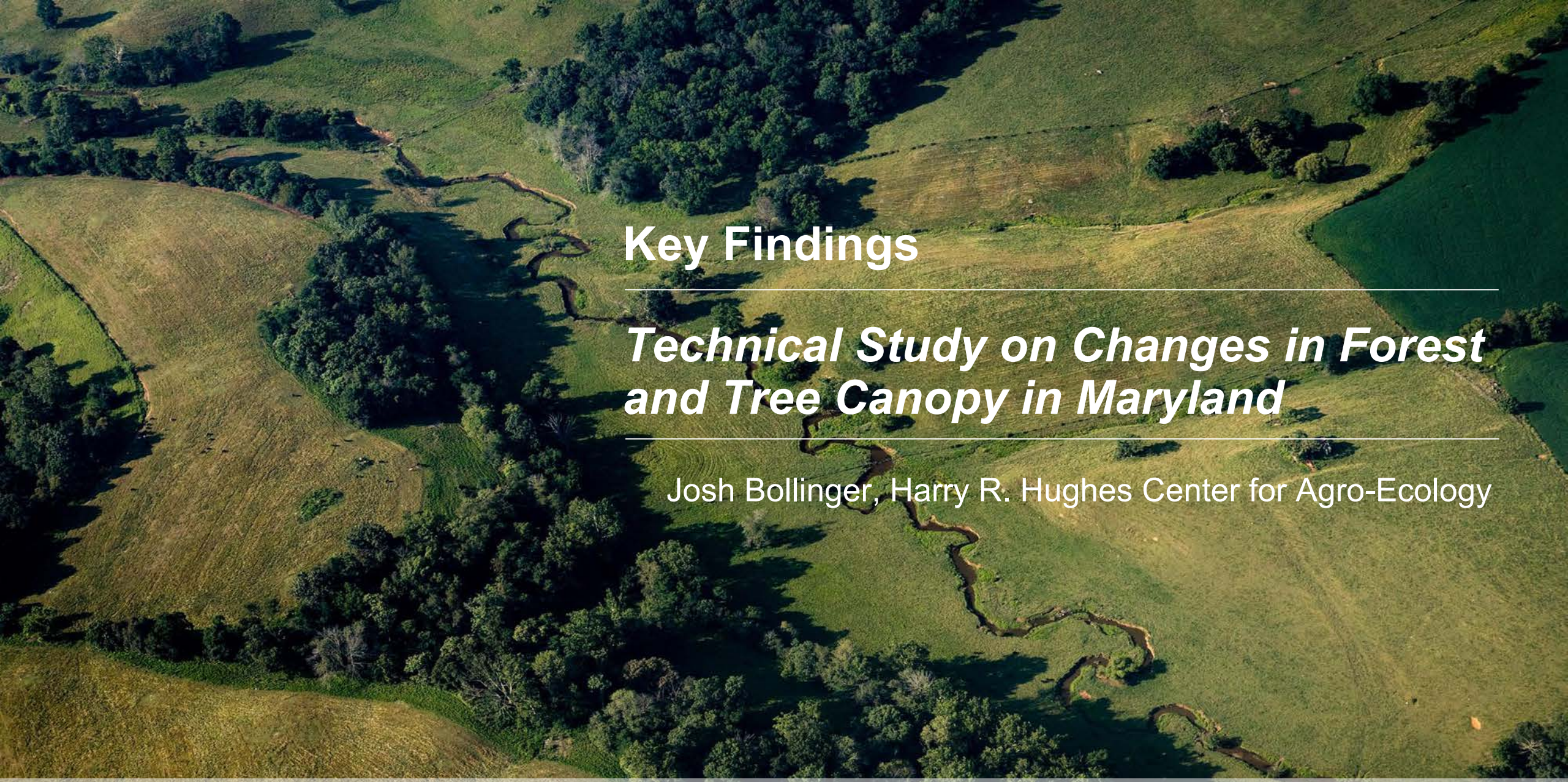

Key Findings

Technical Study on Changes in Forest and Tree Canopy in Maryland

Josh Bollinger, Harry R. Hughes Center for Agro-Ecology

University of Maryland College of Agriculture & Natural Resources
Harry R. Hughes Center for Agro-Ecology
Chesapeake Conservancy
University of Vermont Spatial Analysis Lab

About the Hughes Center for Agro-Ecology

- UMD AGNR nonprofit
- Mission: Research, outreach and collaboration
- Focus: Objective research for policy creation

