Quantifying effects of urban growth and urban greening

Preliminary results from a stakeholder-driven scenario analysis

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The Boston Metropolitan Area is experiencing both inexorable urban growth (suburbanization) and municipally supported efforts toward urban greening, making it an ideal laboratory for understanding the relationships between these two complex processes. The Boston Metropolitan Area is the 10th most populous region in the United States with 4.48 million people. Despite relatively low levels of population growth in the next 20 years, the metropolitan area is expected to consume 152,000 acres of open space, including 58,000 acres of rare and endangered species habitat. Dealing with this predicted growth will require proactive landscape planning in the developing urban fringe, as well as increased "greening" of the existing densely populated urban core. Through a stakeholder-driven scenario analysis, we are examining the effects of four different futures for the Boston Metropolitan region on key ecosystem services and human outcomes, including social equity, biodiversity, and water quantity and quality.

Four Scenarios

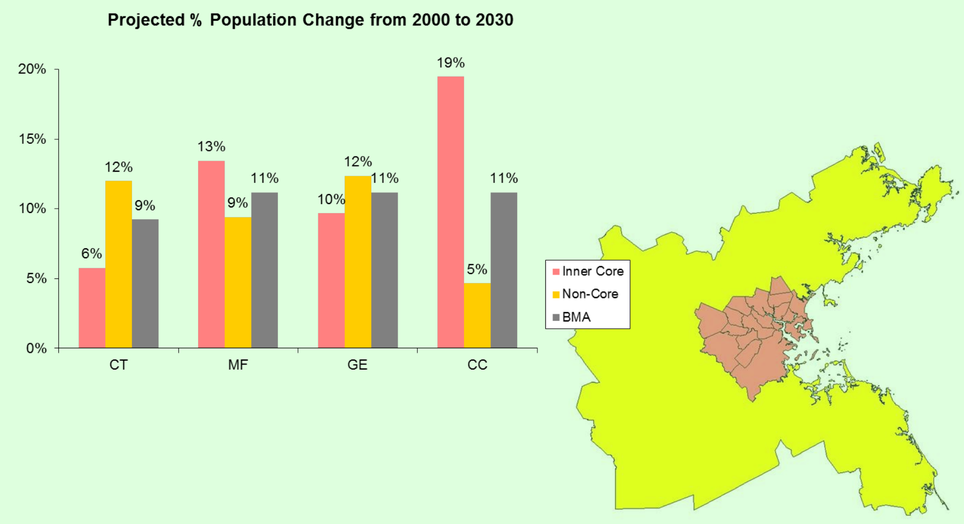
- Population sprawl in developing suburbs
- Moderate investment in greening
- Growing social inequity

- Vibrant pop growth in inner core
- Reduced sprawl in suburbs
- Robust network of green infrastructure

- Limited reduction of sprawl
- Major investment in green infrastructure
- Greening focused in EJ communities

- Very densely populated inner core
- Reduced sprawl in suburbs
- Limited investment in trees/greening

Density vs. Suburbanization



Each scenario represents different degrees of **controlled growth** versus investment in **urban greening**.

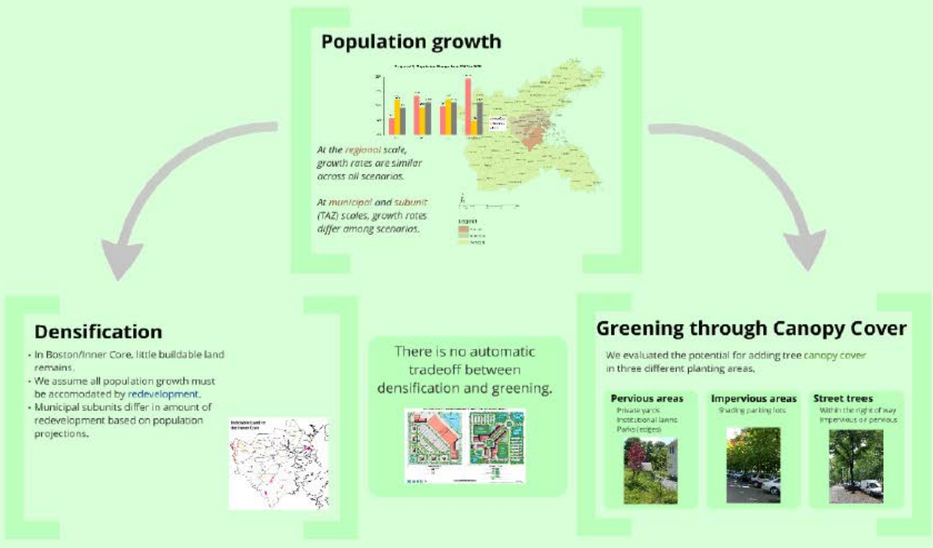
"Compact Core," the scenario with greatest controlled growth, slows suburban growth to 2030 by >1/2 the current rate.

