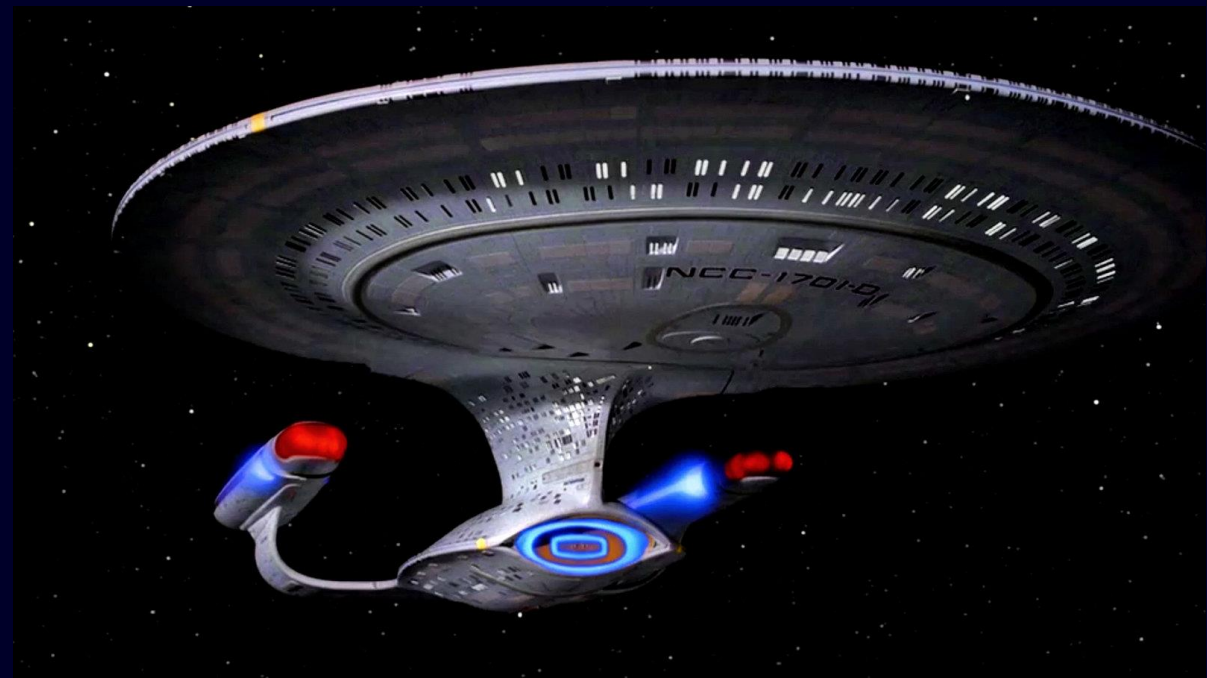# CHESAPEAKE BAY WATERSHED LAND COVER, LAND USE, AND HYDROGRAPHY: THE NEXT GENERATION

