New Land Cover and Land Use Data
for Counties in the Chesapeake Bay Watershed

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January 29, 2016 (re-recorded February 22, 2016)
Webinar: http://www.chesapeakebay.net/calendar/event/23454/

Presentation Outline

1. Overview and Background

2. Production of High-resolution Land <u>Cover</u> Data

3. Production of 10m-resolution Land <u>Use</u> Data

4. Local Review of Phase 6 Land Use Data

5. Q & A.

Chesapeake Bay 2017 Mid-Point Assessment

2010 TMDL

2025 All Practices Implemented
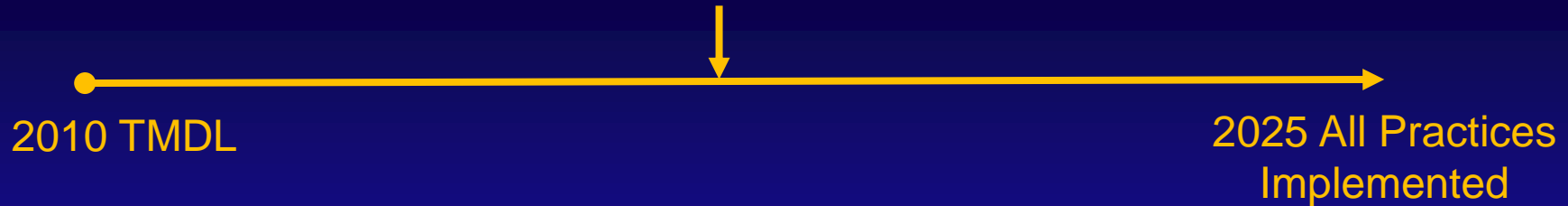
Goal: Determine whether the implementation the CBP Partnership's restoration strategies by 2025 will achieve water quality standards in the Bay.

Objective: Make this determination based on the best available science data, tools, BMPs, and lessons-learned.

#1 Priority: improve accuracy of land use/cover data.

Best available data = county & municipal level land use, land cover, parcels, sewer service areas, zoning, and other relevant information.

