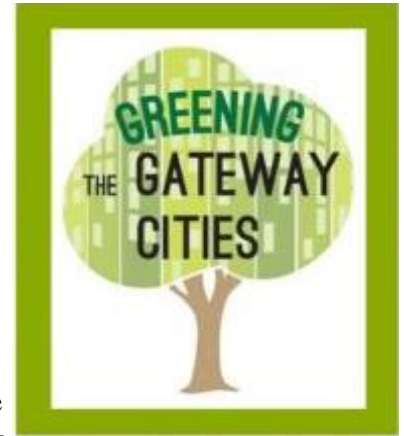


## Executive Summary

### An Evaluation of the Impacts of the *Greening the Gateway Cities* Pilot Program Rachael Lanni, Stephen Kosmo and Michelle Addai

#### Abstract

Low tree canopy in American cities contributes to numerous environmental, economic and health problems. Planting trees can help lower energy use, improve air quality, and increase quality of life. We worked with the Massachusetts Office of Energy and Environmental Affairs and the Department of Conservation and Recreation to evaluate the impacts of its *Greening the Gateway Cities* tree planting program in Fall River and Chelsea. Our group conducted interviews with officials and residents to understand how they define success and developed a methodology for assessing success using tree coverage models and input from residents. Finally, we provided recommendations to improve the program’s outreach and advertising, communication, tree planting & maintenance, and survey development methods.



#### The Problem

Urban neighborhoods and their residents often suffer from a number of environmental, economic and public health problems that stem from increased urbanization, industrialization, a lack of trees, and old, inefficient infrastructure. On a global scale, cities are responsible for 67% of total energy consumption with the rate in urban areas within the United States being higher than most other developed countries (Sustainable Urban Futures, 2016). Consequently, high amounts of carbon dioxide emissions negatively affect the wellbeing of urban residents and the environment. An important cause of these problems in many cities of the U.S. is the decline in tree canopy, which has decreased nationally at a rate of nearly 4 million trees per year (Nowak, 2012). The lack of tree canopy coverage is a primary concern specifically for the urban neighborhoods of Massachusetts; high pollution levels in Boston were attributed to loss of tree coverage (Nowak, 2012). Quality of life is also negatively affected, as stated by a resident of Cambridge, “it’s not just the lack of sun and daylight that make people feel gloomier in the winter – it’s the lack of greenery” (Bolton, 2014, para 2). Therefore,

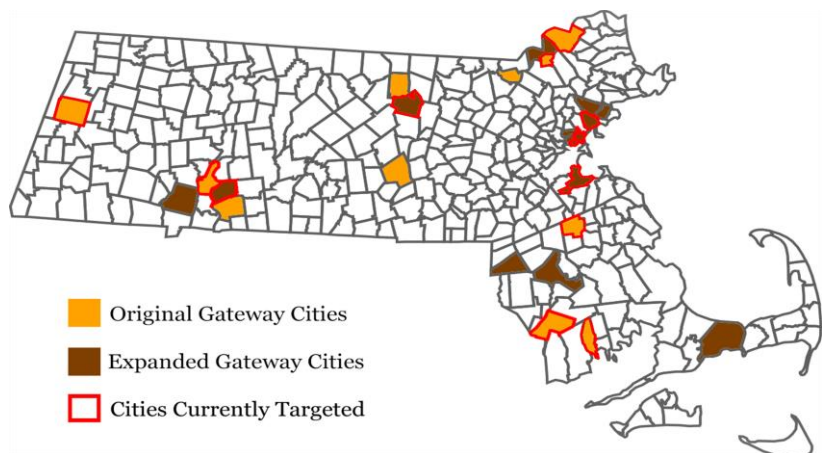


Figure 1: Map of Gateway Cities

the Commonwealth of Massachusetts hopes to increase urban tree canopy to mitigate energy use, high utility bills for residents, storm water runoff, and poor air quality (Heat Urban Impacts, 2016). The Massachusetts Executive Office of Energy and Environmental Affairs (EEA) along with the Department of Conservation and Recreation (DCR) has implemented *Greening the Gateway Cities (GTGC)*, a tree-planting program in Massachusetts, to benefit communities by reestablishing previously lost tree canopy. Figure 1 displays the Gateway Cities across the state. The EEA and DCR have already implemented its program in select Pilot Cities, including Chelsea, Fall River and Holyoke, outlined in red in Figure 1 above. These three Gateway Cities were all chosen to start the program because they had ample planting room and a need for canopy, as well as a high elevation for windiness, and available local partners. Over 5,000 trees have been planted in total in an attempt to reduce energy consumption (Cahill, 2015). The EEA and DCR estimates that the program will lower energy use by 10% and save homeowners approximately \$230 per year (EEA, 2016).

## Goal

**The goal of this project was to evaluate the *GTGC* tree planting program and its impacts on residents and the environment, as well as provide recommendations for future program improvements.**

## Methods

To achieve our project goal we completed three objectives:

### **1. Identified various factors that stakeholders in *Greening the Gateway Cities* may use to assess success of the program.**

We interviewed Mat Cahill, the *GTGC* program coordinator and Hilary Dimino, the Chelsea city tree forester, with questions focused on whether or not the EEA and DCR's goal was being met and other potential ways of measuring success. We also interviewed local partners and participating residents, in order to identify measures that each group of stakeholders used to define success.

### **2. Assessed the extent to which programs in participating Pilot Gateway Cities have met the EEA and DCR's standards of success.**

We found the existing tree canopy using GIS mapping. We then created a methodology that took existing GIS data on land use, tree canopy location, and tax parcel data to create heat maps of tree canopy in Chelsea and Fall River. These maps provide percentages of land covered by tree canopy for each tax parcel in the areas targeted by the program.