Peter Claggett, Research Geographer
U.S. Geological Survey

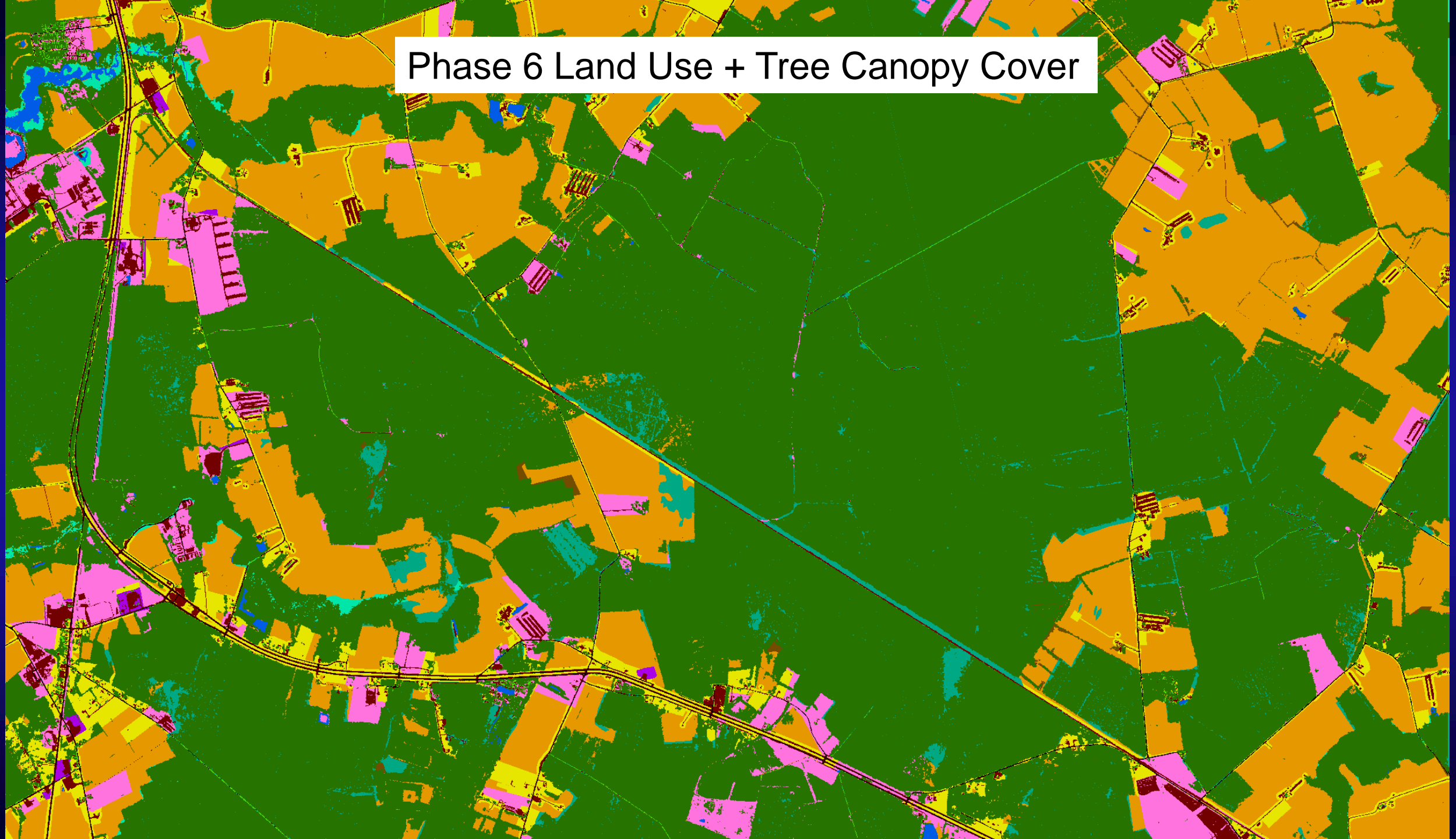April 9, 2020
CBP Management Board Meeting

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).

