



Climate Change Updates to i-Tree

David Nowak, Allison Bodine, Louis Iverson

US Forest Service

i-Tree?

www.itreetools.org



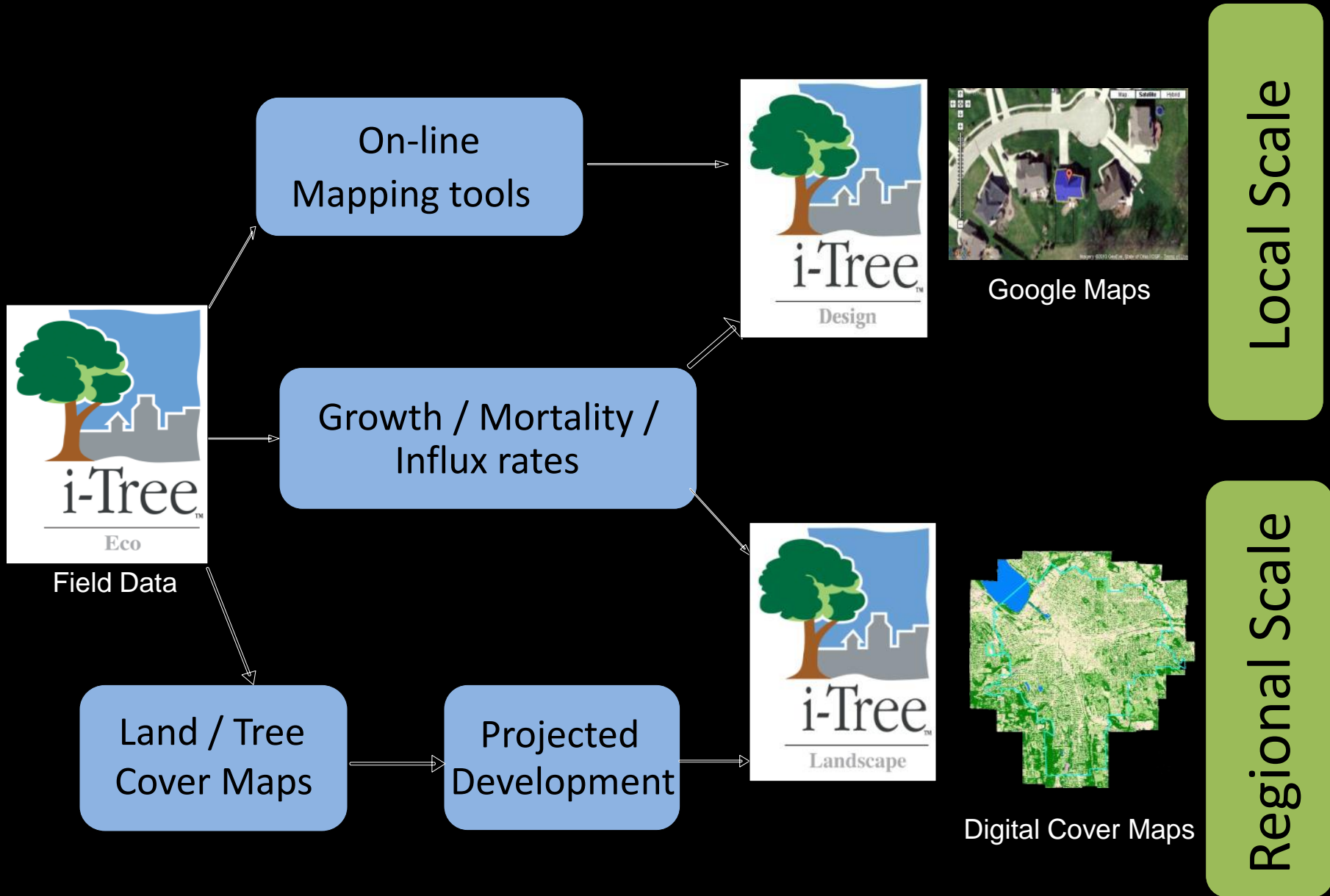
A series of FREE tools to quantify ecosystem services and values from trees (Free support also)



i-Tree is a Cooperative Initiative



i-Tree 2nd Generation (3 Flagship Programs)





