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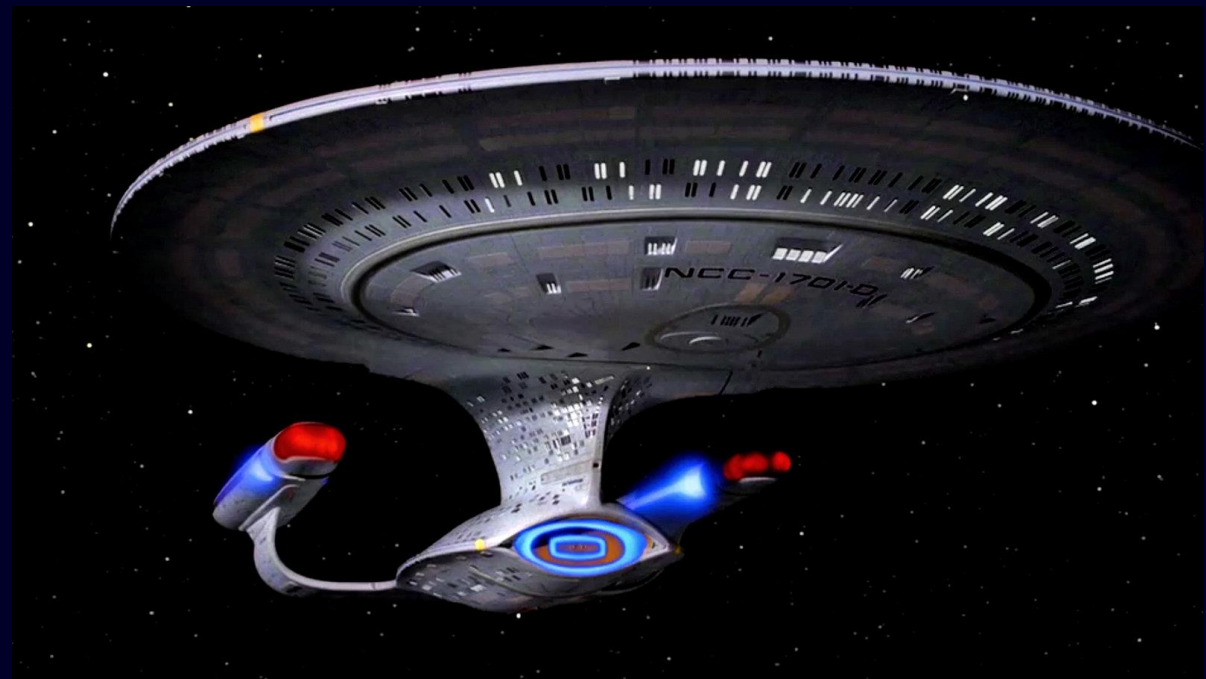
Chesapeake Bay Watershed Land Use: The Next Generation

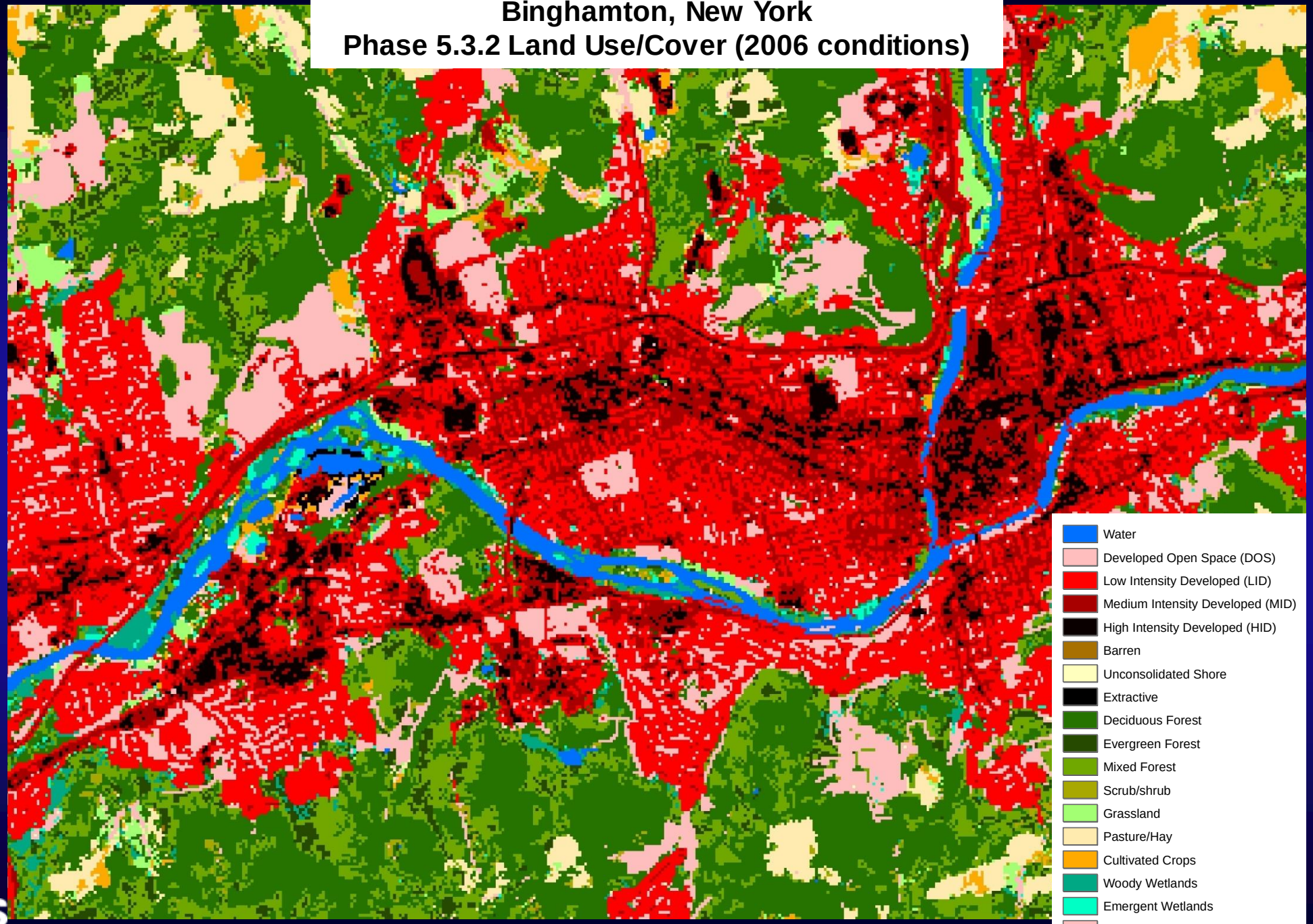
Peter Claggett, Coordinator
CBP Land Use Workgroup

