

Urban Tree Canopy Expansion



Why Urban Tree Canopy?

Tree canopy provides many benefits in urban areas. Trees intercept rainfall, increase evapotranspiration, promote infiltration, and ultimately, reduce the concentration of pollutants and quantity of runoff. Greater tree canopy also improves air quality through the uptake of noxious gases, creates habitat for wildlife, reduces erosion, and mitigates urban heat island effects.

New Practices for Increased Effectiveness

Currently, urban tree canopy expansion is credited as a land use conversion from an urban pervious surface to forest land. In September 2016, the Chesapeake Bay Program (CBP) Water Quality Goal Implementation Team approved the final recommended best management practices (BMP) for urban tree canopy expansion from its report, Recommendations of the Expert Panel to Define BMP Effectiveness for Urban Tree Canopy Expansion, developed by an Expert Panel convened through the Forestry Work Group. The Expert Panel's recommendations clarify the definition of urban tree canopy, document the crediting protocol, create a way to report and track all trees planted, and address the new land use categories included in the Phase 6 Chesapeake Bay model.

Phase 6 Land Use Classification

As a part of the latest update of the Chesapeake Bay Model, the CBP compiled detailed land use data from jurisdictions and localities. The land use classifications for the Phase 6 model include two new tree canopy land uses, which classify tree canopy with a managed understory. The land uses are divided in two subclasses: tree canopy over impervious and tree canopy over turf, which do not include existing forests or buffers, and non-developed land uses.

The Expert Panel's recommendations define two BMPs: urban tree canopy expansion and urban forest planting.



- A Precipitation
- B Throughfall
- C Evapotranspiration

- 1 Tree canopy reduces impact of raindrops and prevents erosion
- 2 Tree roots stabilize soil and prevent erosion
- 3 Reduced volume and rate of runoff reduces erosion and pollutant loads downstream



Information Required to Obtain Credit

- **BMP name**
(Urban Tree Canopy Expansion)
- **Measurement name**
(number of trees planted)
- **Geographic unit**
- **Date of implementation**
(years the trees were planted)
- **Land uses**

Urban Tree Canopy Expansion BMPs

How Credit is Calculated

$$\text{Estimated pounds reduced per year (lb./year)} = \left[\frac{\text{Number of Trees Planted}}{300 \text{ (trees/acre)}} \right] \times \text{Tree Canopy Land Use Loading Rate (\%)} \times \text{Based Tree Canopy Land Use Loading Rate (lb./acre/year)}$$

The urban tree canopy expansion BMP includes tree planting projects on developed land that increase the tree canopy but do not create forest-like conditions. Trees do not have to be planted in a single, contiguous area. Trees planted in a riparian forest buffer or as part of a structural BMP, like bioretention practices, are not included.

Urban tree canopy expansion BMPs will change the existing land cover to one of the Phase 6 tree canopy land use classifications: tree canopy over impervious or turf.

The credit is calculated based on:

- Percentage reduction in nitrogen, phosphorous, and sediment pollutant loads relative to the underlying land use cover.

- Area of tree canopy associated with trees planted, which was estimated through modeling that incorporated a variety of tree species, growing conditions, and mortality. Based on the results of the modeling, the Expert Panel determined that one planted tree has a canopy area of 144 square feet, equal to 300 trees per acre, regardless of species.
- Loading rate of the underlying land cover.

Credit assigned is based only on the number of individual trees planted. Credit duration is ten years. The created tree canopy is assumed to eventually be captured in future aerial imagery and land use analysis, and recorded through the tree canopy land use rather than as a BMP. Additional BMPs like a nutrient management plan may be applied to the underlying land use and also receive credit.

Preliminary estimates of tree canopy land uses acreage in the Phase 6 CBWM (Beta 1 vers.)

Land Use	Total (AC)	Tree Canopy Land Use as % of Developed Land Uses
Tree Canopy Over Impervious	154,000	3
Tree Canopy Over Turfgrass	742,628	14



Urban Forest Planting BMPs

How Credit is Calculated

$$\text{Acreage of trees planted} + \text{trees planted at the state's density} + \text{other requirements for forest management (no fertilization, minimal mowing)}$$

The urban forest planting BMP includes projects that create forest-like conditions. Trees must be planted in a contiguous area, as specified in a documented planting and maintenance plan, and conform to the state's planting density and associated standards for forest conditions.

Urban forest planting BMPs result in a change of land use from turf grass to forest land. The credit for this BMP is calculated based on the difference in the land use loading rate of turf grass and forest land across the acreage of the urban forest planting.

The credit assigned is dependent upon the acreage of planted forest. The number of planted trees will vary based on the individual state's minimum planting density for forest conditions.

Unlike the urban tree canopy expansion BMP, other BMPs may not be used in the same area treated by the BMP.



About this Publication

This fact sheet was prepared by the Department of Defense as part of the DoD Chesapeake Bay Program.

For More Information

Refer to the Chesapeake Bay Program Expert Panel's full report on BMP effectiveness for Urban Tree Canopy Expansion, available at www.chesapeakebay.net/publications/title/urban_tree_canopy_bmp_expert_panel_recommendations.

