Trees of the Huron River Watershed in a Changing Climate
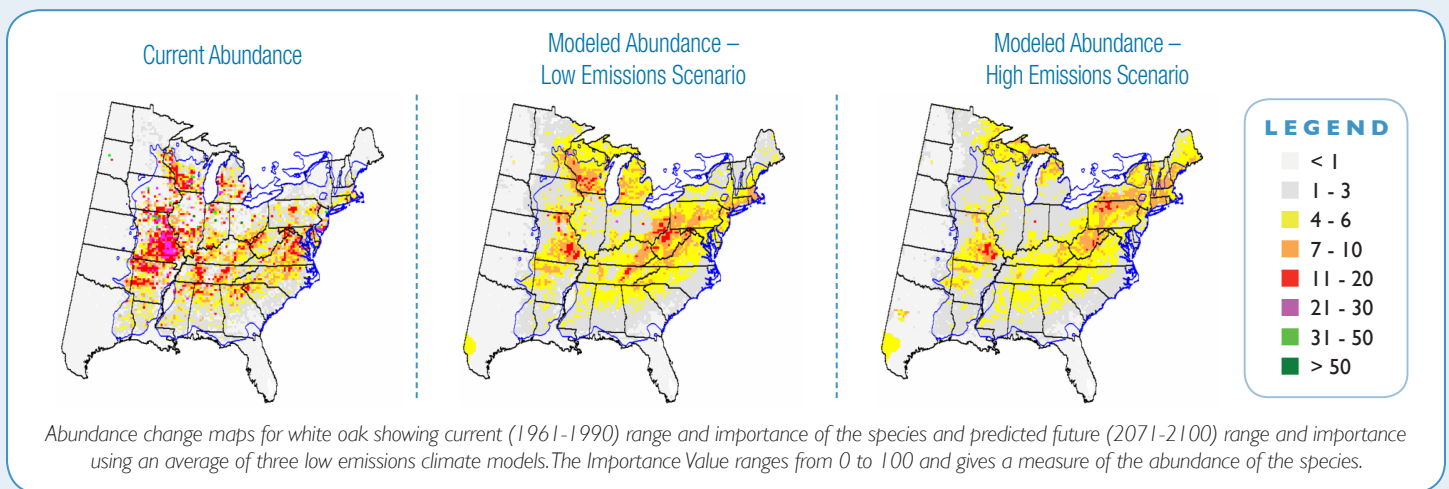
White Oak *Quercus alba*

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Description

White Oak is a very large, strong, long-lived tree. It is found throughout the lower peninsula of Michigan, however that is the northern limit of its range. White Oak is moderately shade tolerant but is poorly adapted to hard winter freezes. White Oak is found on a variety of well drained upland soils ranging from sandy to mesic. Oaks are among the tree species most valuable to wildlife due to the abundance of acorns that they produce which serve as a high quality food source.

Change Maps for White Oak[1]

Current Abundance

Modeled Abundance – Low Emissions Scenario

Modeled Abundance – High Emissions Scenario

LEGEND
- < 1
- 1 - 3
- 4 - 6
- 7 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- > 50

Abundance change maps for white oak showing current (1961-1990) range and importance of the species and predicted future (2071-2100) range and importance using an average of three low emissions climate models. The Importance Value ranges from 0 to 100 and gives a measure of the abundance of the species.

Implications of Climate Change

Because the watershed is located near the northern most extent of its range, white oak will continue to be a favorable plant as climate changes. White Oak is a canopy tree likely to persist while others decline. White oak does not do well in shade, therefore plant only in locations where sapling has full sun. Protection from deer browse, invasive species and pests will help this species continue to thrive.

Natural Communities Associations[2]

Canopy dominant in dry southern forest, dry-mesic southern forest, oak barrens, oak openings and oak-pine barrens.

Vulnerability of Natural Communities[3]

Dry southern forest systems are expected to have low vulnerability to climate change. Longer growing season and warmer temperatures may increase productivity. Because these systems are widespread, there is greater potential for dispersal except in areas of significant fragmentation. The climate envelope for oak barrens and oak-pine barrens will likely shift north, moving these systems out of southeast Michigan. Savannah systems may benefit from increased temperatures and disturbance therefore oak openings have low vulnerability to climate change.

[1]Prasad, A. M., L. R. Iverson., S. Matthews., M. Peters. 2007-ongoing. A Climate Change Atlas for 134 Forest Tree Species of the Eastern United States [database]. http://www.nrs.fs.fed.us/atlas/tree, Northern Research.

[2]Michigan Natural Features Inventory. www.mnfi.anr.msu.edu/communities

[3]Lee, Y., M. A. Kost, J. G. Cohen, and E. H. Schools. 2012. Climate Change Vulnerability Assessment and Adaptation Strategies for Natural Communities in Michigan, Focusing on the Coastal Zone. Michigan Natural Features Inventory Report No. 2012-18, Lansing, MI.