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Chesapeake Bay Watershed Wetland Land Use: The Next Generation

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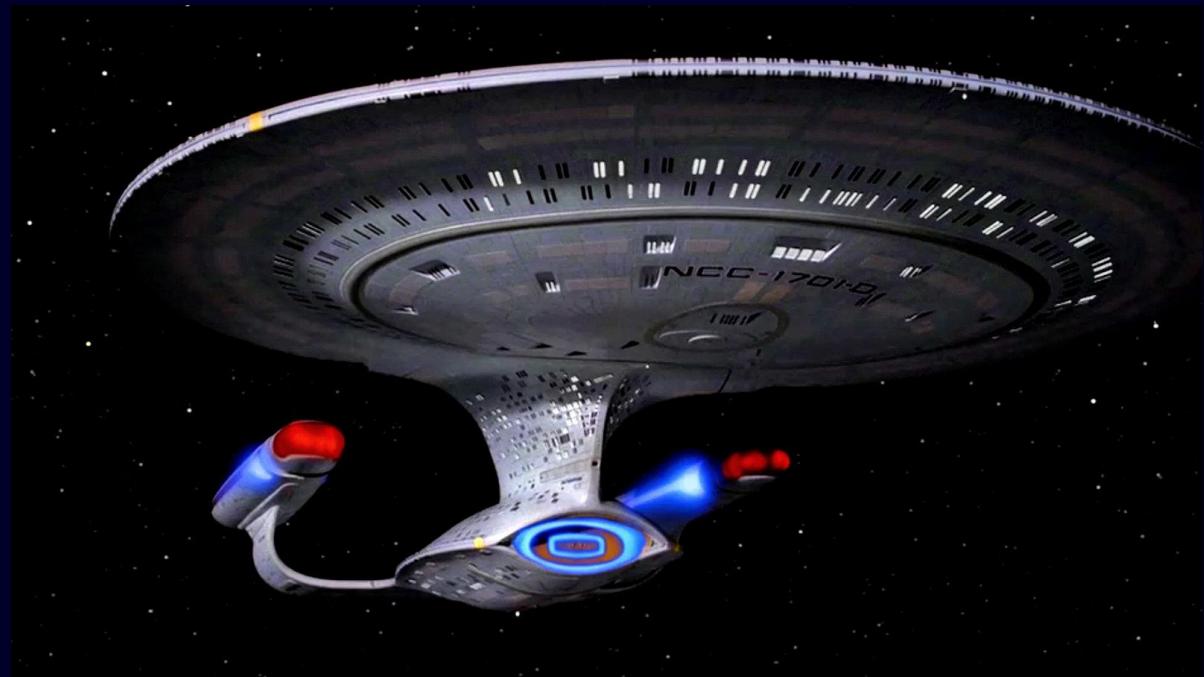
CBP Land Use Workgroup

March 2, 2020
Wetlands Workgroup Meeting



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

Why Update Water and Wetland Land Uses?

Because, current Phase 6 land use fails to:

- Differentiate daylighted vs shaded streams, important for evaluating healthy watersheds supporting cold-water fisheries.
- Differentiate forested from non-forested wetlands making the land use data unusable for forest cover and forest habitat assessments.
- Sufficiently map the extent of floodplains extending into headwater areas
- Account for spatial connectivity to tidal waters
- Represent all classes in the National Wetlands Inventory

Proposed Final CBP Land Use Classification

1. Water (4)
- 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 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 (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 (WLO)
    - 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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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)
- Tidal/Estuarine Zone
- 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.

Proposed New Water and Wetland Land Uses

Current Land Uses:

- Water
- Tidal Wetlands
- Non-Tidal Floodplain Wetlands
- Non-Tidal Other Wetlands

Proposed land uses will **NOT** change nutrient and sediment loading rates nor impact WIPs or other Bay TMDL commitments.

Proposed land uses **CAN** inform local inventories of BMP opportunities, spatial targeting of BMPs, and the next-generation of hydrologic models used by the CBP Partners.

