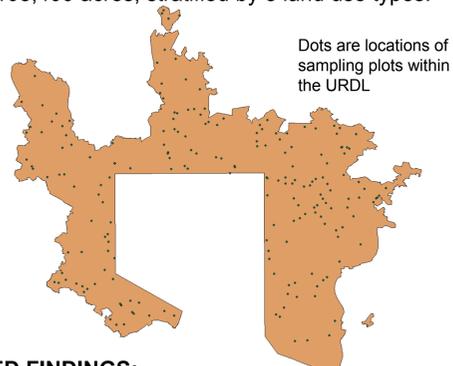


# shadewaterqualityhabitatcarbonsequestrationforestproductsstormwatermanagement

## Urban Forest Effects (UFORE)

Baltimore County contracted with the USDA Forest Service in 2007 to conduct the Urban Forest Effects Model (UFORE) for the 130,700-acre area within the County's urban growth boundary, the Urban-Rural Demarcation Line (URDL). The Forest Service worked with UMBC to sample 197 plots covering 108,400 acres, stratified by 8 land use types.



### SELECTED FINDINGS:

- 89 live tree species were identified within the URDL.
- The County's urban forest has an estimated 6.76 million trees with a replacement value of \$6.3 billion.
- The most-common urban tree species is red maple (9.1%).
- The 2<sup>nd</sup> most-frequently occurring tree type is dead trees (8.7% of total), and the 5<sup>th</sup> most common is Ailanthus (non-native invasive species, at 4.2%).
- Urban trees are small: 58.3% of trees are <6" in diameter.
- The Asian long-horned beetle, an insect that kills a range of hardwood species, poses a threat to 42% of urban trees, a potential loss of \$2.4 billion in damage.
- Trees are cool: the annual energy cost reduction for shaded residential buildings is \$18.3 million.
- Trees save energy: the annual building energy savings (avoided carbon emissions) is 22,600 tons (\$0.467 million).

## Mapping Urban Tree Canopy

The USDA Forest Service and the University of Vermont's Spatial Analysis Laboratory collaborated with Baltimore County to produce a detailed forest and tree canopy land cover classification, which was completed in 2009. The data layer used 2007 leaf-on ortho-photography from the National Agricultural Imagery Project (1-meter resolution) and 2005 County LiDAR data (2-foot pixels).



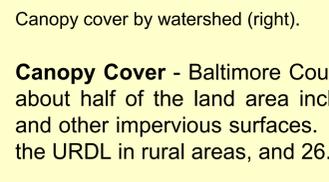
Orthophoto shows canopy extent of all vegetation



Final tree canopy can be viewed over enhanced aerial photography showing buildings and roads.



LiDAR data allows height of vegetation and buildings to be determined.



Canopy cover by watershed (right).

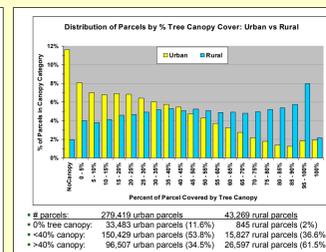
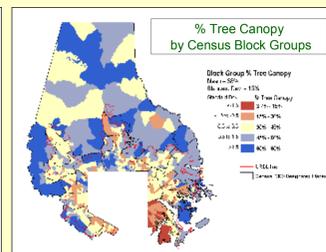
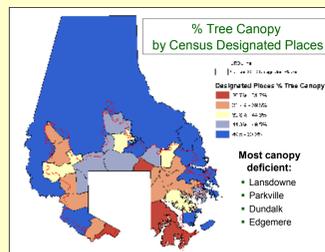
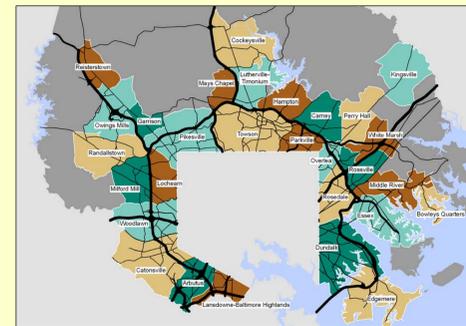
Watershed	Watershed Acres	Canopy Acres	% Canopy
Deer Creek	7,173	3,018	42.1%
<b>Lower Susq. Basin Total</b>	<b>7,173</b>	<b>3,018</b>	<b>42.1%</b>
Prettyboy Reservoir	25,552	13,689	53.6%
Loch Raven Reservoir	139,576	72,303	51.8%
Little Gunpowder Falls	17,276	8,508	49.3%
Lower Gunpowder Falls	29,468	14,436	49.0%
Bird River	16,408	7,057	43.0%
Gunpowder River	5,859	3,219	54.9%
Middle River	6,465	2,817	43.6%
<b>Gunpowder Basin Total</b>	<b>240,605</b>	<b>122,028</b>	<b>50.7%</b>
Liberty Reservoir	17,596	10,321	58.7%
Patapsco River	33,580	17,455	52.0%
Gwynns Falls	28,503	11,409	40.0%
Jones Falls	25,933	13,988	53.9%
Back River	23,113	8,747	37.8%
Baltimore Harbor	11,387	2,648	23.3%
Chesapeake Bay Islands	1,287	379	29.5%
<b>Patapsco Basin Total</b>	<b>141,399</b>	<b>64,947</b>	<b>45.9%</b>
<b>County Total</b>	<b>389,178</b>	<b>189,994</b>	<b>48.8%</b>

