Healthy Watersheds Goal Implementation Team Meeting – December 13, 2021
Chesapeake Bay Program

Land Use Methods and Metrics Outcome

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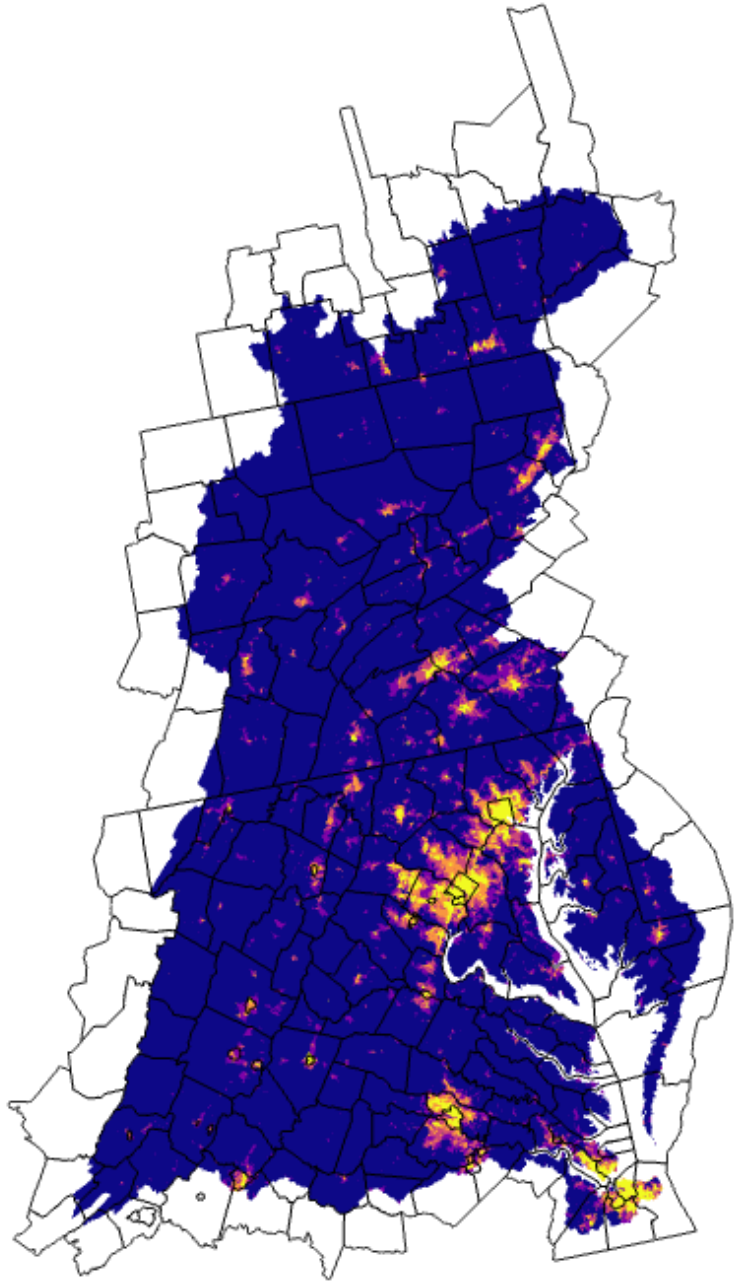
Through the Chesapeake Bay Watershed Agreement, *the Chesapeake Bay Program has committed to…*

1. *Measure rate of farmland, forest and wetland conversion, and the extent and rate of change in impervious surface coverage.*

2. *Quantify the potential impacts of land conversion to water quality, healthy watersheds and communities.*

3. *Launch a public awareness campaign to share this information with citizens, local governments, elected officials and stakeholders.*

Impervious Surfaces as a LUMM metric



1. Measure rate of farmland, forest and wetland conversion, and the extent and rate of change in impervious surface coverage.

Measure the extent of impervious surface coverage by NHDv2 Plus Catchment (1:100k scale)

- *~80,000 catchments covering the Chesapeake Bay Watershed*

* *Percent Impervious Cover by Catchment using Version 1 of the 2017 High-Resolution Land Use*

