The goal of this research is to create a land-cover classification of 26 towns (Fig. 1) in Northeastern Massachusetts. There are few studies of suburban land-cover that utilize sub-meter remotely sensed imagery, particularly for large geographical extents. The conventional methodology for land-cover classification lacks the spatial resolution, extent, and accuracy to describe the phenomena found in a suburban environment. Studies of the causes and consequences of suburban land-use would benefit from a land-cover classification depicting within-parcel heterogeneity, as well as the ability to match other data, such as the census, with land-use. Once all the towns are classified, a relational database will be built with multi-scale analyses of the landscape.

**How did we classify the landscape?**

**Where do we get our data?**

All the data used in this project is obtained for free from either MassGIS or the town to which the data applies. MassGIS provides aerial photographs, impervious surfaces, water and wetland boundaries, as well as town boundaries. Individual towns can but do not necessarily provide parcel boundaries, and building footprints.

**What’s Virtual Field Work?**

To check the accuracy of our maps we compare our land-cover classification with imagery seen in a virtual globe like Google Earth or Microsoft Virtual Earth. We place points randomly across the map, grouped by strata, and determine which land-cover they are characterized by in the virtual globe (Figures 9 & 10). We then compare the land-cover provided by our map with the land-cover determined using the virtual globe. We create strata because we want to know how well each of our land-cover categories correctly characterizes the landscape, as well as how often privately managed lawns can be observed in the virtual globe (Figures 9 & 10).

**Classification was performed by applying a hierarchy of rules (Fig. 3). Some classes were defined by sampling, while others were determined by layers from MassGIS. A classified town (see Fig. 4) must be validated before it can be analyzed for land-cover proportions and lawn presence.**

**How do we know how good our maps are?**

To check the accuracy of our maps we compare our land-cover classification with imagery seen in a virtual globe like Google Earth or Microsoft Virtual Earth. We place points randomly across the map, grouped by strata, and determine which land-cover they are characterized by in the virtual globe (Figures 9 & 10). We then compare the land-cover provided by our map with the land-cover determined using the virtual globe. We create strata because we want to know how well each of our land-cover categories correctly characterizes the landscape, as well as how often privately managed lawns can be observed in the virtual globe (Figures 9 & 10).

**How much lawn?**

The HERO MAP project will continue to add towns to its 0.5m resolution land-cover database, which will be searchable at the town, census block, and parcel scale (Figures 11 & 12). For each of these scales we derive data such as area of fine green cover, greenness for fine green areas, and proportions of each land-cover (Figures 13 & 14). We also break the study area into strata and determine the likelihood of the presence of privately managed lawns for each stratum. This database will be available to the public and will serve as a useful tool for studying the effects of suburbanization.

**Finding Lawns in Northeastern Massachusetts**

**Why map lawns?** Finding Lawns

How much lawn? Finding Lawns

The conventional methodology for land-cover classification lacks the spatial resolution, extent, and accuracy to describe the phenomena found in a suburban environment. Studies of the causes and consequences of suburban land-use would benefit from a land-cover classification depicting within-parcel heterogeneity, as well as the ability to match other data, such as the census, with land-use. Once all the towns are classified, a relational database will be built with multi-scale analyses of the landscape.

**Segmentation refers to the process of dividing a digital image (Fig. 2a) into multiple image objects. Neighboring pixels are grouped in the same image object (Fig. 2b) if they are similar with respect to a series of characteristics such as color, brightness, and texture. Image objects are then classified (Fig 2c).**

**Image Objects**

Findings:

- Finding 1:
  - The conventional methodology for land-cover classification lacks the spatial resolution, extent, and accuracy to describe the phenomena found in a suburban environment.
  - Studies of the causes and consequences of suburban land-use would benefit from a land-cover classification depicting within-parcel heterogeneity, as well as the ability to match other data, such as the census, with land-use.

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