November 6, 2019
Habitat Goal Implementation Team Meeting



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

Binghamton, New York
Phase 5.3.2 Land Use/Cover (2006 conditions)



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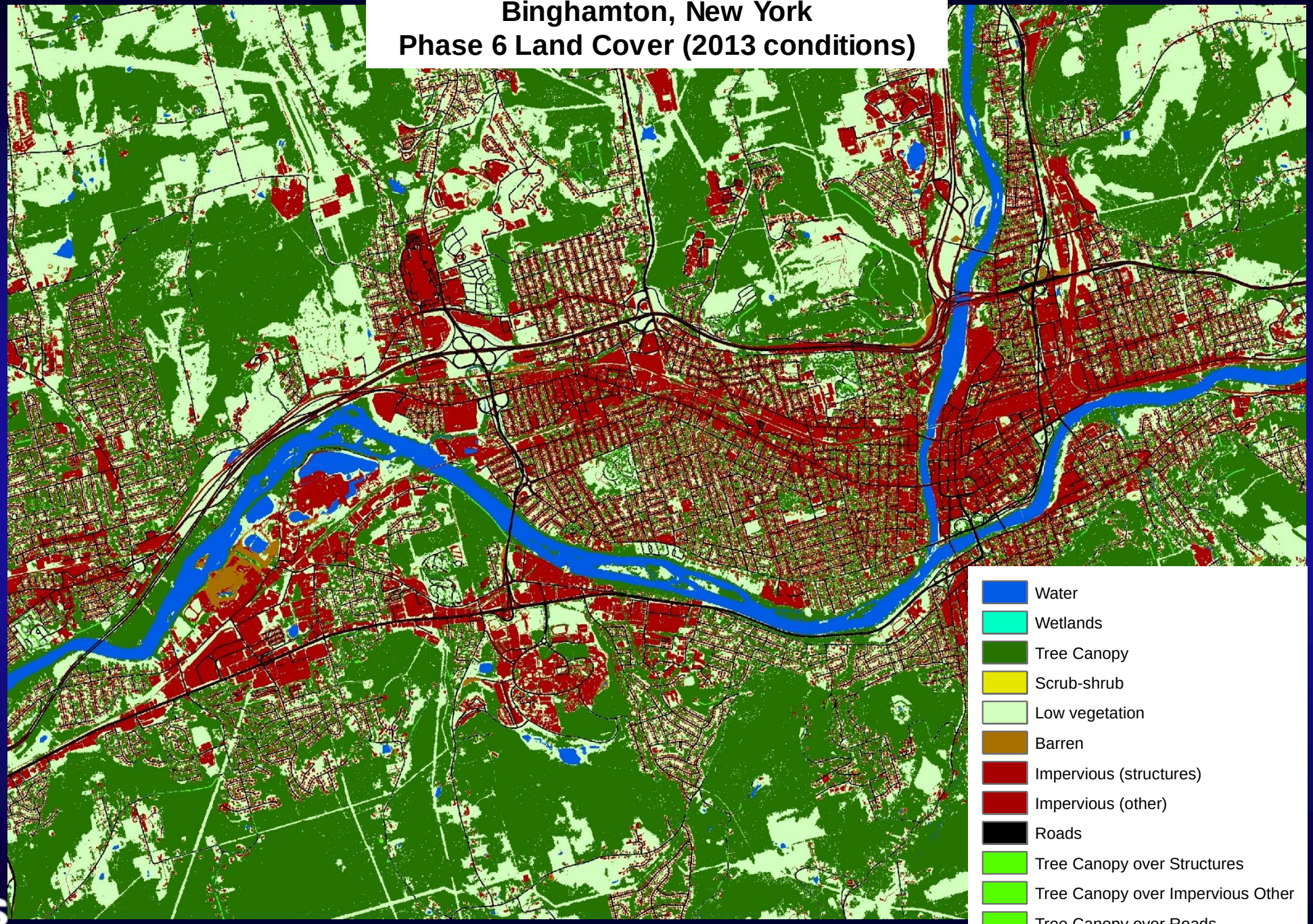
Binghamton, New York
Phase 6 Land Cover (2013 conditions)



