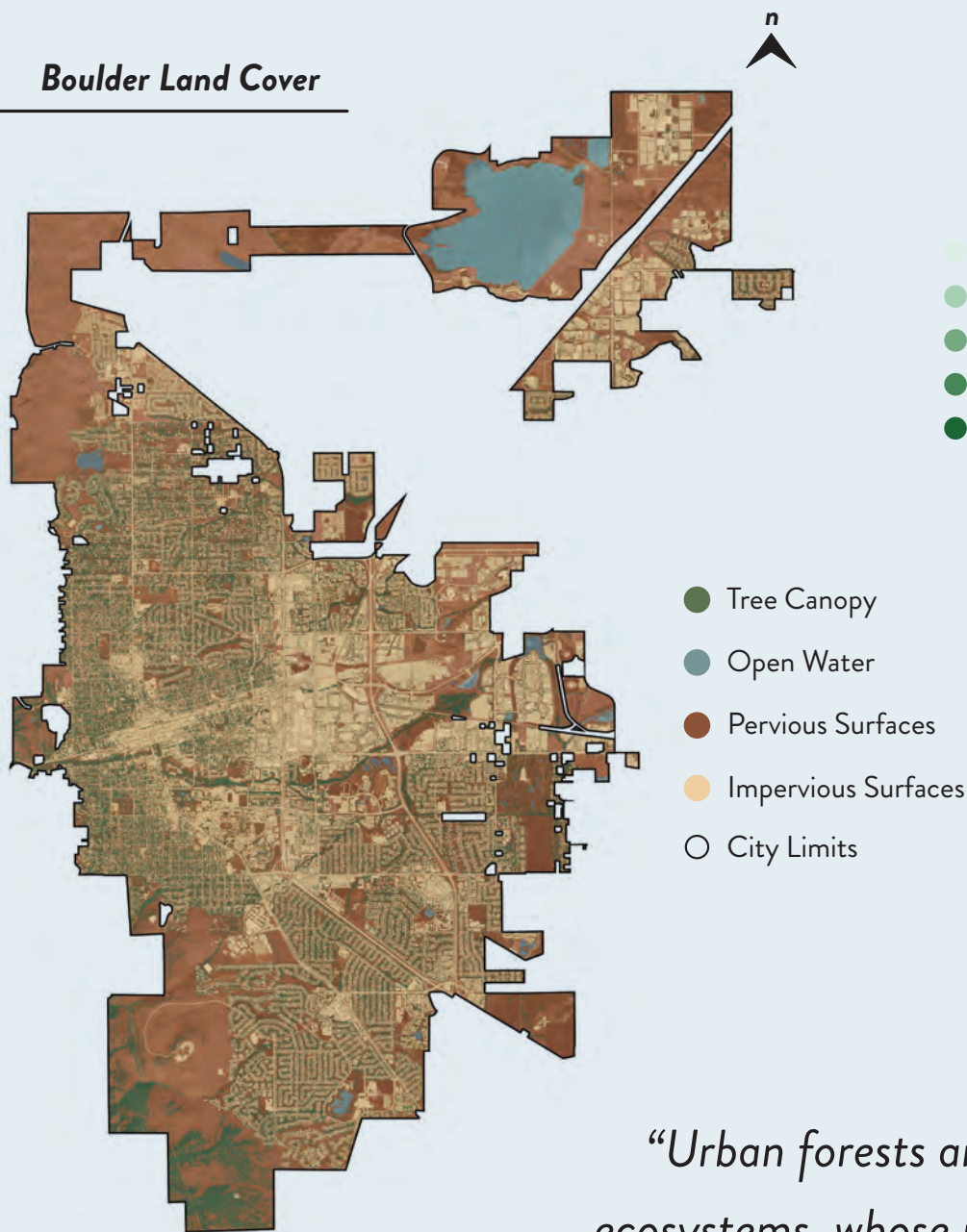


WHAT IS AN URBAN FOREST?

