Tree Canopy Indicator Update

Water Quality GIT 1/23/23

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Through the Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program has committed to…*

Vital Habitats Goal

Tree Canopy Outcome*:* Continually increase urban tree canopy capacity to provide air quality, water quality and habitat benefits throughout the watershed. **Expand urban tree canopy by 2,400 acres by 2025.**

Defining & Measuring Tree Canopy

"In this Management Strategy, we use a broad definition of "urban" tree canopy that includes all sizes of communities. It is important to note that this goal is intended to reflect a *net gain* in acreage of tree canopy, after accounting for canopy losses due to various factors such as development, storms, pests/diseases, and natural mortality. Meeting the goal requires protecting as much of our existing tree canopy as possible and planting enough to both mitigate losses and expand the tree canopy cover by 2,400 acres."

Defining & Measuring Tree Canopy

- New quantitative outcome in CB Watershed Agreement – no baseline/indicator or tracking systems in place
- Management Strategy proposed to track progress using combination of 1) annual tree planting BMP data, and 2) high resolution land cover dataset, under development at the time
- Developed an approved methodology in 2018, but we have been waiting on updated land use data to test and refine it

Tree Canopy Indicator- Measuring Progress 1) Reported Tree Plantings

- Track and total 3 Urban Tree BMPs reported to NEIEN
  - Urban Tree Planting
  - Urban Forest Planting
  - Urban Forest Buffer

- Report on annual progress, 2014– present *(2014 Agreement is starting point for adding 2400 new acres by 2025)*
- Use custom “no expiration” scenarios in NEIEN to make sure all new annual acres are counted

Tree Canopy Indicator Measuring Progress 2) Land Use Change Data

- CBP High Resolution Land Cover/Land Use data provides best tracking of Tree Canopy gains and losses over time
  - 2013/2014 – baseline status for Watershed Agreement
  - 2017/2018 – use to assess gains and losses (net change) since baseline
  - Future datasets every 4 or so years will be critical for tracking long term trend and progress

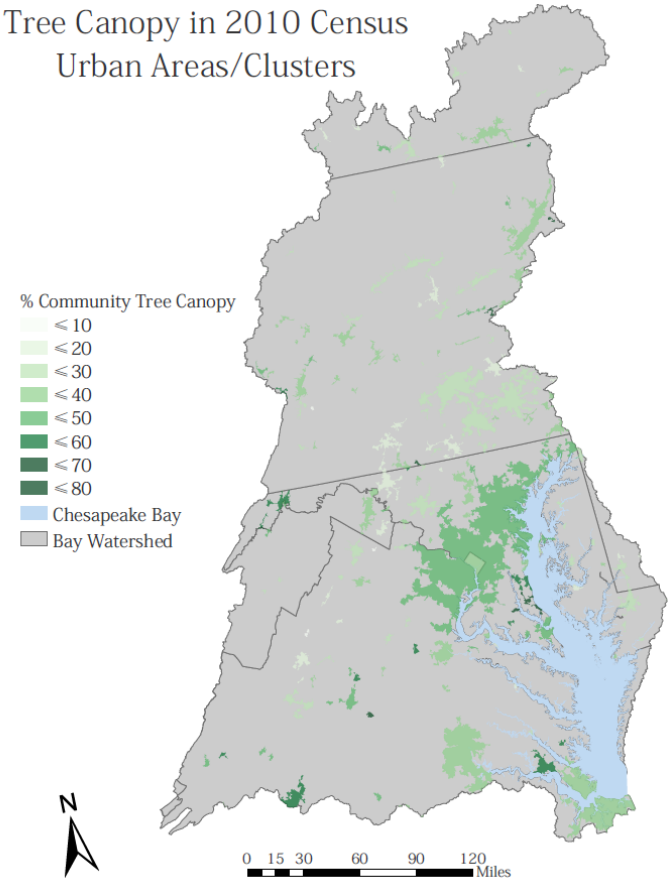
Tree Canopy Indicator Measuring Progress 2) Land Use Data

