



***Bloomington, Indiana
State of the Urban Forest Results***

Completed by: Davey Resource Group

What is an Urban Forest?

Why measure an Urban Forest?

You can't manage what you can't measure

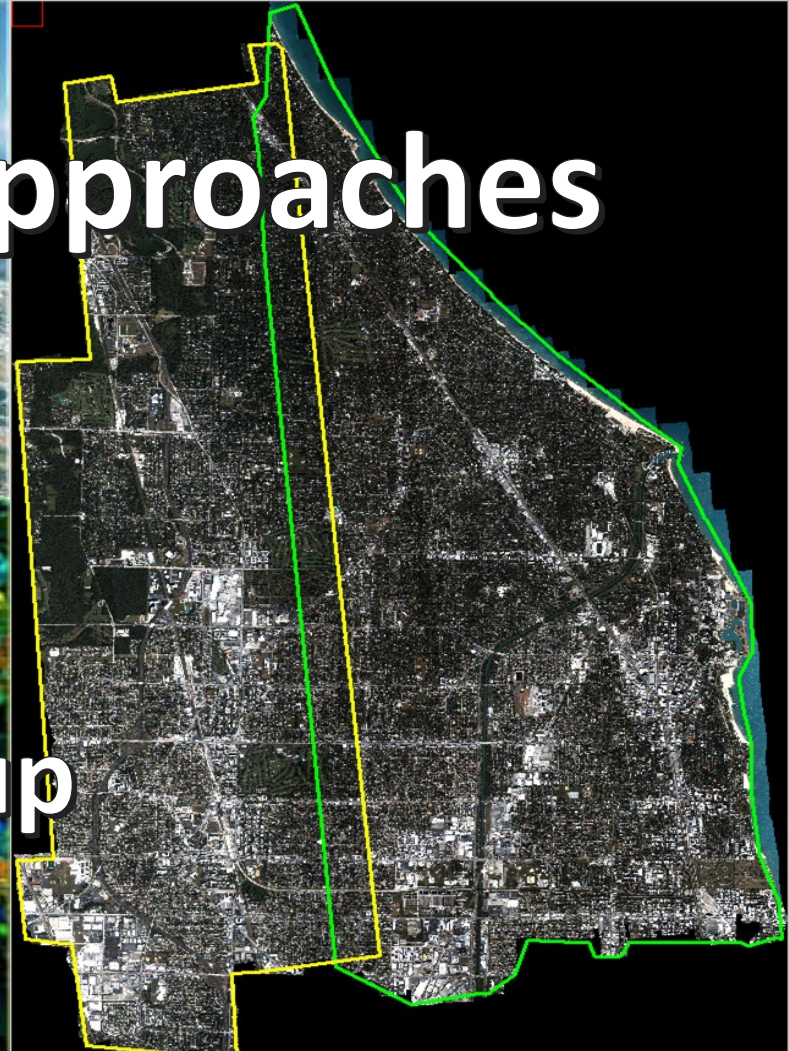
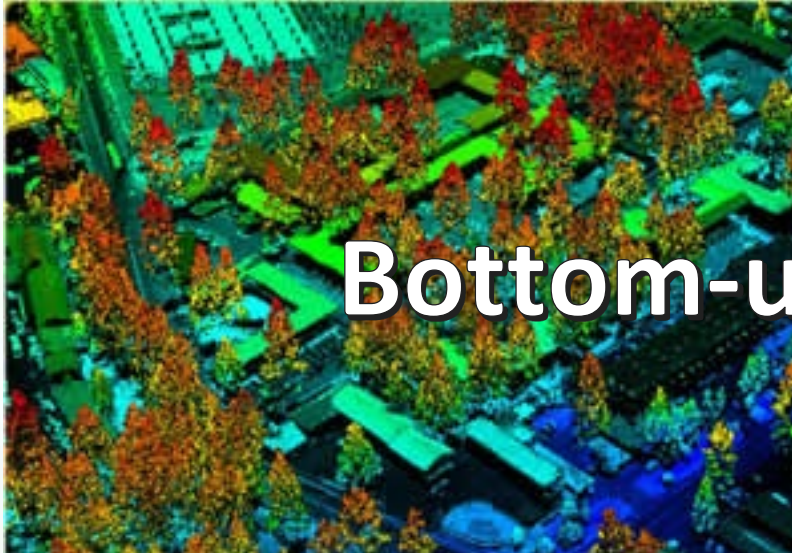
- ✓ Prioritize and schedule work.
- ✓ Budget predictions.
- ✓ Understand and plan for threats.
- ✓ Develop or measure progress towards goals.
- ✓ Report accomplishments.
- ✓ Communication and outreach.

Measurement Approaches

Bottom-up

A tree inventory provides information about individual trees; collectively the data can provide information about the benefit-services and reliance of the tree population.

Measurement Approaches



An urban tree canopy assessment provides information about public and private trees; collectively the data can provide information about the benefit-services and equity of the natural resource.

Sites included in the inventory:

- Trees, stumps, and vacant planting sites
- Located within the 237 miles of city maintained street ROW and 11 city parks
- Planting sites were identified as small, medium and large

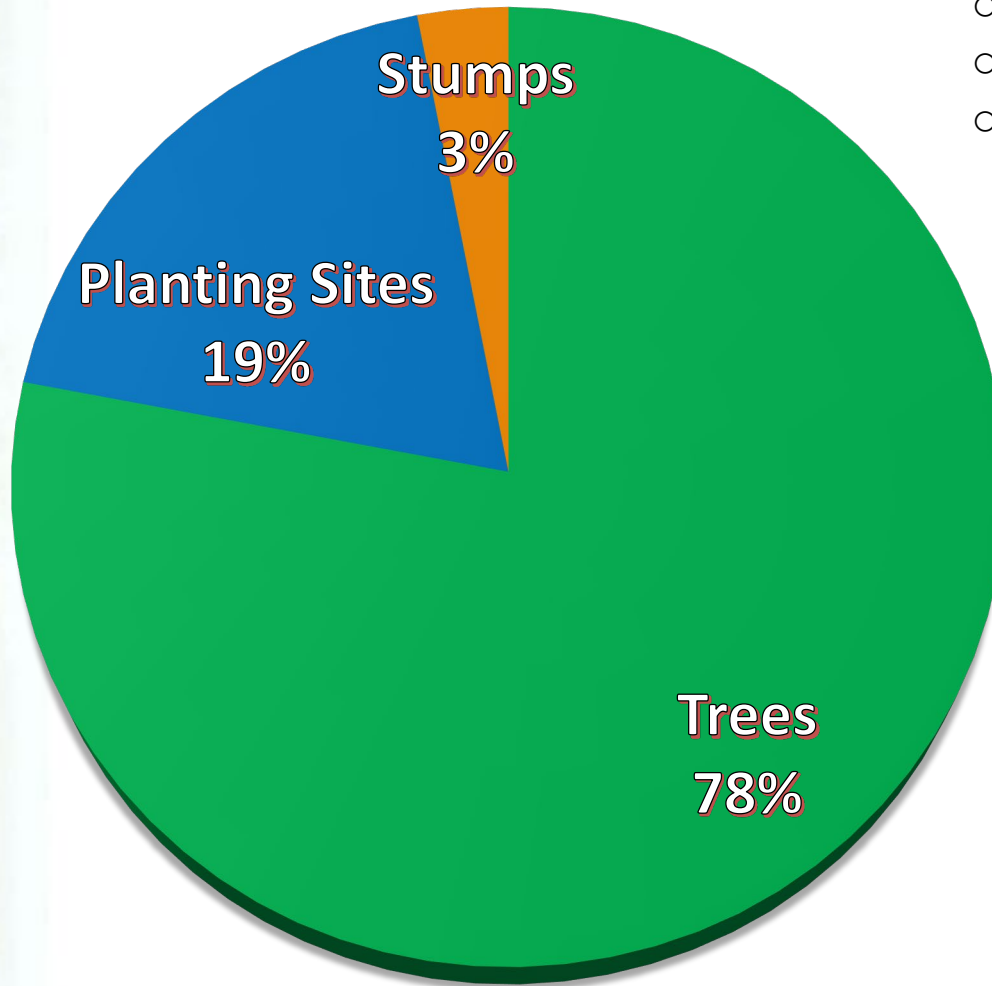
Data fields:

Location (Address)	Primary Maintenance Need
GIS X and Y	Defects
Species	Risk Rating
Diameter at Breast Height (DBH)	Further Inspect
Multi-Stem	Overhead Utilities
Tree Condition	Tree Grate

Data collection: February to August 2019

Types of Sites

24,371 Total sites



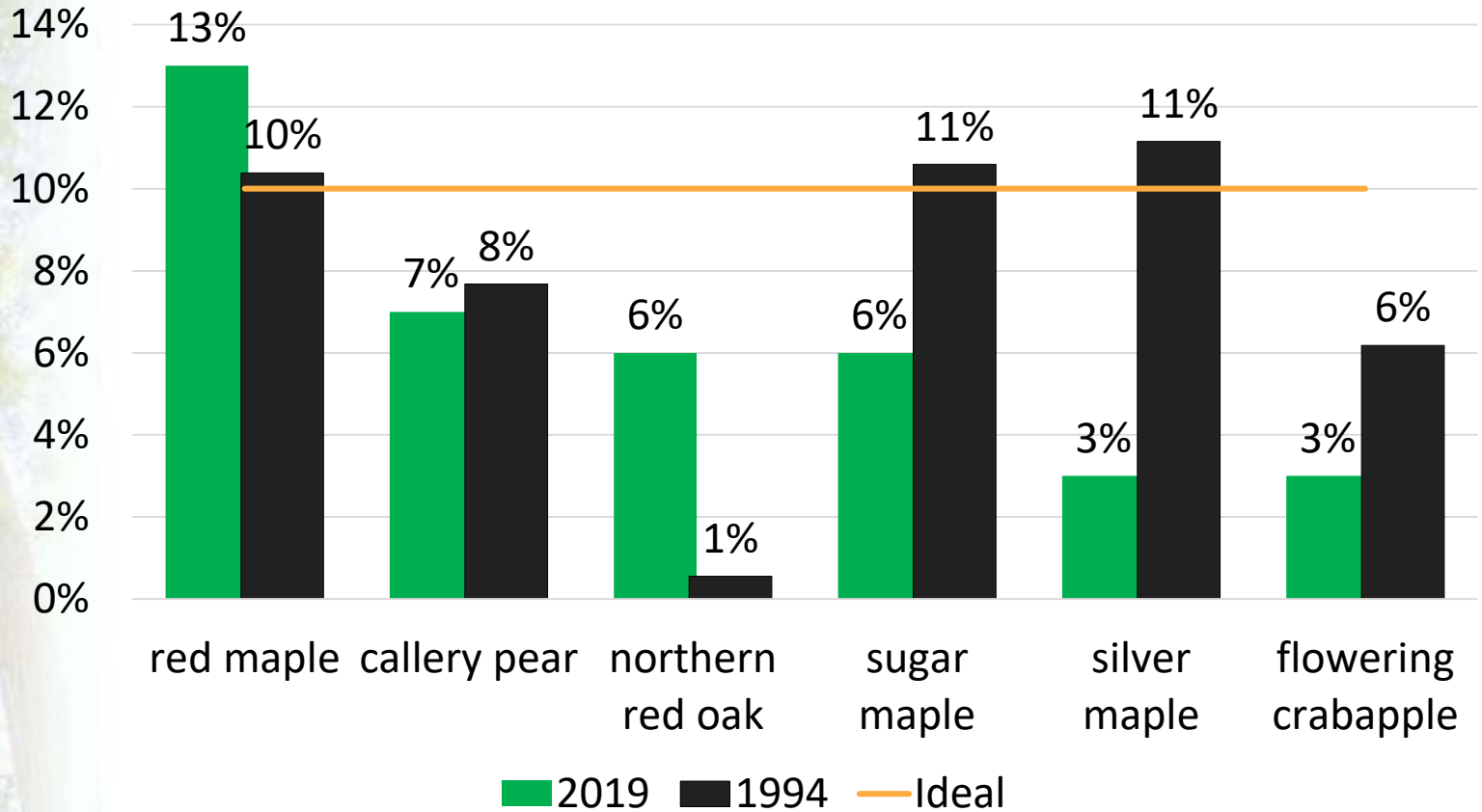
- 19,013 Trees
- 4,417 Plantings sites
- 741 Stumps
- Stocking Level 77%

1994 Inventory
10,522 Street Trees

2019 Inventory
17,541 Street Trees

Differences
Trees 7,019
Stocking Level -14%

Species and Genus Diversity



168 species representing 63 genera

2019 maple represents 24%

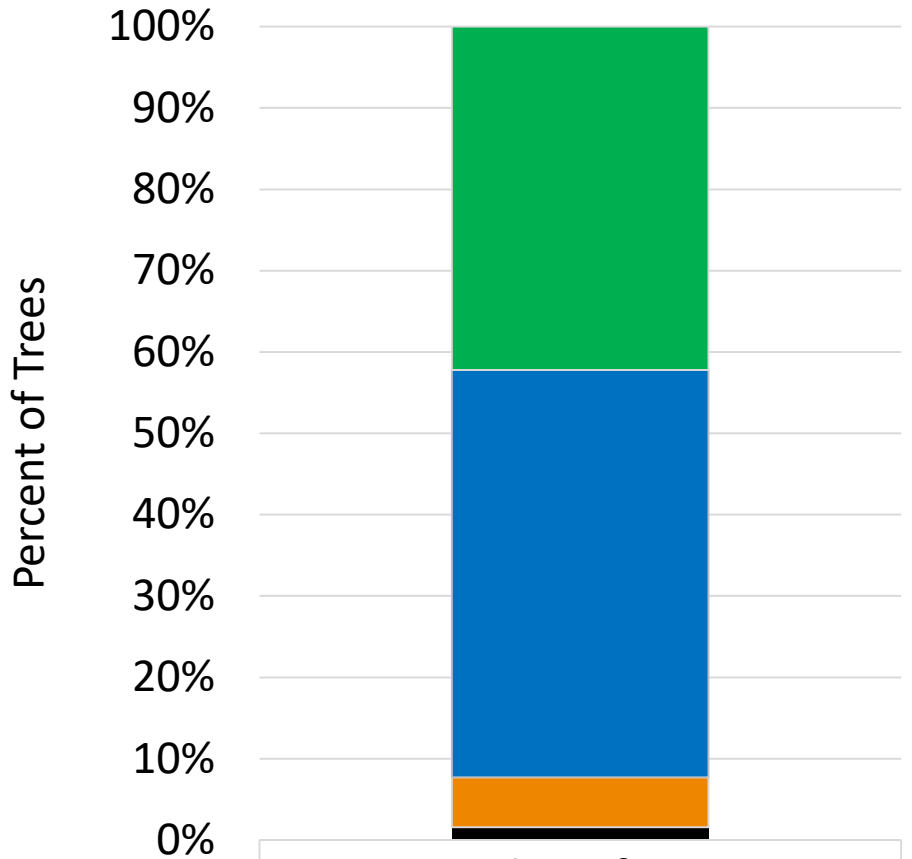
1994 maple represented 30%

Tree Condition

- Healthy population of Fair and Good condition trees make up 92% of all trees
- Poor and Dead make up 8%