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

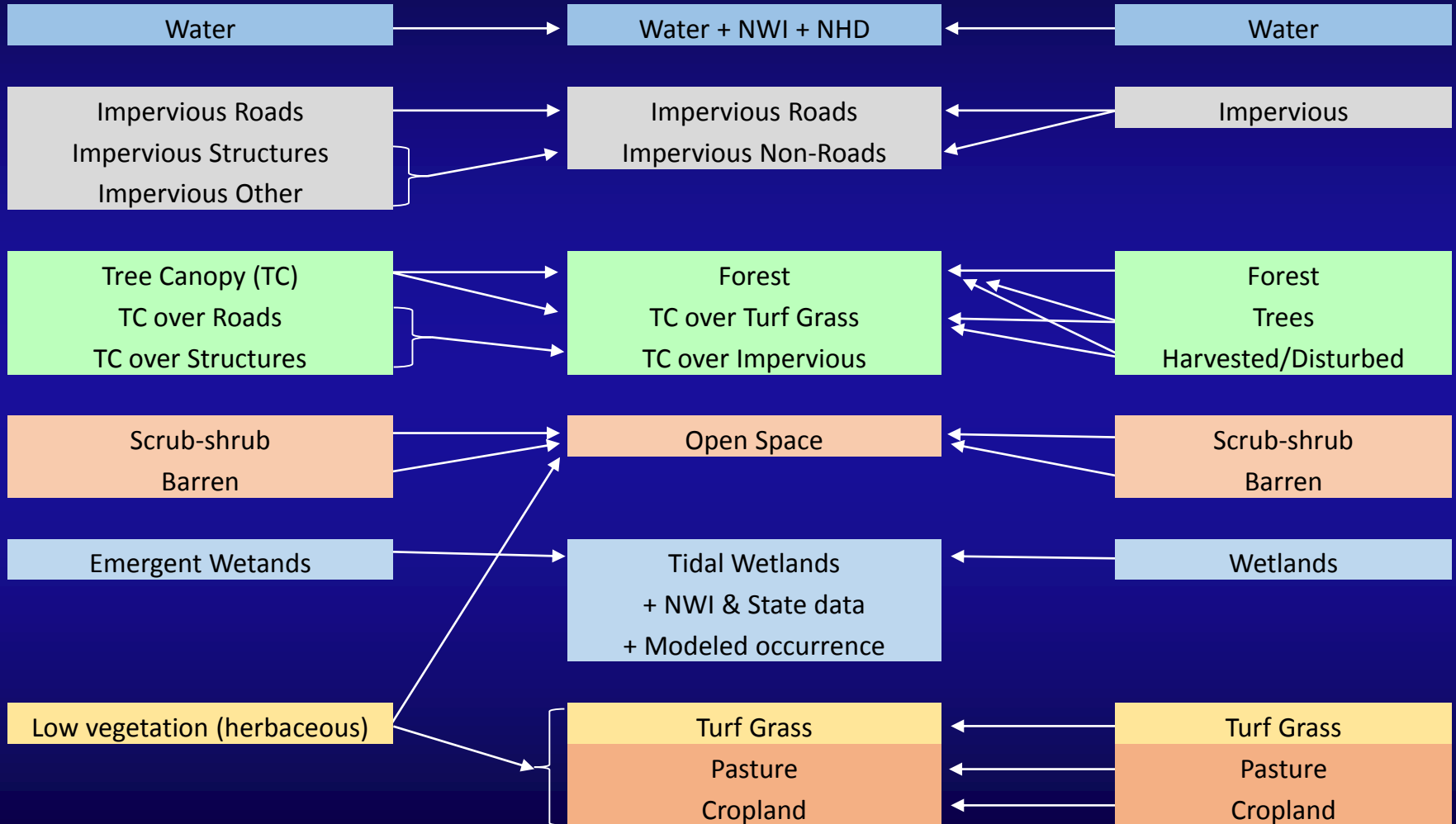# Local Parcel and Land Use Data Collected by CBP
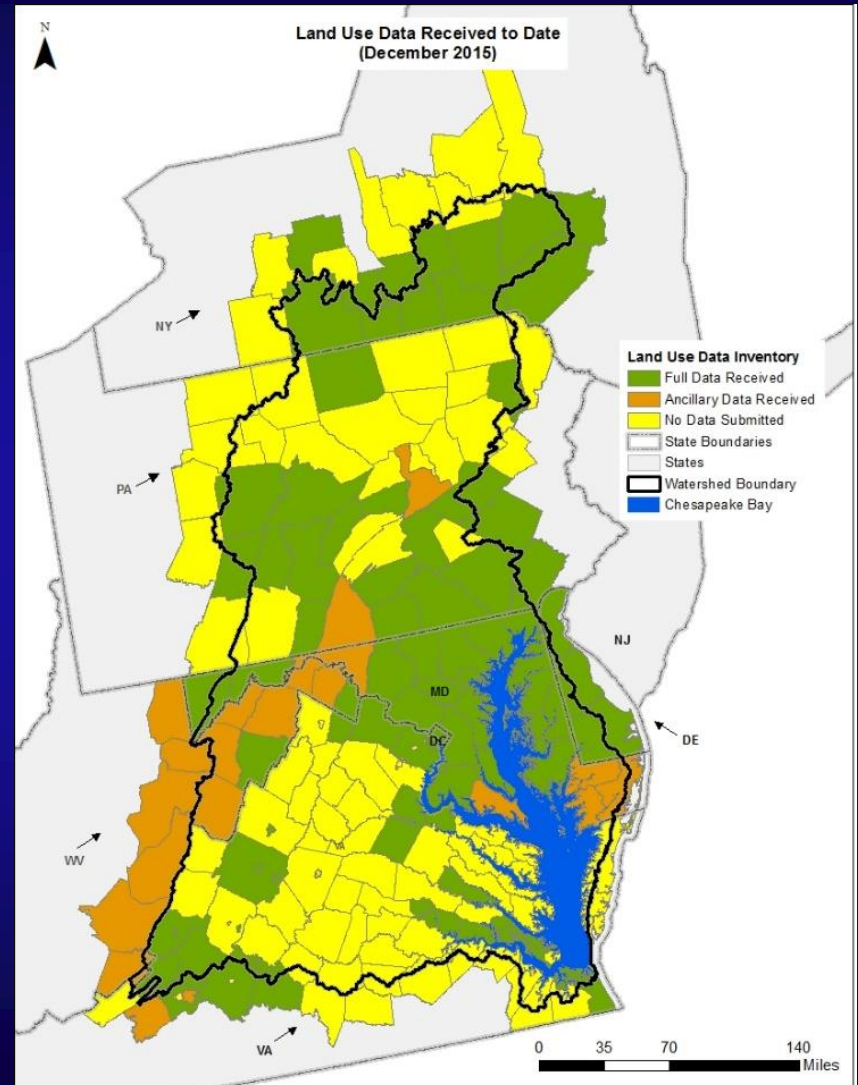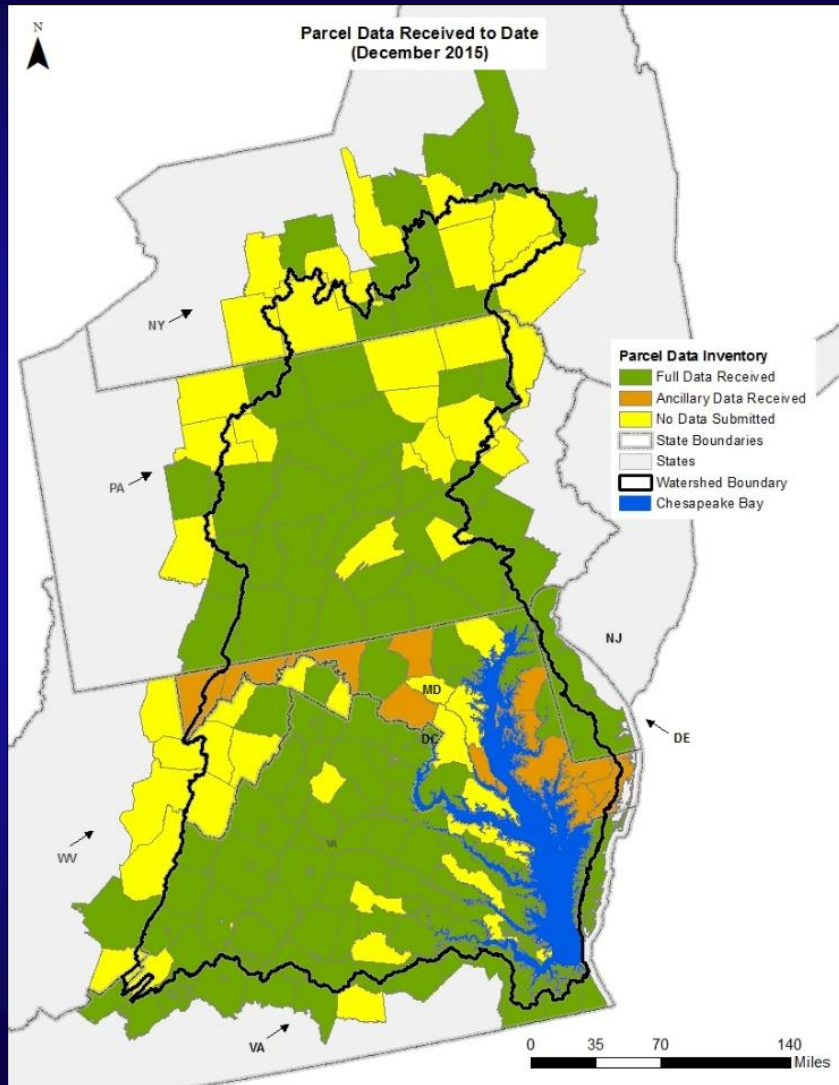
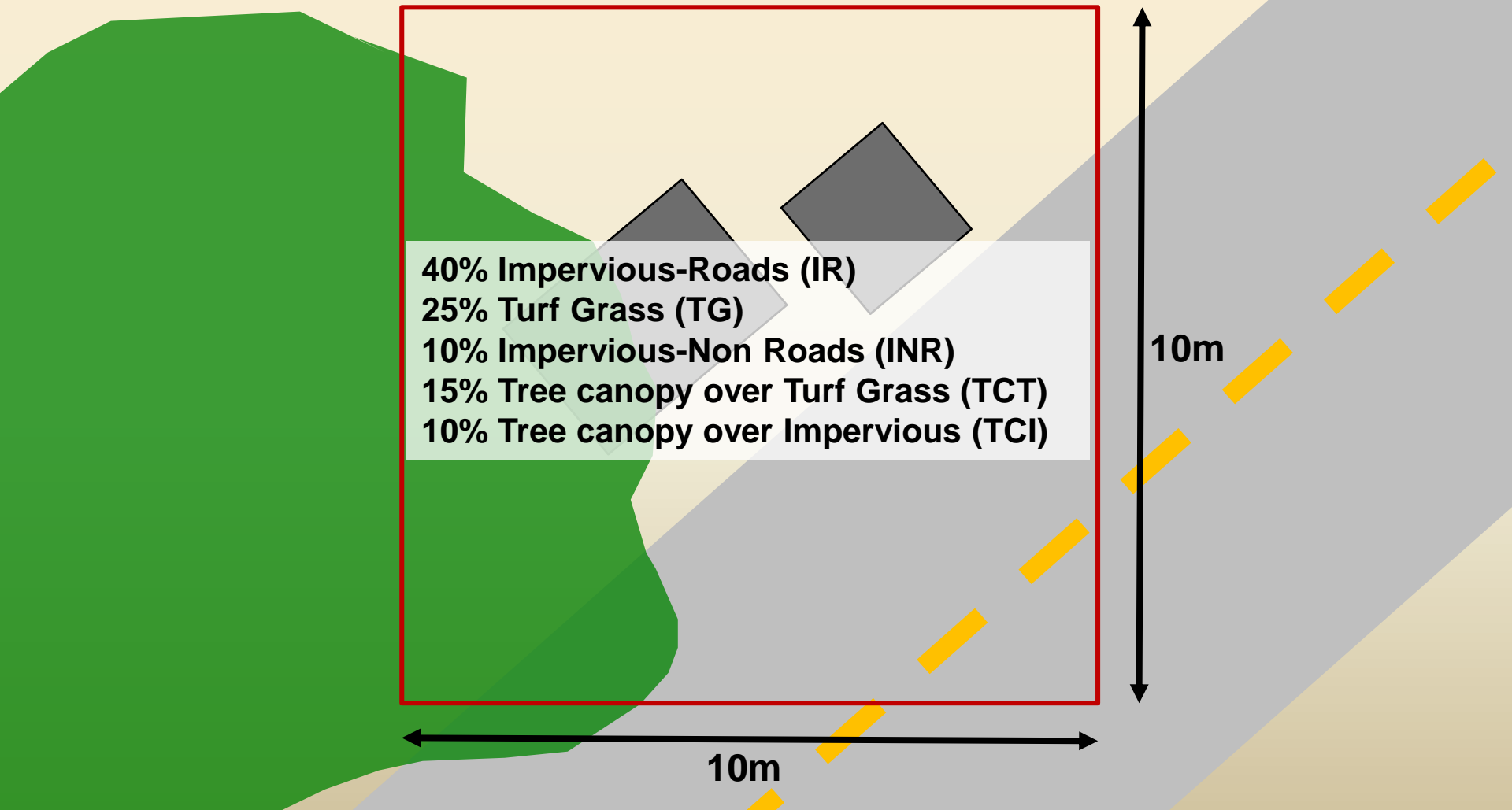# Land Cover to Land Use Crosswalk

