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Chesapeake Bay Watershed Land Cover, Land Use, and Hydrography: The Next Generation

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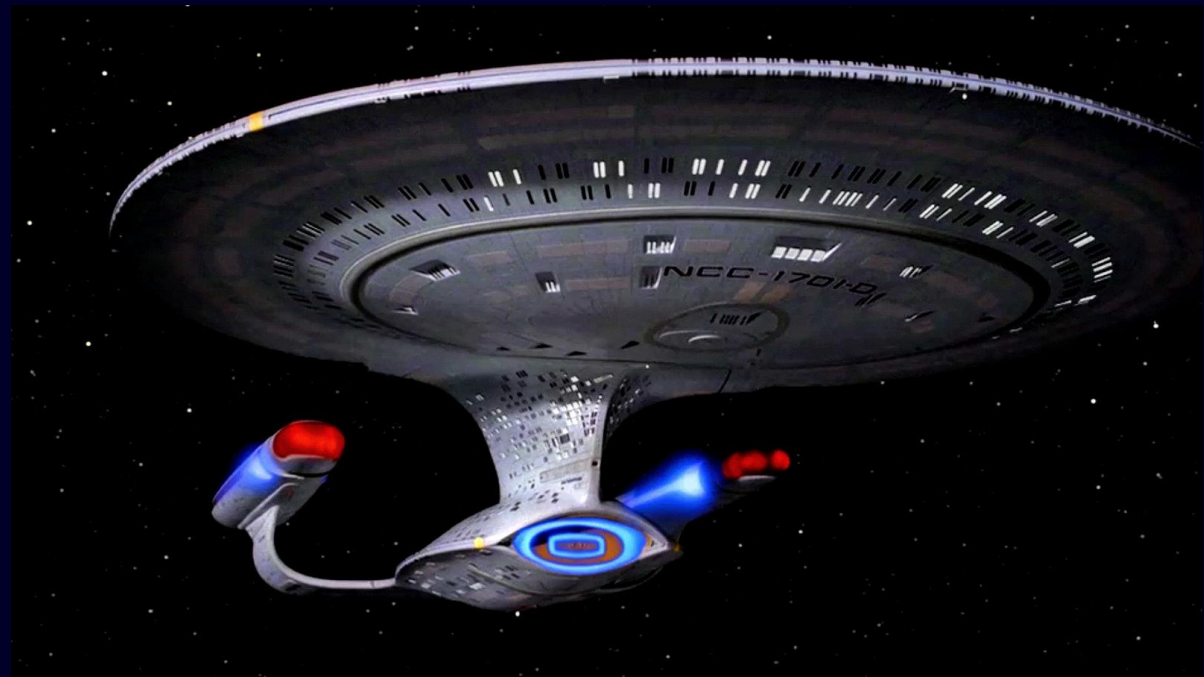
U.S. Geological Survey