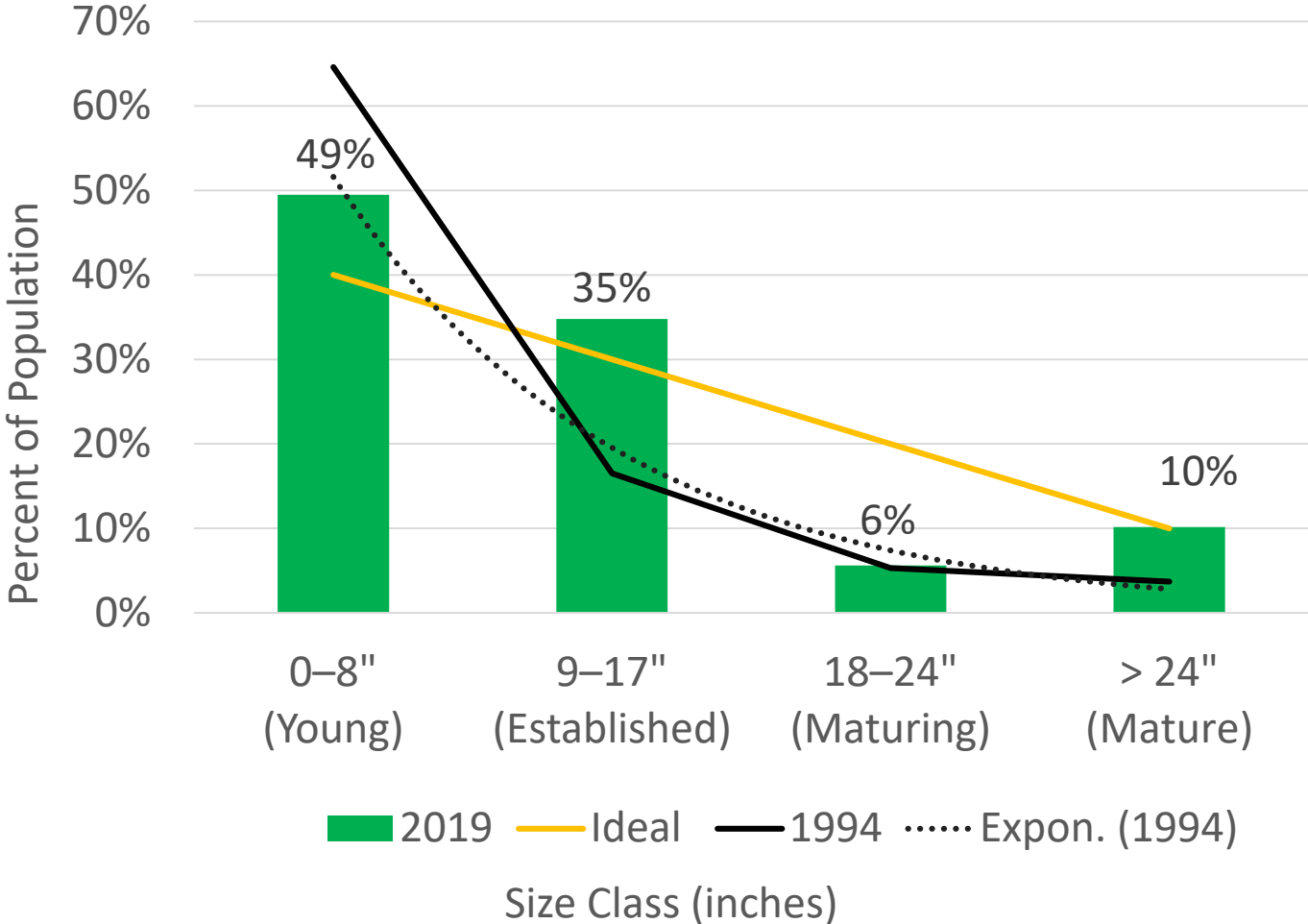
1994 Inventory
Healthy population 87%

Difference
Healthier by 13%

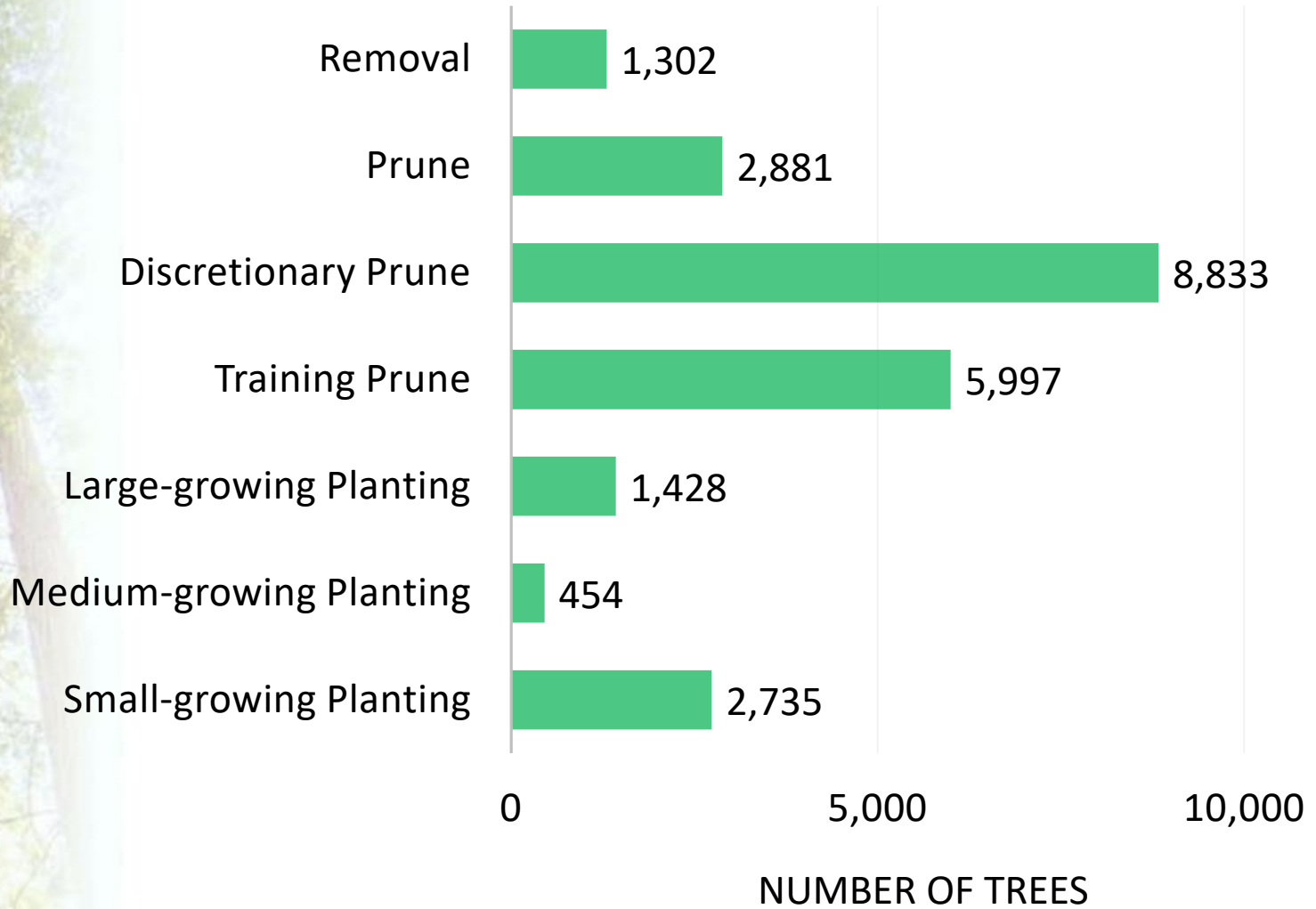


	Number of Trees
Good	8,022
Fair	9,522
Poor	1,170
Dead	299

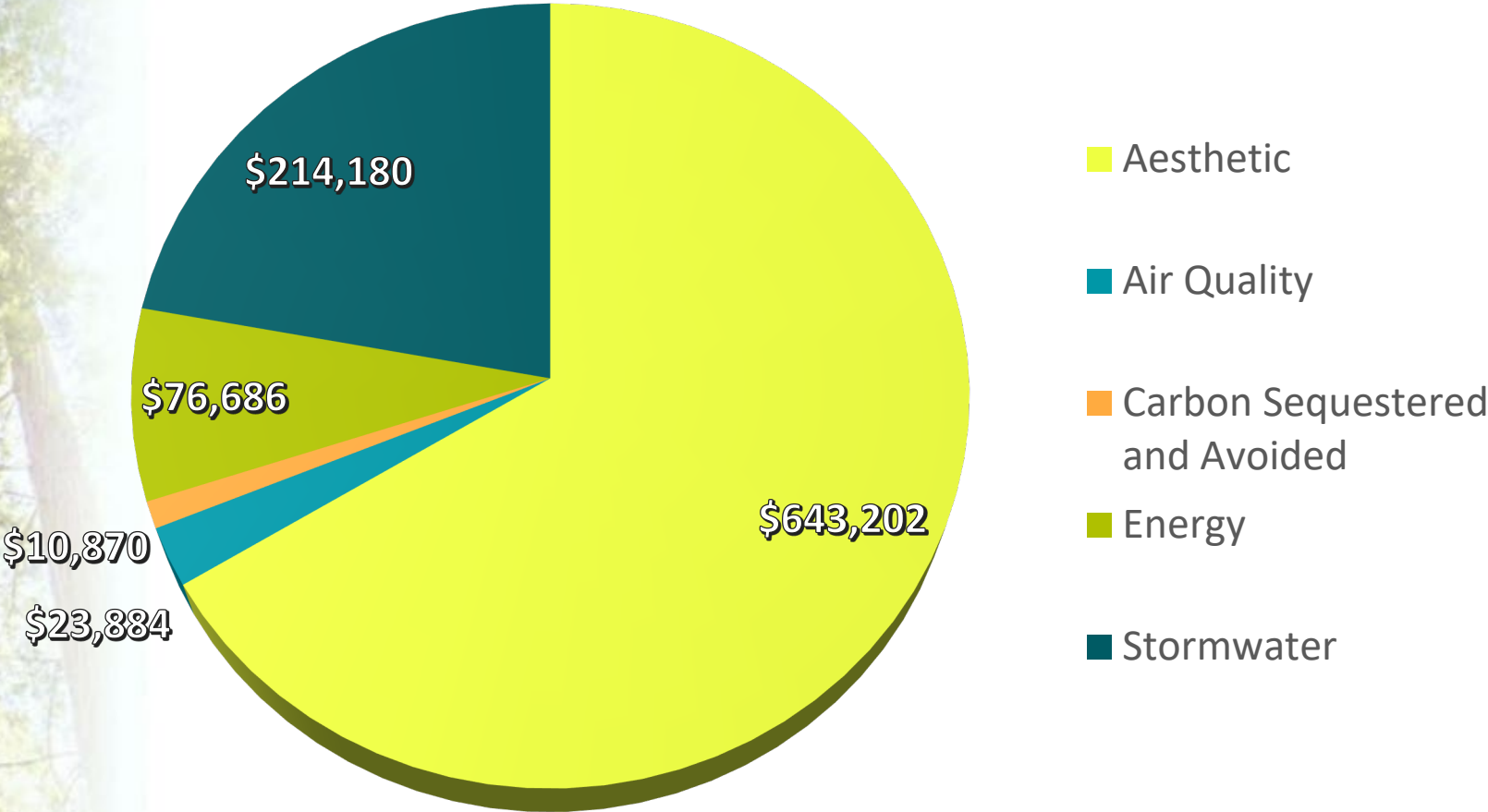
Diameter Class Distribution



Maintenance Needs



City-Managed Public Tree Benefits



Total Annual Benefit \$968,823

Benefit per capita \$11

Benefit per tree \$51

TreeKeeper Software

Bloomington uses Davey's TreeKeeper software; data was delivered in TreeKeeper, ESRI, and Excel.

TREEKEEPER

Welcome, Aren Flint (DRG)

Bloomington, IN

search

Tree Benefits

Trees Benefits
19,013 Calculated Trees
Total Yearly Eco Benefits \$968,822.68
Greenhouse Gas Benefits \$10,870.98 1,533,912.34 lbs CO ₂ avoided 2,145,410.34 lbs CO ₂ sequestered
Water Benefits \$214,179.99 34,545,160.38 gallons saved
Energy Benefits \$76,685.53 853,139.69 kWh saved 19,190.16 Therms saved
Air Quality Benefits \$23,883.75 16,229.75 lbs pollutants saved
Property Benefits \$643,202.43 2,200,292.98 leaf surface area (sq.ft.)

0 Total | 0 Queued

DAVEY
RESOURCE GROUP
A Division of The Davey Tree Expert Company

Land cover included in the urban tree canopy assessment:

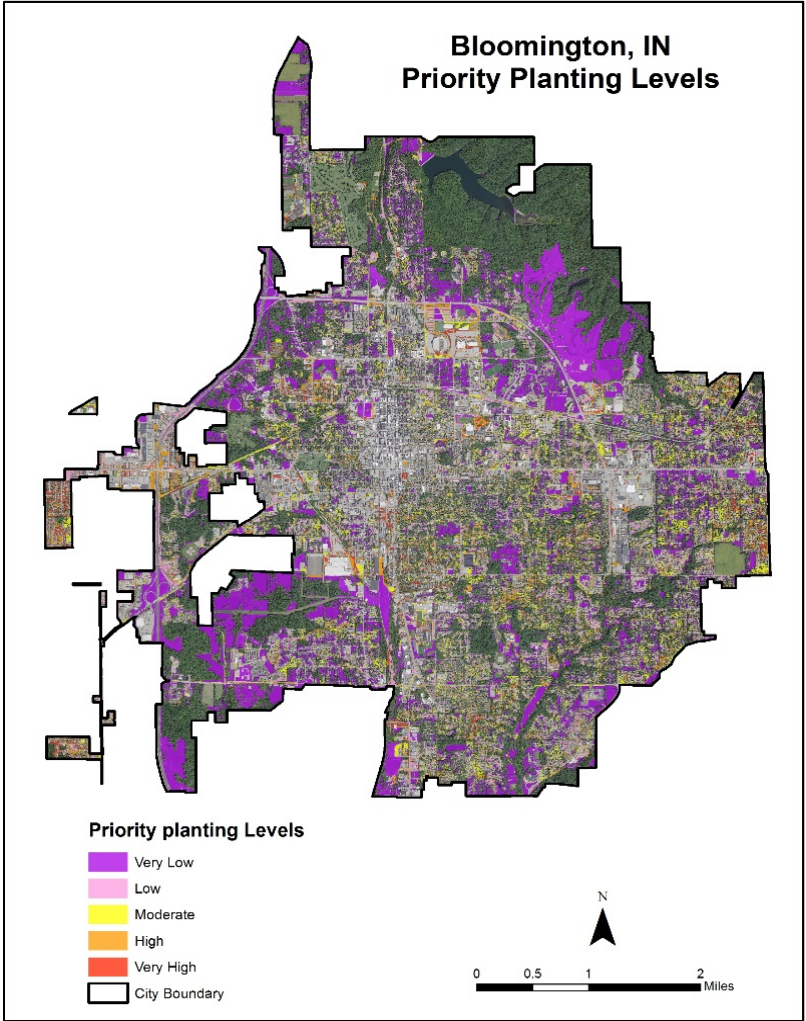
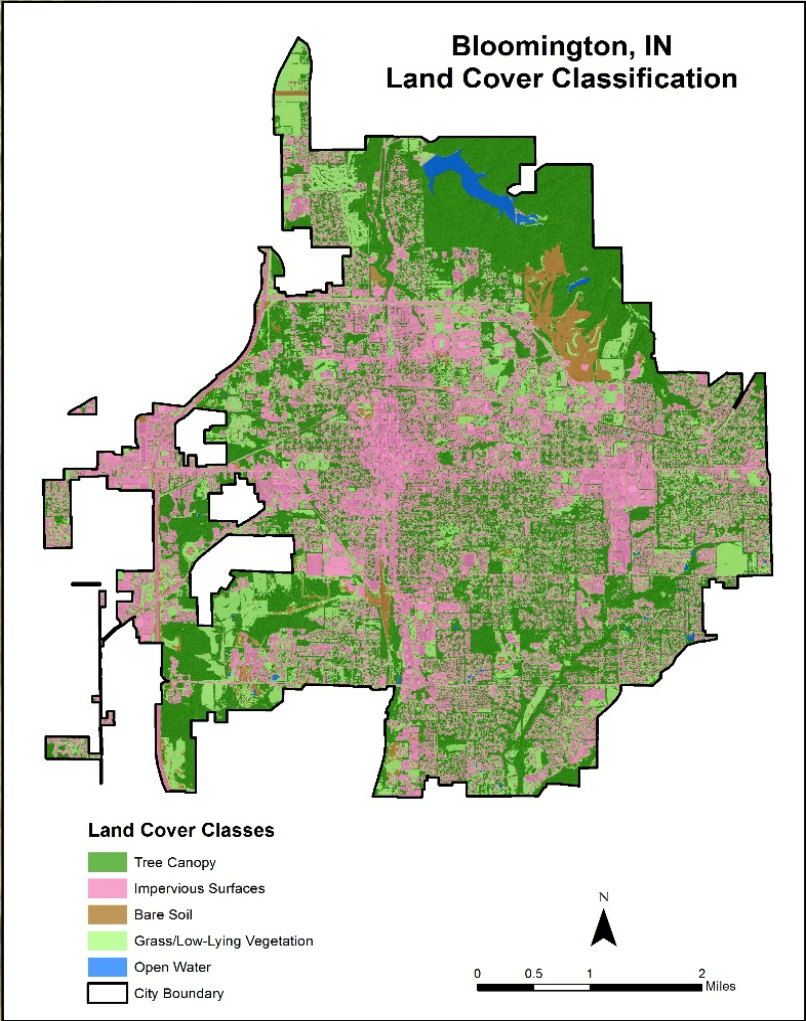
- Tree canopy, impervious surface, pervious surface, bare soil, and open water
- 15,000 acres citywide
- Plantable spaces were identified and ranked by priority

Results:

Tree canopy	5,735 acres
Impervious surface	5,064 acres
Pervious surface	3,641 acres
Bare soil	435 acres
Open water	125 acres

Data collection: 2018 National Agricultural Imagery Program (NAIP) leaf-on, multispectral imagery acquired and processed by the United States Department of Agriculture (USDA)

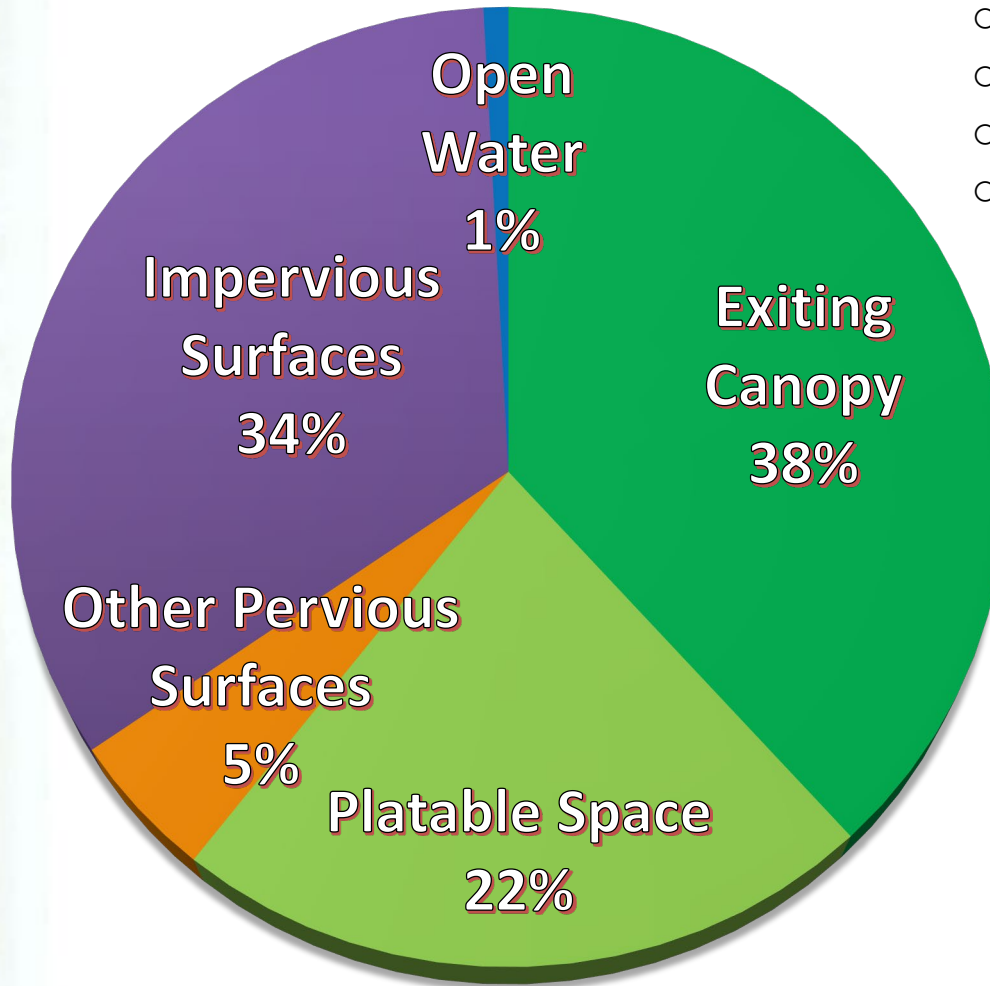
Land Cover and Prioritized Plantable Space