### **3. Determined how the *Greening the Gateway Cities* program has impacted urban residents.**

We interviewed 44 residents from Chelsea and Fall River who had received trees to gather their opinions about the program. We developed three kinds of surveys to conduct with residents in these cities. The surveys targeted residents who participated in the *GTGC* program, residents who had heard about the program and did not participate and the lastly residents who had not heard about the program. We surveyed 21 residents total from both cities.

## Findings

We analyzed the data we gathered from literature reviews, computer simulations, interviews and surveys, and then were able to identify elements that contributed to or hindered the success of the *GTGC* tree planting program.

### Measures of Success in the Pilot Cities

**Finding 1:** Stakeholders in *GTGC* measure program success in a variety of ways, including percent increase in tree canopy, high rate of tree survival, and overall improvements to health, relationships, and communities.

**Finding 2:** Based on stakeholders' measures for defining success and computer simulations, both Fall River and Chelsea have represented successful participants in the Gateway Cities tree planting program, but can further benefit from the addition of trees. Figures ES.1 and ES.2 show locations of high and low tree canopy for Fall River and Chelsea.

### Contributors to Success of the Program

**Finding 3:** The ability of local partners to facilitate tree planting programs played a key role in program success.

**Finding 4:** Residents' willingness to participate in the *GTGC* tree planting program was influenced by their connection with staff, planters, and foresters.

**Finding 5:** Seeing tree plantings around different sections of a city stimulated resident interest in the *GTGC* program.

**Finding 6:** The provision of additional resources for street tree maintenance has been crucial for tree survival.

### Limitations that Hinder Program Progress/Success

**Finding 7:** Some renters lack authority to decide on program participation without getting approval from landlords, which potentially limits program success.

**Finding 8:** Inefficient communication between program and city officials can diminish residents' confidence in program implementation.

Fall River Tree Canopy Percent Change per Tax Parcel



Figure ES.1: Percent Change in Tree Canopy for a Sample Block in Fall River

Chelsea Tree Canopy Percent Change per Tax Parcel



Figure ES.2: Percent Change in Tree Canopy for a Sample Block in Chelsea

**Finding 9:** A lack of public awareness of the specifics of the program hindered its implementation in Chelsea and Fall River.

**Finding 10:** Water restrictions due to drought can hinder program progress in Gateway Cities.

## Recommendations

Our recommendations fall under four general themes: Outreach and Advertising Strategies, Program Communication, Tree Planting and Maintenance and Development of Methodology for Future Evaluation.

### Outreach and Advertising Strategies

**Recommendation 1:** The EEA and DCR should raise awareness about the ongoing tree planting program by using local news media and newspapers, and having local partners spread information through word of mouth to supplement door fliers in each participating Gateway City.

**Recommendation 2:** The EEA and DCR should have students and youth groups involved in *GTGC* tree planting program, in order to facilitate increased awareness of the program to overcome the barrier created by lack of awareness.

### Program Communication

**Recommendation 3:** The EEA and DCR should endeavor to build residents' confidence in program implementation by ensuring that there is effective and regular communication between program staff and city officials.

**Recommendation 4:** The EEA and DCR should provide additional support to foresters and staff knocking on doors to gather tree planting orders, in order to better promote and implement the program.



### Tree Planting and Maintenance

**Recommendation 5:** The EEA and DCR should carefully consider expanding tree plantings outside of the set quadrants within each Gateway City.

**Recommendation 6:** The *GTGC* program foresters should emphasize to residents that there is an available help line that residents can call for questions about their trees.

**Recommendation 7:** For cities without a local support system, the EEA and DCR should regularly check with city officials to see if trees are being properly maintained during the first year of the program and ensure that there is a maintenance calendar for doing so.

### Development of Methodology for Future Evaluation

**Recommendation 8:** The EEA and DCR should consider using a survey as a tool to measure program success, in order to gauge residents' response to the program.

## Deliverables

By completing our research objectives, we provided the following deliverables to supplement our recommendations for the EEA and DCR:

- An assessment framework consisting of measures for evaluation, an evaluation process, and a data analysis tool, all of which can help analyze the success of future cities.
- A preliminary survey template can be used by the EEA and DCR to gather feedback about the impact of the program on the community. This can help the EEA and DCR get a larger sample of opinions as to what residents consider most important in deciding whether or not to participate in tree planting programs and thus know what areas to improve on in raising awareness about the program.

## Conclusion

Cities throughout the country face the negative impacts of low tree canopy and the cities of Massachusetts are not immune to these impacts. The *Greening the Gateway Cities* tree planting program implemented by the Massachusetts Office of Energy and Environmental Affairs (EEA) and the Department of Conservation and Recreation (DCR) seek to mitigate these negative effects such as storm water runoff, air pollution and high energy costs by increasing tree canopy in Gateway Cities of Massachusetts. In this project, we sought to evaluate the impacts of the *GTGC* tree planting program on the residents and other stakeholders involved. We used Chelsea and Fall River as case studies for our evaluation.

Our literature review, computer simulations, interviews and surveys have informed us that the program has been a success in the Pilot Cities. This success is due in part to the efforts of local partners. Their role in community outreach was instrumental in stimulating interest of residents for the program. The resources provided to and by the local partners were also key to the program's success. Foresters sent out to the cities helped plant the trees correctly, and taught residents how best to care for their trees. Even though the program was successful, there are still areas for improvement. A careful consideration and application of the findings and recommendations developed as part of our project can help bring the EEA and DCR a step closer in ensuring the success of the *GTGC* tree planting program in other Gateway Cities. In the long run, Massachusetts can reach its goal of mitigating the negative impacts of low tree canopy- storm water runoff, high energy use, air pollution, and poor public- in its urban areas.