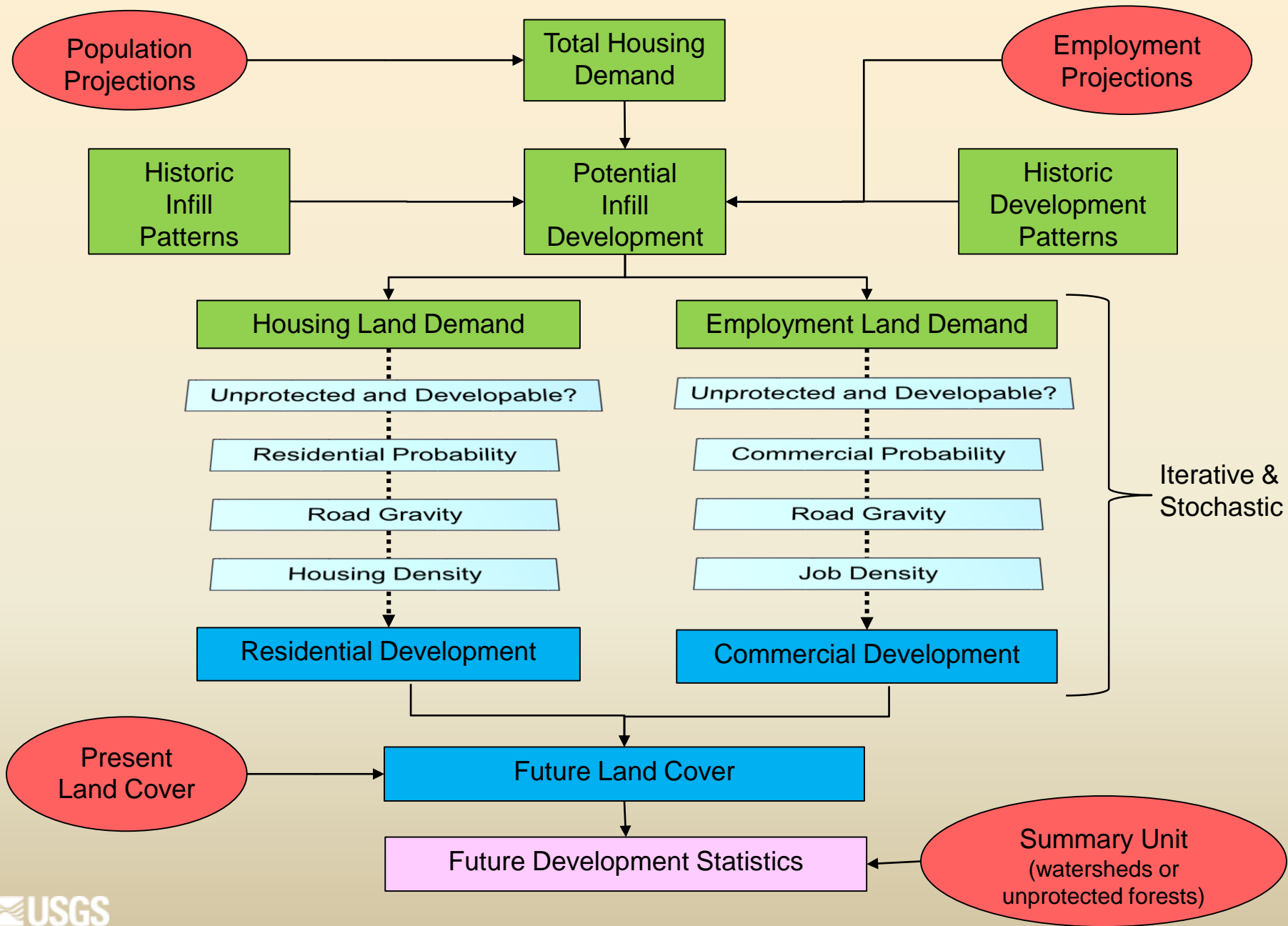


Chesapeake Bay Land Change Model Status Update

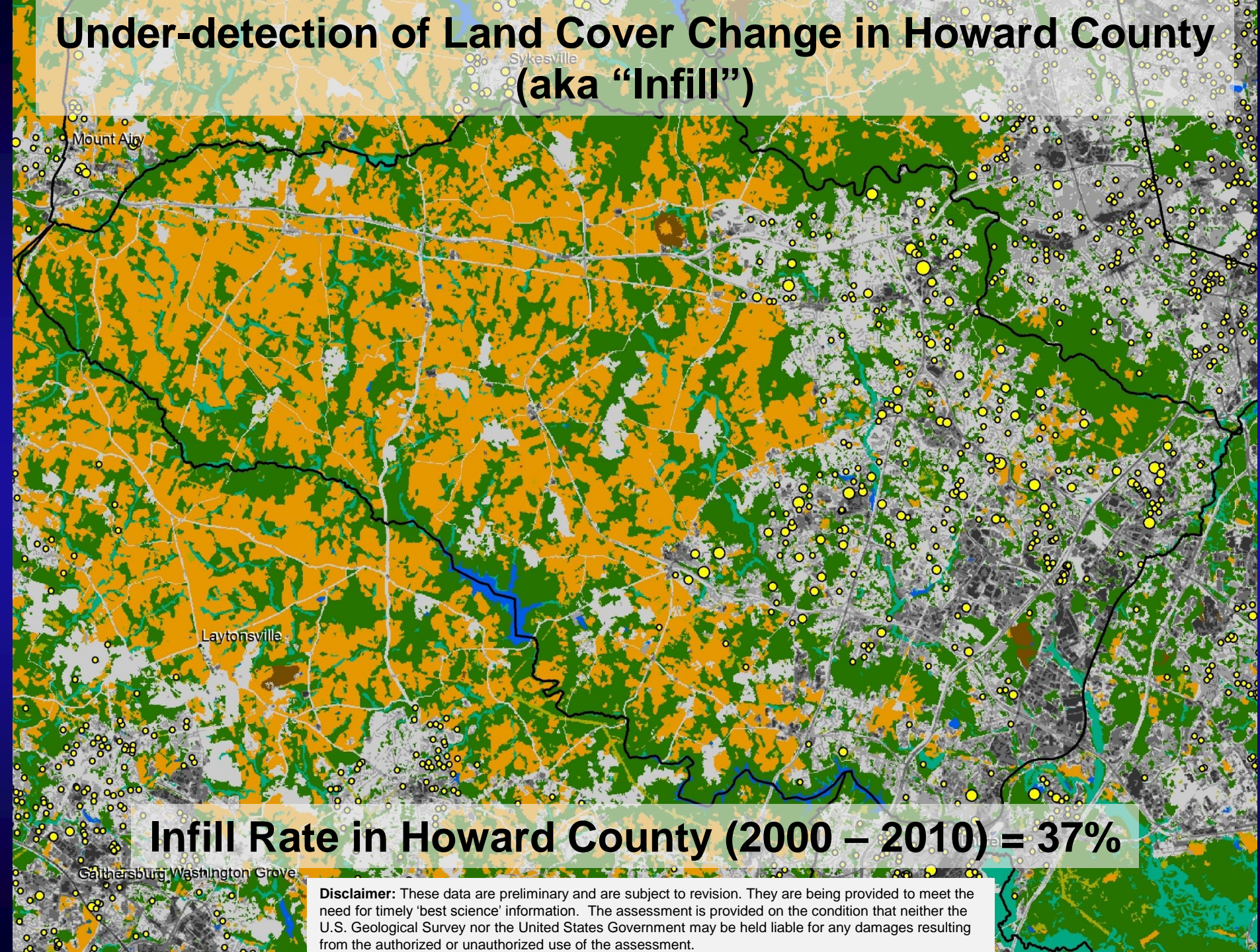
Peter Claggett, Geographer
U.S. Geological Survey