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340/85 wedge
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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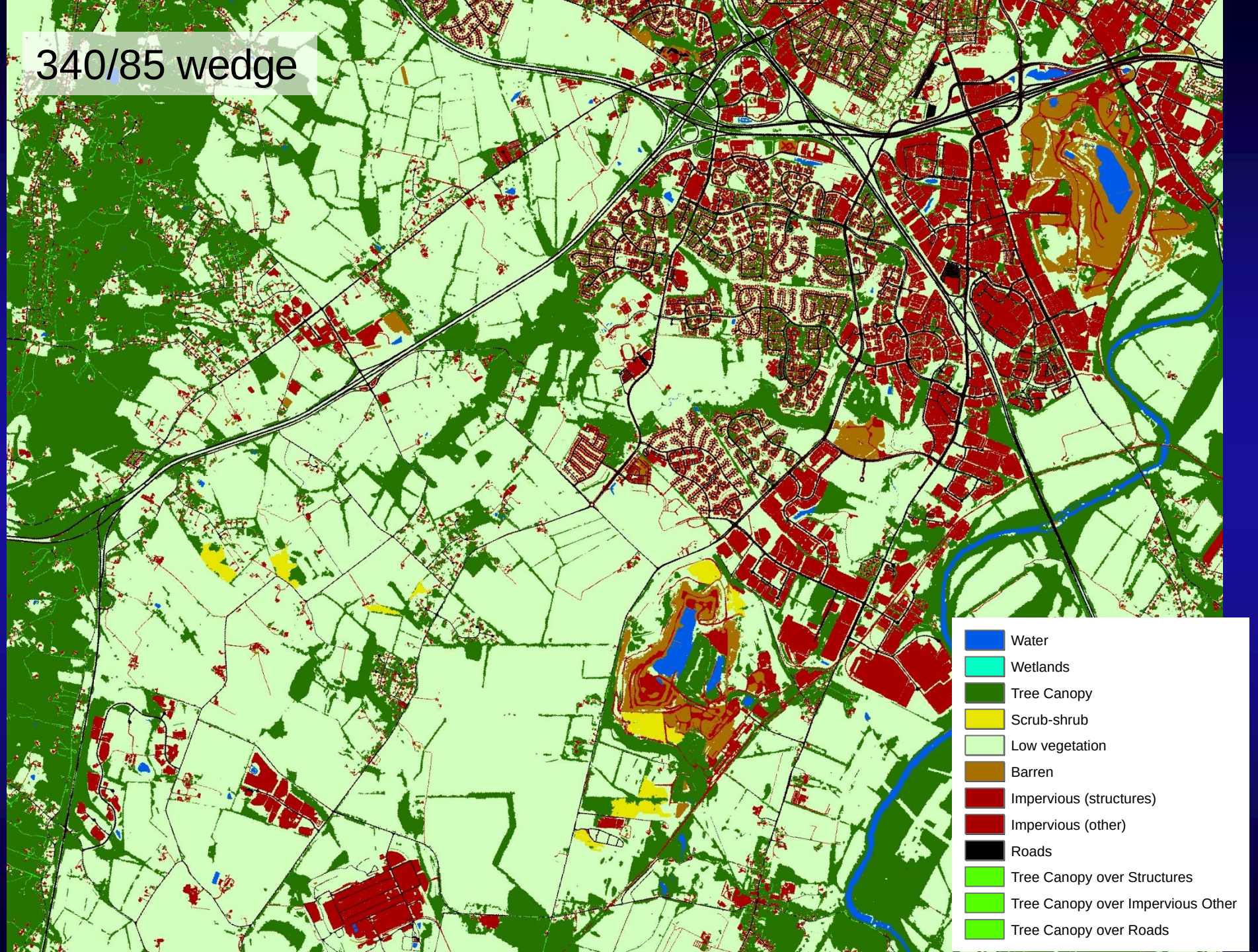
340/85 wedge
Water
Wetlands
Tree Canopy
Scrub-shrub
Low vegetation
Barren
Impervious (structures)
Impervious (other)
Roads
Tree Canopy over Structures
Tree Canopy over Impervious Other
Tree Canopy over Roads

