

2021 City of Chicago Resource Assessment and Management Plan Proposal

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PROJECT NARRATIVE

The City of Chicago Bureau of Forestry is proposing the development of an Urban Forest Management Plan that would include conducting a new resource assessment. The last management plan was delivered in 2010 and was paid for by our local non-profit partner Openlands while our last resource assessment was conducted in 2013. Another local partner, the Chicago Region Trees Initiative has completed a Regionwide Urban Forest Assessment and will soon be releasing data. Preliminarily, they have identified that while our region has increased in canopy cover from 21% to 23%, the canopy cover has declined in the City of Chicago from 17.2% to 15.7%.

The Bureau of Forestry has completed an i-Tree Canopy analysis of the 19th Ward for 2010 and 2021 and found that the canopy cover has declined from 36 % in 2010 to 33% in 2021. The resultant measurable impact of the 3% loss in canopy can be seen in the decline in hydrological benefits of 4 million gallons of avoided run off (9% loss) and 11 million gallons of stormwater interception (8% loss).

Background Data

Since 1990, the Bureau of Forestry has conducted resource assessments consisting of two (2) tree census (count) and three (3) random sample inventories. We are presently conducting a full street tree inventory with an anticipated 5-10-year timeline. However, with the challenges the City is facing, a Sample inventory is needed to quickly fill the information gap.

1990: 441,574	tree count	1994: 450,058	sample
2003: 528,000	tree count	2003: 538,394	sample
2013: 586,811	sample	2020: 525,338	estimate

In 2013, a third Random Sample Inventory was conducted with the intent to capture tree data on a 10-year cycle. Additionally, we felt that this survey would mark our peak street tree population due to anticipated losses from the Emerald Ash Borer and a continuing decline in Planting funds. Due to a lack of funding and staffing, the statistical analysis is incomplete and currently only includes tree population estimates, tree species and size distribution. The only time we had a full analysis of the data was in 1994 when data analysis was performed by a Consultant hired as part of an Urban and Community Forestry Grant.

The City of Chicago has an estimated street tree population of **525,338**. This represents a 10.5% (61,473) decline from our peak population of 586,811 trees in 2013. The City's street tree population has declined about 8,000 trees annually since 2014. While this estimated decline is significant, the Bureau of Forestry has historically undercounted new trees being installed without permits. Based on our sample inventory in 2013, the undercounting represented about **41,000 more trees** than what we estimated our population to be based on the 2003 tree count (528,000 or 538,000 for 2003 pre-sample) plus plantings and removals that we are able to track (In-house work and permits issued). It is believed that these additional trees are due to unpermitted plantings by private landscape companies

planting projects approved under the Chicago Landscape Ordinance as well as by homeowners and other non-compliant landscapers.

To restore lost trees, the City needs to take all reasonable efforts to preserve existing trees as well as increase tree planting. In 2020, the City announced a Capital Plan that included increased funding of \$3 million annually for tree planting over the next five years. At present, it would take a planting effort of **19,000 to 20,000** trees annually for the next ten (10) years to replace trees lost over the past ten years with an estimated cost ranging from \$8 million (based on current contract costs \$500/tree) to \$19 million (based on future contact cost estimates of \$1000/tree). In order to gain a better insight on our current population a update to our Street Tree Inventory is vital to identify scope of the problem. The resultant Management Plan is critical in identifying the current state of our resource and outlining potential solutions to properly manage, maintain, and grow our urban forest.

The Bureau of Forestry will conduct a Random Sample Inventory, complete an i-Tree Canopy Analysis of all 50 political wards, and supply data to an Urban Forestry Consultant. The Consultant will analyze data, complete report on data, examine all relevant policies, ordinances, standards, practices, budget, personnel etc and write an Urban Forest Management Plan.

Inventory Phase

The resource assessment the Bureau of Forestry will utilize is one developed by Nina Bassuk and Richard Jaenson (Journal of Arboriculture 18(4): July 1982 pg 171-183. A Statistical Method for Accurate and Rapid Sampling of Urban Street Street Populations). We have utilized this method in 1994, 2003, 2013 and would like to utilize this same method in 2021 for the sake of uniformity and accuracy. The City will be divided into three Sample Areas (each represent about 176,000 street trees). These Sample Areas will be further divided into 10 zone segments such as DT (downtown), RR (rectangular residential) and CR (curvilinear residential), etc. A total of 300 to 350 sample blocks will be sampled (about 100-115 per Sample Area) for the pre-sample phase and 300 to 450 for the sample Phase.