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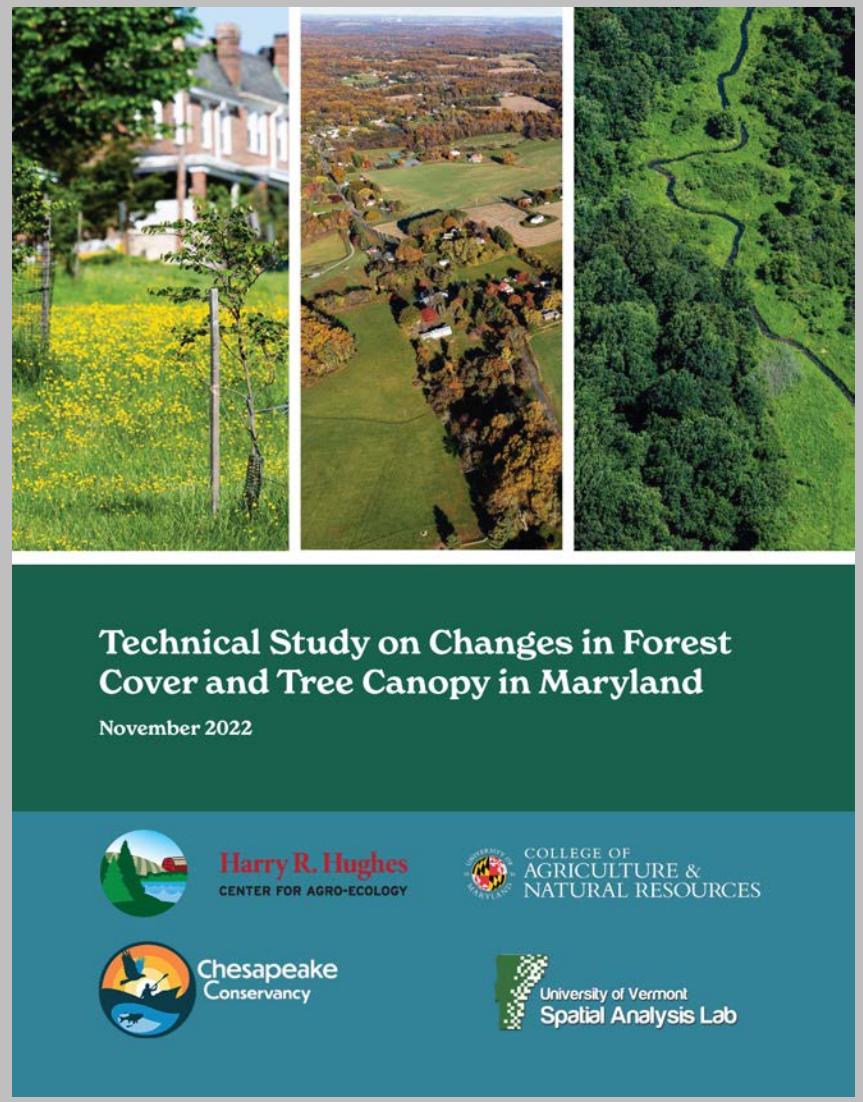
Maryland and Forest Policy

- Forest Conservation Act of 1991
  - The goal is “to minimize the loss”
- Forest Preservation Act of 2013
  - “No Net Forest Loss” and 40% tree cover
- Tree Solutions Now Act of 2021
  - Phasing out retention banks
  - Planting of 5 million trees
  - Reauthorizes this study

Forest Study Analysis Tasks

- Requested Under SB 729 (2019) and HB 991 (*Tree Solutions Now Act of 2021*) – $130,000 in funding from legislature

- Forest and Tree Canopy Extent (Task 1)
- Forest Health (Task 2)
- Chesapeake Restoration (Task 3)
- Forest & Tree Canopy Change (Task 4)
- Forest Change & Protected Areas (Task 5)
- Mitigation Banking (Task 6)
- Forest and Tree Planting Programs (Task 7)



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Key Findings

- While Maryland is still losing forest, the rate of forest loss has declined since the Forest Conservation Act of 1991.
- However, forest loss associated with development and forest fragmentation continue to be significant trends, especially in Central Maryland.
- The state has an opportunity to transition from forest and tree canopy loss to gain.

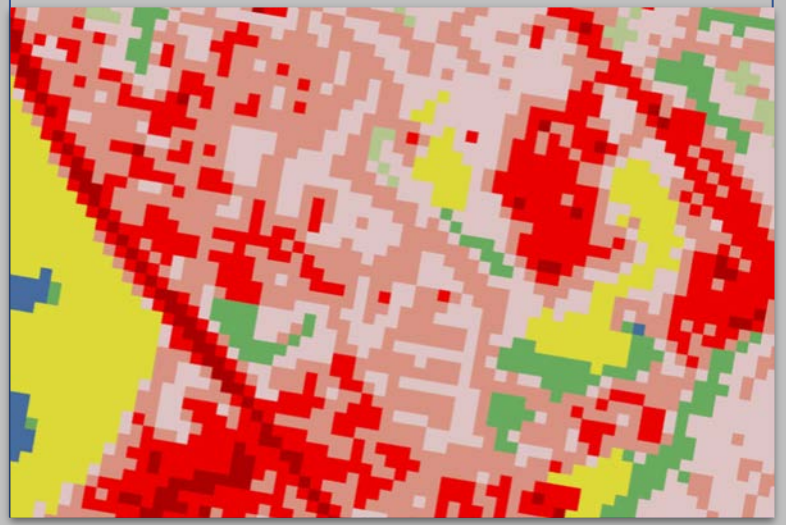
Datasets & Definitions

USDA Forest Service Forest Inventory and Analysis (FIA)

Field sampling for 90 years

National Land Cover Dataset (NLCD)