Current Assessments

- ✿ Carbon storage
- ✿ Carbon sequestration
- ✿ Avoided emissions

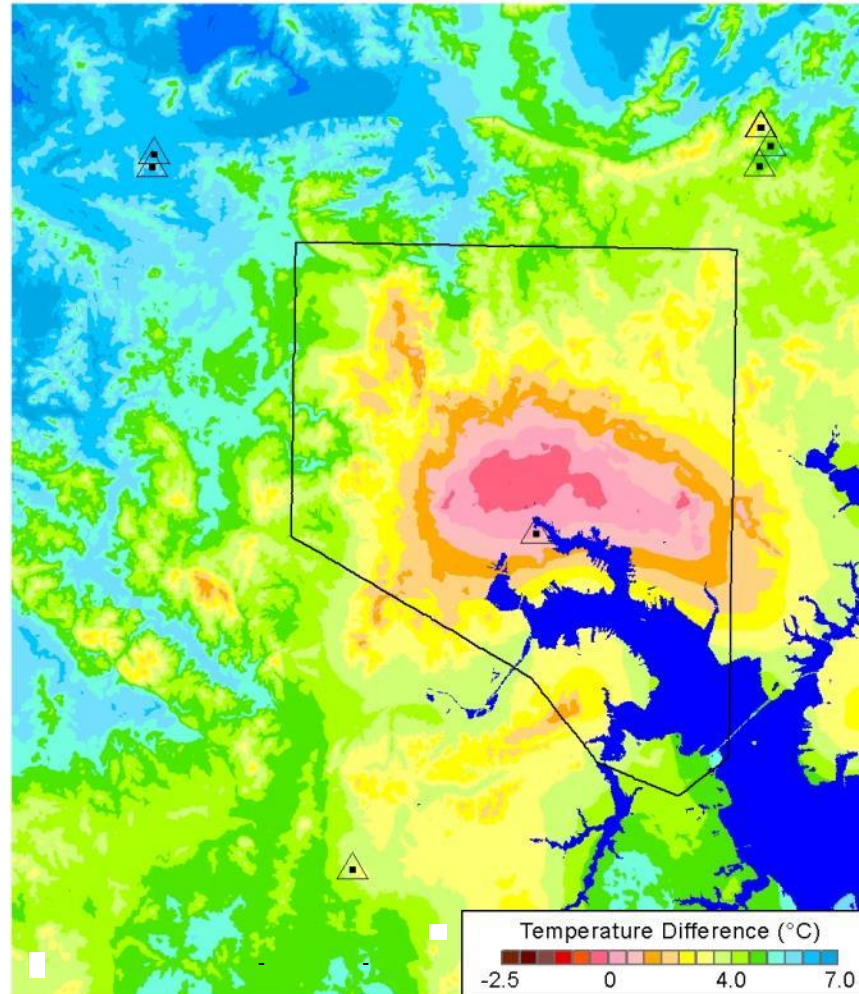


In development

- ✿ Air temperature mapping / human health
- ✿ Future climates / development
- ✿ Changing habitat suitability

5 May 2004 21:00

WIND



Air temperature mapping (2015)

Future Climates and Development

- ✿ ICLUS development patterns
- ✿ NARCCAP climate projections

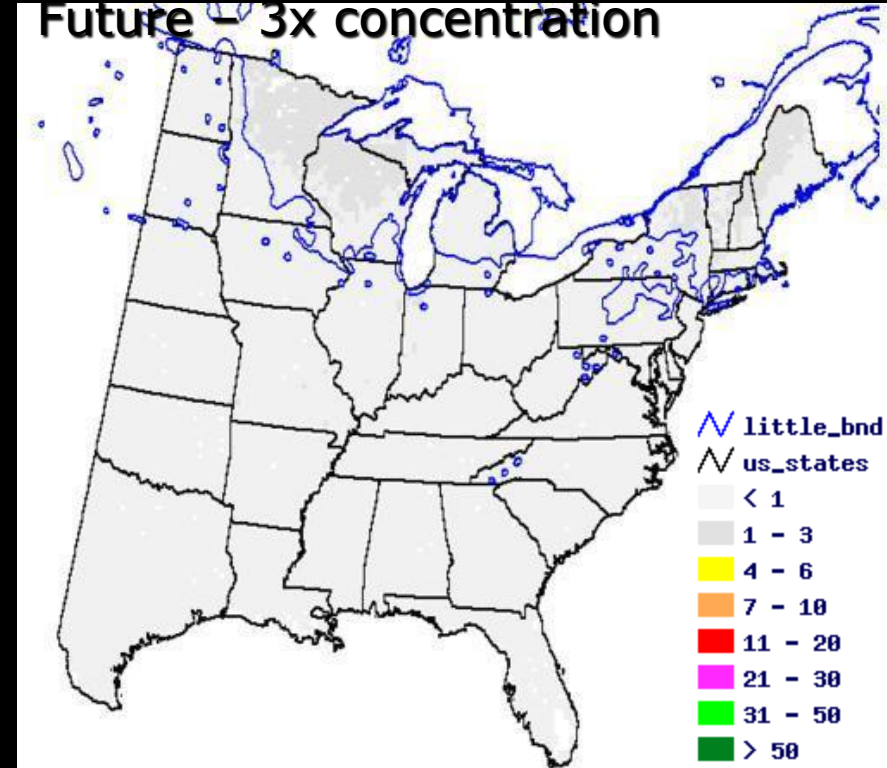
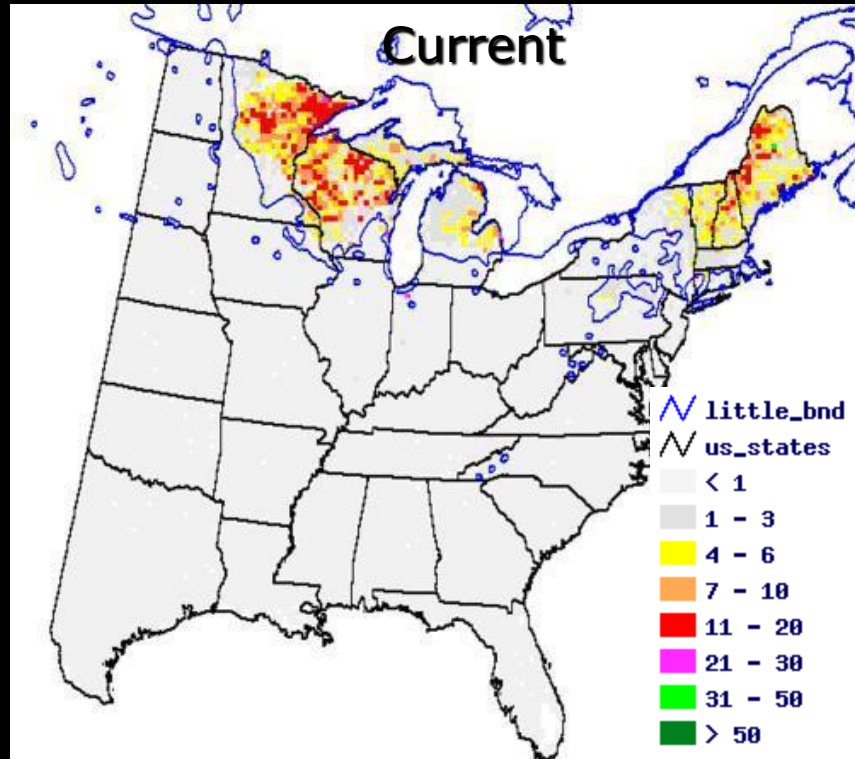