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

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

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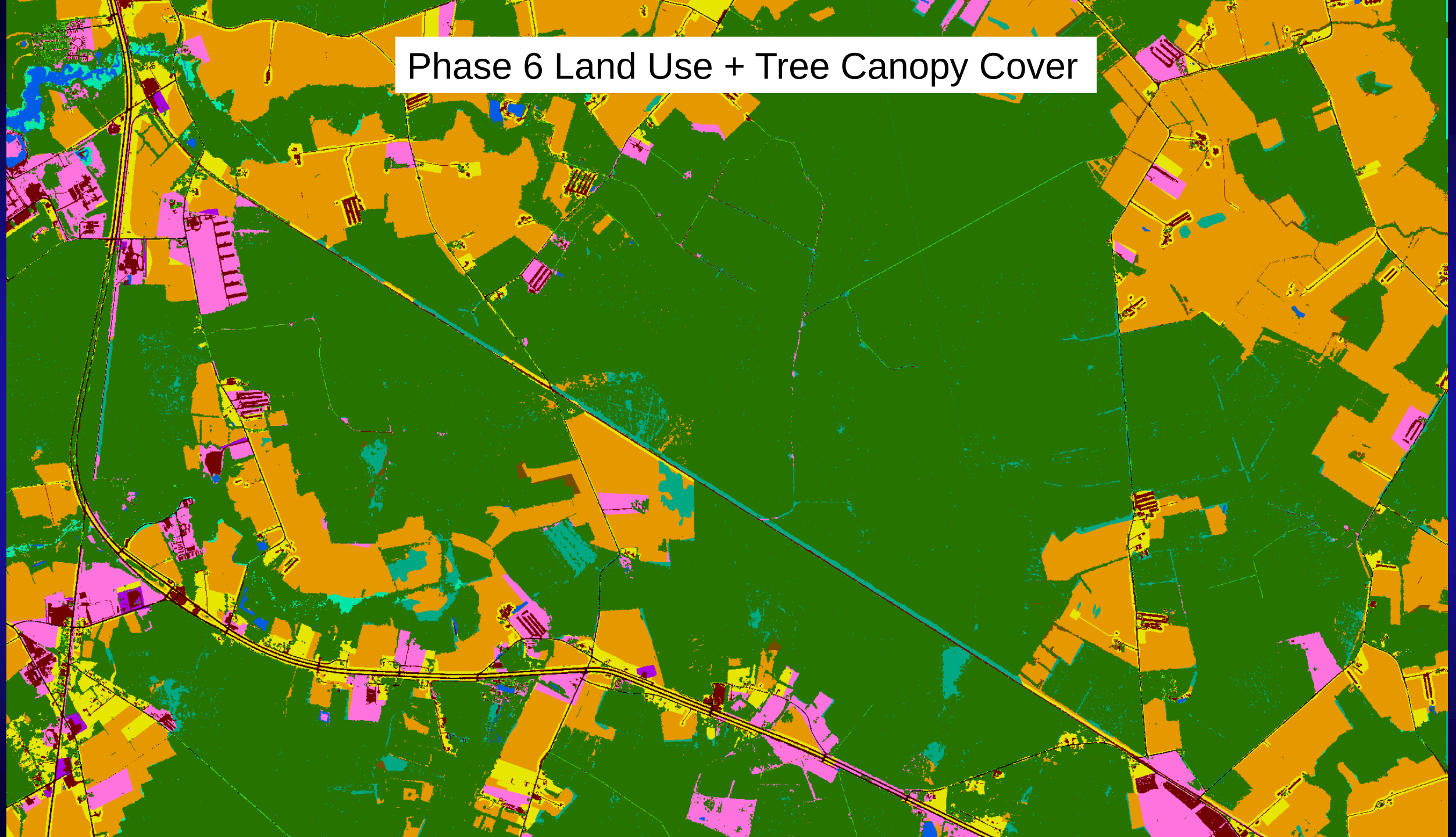
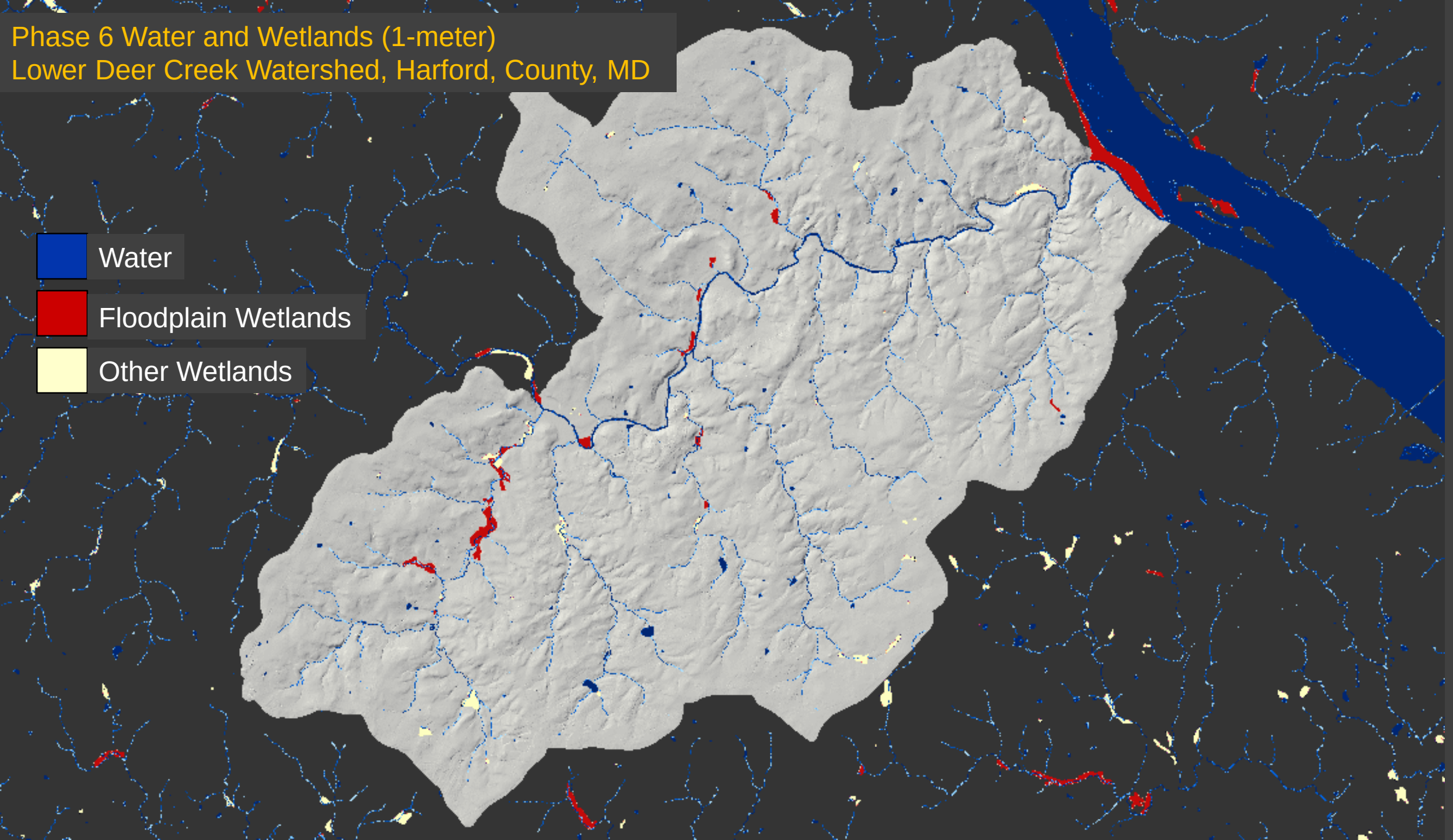
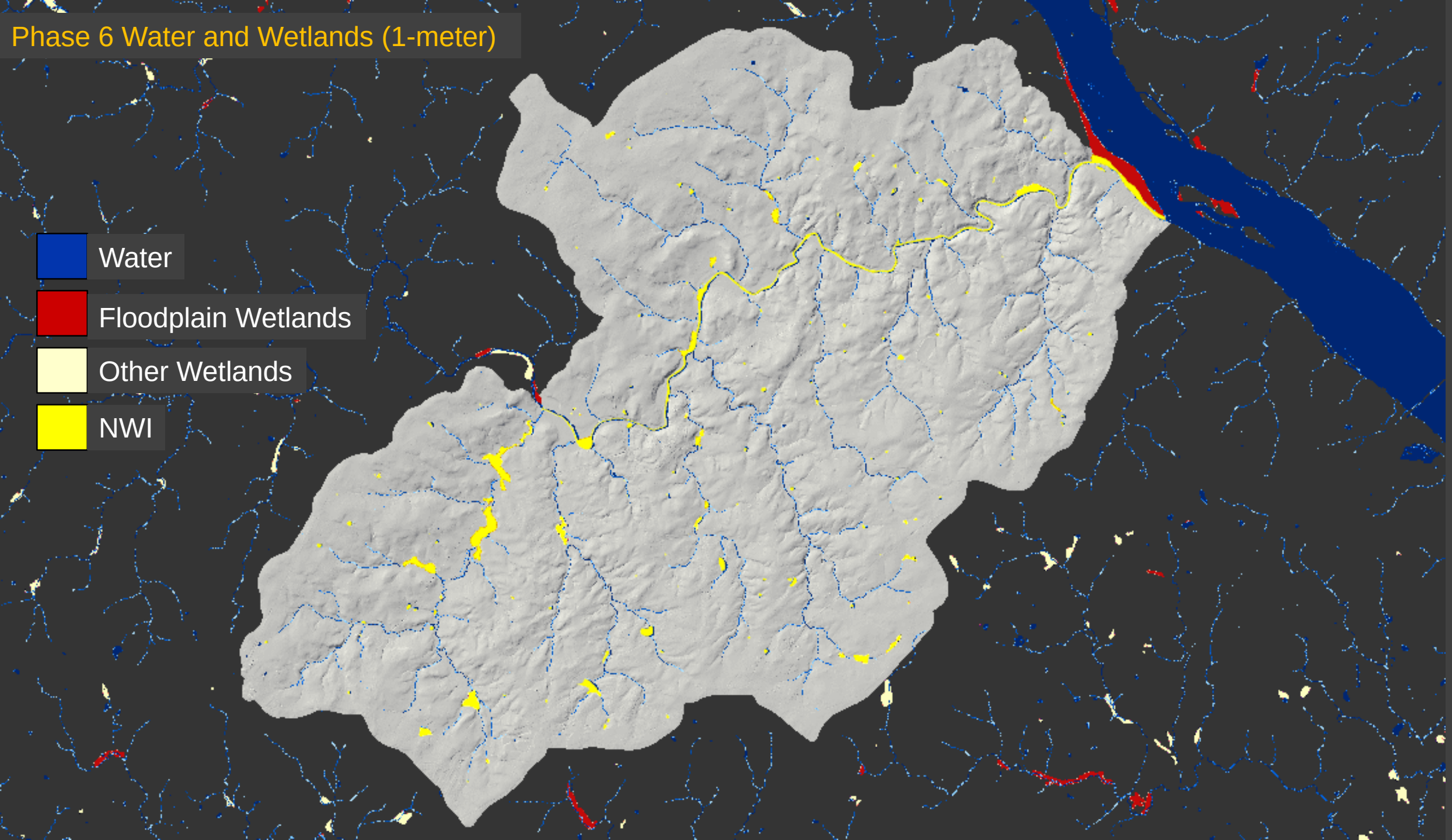
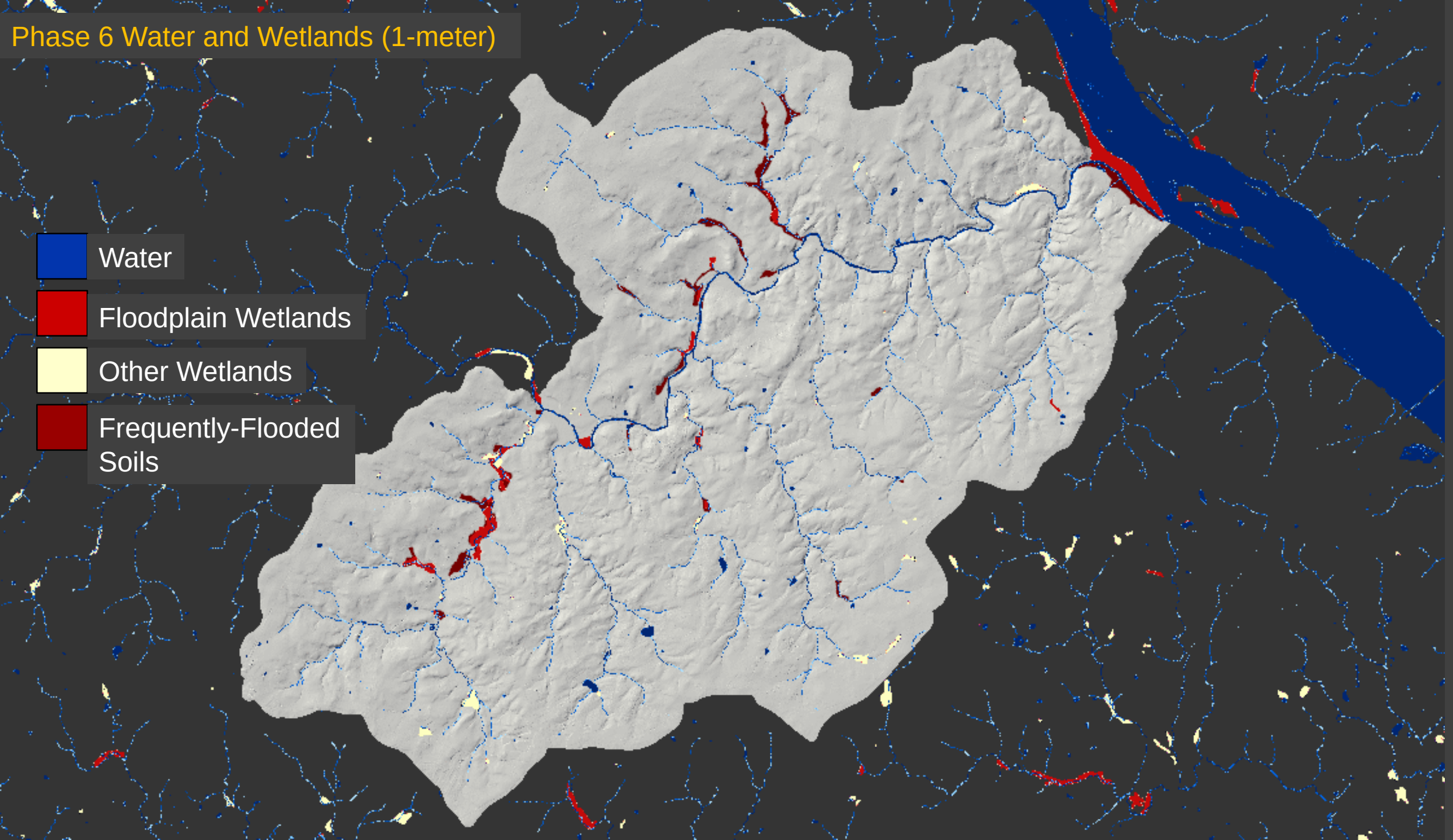

