



Characterizing Land Cover/Use Conditions in the Chesapeake Bay Watershed

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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



Chesapeake Bay Watershed Land Uses

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

Remote Sensing Data

2013 NAIP

Ortho-imagery

LiDAR



nDSM



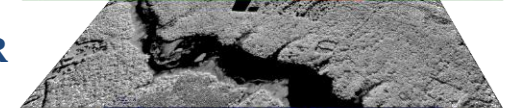
DEM



NDVI



NIR



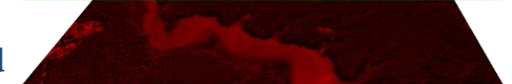
Blue



Green

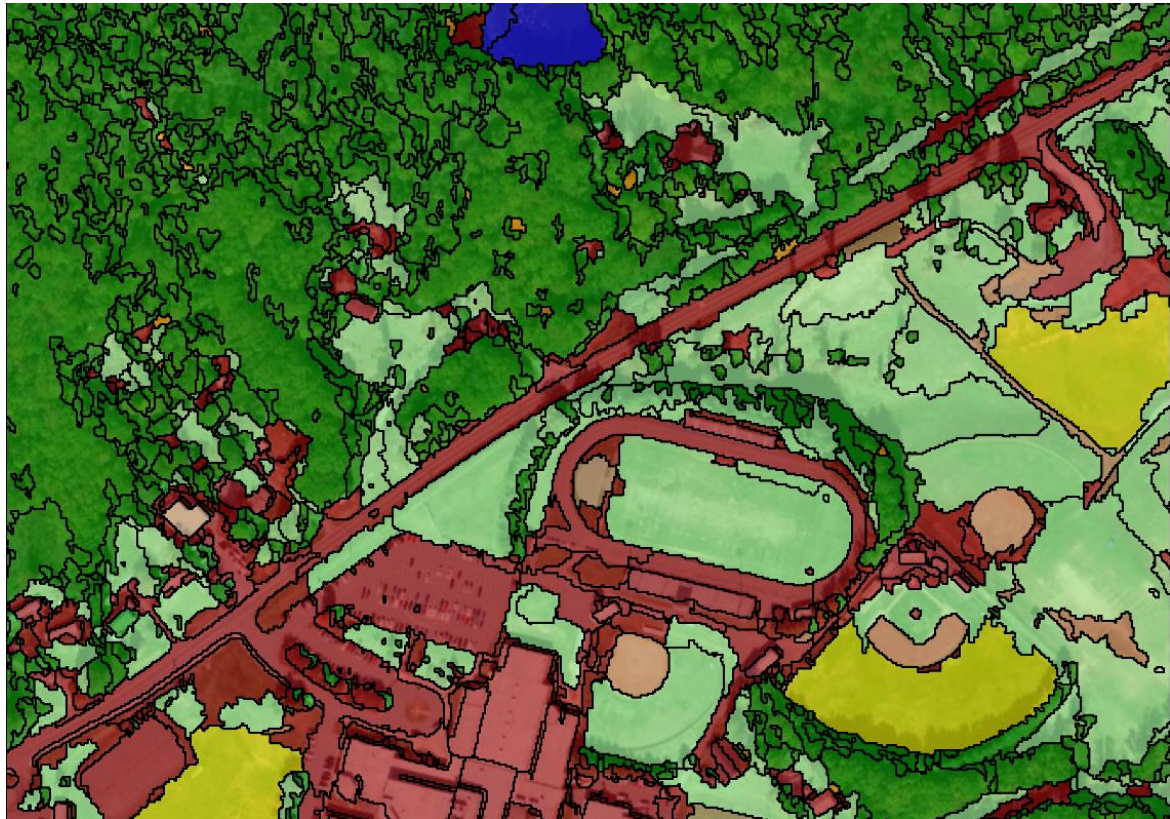


Red



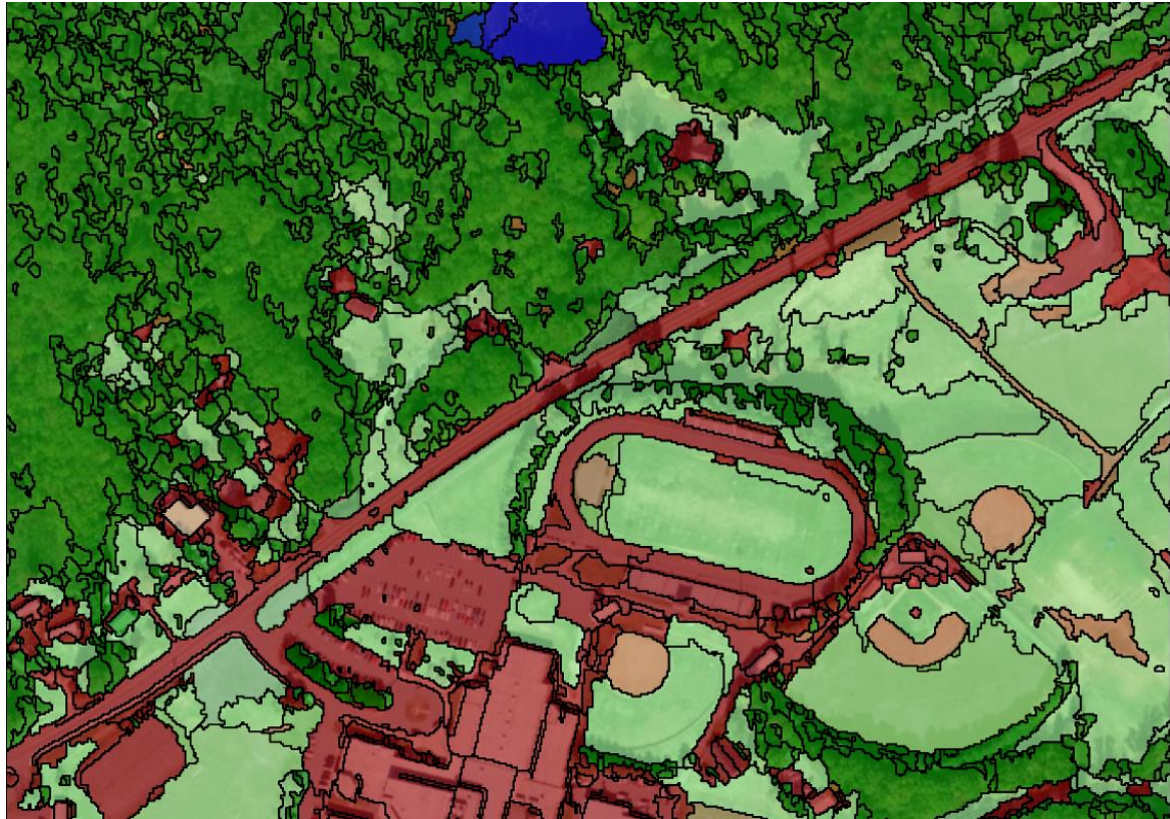
Methods

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

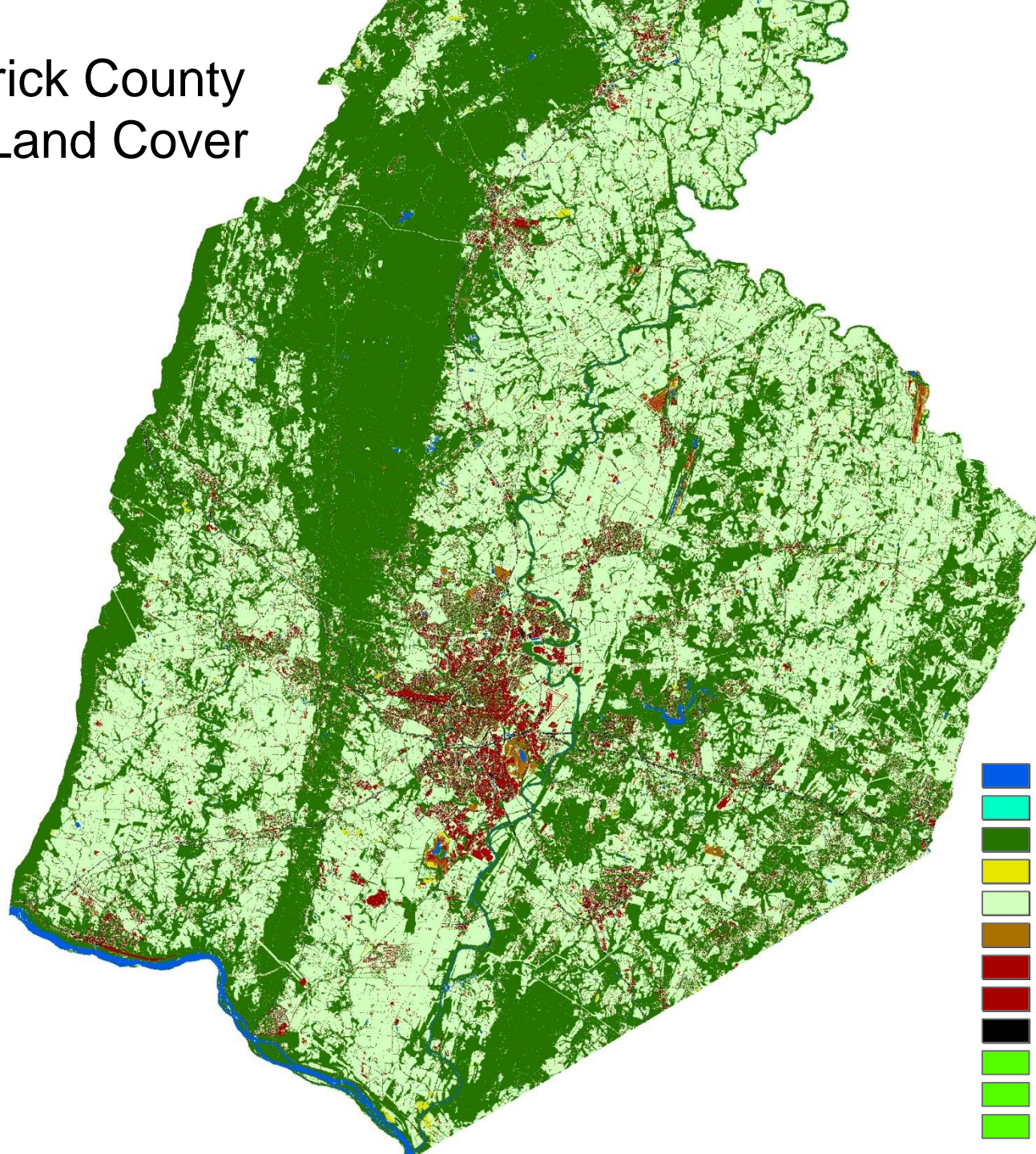