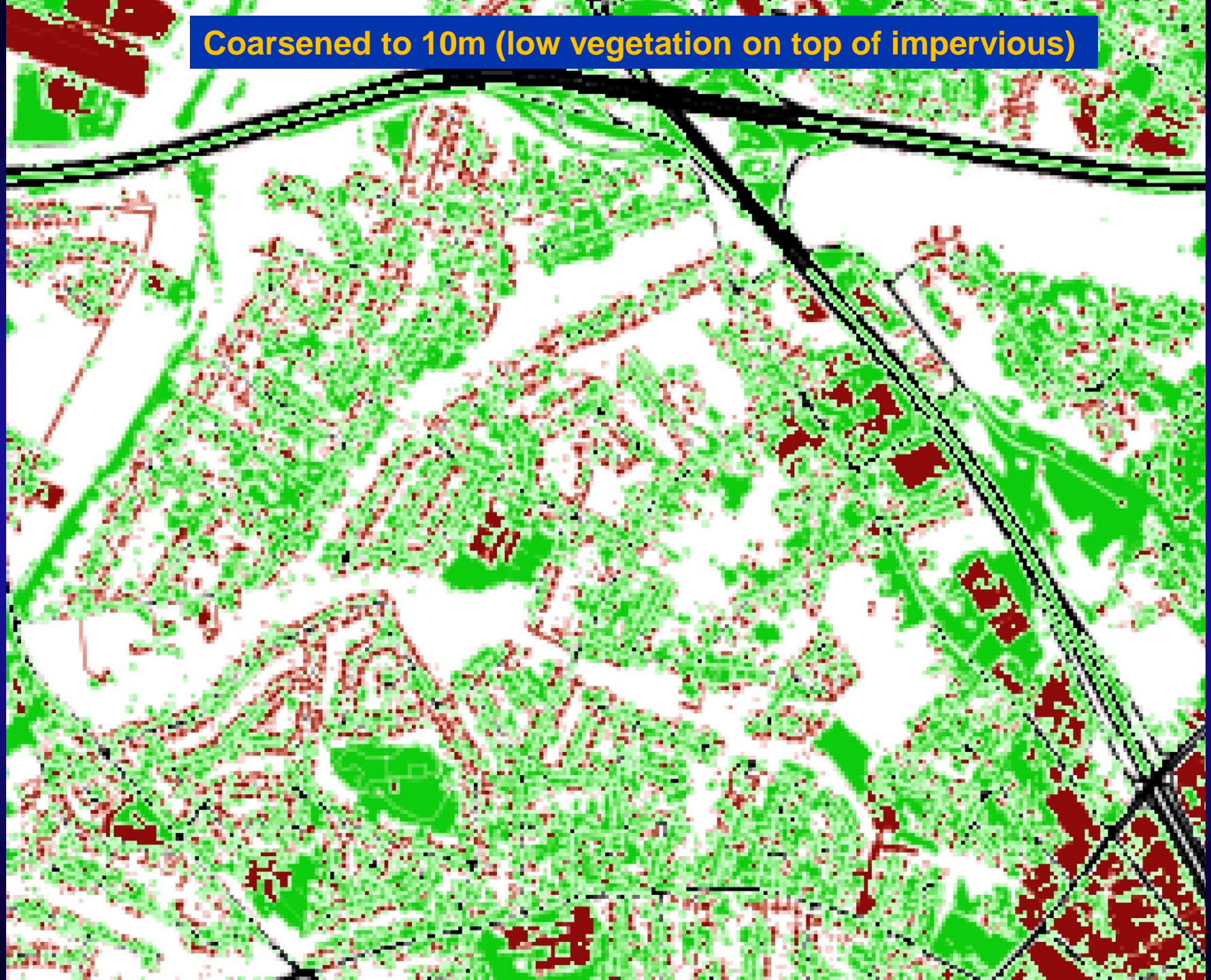| Chesapeake Conservancy/ UVM	Phase 6 CBP	Worldview Solutions Inc.
Water	Water + NWI + NHD	Water
Impervious Roads Impervious Structures Impervious Other	Impervious Roads Impervious Non-Roads	Impervious
Tree Canopy (TC) TC over Roads TC over Structures	Forest TC over Turf Grass TC over Impervious	Forest Trees Harvested/Disturbed
Scrub-shrub Barren	Open Space	Scrub-shrub Barren
Emergent Wetands	Tidal Wetlands + NWI & State data + Modeled occurrence	Wetlands
Low vegetation (herbaceous)	Turf Grass Pasture Cropland	Turf Grass Pasture Cropland

Phase 6 Land Use Database – from local & high-res data

- Thirteen different 10m resolution raster datasets
- Each cell includes the fractional composition of all land uses.

40% Impervious-Roads (IR)
25% Turf Grass (TG)
10% Impervious-Non Roads (INR)
15% Tree canopy over Turf Grass (TCT)
10% Tree canopy over Impervious (TCI)

10m

10m

Coarsened to 10m (low vegetation on top of impervious)

P6 Developed Land Uses

Impervious Roads: paved and unpaved roads and bridges.

Impervious Non-Roads: buildings, driveways, sidewalks, parking lots, runways, and some private roads.

Tree Canopy over Impervious: trees overhanging impervious surfaces.

Tree Canopy over Turf Grass: trees overhanging low vegetation within 30' to 80' of impervious non-roads.

Turf Grass: low vegetation within developed* areas that are potentially fertilized and assumed to have partially compacted soils with a shallow organic layer.

P6 Developed Areas- defined

With local data:

- Land Use: residential, commercial, industrial, recreational, institutional and other urban uses.
- Parcels: <= 5 acres with over 100-ft^2 of non-road impervious surfaces.