Impact of Impervious Surfaces

2. Quantify the potential impacts of land conversion to water quality, healthy watersheds and communities.

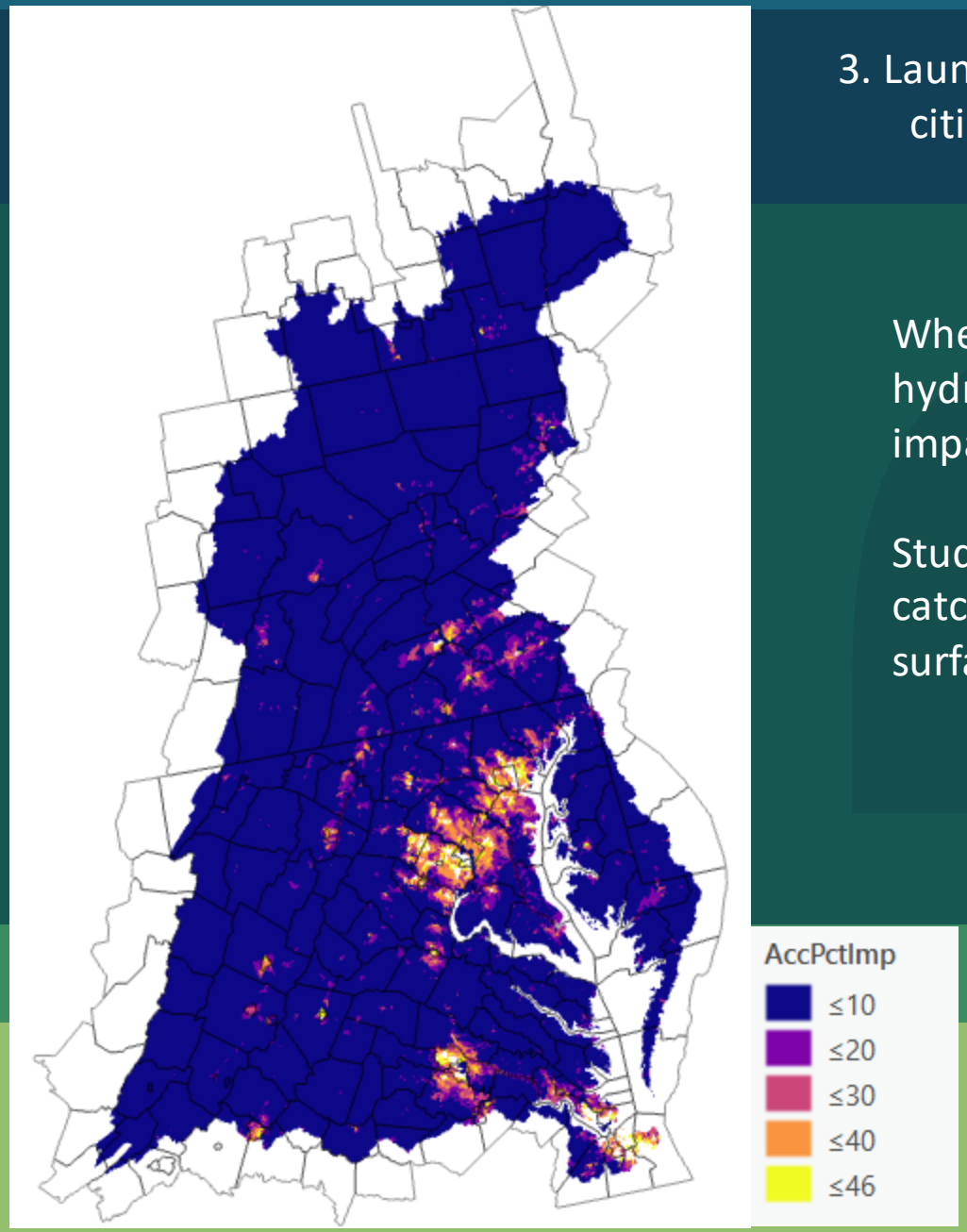
Water Quality and Healthy Watersheds

- Impervious surfaces are the fastest growing polluting land cover class
- Impervious surfaces increase stream flow velocity and temperature and change the chemical composition of surface runoff
- These changes lead to upland erosion and the densification of drainage networks, erosion of stream banks, scour and sedimentation of stream beds, threaten the health of aquatic life (incr. temperature, conductivity, sediment, nutrients, and toxics)

Communities

- Impervious surfaces are an indicator of economic growth and investment
  - This growth can be perceived as both positive or negative, depending on the audience and the purpose of the growth
    - New or updated residential or commercial development for existing local community
    - Gentrification
- Accommodating population growth while minimizing (not eliminating) increases in impervious cover is a hallmark "smart growth" principle

Communicating Impervious Surfaces as a LUMM Metric



3. Launch a public awareness campaign to share this information with citizens, local governments, elected officials and stakeholders.

Where are watersheds at risk of hydrologic, chemical, and biological impairment?

Studies have shown that streams in catchments with more than 10% impervious surface coverage are often impaired.

* *Accumulated Percent Impervious Cover by Catchment using Version 1 of the 2017 High-Resolution Land Use*

LUMM Indicators

County, Place/Township, NHD catchment, and Riparian Area (100-ft buffer):

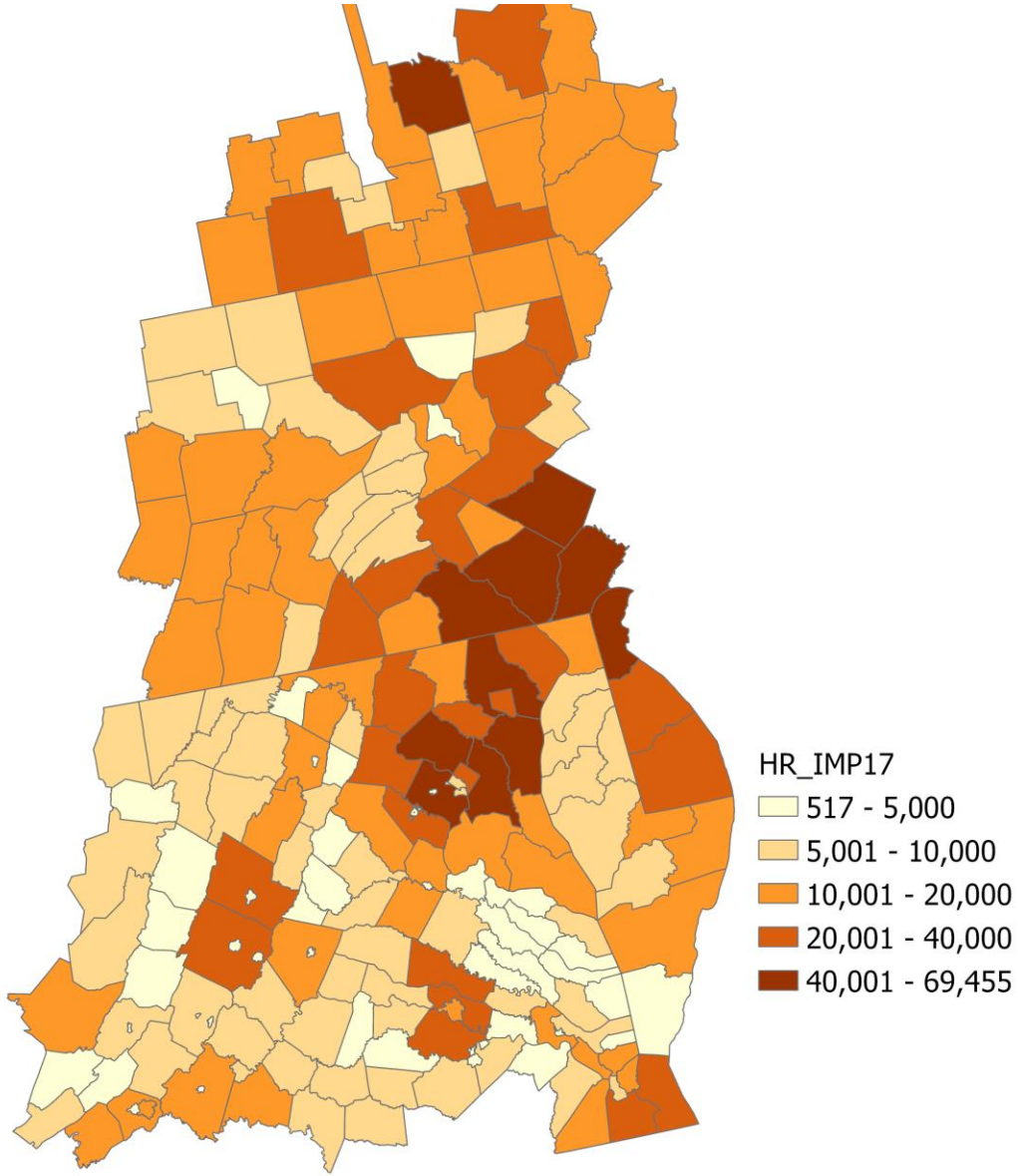
- Impervious surfaces (% and change)
- Natural lands (% and change)
- Agricultural lands (% and change)

TBD Indicators:

- Effective impervious cover (% and change)
- Forest cover (% and change)
- Timber harvest and regrowth
- Urban tree canopy
- Residential and commercial development