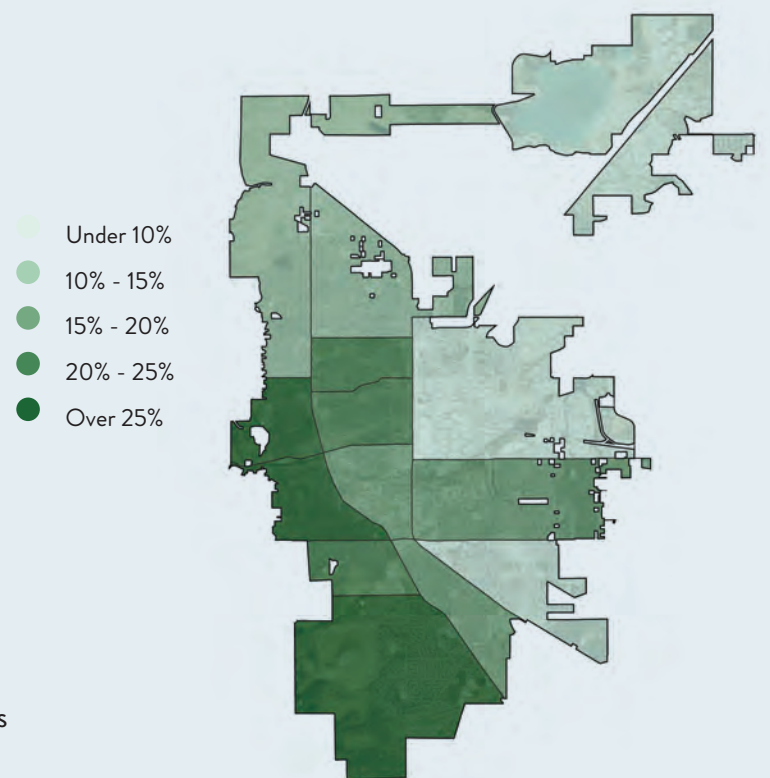


The Urban Forest refers to the population of all public and private trees and shrubs that grow within an urban area. And within this context of the greater Boulder Urban Forest, we are referring to the subset of Boulder’s Tree population that is carefully tended and managed by The Boulder Forestry Division.

Boulder Land Cover



Tree Canopy by Maintenance Area



“Urban forests are an integral part of community ecosystems, whose numerous elements – such as people, animals, buildings, infrastructure, water, and air – interact to significantly affect the quality of urban life.”

-Nowak- Sustaining America’s Urban Forest



50,725 public trees

237 unique tree species

The top 5 species are: Green ash, Siberian elm, Honeylocust, Silver maple and Cottonwood

BY THE NUMBERS

91% of the trees are in fair or better condition.

651 acres of public canopy cover

That's about 4% of the overall land area in Boulder

Replacement of Boulder's 50,725 public trees with trees of similar size, species, and condition would cost nearly \$110 million.

Annually, Boulder's public trees provide cumulative services to the public at an average value of **\$102 per tree**, for a total value of nearly **\$5.2 million per year**. These annual services include:

Reducing electricity and natural gas use through shading and climate effects.

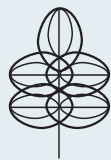
Improving air quality, including removal and avoidance of pollutants.

Increasing property values, human health, community aesthetics, and socioeconomics.



\$442^K

Combined annual value of electric and gas consumption reduction



2,254

Tons of atmospheric carbon that public trees capture



30.6^M

Gallons of storm water that public trees intercept

GOOD RETURN. When the annual investment of nearly \$1.17 million for the management of the public urban forest is considered, the annual net benefit (services minus investment) for the community is over \$4 million, an average of \$39 per tree. In other words, for every \$1 invested in public trees, the community receives \$4.46 in services.

THREATS TO OUR FOREST



INVASIVE INSECTS AND DISEASES

Dutch Elm Disease (DED | *Ophiostoma fungus*) Spread by the elm bark beetle, DED is responsible for the demise of over 1,300 large American elms in the city (over 30,000 statewide).

Emerald Ash Borer (EAB) This invasive insect will impact about 6,000 public and 70,000 private ash trees in Boulder.

Thousand Cankers Disease (TCD | *Geosmithia fungus*) Spread by the walnut twig beetle, TCD is responsible for the mortality of nearly 1,000 black walnuts in the city.

Drippy Blight (*Kermes Scale and Lonsdalea Enterobacteria*) A bacterial associate of this common insect pest increases red and pin oak tree dieback and mortality. Research is currently underway to determine if effective control options are available.

Thousand Canker Disease (TCD | *Geosmithia fungus*) Spread by the walnut twig beetle, TCD is responsible for the mortality of nearly 1,000 black walnuts in the city.



SEVERE WEATHER

Drought As water drives internal processes from photosynthesis to root growth to nutrient uptake, prolonged drought makes trees more susceptible to pests or leads to mortality.