The following is a brief timeline for the proposed sampling phase of the project:

- 1) June 1-18, 2021: City Forester performs map analysis and preparation necessary to begin the pre-sample phase of the 3 sample areas.
- 2) June 21-30: Three BOF teams consisting of a driver (TT) and a City Forester will survey 100-115 sampling units to estimate the average number of trees per block.
- 3) The pre-sample data is analyzed and based on the number of street trees in each Zone segment, new random sample units will be selected.
- 4) A new map identifying new sampling units are develop for each of the 10 zone segments for each of the 3 sample areas.
- 5) Five (5) crews consisting of a diver (TT) and a City Forester will visit each sampling unit recording data on tree size, species, condition, site location, site type (grass parkway or tree pit), site type size, and available planting sites.
- 6) The observed data for the three sample areas will be entered in preparation for statistical analysis.

i-Tree Canopy Assessment of 50 Wards

The Bureau of Forestry will perform an i-Tree Canopy Cover assessment for all 50 political wards. We will compare current Canopy cover (i-Tree Canopy 2021 imagery) with 2010 imagery from Google Earth Pro (6/10/2010 imagery). To obtain a timeline of work, one political ward (19th) was assessed utilizing 550 plots in the i-Tree Canopy tool. These plots were imported into Google Earth Pro and analyzed using June 2010 imagery noting the changes in the i-Tree Canopy tool. It took 25 minutes to draw the boundaries of the 19th ward in i-Tree canopy and about one hour (61 minutes) to complete the 550-plot analysis with a similar time frame (1 hr) to import and complete the 2010 Google Earth Pro image analysis. As this process took about 2.5 hrs to complete one political ward, it is estimated that it would take an additional 122 hours or 17 business days to complete the remaining 49 wards.

The following is a brief timeline for the proposed i-Tree Canopy phase of the project:

- 1) July 12-30: City Forester maps out remaining 49 wards in i-Tree Canopy and analyzes 550 plots in both i-Tree Canopy (2021) and Google Earth Pro (2010 imagery).
- 2) August 2-6: City Forester analyzes and completes a summary of changes for the estimated benefits in each ward.

Consultant Phase

Concurrent to the Random Sample Inventory development and implementation, the City will issue a contract for consulting services to conduct analysis of the sample data utilizing the Bassuk and Jaenson methodology as well as conform the data to work with an i-trees analysis of benefits provided. The Consultant will also be responsible for:

1. **Project Management and Communication** Consultant will communicate directly with the City of Chicago and provide updates on project progress, barriers, expected completion, invoicing, and any requirements of the City.
Deliverable: Regular email updates; monthly progress meetings; meeting notes.
2. **Background Research** Consultant will meet with Forestry staff to understand the City's goals for its forestry program, current challenges, resource constraints (e.g., budget, staff), and will review existing policies, plans, and related documents to understand current activities, priorities, and existing visions or objectives related to Chicago's forestry program.
Deliverable: background research summary notes.
3. **Analyze Inventory Data** Consultant will perform analyses primarily within the iTree environment. After all data are collected and compiled by the City of Chicago, Consultant will format the data to import easily into iTree. A final, clean dataset will be used for all analyses. Key analyses from the City's sample inventory will be summarized into tables and charts, which will be provided to the City for review. The City and Consultant's project team will meet to discuss initial findings and identify areas for further investigation or consideration in the City's plan.
Deliverable: inventory summary tables and charts.

4. Operations Review Consultant will perform a review of the City's forestry program. The review process will generally include interviews with key forestry personnel, examination of forestry budgets, review of equipment available to support forestry operations, review of the City's staffing plan for forestry, current operational approaches, and a cursory review of technology use, safety standards, and written policies or procedures.

Deliverable: Summary notes from the operations review.

5. Develop Management Scenarios Based on the information discovered throughout this project, Consultant will develop three (3) different urban forest management scenarios. For each scenario, Consultant will calculate the method of operational prioritization and the amount of work that can be accomplished within given budgetary and personnel resource constraints. Consultant and key City staff will discuss the management scenarios in detail and identify the pros and cons of each approach to the City's urban forest management.