Phase 6 Land Use + Tree Canopy Cover

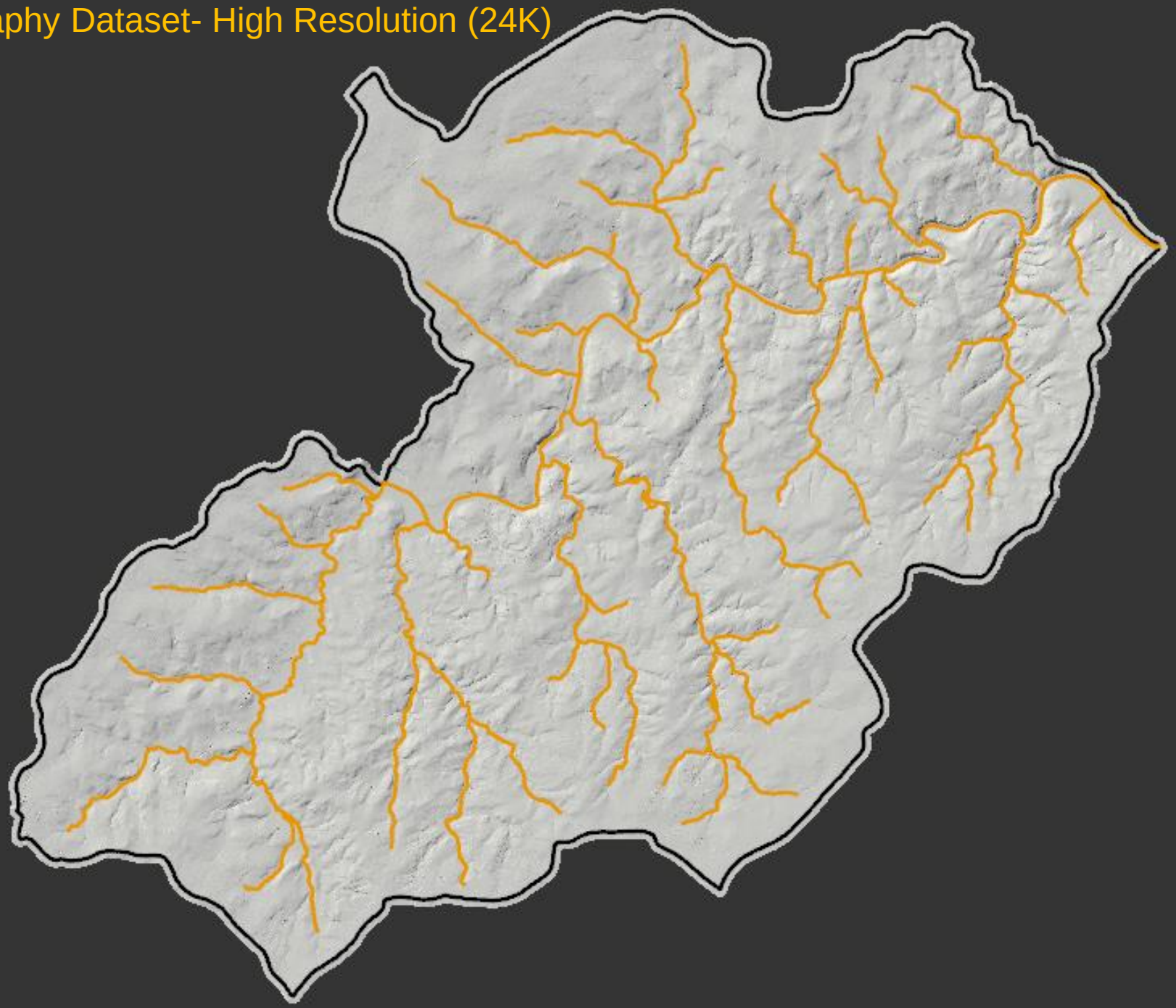

Phase 6 Water and Wetlands (1-meter)
Lower Deer Creek Watershed, Harford, County, MD
Water
Floodplain Wetlands
Other Wetlands

Phase 6 Water and Wetlands (1-meter)



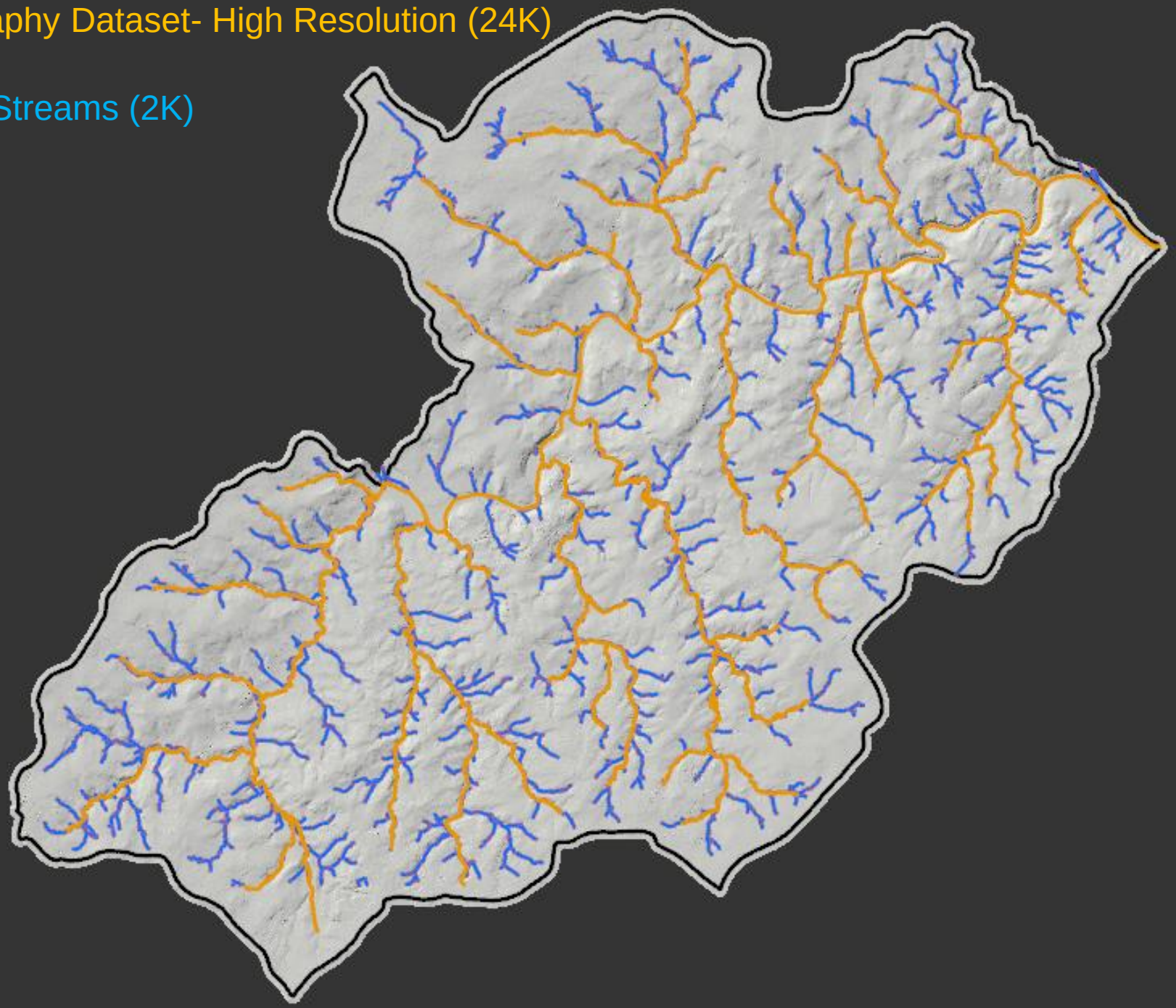

Phase 6 Water and Wetlands (1-meter)
Water
Floodplain Wetlands
Other Wetlands
Frequently-Flooded Soils

National Hydrography Dataset- High Resolution (24K)



National Hydrography Dataset- High Resolution (24K)

