

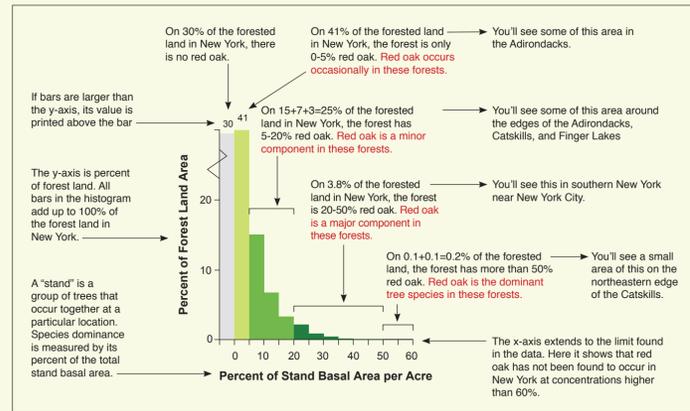
# Modeled distributions of 12 tree species in New York

Rachel I. Riemann, Barry T. Wilson, Andrew J. Lister, Oren Cook, and Sierra Crane-Murdoch

## Map Description

These maps depict the distribution of 12 tree species across the state of New York. The maps show where these trees do not occur (gray), occasionally occur (pale green), are a minor component (medium green), are a major component (dark green), or are the dominant species (black) in the forest, as determined by that species' total basal area. **Basal area** is the area of a cross-section of the trunk at 4.5 feet above ground (breast height). Basal area is a way of measuring how dominant a particular species is in a stand because of the way large trees contribute more to the total basal area than small trees. The map at the top of the circle (red maple) is the species with the greatest basal area in the state. All other maps are generally arranged to group species that commonly occur together. Of the 105 tree species recorded in New York in the 2005-2009 inventories, the species presented here are the top 12 in the state by total basal area, and together represent 74 percent of the total live tree basal area and 75 percent of the number of trees in New York. The center map shows where forest, nonforest, and water are present. In all maps, white is nonforest and water is blue.

Each map has an associated histogram in which the colors and the range of values they span serve both as the legend for interpreting the map and provide additional information about the distribution of that species in New York. Because of the small pixel size of the data relative to the scale of the maps, the exact shade of green in the maps may appear to be a blend of classes in areas where pixels of many colors/classes occur close together. Below is a description of the histogram corresponding to the red oak map.



You can see that some species, such as sugar maple, frequently occur in New York as a large proportion (>20%) or even a majority (>50%) of the forest stands in which it occurs (more areas in darkest green and black). Other species typically occupy less than 20 percent of the total tree basal area, either because of its tendency to be a minor stand component in this region (e.g., quaking aspen) or because New York is at the edge of its natural range (e.g., northern red oak).

These maps are created from data that is part of a larger dataset covering the contiguous United States (Wilson et al. 2012). The data were modeled from tree data collected on U.S. Forest Service Forest Inventory and Analysis (FIA) field plots (4,864 plots in New York), in combination with vegetation phenology derived from MODIS satellite imagery, climate data derived from daily surface weather data by the Oak Ridge National Laboratory, topographic data from the U.S. Geological Survey, and finer resolution tree canopy cover data derived from the National Land Cover Database, which was produced by a consortium of federal agencies.

Field data were collected during 2005-2009 by: Paul Natiella, Wayne Roell, Jonathan Poirer, David Berger, Scott Garber, John Minutilli, Christopher Coolbaugh, Anthony Olsen, Charles Butler, Casey Krogstad, Mark Peet, Matthew Pawlusik, Richard Grassetti, Michael Whitehill, Leland Swoger, Richard McCullough, Richard Starr, Karen Kubly, and Adrienne Evans. Field data were processed and compiled by Carol Alerich, Chuck Barnett, Dale Gormanson, Mark Hatfield, Barbara O'Connell, and Paul Sowers.