With national data:

- Census Blocks: average housing density >= 0.2 dwelling units per acre (e.g., less than 5-acre lots).
- Institutional and recreational areas (Falcone, 2015)

Impervious Non-Roads
over
Developed Land Uses
(national data)
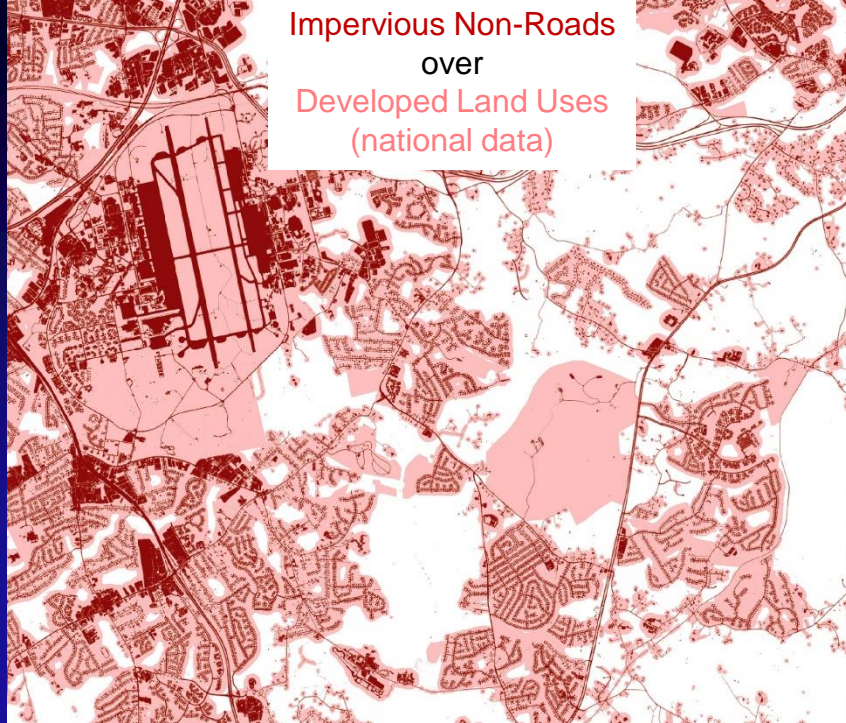
Impervious Non-Roads
over
Developed Land Uses
(local data)
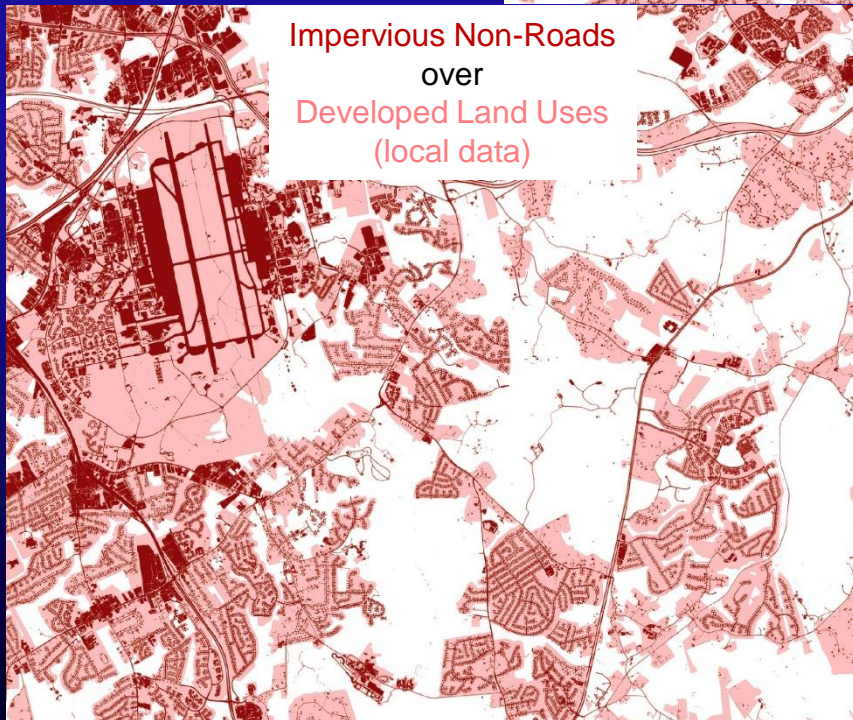
Impervious Non-Roads
over
Developed Parcels
(local data)
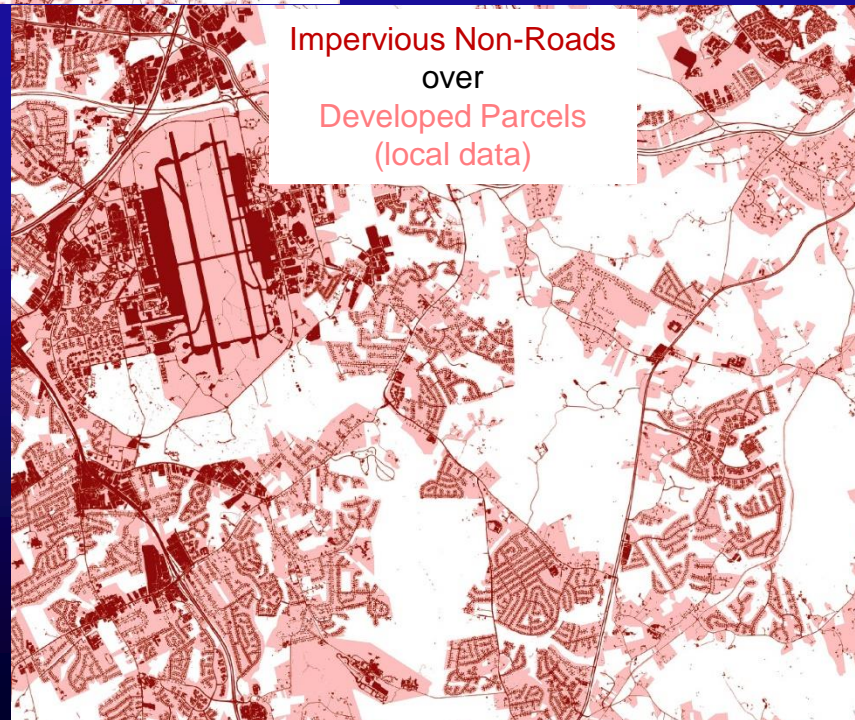
P6 Natural Land Uses

Forest: trees farther than 30' to 80' from impervious non-roads.

Wetlands: Areas mapped as wetlands in the National Wetlands Inventory (NWI), state wetland datasets, or areas modeled as wetlands based on soils, vegetation, and topography.

Open Space: barren, scrub-shrub, and low vegetation that is not turf grass or agriculture (e.g., beaches, vacant lots, transmission line right-of-ways, junkyards, fairgrounds, etc.).

Water: All waterbodies mapped in the National Hydrography Dataset (NHD-H, 1:24K scale), NWI water features, and high-resolution land cover as "water". All single-line NHD-H streams assumed to be 15' wide.

P6 Agricultural Land Uses

Agriculture (maximum potential area): low-vegetation lands outside developed areas that are not explicitly mapped as open space.