≋ USGS

Phase 6 Land Use + Tree Canopy Cover
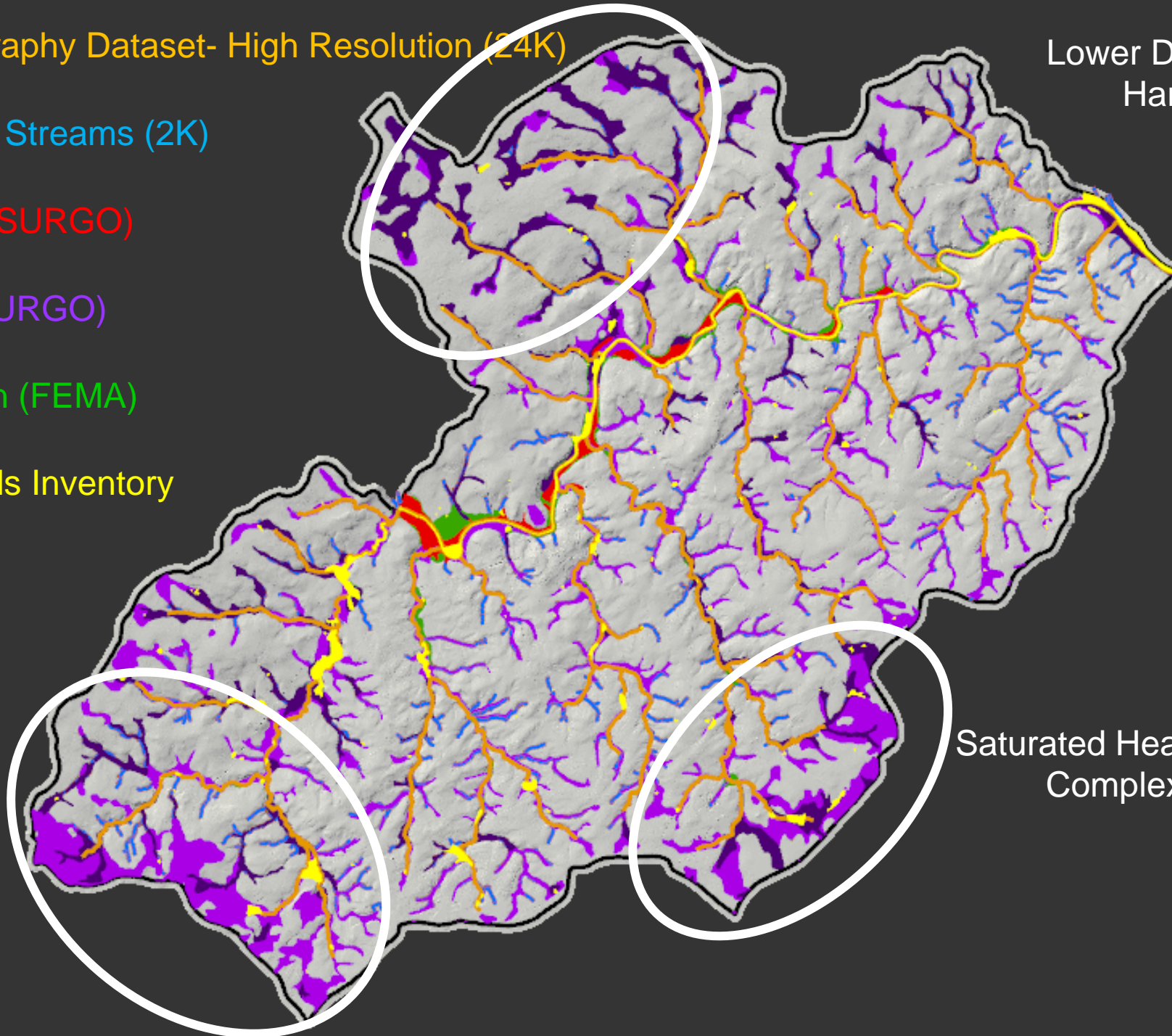
National Hydrography Dataset- High Resolution (24K)

Hyper-resolution Streams (2K)

Flooded Soils (SSURGO)

Hydric Soils (SSURGO)