September 7, 2016
CBP Land Use Workgroup
Annapolis, Maryland

Chesapeake Bay Land Change Model v3a



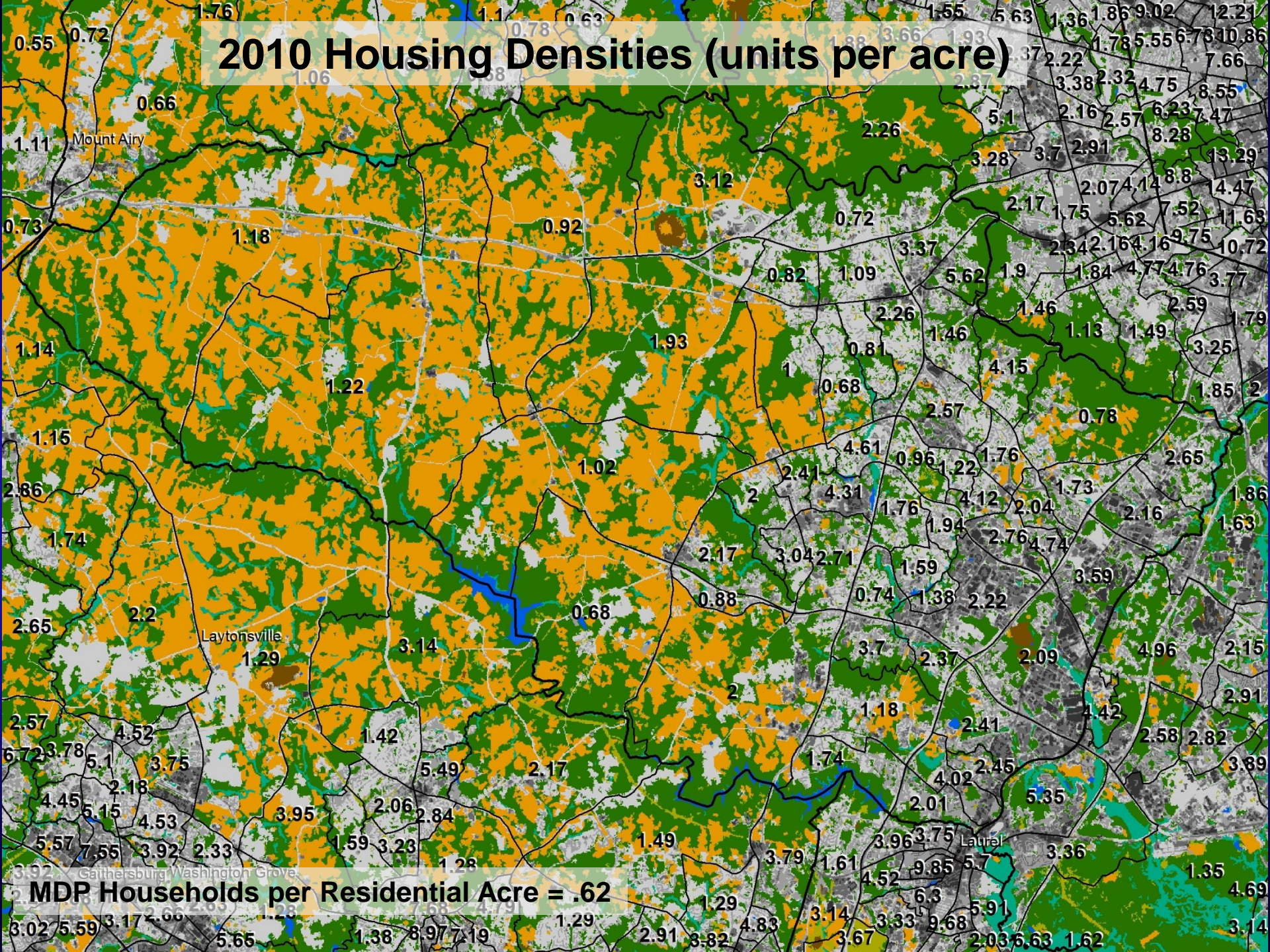
Under-detection of Land Cover Change in Howard County (aka “Infill”)