#1 Original 2018 approved methodology:

- *Focus on tracking change in a census-defined urban/community area (2010 Urban Areas & Clusters)*

And not include:

- Trees on agricultural land
- Forest outside of Census Urban Areas & Clusters



Tree Canopy Indicator Measuring Progress 2) Land Use Data

#2 New Proposal – June 2022

- Use Land Use Change Matrices to track all gains and losses of tree cover (forest+ tree canopy classes) on developed and developing lands

2013/14-2017/18	ROAD	IMPS	IMPO	TCIS	TURF	TCTG	PDEV	FORE	TCOT	HARF	NATS	CROP	PAST	EXTR	TDLW	RIVW	TERW
ROAD	0	14	338	696	74	66	206	138	75	1	17	11	14	4	0	2	0
IMPS	1	0	937	508	277	88	143	7	2	1	37	75	84	2	0	0	0
IMPO	516	3,173	0	1,587	4,334	305	1,288	166	60	102	785	652	1,331	1	21	25	5
TCIS	42	485	690	0	2,446	0	1,599	0	0	181	408	98	184	6	3	7	1
TURF	0	828	5,558	0	0	8,514	1,089	107	106	21	127	3	8	725	0	0	0
TCTG	13	930	4,143	11	11,096	0	783	0	0	93	422	246	539	9	0	0	0
PDEV	1,130	4,377	6,865	0	15,251	49	0	304	33	221	417	142	79	1,270	0	0	0
FORE	1,161	2,764	8,918	732	13,096	28,221	28,107	0	22,046	175,564	81,474	19,557	23,186	4,066	1,381	5,568	193
TCOT	123	952	2,339	0	2,068	2,032	2,341	0	0	788	2,278	3,075	4,566	386	108	250	27
HARF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NATS	63	149	477	0	3,481	371	826	76,425	4,389	4,295	0	546	356	501	0	0	0
CROP	500	3,018	8,369	0	4,031	165	2,514	11,299	3,088	1,367	2,069	0	126	1,182	0	0	0
PAST	307	2.253	9.607	0	6.562	185	3.857	13.163	8.984	1.631	4.035	123	0	1.232	0	0	0

Focus on changes in tree cover on developed/developing lands:

Gain = change from impervious/turf/pervious developed to **tree canopy/forest**

Loss = change from **tree canopy/forest** to impervious/turf/pervious developed

Same method used for county fact sheets…

Tree Cover Status & Change
FOR CUMBERLAND COUNTY, PA

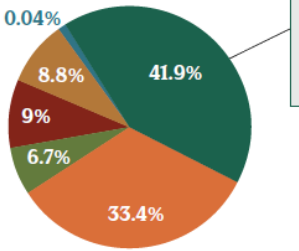
41.6% **Total Percent** of County with Tree Cover

$14+ Million **Annual Benefits** provided by Tree Cover *(in reduced air pollution, stormwater, & carbon dioxide)*

433 Acres **Net Loss** of Tree Cover on Developed Lands, 2013 to 2017

What is the land use/land cover breakdown in your county?

341,668 ACRES OF LAND AREA IN CUMBERLAND COUNTY



41.9%	Tree Cover[1] 142,219 acres	9%	Impervious *(Buildings/Pavement)* 30,882 acres
33.4%	Agriculture 113,222 acres	8.8%	Other[2] 29,890 acres
6.7%	Turf Grass *(Lawns)* 22,569 acres	0.04%	Non-Forested Wetlands 163 acres

1. Tree cover includes all trees occurring on all land uses, such as individual trees found over turf, impervious, agricultural, wetlands, or other lands. It also includes areas of "forest," defined in this dataset as patches of tree cover 1 acre or greater, with a minimum patch width of 240 feet.

2. Other includes a mixture of non-treed land uses not captured in the main pie chart categories. See the Data Guide for detailed definitions of "other" and all the land use categories.