Methods

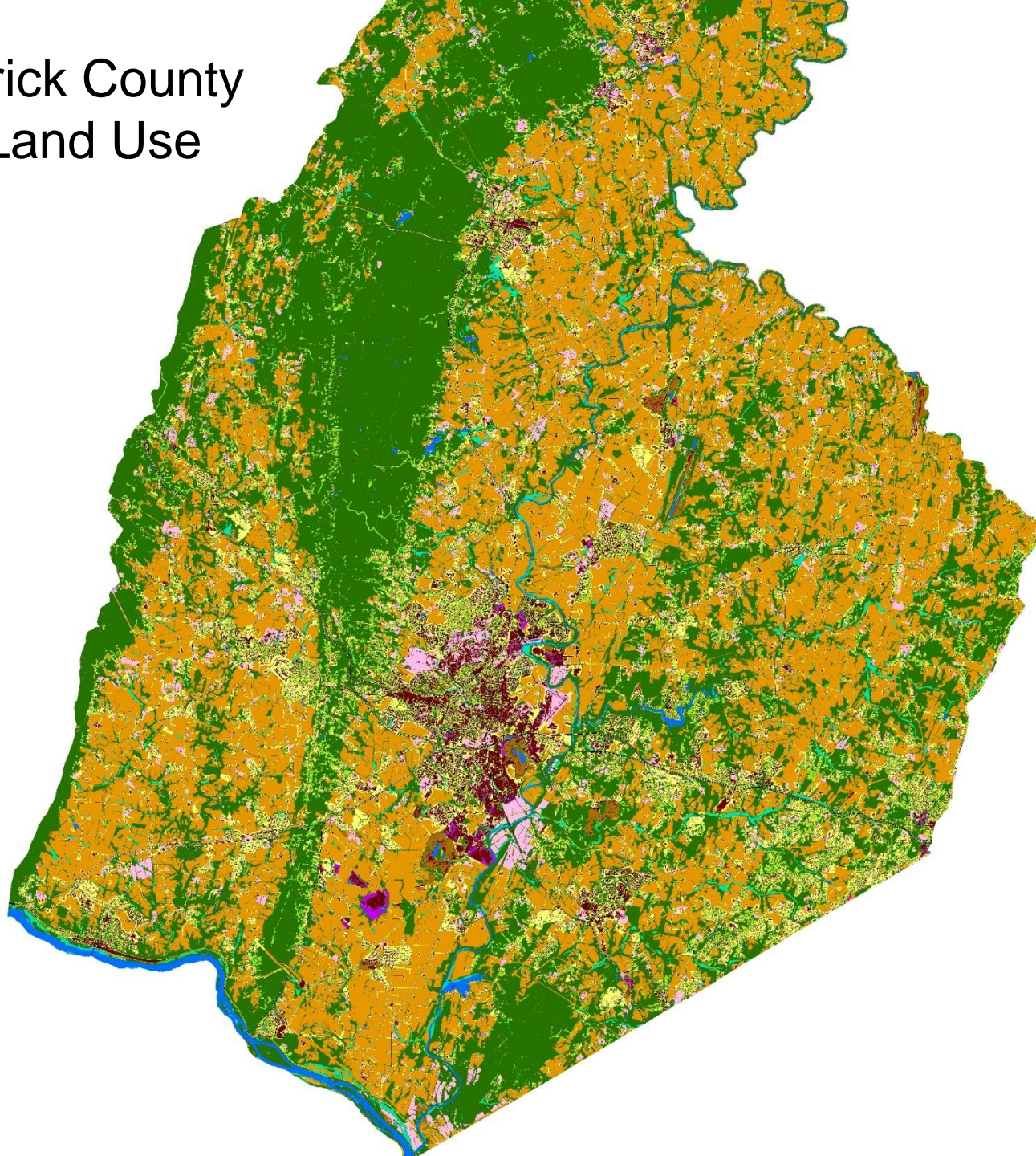
- Initial semi-automated feature extraction with 900x the resolution of NLCD
 - Rule-based, object oriented image classification
- Manual corrections



