



Chesapeake Bay Program
A Watershed Partnership

High-Resolution Land Cover/Use Updates

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Land Use Workgroup Coordinator**

**Water Quality GIT Call
December 10, 2018**

Remote Sensing Data

2017/18 NAIP

Ortho-imagery

LiDAR



nDSM



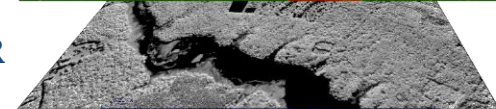
DEM



NDVI



NIR



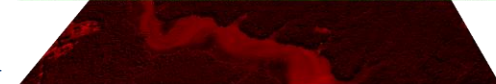
Blue



Green



Red



LIDAR Status By County

LIDAR availability within the Chesapeake Bay Watershed

+

Find address or place

🔍

🏠

📄

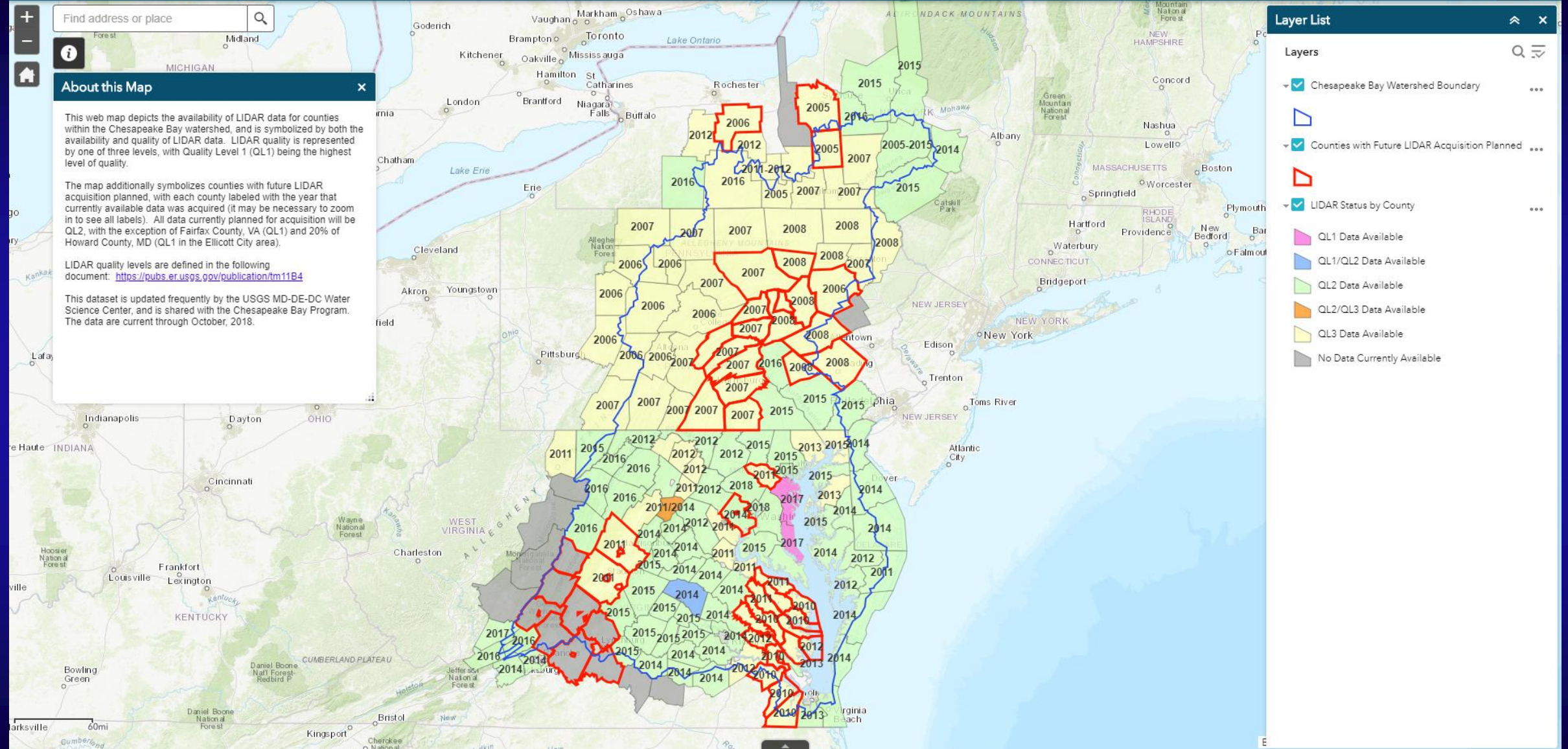
About this Map

This web map depicts the availability of LIDAR data for counties within the Chesapeake Bay watershed, and is symbolized by both the availability and quality of LIDAR data. LIDAR quality is represented by one of three levels, with Quality Level 1 (QL1) being the highest level of quality.

The map additionally symbolizes counties with future LIDAR acquisition planned, with each county labeled with the year that currently available data was acquired (it may be necessary to zoom in to see all labels). All data currently planned for acquisition will be QL2, with the exception of Fairfax County, VA (QL1) and 20% of Howard County, MD (QL1 in the Ellicott City area).

LIDAR quality levels are defined in the following document: <https://pubs.er.usgs.gov/publication/tm11B4>

This dataset is updated frequently by the USGS MD-DE-DC Water Science Center, and is shared with the Chesapeake Bay Program. The data are current through October, 2018.



Layer List

Layers

- ☒ Chesapeake Bay Watershed Boundary
- ☒ Counties with Future LIDAR Acquisition Planned
- ☒ LIDAR Status by County
 - QL1 Data Available
 - QL1/QL2 Data Available
 - QL2 Data Available
 - QL2/QL3 Data Available
 - QL3 Data Available
 - No Data Currently Available

Methods

- Initial semi-automated feature extraction with 900x the resolution of NLCD
 - Rule-based, object oriented image classification

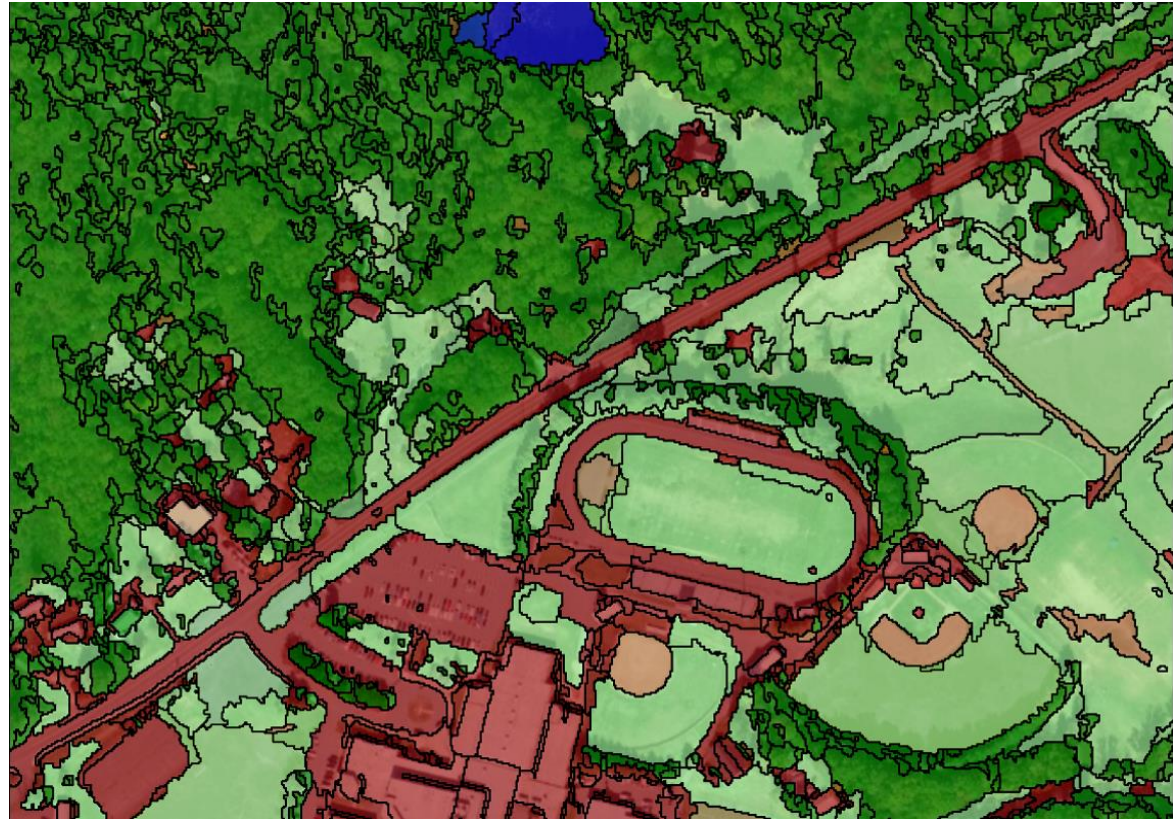
Work will be performed by the University of Vermont Spatial Analysis Laboratory



