# OUR CHANGING FORESTS: AN LTER PARTNERSHIP BETWEEN HARVARD SCIENTISTS, CONSERVATIONISTS, AND GRADE 7-12 TEACHERS AND STUDENTS

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## OUR IMPACT

We created middle and high school classroom lesson plans to investigate the impacts of forest change in local communities, using a combination of plot-based, student-led field studies, remote sensing maps, and conservation resources.

## OUR GOAL

Using field data collected in 10x10m plots and local land-use maps, answer the research questions for the "Our Changing Forests" Schoolyard Ecology project: **How do forests grow and change over time in response to different environments, land use, and disturbances?**

## OUR CHALLENGES

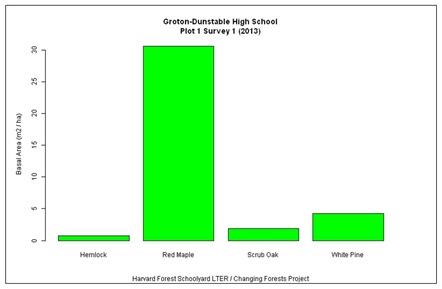
We sought to overcome the difficulty of scaling up from plot-level data to the wider context of forest change. Teachers using the lesson plan should keep in mind availability of technology, weather unpredictability, safety issues, and students' math abilities.

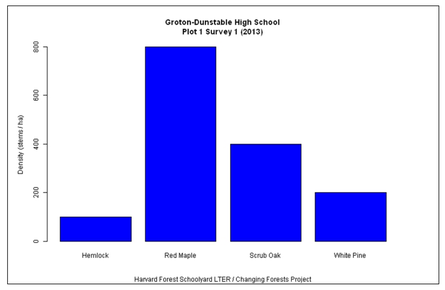
## OUR APPROACH

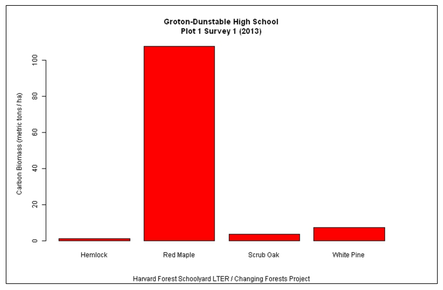
### FIELD DATA COLLECTION & ANALYSIS

*Ecologist-led workshops trained teachers in the plot-based field protocol.*

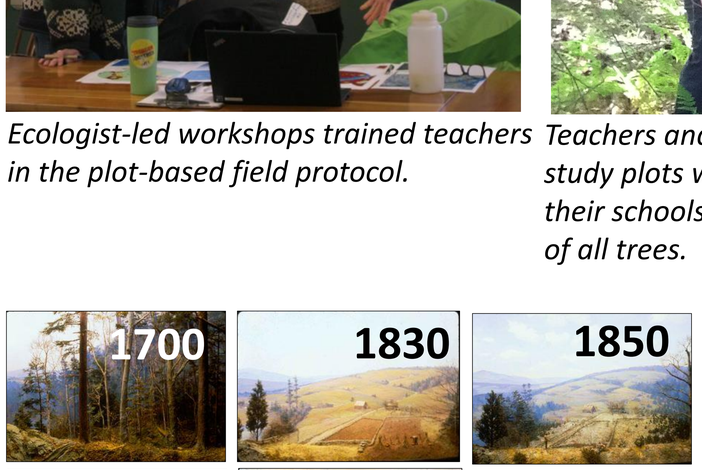
*Teachers and students set up 10m$^2$ study plots within walking distance of their schools and measured diameter of all trees.*



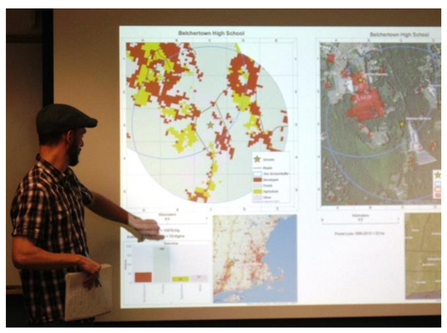




*Students entered their study plot data into a custom Harvard Forest database developed by Information Manager Emery Boose. Online graphing tools helped them analyze basal area, density, and carbon biomass.*