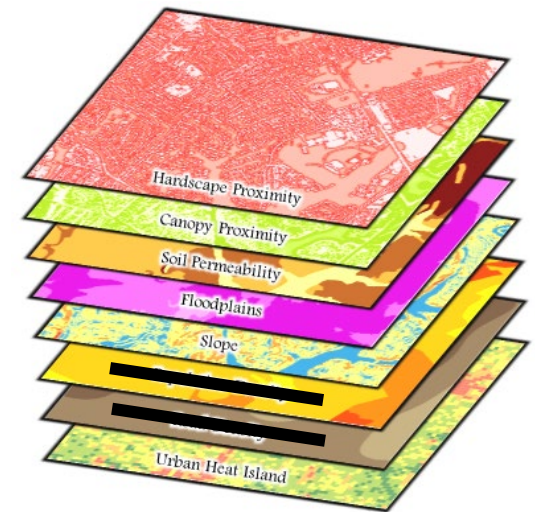
Maximum Tree Canopy

61%

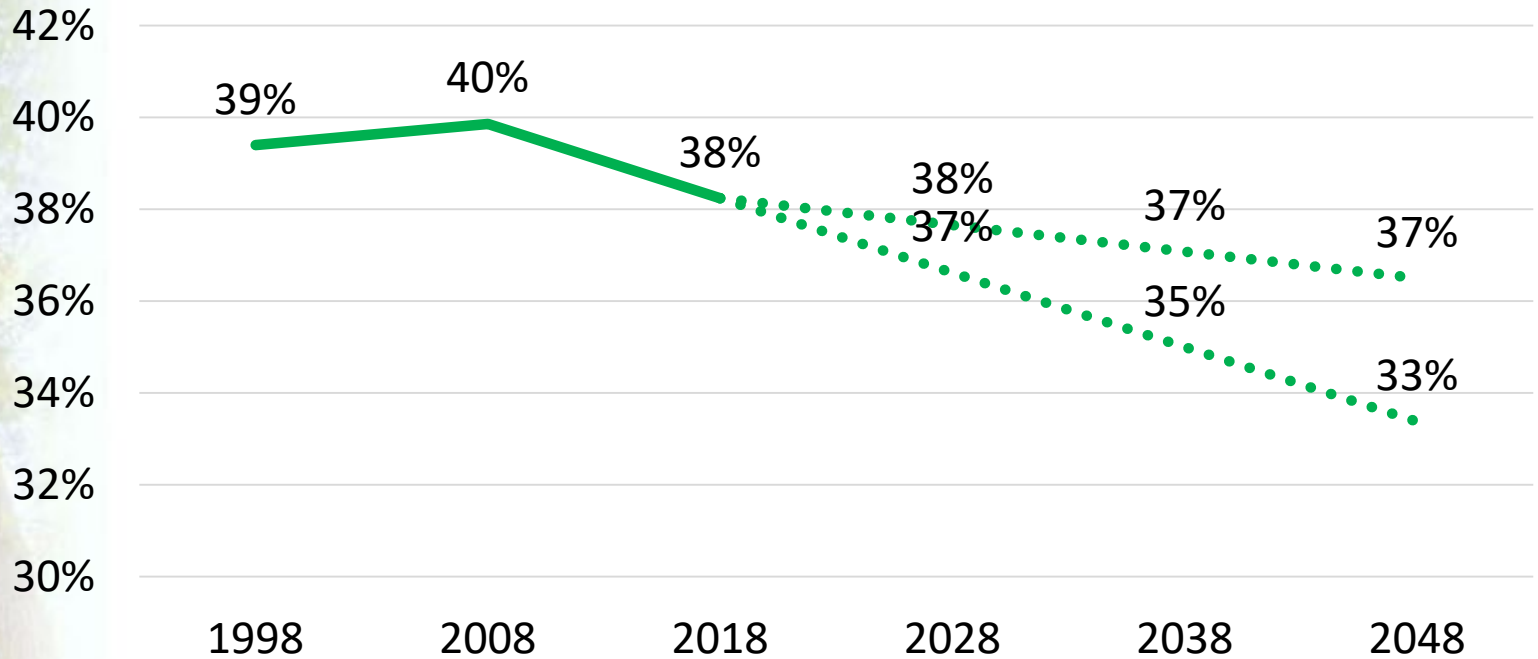
3,338 Plantable acres



- 176 acres Very high
- 356 acres High
- 417 acres Moderate
- 455 acres Low
- 1,934 acres Very low