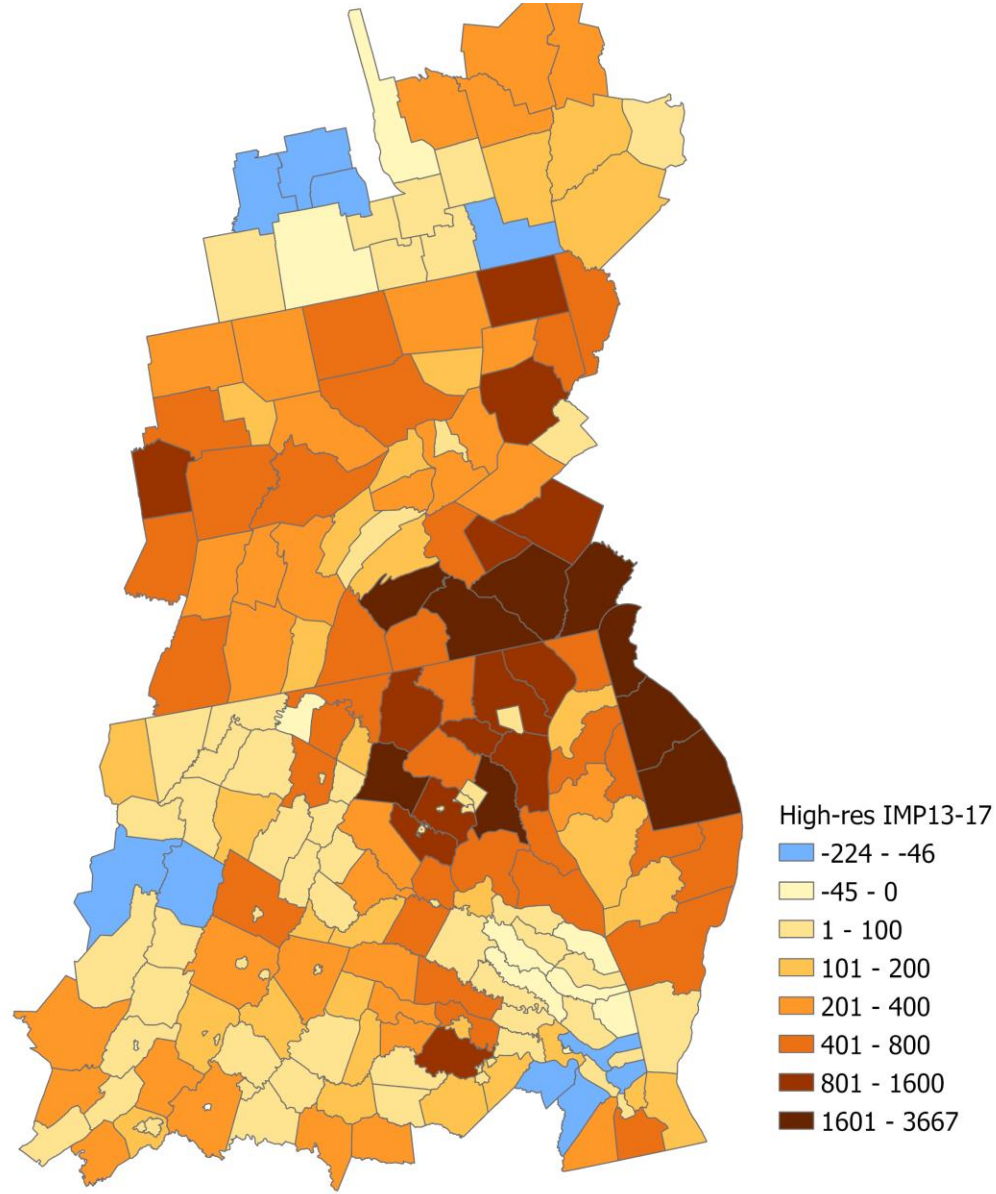
Metric: Total Impervious Area

How much impervious surface is there and where is it?



Metric: Impervious Area Change, 2013 - 2017

How is impervious surface growing and where?