The Process

Stakeholder input

- Series of workshops with city and state level decision makers
- Presented 6 scenarios
- Revised and consolidated to 4
- Differentiated by investments in densification and in greening (trees)

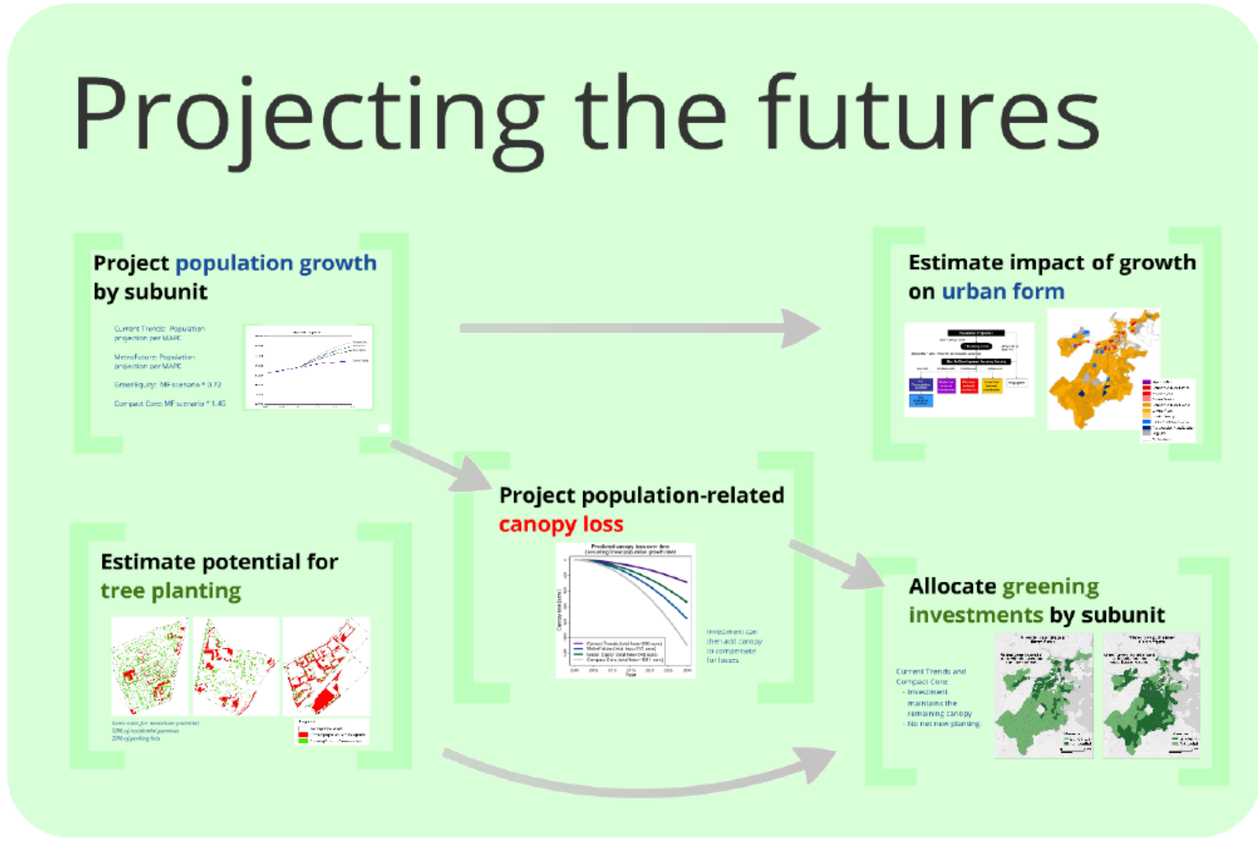
Assumptions



A set of projections were made for Boston, focusing on changes in urban form (densification) and in urban tree canopy under each scenario for municipal subunits (TAZs).

A parallel effort projected land cover in 100m pixels for the suburban portion of the region, focusing on the town of Ipswich.

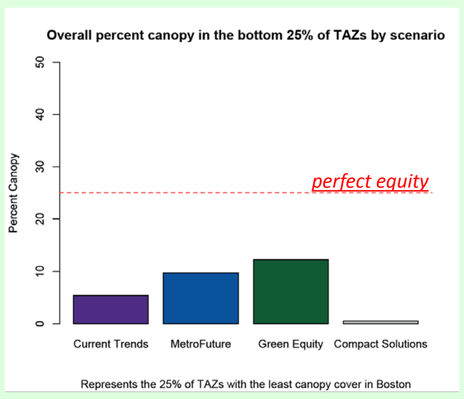
Ongoing work is revising these scenarios with stakeholder input, and expanding the coverage.