Frederick County 2013 Land Cover



Frederick County 2013 Land Use

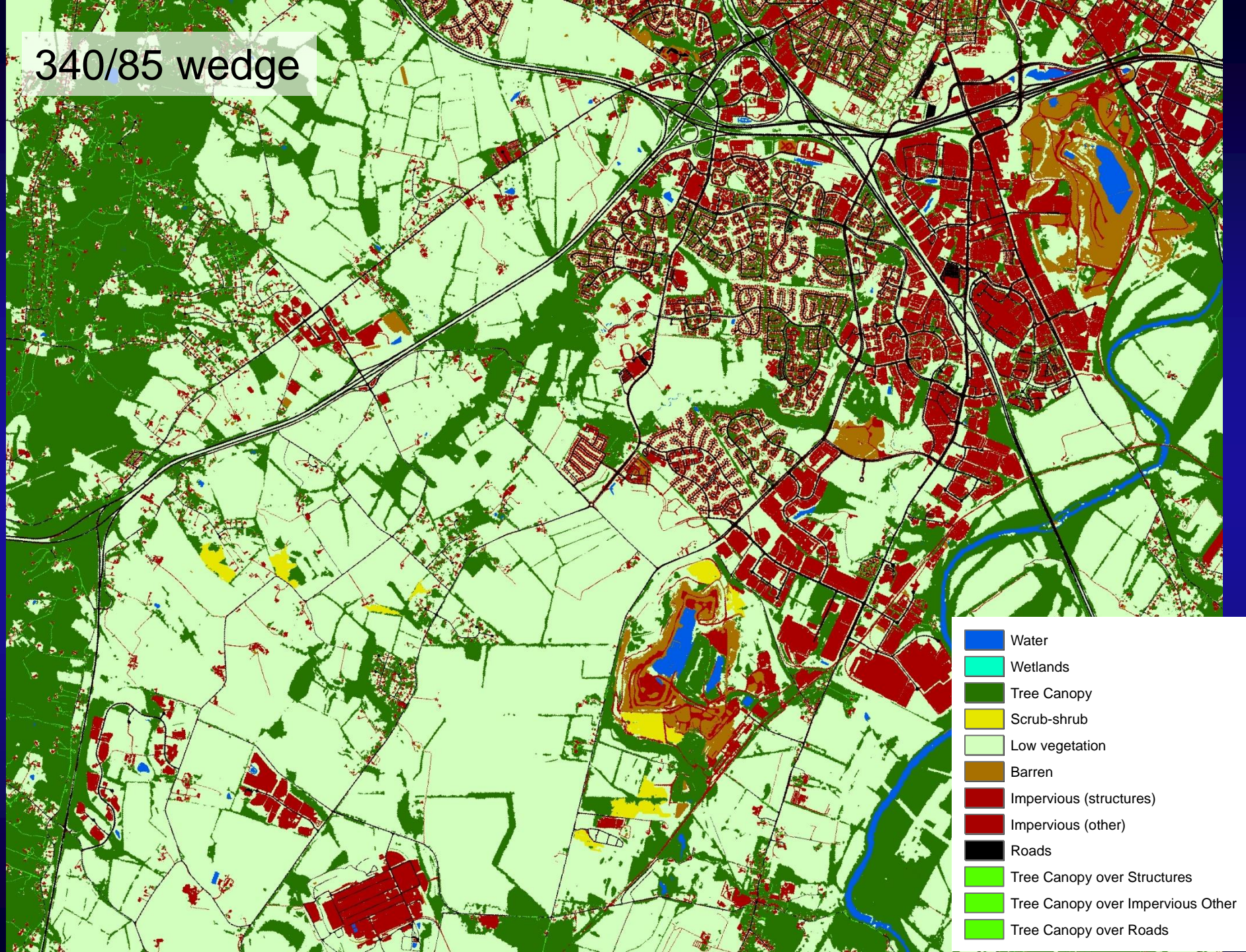


- Impervious, Road
- Impervious, Non-Road
- Tree Canopy over Impervious
- Water
- Tidal Wetlands
- Floodplain Wetlands
- Other Wetlands
- Forest
- Tree Canopy over Turf
- Mixed Open
- Fractional Turf (small)
- Fractional Turf (med)
- Fractional Turf (large)
- Fractional Impervious
- Turf Grass
- Agriculture