Methods

- Initial semi-automated feature extraction with 900x the resolution of NLCD
 - Rule-based, object oriented image classification
- Manual corrections

Work will be performed by the University of Vermont Spatial Analysis Laboratory



Local land use and parcel data



- Low-density Residential
- Recreation
- Agriculture
- Roads

High-resolution land cover data



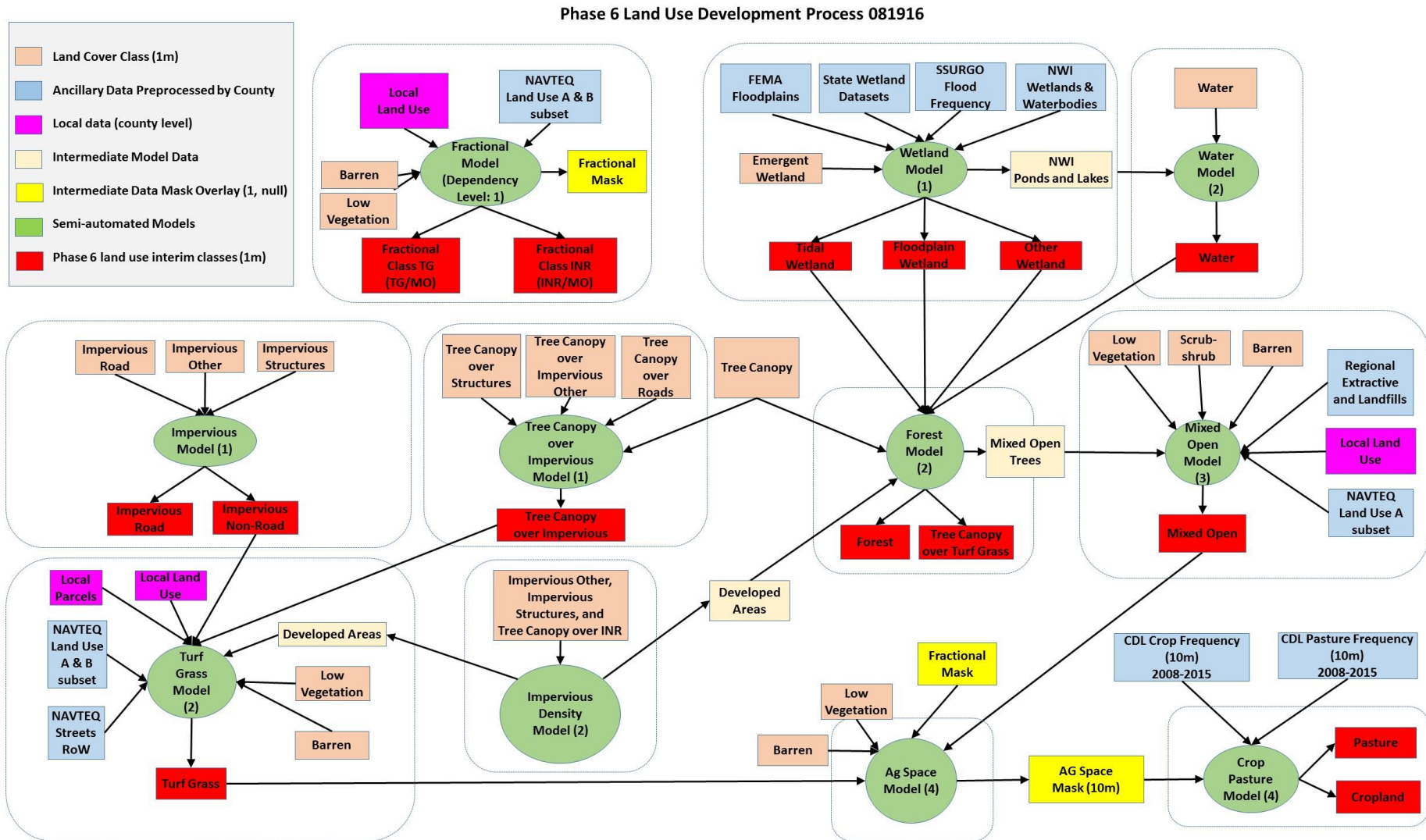
- Impervious surfaces
- Tree canopy
- Low vegetation
- Water