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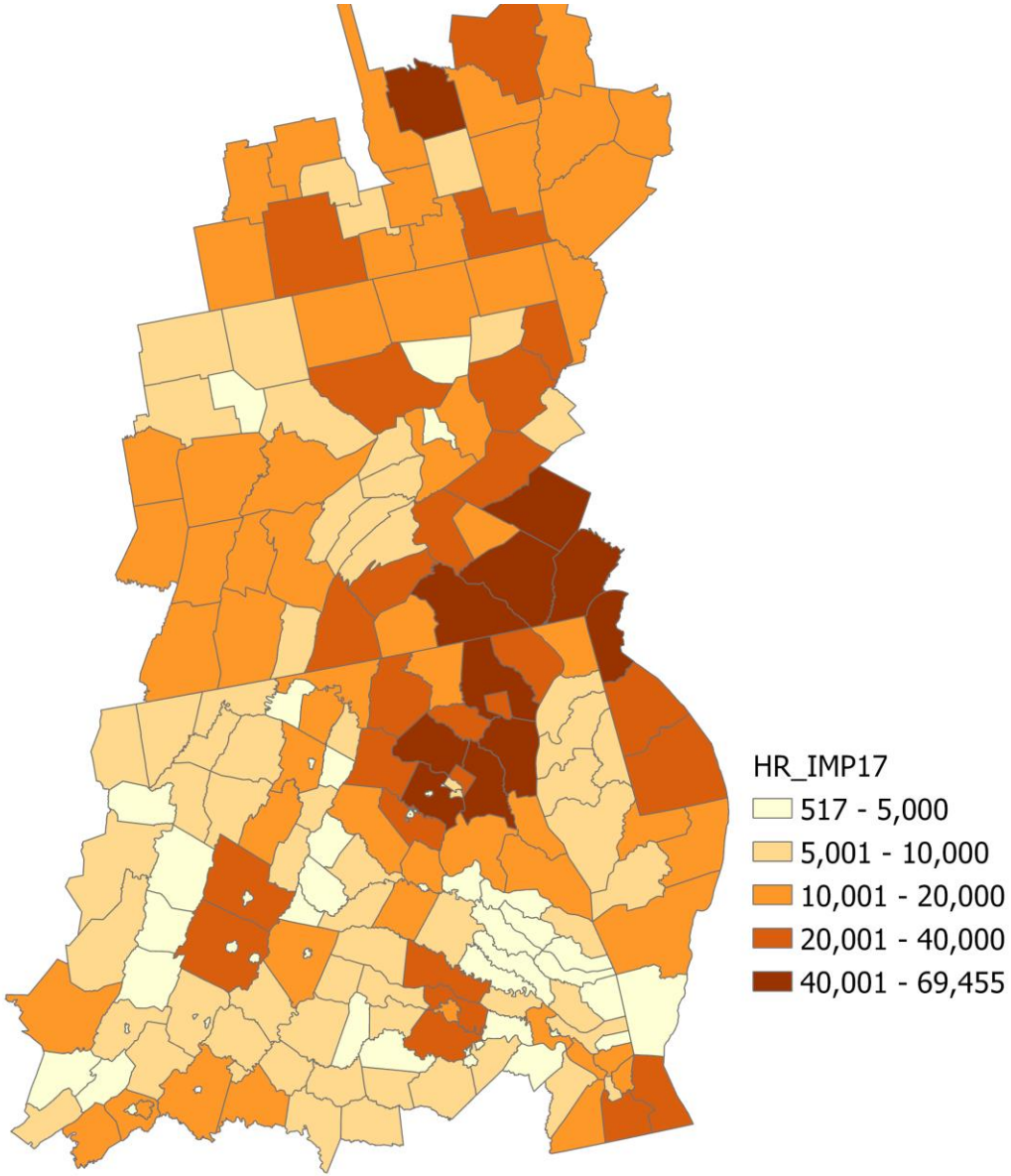
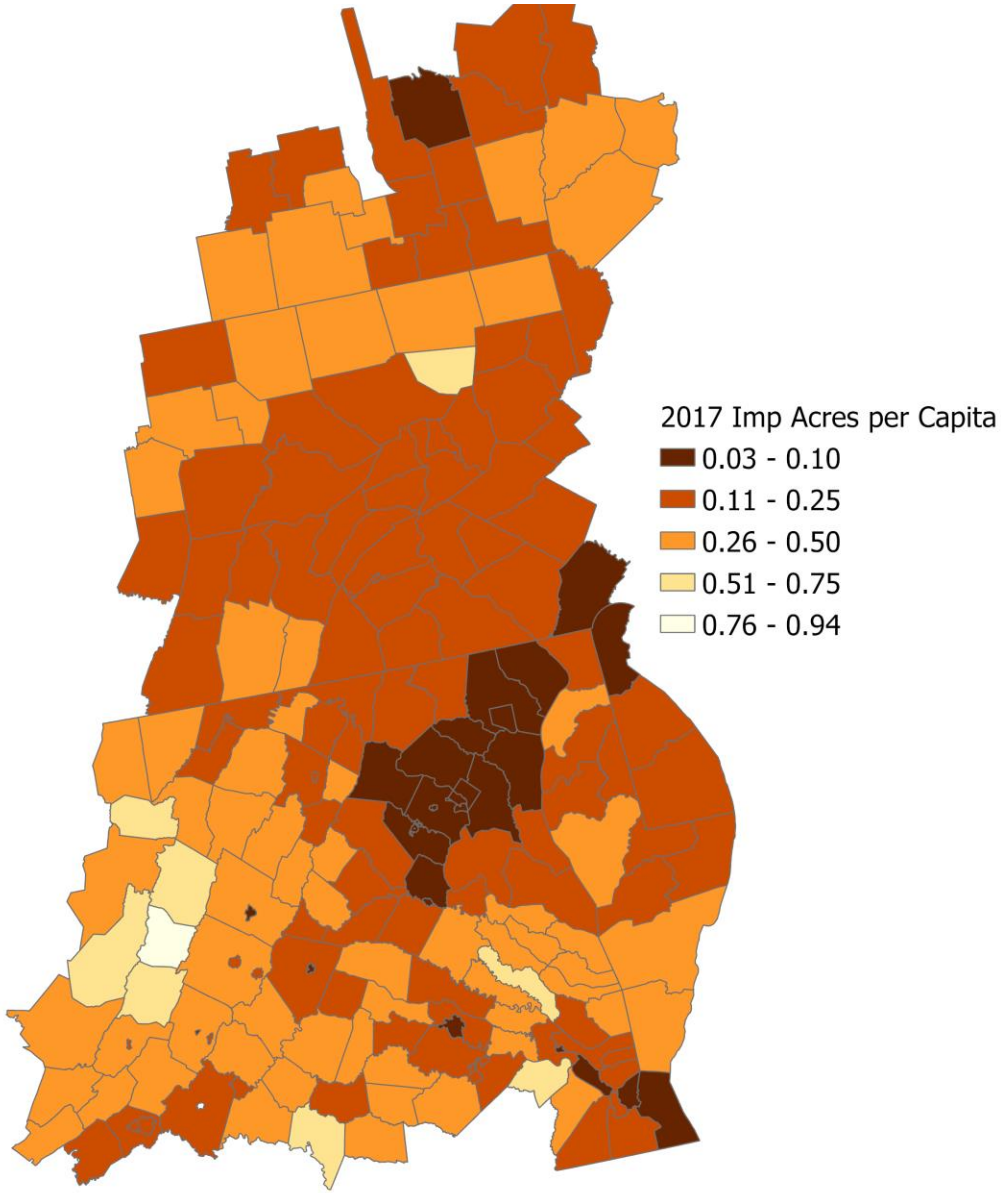
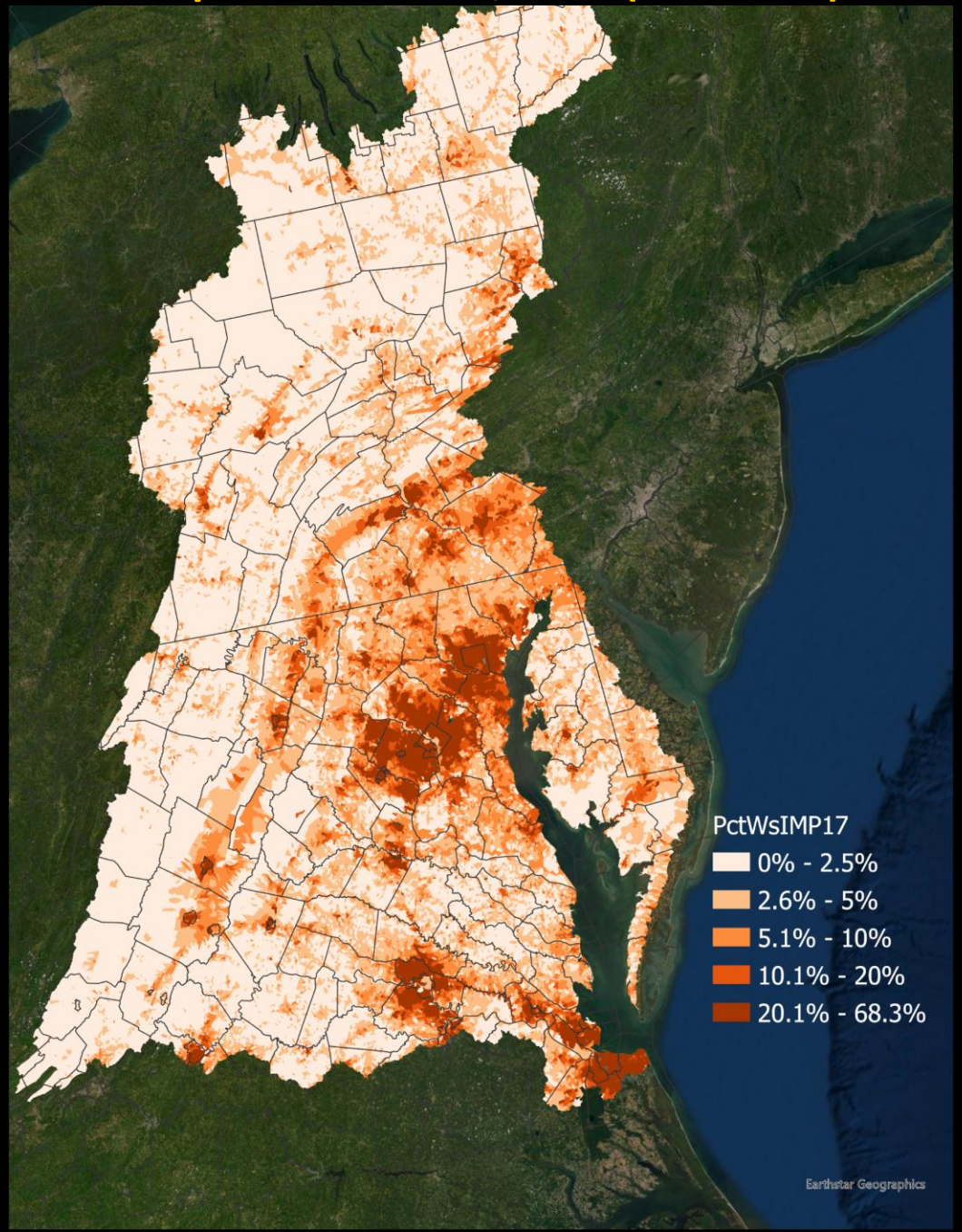