100-yr Floodplain (FEMA)
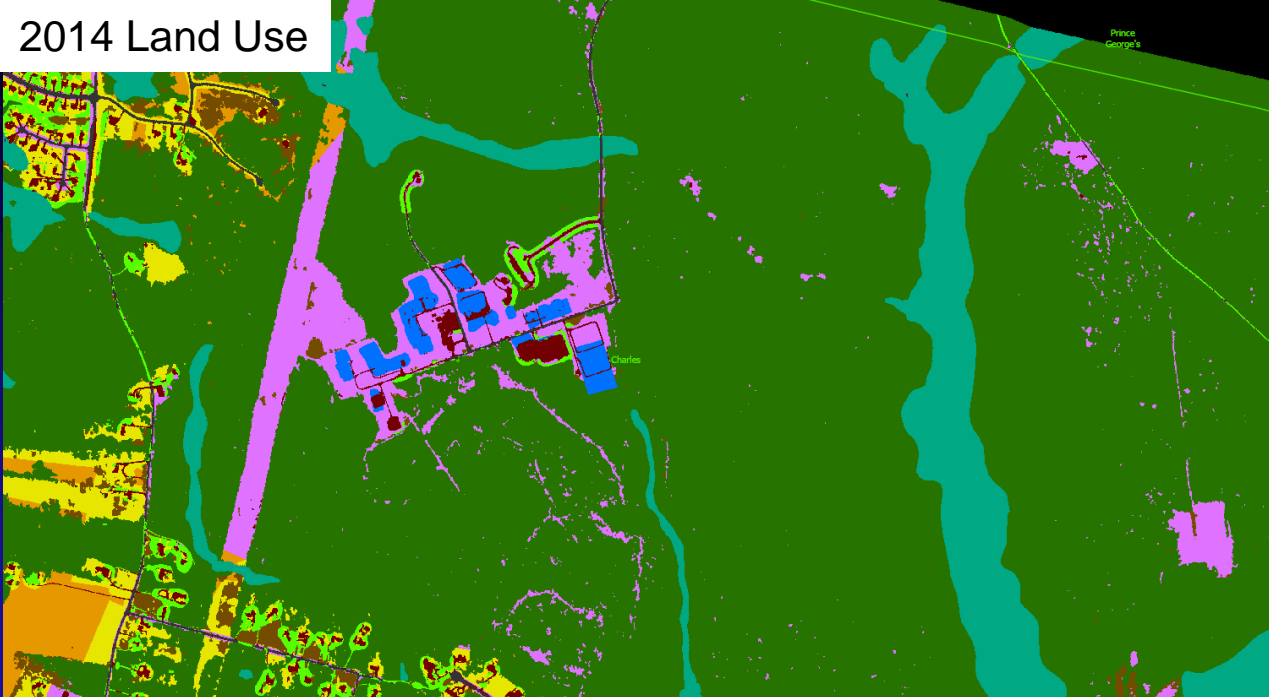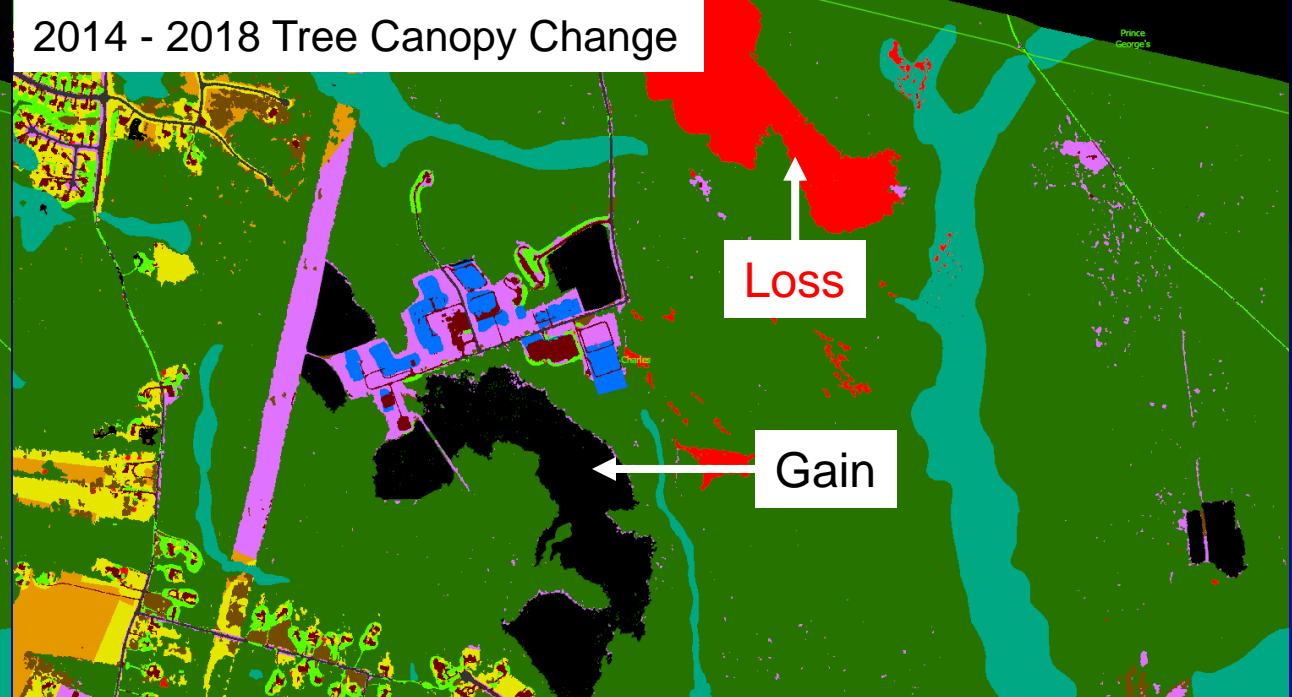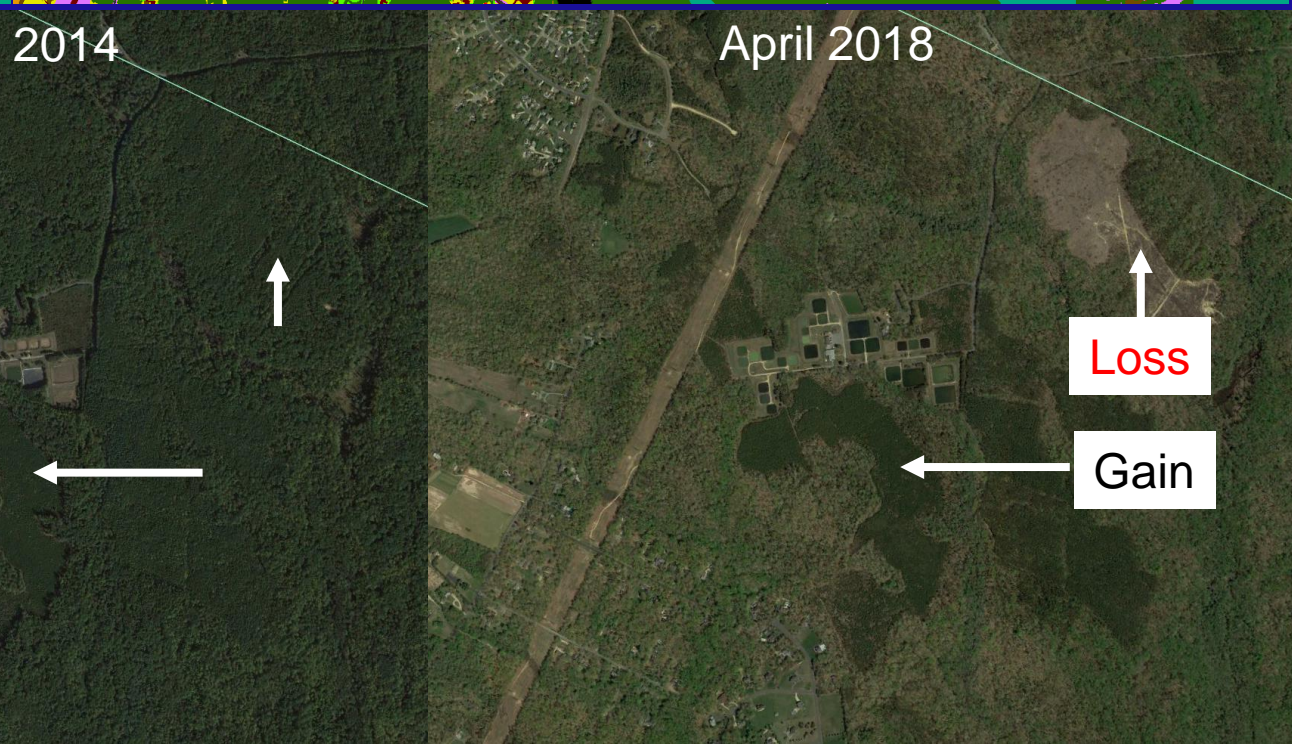
National Wetlands Inventory