Potential cropland: low-vegetation lands outside developed areas that were classed as cropland at least once from 2008 – 2015 (annual NASS Cropland Data Layers).

Potential pasture/Hay: low-vegetation lands outside developed areas that were classed as pasture/hay at least once from 2008 – 2015 (annual NASS Cropland Data Layers).

Note: The above classes are used for distributing 18 different agricultural land uses reported in the Census of Agriculture from the county scale to sub-county watersheds. If fewer total agricultural acres are reported in the Census of Agriculture than are mapped, the remainder are considered to be "open space". If more acres are reported than mapped, the mapped data will take precedent.

Transitioning from Land Cover to P6 Land Use (DC, DE, MD, PA, NY, and WV)

Tree Canopy + GIS Analysis =

- Forest
- Tree Canopy over Turf Grass

Low Vegetation + Local Land Use =

- Turf Grass
- Open Space
- Potential Agriculture

    + NASS Cropland Data Layers =

    - Cropland (potential)
    - Pasture/Hay (potential)

Transitioning from Land Cover to P6 Land Use (DC, DE, MD, PA, NY, VA, and WV)

Water + NHD + NWI =

- Water

NWI + State Wetland Datasets + Modeled Wetlands + Floodplains =

- Floodplain wetlands
- Other wetlands

Transitioning from Land Cover to P6 Land Use (VA only)

Impervious + Roads =

- Impervious Roads
- Impervious Non-roads

Forest + Trees + Harvested Forest + Tree Canopy derived from leaf-on imagery + Impervious + GIS Analysis =

- Forest
- Tree Canopy over Turf
- Tree Canopy over Impervious

Forest vs Tree Canopy over Turf
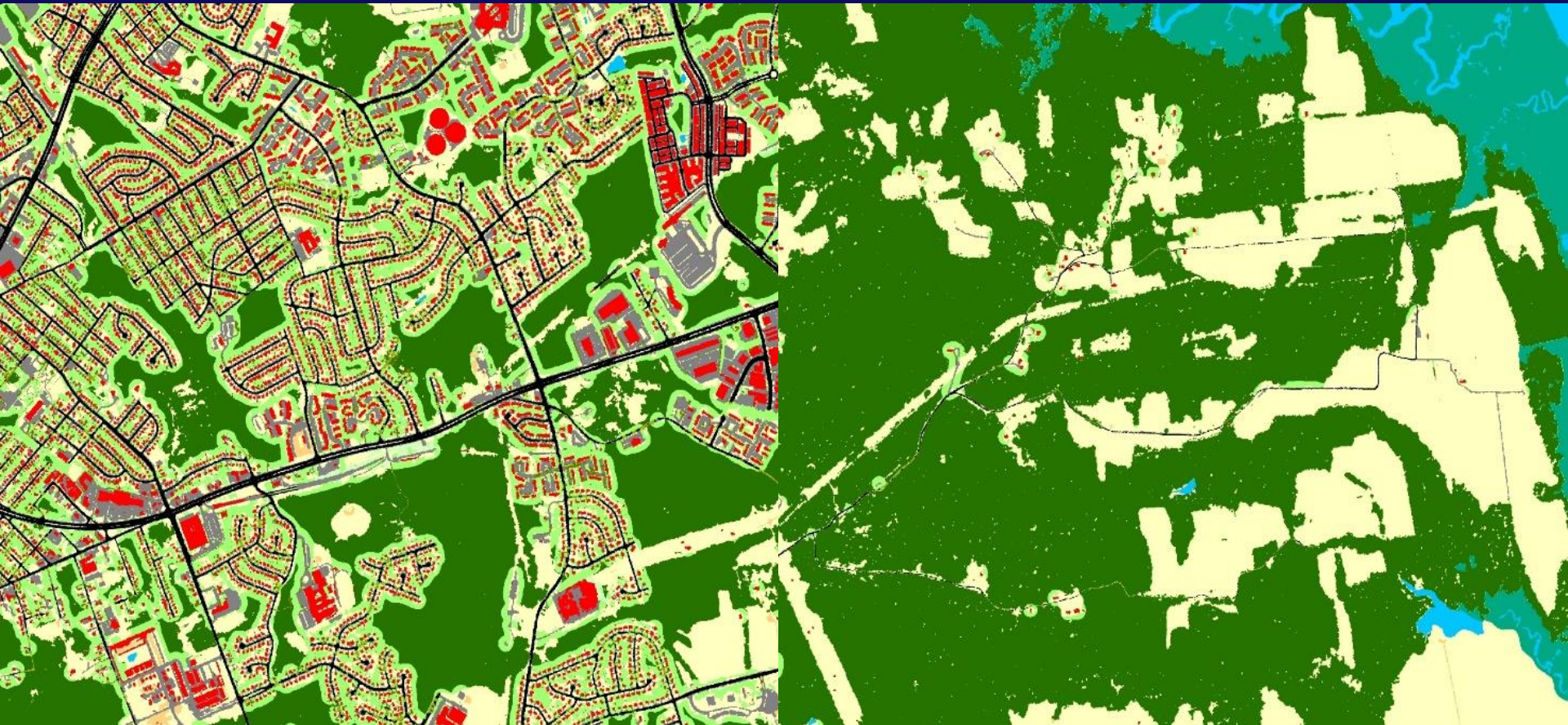
Urban Area