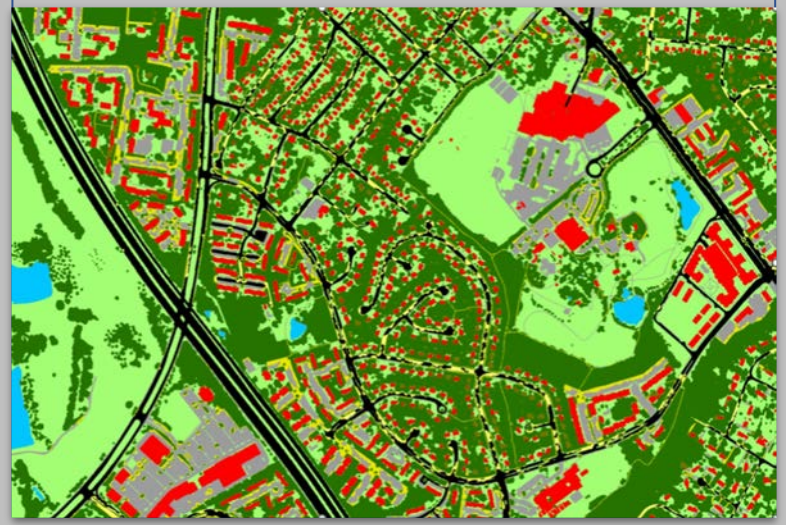
30m Landsat satellite data 2000-2019



Produced by the federal Multi-Resolution Land Characteristics (MRLC) consortium

Chesapeake Bay Program (CBPO) Land Cover/Land Use

1m USDA NAIP imagery + lidar 2013/14 to 2017-18



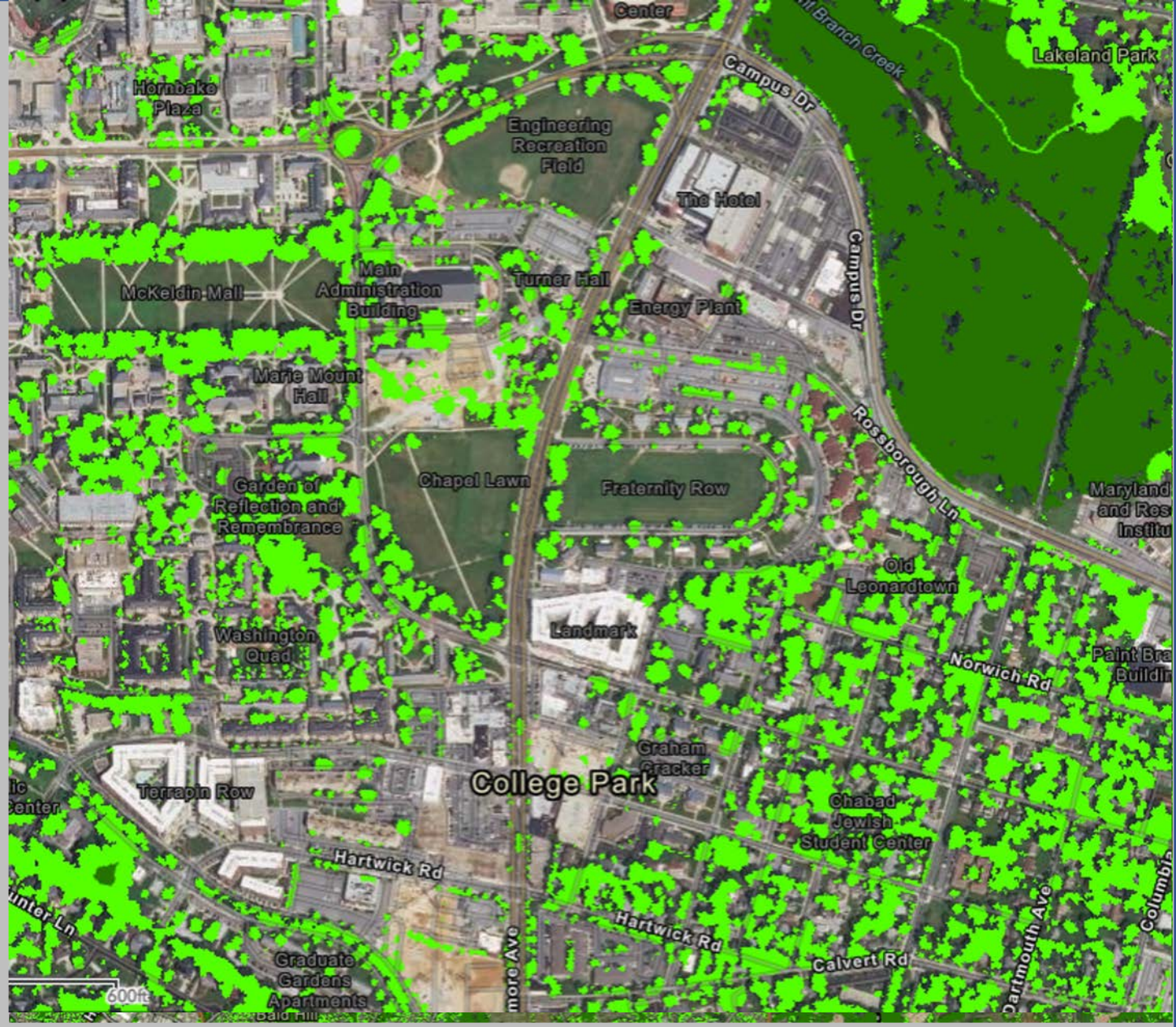
Produced by: UVM, Chesapeake Conservancy and USGS

Forest Definitions

Differences between ”forest” and “tree canopy”

Size requirements to be considered forest:

- US Forest Service - at least one acre in size and at least 120 feet wide
- NLCD - areas dominated by trees at least 5 meters tall and >20% of total vegetation cover
- CBPO - at least one acre and 240 feet wide