Phase 6 Land Uses

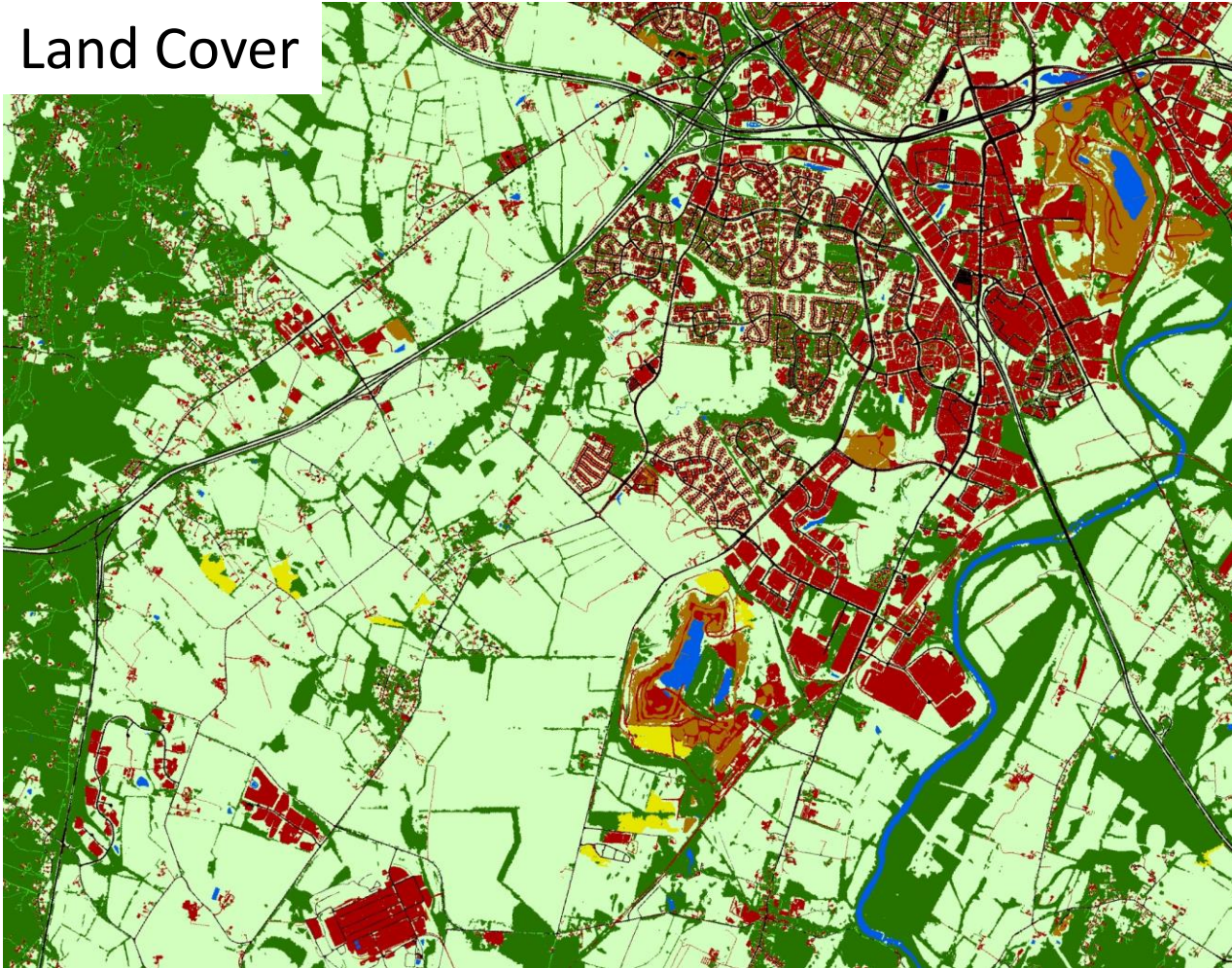
- Impervious-Roads
- Forests
- Turf Grass
- Open Space