Rural Area

Forest

Tree Canopy over Turf

Turf Grass vs Agriculture
(land cover)
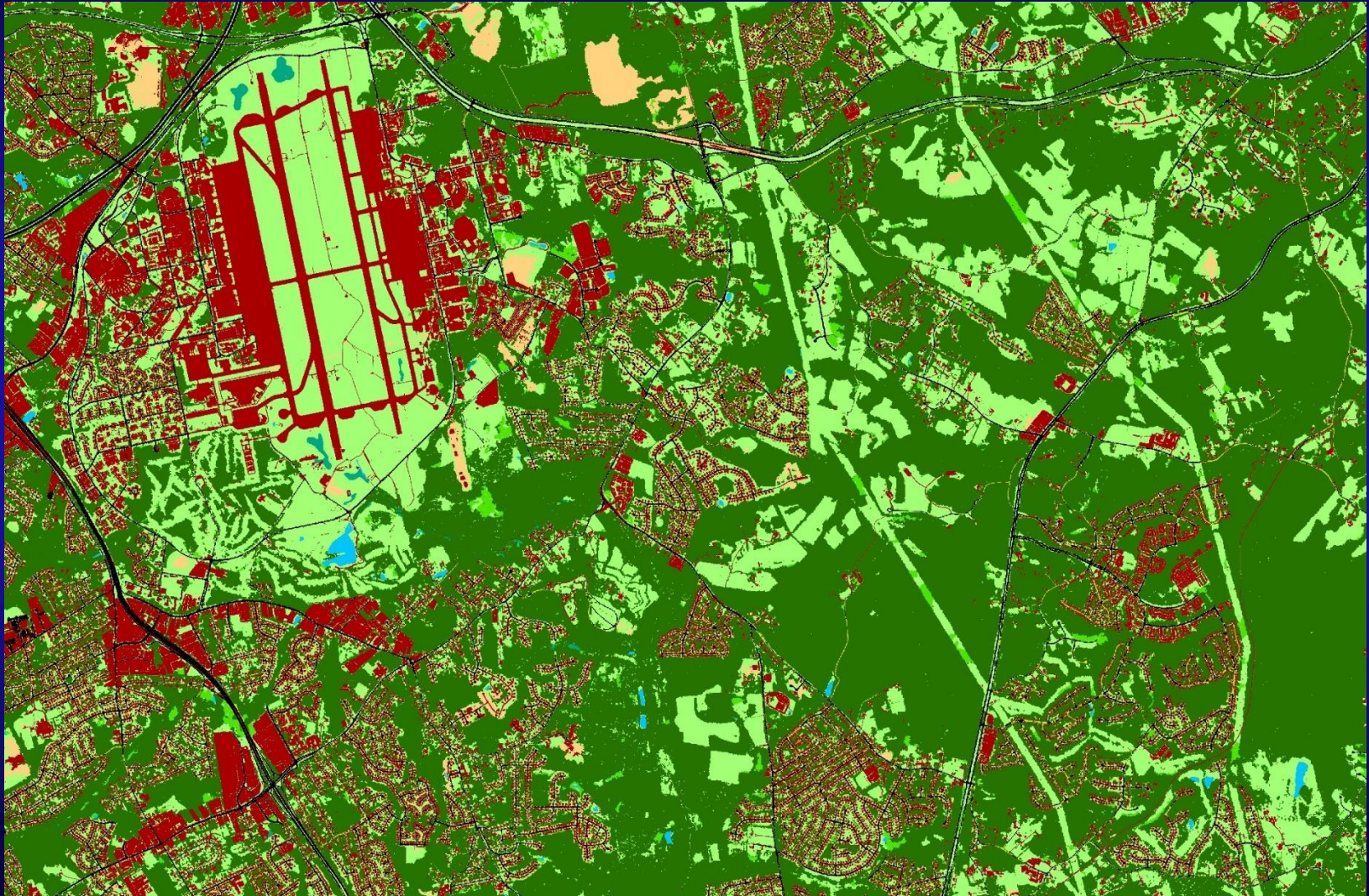
Turf Grass vs Agriculture
(low vegetation)
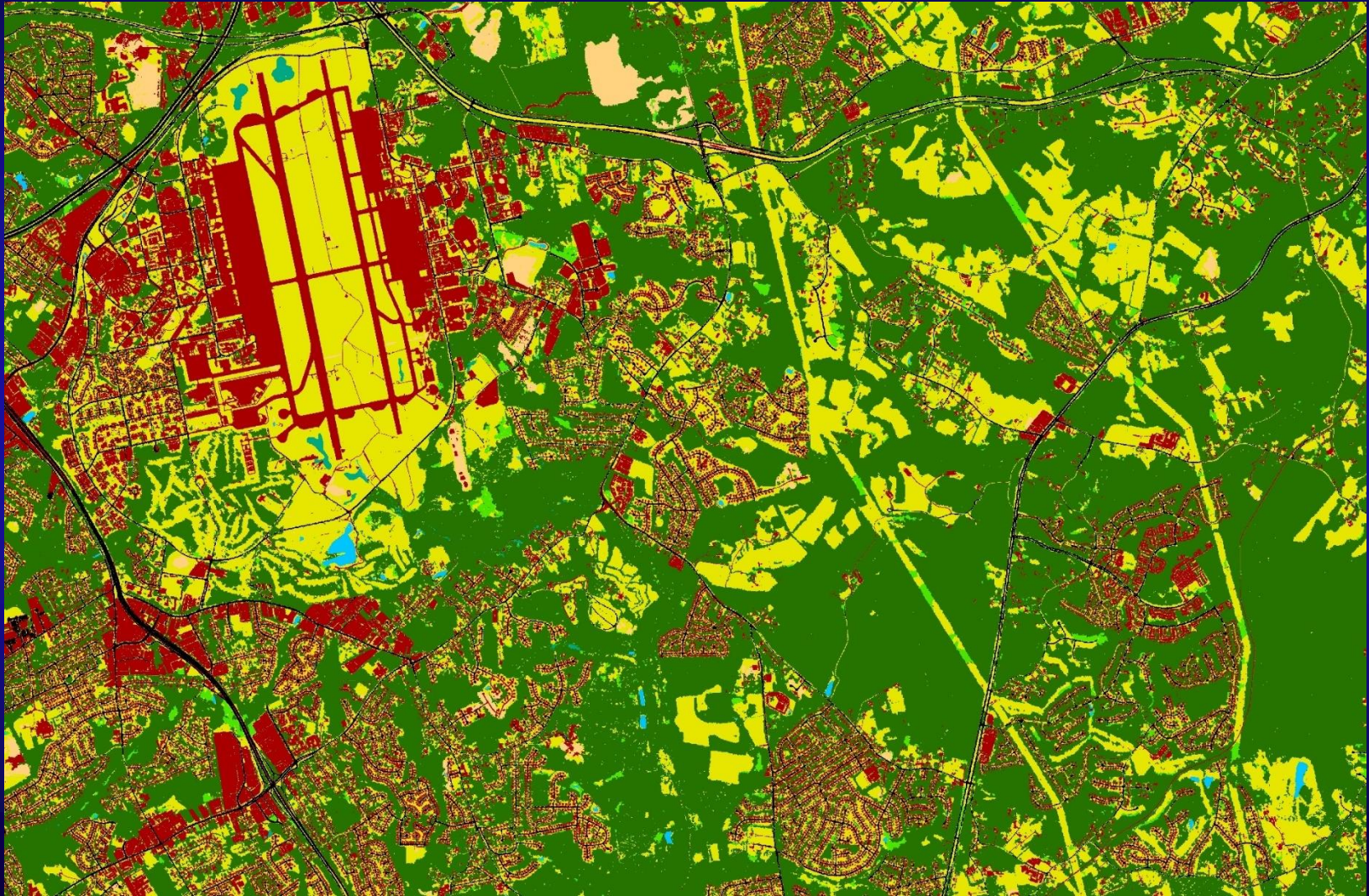
Turf Grass vs Agriculture
(developed land use overlay)