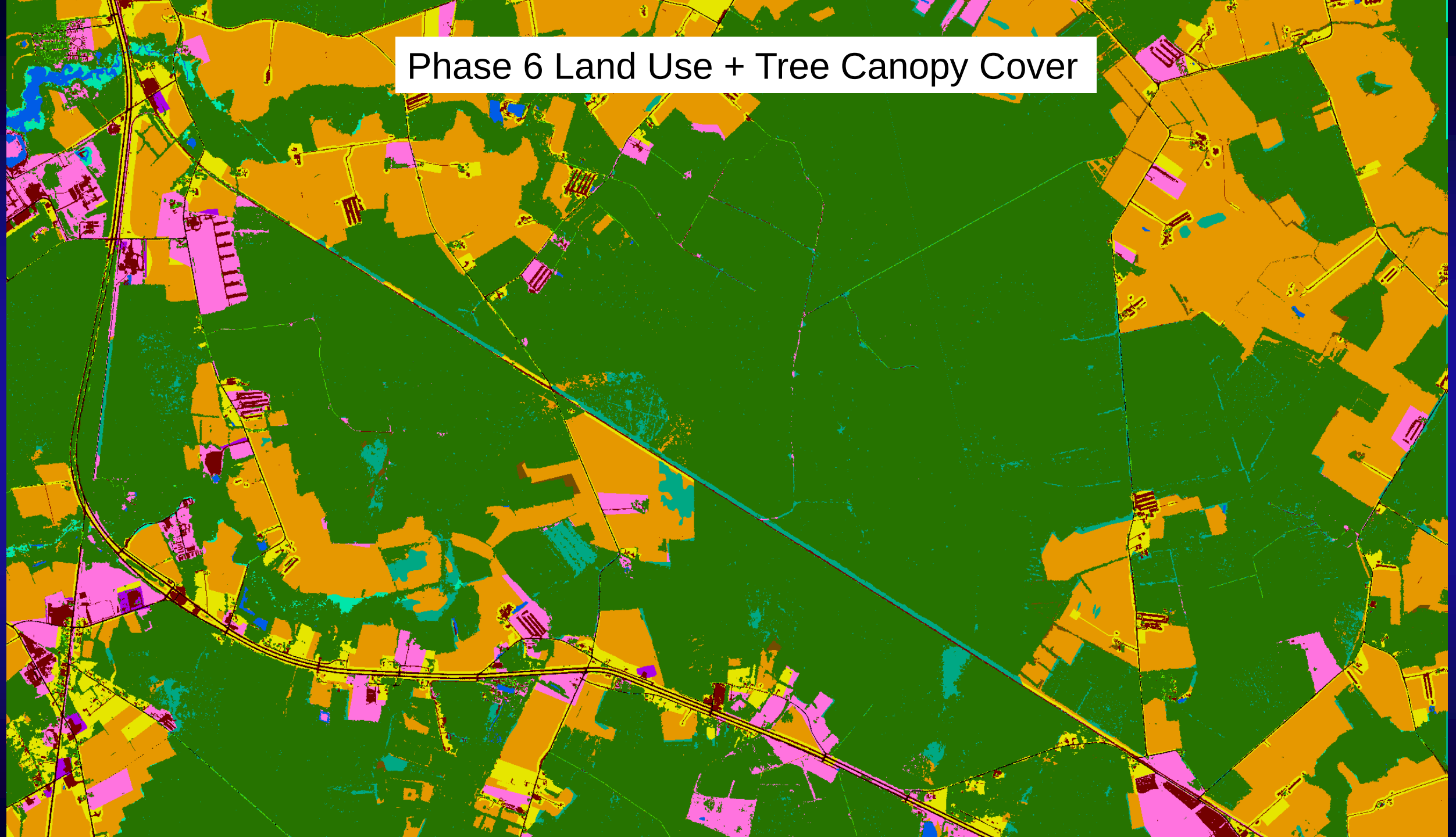
March 23, 2020
CBP Water Quality Goal Implementation Team Call



U.S. Department of the Interior
U.S. Geological Survey

Why Revise CBP Land Uses?

- Differentiate daylighted vs shaded streams, important for evaluating healthy watersheds supporting cold-water fisheries.
- Preserve all land cover information within the land use dataset.
- Improve mapping of floodplain and tidal wetland zones.
- Correct over-estimation of agricultural land and turf grass in some counties.
- Correct for errors associated with class confusion (e.g., solar fields and impervious cover, fragmented forests and mixed open).


Phase 6 Land Use + Tree Canopy Cover

National Hydrography Dataset- High Resolution (24K)