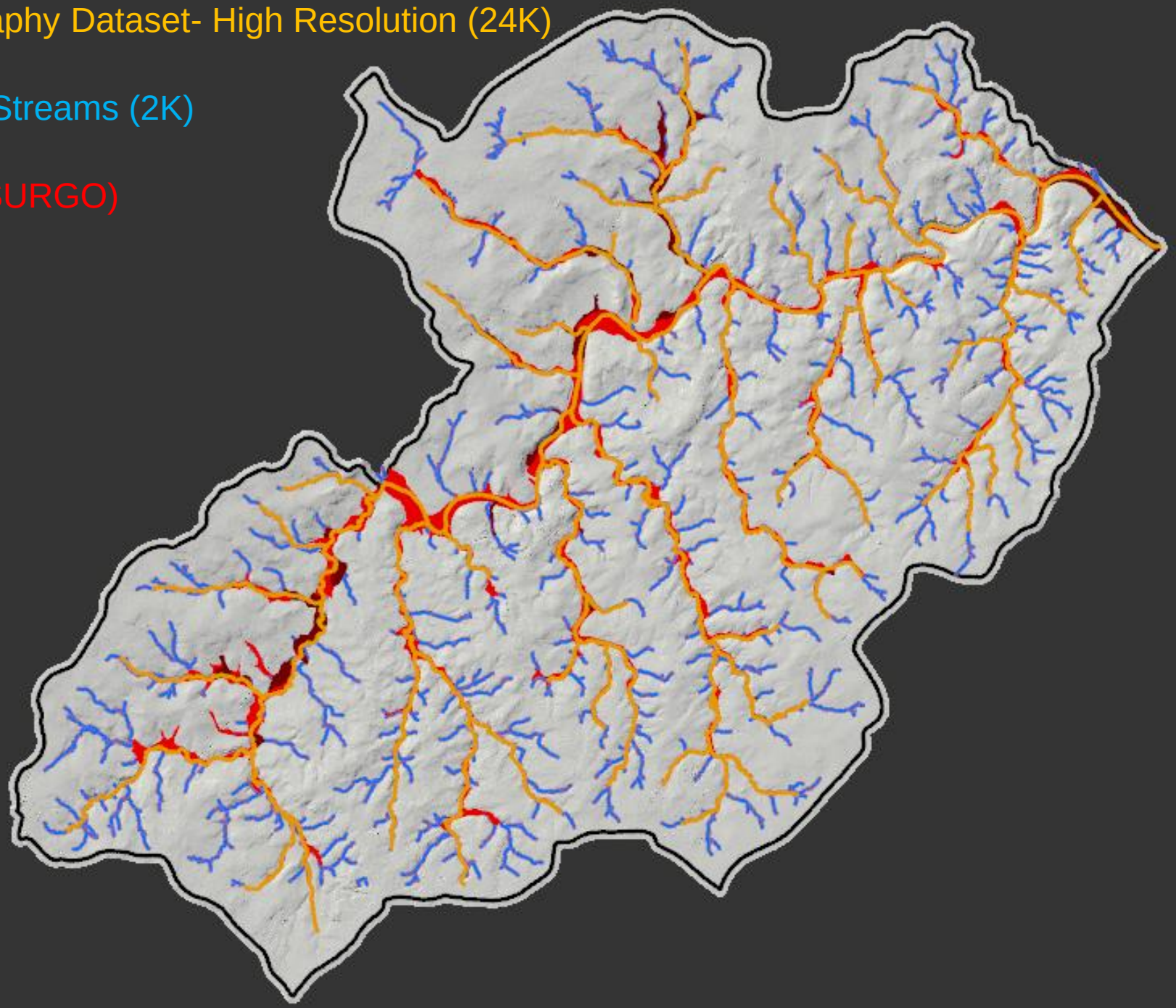
Hyper-resolution Streams (2K)



National Hydrography Dataset- High Resolution (24K)

Hyper-resolution Streams (2K)

Flooded Soils (SSURGO)

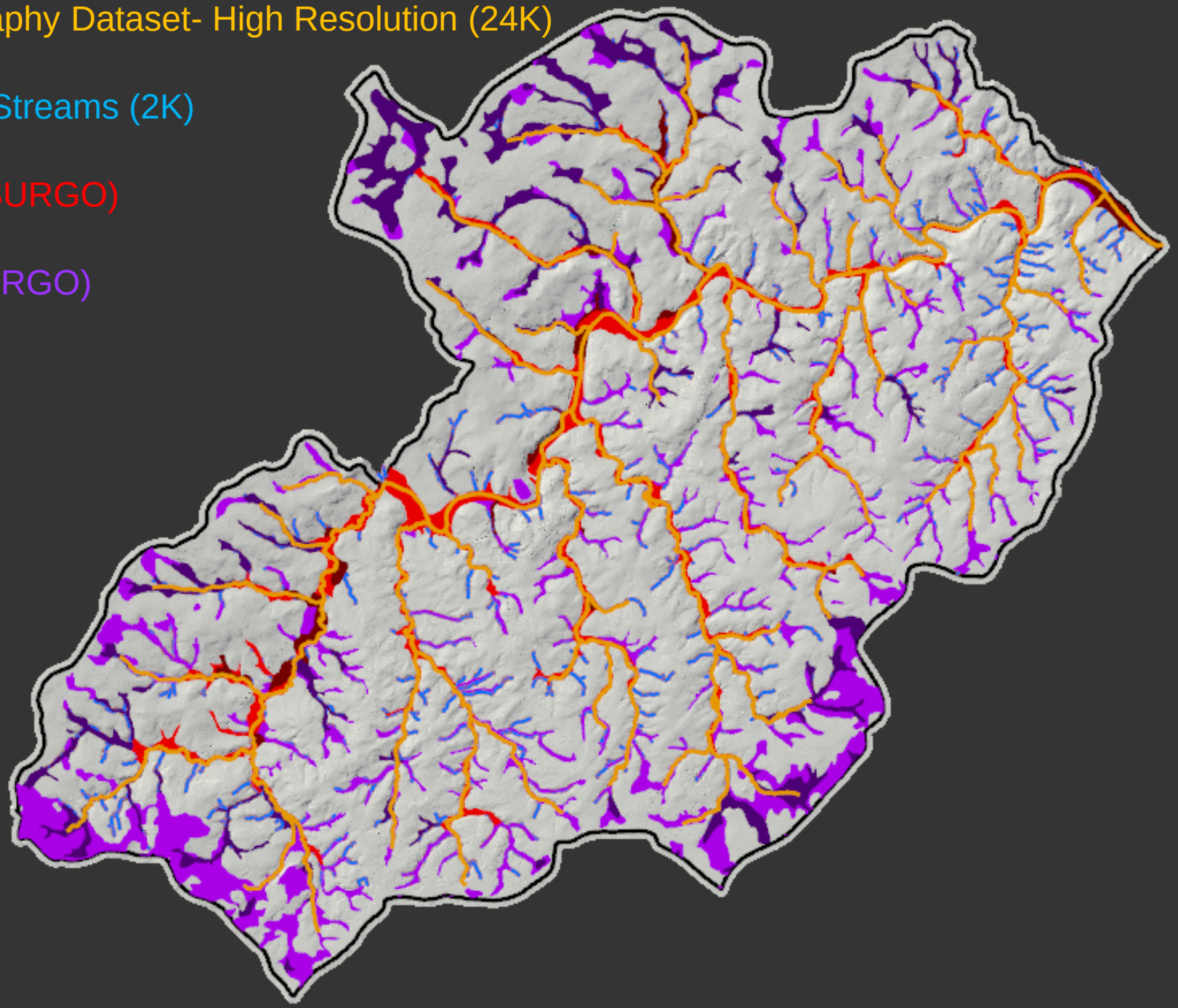


National Hydrography Dataset- High Resolution (24K)

Hyper-resolution Streams (2K)

Flooded Soils (SSURGO)

Hydric Soils (SSURGO)



National Hydrography Dataset- High Resolution (24K)

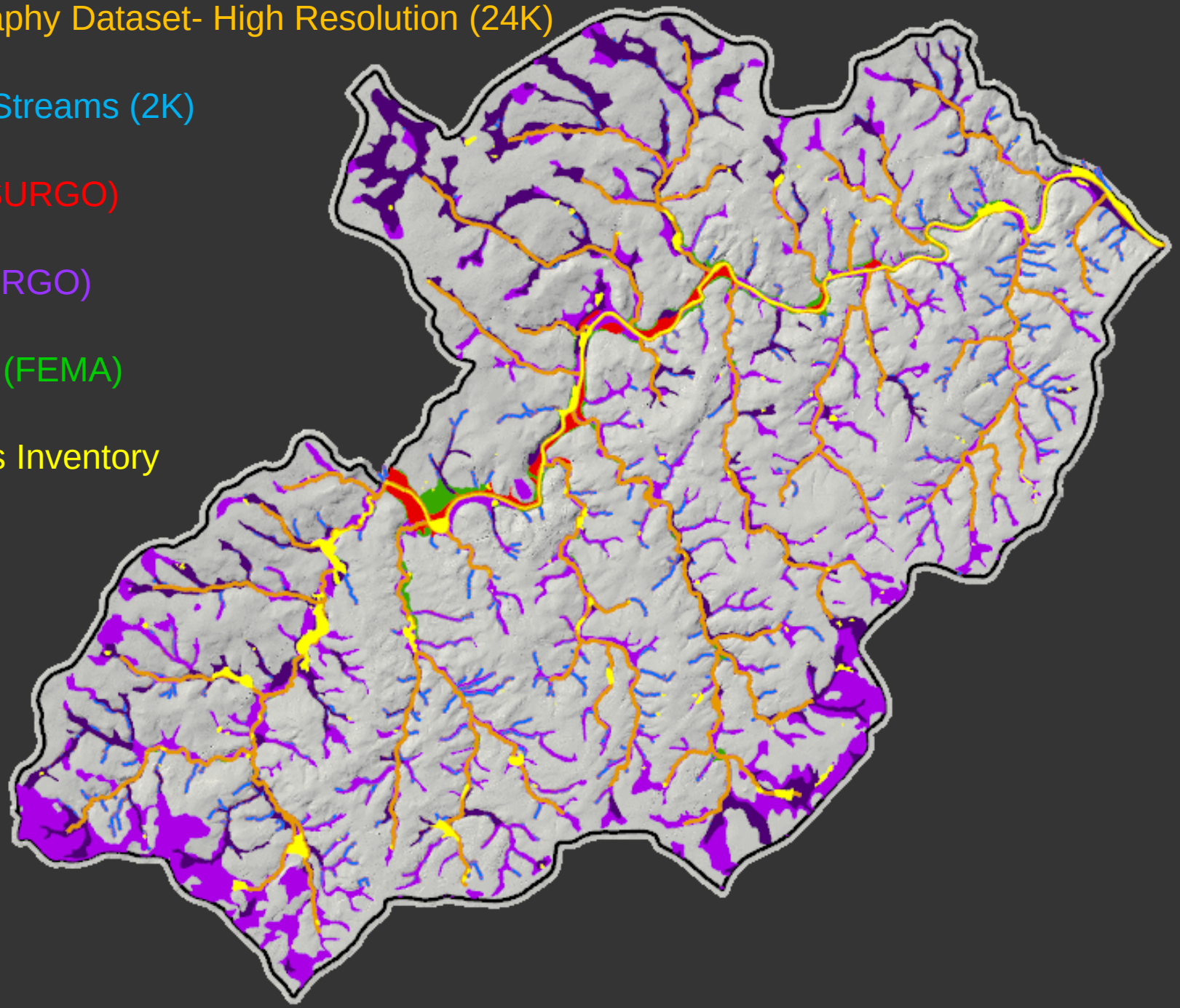
Hyper-resolution Streams (2K)

