



Chesapeake Bay Program
Science. Restoration. Partnership.

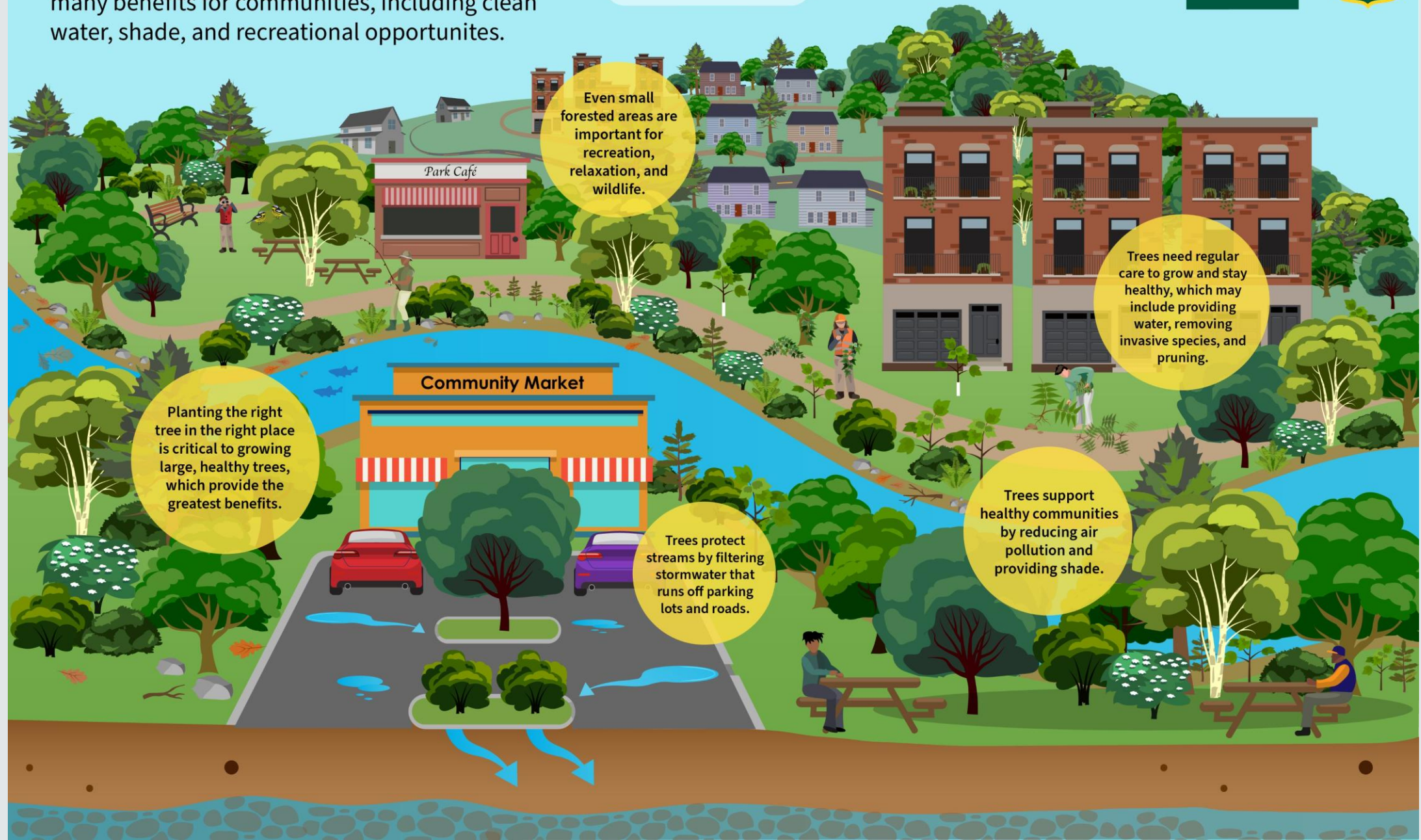
Tree Canopy Resources for Local Governments

Katie Brownson
US Forest Service



Community Landscapes:

Planting trees and restoring forests can provide many benefits for communities, including clean water, shade, and recreational opportunities.



Even small forested areas are important for recreation, relaxation, and wildlife.

Trees need regular care to grow and stay healthy, which may include providing water, removing invasive species, and pruning.

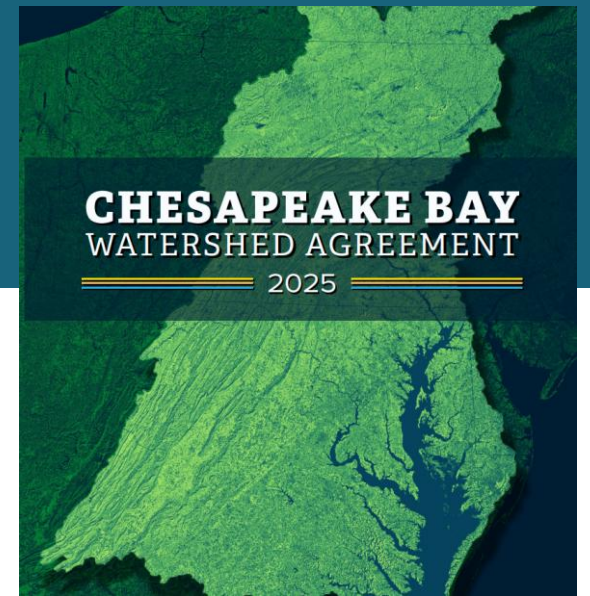
Planting the right tree in the right place is critical to growing large, healthy trees, which provide the greatest benefits.

Trees protect streams by filtering stormwater that runs off parking lots and roads.

Trees support healthy communities by reducing air pollution and providing shade.

New Healthy Forests and Trees Outcome

Conserve, manage and restore forests and tree cover to maximize benefits for water quality, habitat and people throughout the watershed, with a particular focus on riparian areas and communities.



TARGETS

Tree Canopy: Conserve tree canopy within communities by reducing the rate of loss of existing canopy and planting and maintaining 45,000 acres of community trees by 2040 to achieve a net gain in canopy over the long term.

Forest Buffers: Conserve riparian forest by reducing the rate of loss of existing buffers and planting and maintaining 7,500 acres of forest buffers annually to achieve no less than 71.5% riparian forest cover by 2040 and 75% riparian forest cover over the long term.

Forest Conservation: Achieve a net gain in forests over the long-term by reducing the rate of forest conversion to other land uses by 33%, permanently protecting a total of 9 million acres of forested land, and planting, maintaining and managing 202,000 acres of new forests by 2040.

Chesapeake Tree Cover Status & Change Fact Sheets

- Spring 2023 - First set produced for Chesapeake counties
(Dataset: 2013/14 - 2017/18)
- Summer 2025 - New set for Chesapeake counties, municipalities
(Dataset: 2013/14 – 2021/22)
- Partners: Chesapeake Conservancy, UVM Spatial Analysis Lab, USGS, USFS, Chesapeake Bay Program Forestry Workgroup
- Access: <https://chesapeaketrees.net/understand-your-canopy/>

Tree Canopy Status and Change Fact Sheets

Find your
locality's fact
sheet here!