Snow and Ice Excess weight on branches can cause breaks or internal cracks. Cold snaps after trees have broken bud can cause tissue damage and defoliation. De-icing chemicals can cause salt burn on foliage, create undesirable soil conditions and compromise overall plant health.

Extreme Temperatures Unseasonably warm or cold temperatures can cause tissue damage or dehydration. Extreme temperature fluctuations may lead to dead branches or mortality.

Wind Trees can bend and/or fall during wind events.

Climate Change Changing temperatures and precipitation patterns are expected to alter the palette of trees and the respective pests that can survive or flourish in Boulder.



DEVELOPMENT

Increased development and population growth along the Front Range could divert available water from landscapes. Land development can impact established tree canopy, however, landscaping and irrigation accompanying new structures can contribute to a healthy, sustainable tree canopy

#TREEOPP

In 2016, a Knight Cities Foundation grant allowed the City of Boulder to partner with Bridge House, a local nonprofit that assists individuals experiencing homelessness, and BLDG 61 Makerspace to develop the TreeOpp program which employs local artisans to train apprentices with Bridge House's Ready to Work program to use ash wood debris to craft wood products, such as furniture and crafts that can be purchased by the community.



THE CITY FORESTRY DIVISION

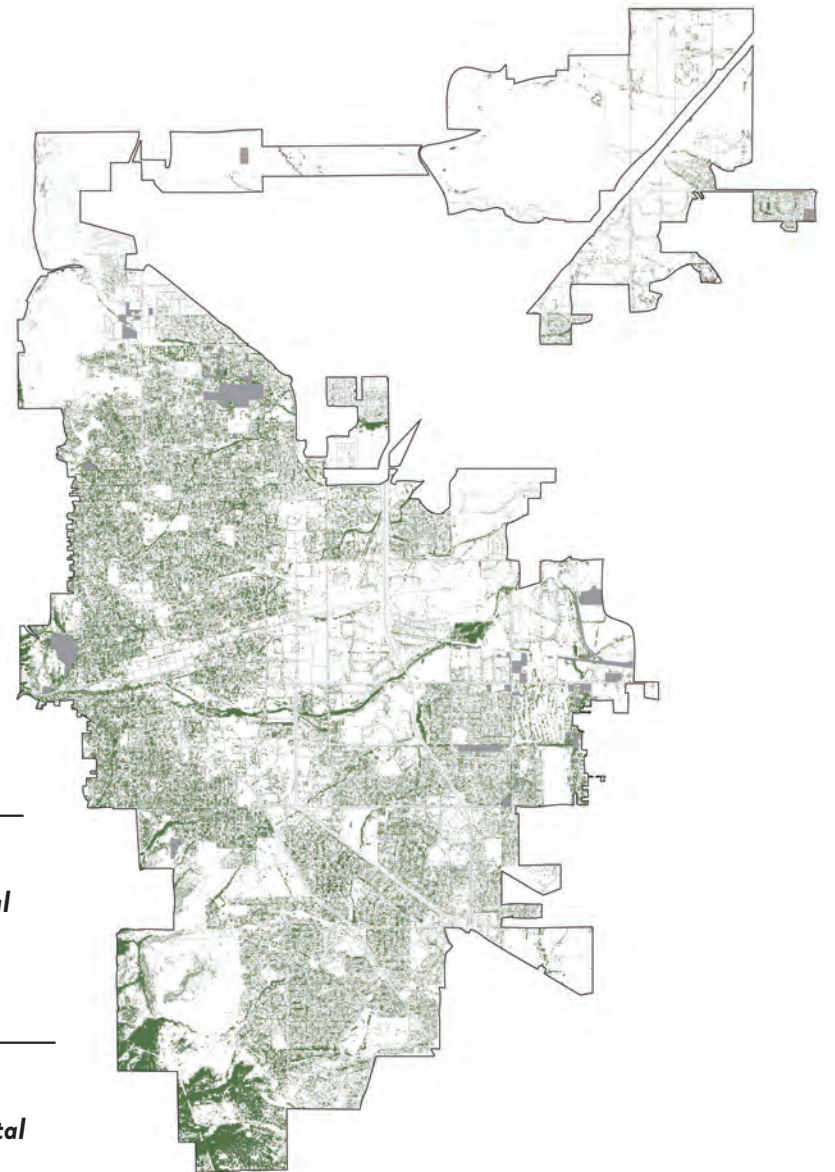
The City Forestry Division is committed to maintaining healthy and safe city trees as well as preserving an extensive and diverse tree cover for future generations. The City's existing well-trained Forestry staff include Certified Arborists and Qualified Tree Risk Assessors. These programs set Boulder ahead of other communities and illustrate the City's commitment to maintaining a diverse, healthy tree population for all to enjoy.