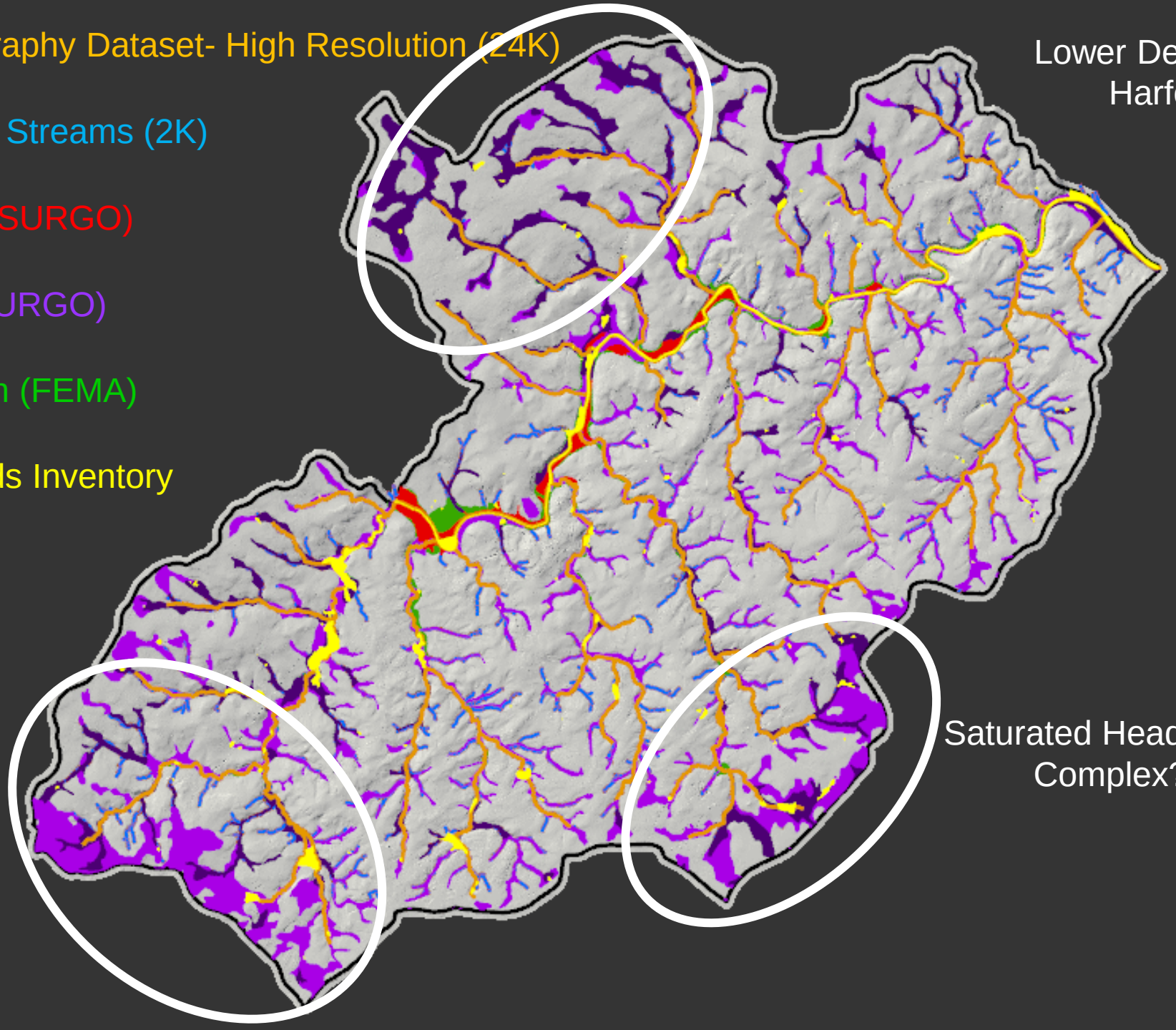
Hyper-resolution Streams (2K)

Flooded Soils (SSURGO)

Hydric Soils (SSURGO)