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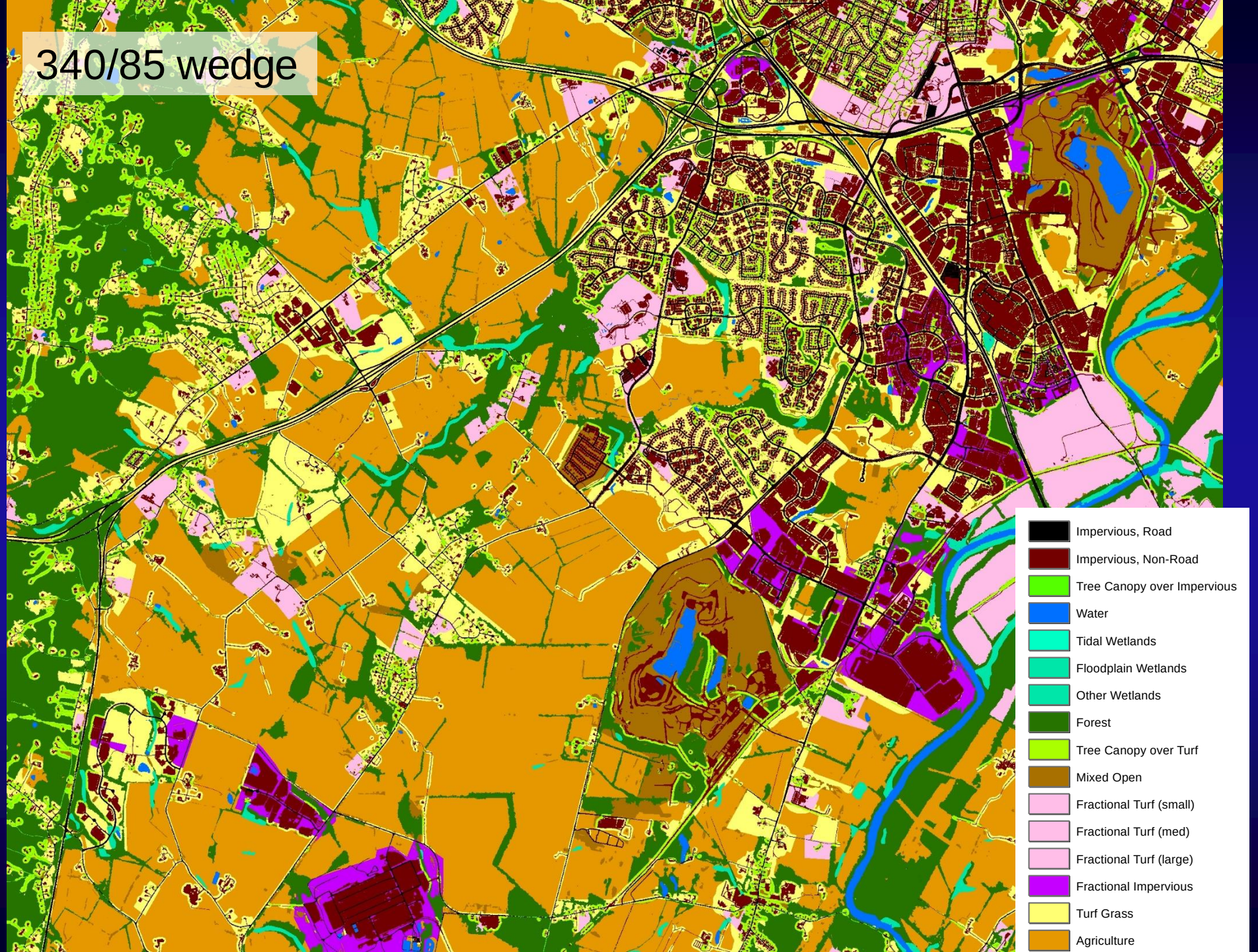
340/85 wedge
Impervious, Road
Impervious, Non-Road
Tree Canopy over Impervious
Water
Tidal Wetlands
Floodplain Wetlands
Other Wetlands
Forest
Tree Canopy over Turf
Mixed Open
Fractional Turf (small)
Fractional Turf (med)
Fractional Turf (large)
Fractional Impervious
Turf Grass
Agriculture