[Home](#) » Understand your Canopy

Understand your Canopy

The first step in working toward a tree canopy goal is understanding what you have. Thanks to the investments of Chesapeake Bay Program partners, we are fortunate to now have ready access to “wall-to-wall” high resolution land cover/land use data for the entire watershed, for the 2013/14, 2017/18, and 2021/2022 time periods.

New county and municipal fact sheets are now available for all Chesapeake watershed counties sharing tree cover status, benefits (from i-Tree) and change information over the 2013/14 to 2021/22 time periods. Use the interactive tree cover map viewer below to select your county (left-side map) or municipality (right-side map) of interest and download the fact sheet. You can also access all the county and municipal fact sheets through this [List of Fact Sheet Links](#) (sorted by state and county).

[Visit the Data Guide](#) for more information on the data sources included in the fact sheets, as well as additional resources. Access to land use/land cover map viewers, GIS datasets, and detailed methods documentation are available from [Chesapeake Conservancy](#).

Tree Cover Status & Change FOR CUMBERLAND COUNTY, PA 2013-2022

44% Total percent of land with Tree Cover	\$87.6 million Annual benefits provided by Tree Cover (in reduced air pollution, stormwater, & carbon dioxide)	-914 Acres Net loss of Tree Cover on developed lands, 2013 to 2022
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What is the land use/land cover breakdown in your community?
349,977 ACRES OF LAND AREA IN CUMBERLAND COUNTY



Where does tree cover occur in your community?

86% is in forest (300,879 acres)	1% is over impervious (2,013 acres)
5% is over turf grass (7,249 acres)	8% is other tree cover (12,103 acres)

How is tree cover changing on developed and developing lands?



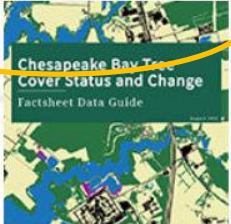
Understanding how your tree cover changes over time can inform the sustainable management of forests and community trees. The map to the left shows where your community has lost and gained tree cover from 2013 to 2022, focusing on land that is already or newly developed.

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 these gains may take 10-15 years to be detected in high resolution imagery.

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!

Featured Resources



Tree Cover Fact Sheet Data Guide

[LEARN MORE »](#)



Chesapeake Land Cover/Land Use Data & Viewers

[LEARN MORE »](#)



Tree Equity Score Mapping Tool

[LEARN MORE »](#)

Tree Cover Status & Change

FOR FREDERICK COUNTY, MD 2013–2021

43%

Total percent of land with Tree Cover

\$125.5 million

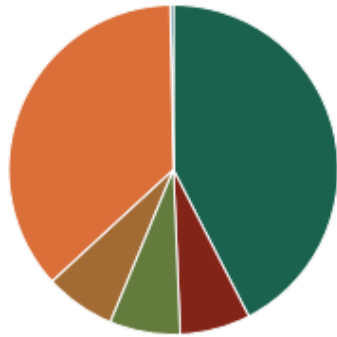
Annual benefits provided by Tree Cover (in reduced air pollution, stormwater, & carbon dioxide)

-1,575 Acres

Net loss of Tree Cover on developed lands, 2013 to 2021

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

423,180 ACRES OF LAND AREA
IN FREDERICK COUNTY



43% Tree Cover¹
180,072 acres

7% Turf Grass
27,921 acres

37% Agriculture
155,163 acres

7% Impervious
28,614 acres

7% Other²
29,993 acres

0.33% Non-Forested Wetlands
1,417 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 36 meters.
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 as well as accuracy statistics.

Land use/land cover statistics were generated based on 2021 imagery using the 2024 edition of the *Chesapeake Bay Land Use and Land Cover Database*.

Where does tree cover occur in your community?



84%
is in forest
(150,402 acres)



2%
is over impervious
(3,719 acres)



4%
is over turf grass
(7,792 acres)



10%
is other tree cover
(18,160 acres)

What are some benefits of tree cover in your community?



Total Air Pollution Removal Value
10.0 million lbs removed annually
\$5.5 million saved annually

Total air pollution removal includes CO, NO₂, O₃, SO₂, and Particulate Matter (PM2.5, PM10).



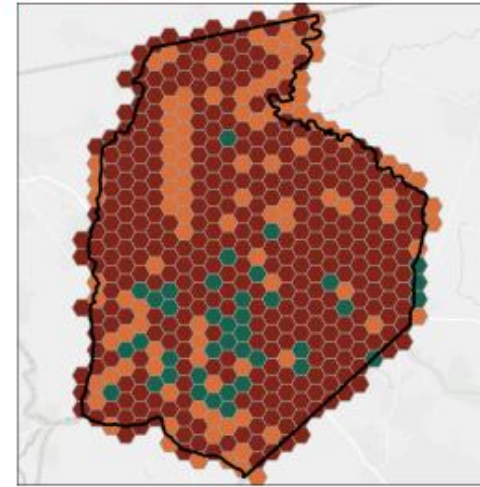
Gallons of Reduced Stormwater Runoff Value
208.3 million gallons reduced annually
\$1.9 million saved annually



Carbon Sequestered Value
248,000 tons removed annually
\$118.2 million saved annually

Calculated based on 2021 tree cover data using:
landscape.itreetools.org

How is tree cover changing on developed and developing lands?



■ > 1 Acres Net Tree Cover loss ■ Minimal Tree Cover Change (± 1 Acres) ■ > 1 Acres Net Tree Cover gain

*Hexagons that are >90% water are not shown on the map.

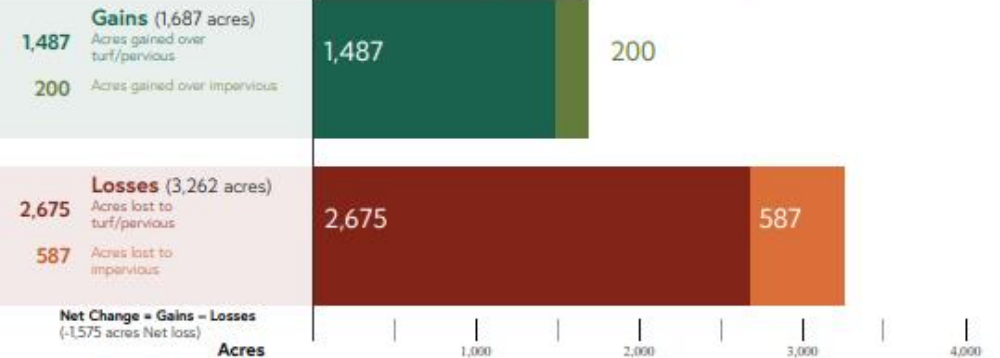
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Tree Cover Change on developed/developing lands (2013–2021)



Learn More:

Chesapeake Tree Canopy Network

Links to municipal and county fact sheets, user guides, map viewers, datasets, and more

Capitalizing on the Benefits of Trees

A slideshow for local leaders featuring tree benefits, case studies and resources

State Urban and Community Forestry Assistance

(Maryland Website)



CHESAPEAKE TREES.NET
PUBLISHED JULY 2025



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

What are some benefits of tree cover in your community?



Total Air Pollution Removal Value

10.0 million lbs removed annually

\$5.5 million saved annually

Total air pollution removal includes CO, NO₂, O₃, SO₂, and Particulate Matter (PM_{2.5}, PM₁₀).