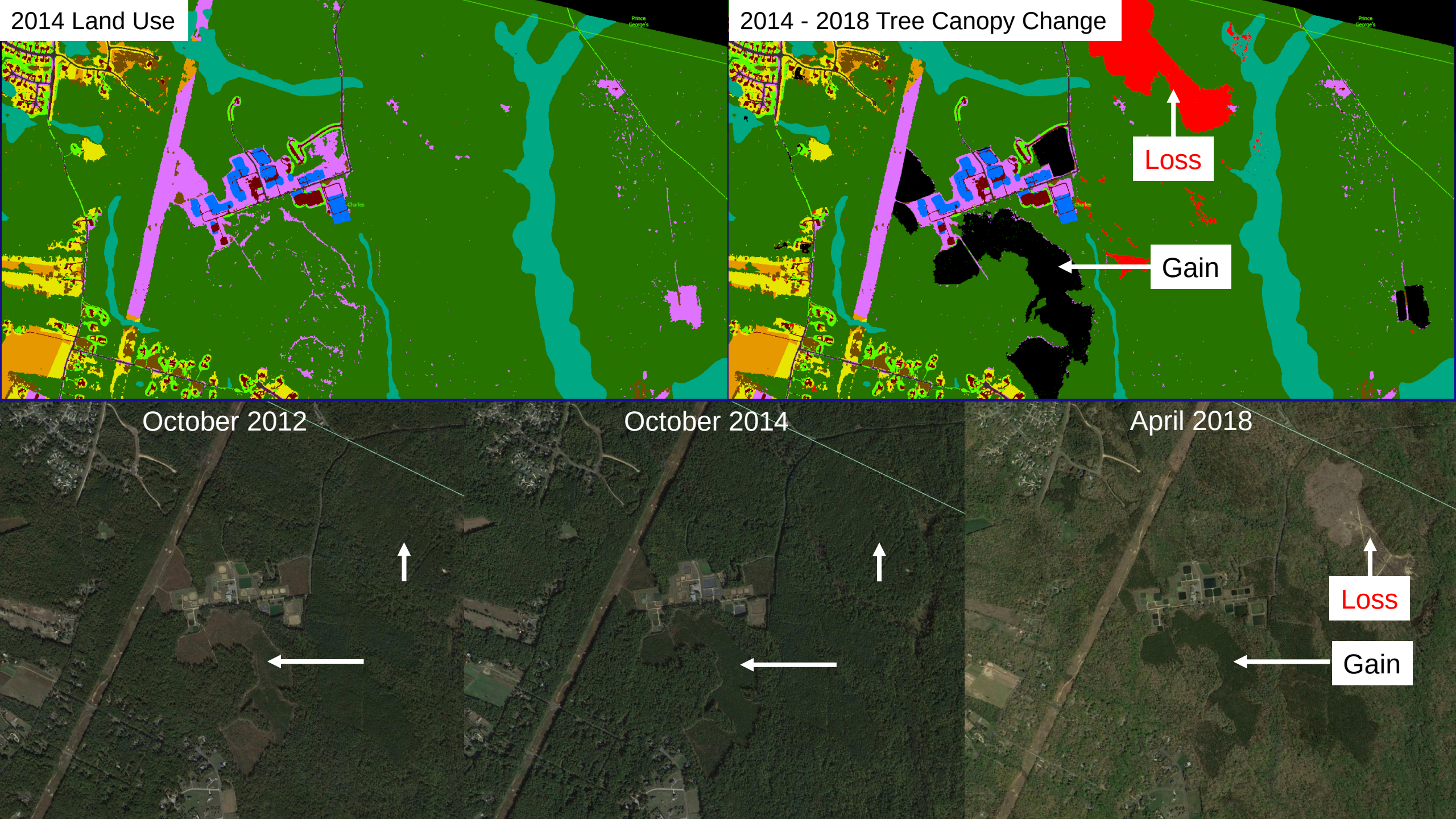
100-yr Floodplain (FEMA)

National Wetlands Inventory



Lower Deer Creek Watershed
Harford County, MD

Saturated Headwater Complex?


2014 Land Use
2014 - 2018 Tree Canopy Change
Loss
Gain
October 2012
October 2014
April 2018
Loss
Gain

Tree Canopy Change in Two Suburban Counties

Prince George's County: 2014 - 2018

TC Loss (7,673 acres):

- 59% of loss change occurred within forest or wetlands
- 41% of loss occurred in developed areas

TC Gain (518 acres):

- 16% of gain occurred within forest or wetlands
  - shrub/scrub; edge of forest
- 54% of gain occurred in developed areas
- 29% of gain occurred on agricultural lands

Anne Arundel County: 2014 - 2018

TC Loss (2,544 acres):

- 57% of loss change occurred within forest or wetlands
- 42% of loss occurred in developed areas

TC Gain (188 acres):

- 9% of gain occurred within forest or wetlands
  - shrub/scrub; edge of forest
- 55% of gain occurred in developed areas
- 35% of gain occurred on agricultural lands

