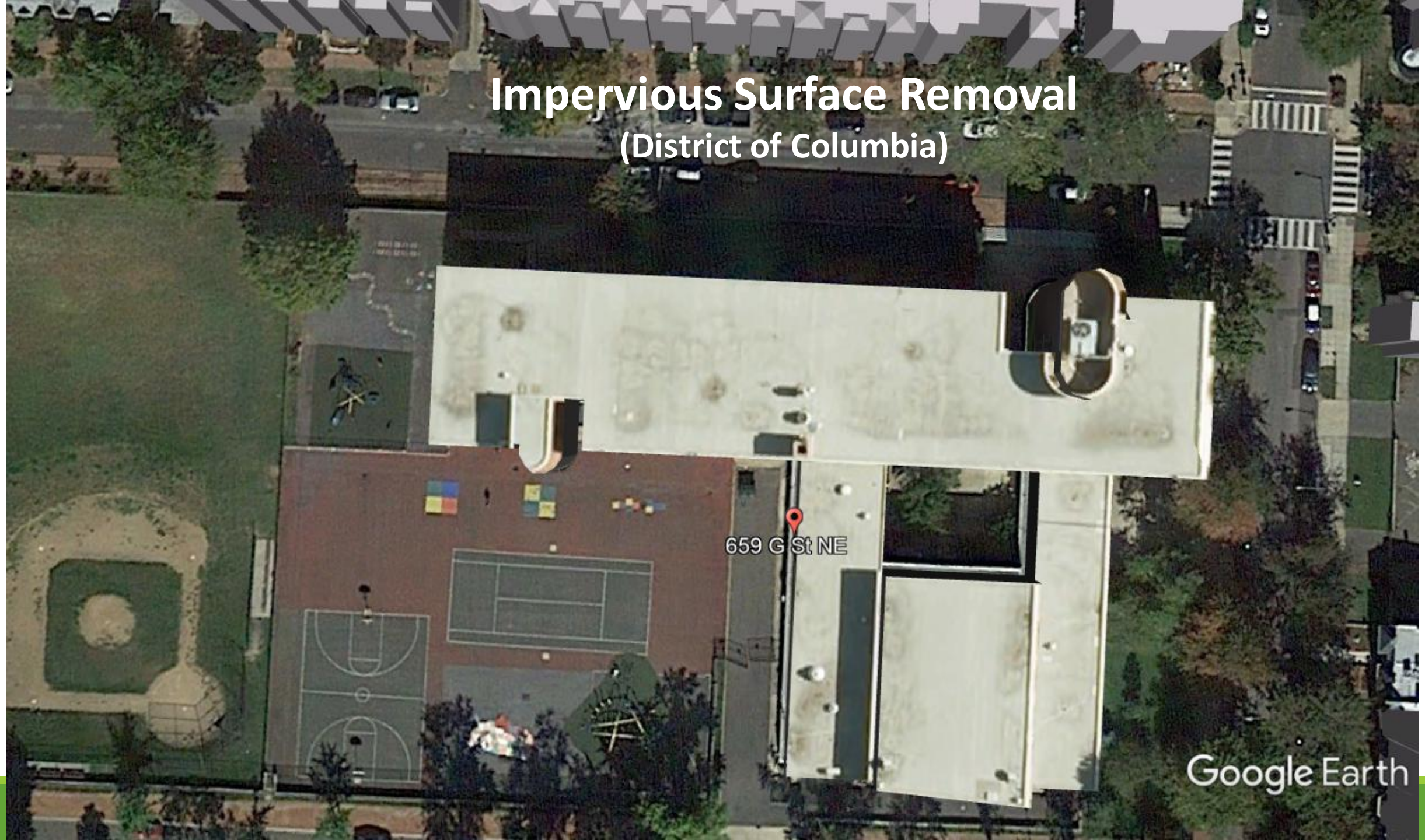
Verifying BMPs with High-resolution Land Use Data

PETER CLAGGETT, RESEARCH GEOGRAPHER

U.S. GEOLOGICAL SURVEY

Impervious Surface Removal
(District of Columbia)