Changing Habitat Suitability

- ✿ Guide species selection in cities based on potential changes in species performance due to climate change

Species Shifts – *Betula papyrifera*



Importance Values

Iverson and Prasad – Climate Change Tree Atlas

http://www.nrs.fs.fed.us/atlas/tree/tree_atlas.html



Methods

- ✿ Used data from the Climate Change Tree Atlas (available at: <http://www.nrs.fs.fed.us/atlas/tree/>)
- ✿ Analyzed 5 datasets
 - ✿ Actual – current IV based on FIA data
 - ✿ Current – modeled current IV (1960-1990)
 - ✿ Future – modeled future IV (2070-2099)
 - ✿ High – average of three high emission scenarios
 - ✿ Low – average of three low emission scenarios
 - ✿ Average – average of high and low
- ✿ Processed data for each county and state in the eastern U.S. using 2010 Census boundaries
 - ✿ County – assigned average value of pixels within approximately 16,000 km² circle at county centroid
 - ✿ State – assigned average values of all pixels within boundary



Case Study: Syracuse, NY

Common Name	Adaptability	Future:Current			Notes		
		low	average	high	rare?	new habitat?	extirpated?
Red maple	High						
Sugar maple	High						
Flowering dogwood	Moderate				Y		
White ash	Low						
Eastern red cedar	Moderate				Y		
Eastern white pine	Low				Y		
Black cherry	Low						
White oak	High				Y		
Northern red oak	High				Y		
Black oak	Moderate				Y		
Eastern hemlock	Low						
American elm	Moderate				Y		

Classification	Percent of Trees			Percent of Leaf Area		
	low	avg	high	low	avg	high
Large decrease	0.0	2.7	9.0	0.0	1.1	4.8
Decrease [Small decrease]*	3.4	10.8	11.3	3.0	10.0	2.8
No change	17.6	7.5	0.7	15.6	7.5	2.9
Increase [Small increase]	0.6	0.6	0.6	0.2	0.2	0.2
Large increase	0.0	0.0	0.0	0.0	0.0	0.0

* For rare species, decreases are not classified as small or large



Additional i-Tree Cities for Analysis

- ✿ Arlington, TX
- ✿ Atlanta, GA
- ✿ Baltimore, MD
- ✿ Boston, MA
- ✿ Chicago, IL
- ✿ Freehold, NJ
- ✿ Gainesville, FL
- ✿ Hartford, CT
- ✿ Jersey City, NJ
- ✿ Lincoln, NE
- ✿ Milwaukee, WI
- ✿ Minneapolis, MN
- ✿ Moorestown, NJ
- ✿ Morgantown, WV
- ✿ New York, NY
- ✿ Omaha, NE
- ✿ Philadelphia, PA
- ✿ Roanoke, VA
- ✿ Scranton, PA
- ✿ Washington, DC
- ✿ Woodbridge, NJ



i-Tree™

Do you?