**Canopy Cover** - Baltimore County's 187,300 acres of canopy covers about half of the land area including shading over buildings, roads, and other impervious surfaces. About 73.2% of the canopy is outside the URDL in rural areas, and 26.8% is inside the URDL.

Area	Total Land (acres)	% of County	Forest Canopy	
			Acres	% of Area
Rural (Outside URDL)	254,171	66.1%	137,128	54.0%
Urban (Inside URDL)	130,541	33.9%	50,168	38.4%
<b>Total</b>	<b>384,713</b>	<b>100.0%</b>	<b>187,296</b>	<b>48.7%</b>

## Tree Canopy in County Communities

Baltimore County used the urban tree canopy data layer to determine canopy cover for the 29 Census Designated Places (CDPs) in the County. Because the County has no incorporated towns or cities, the CDPs define familiar communities. Four CDPs have <31.7% tree cover, and another 10 have between 31.7-39.8% cover. Communities throughout the Chesapeake Bay watershed have generally established an urban tree canopy cover goal of 40%. Overall, Baltimore County is close to that goal, but the UFORE data shows that tree health is an issue. Tree cover varies widely by smaller areas such as Census Block Groups and individual property parcels.



## Goals for Increasing Forest & Tree Canopy

- Adopt and implement a No Net Loss of Forest policy.
- Increase overall tree canopy within the URDL to 40% (add 2,048 acres of canopy).
- Increase tree canopy for all Census Designated Places to a minimum of 40%.
- Increase forest cover in reservoir watersheds, increase riparian buffers, and implement Conservation Landscaping.
- Maintain and improve forest and tree health.
- Continue to expand tree planting through the Growing Home Campaign, the Tree-Mendous MD program, and the County's Big Trees program.



Tree canopy in the Towson area.

## Forest Carbon

Baltimore County's Office of Sustainability convened a Sustainability Network (SN) of agency and citizen stakeholders to recommend how to reduce greenhouse gas (GHG) emissions from County government operations by 10% by the year 2012 (from 2006 levels). The SN's Protection of Natural Resources working group estimated the benefits of all forests and trees for removing carbon dioxide from the atmosphere and storing it in woody biomass.



Urban and rural forests and trees are important for sequestering and storing carbon emissions, but intact forests provide greater benefits.

**Carbon Sequestration** - Net sequestration of carbon by all forests and trees is 413,555 metric tons CO<sub>2</sub>/yr (2.21 tons/acre), or 3.58% of the annual Countywide eCO<sub>2</sub> emissions. The per acre rate for rural forests is 46% greater than for trees inside the URDL.

**Carbon Storage** - The 187,300 acres of forest and tree canopies also store about 14.42 million metric tons of carbon, (assuming 77 tons of carbon/acre for oak-hickory forests in northeast U.S.). This storage equals about 4.58 years of total community emissions in the County at the 2006 rate of emissions.

**Forest Soil Carbon** - Below-ground stocks of carbon are about 2-fold higher than aboveground levels. Further losses of forest will result in a significant decline in those stocks.

# Baltimore County's Urban Forest

## Baltimore County Forest Sustainability Program

Local application of the **MPCI - Montreal Process Criteria and Indicators** a tool for measuring the ecological and economic sustainability of forests

<http://www.baltimorecountymd.gov/agencies/environment/forestsandtrees>