The following are some of City Forestry's programs and duties:

- ✿ Rotational pruning for tree health and safety of both trees in city parks and in the public street rights-of-way
- ✿ Tree planting
- ✿ Removal of dead, diseased/infested or potentially dangerous trees
- ✿ Tree safety inspections
- ✿ Integrated pest management
- ✿ Commercial tree program
- ✿ Providing development design review and enforcement of tree protection codes for public trees
- ✿ Arborist licensing
- ✿ Emergency response after major storm events
- ✿ Tree watering and mulching
- ✿ Tree inventory database maintenance



OUR CANOPY*



Percentage of Canopy Cover **15.89%**

Number of Canopy Acres **2,773 acres**

Planted: Average Past 20 years** **260^{annual} / 5,200^{total}**

Removed: Average Past 20 years** **300^{annual} / 6,000^{total}**

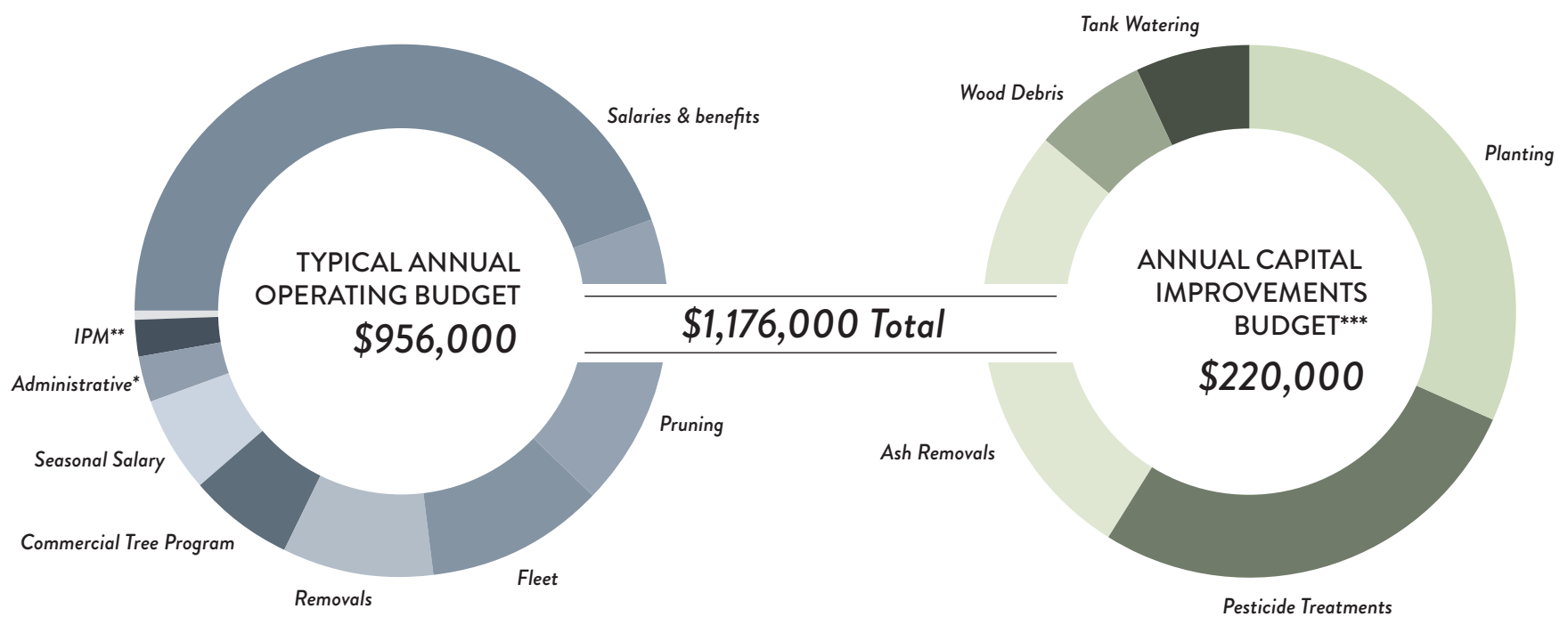
Environmental Benefit **\$876,155**

Stormwater Benefit 1,500,357 gallons at \$177,016 value
Carbon Benefit 18,709 tons at \$676,508 value
Air Quality Benefit 278,780 pounds at \$22,631 value