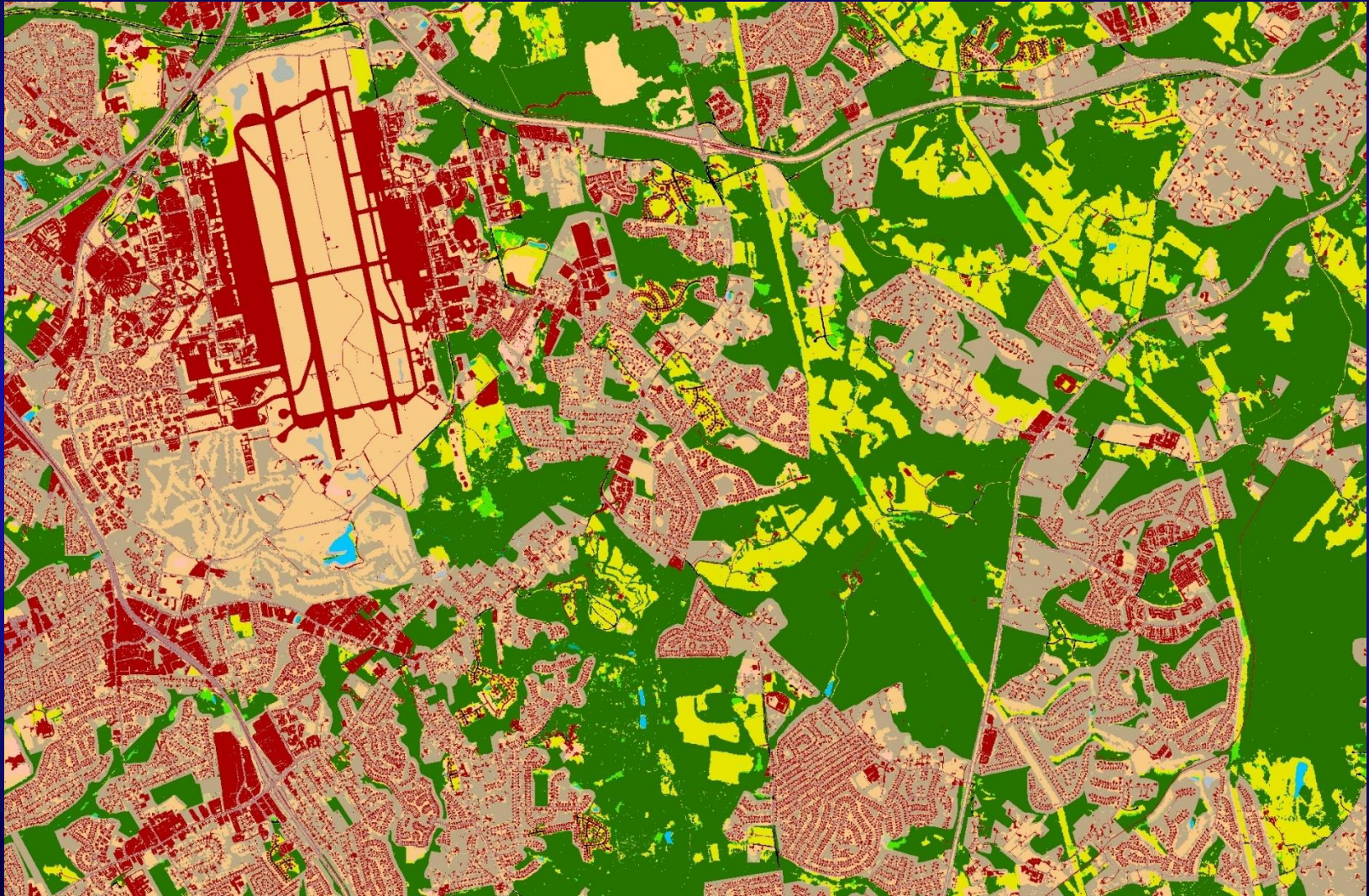
Water and Wetlands
(mapped from land cover)
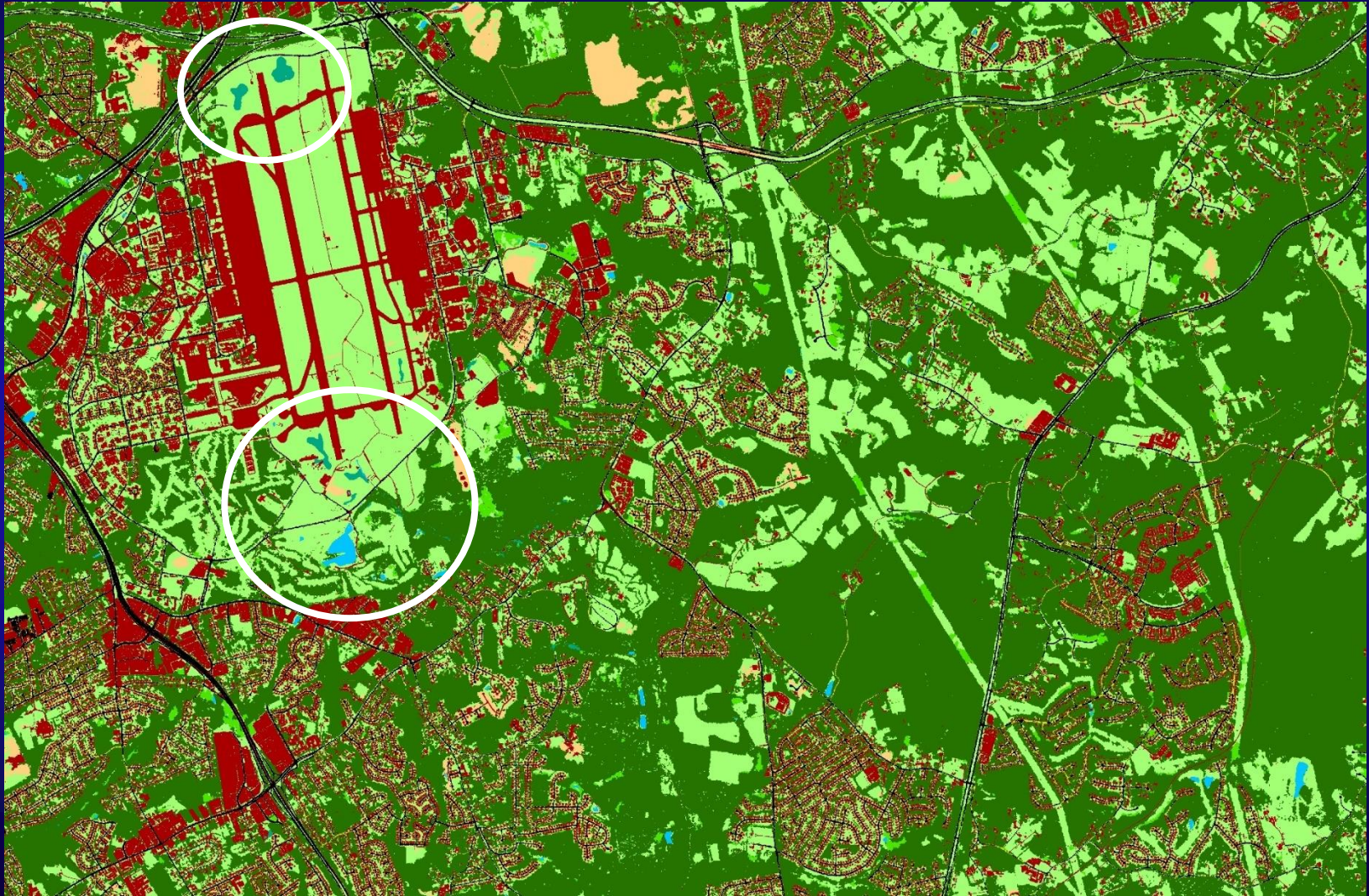
Water and Wetlands
(added from NHD and NWI)
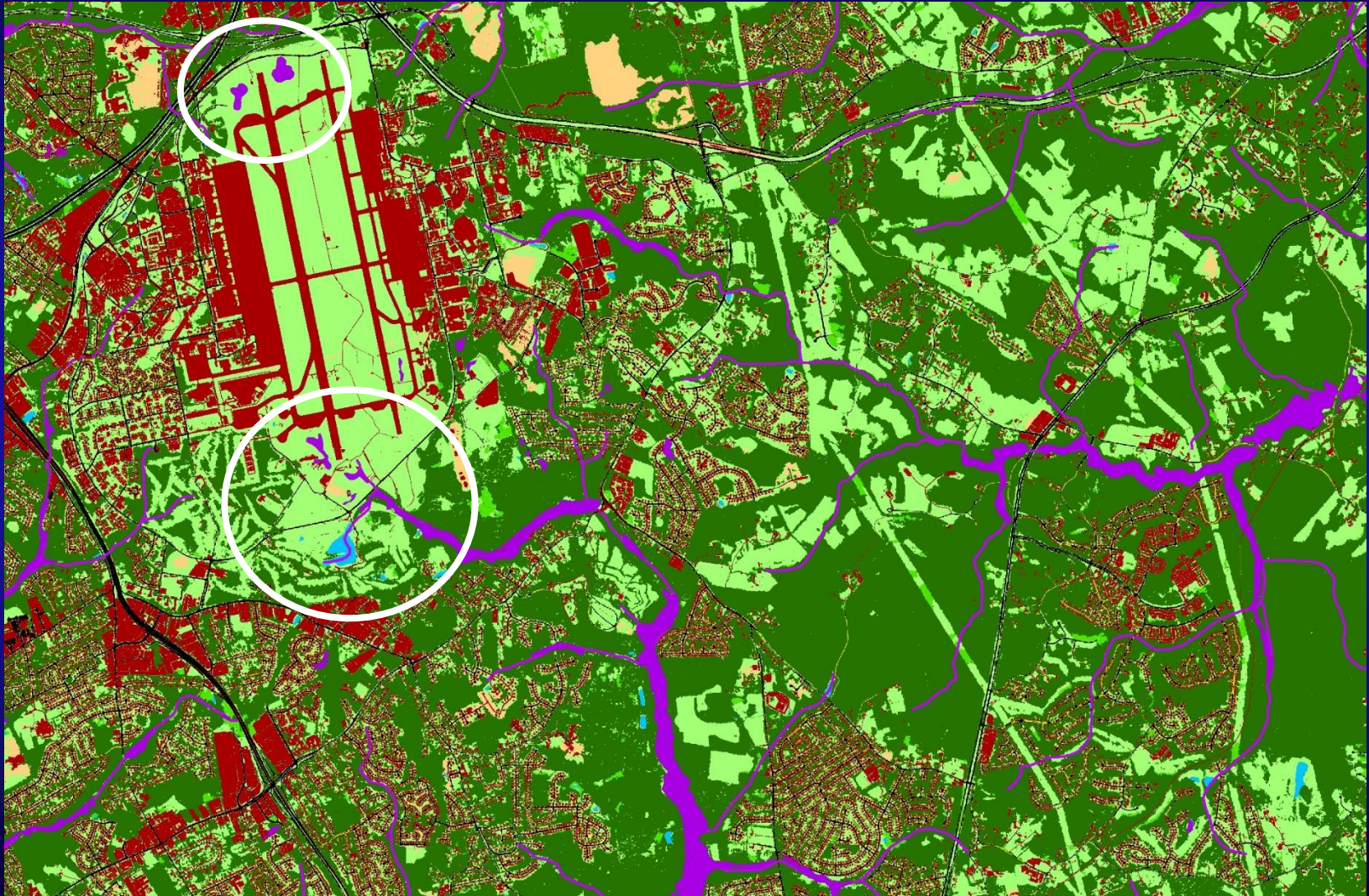
Phase 6 Land Use Database: Completion Dates