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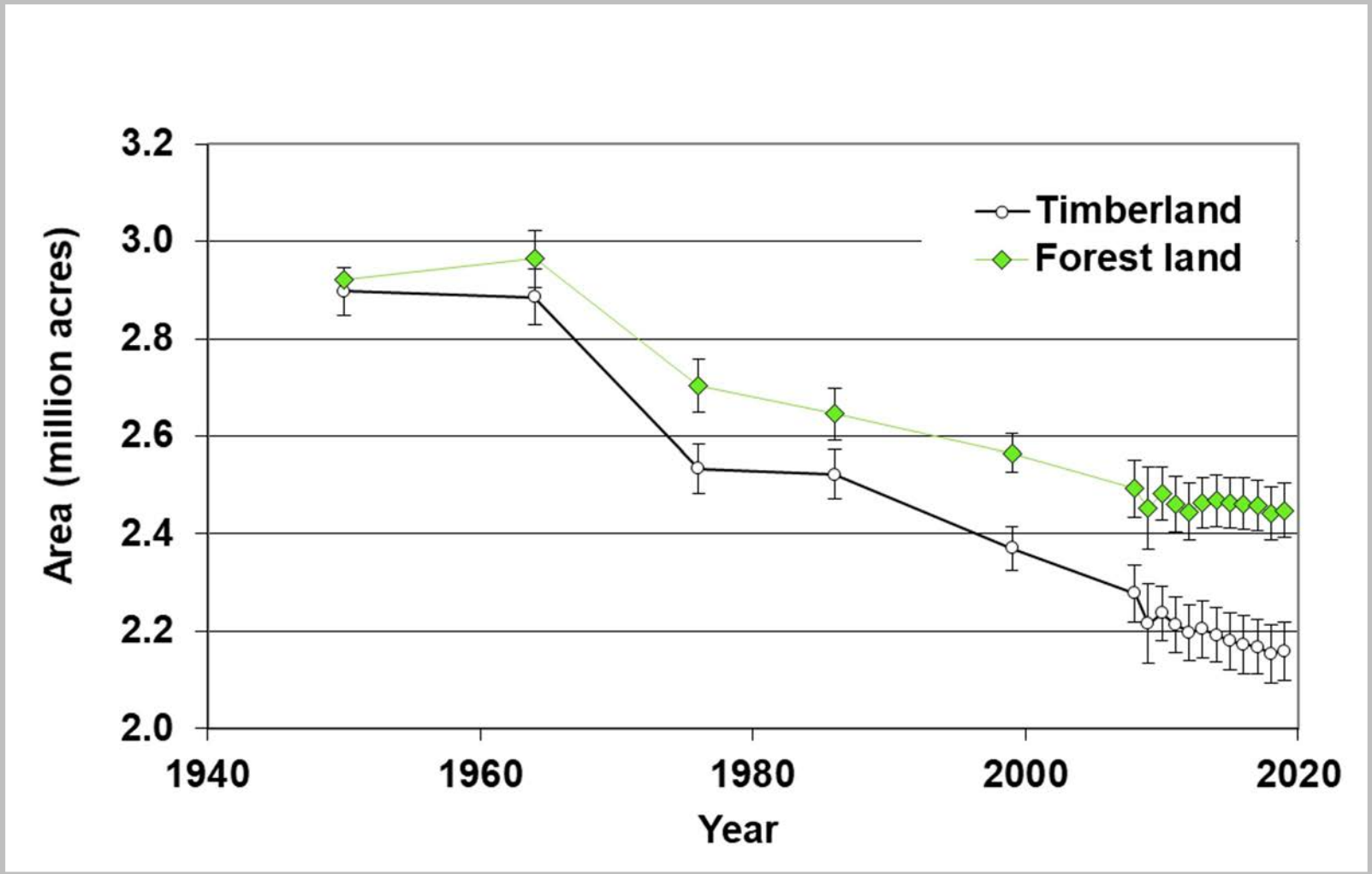
Forest and Tree Canopy Extent (Task 1)

USDA Forest Service FIA Data

- Rapid forest loss after 1960
- Reduction in rate of loss from 2000 to 2020
- Percent forest cover estimates range from 39-42% of the state's total land area



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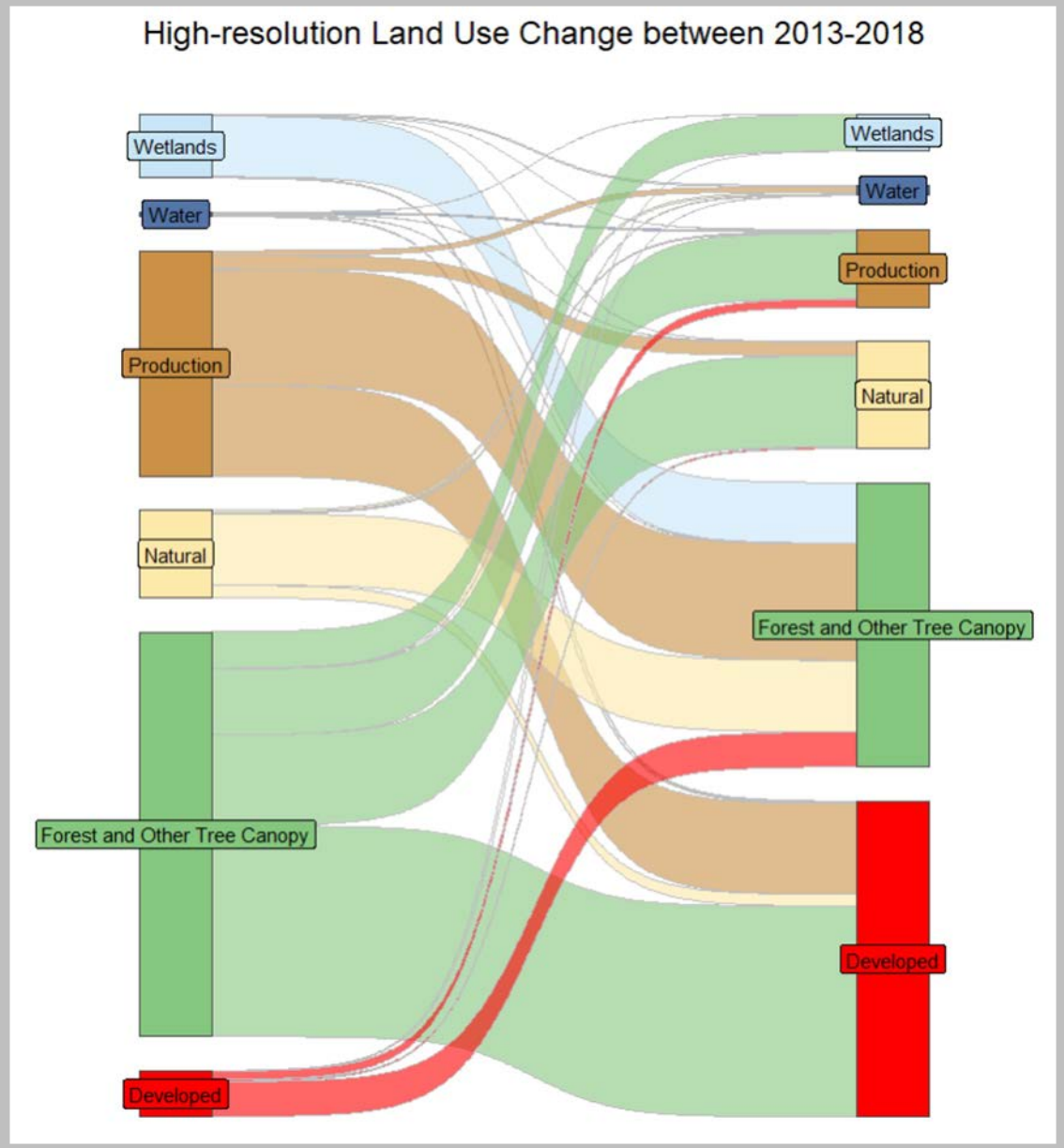
Forest and Tree Canopy Change (Tasks 4 & 5)

