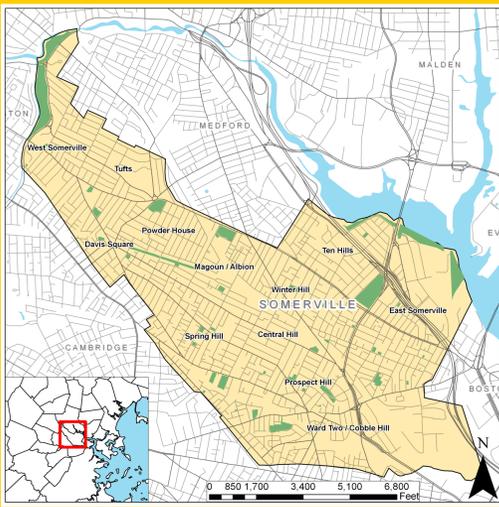


Somerville Street Trees and Replanting Opportunities

Location, Condition and Replanting Opportunities by Census Block Group Attributes



Street Trees: Why are they Important?

Street trees are trees that lie in the public way and are generally planted from four feet to eight feet from the curb. Street trees provide many benefits to the streets themselves and the residents that live on the streets the trees occupy. The benefits these street trees provide include; more appropriate traffic speeds, safer walking environments, less drainage infrastructure, lower urban air temperatures, added value to adjacent homes and businesses, and many more. These benefits that are so that they should always be considered as a default street making feature; yet they are often not. Recent peer-reviewed literature has looked at the connections between street tree canopy cover and household income, private-public property relations, race and ethnicity. Numerous studies have concluded that there is an inequitable distribution of urban canopy cover within various urban municipalities. Urban trees positively affect the quality of life and the spatially inequitable distribution of urban trees is an instance of urban environmental inequality.

Research Objectives

The objective of this project is to take a community inventory of the City of Somerville's Street Trees and conduct a rudimentary analysis of replanting opportunities based on tree health, municipal maintenance protocol, public health and environmental justice issues. While this analysis is not meant as a replanting guide for the City of Somerville, it is intended to provoke conversation among municipal planner on where to focus their replanting efforts.

Cartography: DJ Forbes
Course: Tufts University UEP 232: GIS
Projection: NAD 1983 State Plane Mass Mainland FIPS 2001
Data Sources: City of Somerville GIS, MassGIS
Date: December 16, 2009



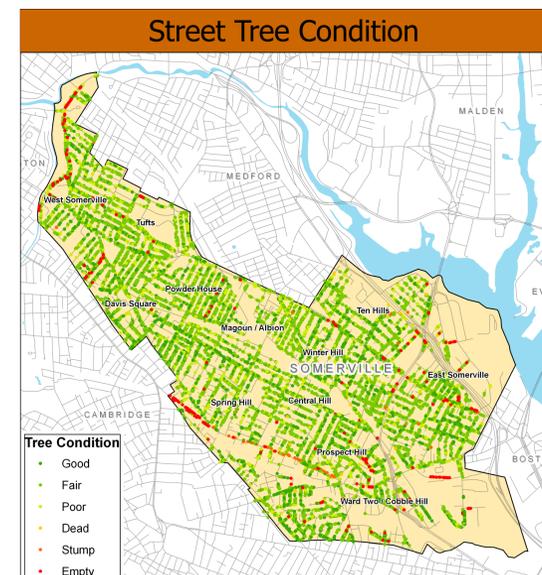
Introduction

Tree point data was acquired from The Mayor's Office of Strategic Planning and Community Development (OSPCD) from the City of Somerville. Two different types of street tree data was available; street tree data (Tree Inv 2009 street) and park street data (Tree Inv 2009 park). For this analysis, only the street tree data was used. This poster will explain verbally and visually the route taken to define the tree sites' condition, removal status and replanting opportunity. Once replanting opportunities were identified, an short analysis of Somerville's 2000 Census Block Group Data was conducted focusing on the following fields; median value of all owner-occupied housing units, percent of the population under 18, population below the poverty level and the median income per household at the block group level. Once these factors were analyzed, "opportunity block groups" were delineated to show where replanting should take precedent. The following methodology will explain these steps in more detail.

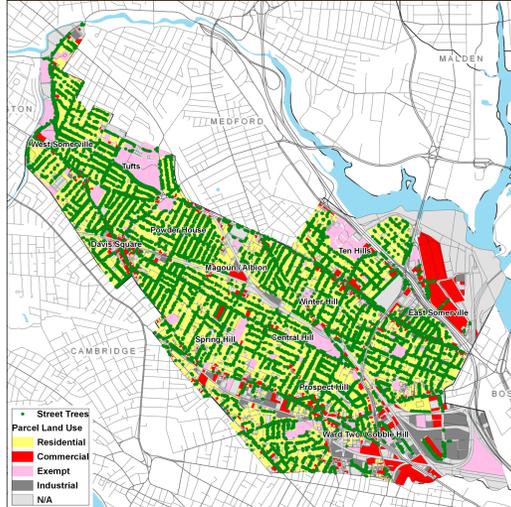
Methodology

Step 1:
Load all of the following layers onto ArcGIS:

Layer and Table Name	Layer Description	Layer Source
Tree Inv 2009 street	Point Data showing all of the street trees in Somerville	Somerville GIS
Streetscl	Somerville Streetlines	Somerville GIS
CENSUS2000BLOCK-GROUPS POLY	Block Group Census Data	Mass GIS
EJ POLY	Environmental Justice Block Groups as defined by MassGIS	Mass GIS
TOWNS POLY	Mass Towns	Mass GIS
HYDRO25K POLY	Water and Stream layer	Mass GIS
Parcels 03 2009	Somerville Parcels	Somerville GIS
Parks	Somerville Parks	Somerville GIS
CityBoundary	Somerville's Boundary	Somerville GIS
BG Median Income Table	BG Median Income Table	Mass GIS



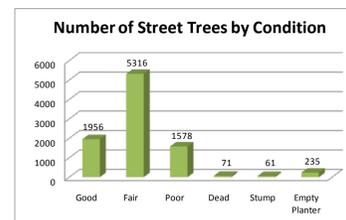
Street Tree Points by Parcel Land Use



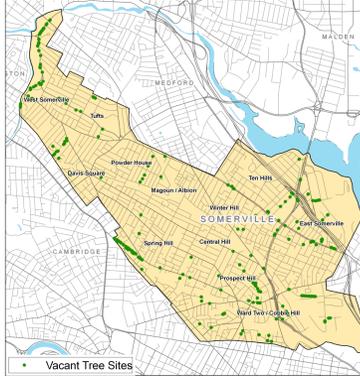
Step 2:
Create a map that shows the condition of all of the Street Trees in Somerville. The map *Street Tree Condition* was produced by mapping the unique values of the COND value field.

Step 3:
Once the condition of the Street Trees were analyzed, additional analysis was necessary in order to understand what the City of Somerville's maintenance plan was with the trees in their various conditions. The points in the *Street Tree Condition* map labeled as "plant" are tree sites that are empty and the City's maintenance plan is to replant. These points are shown in the map *Vacant Tree Sites*. In the attribute field of the Street Tree Data, a field labeled as MT (maintenance) shows what the City of Somerville is planning to do with each individual tree. The choices are either "maintain" or "remove". Using the "Select by Attribute" function, the map *Street Trees Being Removed* was created. Combining the these two maps and their subsequent points; a *Street Tree Replanting Opportunity* map was created using the vacant tree street sites and the sites where trees were to be removed as sites where replanting could occur.

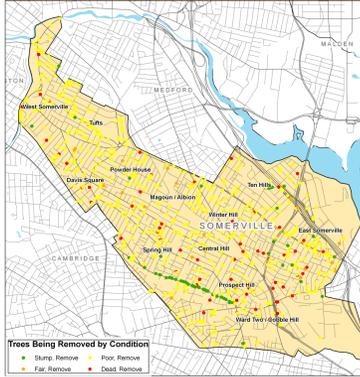
Step 4:
Once the replanting opportunities were defined city-wide, an analysis of the block groups where these sites were located was necessary. As stated earlier, median value of all owner-occupied housing units, percent of the population under 18, population below the poverty level and the median income per household were the factors analyzed in order to create an opportunity zone for replanting. In order to accomplish this, all of the necessary Census tables were joined to the Block Group layer using a table join. Once all of the necessary tables were all on one layer, the function "select by attribute" was conducted selecting the block groups within Somerville by the Census factors previously listed. Such as, selecting the block groups where median value of all owner-occupied housing units was less than \$277,000, where the percent of the population under 18 was greater than 10%, where the population below the poverty level was greater than 1000 persons and the where the median income was less than \$53,452. These figures were obtained from Census maps created during the process and the map *Priority Street Tree Planting Sites* is located below displaying the Opportunity Zones for Replanting and the replanting opportunities falling within these zones.



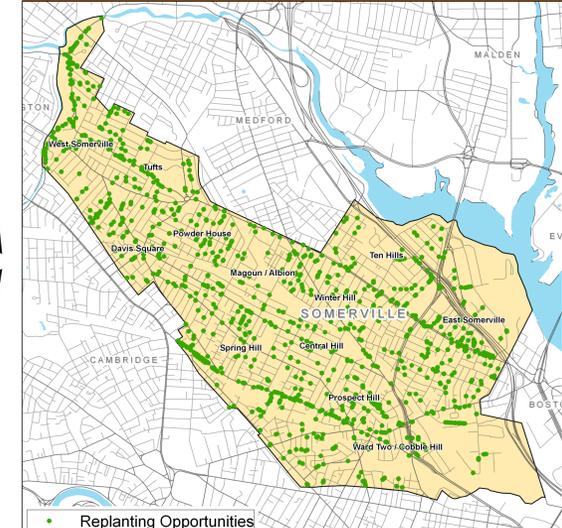
Vacant Street Tree Sites



Street Trees Being Removed



Street Tree Replanting Opportunities



Conclusions

GIS tools are very useful in analyzing municipalities' environmental equality or inequality in terms of spatial distribution of street trees. A more comprehensive analysis studying replanting opportunities by block group is necessary in order to form a comprehensive tree planting guide for the City of Somerville. This analysis is meant to provoke interest so future researchers can conduct analysis using more statistically accurate figures in terms of block group numerical factors. In addition, tiers of replanting priority sites could be created by assigning weighted values to the Block Group factors selected by the researcher.

Priority Street Tree Planting Sites