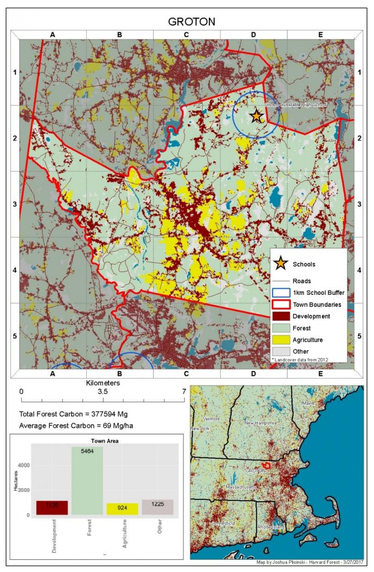


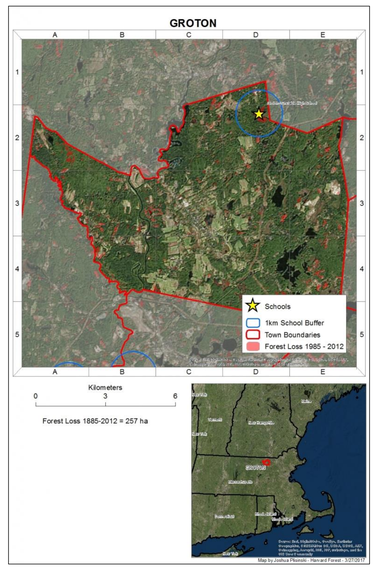

*Fisher Museum dioramas showed students the vast scale of past deforestation in New England.*

### LOCAL & REGIONAL CONTEXT

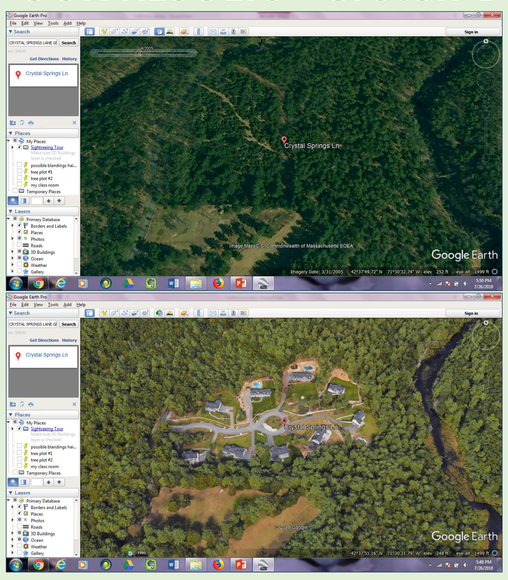


*Maps produced by Harvard Forest RA Joshua Plisinski showed decades of land-cover change in a 1-mile radius around the school and in the surrounding town.*



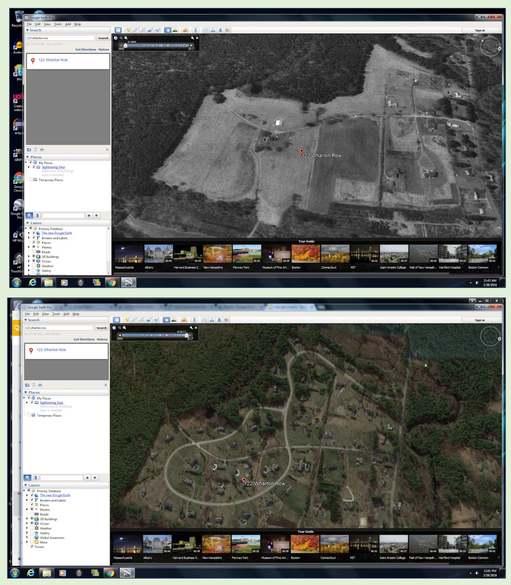

## OUR RESULTS - Groton-Dunstable Regional High School




*Students explored local land-cover change using HF maps and the aerial map time slider in Google Earth Pro.*

*Students discovered forest and farmland converted into housing developments, and analyzed whether smart-growth techniques were used.*

*This year, students will also estimate how much carbon biomass may have been removed from areas converted from forest to development.*



### NEXT GENERATION SCIENCE STANDARDS USED

**HS-ESS3-4**. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

**HS-LS2-7**. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Full lesson plan available

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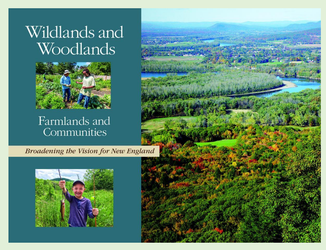
Grades 9-12

Four to five 84-min class periods




### RESOURCES

Harvard Forest Schoolyard Ecology. 2018. Our Changing Forests. http://harvardforest.fas.harvard.edu/Our_Changing_Forests

Plisinski, J. 2018. Land-Use Change Maps. http://harvardforest.fas.harvard.edu/SYLandUseChangeMaps

Smart Growth America. 2018. "What Is Smart Growth?" https://smartgrowthamerica.org/our-vision/what-is-smart-growth/

Groton municipal map of property information: https://grotonma.mapgeo.io/?latlng=42.616309%2C-71.576977&zoom=12

### ACKNOWLEDGEMENTS

The authors would like to thank Jonathan Thompson for intellectual contributions to the project. Funding was provided by Highstead, the Harvard Forest, and the National Science Foundation's Long-Term Ecological Research Program (DEB #1237491).