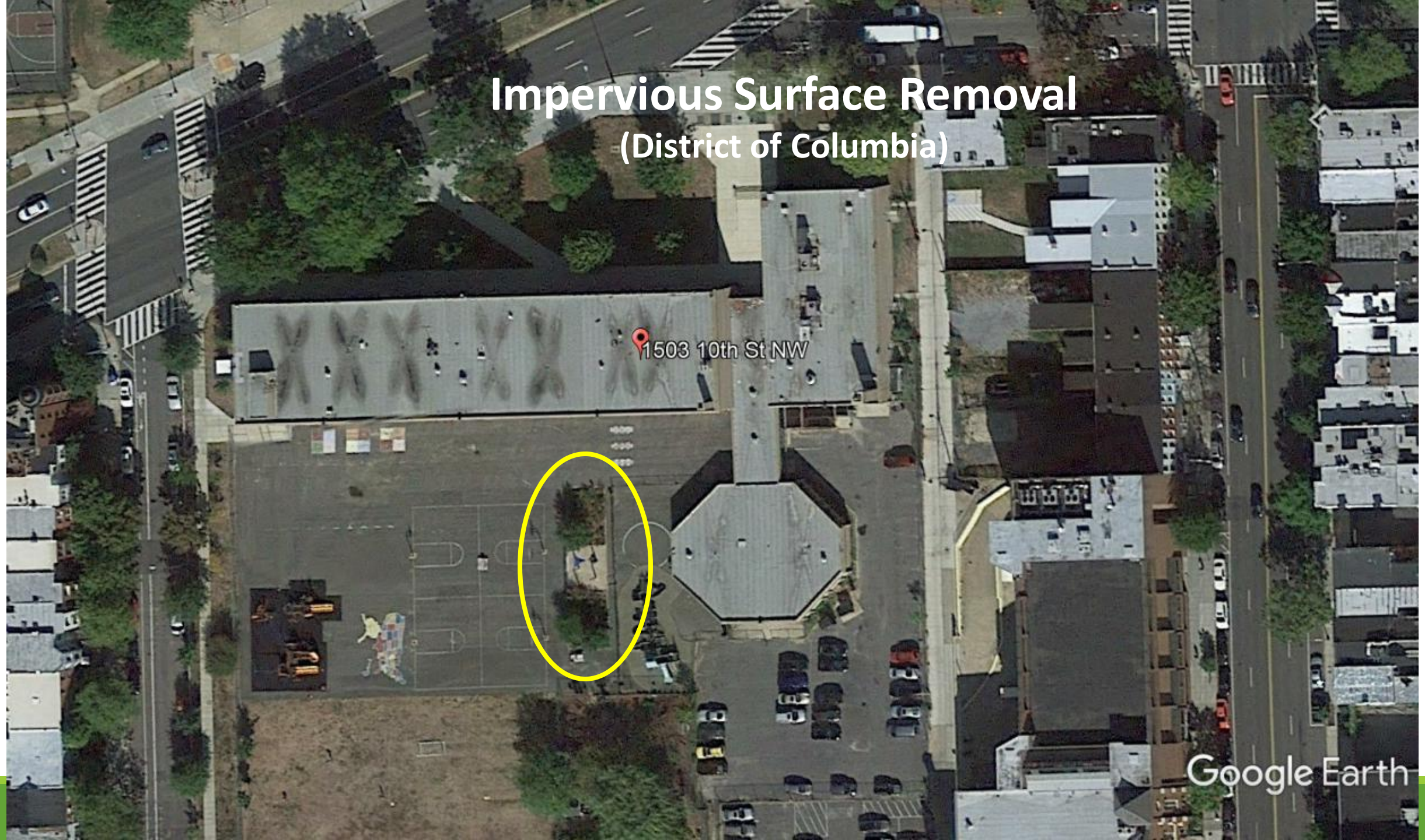


Impervious Surface Removal
(District of Columbia)

Impervious Surface Removal

(District of Columbia)

Impervious Surface Removal
(District of Columbia)