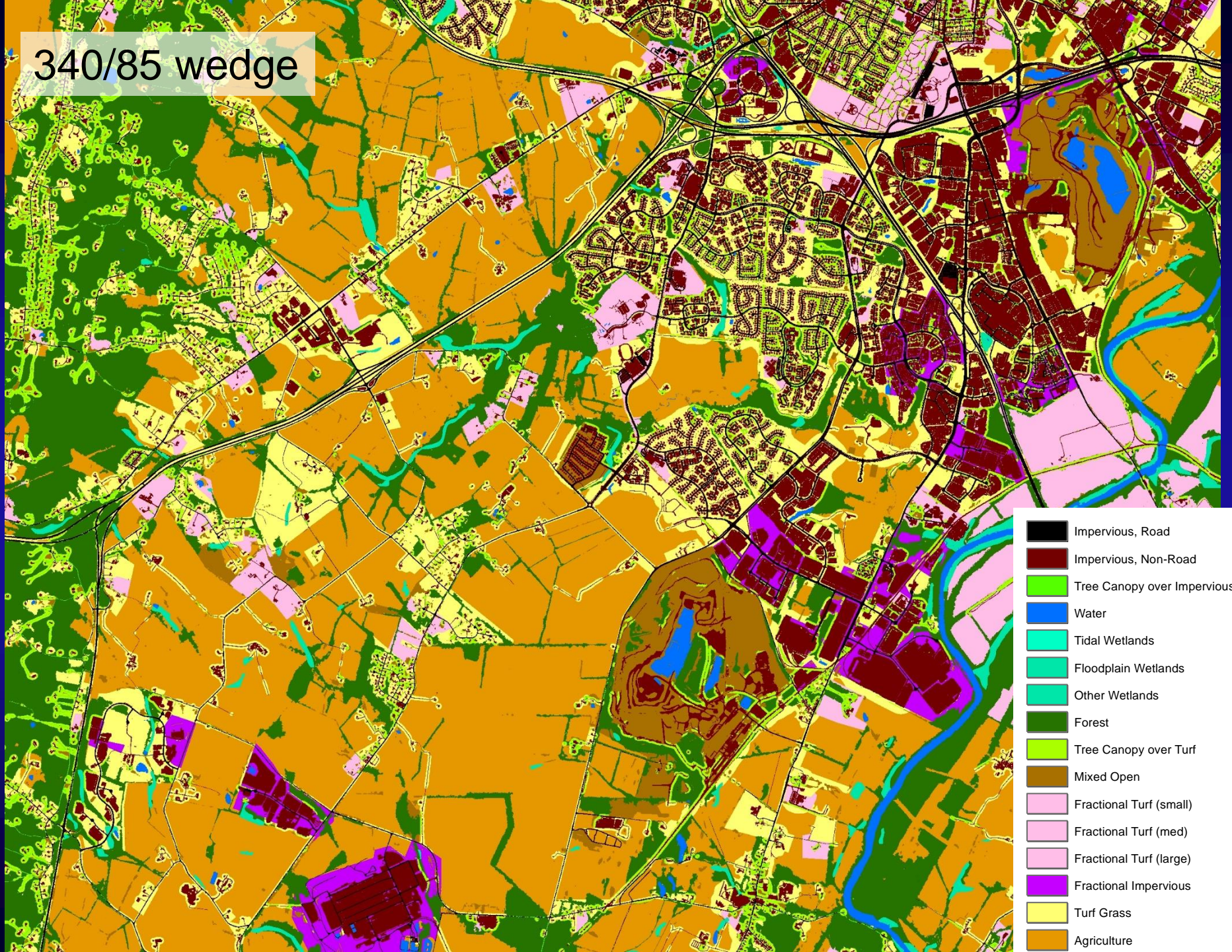
340/85 wedge



340/85 wedge



340/85 wedge



Phase 6 Error Rates for 2013 conditions

Census of Agriculture (2012)

- Mean: 83.8% (59.8% - 95.2%) (0.05 – 0.95 percentiles)
- Applied to cropland, pasture, mixed open, and turf grass
- VA Turf Grass assigned an accuracy of 72%. VA crop and pasture may receive accuracies of 95% and 91% respectively.

Impervious roads: 92% (74% - 100%)

Impervious Non-Roads: 93% (88% - 97%)

Tree Canopy over Impervious: 59% (19% - 92%)