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
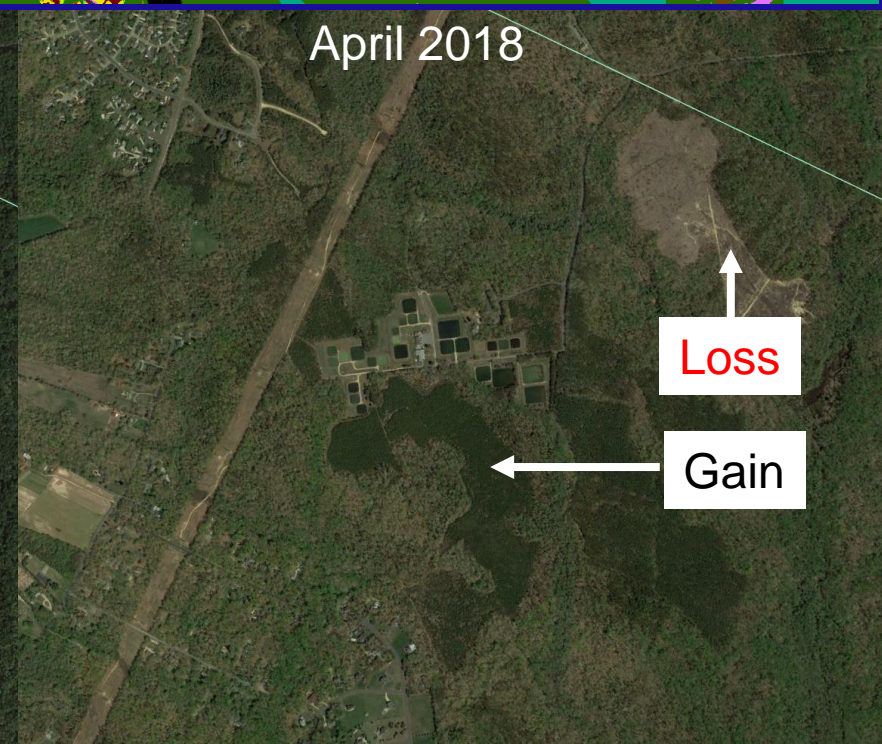
Loss