Phase 6 Land Use Model

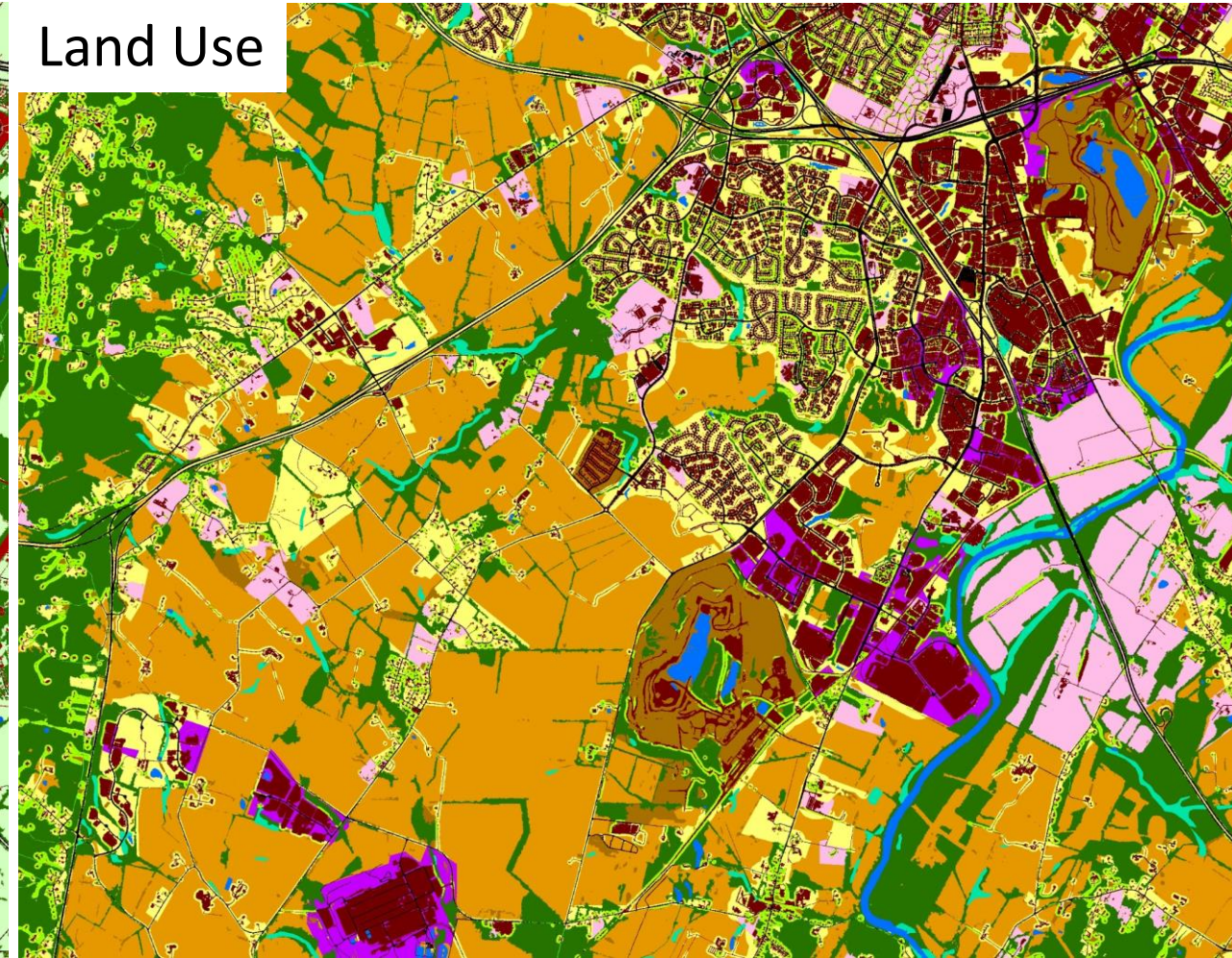


Establishment of a 2013 baseline for monitoring land cover and land use change