Impervious Surface Removal

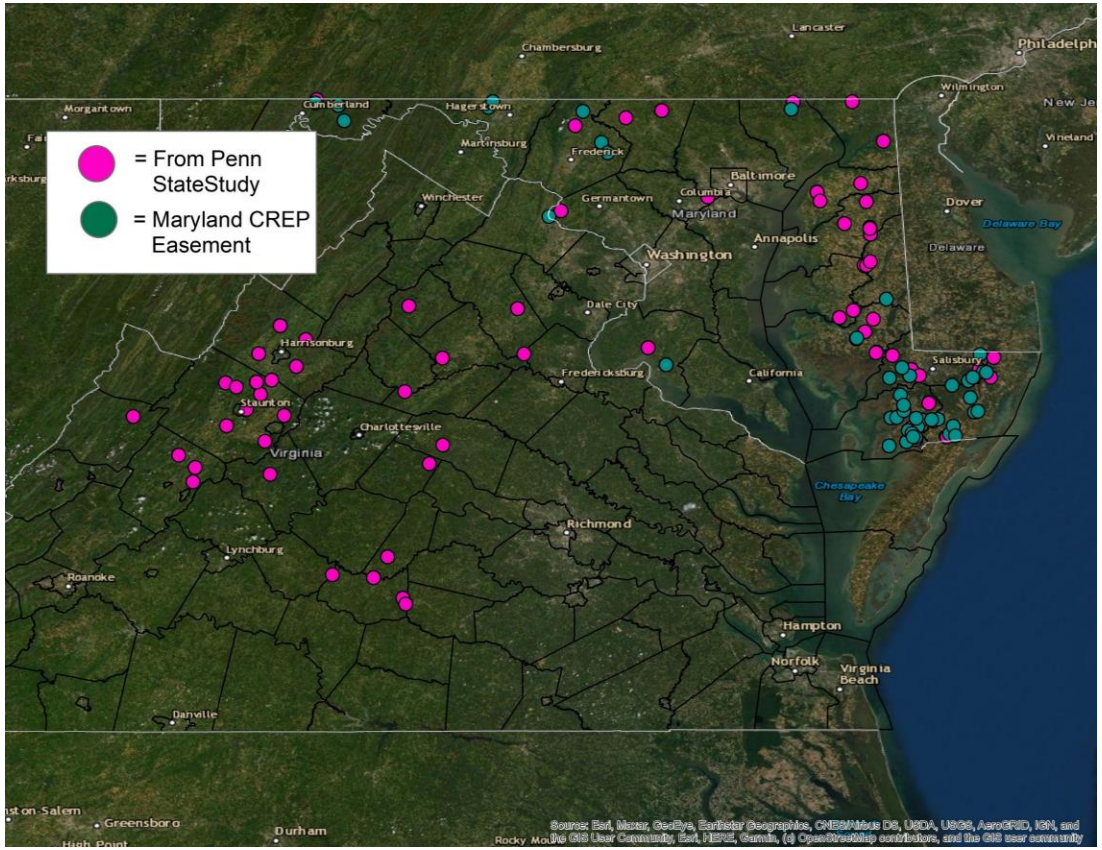
(Norfolk, Virginia)

Impervious Surface Removal

(Norfolk, Virginia)

Verifying Riparian Forest Buffers: Methods/Data

- CREP buffer shapefiles from PA, VA, and MD used in Penn State Study
  - Could not locate planting dates for PA plantings
- Maryland CREP Easements
- Chesapeake Conservancy 2013 and 2017 land cover
  - 2017 LC not available for all counties
- Calculated area of different land cover in each buffer shapefile