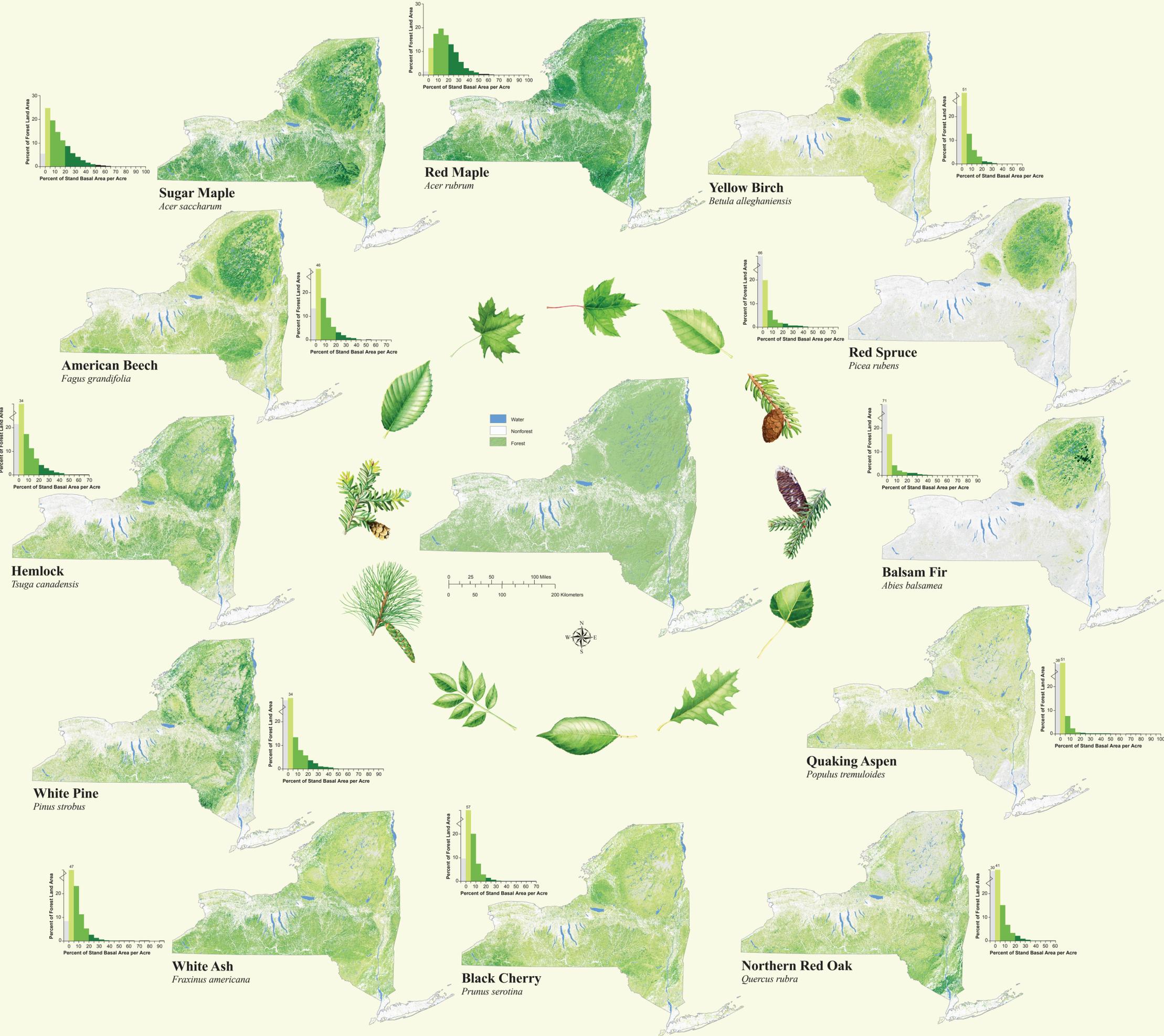
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Leaf images by Linda Ellis, Galena, MO.

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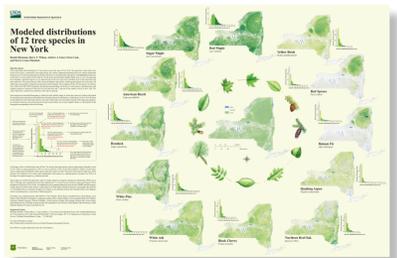
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## Methods:

The tree species distributions were modeled at a 250-m grid cell size using imputation and canonical correspondence analysis techniques. Much of the species covariance found on the forest inventory plots is retained in the datasets, which means that each grid cell in the modeled datasets contains close to the same mix and proportion of species as found on the ground in the field data. Regionwide and neighborhood accuracy assessments results are available in Wilson et al. (2012), and are associated with each species in the online database (Wilson et al. 2013). In addition, we are currently working on methods to calculate measures of per-pixel model uncertainty to accompany the datasets.

## Dataset Reference:

Wilson, B.T.; Lister, A.J.; Riemann, R.I.; Griffith, D.M. 2013. Live tree species basal area of the contiguous United States (2000-2009). Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. [GIS database]. <http://dx.doi.org/10.2737/RDS-2013-0013>.

## References:

Wilson, B.T.; Lister, A.J.; Riemann, R.I. 2012. A nearest-neighbor imputation approach to mapping tree species over large areas using forest inventory plots and moderate resolution raster data. *Forest Ecology and Management*. 271:182-198.

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