Flooded Soils (SSURGO)

Hydric Soils (SSURGO)

100-yr Floodplain (FEMA)

National Wetlands Inventory



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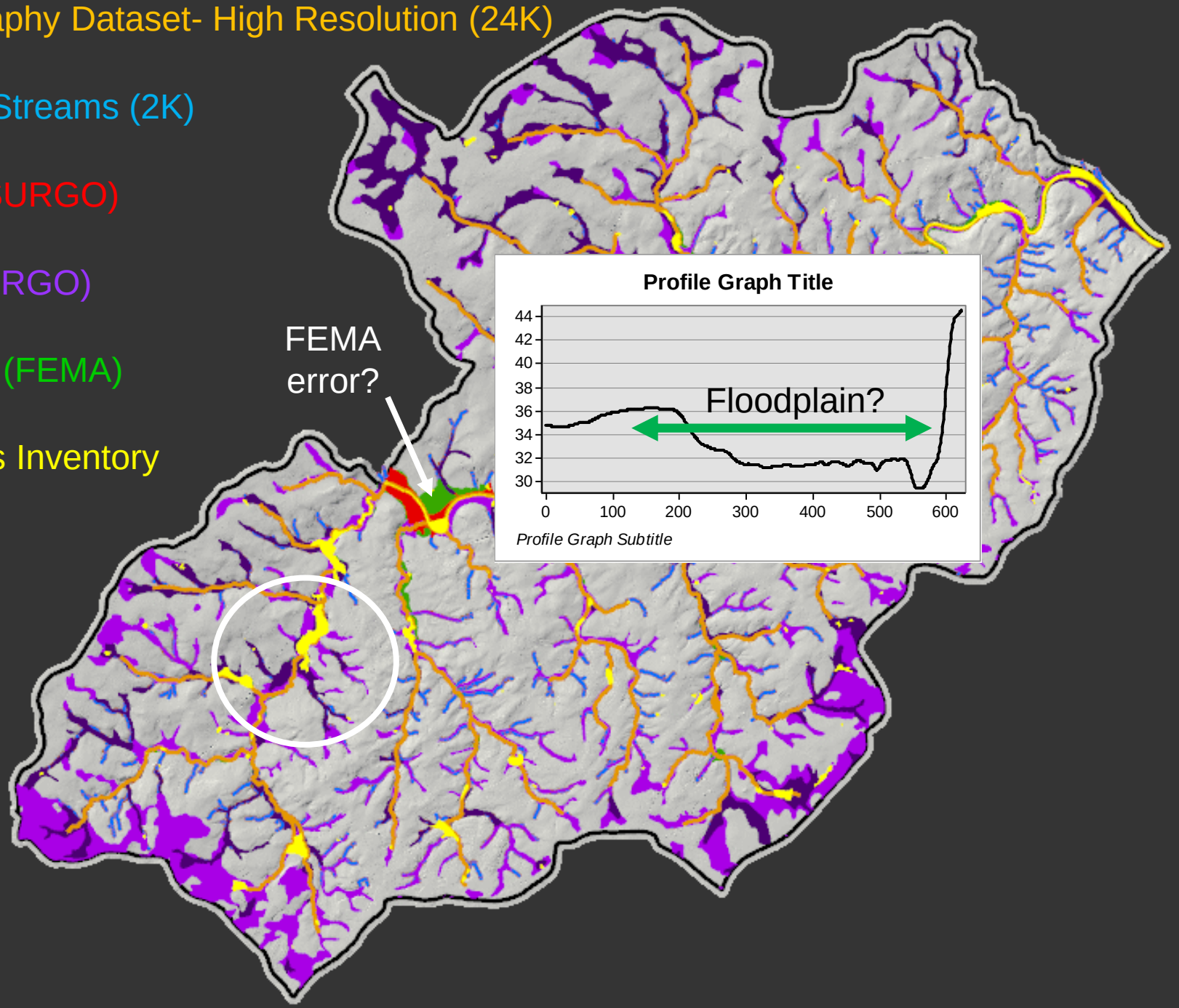
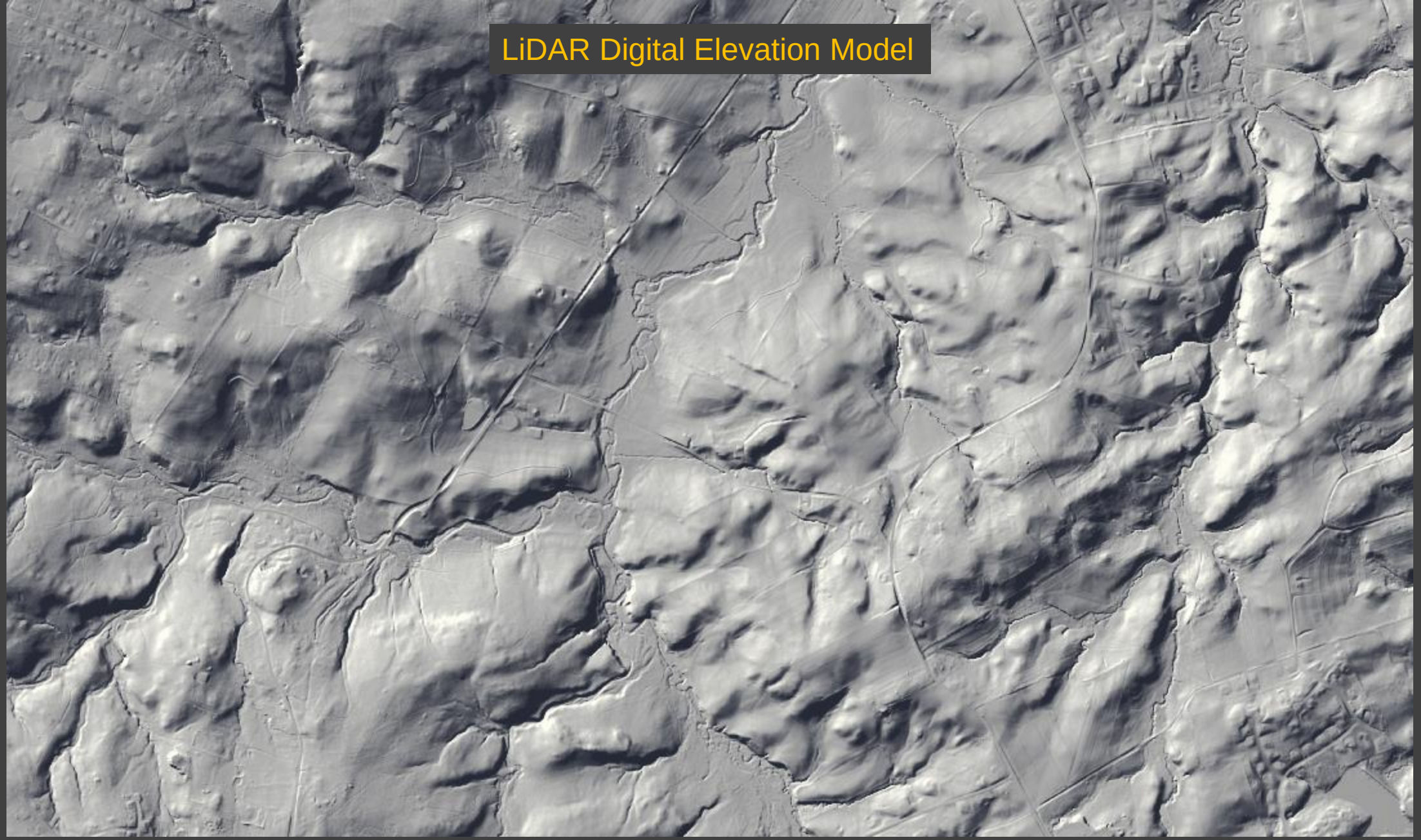
National Wetlands Inventory