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Estimating the value of ecosystem services with i-Tree

Ecosystem services are often difficult to account for but are important to consider in community planning. This analysis used i-Tree Landscape models which are part of the i-Tree forestry assessment suite of tools developed by the USDA Forest Service and partners. Using the very high-resolution land cover data for 2021/2022, these models helped quantify the monetary value of some of the tangible benefits of tree cover: air pollution removal, stormwater runoff reduction, and carbon sequestration.

Note: i-Tree estimates are not directly comparable with the estimates provided in the original county tree cover fact sheets because of updates to model input and validation data.

i-Tree Outputs

Factors used to estimate pollution removal in terms of g/m² tree cover include: leaf area index, percent evergreen trees, weather, population, and pollution data for carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), and particulate matter (PM_{2.5}, PM₁₀) (averaged over 2016-2020).



Air Pollution Removal

The estimated value of the air pollution reduction is based on local health impact estimates from the U.S. EPA BenMap model.

Estimates for the volume of stormwater intercepted, transpired, and evaporated are based on total tree cover, height, canopy percentage, crown width, leaf area indices and local weather data (averaged over 2016-2020).



Reduced Runoff

The value of avoided runoff is estimated using the i-Tree Eco model which uses the U.S. national average dollar value of \$0.008936/gallon based on studies of stormwater control and treatment costs.

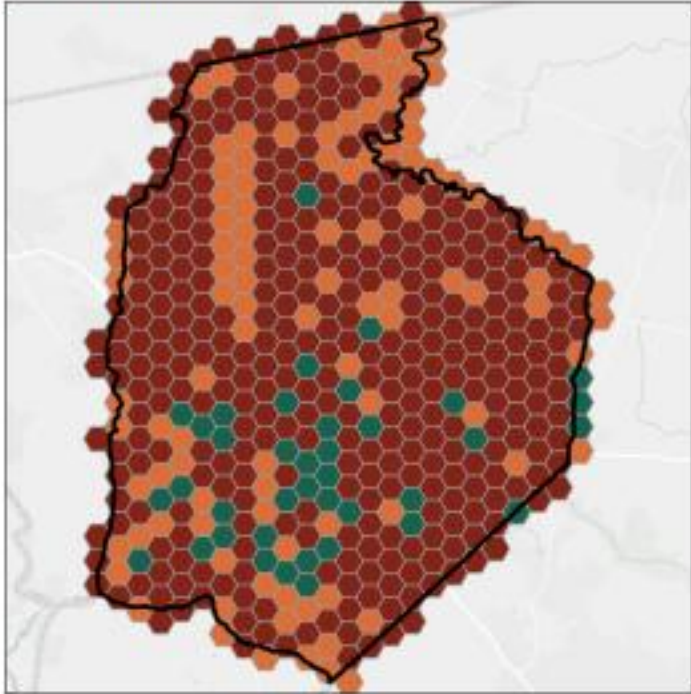
Carbon storage and sequestration values are calculated separately for forested and non-forested land cover classes. Carbon sequestration for trees in non-forest areas is estimated using values from urban forests (Nowak et al. 2013).



Carbon Sequestration

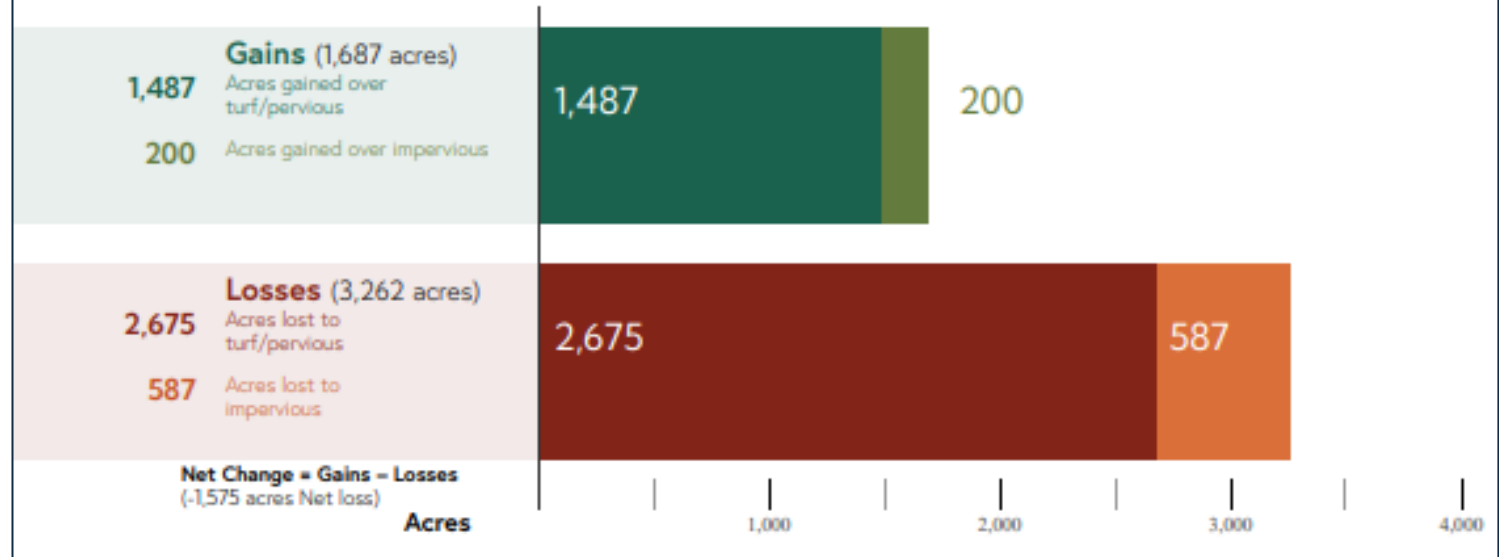
The value of carbon sequestration for forested regions is currently estimated at \$477 per metric ton based on the social cost of carbon (Interagency Working Group, 2025), which marks a major increase over the values reflected in the original county tree cover fact sheets.

How is tree cover changing on developed and developing lands?



■ > 1 Acres Net Tree Cover loss
 ■ Minimal Tree Cover Change (± 1 Acres)
 ■ > 1 Acres Net Tree Cover gain

Tree Cover Change on developed/developing lands (2013–2021)



Use Case: Metropolitan Washington Council of Governments Regional Tree Canopy Sub-Committee