*Data based on 2013 canopy assessment
 **Does not reflect private property or other city projects

CITY FORESTRY BUDGET AND FUNDING

The City Forestry budget includes funds from the general fund and Parks and Recreation Sales Tax, as well as limited-term Capital Improvement Program (CIP). Currently, CIP funds are being used to address emerald ash borer management, and past uses have included tree planting campaigns and tree inventory database updates. The following characterizes typical actual City Forestry expenses over the past 3 years (2014 - 2016):



*Administrative may include landscape supplies, other tree care activities, training, cell phones, technology, etc
 **IPM refers to non-emerald ash borer pesticide applications
 ***Percent of budget allocated for ash removals will increase annually as EAB progresses over the next five years

CANOPY 2037

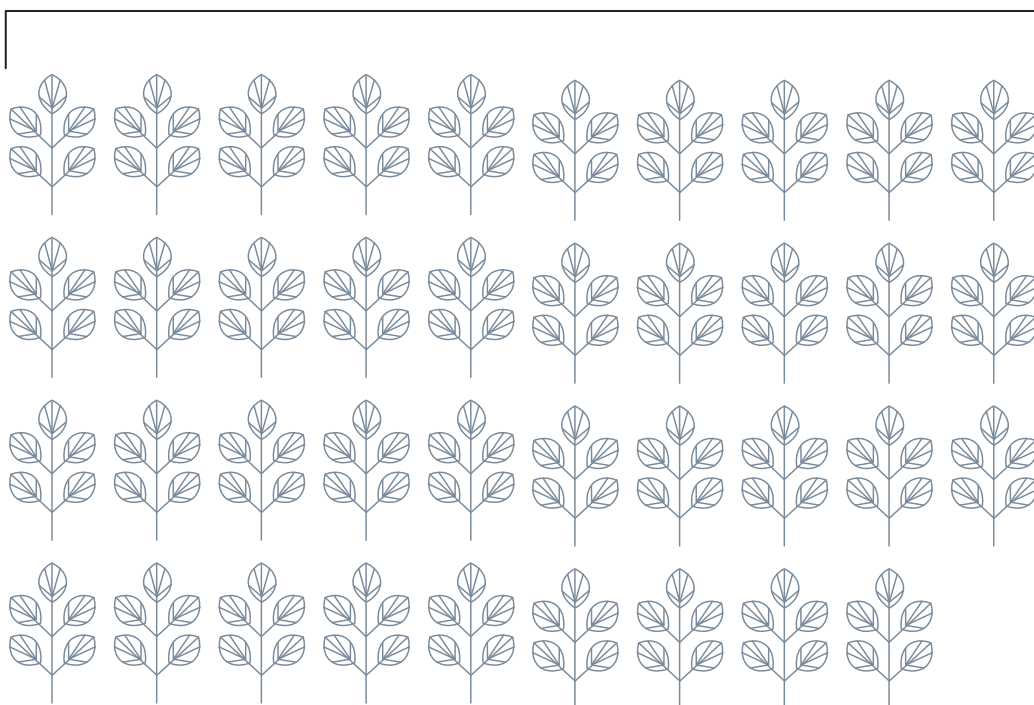
It is estimated that by the year 2037, **160,000 public and private trees will be removed**. Our planning now will define how we will maintain a vibrant and vital canopy. As you will see in the following scenarios there is a lot of work to be done over the next twenty years to maintain our current level of canopy coverage.

While we can't predict the future, we can anticipate tree and canopy change over the next 20 years. These canopy scenarios were developed based on mapping existing canopy, then applying change factors such as tree planting, normal tree mortality, and insects and diseases that currently exist in Boulder.