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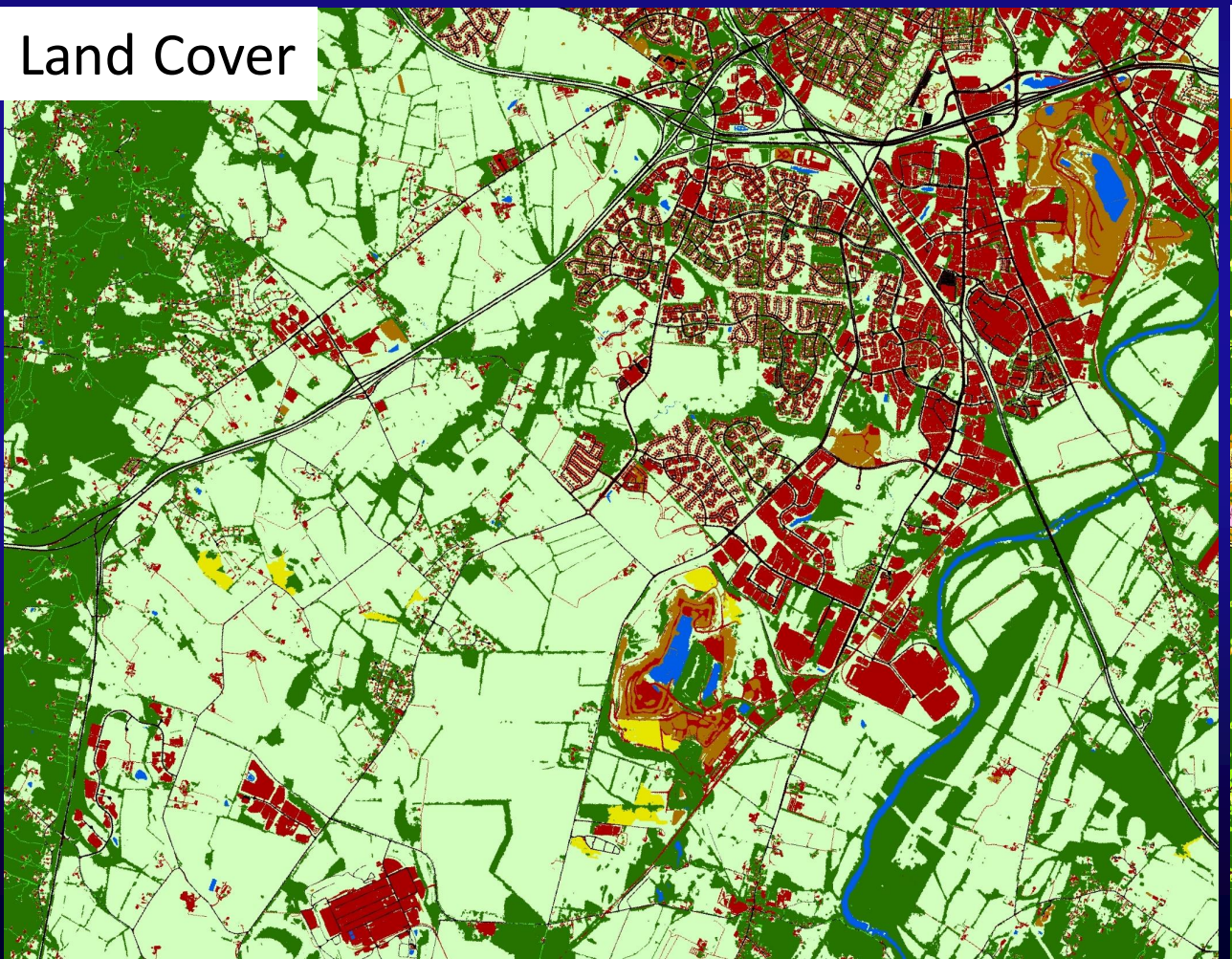
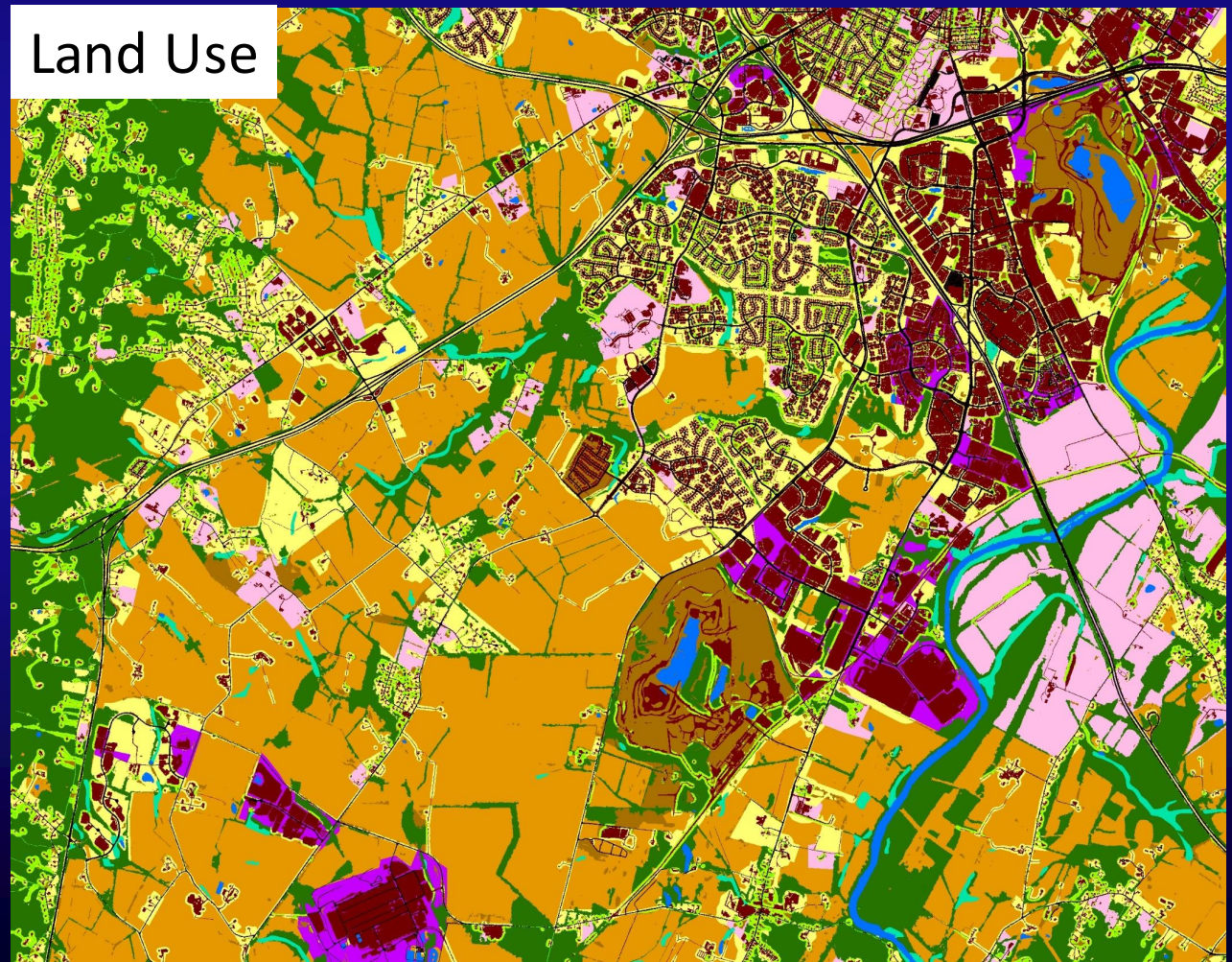