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

≋ USGS

Thirty Years of Change (1985 – 2015)

LCMAP_Reclassed

- No Pattern
- Afforestation
- Deforestation
- Harvest_TC
- Harvest_nTC
- Urbanization
- Crop Rotation
- Wetland Dynamics
- Pre-Development_D
- Pre-Development_nD
- Water
- Not_classified
- MidAtlantic_Counties
- Chesapeake_Bay
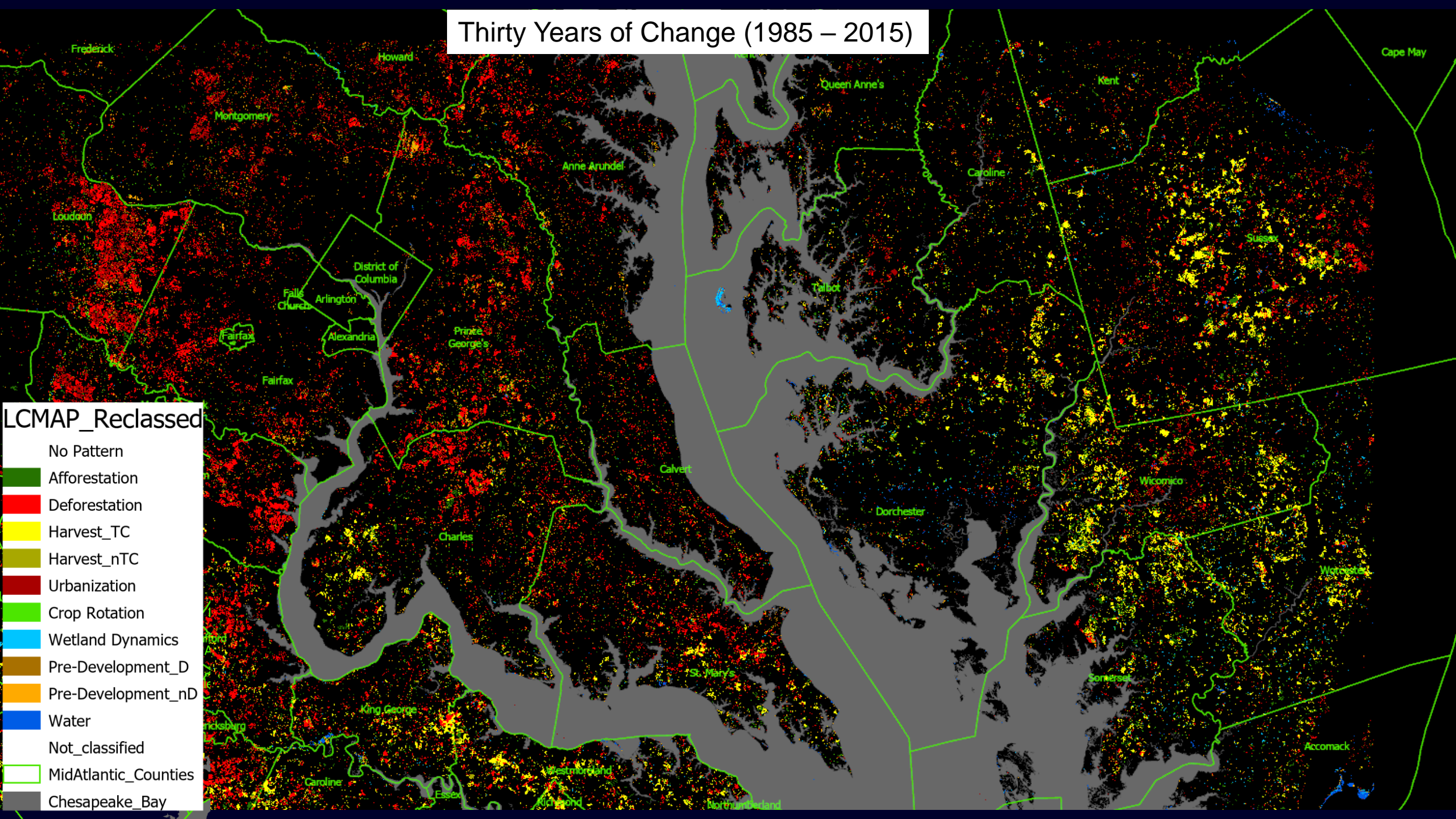
Land Use Overlays*