End Final	16-Mar	16-Apr	16-May	16-Jun	16-Jul	16-Aug	%/State
DC	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
DE	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
MD	29.2%	25.0%	16.7%	20.8%	4.2%	4.2%	100.0%
NY	0.0%	20.0%	50.0%	30.0%	0.0%	0.0%	100.0%
PA	0.0%	44.2%	23.3%	25.6%	7.0%	0.0%	100.0%
VA	0.0%	12.7%	19.6%	6.9%	56.9%	3.9%	100.0%
WV	0.0%	0.0%	7.1%	57.1%	35.7%	0.0%	100.0%

Phase 6 Land Use Database:
Local Review Start Dates

FIPS	ST	CNTYNAME	Vendor	LandCover Review Start	LandUse Revew Start	LandUse_Final
51111	VA	LUNENBURG	WSI	n/a	3/16/2016	4/20/2016
51113	VA	MADISON	WSI	n/a	3/18/2016	4/22/2016
51683	VA	MANASSAS	WSI	n/a	3/21/2016	4/25/2016
51685	VA	MANASSAS PARK	WSI	n/a	3/23/2016	4/27/2016
51125	VA	NELSON	WSI	n/a	3/25/2016	4/29/2016
51135	VA	NOTTOWAY	WSI	n/a	3/28/2016	5/2/2016
51137	VA	ORANGE	WSI	n/a	3/30/2016	5/4/2016
51145	VA	POWHATAN	WSI	n/a	4/1/2016	5/6/2016
51147	VA	PRINCE EDWARD	WSI	n/a	4/4/2016	5/9/2016
51153	VA	PRINCE WILLIAM	WSI	n/a	4/6/2016	5/11/2016
51157	VA	RAPPAHANNOCK	WSI	n/a	4/8/2016	5/13/2016
51177	VA	SPOTSYLVANIA	WSI	n/a	4/11/2016	5/16/2016
51179	VA	STAFFORD	WSI	n/a	4/13/2016	5/18/2016
24003	MD	ANNE ARUNDEL	CC	3/16/2016	4/15/2016	5/20/2016
24510	MD	BALTIMORE CTY	CC	3/19/2016	4/18/2016	5/23/2016
24023	MD	GARRETT	CC	3/21/2016	4/20/2016	5/25/2016
36003	NY	ALLEGANY	CC	3/23/2016	4/22/2016	5/27/2016

Chesapeake Bay Phase 6 Land Use Viewer

http://chesapeake.usgs.gov/phase6/

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For more information:

Webinar Recording, Project Description (whitepaper), Frequently Asked Questions (TBD), Production/Review Schedule (TBD): :
http://www.chesapeakebay.net/calendar/event/23454/

Phase 6 Land Use Database:

http://chesapeake.usgs.gov/phase6/

High-resolution Land Cover Data (VA):

http://gismaps.vita.virginia.gov/arcgis/rest/services

High-resolution Land Cover Data (DC, DE, MD, PA, NY, and WV):

- Separate websites will be developed and launched by CC and UVM for each batch of land cover data produced.

Phase 6 Land Use Database:
- U.S. Geological Survey: Fred Irani, firani@usgs.gov, Peter Claggett, pclaggett@usgs.gov

High-resolution Land Cover Datasets:
- Chesapeake Conservancy: Cassandra Pallai, cpallai@chesapeakeconservancy.org
- University of Vermont: Jarlath O'Neil-Dunne, Jarlath.ONeil-Dunne@uvm.edu
- Virginia Department of Environmental Quality: James Davis-Martin, James.Davis-Martin@deq.virginia.gov