

SOUTH KING COUNTY TREE CANOPY ASSESSMENT INITIATIVE

King Conservation District is tasked with one of the most interesting and multi-faceted opportunities facing any conservation district: to extend its traditional reach and work in the backyards, public easements, and parks and open spaces in the incorporated landscapes of the 34 cities we are proud to call our partners. Healthy trees and forests are important attributes in our communities – they increase property values, decrease crime rates, and bring well-studied health benefits to communities. Urban forestry programs across the country are expanding their historical focus on aesthetics and heat islands to include wildlife habitat in cities, storm water management, water quality improvement, pollution abatement and carbon sequestration.

As managed growth concentrates development within the Urban Growth Boundary, healthy urban forests, tree canopies and street trees become even more necessary. KCD works to increase the resilience of urban tree canopies and capture the ecological, recreational and other values of green infrastructure by helping residents and landowners actively manage urban trees in yards and public open spaces. KCD will build on its successful partnerships with south King County member cities* to expand conservation of urban tree canopies and grow green infrastructure by supporting, providing and collaborating on tree canopy assessments.

**Algona, Auburn, Bellevue, Black Diamond, Burien, Covington, Des Moines, Kent, Maple Valley, Mercer Island, Newcastle, Normandy Park, Renton, SeaTac, and Tukwila*

King Conservation District has contracted experienced forest assessment specialist Plan-It Geo to work with our municipal partners across south King County to plan and conduct tree canopy assessments. Plan-It Geo (PG) has conducted over 150 urban forest assessments and specializes in developing custom desktop and web/mobile-based software applications integrating tree inventories, ecosystem services (i-Tree), and Tree Canopy Assessment (TCA) data.

KCD's Value Proposition:

1. Provide an assessment that guides tree planting, policy, management forecasting, and outreach through map-based tools.
2. Support land use planning and development for tree protection, open space, habitat and ecological restoration, and tree planting

KCD's Project Management Includes:

1. Project launch with involved staff
2. Project check-in to review land cover mapping results and discuss maps/report products
3. Management and review of draft report and map products
4. Final delivery of all data and products
5. Orientation on the online planning tools with canopy maps and data.

To support your goals, KCD:

1. Conducts a detailed city-wide tree canopy assessment using GIS and remote sensing technologies
2. Provides concise map-based and narrative reports and customized fact sheets with recommendations based on our collected data with input from the City
3. Hosts and supports an online planning tool utilizing the data to graphically demonstrate the power and ease of planning and management of the canopy in the community
4. Generates the stormwater capacity of the City's canopy through calibrated modeling

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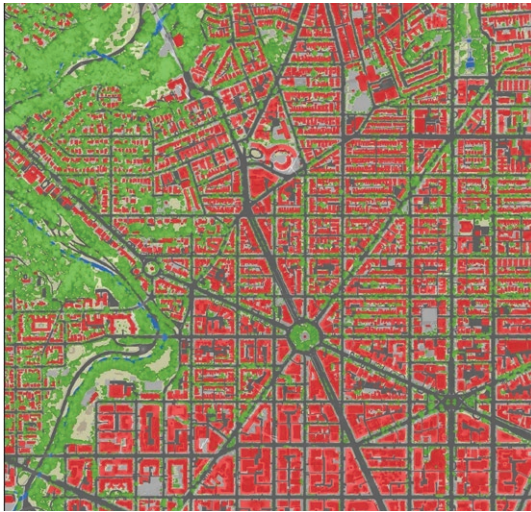
SERVICES AND DELIVERABLES PROVIDED TO PARTICIPATING CITIES

Mapping, Assessment & Analysis, and Planning & Communications Tools

KCD will engage with the city using GIS and remote-sensing technologies to map current tree canopy and other land cover classes city-wide. The land cover data are processed through a complex GIS model to provide metrics for city-specified geographies. These assessment results and subsequent analyses are assembled in an illustrative factsheet, summary report and web-based planning software to support planning, community development, and urban forest management.