Infill Rate in Howard County (2000 – 2010) = 37%

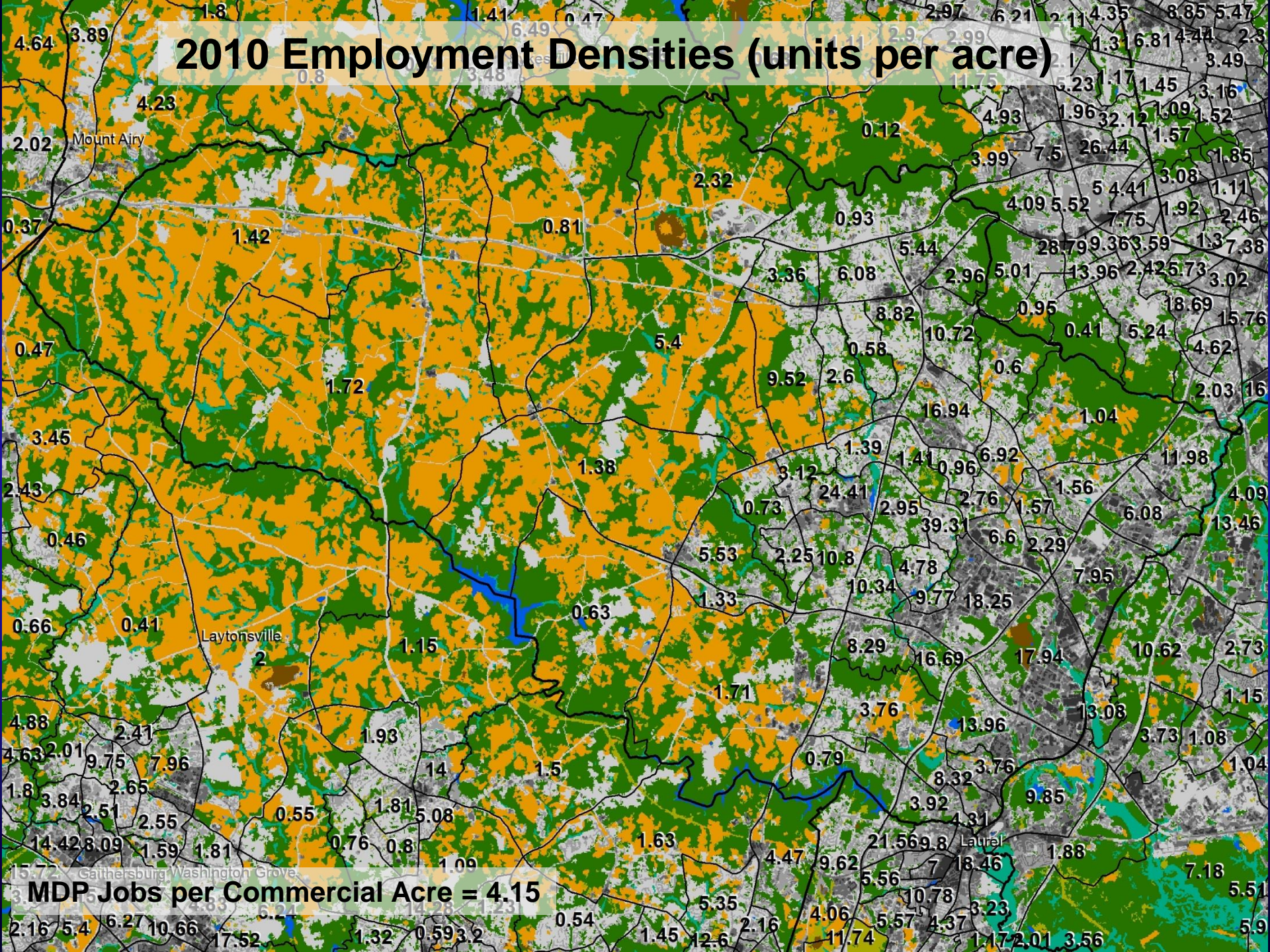
Disclaimer: These data are preliminary and are subject to revision. They are being provided to meet the need for timely 'best science' information. The assessment is provided on the condition that neither the U.S. Geological Survey nor the United States Government may be held liable for any damages resulting from the authorized or unauthorized use of the assessment.