Land Cover

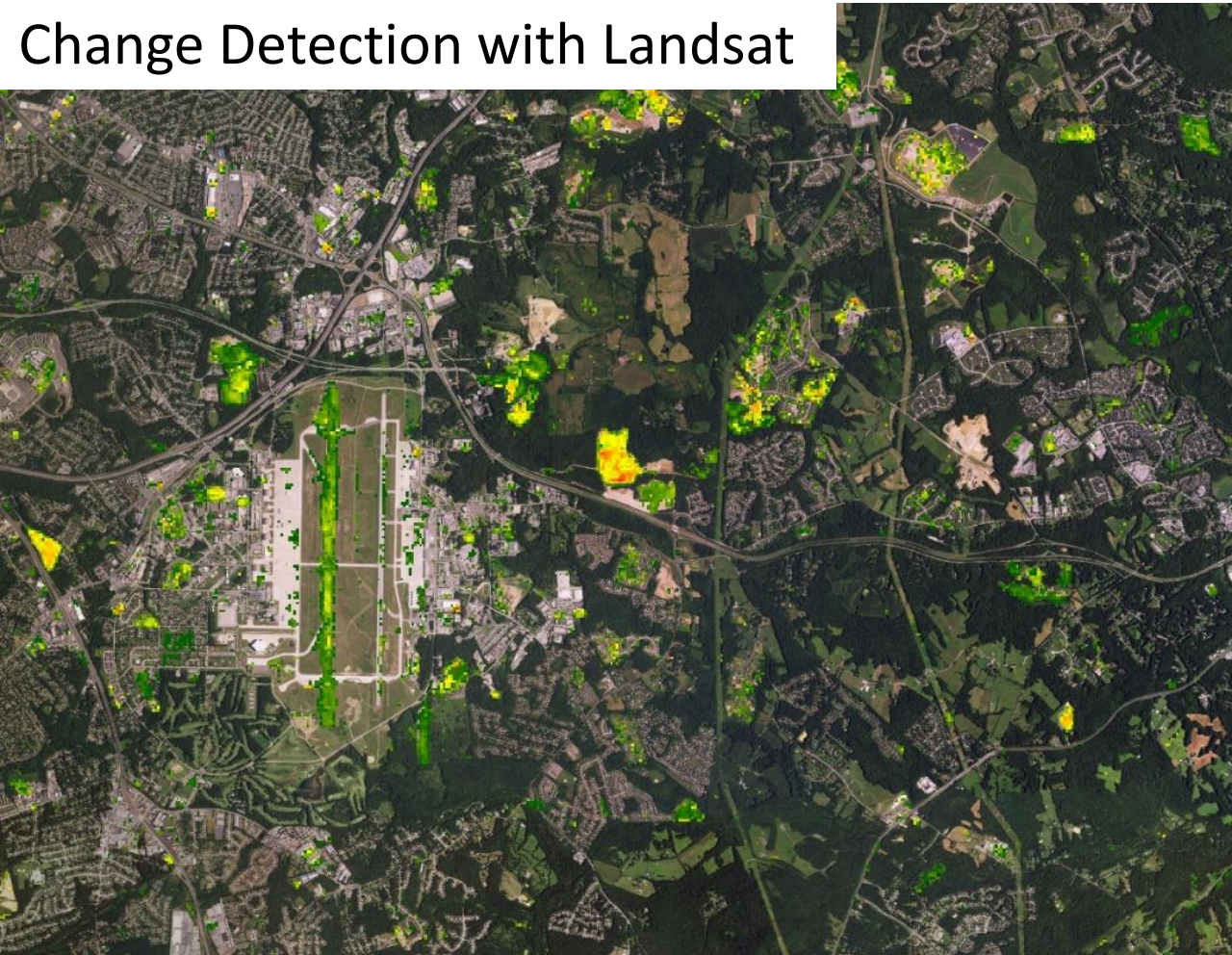


Land Use



“Hot Spot” change mapping is most efficient method for 2-year
land cover/use updates