Metric: Impervious Area per Capita

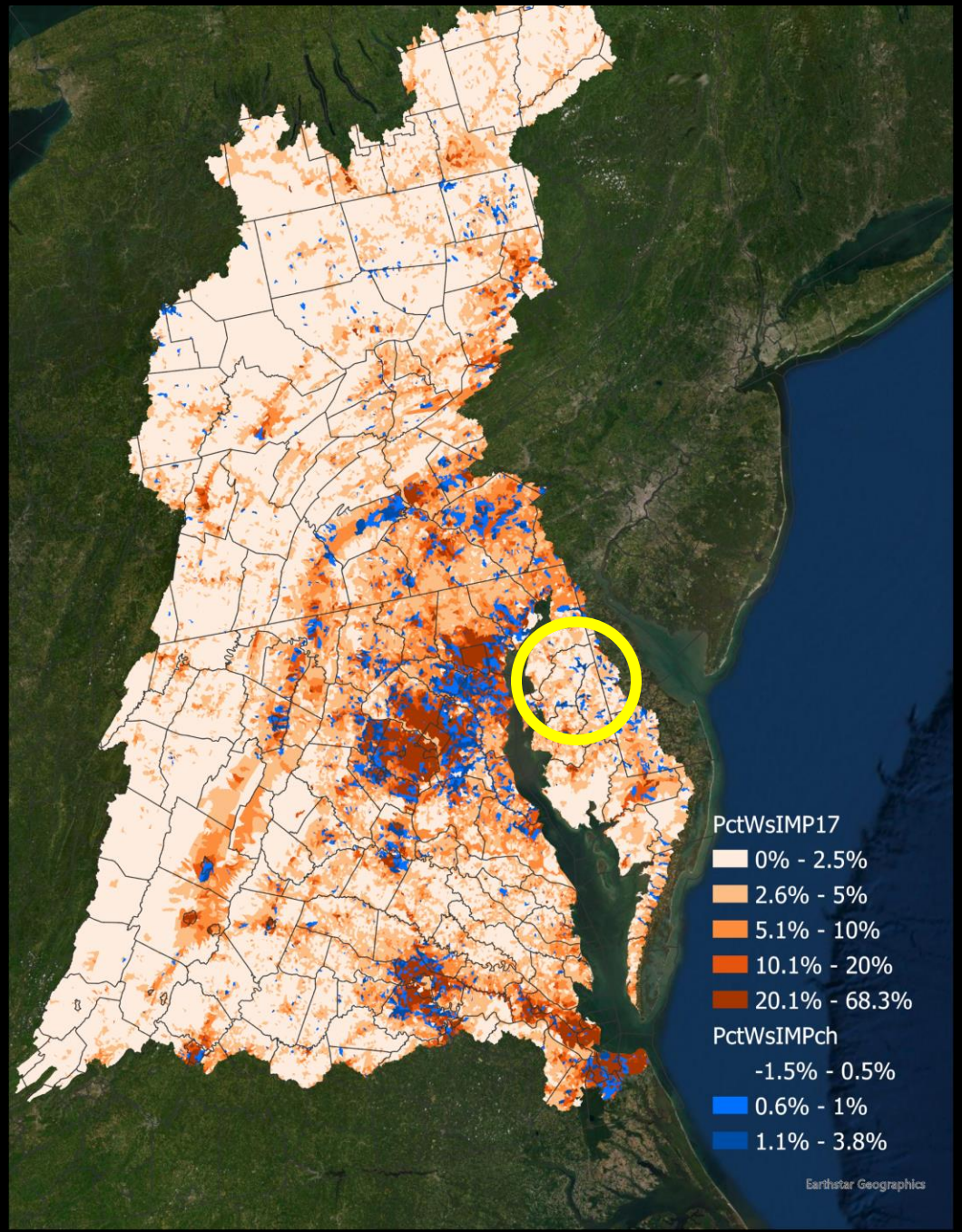
How concentrated/dense is development?