2010 Housing Densities (units per acre)

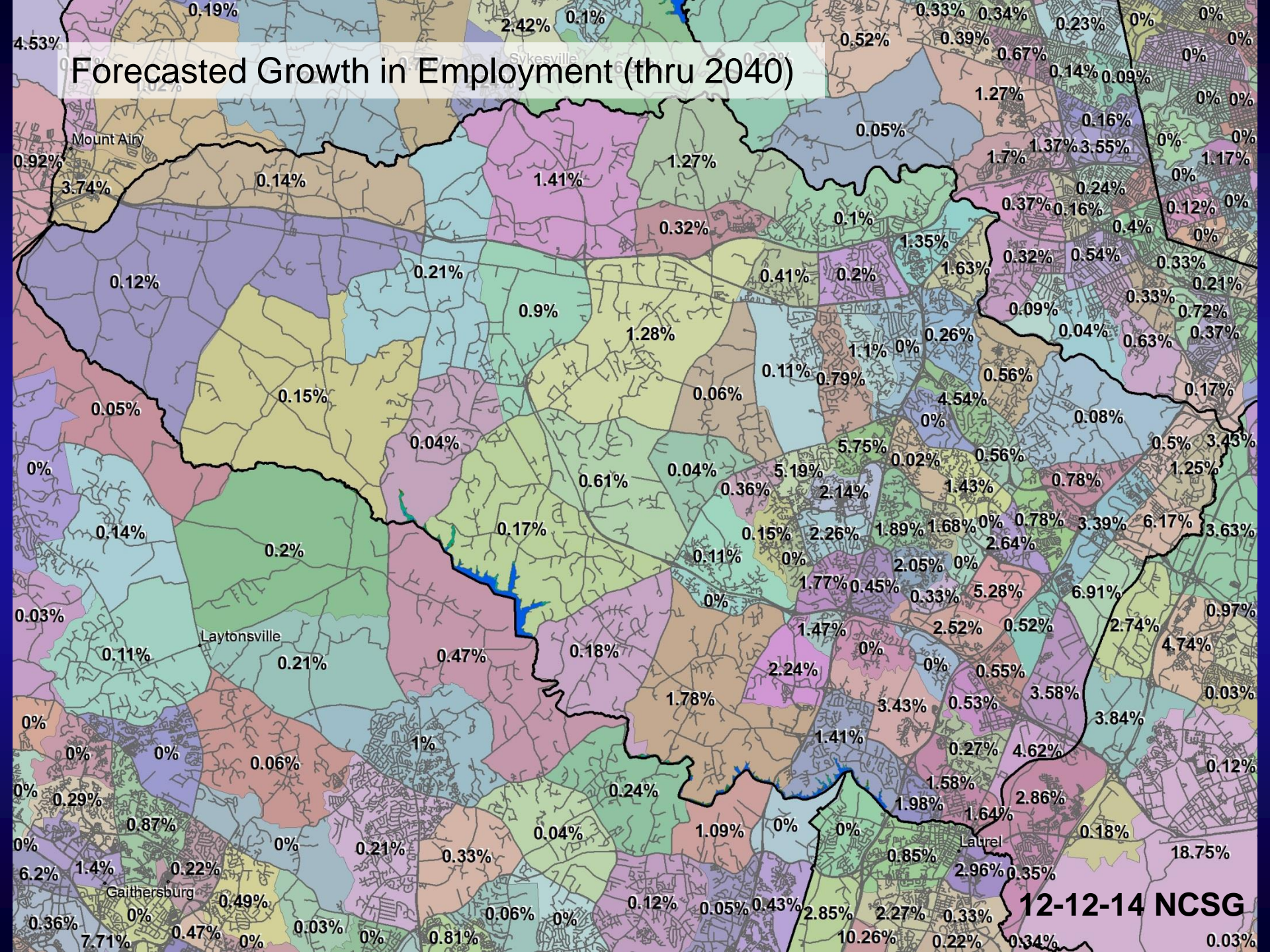


MDP Households per Residential Acre = .62

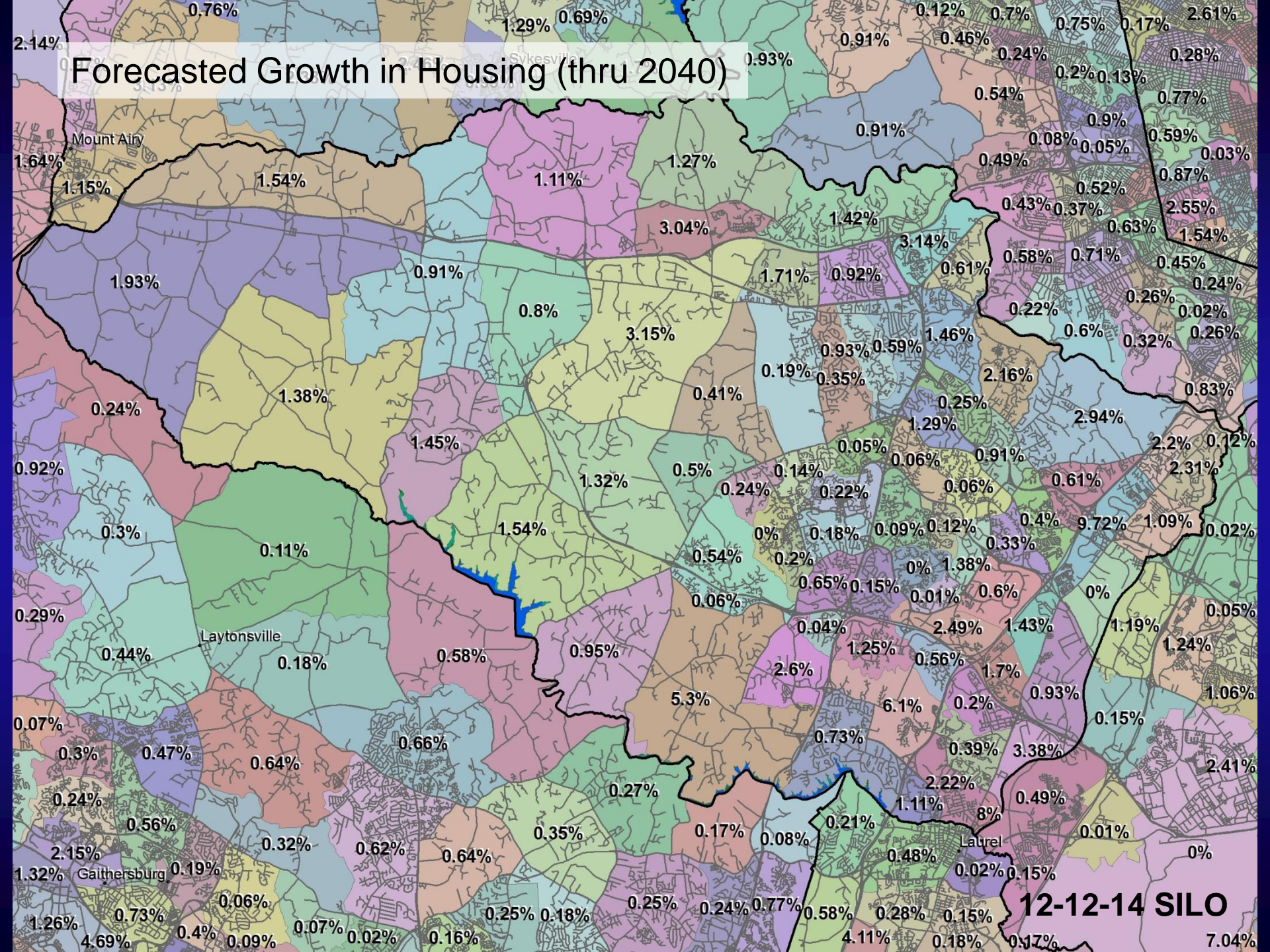
2010 Employment Densities (units per acre)



Forecasted Growth in Employment (thru 2040)



Forecasted Growth in Housing (thru 2040)



Future Scenarios

1. Continuation of current policies (POL)
2. Accelerated urbanization (URB)
3. Decelerated urbanization (LAX)
4. Focused land conservation (CON)

Future Scenarios: POLicy

- Exclude all developed land uses, emergent wetlands, open water
- Exclude steep slopes ($> 21\%$)
- Base proportions of future development in urban and rural areas on metropolitan travel demand forecasts
- Outside metro areas, use historic proportions of 70% urban, 30% rural.
- Include rural parcels along sewer extensions in urban zone.

Future Scenarios: URBanization

- Increase infill/redevelopment rate by 15%
- Increase residential and commercial densities by 15% each decade.
- Increase proportion of growth in urban areas by 15%, decrease proportion in rural areas by 15%.

Future Scenarios: Laissez-faire (LAX)

- Decrease infill/redevelopment rate by 15%
- Decrease residential and commercial densities by 15% each decade.
- Decrease proportion of growth in urban areas by 15%, increase proportion in rural areas by 15%.