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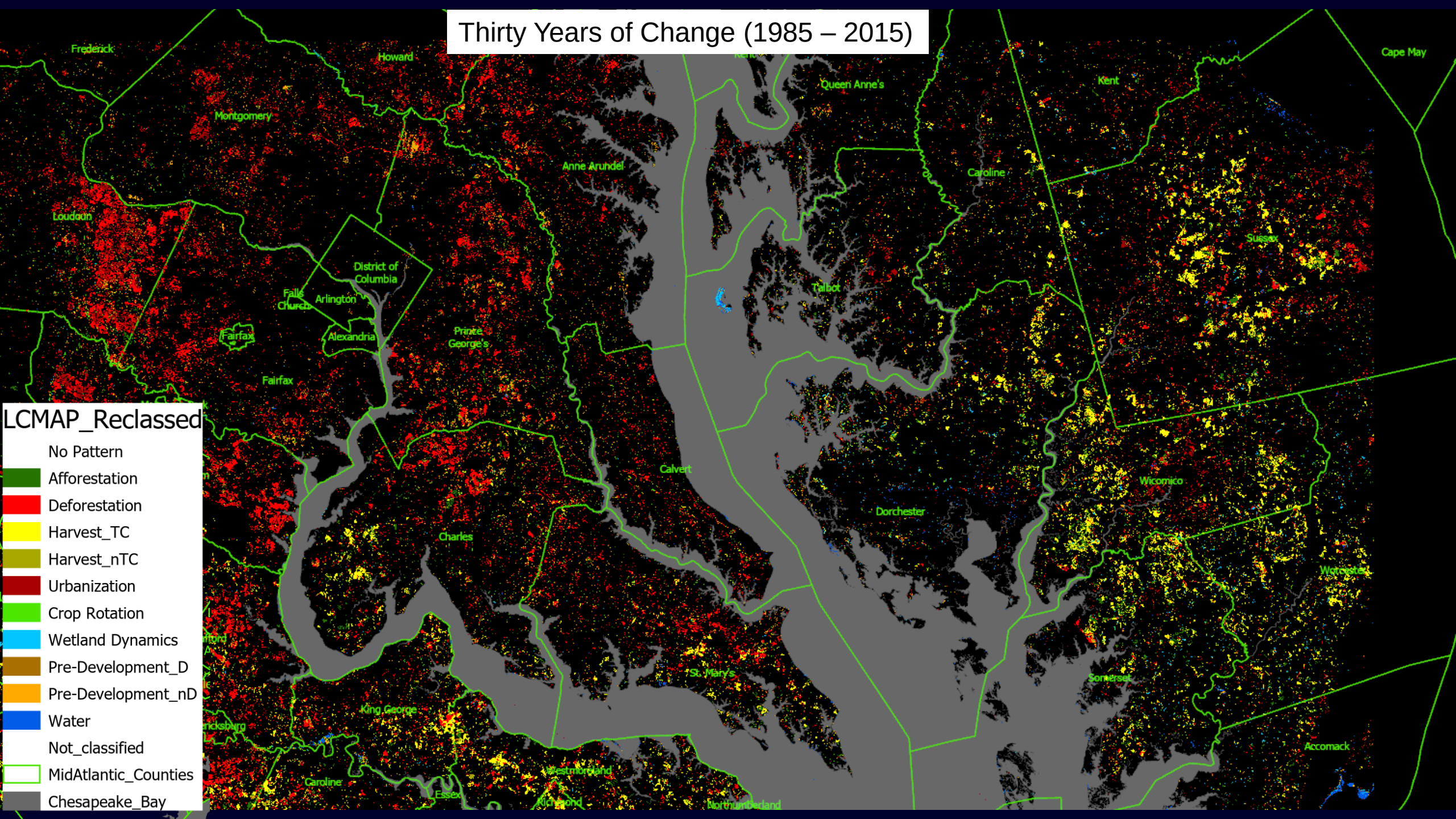
Thirty Years of Change (1985 – 2015)



Land Use Overlays*

Existing

- Federal Lands
- MS4 Areas
- Sewer Service Areas
- FEMA Floodplains (HAZUS)
- Frequently Flooded Soils (gSSURGO)
- National Wetlands Inventory
- State Wetlands Inventories
- Cropland (Cropland Data Layer)
- Pasture (Cropland Data Layer)
- Parcels
- Land Use (County/City/State)
- Surface Mines
- Landfills
- Roads

Proposed (new)

- Deciduous Trees (from land cover)
- Evergreen Trees (from land cover)
- Ground Elevation (1m, LiDAR DEM)
- Ground Elevation (1m, LiDAR DTM)
- Surface Elevation (1m, LiDAR DSM)
- Classified Point Cloud (normalized to the ground)
- Height (normalized DSM to ground elevation)
- Intensity (1m, LiDAR)
- Compound Topographic Index (3m, LiDAR)
- Poultry Houses (USGS polygons- for DelMarVA)
- Solar fields (points from VA-DEQ, other?)
- Center-Pivot Irrigated Fields (DE)
- Historical Land Cover Change (1985 – 2017; USGS-LCMAP)
- Agricultural business addresses (ESRI)
- Transmission Lines (TBD)
- Buildings (Microsoft)
- Marine/ Lentic/ Lotic shore

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* Overlays represent ancillary spatial data that are either used or could be used to inform the land use classification.