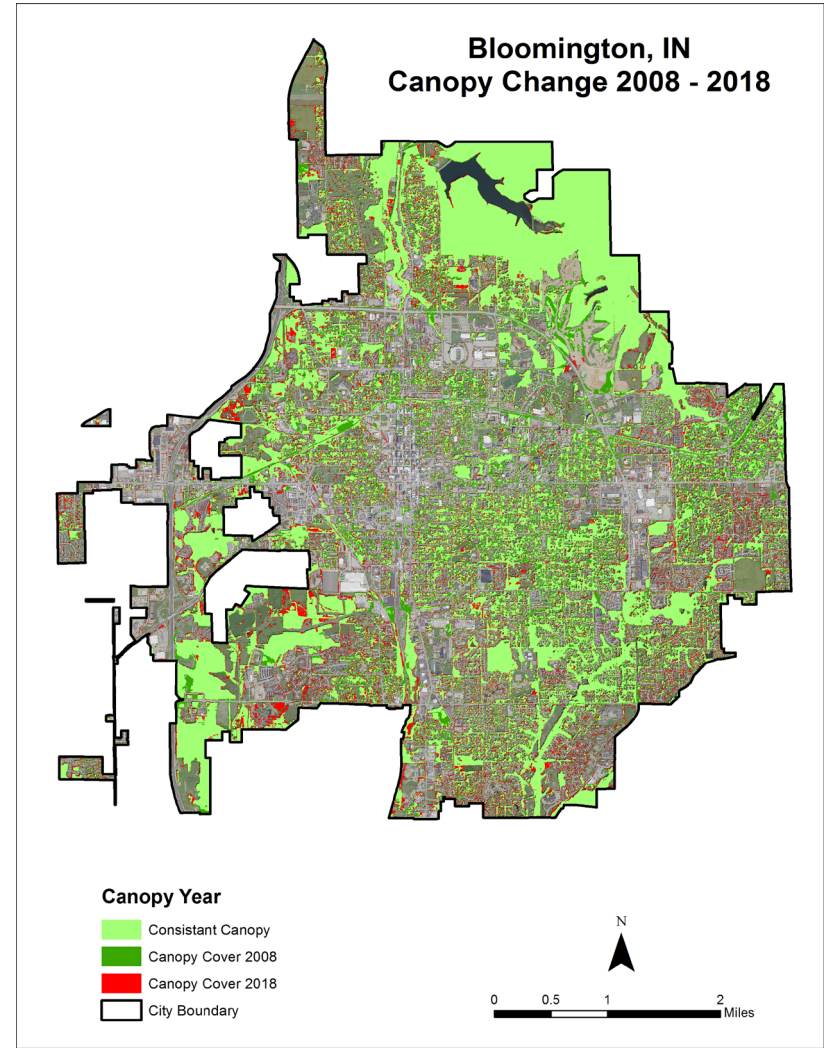


Tree Canopy Change over 50 years



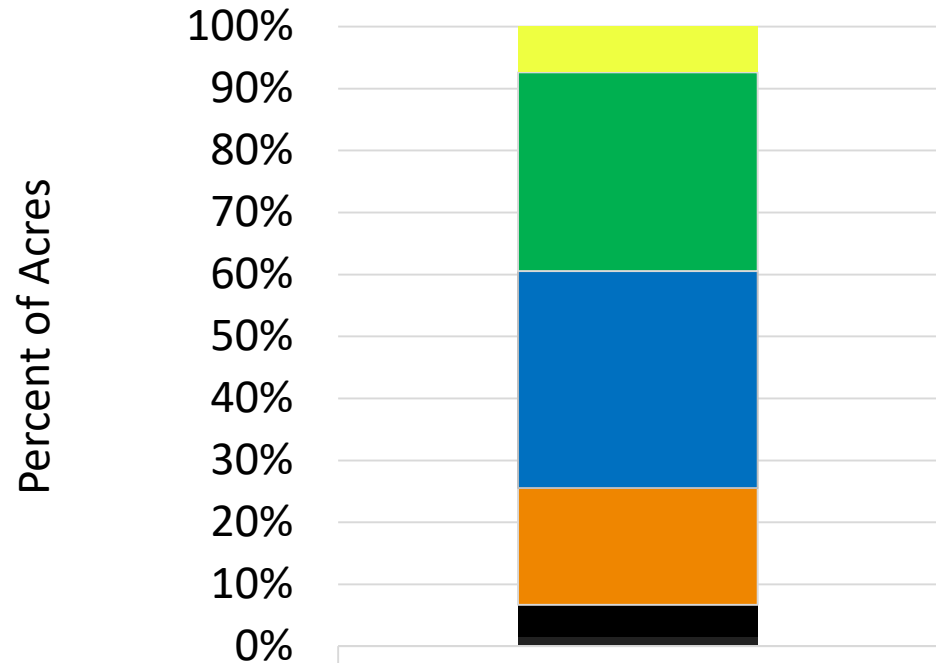
- City of Bloomington Tree Canopy Change
- City of Bloomington Tree Canopy Projected Change over 10 Years (1.6%)
- City of Bloomington Tree Canopy Projected Change over 20 Years (0.6%)

Tree Canopy Change



Canopy Condition

- Healthy population of Fair and Good condition trees make up 74% of all trees
- Poor and Dead make up 24%



Number of Acres	
Very Good	423
Good	1,840
Fair	2,007
Poor	1,081
Dead/Dying	295
Shadow/Not Classified	90

Other Analyses

- Geographic units: census tracts, city-owned parcels, citywide, council districts, Indiana University campus, neighborhood associations, parks, watersheds, and zoning.

Nighborhoods with most tree canopy percentage: Bittner Woods, South Griffy, and Woodlands-Winding Brook

Nighborhoods with most tree canopy acreage: Elm Heights, Covenanter, Sherwoods Oaks

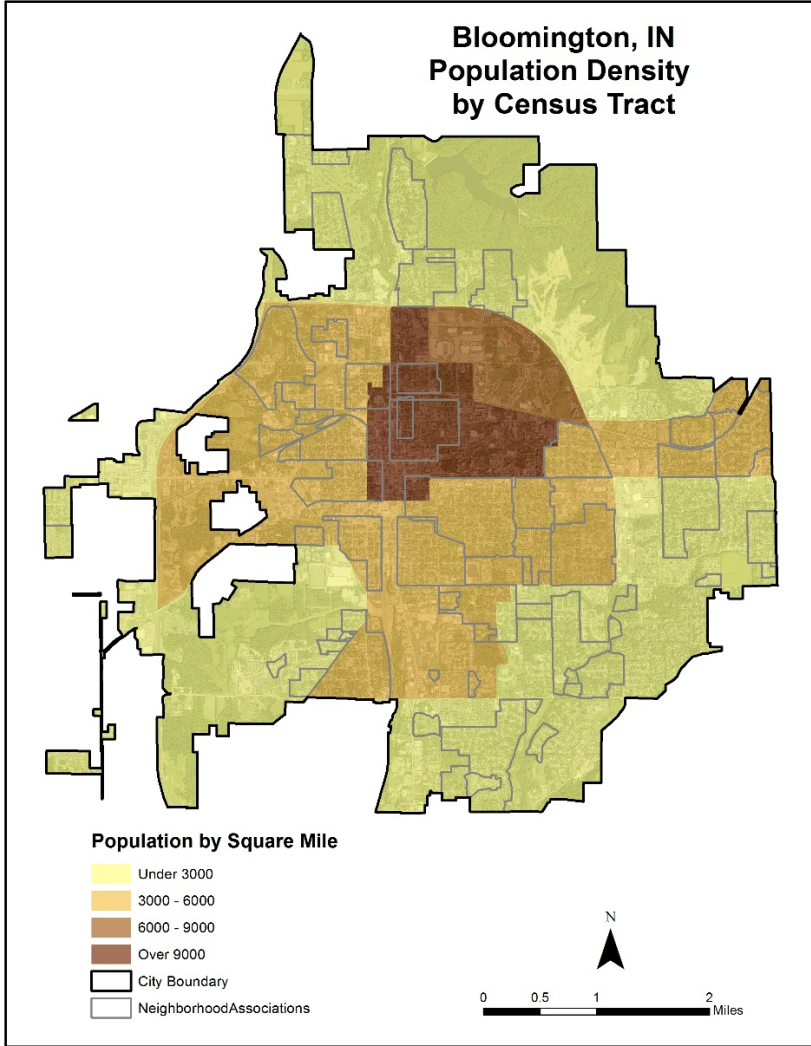
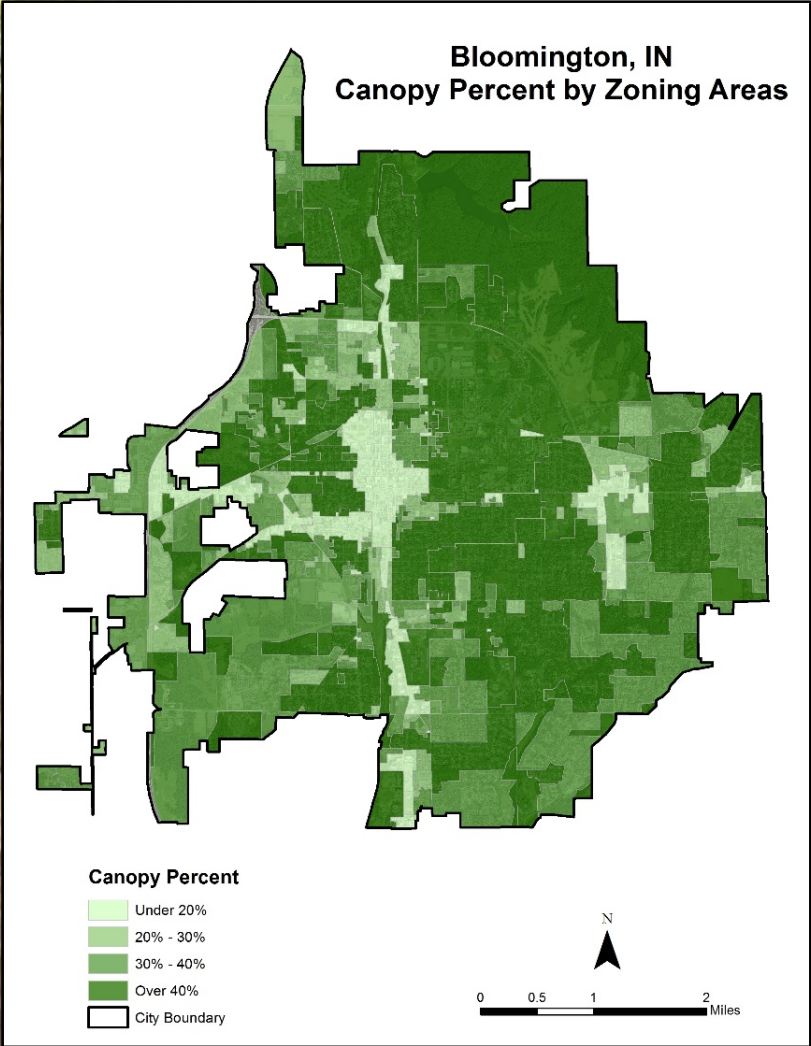
Nighborhoods with most positive change in tree canopy percentage: Autumn View, Southern Pines, Highland Village