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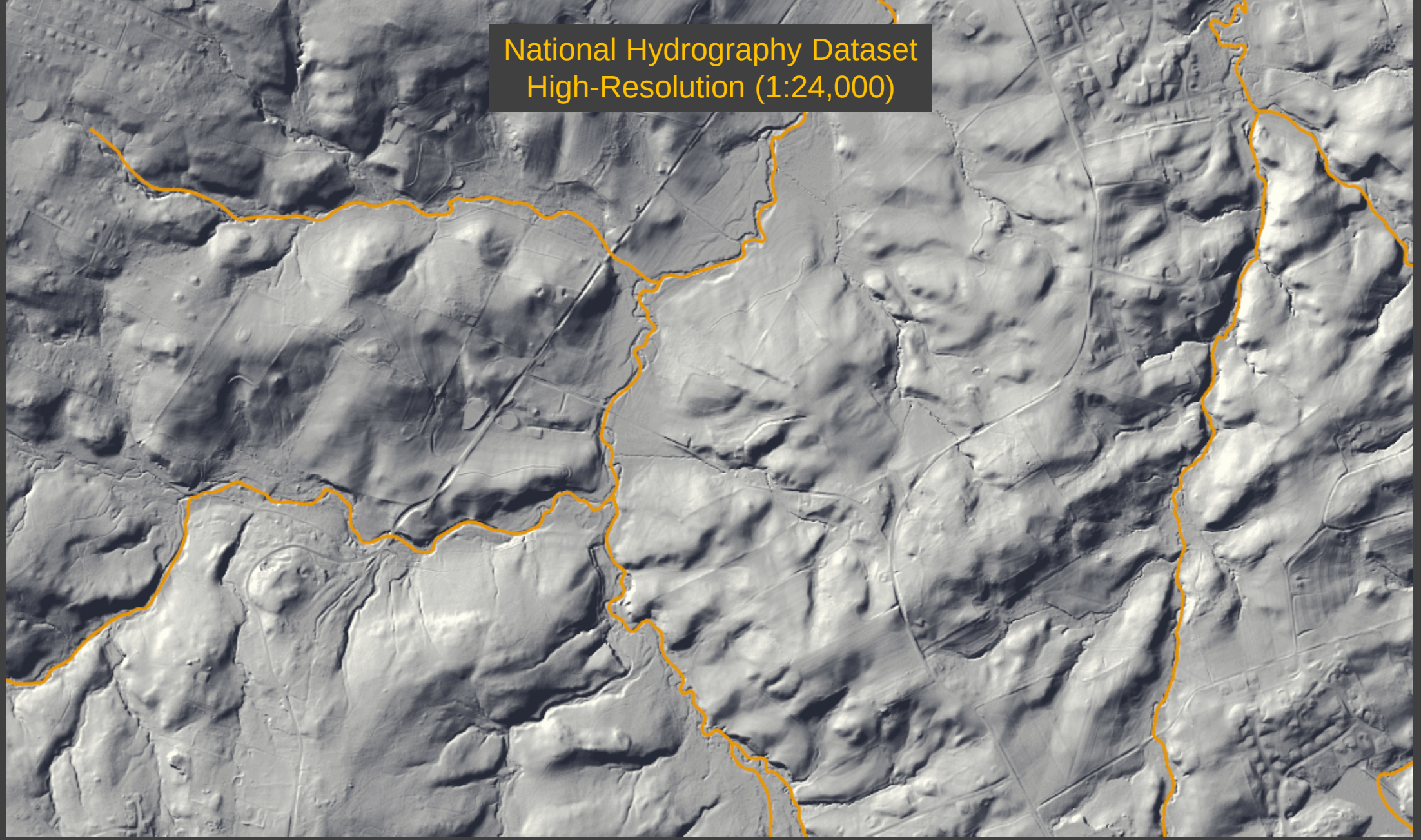

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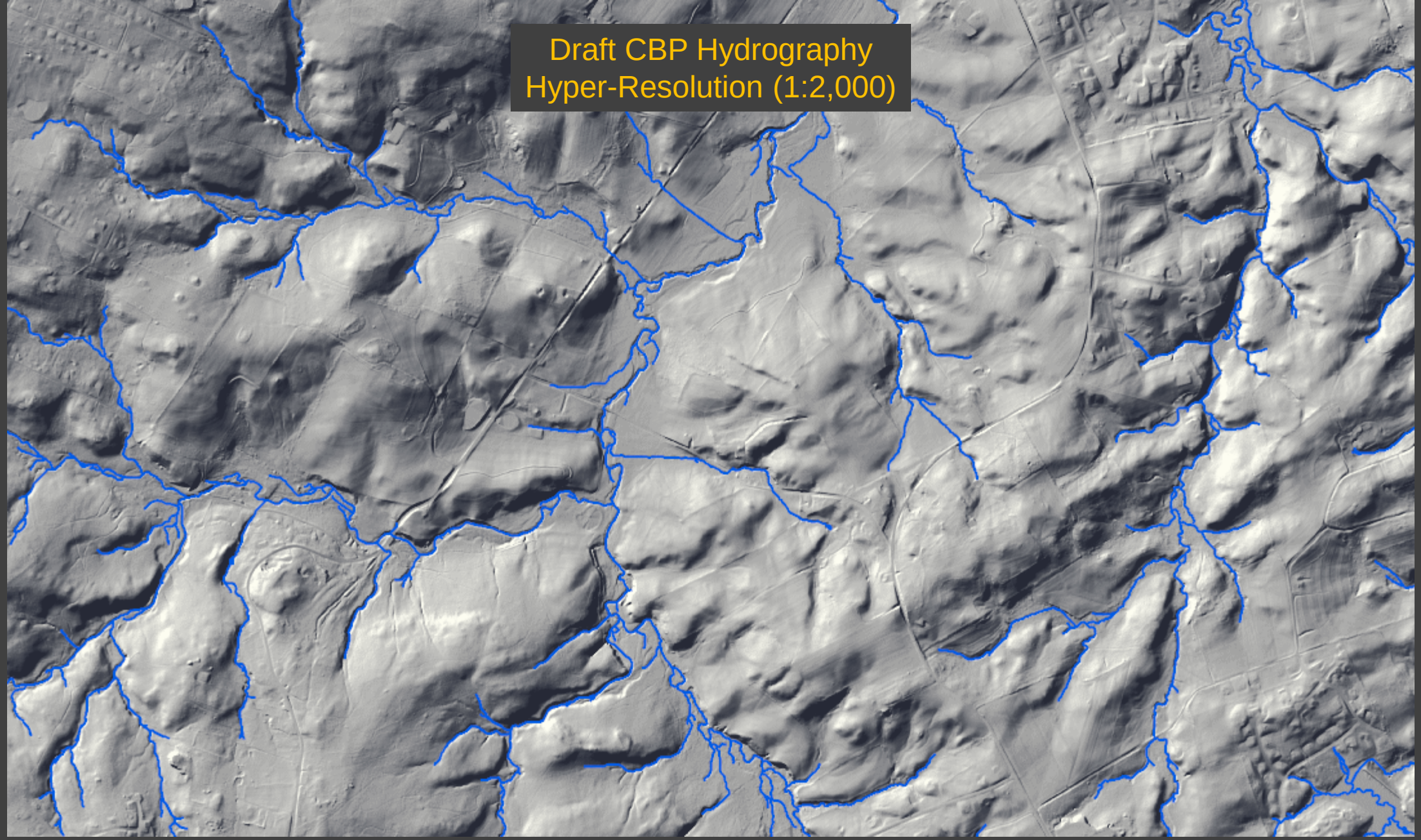