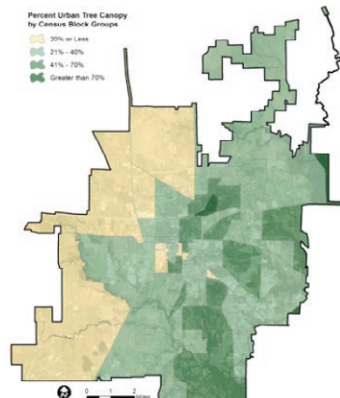
1

Utilize the most recent 1-meter resolution multispectral NAIP imagery and LiDAR data (preferred, if available) to map all tree canopy and other land cover classes on public and private property. Optionally, half-meter (0.5) satellite imagery can be purchased by the city.



2

Process the land cover data through a GIS model to provide metrics (area and percent cover) for each land cover class citywide and by 6 geographic scales (see sidebar). This will produce citywide maps of tree canopy and overall land cover, summaries for each geography in an assessment spreadsheet, maps of canopy change



MAPPING

Conduct a detailed QA/QC GIS review and editing task yielding at least 92% overall accuracy for all land cover classes with a minimum mapping unit of 3x4 square meters .

Classes include tree canopy (generally above 15' in height/size), impervious surfaces (broken out by building, road, parking, etc. depending on available data sources from the city), low-lying herbaceous vegetation (grass, open space, shrub), barren soil / dry vegetation, and open water.

No field-based ground truthing of the land cover mapping is included. Instead, we use multiple imagery sources beyond the NAIP & LiDAR imagery to train the classification / OBIA process and to verify mapping accuracy including Google Street View, Google Maps/Earth, Bing, and city/county ortho imagery. This is especially important to distinguish tree canopy from shrub vegetation

Using available GIS data, areas deemed undesirable or unsuitable for increasing tree canopy will be compiled in order to remove them from the non-tree vegetation class to create the plantable spaces data layer. Our GIS technicians will manually map areas where data do not exist, such as the playing areas in golf courses and sports fields. This will create a "Possible Planting Areas" (PPA) data layer for analysis of priority planting areas.

DATA ANALYSIS

GIS assessment of land cover data metrics for the city boundary and up to 6 other geographies:

- Census block groups
- HUC-12 watershed (drainage areas)
- Land use (preferably county data for consistency across all KCD TCA cities with descriptions on each land use class)
- Two additional chosen by the City

Delivery format in ESRI vector-based shapefile or geodatabase and raster-based TIFF or IMG for imagery and land cover with basic metadata

3

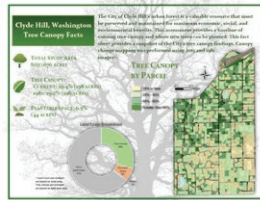
Stormwater Benefits of Urban Canopy

Conduct additional analysis using i-Tree Hydro (USFS, <https://www.itreetools.org/>) to produce a baseline of canopy cover impacts on stormwater capacity using current land cover conditions and hydrology. Results will quantify and illustrate the hydrological impacts at the citywide scale and will be incorporated into the Tree Canopy Assessment report.

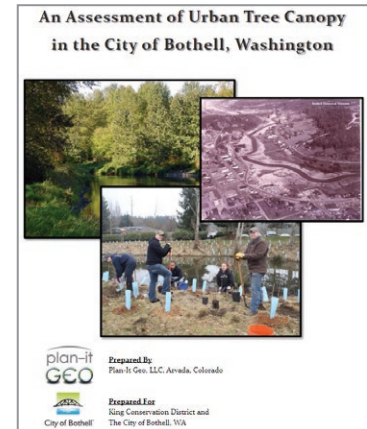
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Develop a 1-page factsheet and a summary report (10-15 pages plus appendix) with sections on the purpose, methods, data sources, findings/maps, and broad recommendations.

FACT SHEETS



REPORTS



5

Canopy Planner Online Software

Provide online canopy planning tools with the mapping and data to allow both the public and city departments to interactively track planting and management while exploring possible grow-out scenarios.

