



Indiana

Forest Health Monitoring

Baseline data summary



The **crown measures** of foliage transparency, crown density, dieback and live crown ratio can be used to access the tree's "health". Trees with **low** foliage transparency and dieback values and **high** crown density and live crown ratio have increased potential for carbon fixation, nutrient storage, survival and reproduction.

Using these measures and making comparisons between years, the FHM survey should identify a problem with a tree species or forest type. Once identified, a problem can be evaluated on a more localized basis to understand the problem and define management measures. The information below summarizes the survey findings.

For **foliage transparency**, which is used to indicate defoliation, the survey found 97% of the hardwoods and 92% of the softwoods had normal transparency (<30%). Only maple, oak, elm and ash had any trees with moderate to severe transparency (30-50% & >50%).

Dieback is the amount of current years twigs that have died in the outer tree crown. No dieback was found on 84% of the hardwoods and 96% of the softwoods. Light dieback (6-20%) was observed on 13.7% of the hardwoods. Moderate to severe dieback (21-50% & >50%) was recorded on 1.6% of the hardwoods. By genus/species, Oak, elm, maple, ash and yellow poplar had the most dieback recorded.

Crown Density

Genus/species	Average (21-50%)	Good (>50%)	Genus/species	Average (21-50%)	Good (>50%)
Sweetgum	16.7	83.3	Elm	38.8	57.1
Maple	22.5	77.5	Oak	48.2	51.8
Yellow poplar	22.7	75.0	Beech	53.8	46.2
Walnut	25.0	68.8	Ash	57.6	42.4
Basswood	33.3	66.7	Aspen	62.5	37.5
Hickory	37.7	62.3	Other hwds	46.1	50.8

Crown density is the amount of foliage, twigs, branches, and seeds in the crown. The survey found 98.7% of all trees had average to good density (21-50% & >50%). Only hardwoods - elm, yellow poplar and black walnut - recorded trees with poor density (<20%). By genus/species, ash, aspen, and beech had more trees with average density than a good density. Maples had the highest percent of trees with good density for the hardwoods.

For hardwoods, 64% of the trees had **Live Crown Ratios** greater than 40%; whereas the softwoods had 87% of the trees greater than 40%. Examining individual genus/species, there may be concern with ash, yellow poplar, black walnut and elm that had 40%, 58%, 57% and 66%, respectively, of the trees sampled with LCR >40%. This may indicate a problem in the "health" of this genus/species.

From the initial data, the "health" of ash, yellow poplar, elm and perhaps maple and oak in Indiana needs to be monitored for future change. The live crown ratio, crown density, crown transparency and crown dieback data for these genus/species indicate they may have a greater "health" concern than other genus/species.

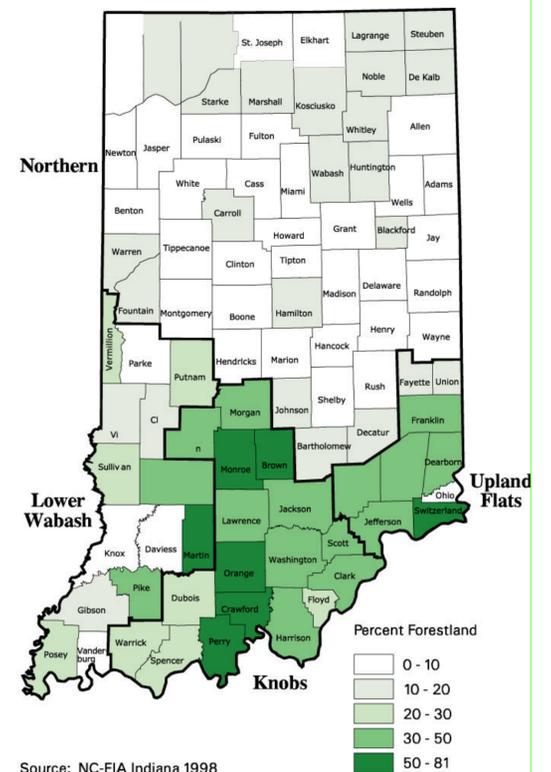
Foliage Transparency

	% Normal - <30%	% moderate/severe - >30%
Hardwoods	97	
Softwoods	92	
Maple		0.9
Elm		2.0
Oak		2.5
Ash		6.5

Dieback

	Hardwoods (%)
No Dieback	84
Light Dieback (6-20%)	13.7
Moderate/Severe (21-50% & >50%)	1.6

[Click here for full scale view of map](#)



Source:

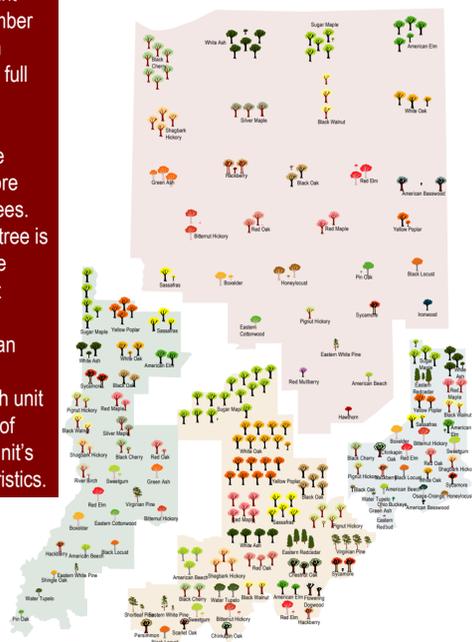
Indiana Land Cover produced by a cooperative project between the U.S. Geological Survey and the U.S. Environmental Protection Agency based on Landsat TM5 Imagery acquired by the Multi-resolution Land Characterization (MRLC) Consortium. The images date from 1989 to 1993. Classes 41-43 and 91 were used to represent Indiana's forests.

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Live Crown Ratio (Percent of Trees)

	LCR >40% (%)
Hardwoods	64
Softwoods	87
Ash	40
Yellow poplar	58
Black Walnut	57
Elm	66

The most abundant trees and the number found within each survey unit. Each full tree in the figure corresponds to 2 million trees. Tree species underscore each cluster of trees. The size of each tree is proportional to the number of trees it represents. Tree quantities less than 400,000 are not represented. Each unit has its own suite of trees due to the unit's general characteristics.



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