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)
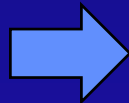- Ground Elevation (1m, LiDAR DTM)
- Surface Elevation (1m, LiDAR DSM)
- Classified Point Cloud (normalized to the ground)
- Height (normalized DSM to ground elevation)
- Intensity (1m, LiDAR)
- Compound Topographic Index (3m, LiDAR)
- Poultry Houses (USGS polygons- for DelMarVA)
- Solar fields (points 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

≋ USGS

* 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

Proposed New CBP Land Use Classification Scheme 03.19.2020

Phase 6 Land Use Perspective
(16 additional classes):

1. *Water (WAT; from 1 to 7 classes)*
    1. Lotic
        1. Estuary
        2. Lakes & Ponds
    2. Lentic
        1. Streams
            1. Daylighted
            2. Shaded
            3. Buried
        2. Ditches
            1. Daylighted
            2. Shaded

2. *Impervious, Roads (IR; no change)*

3. *Impervious, Non-Roads (INR; 2 to 4 classes)*
    1. Structures
    2. Other Impervious
    3. Solar fields
    4. Railroads

4. *Tree Canopy over Impervious (TCI; 1 to 2)*
    1. Tree Canopy over Structures
    2. Tree Canopy over Other Impervious

11. Mixed Open (1 to 7 classes)
    1. Natural Succession
    2. Timber Harvest
    3. Utility Rights-of-Ways
    4. Bare Construction
    5. Bare Shore
    6. Extractive
    7. Fragmented Forest (< 1 acre)

12. Cropland (CRP; 1 to 2 classes)
    1. Cropland
    2. Orchard/vineyard

13. Pasture (PAS; no change)

5. *Turf Grass (TG; no change)*

6. *Tree Canopy over Turf Grass (TCT; no change)*

7. *Forest (FORE; change in name only)*
    1. Contiguous (> 1 acre)

8. *Tidal Wetland (WLT; updated tidal zone overlay)*

9. *Non-Tidal Floodplain Wetland (WLF; updated floodplain overlay to include headwaters)*

10. *Non-Tidal Other Wetlands (WLO; no change)*

≋ **USGS**

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

USGS