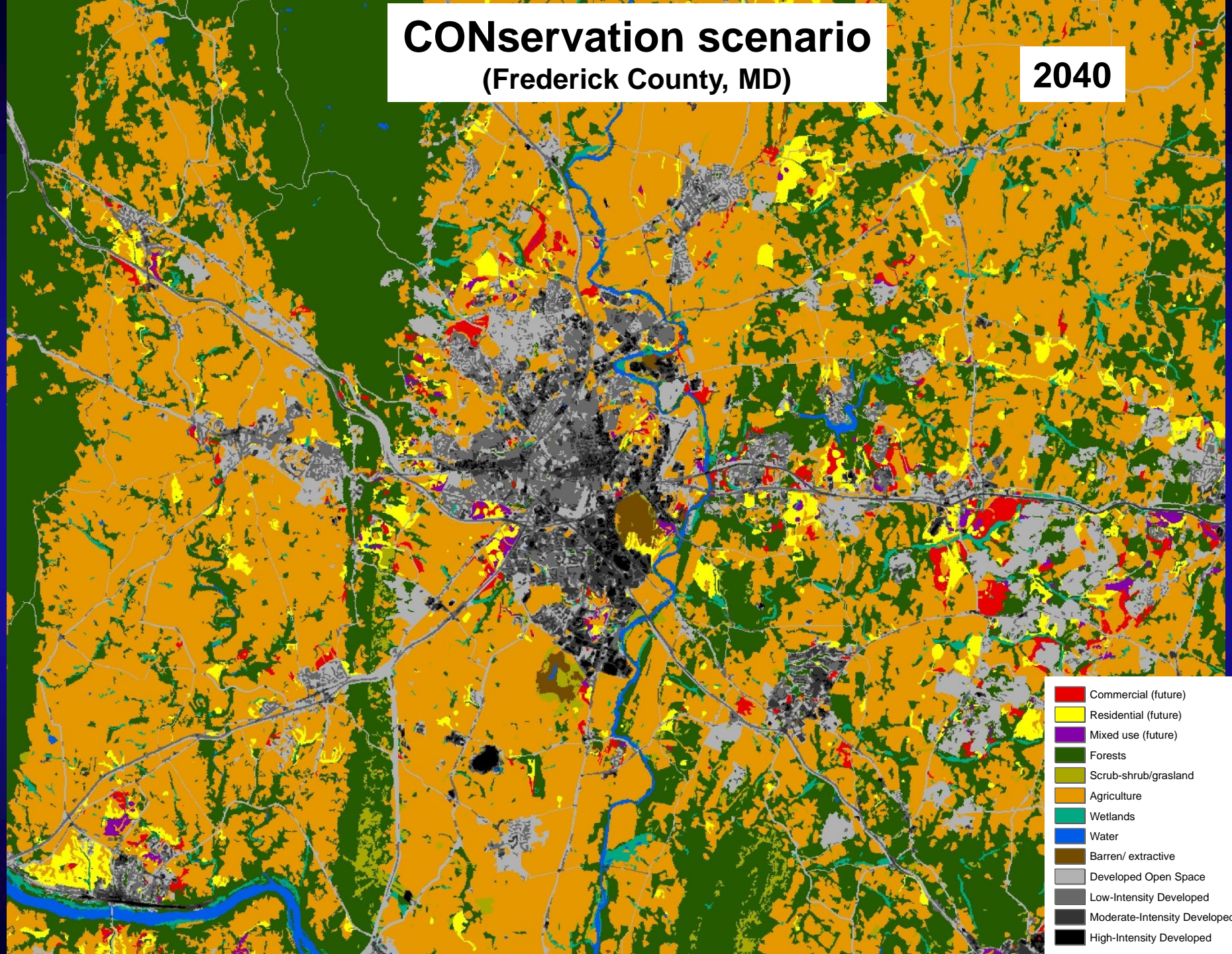
Future Scenarios: CONservation

- Protect all wetlands (National Wetlands Inventory)
- Protect all forested/scrub habitat with \geq 250-acres interior
- Protect all prime soils (SSURGO database)

CONservation scenario

(Frederick County, MD)

2040



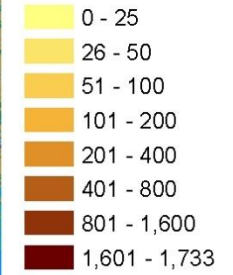
Conservation Suitability (CON)

(Frederick County, MD)



CONservation scenario

Development (acres)