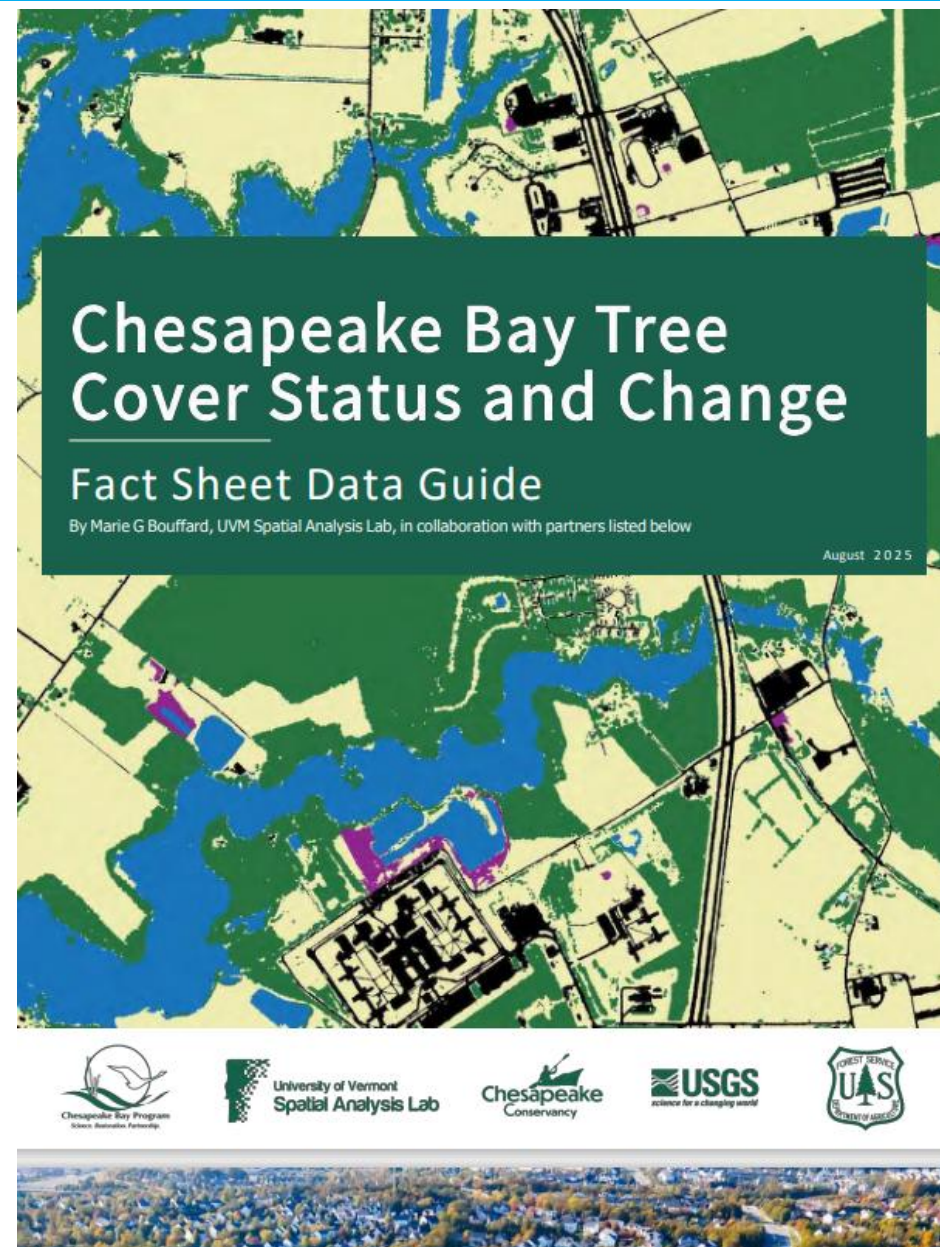
- Having a dataset that is consistent across jurisdictions supported regional planning efforts
- Developed a tree canopy change projection model to 2050
- Estimated how much jurisdiction would need to spend to offset the projected loss in ecosystem services from tree canopy loss
- Evaluated impacts of potential approaches to tree conservation
- Established a regional tree canopy goal to maintain 50% tree canopy with intermediate and smaller-scale target goals to guide sub-regional conservation efforts

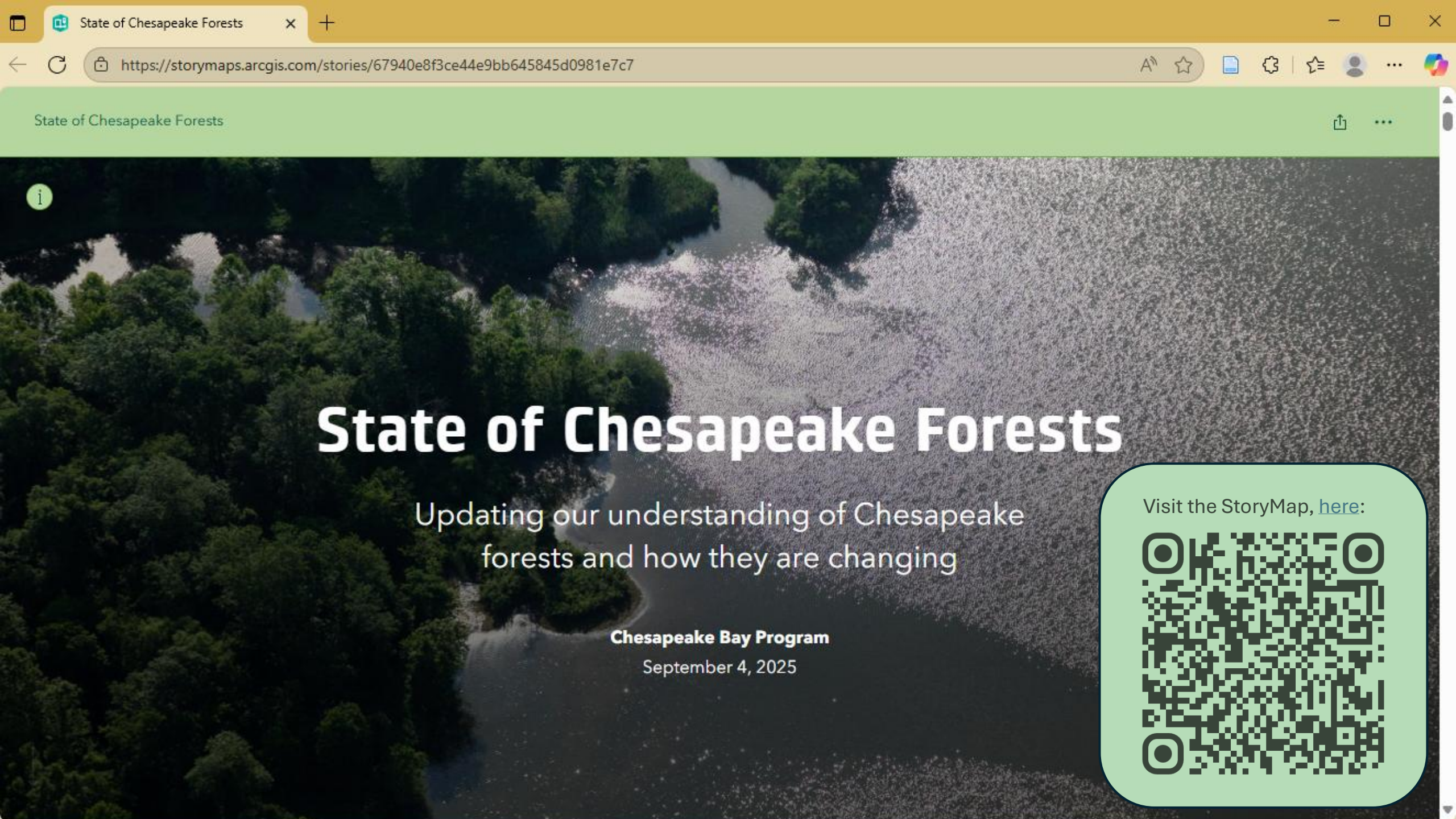
Access your county & municipal
fact sheet and the data guide:



Help spread the word!