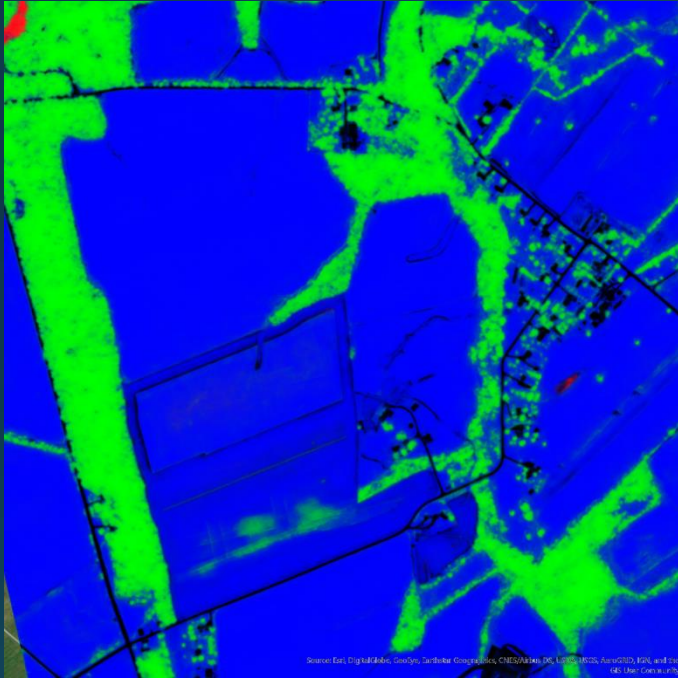
Change Detection with Landsat



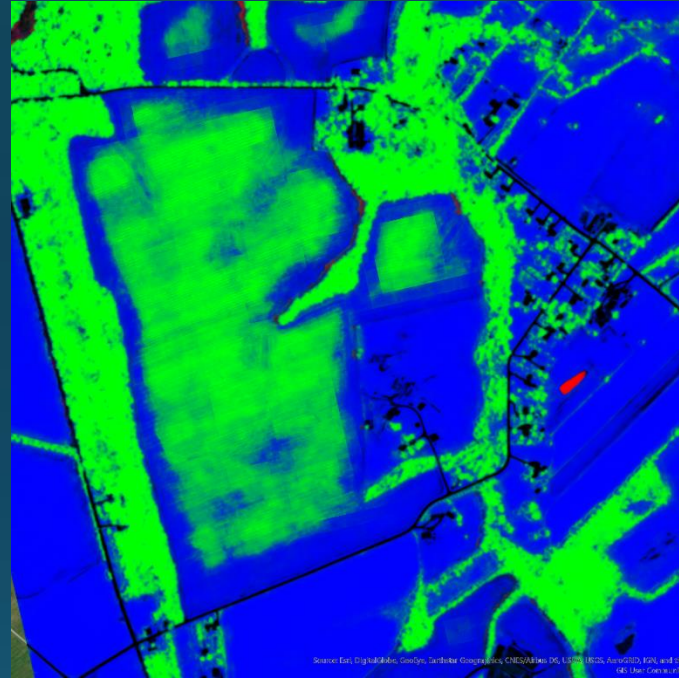
Noise in 1m Resolution Change Detection



Microsoft Land Cover- AI Probabilistic Methods



2013 probability



2015 probability



Resulting LC raster

Combining LCMAP and Microsoft AI

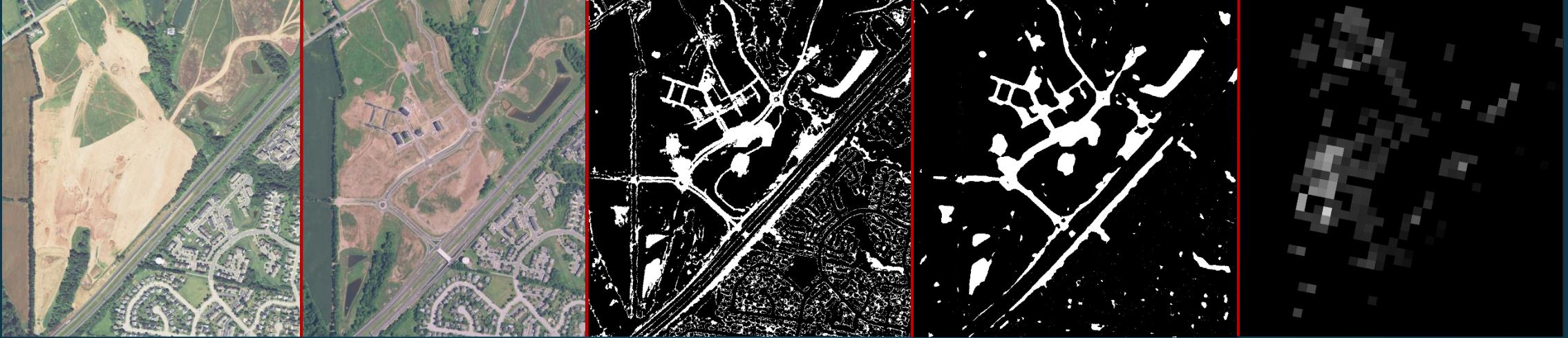
2013

2015

MSFT raw

MSFT Focal (15 pixel)

LCMAP ChangeMag



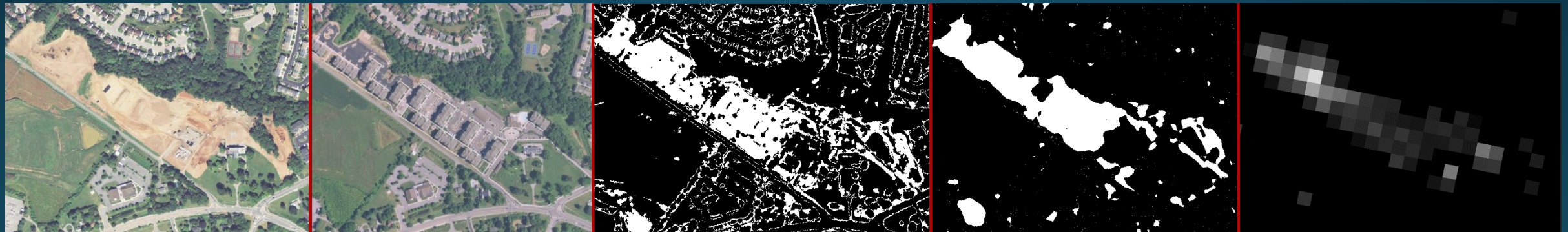
2013

2015

MSFT raw

MSFT Focal (15 pixel)

LCMAP ChangeMag



High-Res Land Use Production Schedule

June 2019:

- Land cover dataset update to 2017/18 conditions using “hot spots” of change
- Finalization of classification scheme with additional classes under consideration:
 - Deciduous vs evergreen trees, Timber harvests, Vegetation height, Cover crops, Center-pivot irrigation, Vineyards, Nurseries, Greenhouses, Orchards, Solar fields, Chicken houses, Ponds
- Update local ancillary datasets (e.g., parcels, land use, zoning, sewer service areas)

June 2020:

- Wall-to-wall update of high-res land cover (2017/18 NAIP imagery)
- Update of 2013/14 high-res land cover

June 2021:

- Wall-to-wall update of high-res land use (2013/14 and 2017/18)
- Land cover updated to 2019/2020 conditions using hot spots of change
- Analysis of land cover change 2013/14 – 2017/18

June 2022:

- Accuracy Assessment and Lesson’s Learned Report
- Update local ancillary datasets (e.g., parcels, land use, zoning, sewer service areas)

June 2023:

- Wall-to-wall update of high-res land cover (2013/14, 2017/18, and 2021/22 NAIP imagery)

June 2024:

- Wall-to-wall update of high-res land use (2013/14, 2017/18, and 2021/22 NAIP imagery)
- Final Report and Accuracy Assessment