CBPO Land Use Transitions

- Between 2013 and 2018
- Forest - 49% of all areas that changed in 2013
- Developed - largest resulting class in 2018 (38%)



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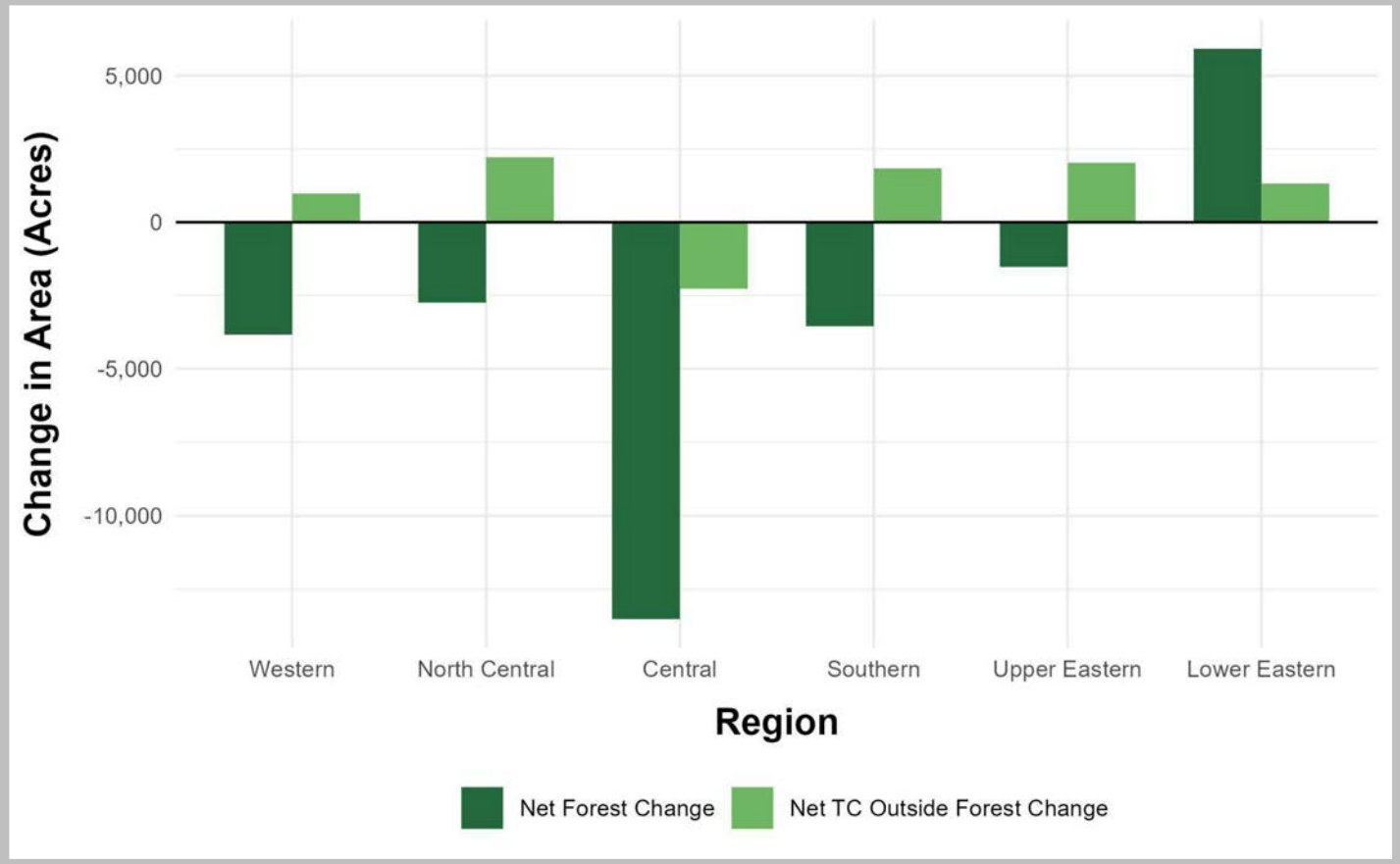
Forest and Tree Canopy Change (Tasks 4 & 5)

Net Change in Forest and Tree Canopy

- Greatest loss in Central Maryland
- Tree Canopy Outside Forests and Fragmentation
- Lower Eastern forest gains



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Forest and Tree Canopy Change Associated with Development