Land use/land cover statistics were generated using the 2022 edition of the *Chesapeake Bay Land Use and Land Cover Database*.

Where does tree cover occur in your county?

82% is in forest (**116,180** acres)

1% is over impervious (**2,128** acres)

11% is over turf grass (**15,762** acres)

6% is other tree cover (**8,149** acres)

What are some benefits of tree cover in your county?

Total Air Pollution Removal Value
9.7 million lbs removed annually
$9.2 million saved annually
Total air pollution removal includes CO, NO_2, O_3, SO_2, and Particulate Matter (PM2.5, PM10).

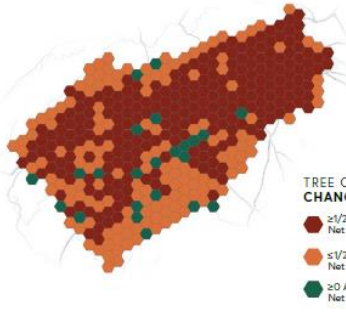
Gallons of Reduced Stormwater Runoff Value
560.1 million gallons reduced annually
$5.0 million saved annually

Carbon Sequestered Value
120,250 tons removed annually
$10,594 saved annually

Calculated based on 2017 tree cover data using: *landscape.treetools.org*

CHESAPEAKETREES.NET
PUBLISHED AUGUST 2022

How is tree cover changing on developed and developing lands?



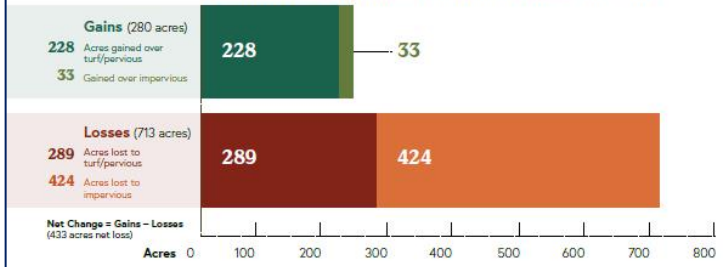
Understanding how your tree cover changes over time can inform the sustainable management of forests and community trees. The map to the left shows where your county has lost and gained tree cover from 2013 to 2017, focusing on land that is already or newly developed.

Tree cover can be lost quickly due to human activities (e.g., construction) or natural events (e.g., severe weather).

Tree cover can be gradually increased through tree planting and natural regrowth, but maintaining this new growth requires long-term investments.

Since mature, healthy trees provide significantly greater community benefits than newly planted trees, it is important to both preserve existing tree cover and seek opportunities to grow new trees and forests. Local land use planning, ordinances, and tree programs play a critical role!

Tree Cover Change on developed/developing lands (2013–2017)



Learn More:

Chesapeake Tree Canopy Network — Links to county fact sheets, user guides, map viewers, datasets, and more

Tree Equity Score — Explore maps of how tree benefits are distributed across communities

Capitalizing on the Benefits of Trees — A slideshow for local leaders featuring tree benefits, case studies and resources

State Urban and Community Forestry Assistance (State contact and website)

Fact sheets produced through a grant from the **USDA Forest Service.** USDA is an equal opportunity provider, employer and lender.

Tree Canopy Indicator Measuring Progress 2) Land Use Data

Held meeting on Water Quality GIT Concerns (Aug. 2022)

- Tracking all loss of forest to development extends beyond the scope of the outcome; focus on urban/community areas
  - *Loss of forest to development is important to communicate but better captured in the Land Use Methods & Metrics Outcome*