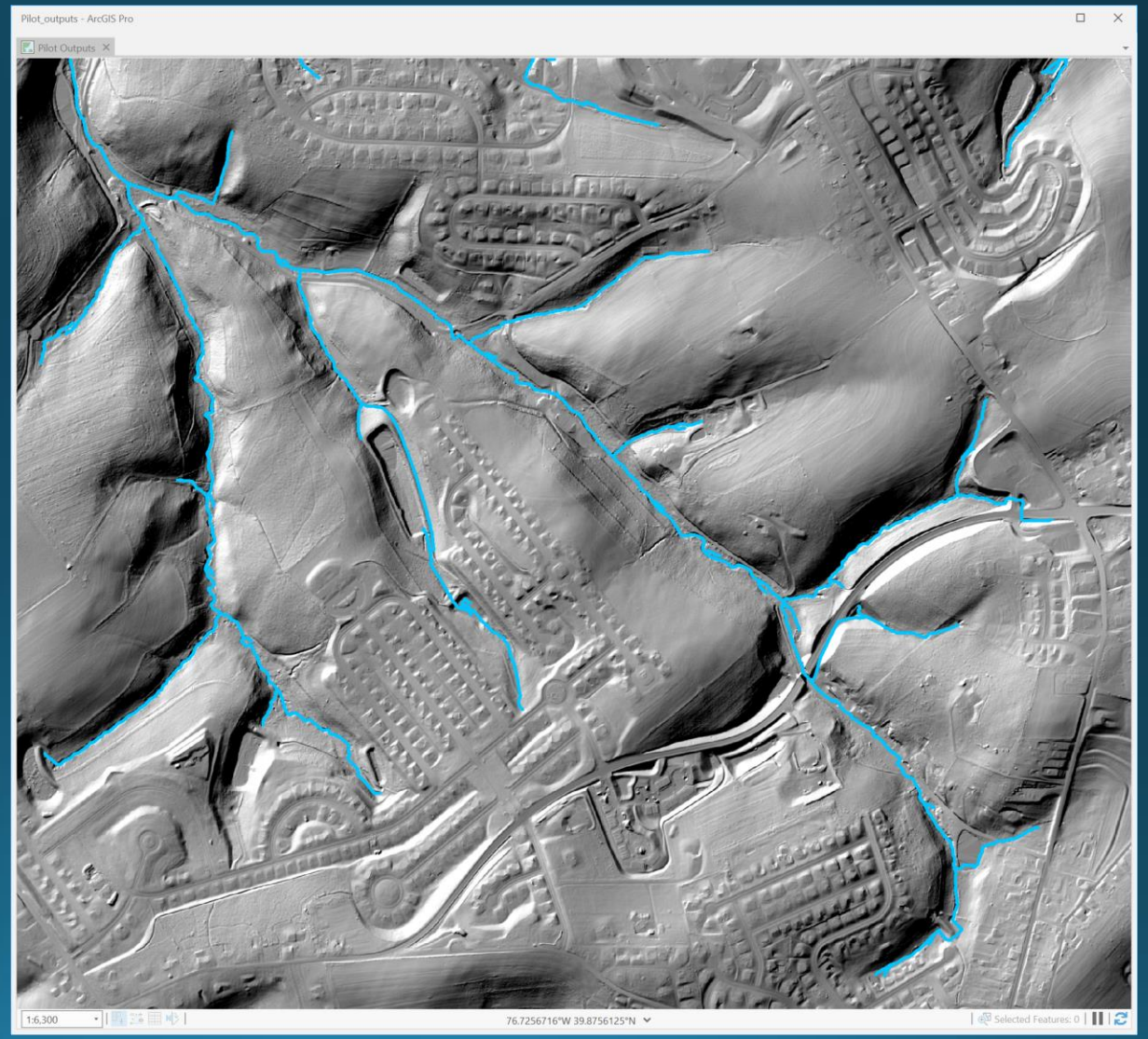
Establishment of a 2013 baseline for monitoring land cover and land use change