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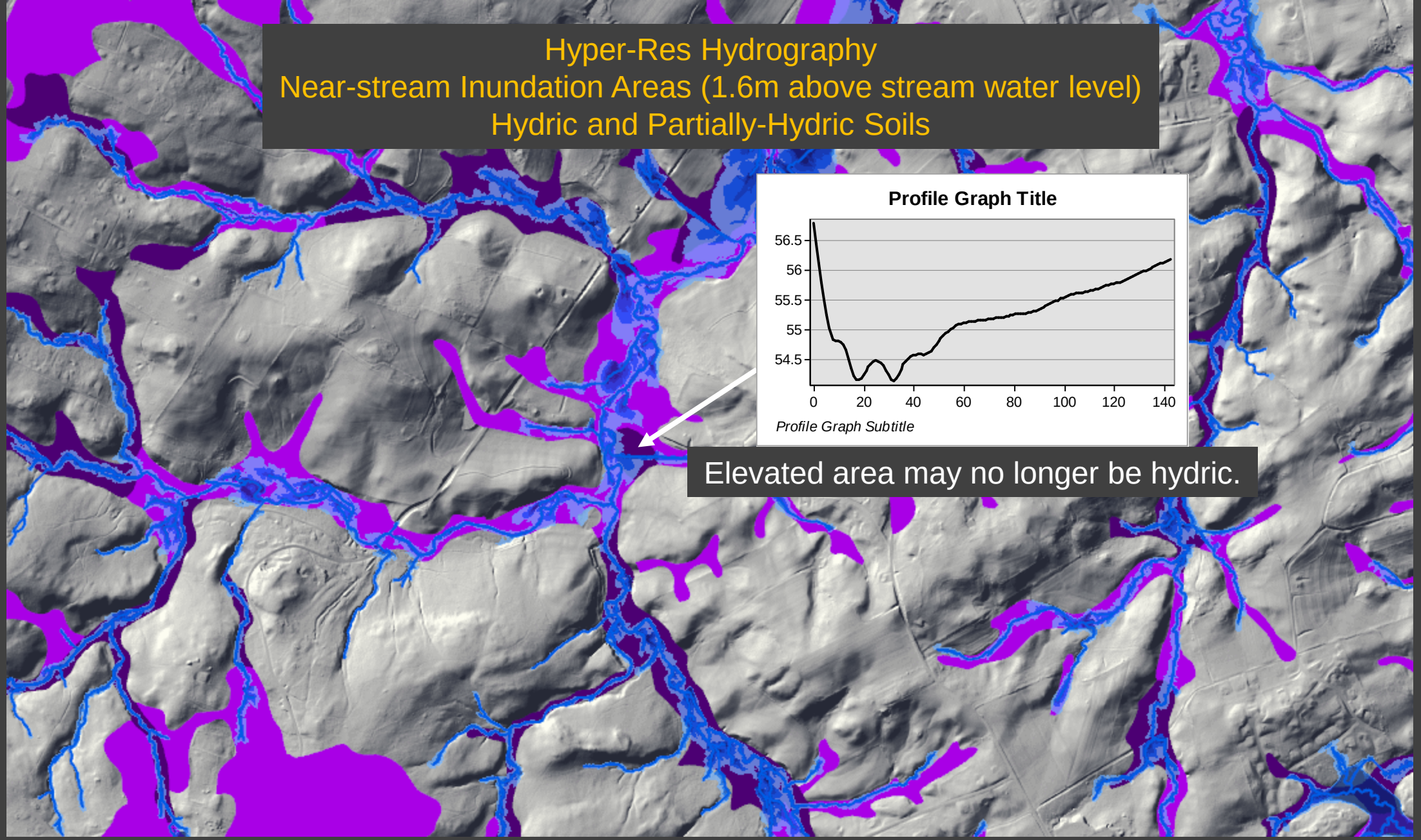
Hyper-Res Hydrography
Near-stream Inundation Areas (1.6m above stream water level)
Hydric and Partially-Hydric Soils
Profile Graph Title
56.5
56
55.5
55
54.5
0
20
40
60
80
100
120
140
Profile Graph Subtitle
Elevated area may no longer be hydric.

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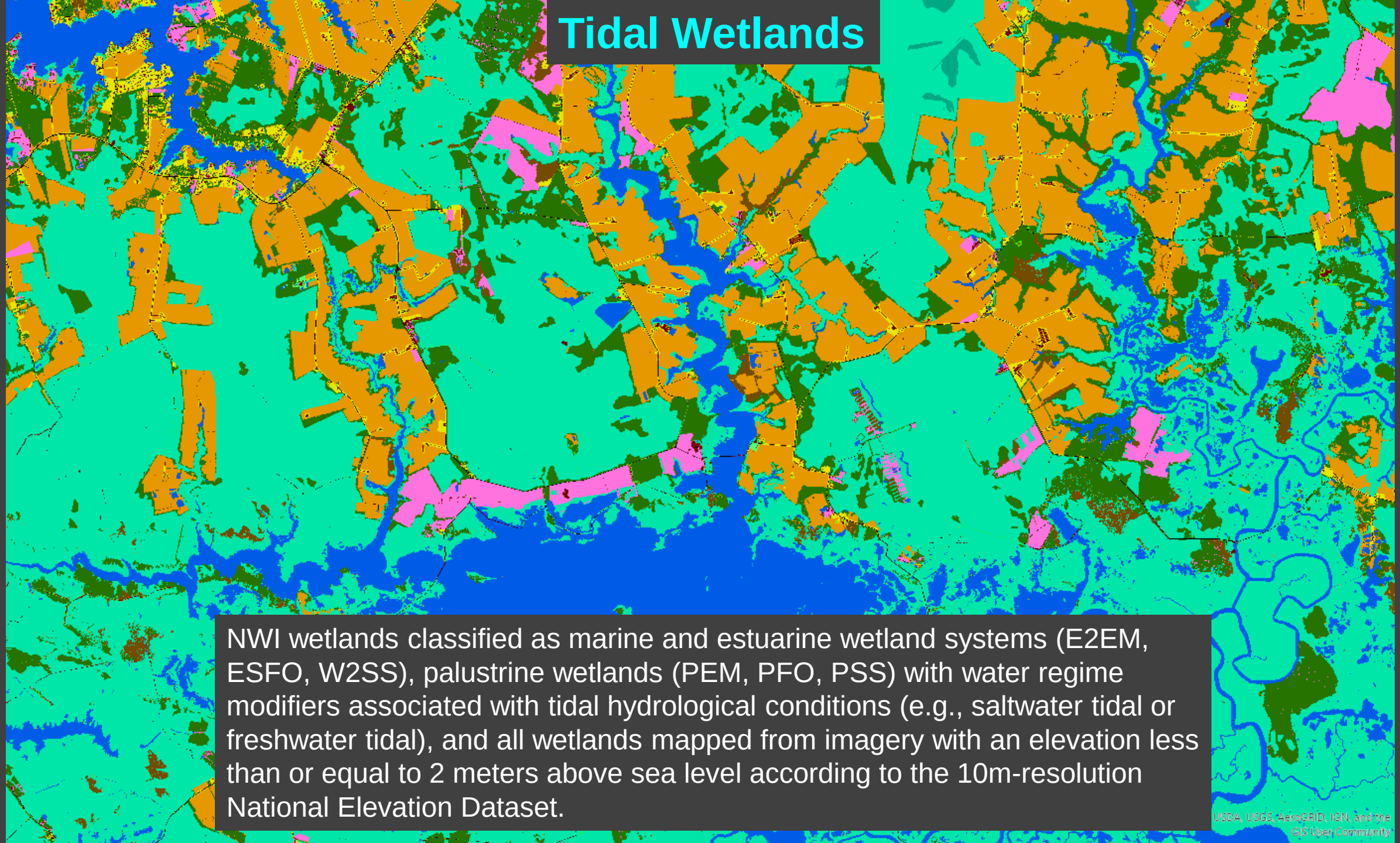
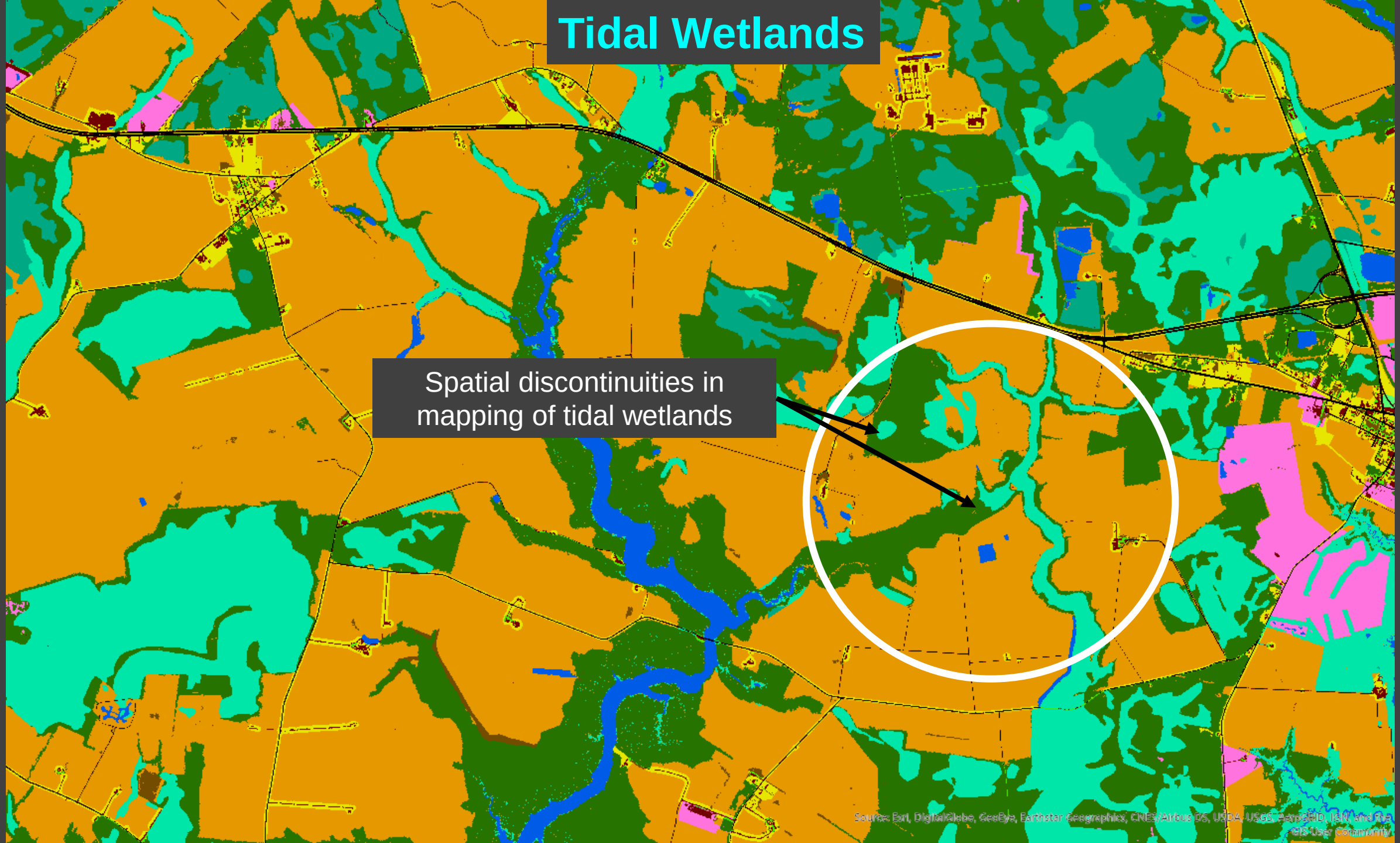
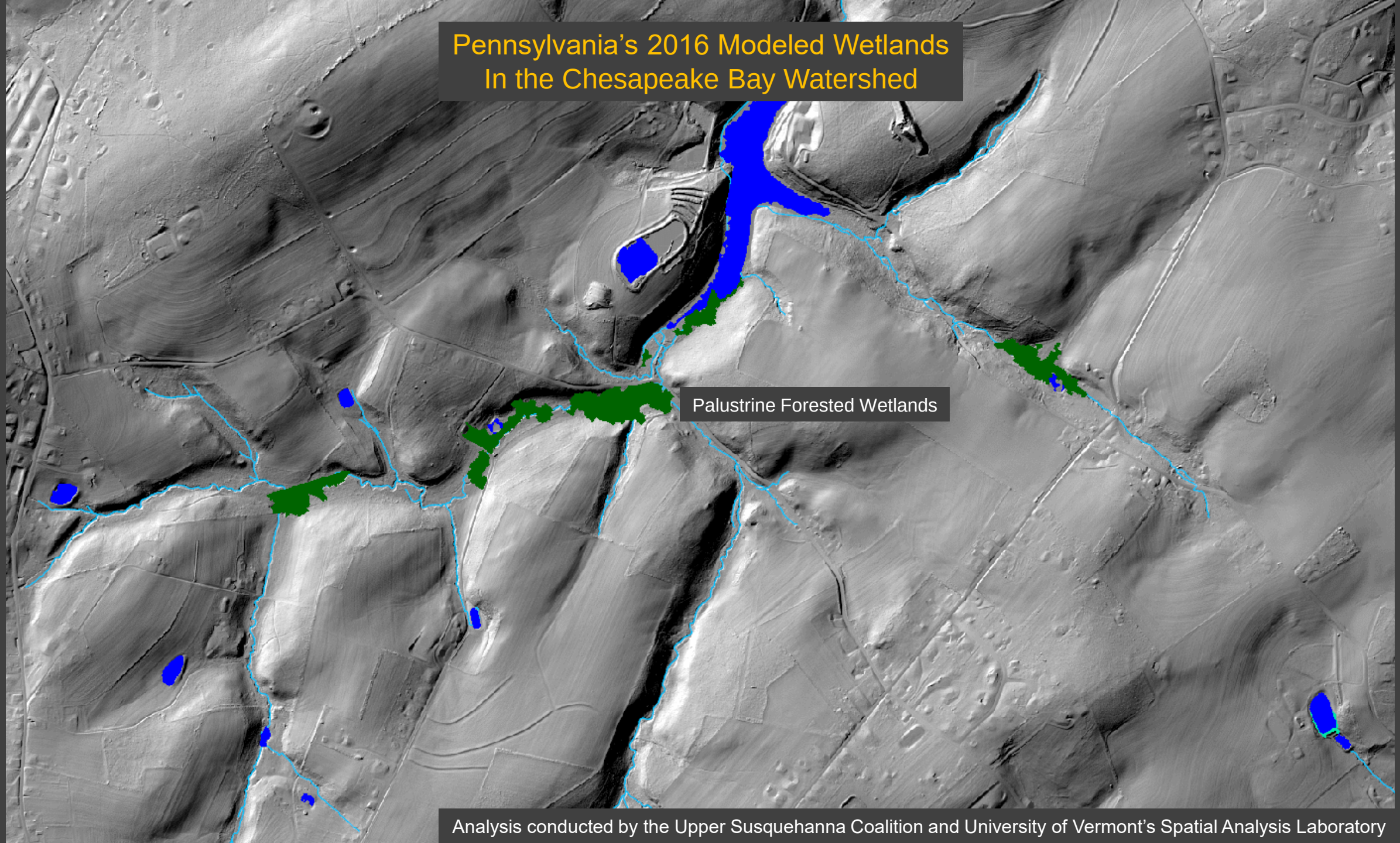
Tidal Wetlands