Pennsylvania

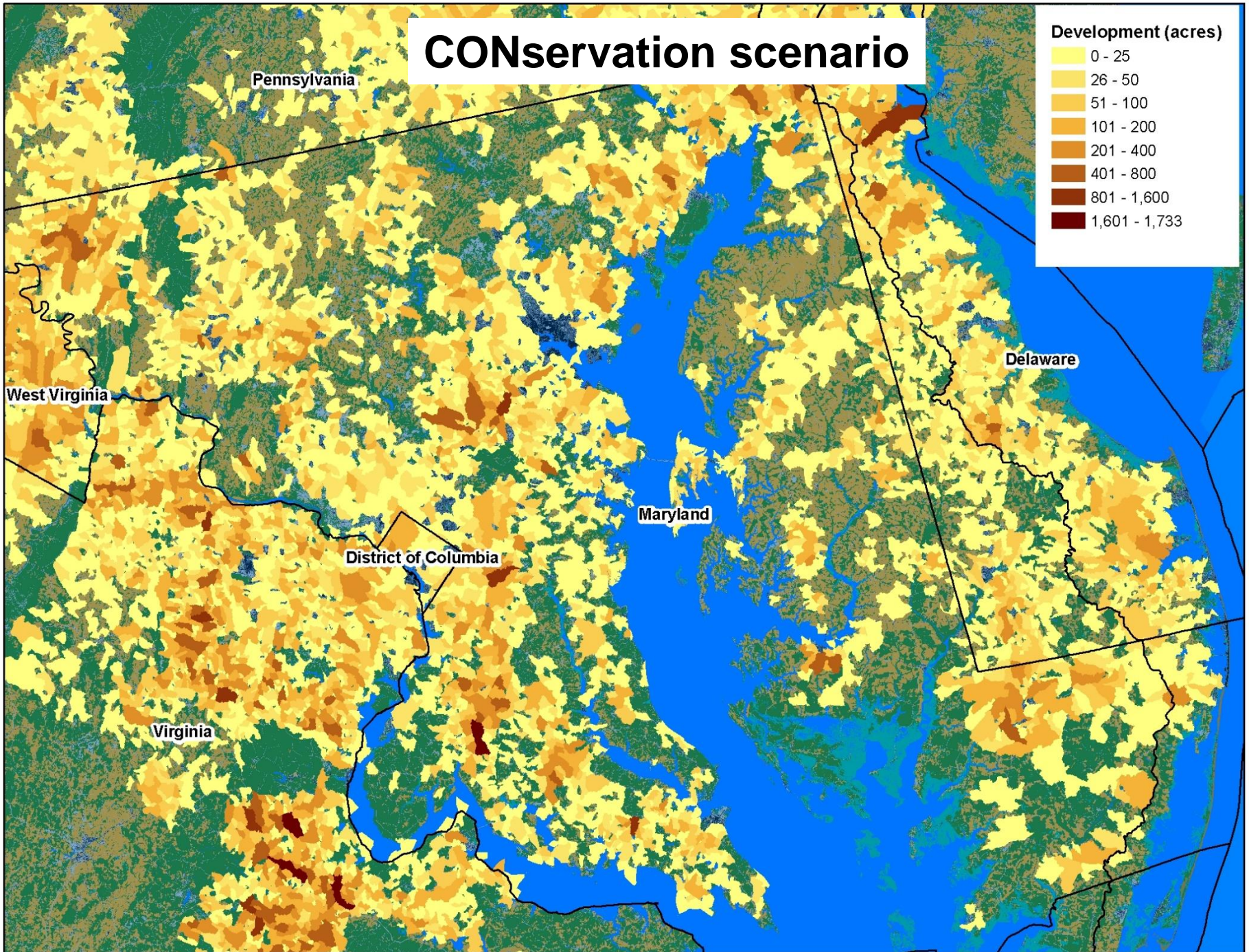
Delaware

West Virginia

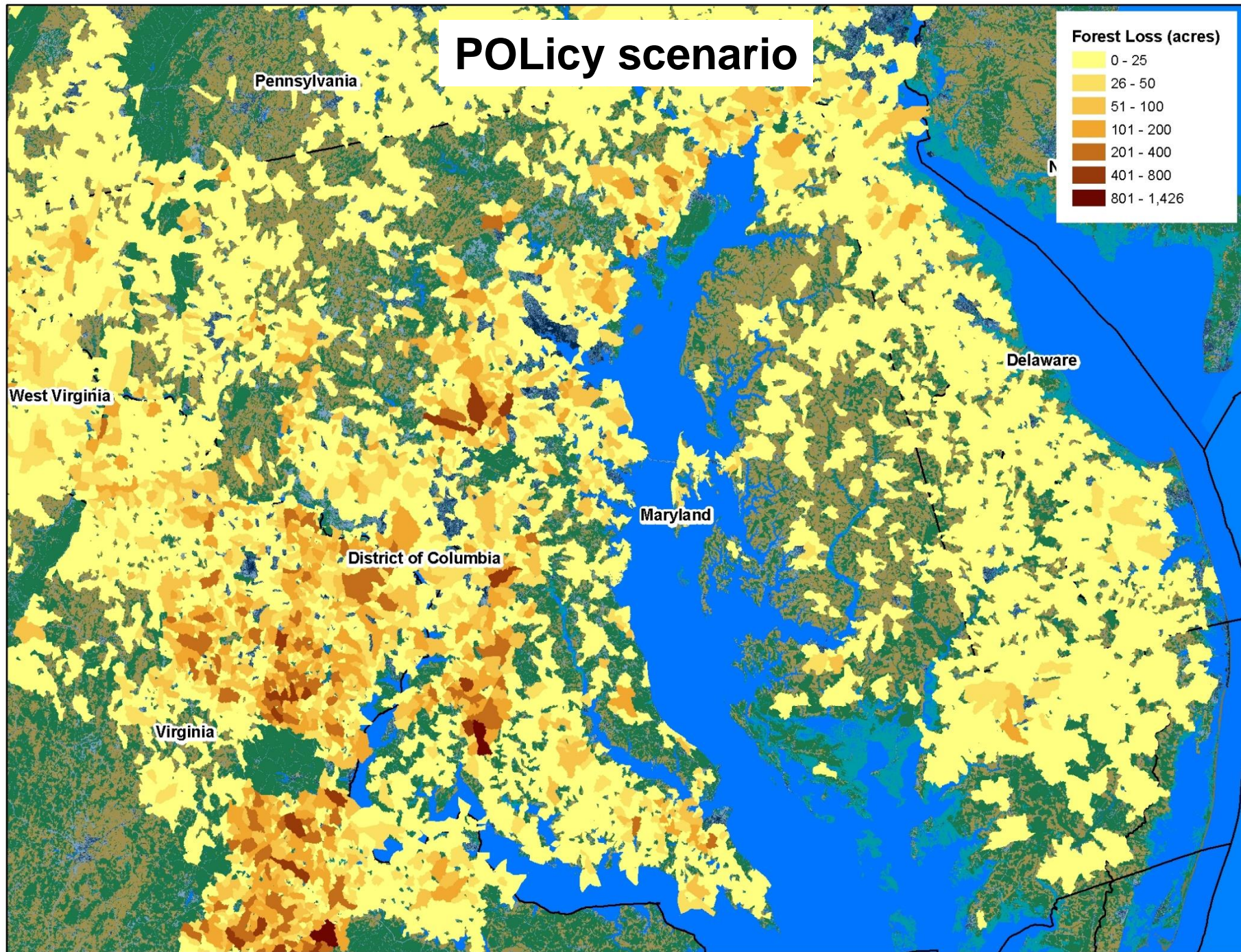
Maryland

District of Columbia

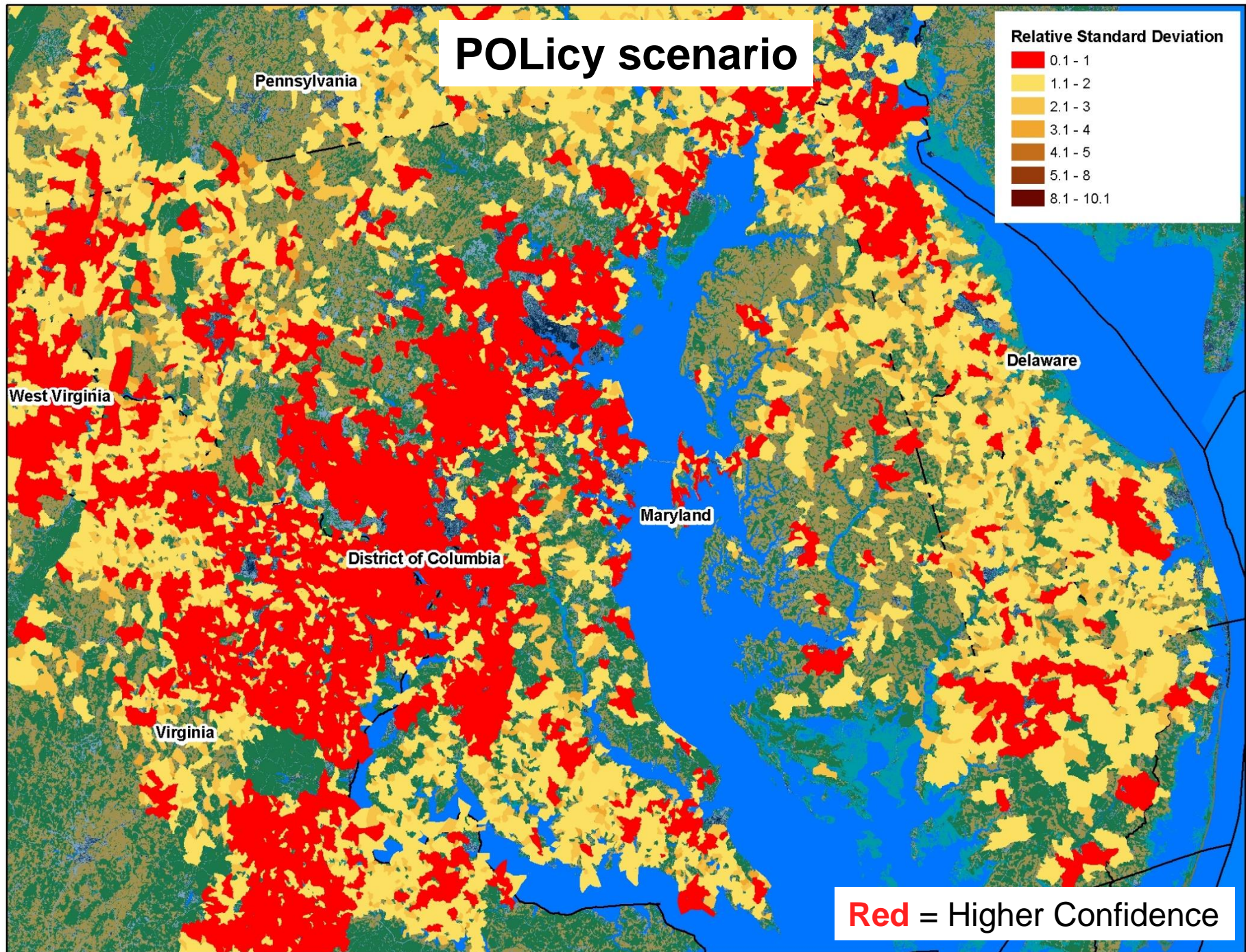
Virginia



POLicy scenario



POLicy scenario



RESULTS

POL	2020	2030	2040
Development	205,165	192,664	158,080
Forest loss	95,087	89,775	75,385
Farmland loss	84,218	78,378	62,303
