Tree Canopy Indicator – Revised Proposal for Forestry Workgroup

Overview

The Tree Canopy Indicator is currently being developed to capture baseline and progress in achieving the Tree Canopy Outcome adopted in the 2014 Chesapeake Bay (CB) Watershed Agreement:

"Continually increase urban tree canopy to provide air quality, water quality and habitat benefits throughout the Chesapeake Bay watershed. Expand urban tree canopy by 2,400 acres by 2025"

The proposed Tree Canopy Indicator has two components: 1) urban tree planting BMPs reported by states annually to track progress towards meeting the Bay TMDL; and 2) remotely-sensed changes in tree canopy updated every five years. Both of these components combined represent the annual extent of tree canopy in the Bay watershed. Indicators and progress information for all the CB Agreement goals are communicated via the Chesapeake Progress website, and the current page for Tree Canopy will be updated once we have our Indicator finalized.

Additional background on the issues and options considered to arrive at this revised proposal is provided towards the end of the document.

Reported Tree Plantings

To track real-time progress that jurisdictions and partners are making in planting trees to increase canopy, we will use annual BMP progress data that are reported for the Chesapeake Bay TMDL. We will use the combined reported acres of **Urban Tree Canopy Expansion**, **Urban Forest Planting**, and **Urban Forest Buffer** BMPs to summarize progress in each state, wherever they are reported in the watershed. The only geographic constraint for reporting these BMPs is that they must be reported on developed land uses (e.g. turf, impervious surfaces), not on agricultural land uses. The Forestry Workgroup proposes to count BMP progress data starting from 2010 when the TMDL went into effect and jurisdictions began implementing urban tree BMPs as part of WIP efforts. This aligns with the indicator reporting approach used by the Wetlands Outcome.

The annual BMP data provide our best real-time estimate of tree canopy expansion. However, this measure only captures gains, not the losses in tree canopy that we know are occurring across the landscape every day due to development, storms, rising sea levels, invasive pests such as Emerald Ash Borer, and other factors. To track overall net changes in tree canopy, remotely-sensed land cover data are needed to supplement the annual BMP data.

Remotely-sensed Changes in Tree Canopy

Thanks to the Chesapeake Bay Program Partner's investment in high-resolution land cover and land use data with tree canopy coverage, we have a remotely-sensed estimate of tree canopy throughout the watershed for year 2013/14. Using these data, the current extent of tree canopy in the watershed includes all tree planting BMPs reported from 2010 to present plus all mapped "tree canopy over turf grass" and "tree canopy over impervious surfaces" in the watershed, plus all "forest" found within 2010 Census Urban Areas/Clusters. (*see rationale in background section below) These data will be updated annually based on reported BMPs and every five years based on the combination of reported BMPs and updated high-resolution land cover and land use data.

The first planned update of the high-resolution land cover/use data is scheduled for release in 2021 based on 2018/19 imagery. Using these new land cover data, all newly emergent "tree canopy over turf grass" and "tree canopy over impervious surfaces" that fall outside areas classed as forest in 2013/14 will be added to the total tree canopy extent along with all urban tree BMPs reported since 2010. Formerly forested lands that convert to tree canopy land uses in the updated land cover will be tracked separately and will not be used to count for tree canopy expansion. Newly emergent tree canopy on agricultural lands that have been converted to development will be counted as "gains" in community tree canopy. Emergent tree canopy on active crop and pasture lands will not be counted towards gains, since agricultural lands fall outside of our definition of community tree canopy. A summary table of 2013 state baseline information for the Tree Canopy Indicator is provided below.

The second update of high-resolution land cover and land use data based on 2023/2024 imagery is scheduled for release in 2025. Because it is estimated to take approximately 10 years for new tree plantings to be detected in high-resolution land cover data, only tree planting BMPs reported since 2014 will be included in it.

Background

In our Management Strategy for this outcome, we convey that "urban tree canopy" is broadly defined to include tree plantings in communities of any size – urban, suburban and rural – that are not on agricultural lands.

The main question we have been considering among the Forestry Workgroup is: how to define an "urban/community" GIS footprint for the Indicator in a way that is inclusive enough to capture smaller communities but still focuses on trees within communities and excludes the much larger land area encompassed by rural forest cover.

In consultation with those with expertise in this topic (Peter Claggett-USGS, and Morgan Grove-USFS), the Forestry Workgroup first considered a proposal to use 2010 Census Urban Areas and Urban Clusters to define a fixed "universe" within which we would track tree canopy progress towards the outcome. The main advantage of defining this "urban/community area" (using

Census definitions) and holding its boundaries constant over time is to focus attention on gains in tree canopy within already developed areas and exclude apparent increases in tree canopy associated with new development. For example, subdividing and developing a 500-acre forest parcel in the future might create new "tree canopy" by converting forests into smaller patches of trees surrounded by new development.

However, during Forestry Workgroup review of this initial proposed indicator at the June 6 meeting and subsequent jurisdictional review and discussion at a June 28 Tree Canopy meeting, it was discovered that many smaller communities working on tree canopy goals in more rural areas (e.g. West Virginia, Delaware, New York, etc.) would not be represented in this solely census-defined footprint. Therefore, the revised approach described above has been developed to ensure that all tree canopy land cover (over turf and over impervious surface) is included in the indicator, and all forest land cover that falls within Census Urban Areas & Clusters is included as well. To address the problem of tree canopy "gains" that are the result of forest being fragmented/developed, these areas will be subtracted out of our measure of progress when the new land cover data are analyzed.

Next Steps

We are providing this revised proposal as well as GIS data layers for the proposed indicator, as requested by state leads, for review in preparation for the September 5 Forestry Workgroup meeting focused on the Tree Canopy Outcome/SRS Review. We ask that state tree canopy leads and Forestry Workgroup bring all remaining questions and concerns to the September 5 discussion in hopes that we can approve this proposal as is or with some agreed upon modifications. Once approved, the indicator proposal will be presented to the CBP Status and Trends Workgroup, which supports indicator development and approval across all outcomes. Over the summer and fall, we will continue to work with state tree canopy and BMP reporting leads in each jurisdiction to ensure that the annual BMP Progress data record for our tree canopy BMPs is accurately reflected on the ChesapeakeProgress website and to prepare for fall meetings on the Tree Canopy Outcome/Workplan/SRS Review.

Chesapeake Bay Watershed: Community Tree Canopy - Proposed 2013 Baseline

Jurisdictions	Total TC (acres)	Total Forest (acres)	Forest in UAUC (acres)	TC + Urban Forest
Delaware	6,320	92,779	3,414	9,734
District of Columbia	8,073	4,477	4,477	12,550
Maryland	317,076	2,124,730	331,308	648,384
New York	50,840	2,291,567	22,058	72,898
Pennsylvania	293,821	8,408,855	148,724	442,545
Virginia	407,940	8,692,212	303,375	711,315
West Virginia	46,069	1,655,951	15,481	61,549
Watershed	1,130,139	23,270,571	828,837	**1,958,976**

Tree Canopy = Tree Canopy over Turf Grass and Tree Canopy over Impervious (both from Phase 6 land use)
Forest = Forest as defined in Phase 6 model land use, exclusive of tree canopy