- Urban Tree Resource Analysis and Cost Estimator (UTRACE) tool, utilizes the land cover assessment data to estimate the number of trees required and costs to increase and maintain the newly planted tree canopy.

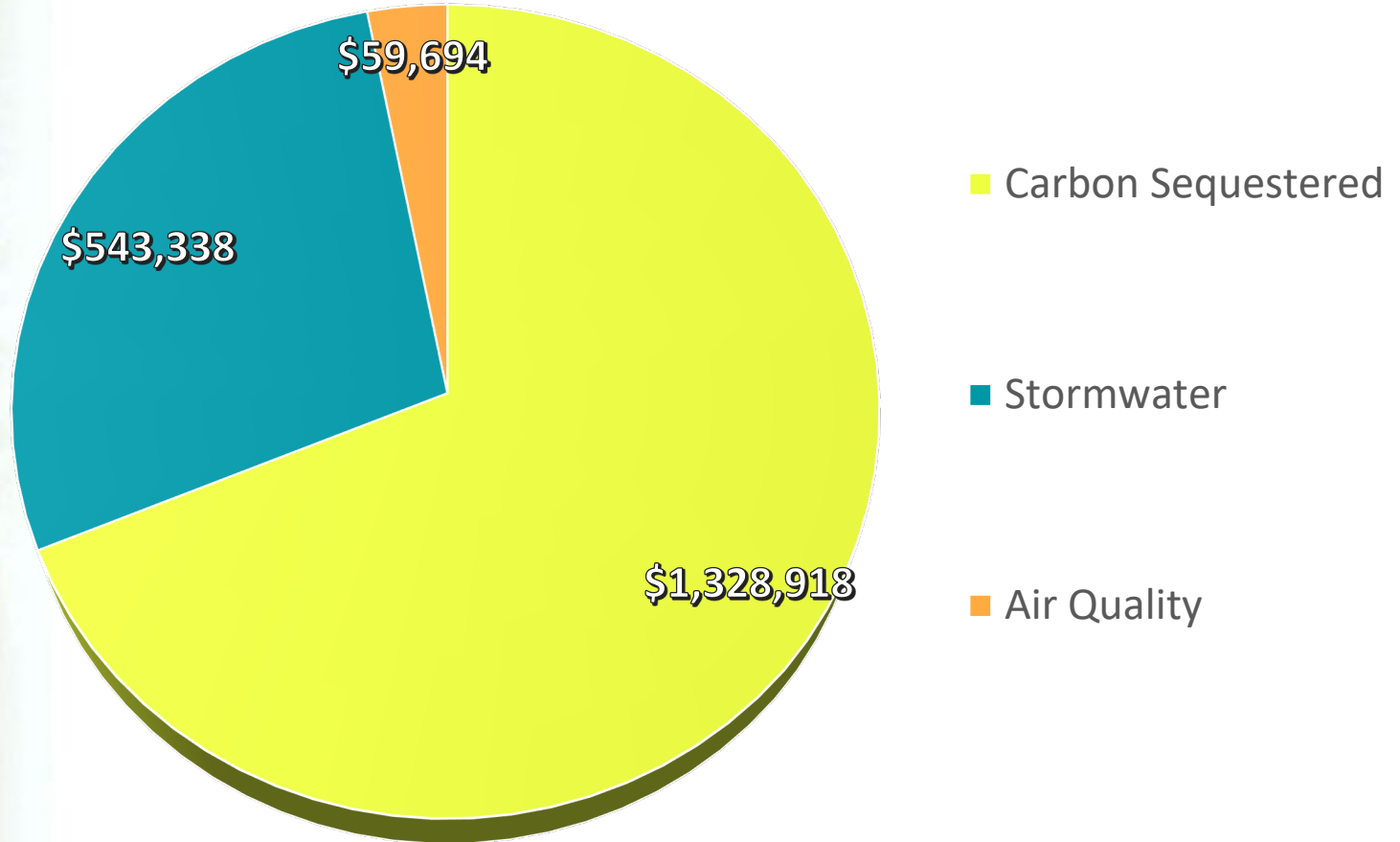
2% CANOPY INCREASE = 10,841 TREES for COST OF \$4,770,016

Zoning Types with most trees to be planted: Institutional, Planned Unit Development, and Residential Core

Other Analyses - Socio-Demographic and Economic Analyses



Urban Tree Canopy Benefits



Total Benefit \$54,994,625

Total Annual Benefit \$1,931,950

Aesthetic and Other Benefits \$19,688,555

Stored Carbon Benefit \$33,374,120

TreeKeeper Software

Bloomington's prioritized planting plan is on TreeKeeper; assessment deliverables in ESRI with projection and metadata and supporting analyses are in Excel with few Maps in jpeg and PDF formats.

The screenshot displays the TreeKeeper software interface. At the top left is the 'TREEKEEPER' logo. A search bar contains 'city hall'. The top right shows 'Welcome, Guest' and navigation icons. Below the search bar, the location 'Bloomington, IN' is displayed. The main map area shows a satellite view of a city grid with numerous colored overlays (yellow, orange, purple) and circular markers representing trees. A left-hand sidebar contains a 'Layers' panel with 'Overlays' and 'Base Layers' sections. The 'Overlays' section includes: 'Selected' (checked), 'Gold Medal Trees', 'Trees', 'Basemap-Parks', 'Basemap-Priority Planting' (checked), and 'Basemap-City Limit'. The 'Base Layers' section includes: 'Google Street', 'Google Satellite' (selected), 'Bing Street', and 'Bing Satellite'. At the bottom of the map, it shows '4617 Total | 0 Queued' and navigation controls.

Bloomington Storymap



ABOUT THIS STORYMAP

This is Davey Resource Groups's customizable cascading Template.
All colors and images are customizable.

There are a variety of basemap options displayed here, and the styling and colors of the map may be customizable as well.

Summary and Next Steps

- Create a 5 to 7 year public tree management plan to develop a strategies for improving genus and species diversity, manage for maturing/mature tree population, and maximize public benefit through planting and building resiliency.
- Prune young trees now to improve structure encouraging better form as they age. Theoretically, this is a cost saver down the road.
- Use TreeKeeper to keep the inventory up-to-date as work is performed, budget for partial re-inventory every year to continually measure progress and adjust, and tree preservation and landscape plans.
- Review and revise as necessary the tree ordinance, adjust tree preservation and landscape ordinance, and refine other policies.
- Consider tree canopy goal establishment and an urban forest master plan to bring the community together in achieving the same goal and building equity.



Thank you for working with Davey Resource Group!

QUESTIONS?

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