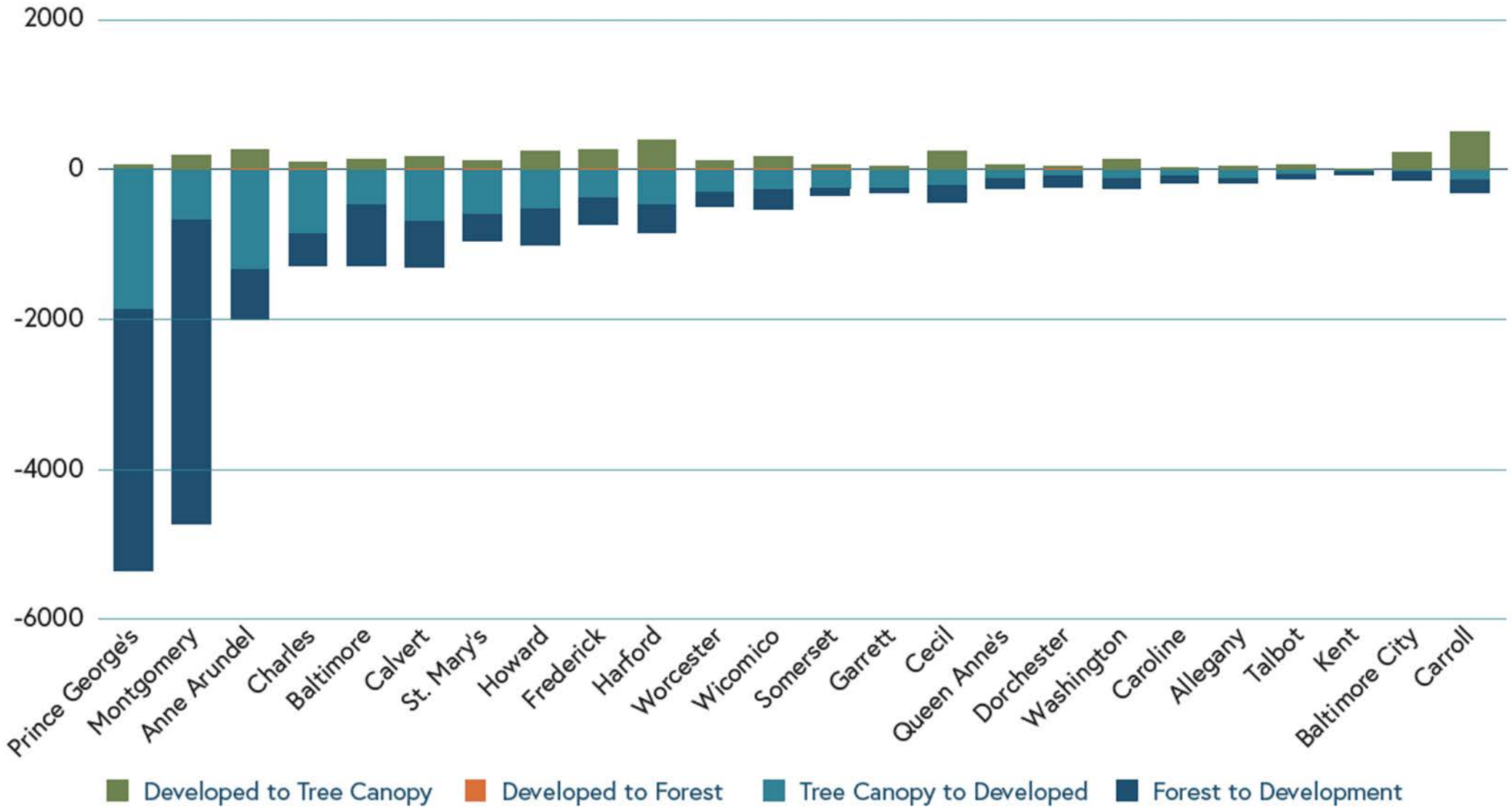
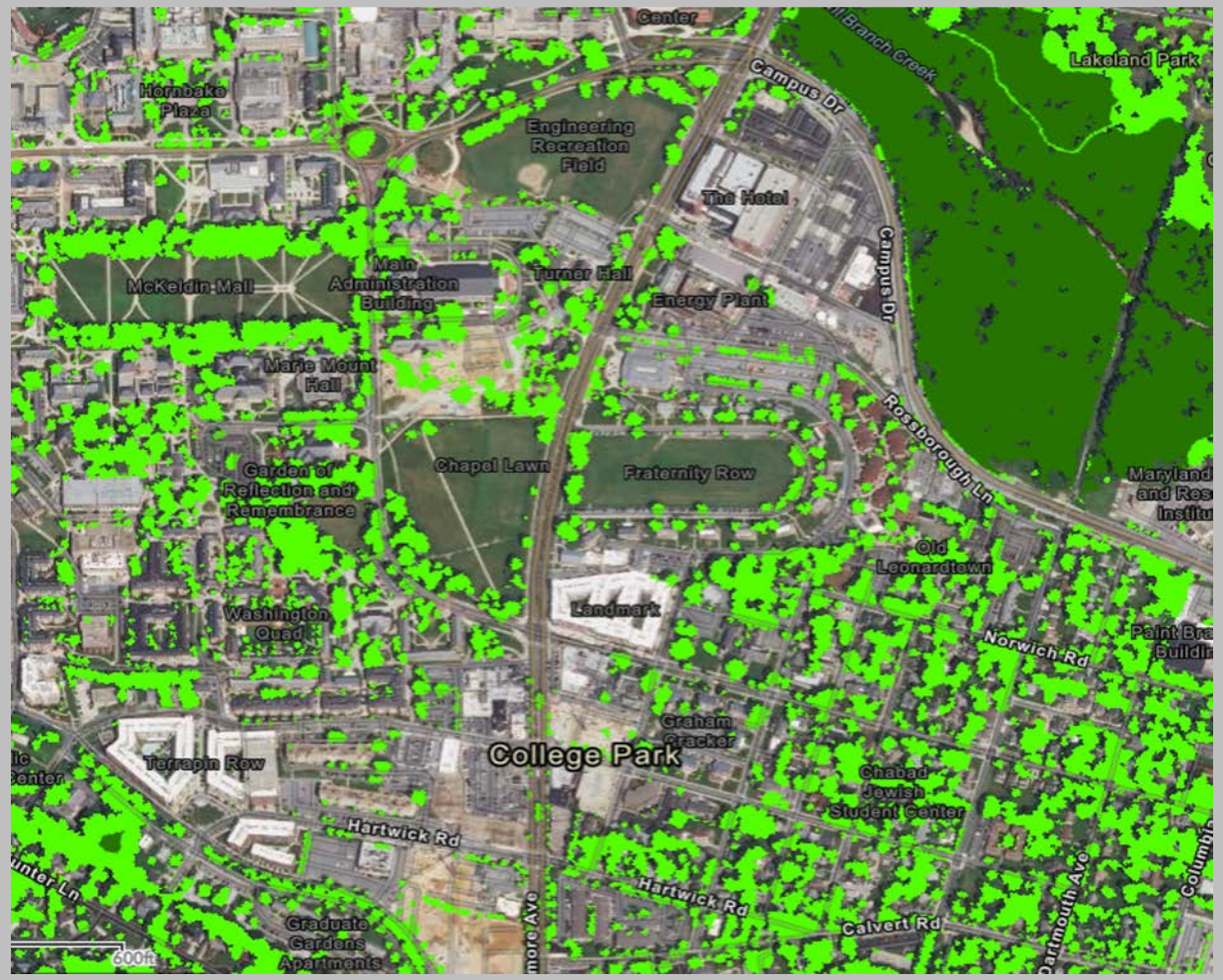