<https://chesapeaketrees.net/understand-your-canopy/>





State of Chesapeake Forests

Updating our understanding of Chesapeake
forests and how they are changing

Chesapeake Bay Program
September 4, 2025

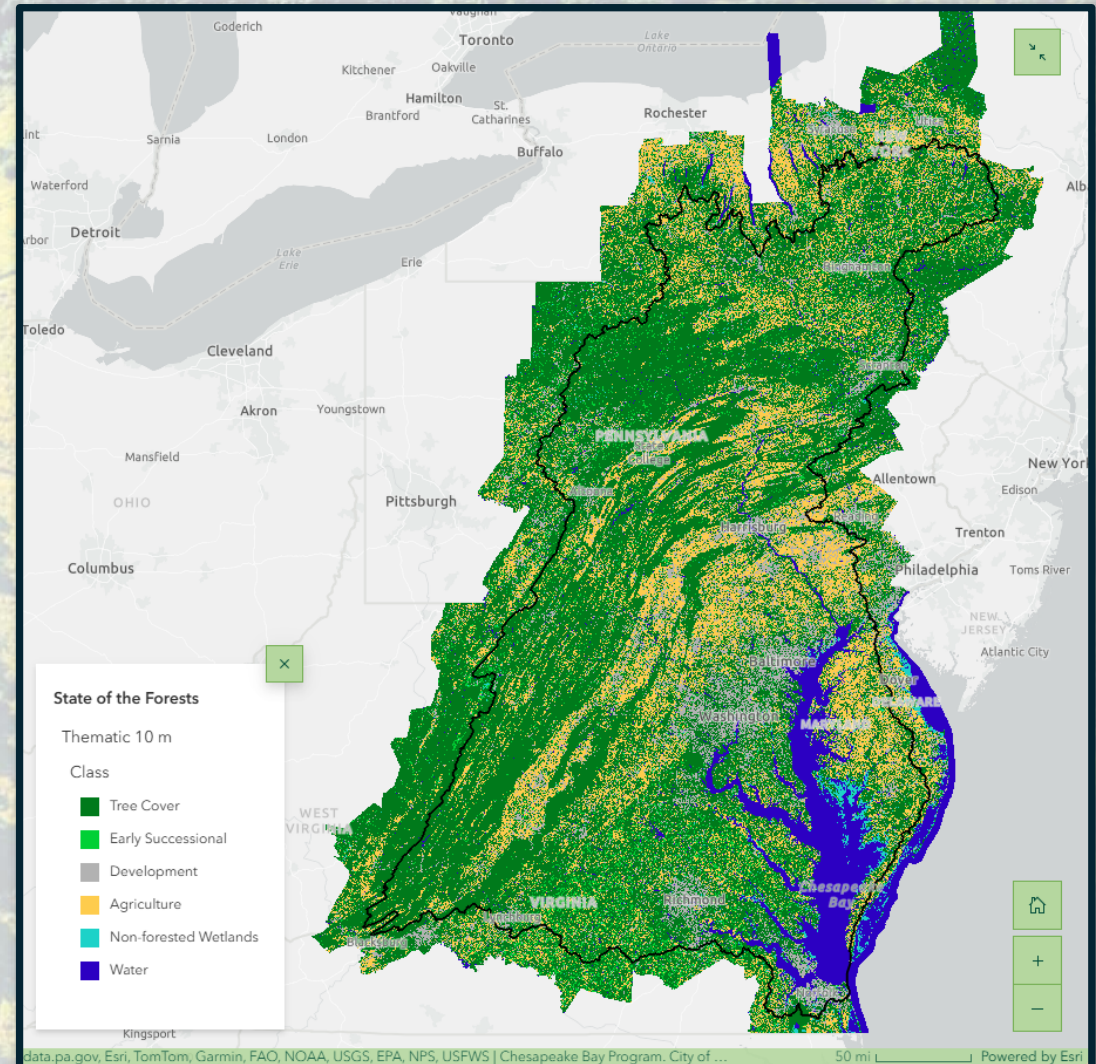
Visit the StoryMap, [here](#):



State of the Chesapeake Forests StoryMap

Highlights:

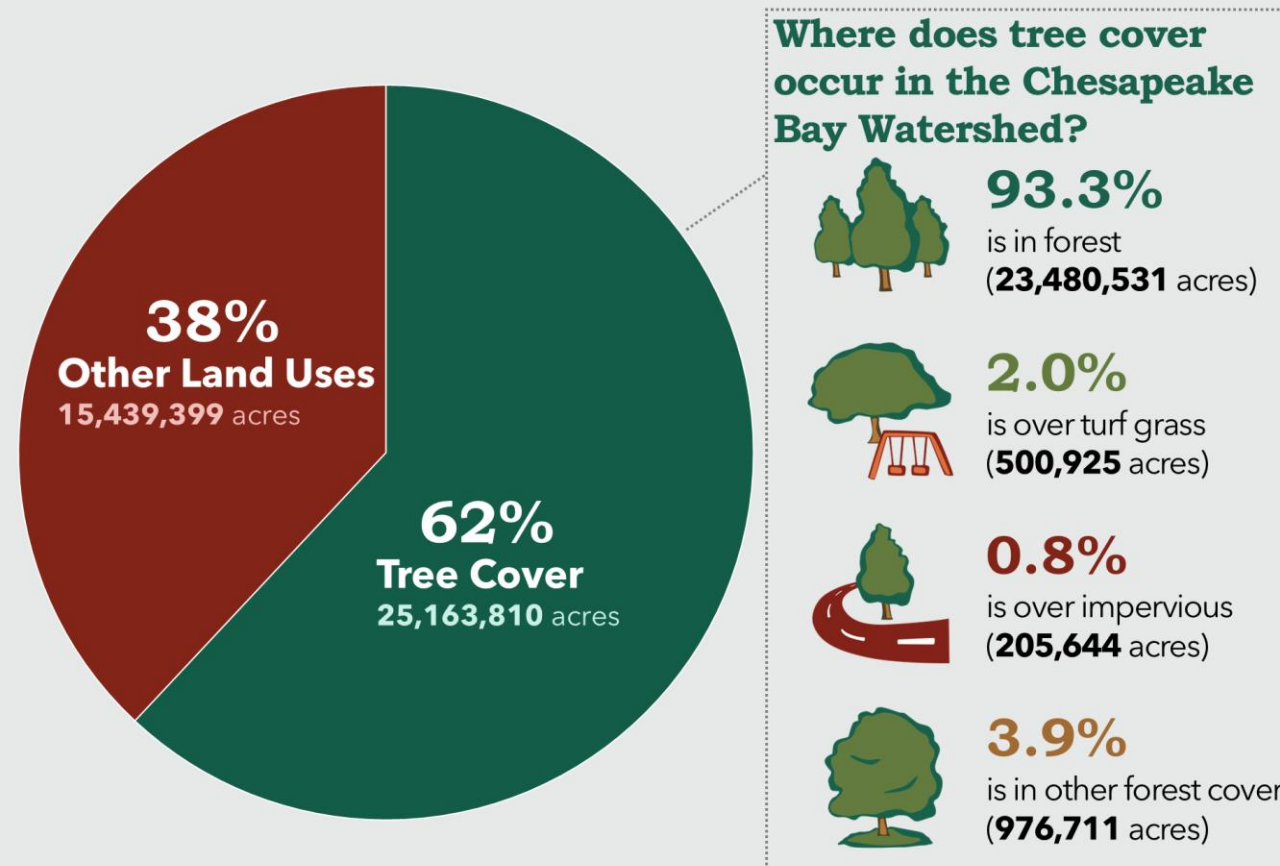
1. New estimates on the benefits of tree cover
2. Summarized data on forest and tree canopy change across the watershed
3. Interactive maps
4. Case Studies
5. Links to Tree Cover Fact sheets



Trees are providing over \$15.3 billion in benefits annually!