Ratio (For:Farm)	1.13	1.15	1.21

CON	2020	2030	2040
Development	193,041	178,794	136,625
Forest loss	94,559	85,740	61,180
Farmland loss	85,127	80,508	66,737
Ratio (For:Farm)	1.11	1.06	0.92

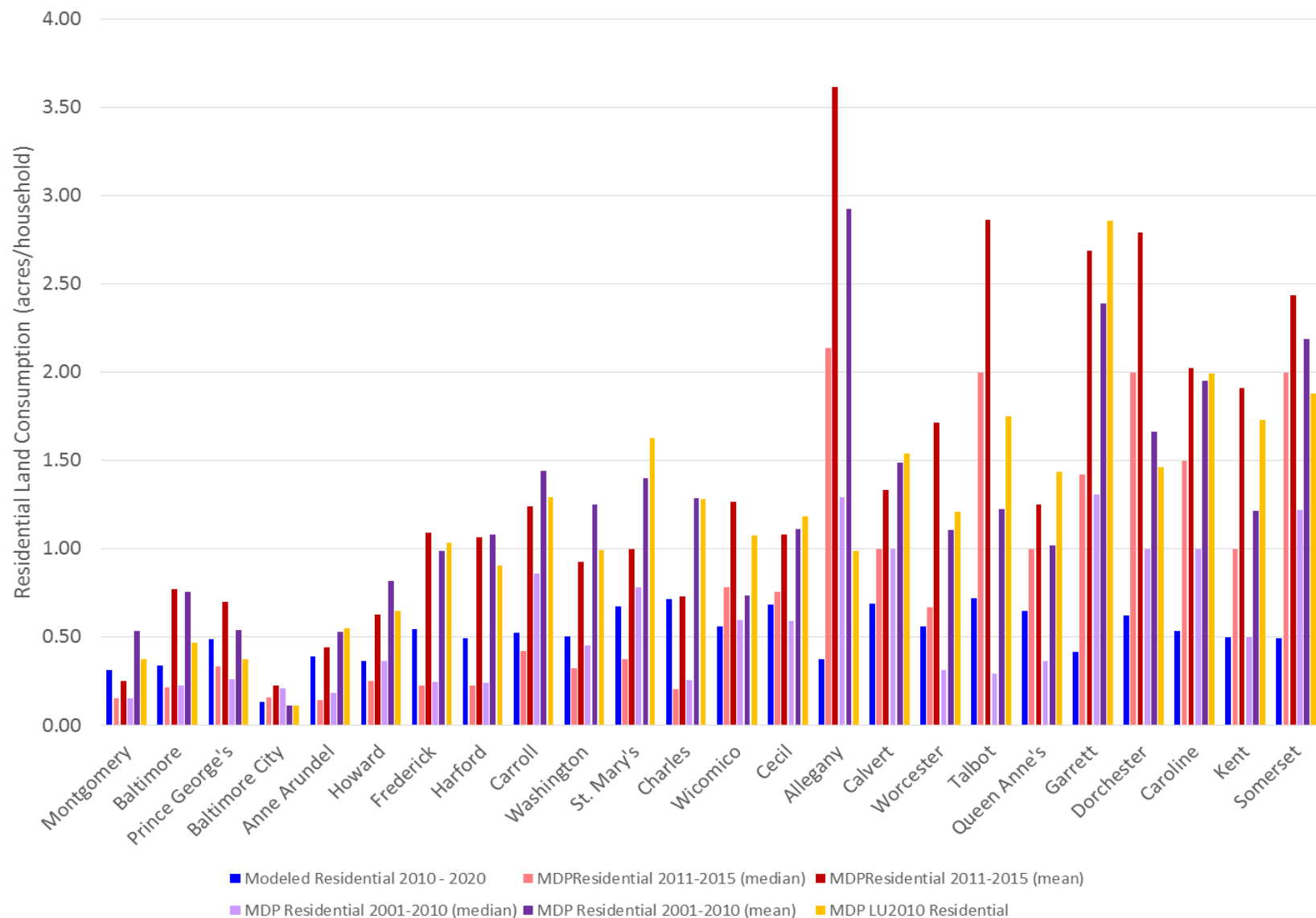
URB	2020	2030	2040
Development	177,742	157,580	127,270
Forest loss	79,315	70,389	59,194
Farmland loss	74,004	66,390	52,056
Ratio (For:Farm)	1.07	1.06	1.14