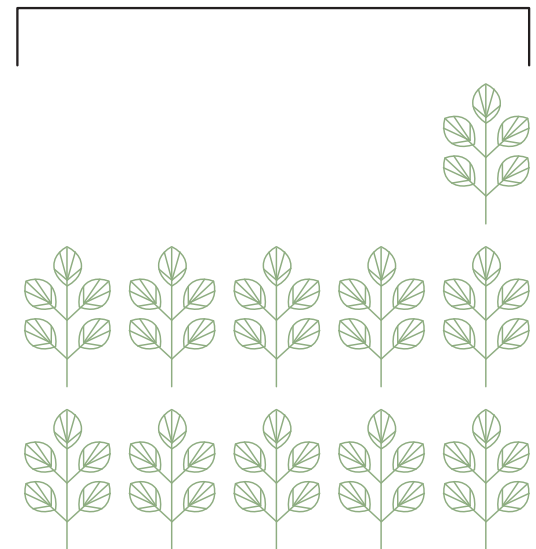
Also note, the tree canopy takes time to develop, and newly planted trees provide little impact on overall canopy area. Therefore, in order to achieve the canopy growth projected for 2037, trees would need to be planted in the first 5- 10 years of the scenario.

Total Acres of Boulder Tree Canopy: 2,773*

Private Trees



Public Trees



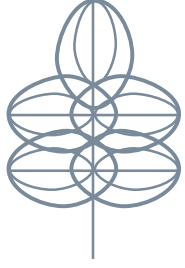
*Based on 2013 assessment

1 CANOPY LOSS 2037

28% Canopy loss*

1,997
Canopy Acres

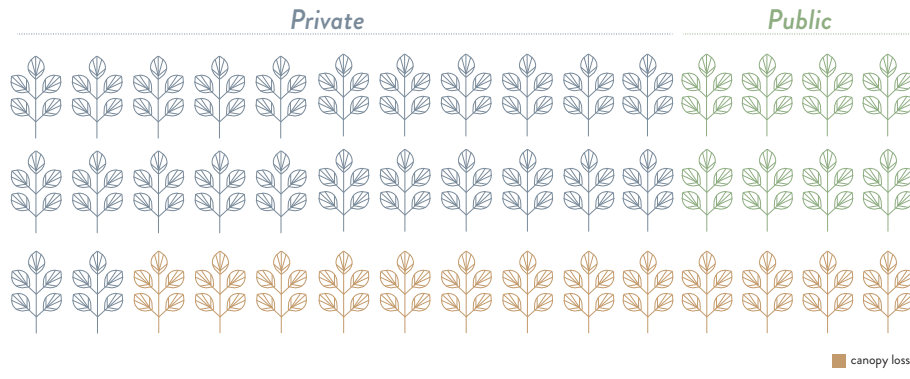
-776
Acre loss



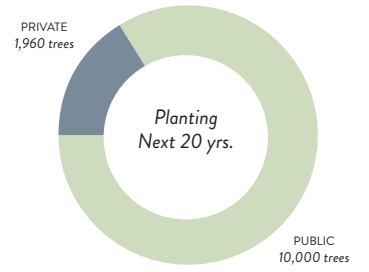
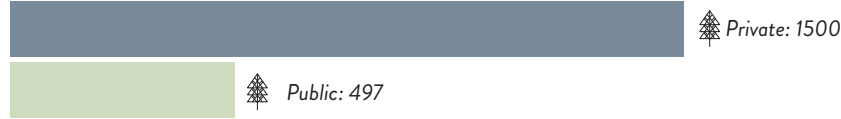
\$634,439

Annual Average
Environmental Benefit

28% CANOPY LOSS



ACRES OF CANOPY COVERAGE – PRIVATE VS. PUBLIC



City of Boulder

Planting (trees) **500** ANNUAL
10,000 20YR-TOTAL

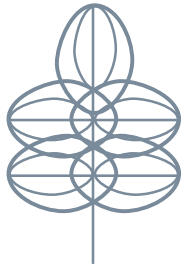
Planting Investment **\$187,500** ANNUAL
\$3,750,000 20YR-TOTAL