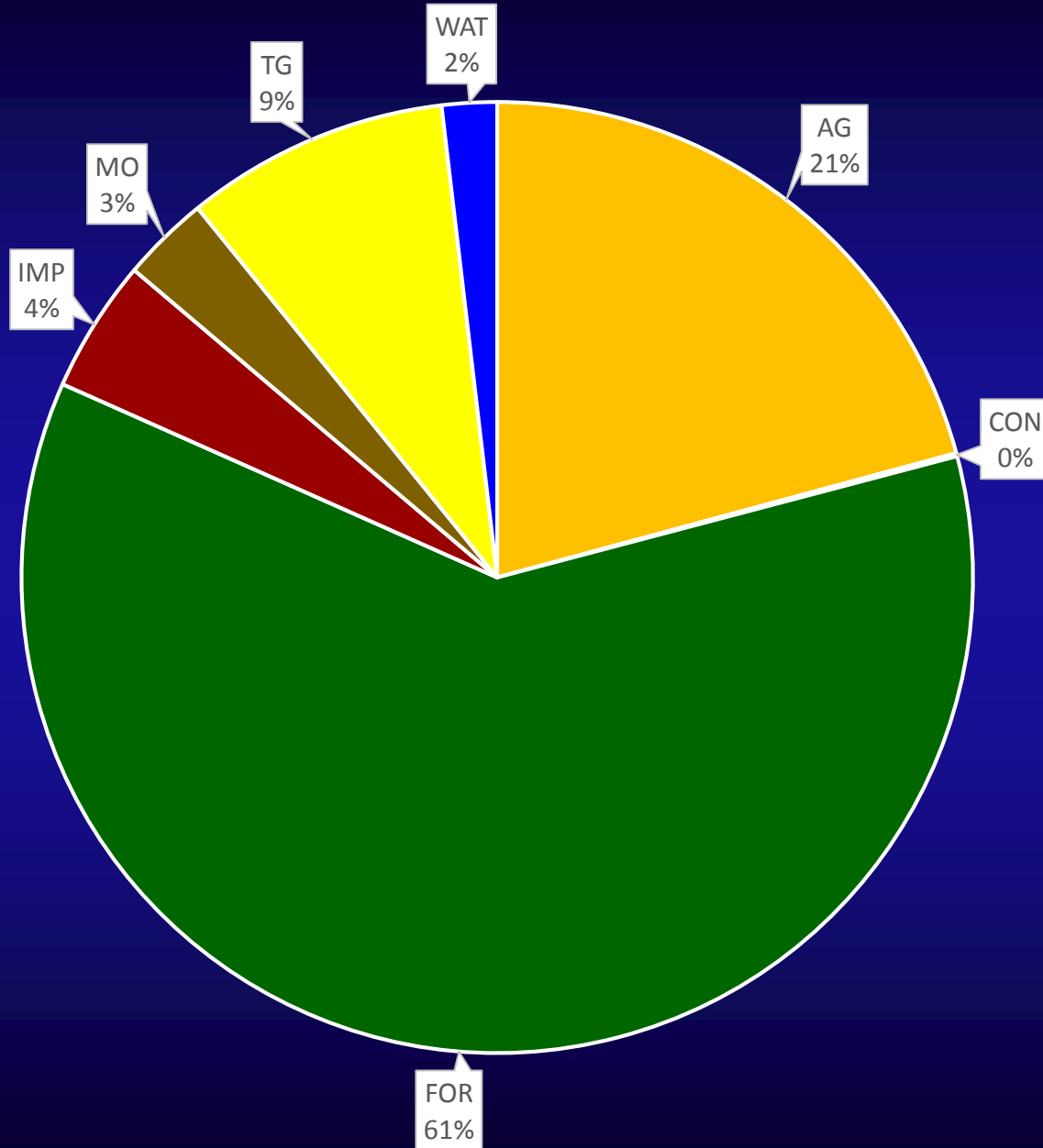
Tree Canopy over Turf Grass: 94% (83% - 99%)

Water: 98% (96% - 100%)