How much tree cover is there in the Chesapeake Bay watershed?

40,603,210 ACRES OF LAND AREA
IN THE CHESAPEAKE BAY WATERSHED



What are some benefits of tree cover in the Chesapeake Bay watershed?



Total Air Pollution Removal Value

1.4 million lbs removed annually
\$953.3 million saved annually
Total air pollution removal includes CO, NO₂, O₃, SO₂, and Particulate Matter (PM_{2.5}, PM₁₀).



Reduced Stormwater Runoff Value

55.9 billion gallons removed annually
\$499.7 million saved annually



Carbon Sequestered Value

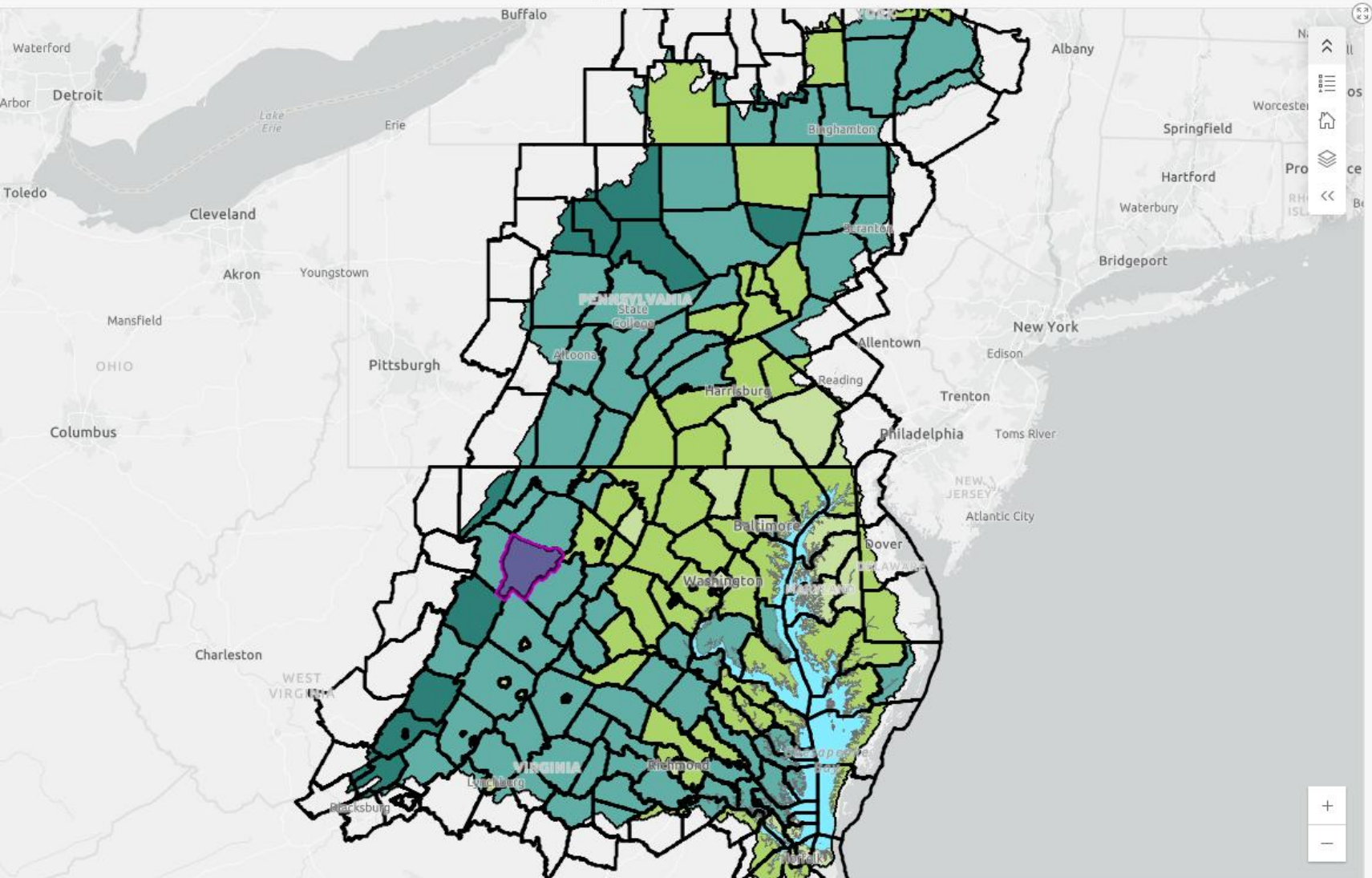
29.1 million tons removed annually
\$13.9 billion saved annually