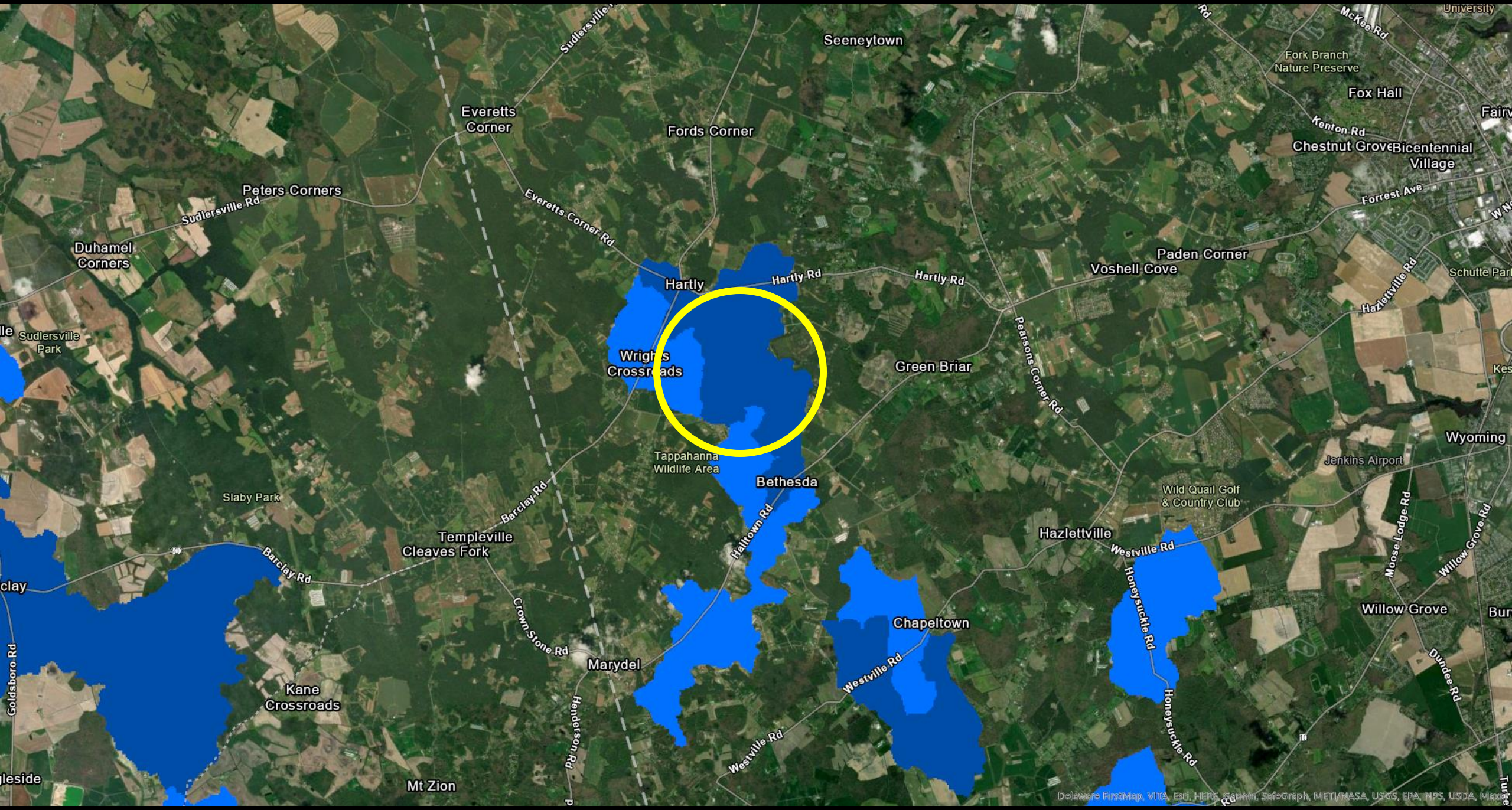


Impervious Cover, 2017 (accum. %)



Impervious Cover Change, 2013-17 (accum. %)




Seeneytown
Everetts Corner
Fords Corner
Fork Branch Nature Preserve
Fox Hall
Chestnut Grove
Bicentennial Village
Peters Corners
Sudlersville Rd
Everetts Corner Rd
Forrest Ave
Duhamel Corners
Hartly
Hartly Rd
Paden Corner
Voshell Cove
Hazlettville Rd
Sudlersville Park
Wrights Crossroads
Green Briar
Pearsons Corner Rd
Tappahanna Wildlife Area
Bethesda
Wyoming
Jenkins Airport
Slaby Park
Barclay Rd
Templeville
Cleaves Fork
Halltown Rd
Wild Quail Golf & Country Club
Hazlettville
Westville Rd
Honeysuckle Rd
Moose Lodge Rd
Willow Grove Rd
Willow Grove
Chapeltown
Crown Stone Rd
Marydel
Goldsboro Rd
Kane Crossroads
Henderson Rd
Dundee Rd
Mt Zion
Delaware FirstMap, VITA, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA

Land Use Change Viewer

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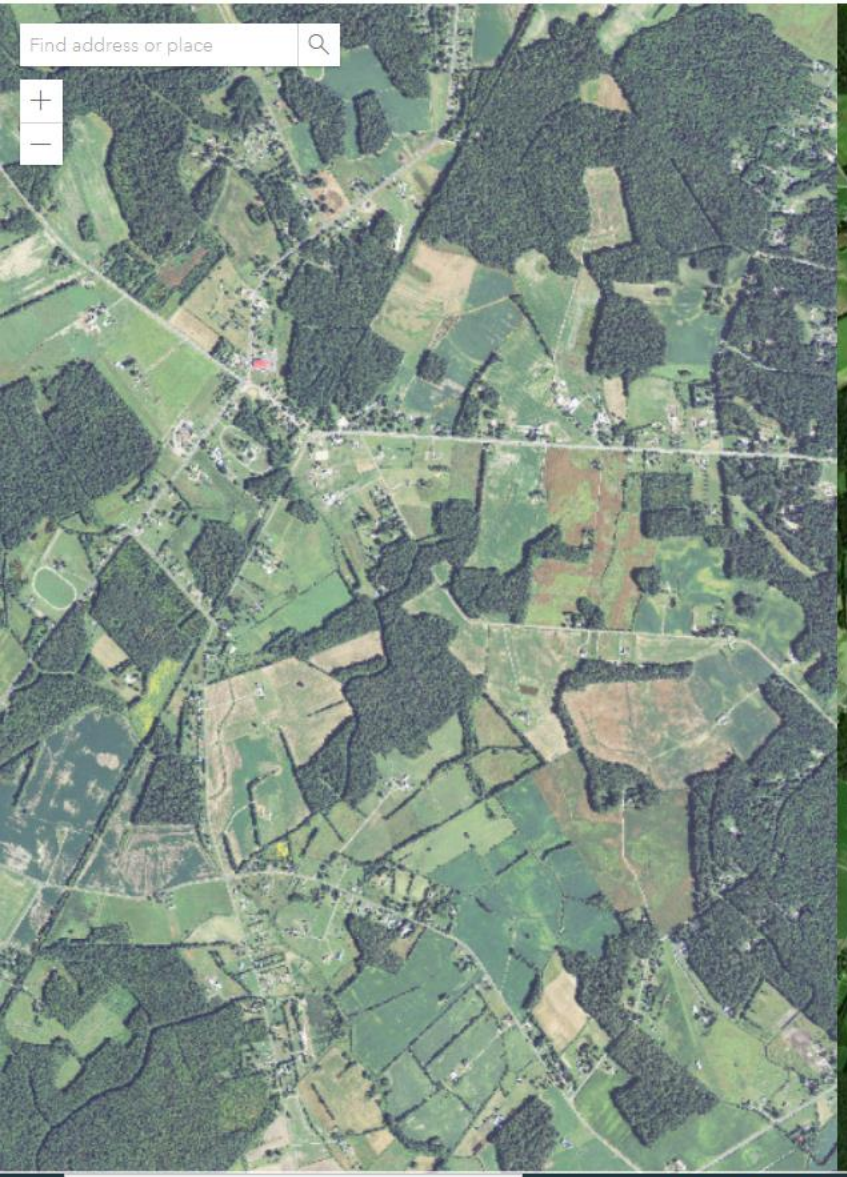
NAIP 2013/2014