Figure 22. *Forest cover change due to development, by jurisdiction.*

Forest Health (Task 2)

Results

- Increasing fragmentation
- Forest → tree canopy outside forest & isolated forest patches
- Invasive species risk factor



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Chesapeake Restoration Progress (Task 3)

Results

- 70% tree canopy coverage in **riparian forest buffer** areas by 2025
- Maryland average = 58%
- Net loss of **urban tree canopy**, especially in Montgomery and Prince George's
- Gains in areas

Photo: Chesapeake Bay Program

Photo: Chesapeake Bay Program

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Forest and Tree Canopy Commitments (Task 5) Protected Areas

Protected Areas

- 33.2% of Maryland's forests and 9.3% of tree canopy outside forests are currently protected
- Statewide: 26.9% of land protected in Maryland in 2018; 29% in 2021
- Net gain of >2,000 acres of total tree canopy in protected areas

Photo: Chesapeake Bay Program

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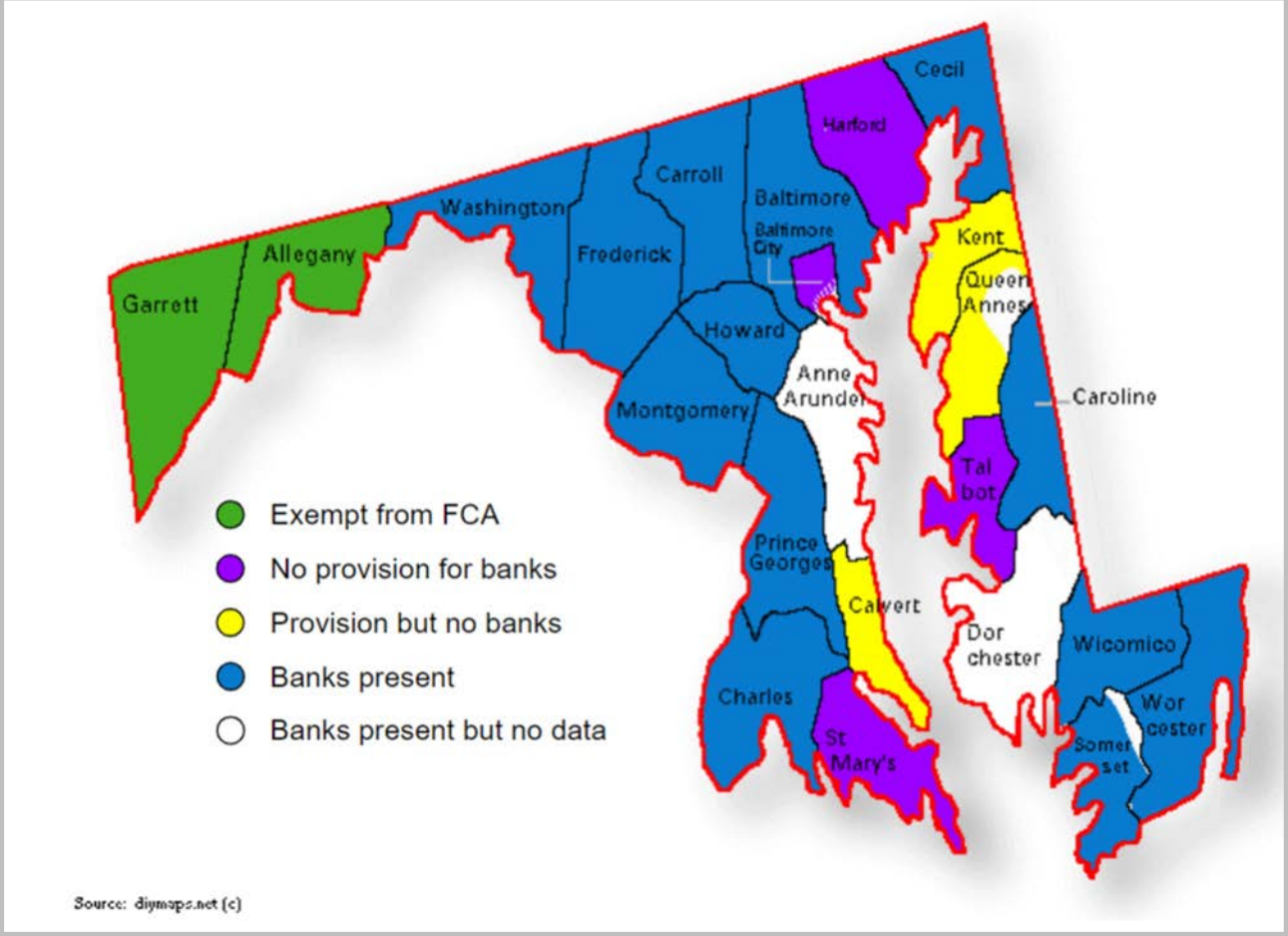
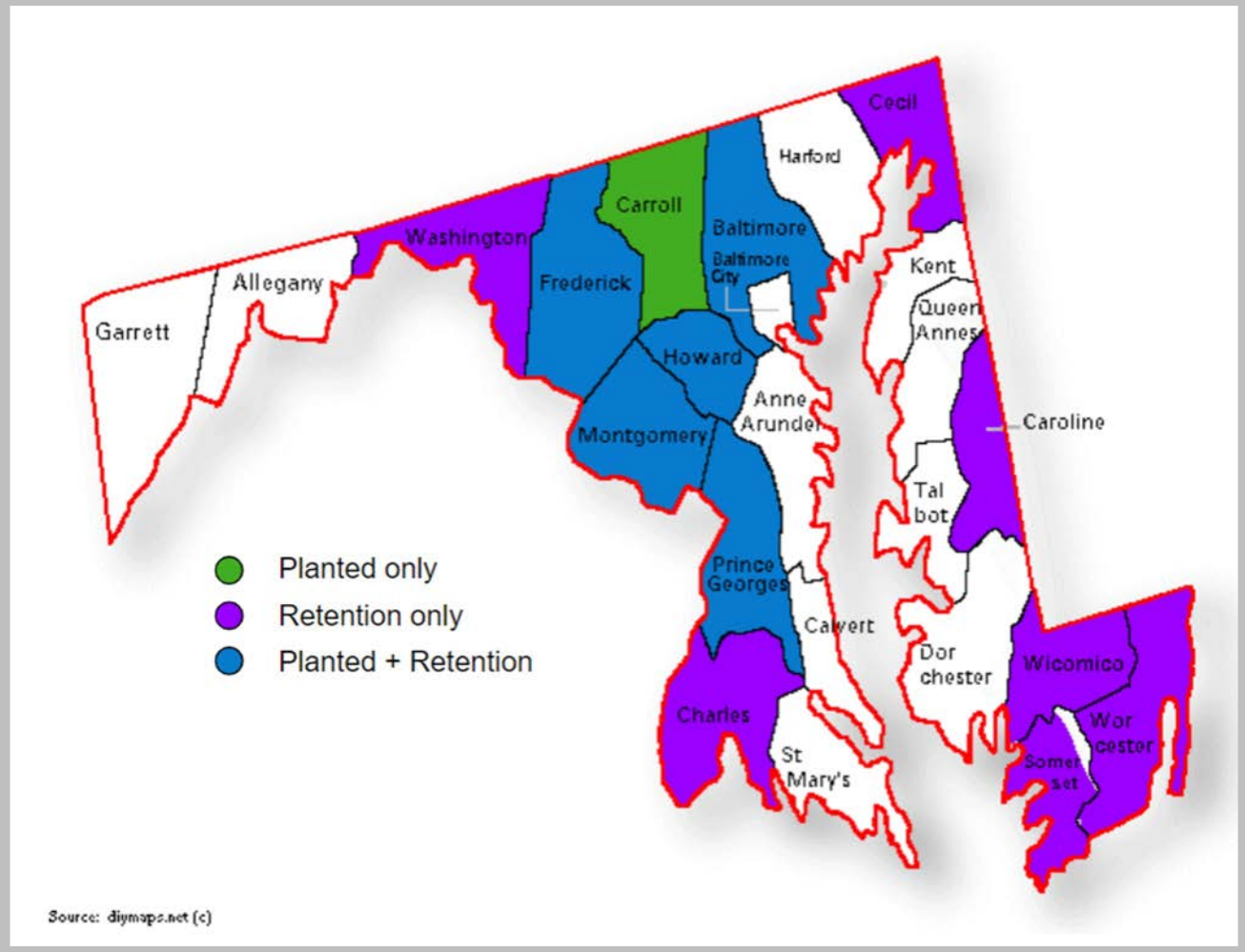
Forest Mitigation Banking (Task 6)



Capacity and location of active banks:

- 17,258 acres total in MD
- 4,748 acres active/available for the purchase of credits

Forest Mitigation Banking (Task 6)



Number of Planted vs. Retention Banks:

- Retention: 13,997 acres (81.1%)
- Planted: 3,261 (18.9%)

Tree Planting Programs (Task 7)

- In 2018 & 2019 ~ 1854 acres total
- Many programs, all levels
- Likely underestimation

Classifications of plantable areas in Baltimore City by size.

Recommendations:

- Consider how policies impact different areas of Maryland that are seeing different trends.

- Consider programs and policies that will protect the health of our forests and reduce fragmentation.

- Continue forest monitoring.

Story Map

- Online Resource
- Full Study and Map Viewer
- go.umd.edu/ForestStoryMap

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Full Study Available at go.umd.edu/ForestTechnicalStudy