Calculated based on 2021 and 2022 tree cover data using landscape.itreetools.org

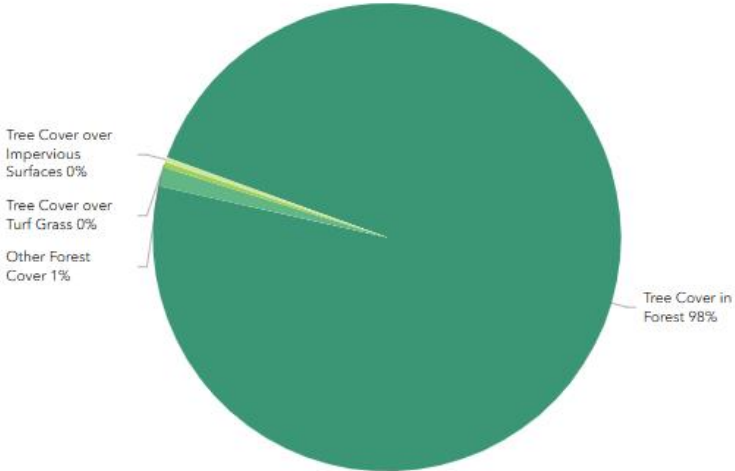
Hardy County, WV

Percent Tree Cover: 80.9%

Within the Chesapeake Bay Watershed

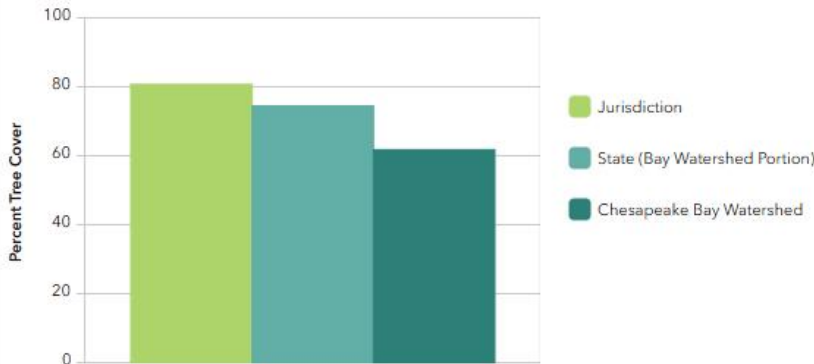


Distribution of Tree Cover Classes



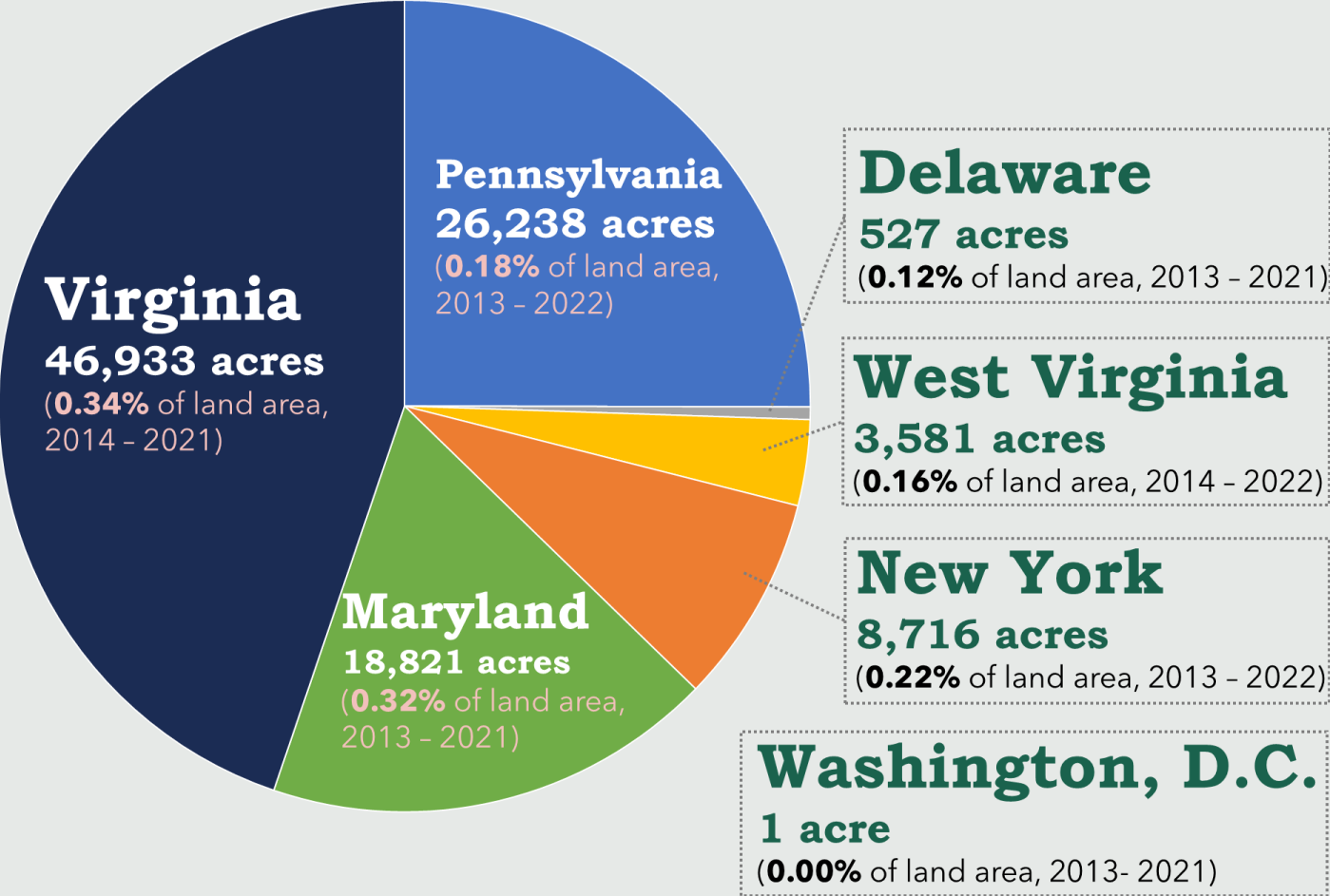
Tree Cover in Forest: Patches of tree cover 1 acre or greater, with a minimum patch width of 36 m
Other Forest Cover: smaller patches of forest cover that are assumed to have an unmanaged understory

How Does Your Jurisdiction Compare?



How has tree cover changed with development in the Chesapeake Bay watershed?

104,817 ACRES NET LOSS (0.26% OF LAND AREA)