Slide courtesy of Iris Allen, MD-DNR Forest Service

Tree Canopy in 2013 = 6%
Age 10

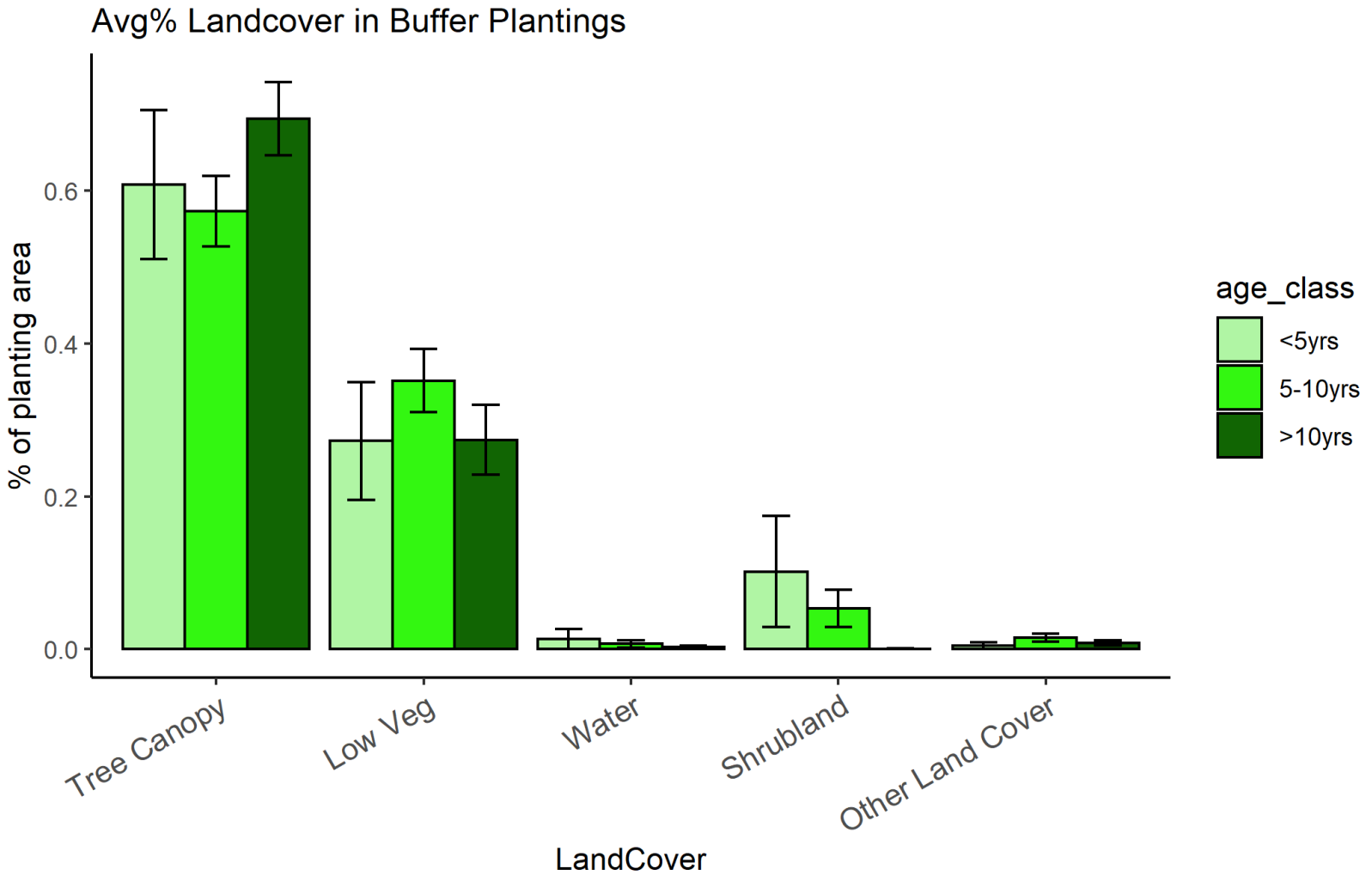
Tree Canopy in 2017 = 98%
Age 14