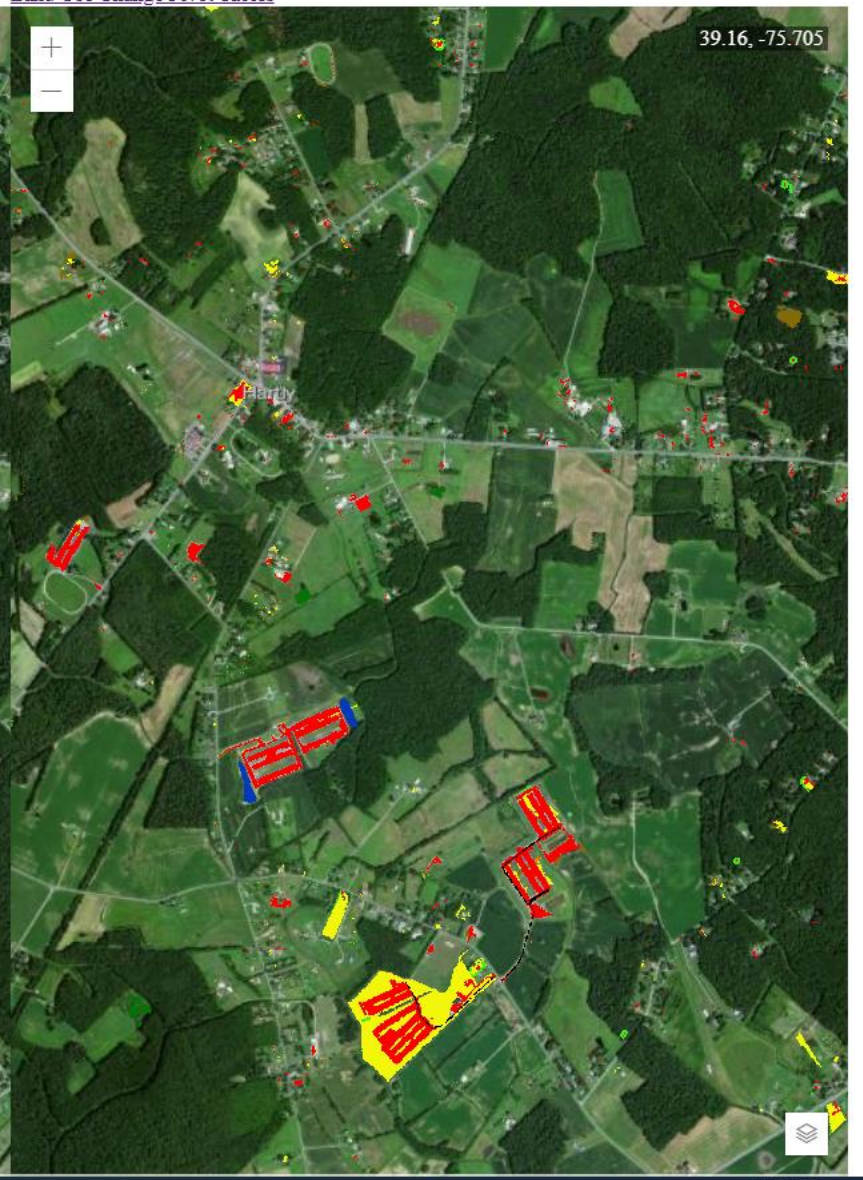
NAIP 2017/2018

Version 1 Land Use Change

NAIP 2017/2018

Land Use Change Pivot Tables





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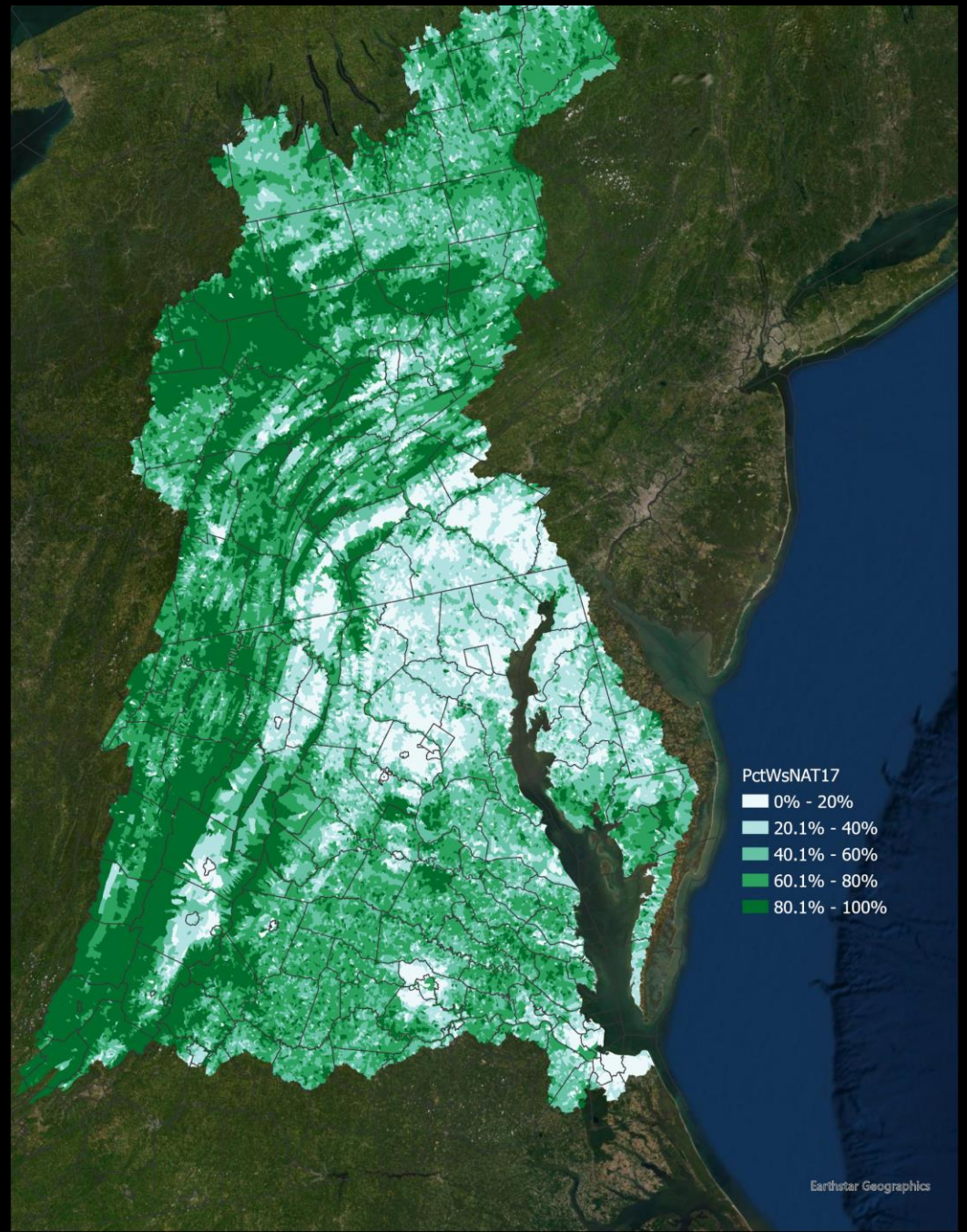
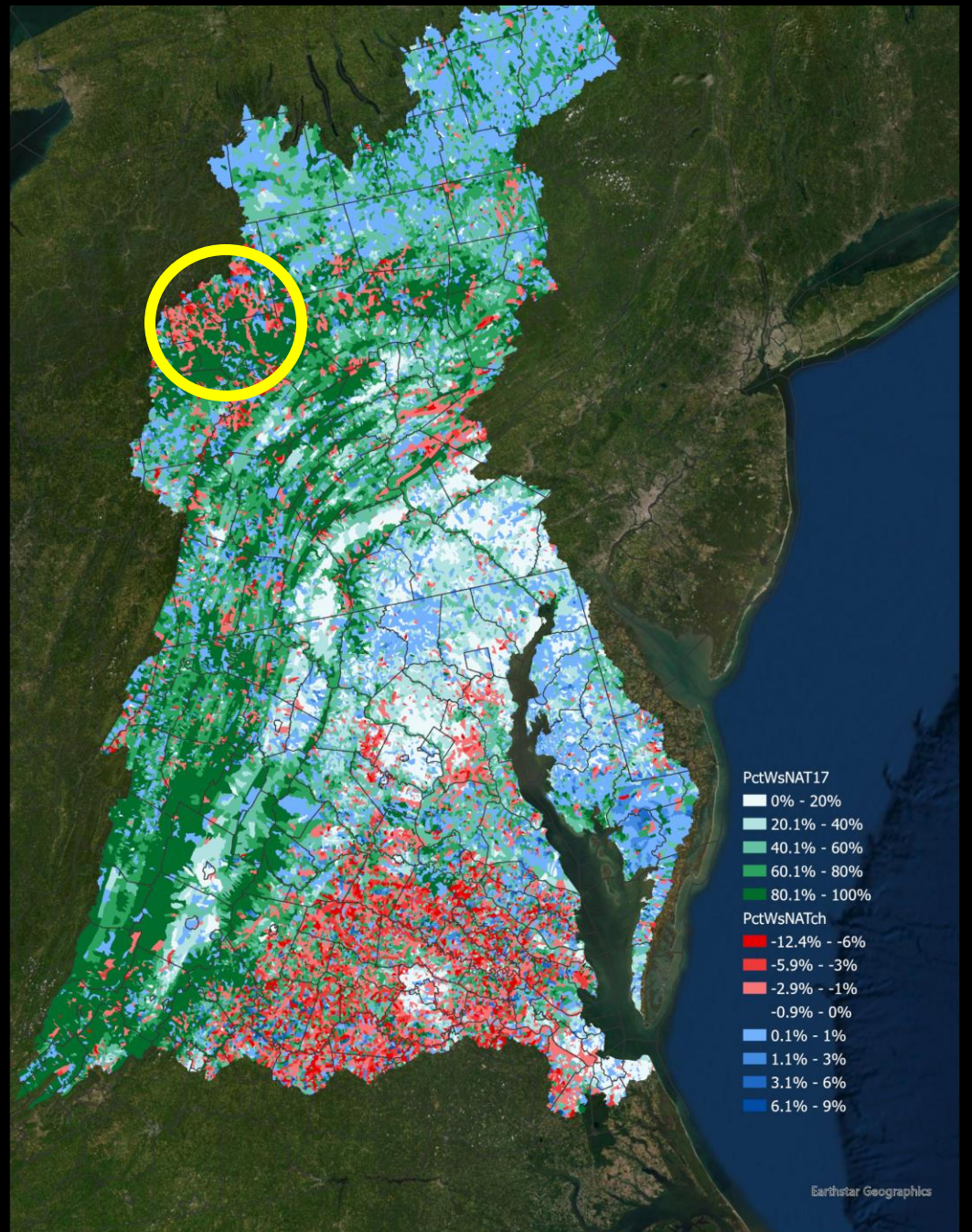
12/13/2021