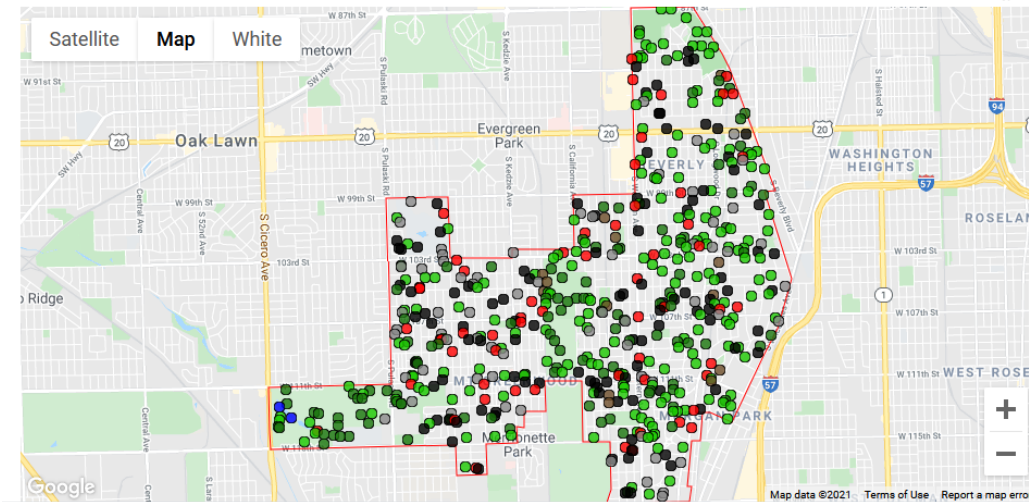
Deliverable: Excel spreadsheets containing 3 different urban forest management scenarios.

6. Urban Forestry Plan The Urban Forestry Plan will be structured to accomplish Chicago's management goals within the constraints of limited resources (generally budget and staff, but also in the context of the tree resource). Consultant will use the background information, operations review, inventory analysis, and evaluation of management scenarios to develop an action plan of specific activities that the City can take to help improve the health and condition of community trees. From this action plan, Consultant will develop a budget table which establishes investment expectations over the next 5-10 years to help advance the City's urban forestry program. The action plan and budget table will be incorporated into a full narrative that includes the City's management objectives, current resource conditions, and explores the management activities (e.g. tree planting, cyclical pruning, regular inspections, risk tree abatement) that simultaneously meet the City's goals and fall within its resource constraints. Consultant will produce an initial draft of all documents for review by the City.

Deliverable: Draft urban forestry plan; final plan in word document format.