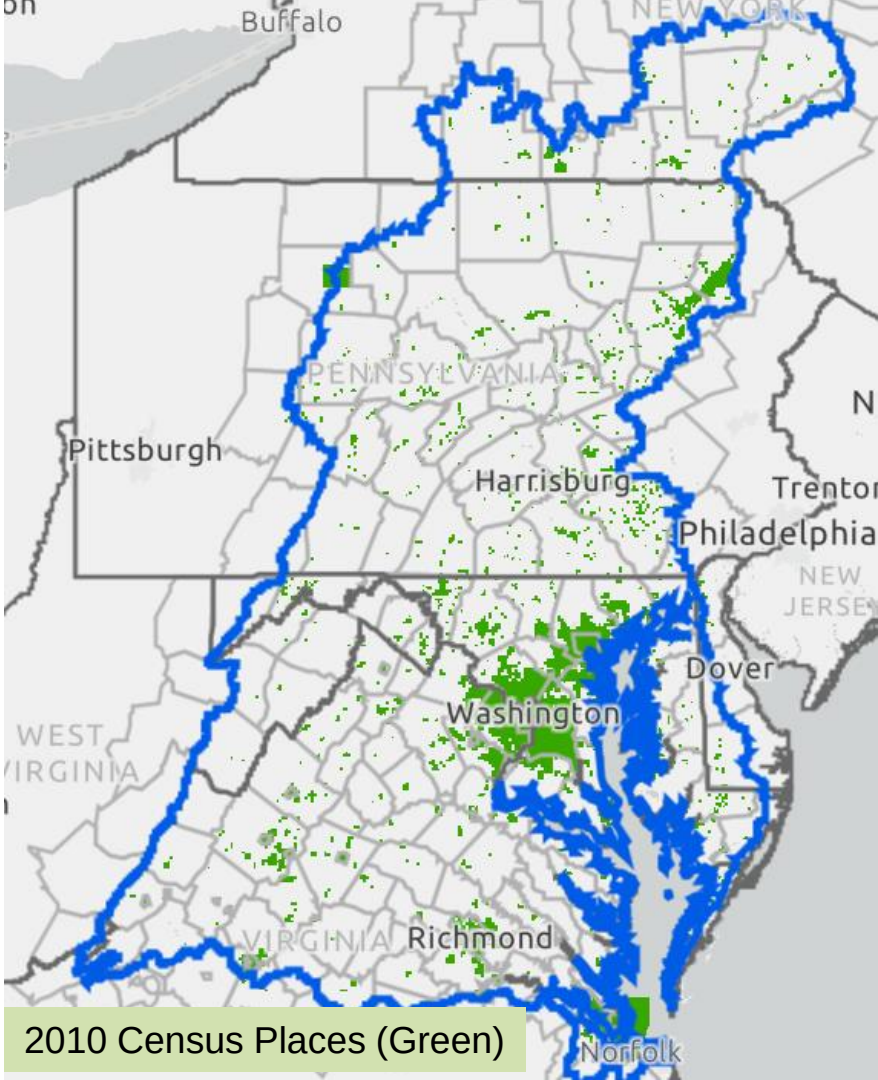
- Need urban/community "footprint" for 2014 baseline to track change over time
  - *With #2 Proposal, there is no baseline, the footprint is always expanding and losses from development typically outweigh changes within existing urban/community areas*
  - *Align urban/community footprint with local units of government where applicable (e.g. Census Designated Places, instead of Urban Areas/Clusters)*

Tree Canopy Indicator
Measuring Progress
2) Land Cover/Land Use Data

Forestry Workgroup Decisions: (Jan. 2023)

1. Return to 2018 approved Methodology based on census-defined urban/community footprint
   - *Refinement: Use 2010 Census Designated Places which aligns more closely with local government boundaries and identifiable communities*

2. Work with Land Use Methods & Metrics Outcome on separate metric for forest/tree cover loss to development



2010 Census Places (Green)

Next Steps

- Currently computing the approved indicator for Tree Canopy Outcome SRS Review (2/9 Management Board)
- County Tree Cover Status & Change Fact Sheets will be available soon
  - Will send email updates to WQGIT when the new indicator and fact sheets are available online

Questions?

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