2013 Chesapeake Bay Watershed Land Cover/Use Data

1m Land Cover

- Water
- Wetlands
- Tree Canopy
- Scrub-shrub
- Low vegetation
- Barren
- Impervious (structures)
- Impervious (other)
- Roads
- Tree Canopy over Structures
- Tree Canopy over Impervious Other
- Tree Canopy over Roads

1m Land Use

- Impervious, Road
- Impervious, Non-Road
- Tree Canopy over Impervious
- Water
- Tidal Wetlands
- Floodplain Wetlands
- Other Wetlands
- Forest
- Tree Canopy over Turf
- Mixed Open
- Fractional Turf (small)
- Fractional Turf (med)
- Fractional Turf (large)
- Fractional Impervious
- Turf Grass
- Agriculture

10m Land Cover/Use

- Impervious Roads
- Impervious Non-Roads
- Tree Canopy Over Impervious
- Tree Canopy Over Turf Grass
- Turf Grass
- Forest
- Wetlands (Floodplain)
- Wetlands (Other)
- Wetlands (Tidal)
- Water
- Mixed Open
- Cropland
- Pasture

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Proposed Final CBP Land Use Classification

1. Water (7)
- 1.1 Lotic
  - 1.1.1 Estuary
  - 1.1.2 Lakes & Ponds
- 1.2 Lentic
  - 1.2.1 Streams
    - 1.2.1.1 Daylighted
    - 1.2.1.2 Shaded
    - 1.2.1.3 Buried
  - 1.2.2 Ditches
    - 1.2.2.1 Daylighted
    - 1.2.2.2 Shaded

2. Developed (13)
- 2.1 Infrastructure
  - 2.1.1 Roads
  - 2.1.2 Railroads
  - 2.1.3 Tree Canopy over Roads
  - 2.1.4 Structures
  - 2.1.5 Tree Canopy over Structures
  - 2.1.6 Other Impervious
  - 2.1.7 Tree Canopy over Other Impervious
  - 2.1.8 Utility Rights-of-Ways
    - 2.1.8.1 Barren
    - 2.1.8.2 Herbaceous
    - 2.1.8.3 Scrub-shrub
- 2.2 Bare Construction
- 2.3 Turf Grass
- 2.4 Tree Canopy over Turf Grass

3. Forest (5)
- 3.1 Contiguous (> 1 acre)
- 3.2 Fragmented (< 1 acre)
- 3.3 Natural Succession (e.g., Fallow)
  - 3.3.1 Barren
  - 3.3.2 Herbaceous
  - 3.3.3 Scrub-shrub

4.Production (14)
- 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
- 4.2 Timber Harvest
  - 4.2.1 Barren
  - 4.2.2 Herbaceous
  - 4.2.2 Scrub-shrub
- 4.3 Extractive
  - 4.3.1 Barren
  - 4.3.2 Herbaceous
  - 4.3.3 Scrub-shrub
- 4.4 Solar fields

5.Wetland (19)
- 5.1.Tidal
  - 5.1.1.Open water
  - 5.1.2.Barren
  - 5.1.3.Herbaceous
  - 5.1.4.Scrub-shrub
  - 5.1.5.Contiguous Forest
  - 5.1.6.Fragmented Forest
- 5.2.Non-tidal
  - 5.2.1.Floodplain/ Headwater
    - 5.2.1.1.Open water
    - 5.2.1.2.Barren
    - 5.2.1.3.Herbaceous
    - 5.2.1.4.Scrub-shrub
    - 5.2.1.5.Contiguous Forest
    - 5.2.1.6.Fragmented Forest
  - 5.2.2.Other
    - 5.2.2.1.Open water
    - 5.2.2.2.Barren
    - 5.2.2.3.Herbaceous
    - 5.2.2.4.Scrub-shrub
    - 5.2.2.5.Contiguous Forest
    - 5.2.2.6.Fragmented Forest
- 5.3. Bare shore

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