2 NET NEUTRAL 2037

0% Canopy Growth*

2,773
Canopy Acres

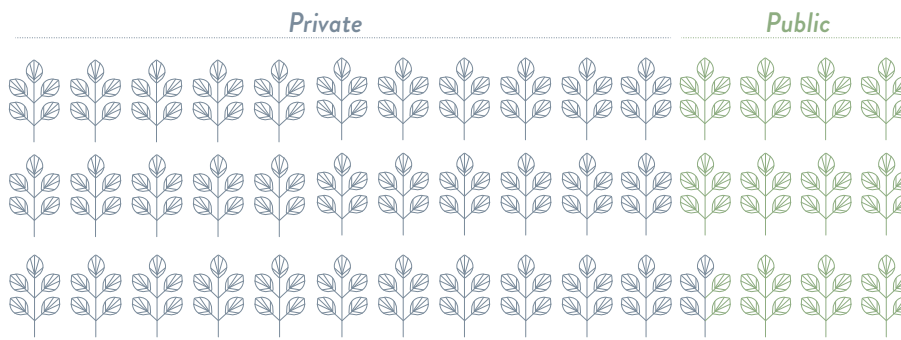
0
Acre loss



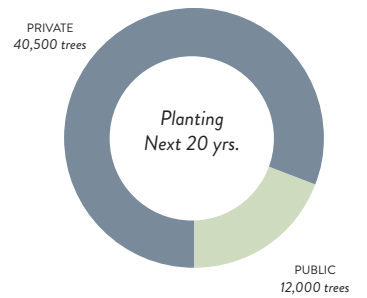
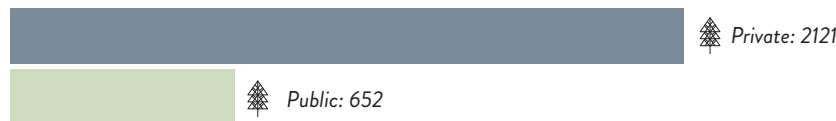
\$876,155

Annual Average
Environmental Benefit

0% CANOPY LOSS



ACRES OF CANOPY COVERAGE – PRIVATE VS. PUBLIC



City of Boulder

Planting (trees) **600** ANNUAL
12,000 20YR-TOTAL

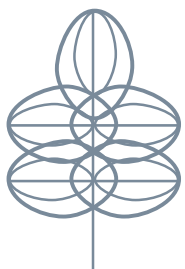
Planting Investment **\$225,000** ANNUAL
\$4,500,000 20YR-TOTAL

3 CANOPY GROWTH 2037

6% Canopy Growth*

2,939
Canopy Acres

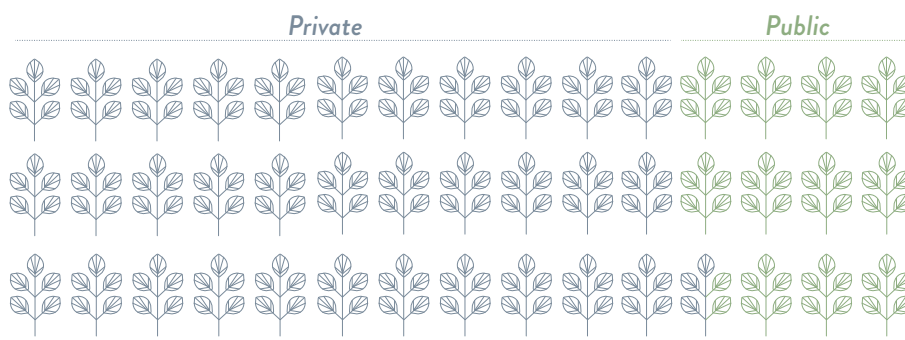
166
Acre gain



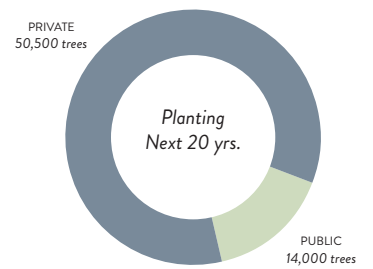
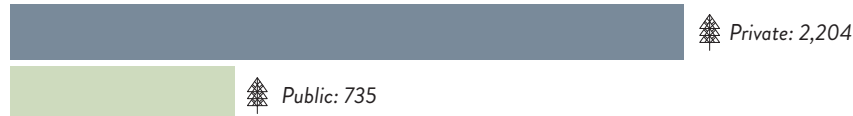
\$931,296

Annual Average
Environmental Benefit

6% CANOPY GAIN



ACRES OF CANOPY COVERAGE – PRIVATE VS. PUBLIC



City of Boulder

Planting (trees) **700** ANNUAL
14,000 20YR-TOTAL

Planting Investment **\$262,500** ANNUAL
\$5,250,000 20YR-TOTAL

*Percentage of canopy change based on 2,773 acres. All figures are estimates based on current data and future projections. Figures based off of \$375/tree.



For more information, visit
BranchingOutBoulder.org



Boulder Parks & Recreation