Natural Cover, 2017 (accum. %)



Natural Cover Change, 2013-17 (accum. %)



2013 2017 Land Use Change, 2013-17

LUMM Indicators

County, Place/Township, NHD catchment:

- Impervious surfaces (% and change)
- Natural lands (% and change)
- Agricultural lands (% and change)

TBD Indicators:

- Effective impervious cover (% and change)
- Forest cover (% and change)
- Timber harvest and regrowth
- Urban tree canopy
- Residential and commercial development

CBP Land Use/Cover Classification (60 classes, final version)

1. Water (9)
- 1.1 Lentic
  - 1.1.1 Estuary (tidal)
  - 1.1.2 Lakes & Ponds (non wetlands)
- 1.2 Lotic
  - 1.2.1 Channels (TBD)
    - 1.2.1.1 Open Channel
    - 1.2.1.2 Tree Canopy over Channel
    - 1.2.1.3 Culverted
  - 1.2.2.Ditches (TBD)
    - 1.2.2.1 Open Ditch
    - 1.2.2.2 Tree Canopy over Ditch
    - 1.2.2.3 Culverted
- 1.3 Other Water

2. Developed (12)
- 2.1 Impervious
  - 2.1.1 Roads
  - 2.1.2 Structures
  - 2.1.3 Other Impervious (Parking lots, driveways)
  - 2.1.4 Tree Canopy (TC) over Impervious
    - 2.1.4.1 TC over Roads
    - 2.1.4.2 TC over Structures
    - 2.1.4.3 TC over Other Impervious
- 2.2 Pervious
  - 2.2.1 Turf Grass
  - 2.2.2 Bare Developed
  - 2.2.3 Suspended Succession (rights-of-way)
    - 2.2.3.1 Barren
    - 2.2.3.2 Herbaceous
    - 2.2.3.3 Scrub-shrub
  - 2.2.4 Tree Canopy over Turf Grass

3. Forest (7)
- 3.1 Forest (>= 1 acre, 240-ft width)
- 3.2 Other Tree Canopy
- 3.3 Harvested Forest (<= 3 years)
  - 3.3.1 Barren
  - 3.3.2 Herbaceous
- 3.4 Natural Succession (> 3 years)
  - 3.4.1 Barren
  - 3.4.2 Herbaceous
  - 3.4.3 Scrub-shrub

4. Production (16)
- 4.1 Agriculture
  - 4.1.1 Cropland
    - 4.1.1.1 Barren
    - 4.1.1.2 Herbaceous
  - 4.1.2 Pasture
    - 4.1.2.1 Barren
    - 4.1.2.2 Herbaceous
  - 4.1.3 Orchard/vineyard
    - 4.1.3.1 Barren
    - 4.1.3.2 Herbaceous
    - 4.1.3.3 Scrub-shrub
  - 4.1.4 Animal Operations (TBD)
    - 4.1.4.1 Impervious
    - 4.1.4.2 Barren
    - 4.1.4.3 Herbaceous
- 4.2 Solar fields
  - 4.2.1 Impervious
  - 4.2.2 Pervious
    - 4.2.2.1 Barren
    - 4.2.2.2 Herbaceous
    - 4.2.2.3 Scrub-shrub
- 4.3 Extractive (active mines)
  - 4.3.1 Barren
  - 4.3.2 Impervious

5. Wetlands and Water Margins (16)
- 5.1 Tidal
  - 5.1.1 Barren
  - 5.1.2 Herbaceous
  - 5.1.3 Scrub-shrub
  - 5.1.4 Tree Canopy
  - 5.1.5 Forest
- 5.2 Riverine (Non-tidal)
  - 5.2.1. Barren
  - 5.2.2 Herbaceous
  - 5.2.3 Scrub-shrub
  - 5.2.4 Tree Canopy
  - 5.2.5 Forest
  - 5.2.6 Ponds
- 5.3 Terrene/Isolated (Non-tidal)
  - 5.3.1 Barren
  - 5.3.2 Herbaceous
  - 5.3.3 Scrub-shrub
  - 5.3.4 Tree Canopy
  - 5.3.5 Forest
  - 5.3.6 Ponds
- 5.4 Bare shore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