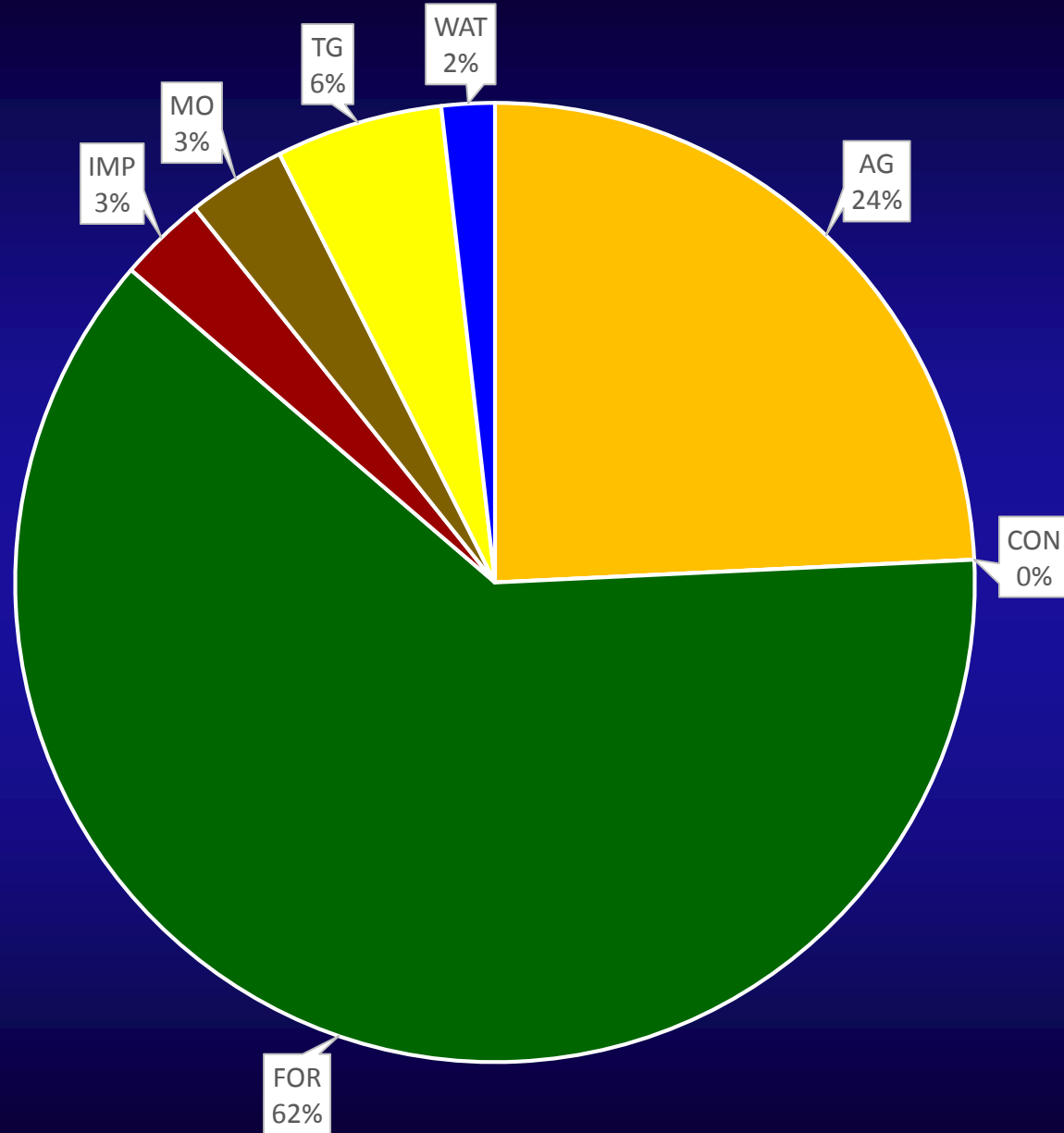
Forest: 98% (96% - 99%)

Wetlands: 95% assigned to all because NWI was “burned in”

2013 Land Use



1984 Land Use



Variation in Developed Lands in Phase 5.x and 6.0 models

Model Version	Impervious Surface (acres)	Pervious Surface (acres)
Phase 5.3 (2002) (Landsat data only)	623,868	1,991,690
Phase 5.3.2 (2001)^a (Landsat + Roads + Housing)	1,207,346	3,143,388
Phase 6.0 (2001) (High-res Land Use)	1,542,291^b	3,144,631^c

^a Claggett, et al., 2013

^b 30% roads, 57% buildings and 13% is trees over impervious

^c 76% turf grass and 24% trees over turf grass