MARYLAND DEPARTMENT OF NATURAL RESOURCES

MARYLAND FOREST SERVICE

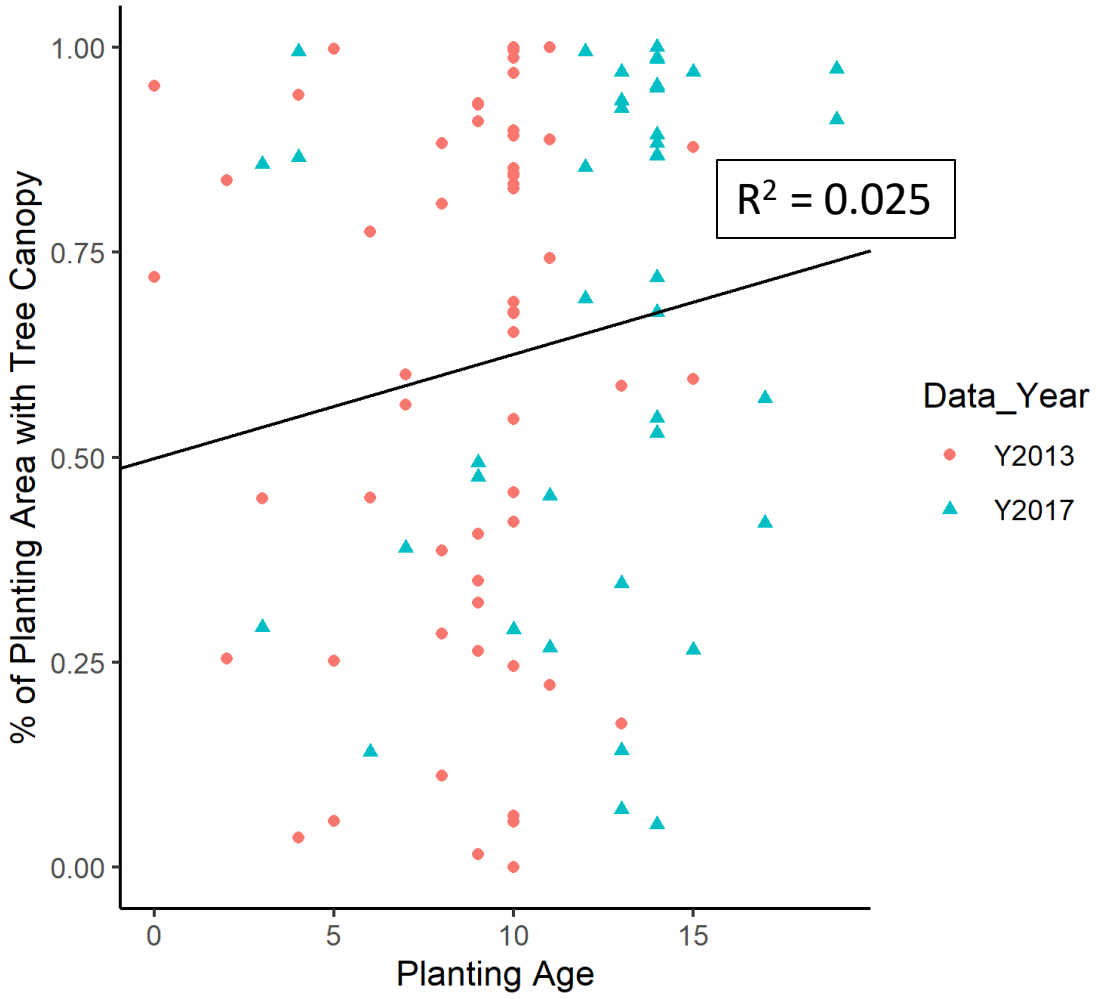
Slide courtesy of Iris Allen, MD-DNR Forest Service