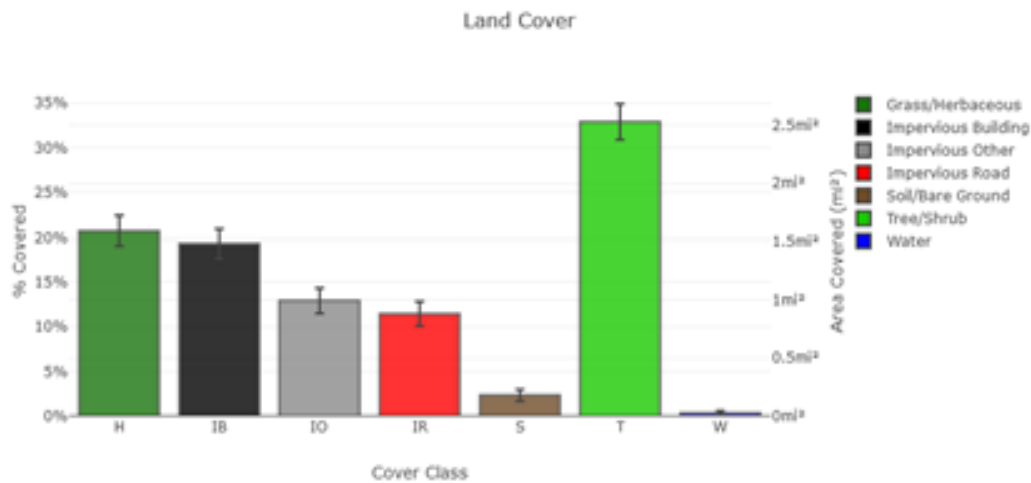
i-Tree Canopy Analysis of the 19th Ward

550 Plots utilized



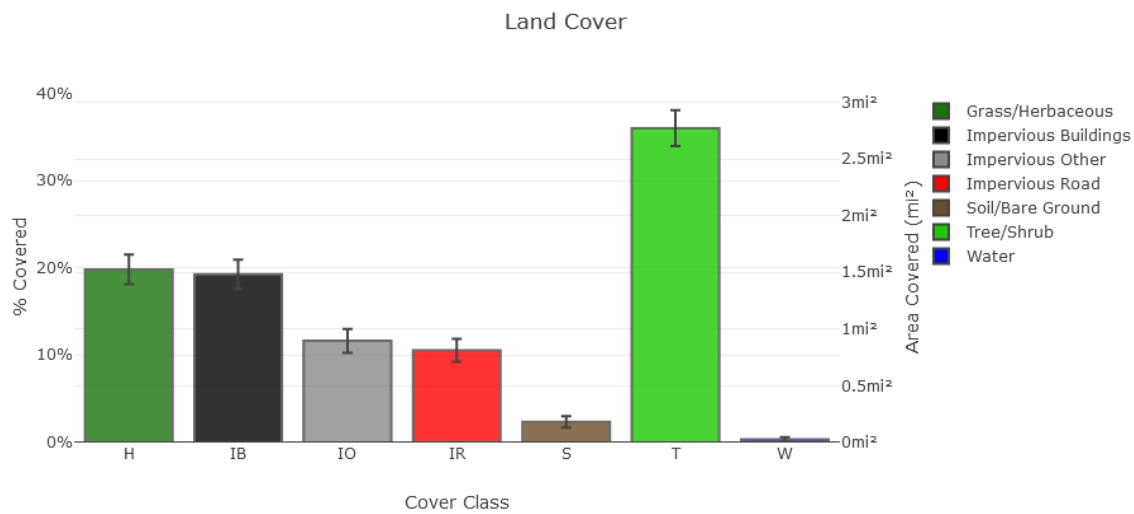
i-Tree Canopy 2021 Analysis

Abbr.	Cover Class	Points	% Cover ± SE	Area (mi ²) ± SE
T	Tree/Shrub	181	32.91 ± 2.00	2.53 ± 0.15
IB	Impervious Buildings	106	19.27 ± 1.68	1.48 ± 0.13
IO	Impervious Other	71	12.91 ± 1.43	0.99 ± 0.11
IR	Impervious Road	63	11.45 ± 1.36	0.88 ± 0.10
S	Soil/Bare Ground	13	2.36 ± 0.65	0.18 ± 0.05
W	Water	2	0.36 ± 0.26	0.03 ± 0.02
		550	100	



i-Tree Canopy 2010 Analysis (6/10/2010 Google Earth Image)

Abbr.	Cover Class	Points	% Cover \pm SE	Area (mi ²) \pm SE
T	Tree/Shrub	198	36.00 \pm 2.05	2.77 \pm 0.16
IB	Impervious Buildings	106	19.27 \pm 1.68	1.48 \pm 0.13
IO	Impervious Other	64	11.64 \pm 1.37	0.89 \pm 0.11
IR	Impervious Road	58	10.55 \pm 1.31	0.81 \pm 0.10
S	Soil/Bare Ground	13	2.36 \pm 0.65	0.18 \pm 0.05
W	Water	2	0.36 \pm 0.26	0.03 \pm 0.02
		550	100	



2021

Tree Benefit Estimates: Hydrological (English units)

Abbr.	Benefit	Amount (Mgal)	±SE	Value (USD)	±SE
	AVRO Avoided Runoff	42.64	±2.60	\$381,021	±23,197
E	Evaporation	118.17	±7.19	N/A	N/A
I	Interception	118.30	±7.20	N/A	N/A
T	Transpiration	288.35	±17.56	N/A	N/A
PE	Potential Evaporation	1,059.85	±64.53	N/A	N/A
PET	Potential Evapotranspiration	740.83	±45.10	N/A	N/A

2010

Tree Benefit Estimates: Hydrological (English units)

Abbr.	Benefit	Amount (Mgal)	±SE	Value (USD)	±SE
	AVRO Avoided Runoff	46.64	±2.65	\$416,807	±23,697
E	Evaporation	129.27	±7.35	N/A	N/A
I	Interception	129.41	±7.36	N/A	N/A
T	Transpiration	315.44	±17.93	N/A	N/A
PE	Potential Evaporation	1,159.39	±65.92	N/A	N/A
PET	Potential Evapotranspiration	810.41	±46.07	N/A	N/A