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**Identification of the problem:**

1. Trees are for everyone, efforts in public and private tree protection need to expand in order to build resilience to global climate change and enhance the value of suburban communities.
2. People are moving out of cities, but they're staying in areas right outside of metro areas and urban growth boundaries. Development in these areas need to simultaneously consider the health of existing ecosystems and ecoservices as new housing is developed.
3. Many problems leading to tree removal can happen when suburbs host growing populations as there is more foot traffic, more human-to-nature interaction and infrastructure that can interfere with root health.

**Key Questions in research:**

1. How can suburban areas expand tree protection and more closely monitor tree health in the midst of highly demanded residential and commercial development
2. What are proactive steps that municipalities can take in order to ensure proper care of public trees, and how can these municipalities grow connections with private landowners and developers in order to encourage the care and consideration of public tree health down the line.

**Focus:**

We spoke with certified arborists, an urban canopy cover researcher, a director of a forestry organization, and tree wardens to develop multiple routes that suburban tree committees and town planners can explore in hopes of altering attitudes around conservation, inspiring residents through education and incentives, revising bylaws to better suit the agenda of protecting trees, and creating successful financial tools and strategies. In the future, an exploration into enforcement enhancements through increased funding is an important focus, as many of the solutions discussed in our findings indicate a need for resource and funding adequacy. We hope that EE 538 students can explore this question further in the following semester's projects.

**Solutions to development pressures/neglect of trees on private land:**

*Certified Arborist Implementation:*

Towns in Massachusetts looking to more closely monitor tree health during development on private property can introduce new bylaws that require the outsourcing of a certified arborist. The arborist will create a detailed plan outlining tree removal and tree health considerations made by the developers and submit the plan for approval. This takes away the possibility of developers making tree plans without proper expertise, and adds only a small cost to developers compared to the aggregated cost of every other aspect of development. Further bylaws can mandate added costs to the removal of a certain number of trees based on this plan, or a portion of trees relative to the entire canopy of the original plot of land. Towns can have a compiled list of recommended arborists in the area on their website to compile companies that developers can be referred to.

### *Careful enforcement of a three-step permit system*

Ensuring the ability of municipal staff to carefully review permit applications in three different permit steps strengthens enforcement. Having developers apply for three permits, with careful application reviews, makes it easier to monitor compliance with developed tree plans. A **demolition permit** followed by a **building permit** and then an **occupancy permit** need all careful consideration before approval. More steps for approval or disapproval in the development process allow for holding developers compliant with bylaws. Developers have an incentive to remain compliant because they need to sell their development to make their losses back.

### *Violations between obtaining permits*

Tree wardens or other staff members can walk onto developing properties and survey for anything that would make developers out of compliance with tree protection bylaws. If violations are found, fines can be issued. Developers should not be approved for the next permit in the permitting process until all fines within the previous permitting period have been settled

## **Solutions to public shade tree removal:**

### *Planting in the Setback*

Planting trees within the setbacks of properties instead of directly in the public right-of-way can reduce pedestrian traffic on tree roots and damage to trees from traffic and road construction. Planting in the setbacks of properties can establish better connections between tree protection staff and private landowners, furthering opportunities for conservation in the future and increasing public awareness on tree health. Planting on lawns has benefits to tree health vs. planting in more fragmented areas with impervious surfaces such as sidewalks.

### *Fines for Mature Tree Removal*

If private landowners submit requests for removal of trees in setbacks, they should be evaluated by the tree warden. If the tree warden approves the removal, landowners can pay into a tree fund where saplings are planted elsewhere, pay to have a certain number of new saplings planted in the area, or pay the fine for removal. For mature trees, fines can be issued based on the tree's DBH.

### *Miyawaki Method*

Created by Japanese botanist, Akira Miyawaki, it is a solution to small-scale afforestation within urban areas. Native plants are planted densely together in a space of at least 20 sq ft, where they'll grow and protect each other from parasitic plant growth. It would require maintenance for 3 years, with full growth in 15-20 years. This a model for accelerated tree canopy development. When removing trees elsewhere and having to account for the benefits of a mature tree, condensed native flora in the Miyawaki method is an option.

### **Tree maintenance:**

#### *Fencing*

During developmental periods, construction sites should install fencing around critical root systems helps avoid damage during vehicle maneuvering. For streets and recreational areas, single-chain fences around root systems can discourage pedestrian foot damage.

#### *Root & Soil Health*

Sand-based structural soil ensures soils receive sufficient oxygen since the structure of sand keeps the soil from being too compacted. Additional support can be through compost application to assist with the soil's microclimate. Proper mulching around the diameter of the trees so they can retain moisture, moderate soil temperature, suppresses weeds, and increases nutrient availability as the mulch decomposes.

#### *Programs*

Young trees' maintenance is imperative for resilience as they reach maturity. A program for young trees should be implemented, where trees are set for pruning after 2 years of growth, and watered for the first five years.

#### *Full-time Tree Warden*

Based on conversations with tree wardens in MA, towns are able to be more actively involved in restoring and protecting canopy cover as well as routine maintenance when there is a dedicated tree warden working full time without added responsibilities. This concept relates to the success of fines and violations previously discussed, and allows for a centralized contact.

### **Technological and educational outreach solutions:**

#### *Information Officer*

An information officer could assist residents, developers, etc. with finding arborists, tree experts, or other information regarding trees such as tree removal regulations to reduce the strain on Tree Warden's responsibilities. Residents can have secondary personnel to go for inquiries.

#### *Tree Committee Scheduling*

Proposals for tree updates or bylaws could start around April, and end during summer with notification for the public on decisions, with official implementation around Fall or early Winter. A set schedule allows time for decision-making to be discussed and alleviates ambiguity of expected time frames for committee members and the public. Additionally, in the event that the decisions made require tree planting, Fall is typically the best time to do so.

#### *Tree Value Awareness*

iTrees (<https://www.itreetools.org/>) is a tool great for helping residents be aware of the monetary value of trees. For ease of access, they can download the app MyTree (<https://mytree.itreetools.org/#/>) or remain on the web browser. Knowledgeable insight on trees for more than their aesthetic value provides extra thought before deciding to remove trees, particularly ones on private property.

#### *Student Participation*

Environmental clubs at schools can allow students to have a tree planting activity on school grounds, with assistance from nonprofits to insure the correct species is planted. Student engagement is integral to community engagement, as young voices can reach various platforms, such as social media.

#### *Interactive Map*

Public trees are mapped on an interactive map so residents can report or comment on trees around the area. Most likely the proposed Information Officer and other subordinates, can

compile concerns and work to pass the information along to proper entities to resolve issues in a timely manner. This serves as a community-regulated system of tree wellbeing, as well as reassurance that residents feel opinions are being accounted for, even when Tree Warden is unavailable. Modeled after an interactive map from New York City (<https://tree-map.nycgovparks.org/tree-map>).

**Powerpoint presentation:** <https://rb.gy/q0p59>

**Experts interviewed:**

**Gregory Cox**, Program Director of the **Massachusetts Forest Alliance**

**Richard Harper**, Extension Associate Research Professor at the **University of Massachusetts Amherst**

**David Lefcourt**, City Arborist and Tree Warden for **Cambridge, Massachusetts**

**Tim Lecuivre**, Tree Warden for **Arlington, Massachusetts**

**Sam A. Bishop**, Director of Urban Forestry and Education at **Trees New York**

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