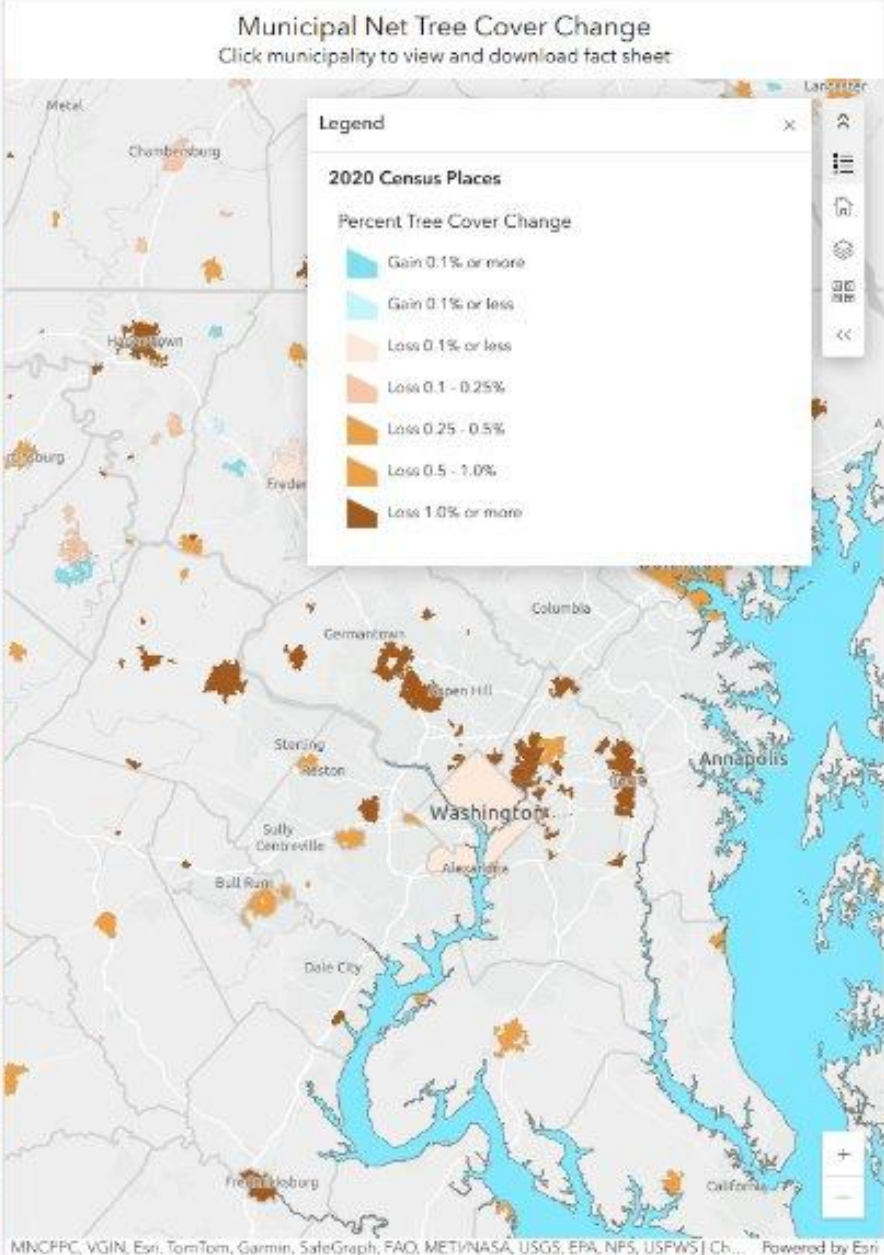
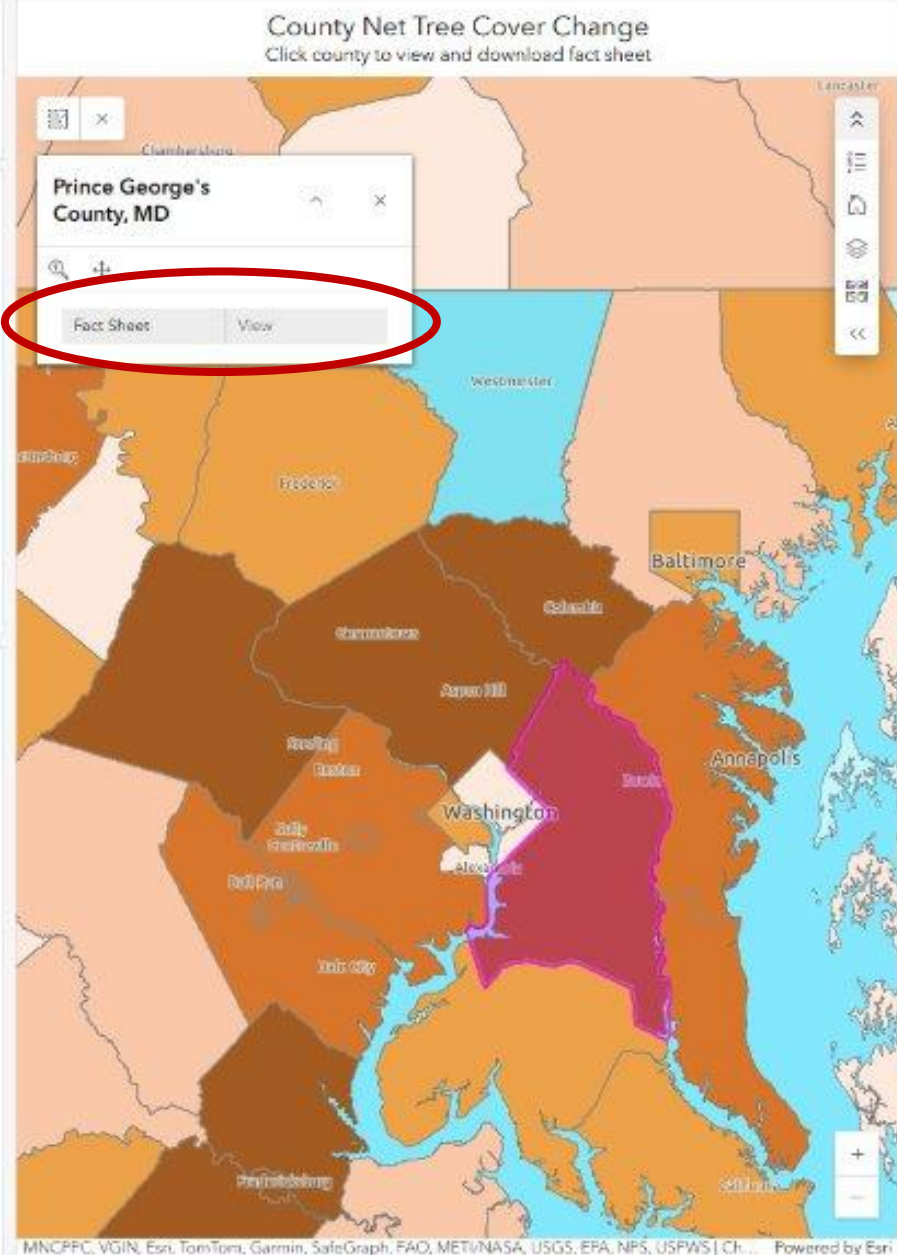
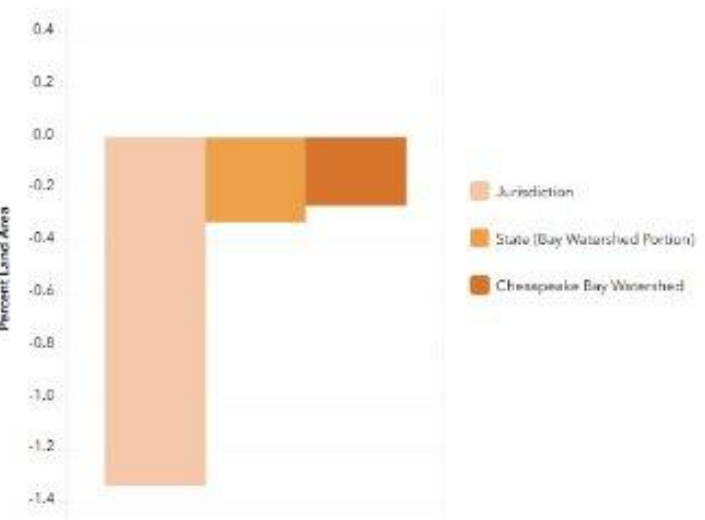
This tree cover loss has resulted in the loss of \$331 million in benefits annually!

Prince George's County, MD

Net Tree Cover Change on Developed/Developing Lands:
-4,102.94 acres (-1.33% land area)

Within the Chesapeake Bay Watershed

Net Tree Cover Change: How Does Your Jurisdiction Compare?



[Forest and tree distribution](#)[Tree cover \(2021/22\)](#)[Forested extent \(2021/22\)](#)[Tree cover change](#)[Forested extent loss](#)[Next Steps](#)

Using Local Ordinances to Guide Sustainable Solar Development

Although solar development can result in forest loss, some jurisdictions are taking steps to minimize the impacts of solar development. The planning commission of Lycoming County in central Pennsylvania has been proactive in guiding sustainable solar development. Local ordinances passed in the summer of 2022 limit solar development in areas that would require the removal of >20% of mature trees.

The county is also interested in exploring opportunities to incentivize mixed-use areas where solar panels are integrated with other impervious surfaces, such as installing solar above parking lots. Modifying statewide policies that currently restrict large-scale community solar projects, including projects that utilize existing impervious surfaces, could help reduce the pressure to site new solar developments on existing forests.

Future updates to the State of Chesapeake Forests Storymap

- Adding in new analyses on:
 - Plantable space
 - Forest fragmentation
 - Riparian forest cover
- Keeping current data updated
 - Next round of data will be for 25/26, expected in 2028
- Let us know what else you'd like to see! Reach out:
Katherine.brownson@usda.gov

Questions?

Katherine.brownson@usda.gov