1. The 'View' tool component of Canopy Planner allows users to easily choose a geographic scale and display % metrics or filter data with slider bars.
2. 'Plan' is a GIS-based prioritization tool with designated weights on city-specified criteria (ex. existing tree canopy, plantable space, and stormwater priorities).
3. The 'Grow' tool allows users to create canopy cover & planting scenarios in the map and save scenario reports.

To explore an example of these powerful tools, go to: <https://pg-cloud.com/Columbus>

View

See the distribution of % tree canopy cover and available planting space.

[Learn about tree canopy assessments: USFS Northern Research Station and UTC Assessment Projects.](#)

[How To](#) [Launch View Tool](#)

Plan

Weight and prioritize criteria to determine suitability for new tree planting. View this [factsheet](#) to learn more about each criteria and the data used to create it.

[Learn more about prioritizing urban tree planting from GILT and examples from New York City and Columbus, OH.](#)

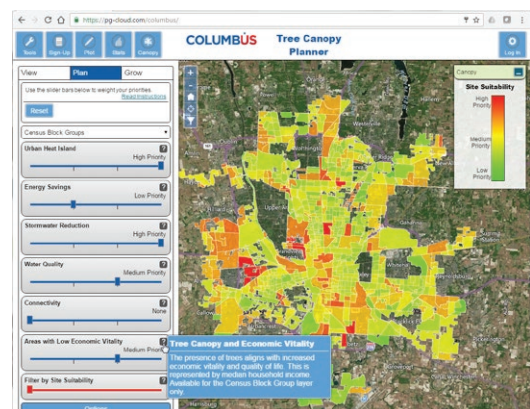
[How To](#) [Launch Plan Tool](#)

Grow

Evaluate potential tree canopy goals and tree numbers to reach goals, forecast future benefits, and compare scenarios.

[Learn more about canopy goal setting from American Forests iTree and Arbor Day Conferences.](#)

[How To](#) [Launch Grow Tool](#)



CITY CONTRIBUTIONS TO A TREE CANOPY ASSESSMENT

TCA project support needed from City staff include up to 25-30 hours of staff time to identify mapping and assessment priorities and meet up to 3-4 times to compile city-specific data needed to conduct the mapping, compile other useful data as agreed upon, and review reports.

GIS and Other Project Data needed include:

- GIS data layer of the municipality boundary or other project "Area of Interest" (AOI) in a GIS layer
- GIS data layer of the geographies for canopy assessment:
 - Parcels,
 - Land Use / Zoning
 - Drainage Areas
 - Planning Areas (neighborhoods, management zones, etc.) Including metadata and/or attributes

OTHER USEFUL DATA

Existing Planning metrics/impervious data: building, road, parking lot, sidewalk, driveway, etc.

LiDAR data (if available) in .las, ASCII or raster elevation/surface models

Hyrdology (lakes, rivers, streams, wetlands)

Recreation areas; ball fields, park boundaries, open spaces/ greenways

GIS/GPS-based street tree inventory data

OPTIONAL SERVICES

In addition to base mapping, analysis and communication tools, cities may access the following optional TCA services at the expense of the city.

Correlation of Tree Canopy and Socioeconomic/Demographic Data

We can correlate areas with high vs. low canopy cover with census data on media home value, income, race, etc. Metrics will be analyzed from available census/demographic information with results provided in a narrative with maps, tables or charts. **Cost: \$3,500**

Table 10: Socio-Demographic data as they relate to Percent Urban Tree Canopy

% UTC	Average Median Income	Average Median Home Value	% with a Bachelor's Degree or higher	% Owner Occupied	% White
0-25%	46,141	138,391	34%	48%	66%
26-50%	49,986	140,573	35%	56%	65%
51-100%	79,307	241,534	51%	65%	79%

Change in Canopy Over Time

(Available only for jurisdictions with previous Tree Canopy Assessment data and mapping)

Utilizing past tree canopy data/maps generated by prior assessment or study, we will run a comparative assessment of canopy cover and designated geographic layers (ex. Land use, zoning, pantable areas) to identify areas of canopy gain and loss change, city-wide and at finer scales. **Cost: \$2,000 - \$3,000**