Hyper-res Hydrography: Channel extraction

1. Lidar elevation
2. Valley-scale geomorphons
3. Channel-scale geomorphons
4. Extract valley network
5. Extract channels using valley network
6. QAQC channel skeleton
7. Connect stream network



Advantages

- Maps more streams more precisely than NHD
- Channel width detected directly from DEM
- Better suited for precision applications

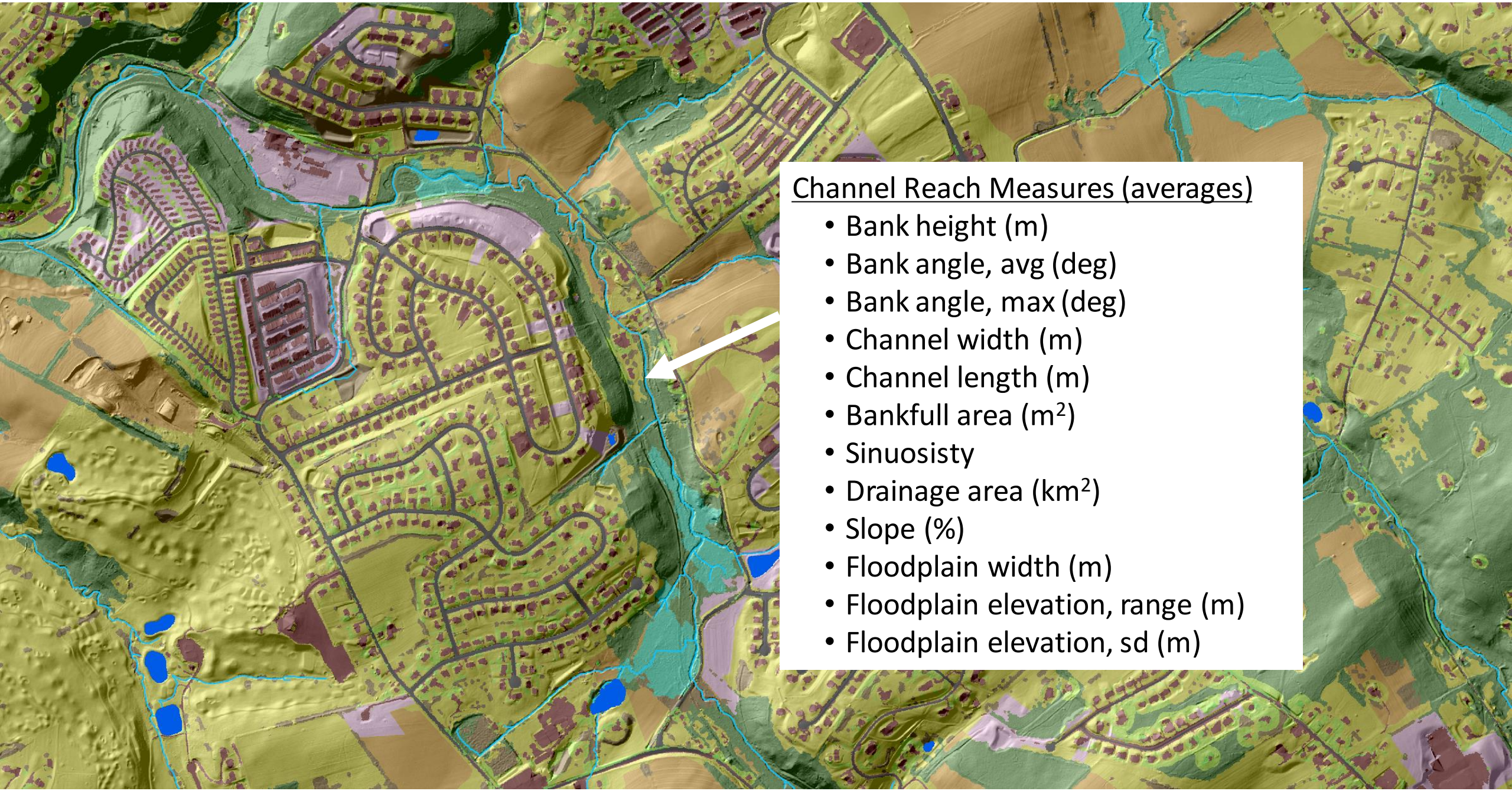
Advantages

- Stream initiation not based on thresholds (FAC, curvature, or otherwise)
- Direct detection of channel signal vs. presumed channel based on accumulation

Advantages

- Upslope and downslope channel location allows for informed, efficient connections
- No need to breach or hydro-enforce DEM

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


Channel Reach Measures (averages)
• Bank height (m)
• Bank angle, avg (deg)
• Bank angle, max (deg)
• Channel width (m)
• Channel length (m)
• Bankfull area (m^2)
• Sinuosisty
• Drainage area (km^2)
• Slope (%)
• Floodplain width (m)
• Floodplain elevation, range (m)
• Floodplain elevation, sd (m)

High-resolution Tree Canopy Change
2014 - 2018

Coming Soon: July 2021

1. High-res Land Cover: 2017/18
2. High-res Land Cover Change: 2013/14 – 2017/18

3. High-res Land Use: 2017/18
4. High-res Land Use Change: 2013/14 – 2017/18

5. High-res Hydrography and Ditches (draft)

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Local land use and parcel data