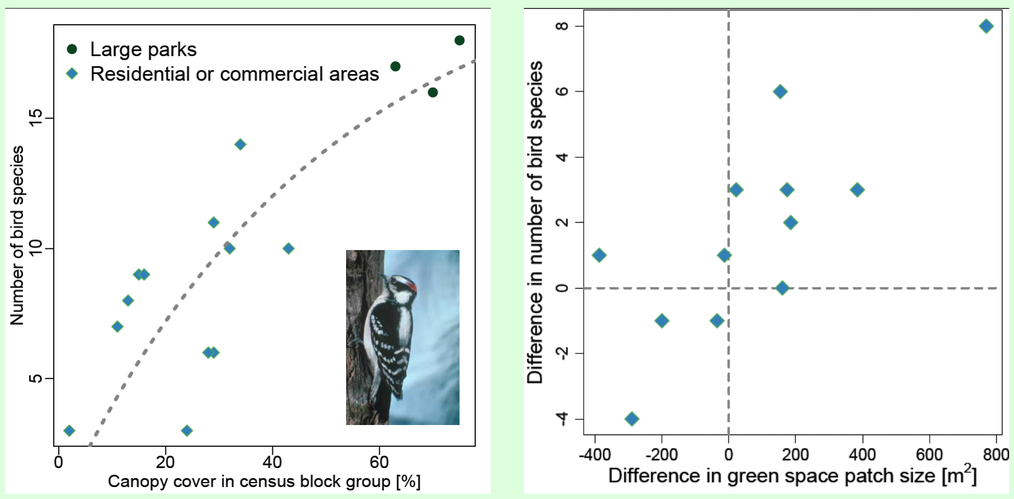
Preliminary Results

Boston Case Study

Equity in canopy cover is difficult to achieve.



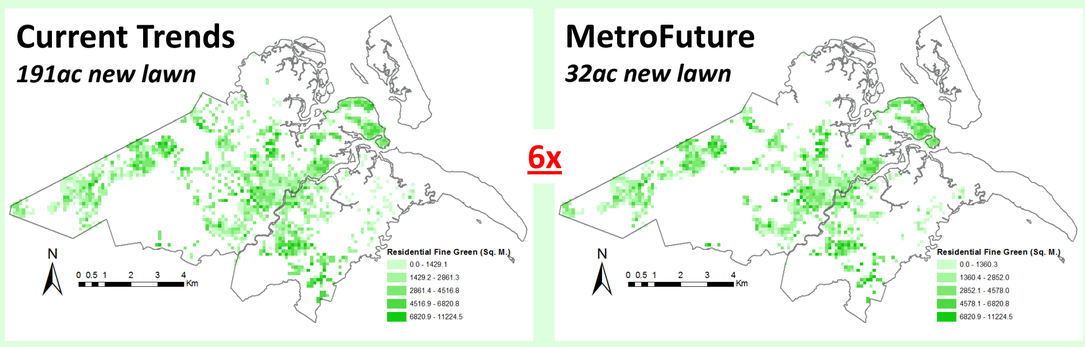
High canopy scenarios should increase local bird diversity.



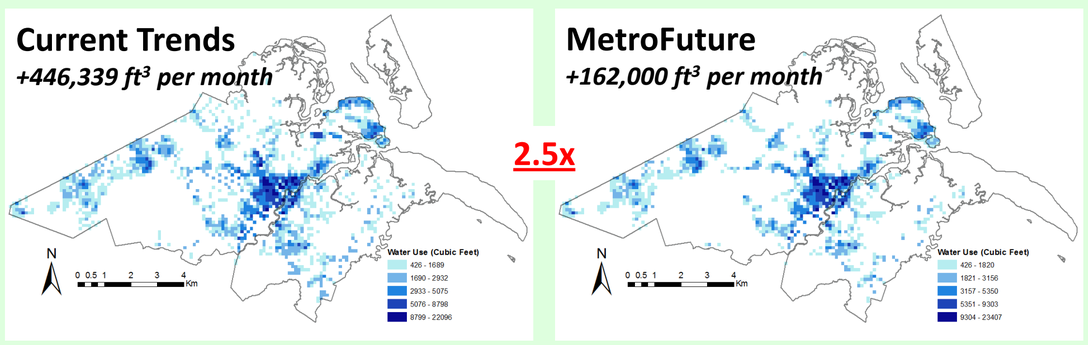
Increasing patch sizes without decreasing human density requires redevelopment.

Ipswich Case Study

Compact development scenario reduces lawn cover…



…with significant impacts on water consumption.



HERO, 2011: hero.clarku.edu

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