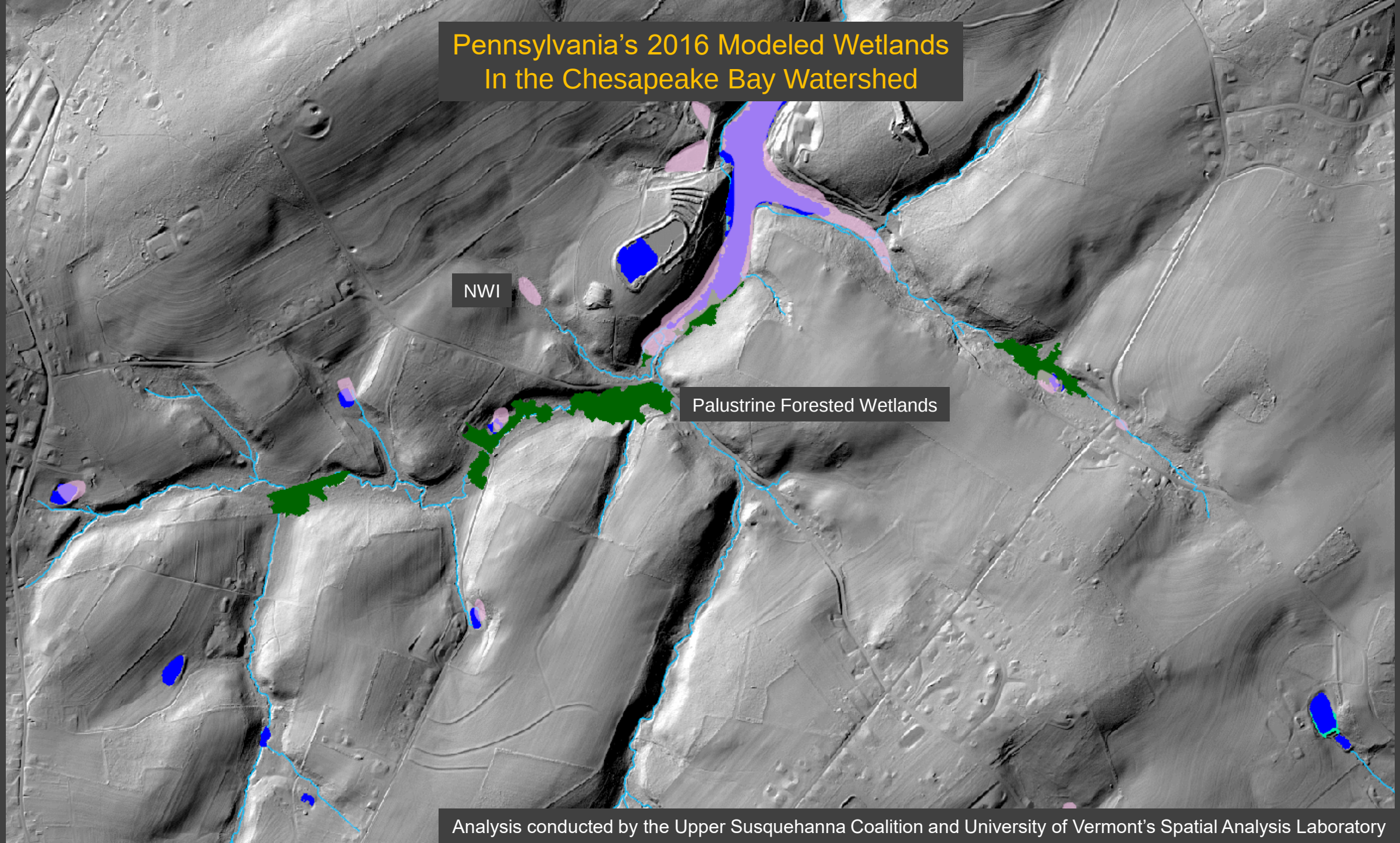


NWI wetlands classified as marine and estuarine wetland systems (E2EM, ESFO, W2SS), palustrine wetlands (PEM, PFO, PSS) with water regime modifiers associated with tidal hydrological conditions (e.g., saltwater tidal or freshwater tidal), and all wetlands mapped from imagery with an elevation less than or equal to 2 meters above sea level according to the 10m-resolution National Elevation Dataset.

Tidal Wetlands




Pennsylvania's 2016 Modeled Wetlands
In the Chesapeake Bay Watershed
Palustrine Forested Wetlands
Analysis conducted by the Upper Susquehanna Coalition and University of Vermont's Spatial Analysis Laboratory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Summary

The CBP Partners have an opportunity to improve our 1-meter resolution mapping of wetlands, particularly for floodplain and tidal wetlands

The CBP interpretation of NWI classes for mapping purposes should be revisited

Frequently or occasionally saturated areas absent from NWI may provide high-valued ecosystem services for transforming and/or retaining nutrients and sediment, and therefore should also be mapped.

High-resolution imagery enables the refinement of wetland boundaries and enforcement of connectivity rules for wetlands and other hydrologically important areas.

Next Steps…

Goal: Finalize new wetland mapping methodology by January 2021 for inclusion in 2017 land use and revised 2013 land use.

How?

- Include wetland mapping as a standing agenda item on Wetlands Workgroup calls?
- Establish an ad hoc team to guide wetland mapping effort?

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