- Low-density Residential
- Recreation
- Agriculture
- Roads

High-resolution land cover data

- Impervious surfaces
- Tree canopy
- Low vegetation
- Water

Phase 6 Land Uses

- Impervious-Roads
- Forests
- Turf Grass
- Open Space

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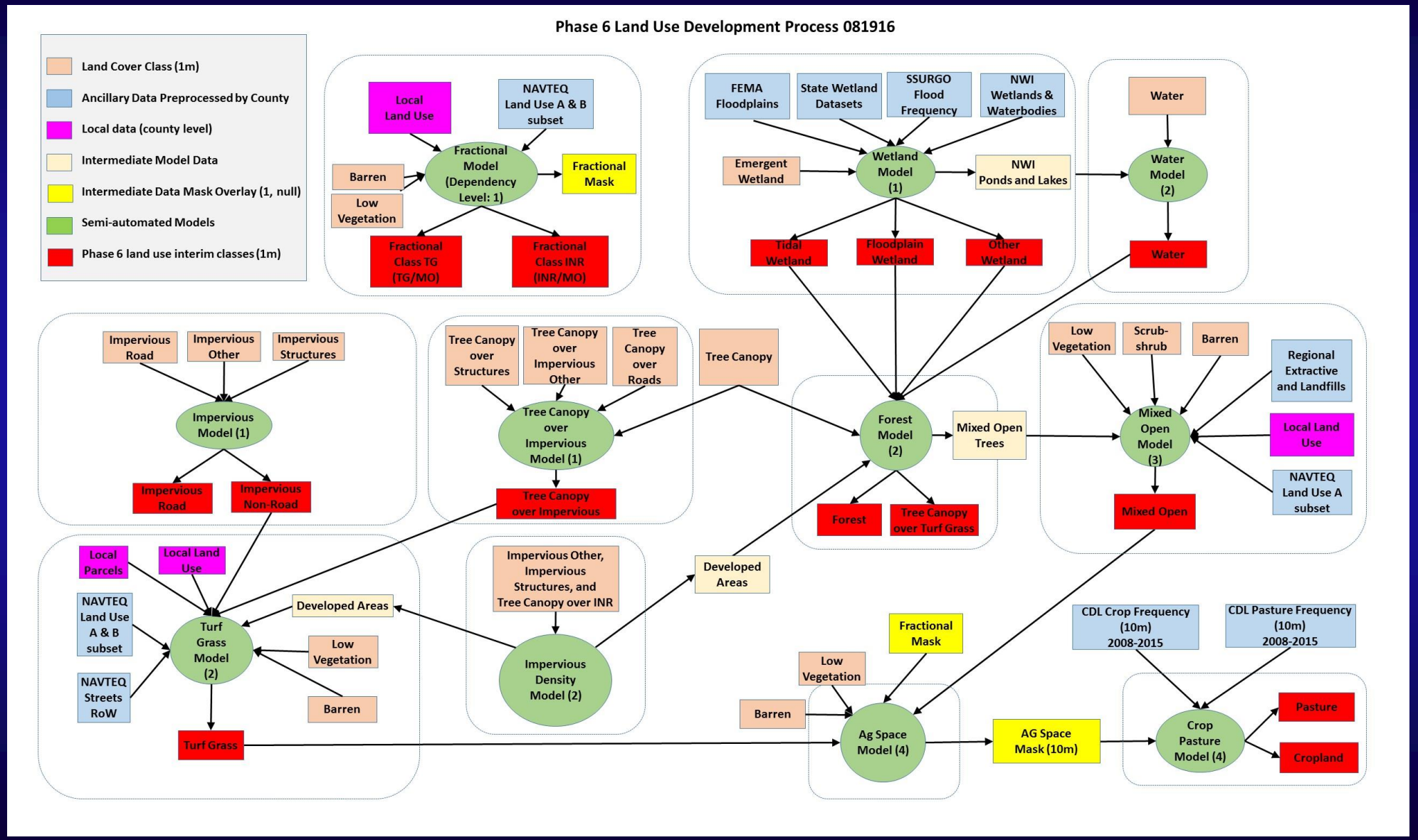
Phase 6 Land Use Development Process (all but Virginia)

Phase 6 Land Use Model: translating land cover into land use



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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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Current vs Potential Land Use Classes

Tree Canopy/Scrub-shrub/Herbaceous

- Tree Canopy Over Impervious
- Tree Canopy Over Turf Grass
- Forest
  - Deciduous
  - Evergreen
  - Cultivated (orchards, vineyards)

Impervious

- Roads
- Non-Roads
  - Buildings
    - Resid/ Comm/ Indus.
    - Greenhouses
    - Poultry
    - Dairy
  - Solar fields
  - Other (driveways, parking lots)

Wetlands

- Tidal
- Floodplain
- Other
  - Headwater
  - Isolated

Herbaceous/Barren/Scrub-shrub

- Turf grass
- Pasture
- Cropland
  - Center Pivot
- Mixed Open
  - Harvested Forest (0-3 yrs)
  - Managed succession
  - Natural succession (fallow)
  - Suspended succession (right-of-ways)
  - Extractive (active)
  - Construction (bare pre-development)
  - Bare shore
    - Marine/Estuarine
    - Lotic
    - Lentic

* White classes are current.

* Yellow classes are proposed.

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