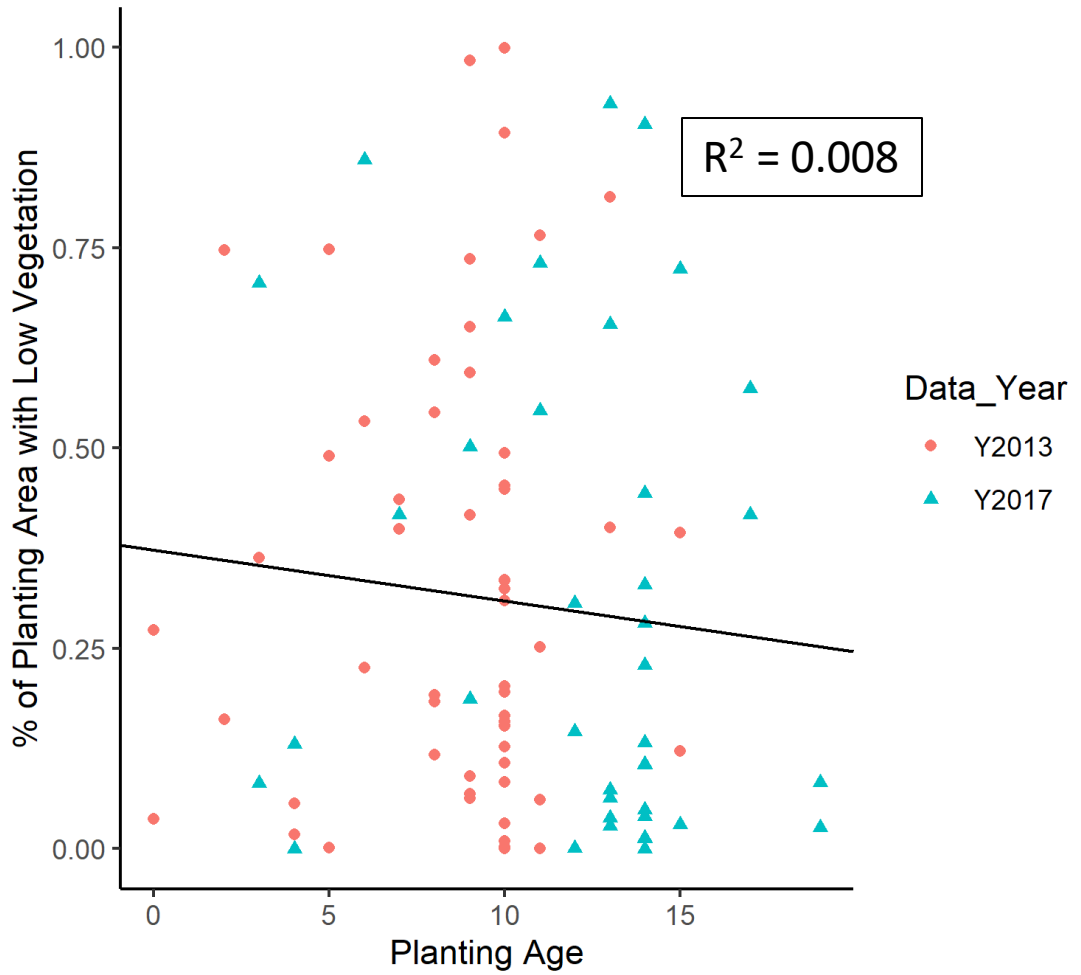
Preliminary Results



LC Year	Age Class	Count
2013	<5	10
	5-10	39
	>10	8
2017	<5	4
	5-10	32
	>10	5

Slide courtesy of Iris Allen, MD-DNR Forest Service





Slide courtesy of Iris Allen, MD-DNR Forest Service

Issues with monitoring buffers with high-resolution data:

- Regions and species have different growth rates
- States have different planting practices
  - VA doesn't plant as many pines and has planted at lower densities than MD
- LiDAR imagery helps distinguish shrubs and trees from bare ground, but the dates of imagery vary by county and may not match the dates of NAIP aerial spectral imagery.
- Sample size for this analysis is low- particularly for representing younger buffers.
- Attribute data on planting dates, densities, and species are not consistently available.
- Polygons representing BMP area are not precisely mapped such that not all parts of the polygon may be planted, and some parts may contain remnant mature trees.

MARYLAND DEPARTMENT OF NATURAL RESOURCES

MARYLAND FOREST SERVICE

Slide courtesy of Iris Allen, MD-DNR Forest Service, edited by Peter Claggett, USGS

Preliminary Conclusions:

- Impervious cover removal projects are likely too small to be detected in high-resolution land cover/use data unless planted with trees.

- Field and GIS data not yet sufficient to verify findings of Tree Canopy Expert Panel that tree plantings are visible in imagery after 10 years. Note that the Panel's findings were based on urban tree plantings which may be more intensively maintained than stream-buffer tree plantings and therefore not transferrable to buffers.

- Mature forest buffers may have natural gaps detected at high-resolution due to tree mortality associated with disease, pests, deer browse, competition, etc. What percent canopy cover should be considered successful for planted buffers?

MARYLAND DEPARTMENT OF NATURAL RESOURCES

MARYLAND FOREST SERVICE

Slide courtesy of Iris Allen, MD-DNR Forest Service