LAX	2020	2030	2040
Development	258,064	258,883	218,422
Forest loss	116,412	118,997	104,495
Farmland loss	110,325	108,116	87,102
Ratio (For:Farm)	1.06	1.10	1.20

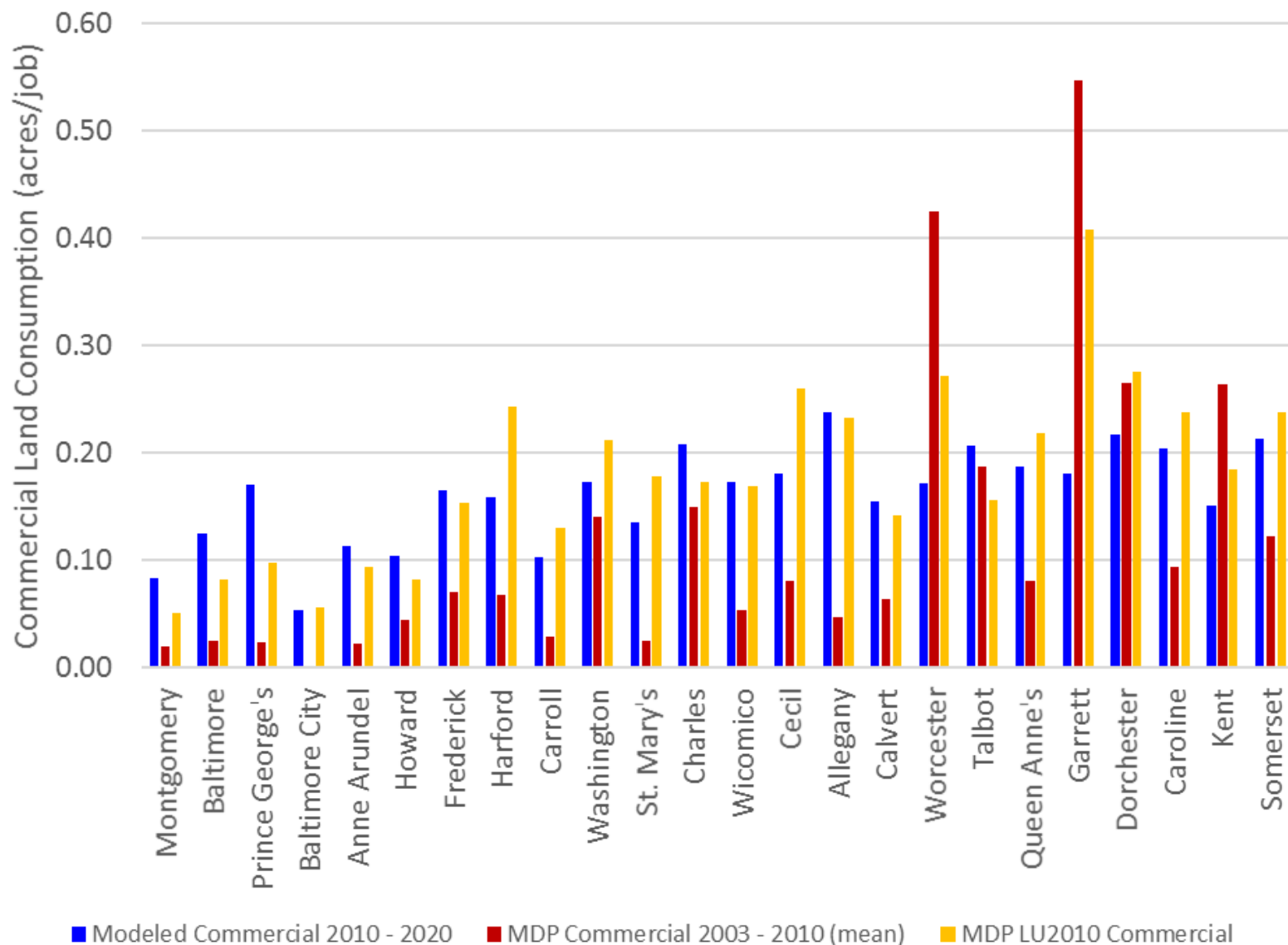
Conclusions:

- URB: Increasing density, infill, and urban:rural proportions by 15% achieved a 17% decrease in development and reduced rural vulnerability.
- LAX: Decreasing density, infill, and urban:rural proportions by 15% resulted in a 32% increase in development and greatly increased rural vulnerability.
- CON: Conserving ALL large forest tracts and wetlands reduced the overall amount of growth (9%) but did not achieve a short-term reduction in forest loss and it resulted in increased conversion of farmland.

Residential Land Consumption: Modeled vs Observed



Commercial Land Consumption: Modeled vs Observed



Peter Claggett, Geographer U.S. Geological Survey

pclaggett@usgs.gov

pclagget@chesapeakebay.net