CBP Land Classification and Land Change Forecasting Capabilities

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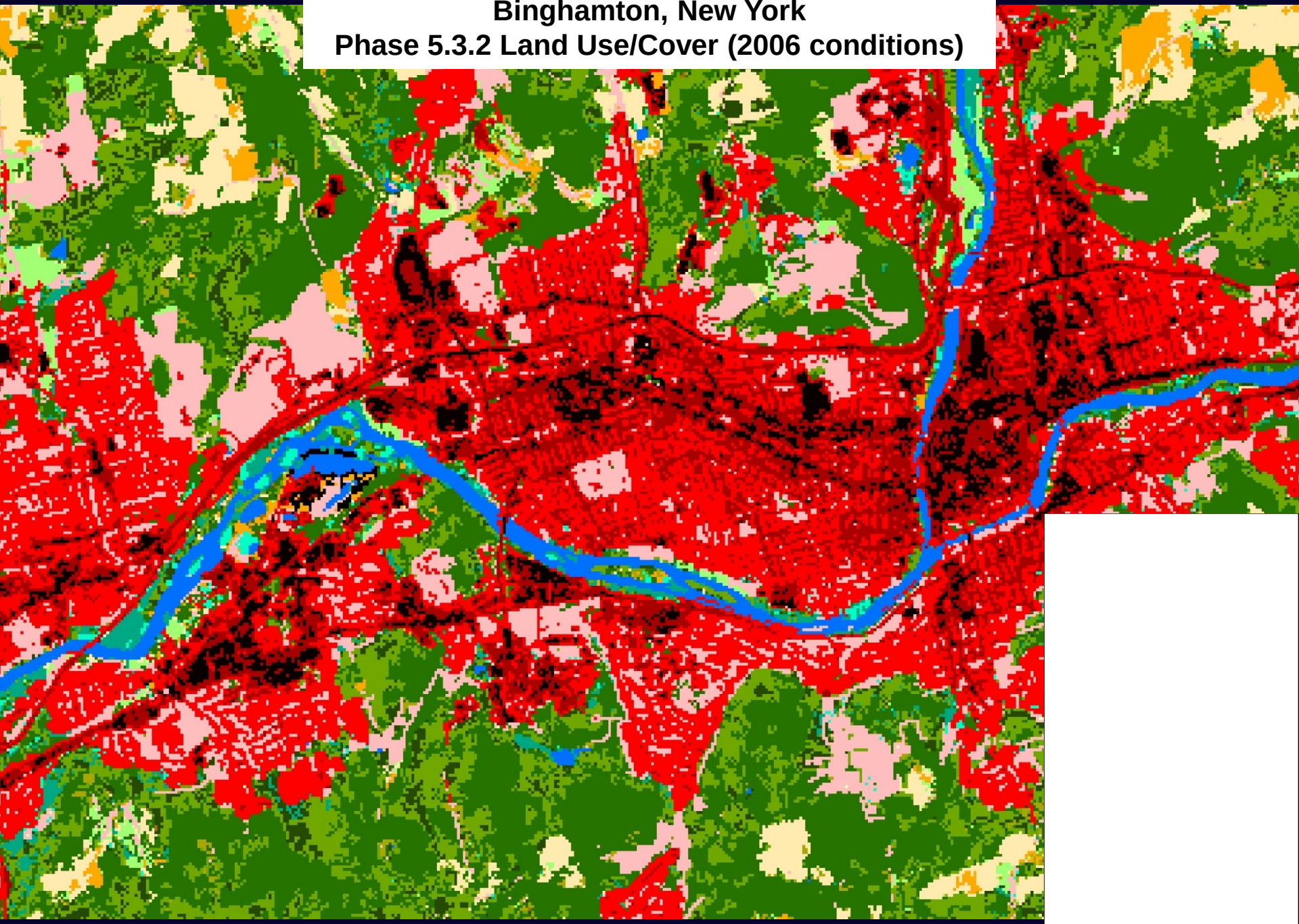
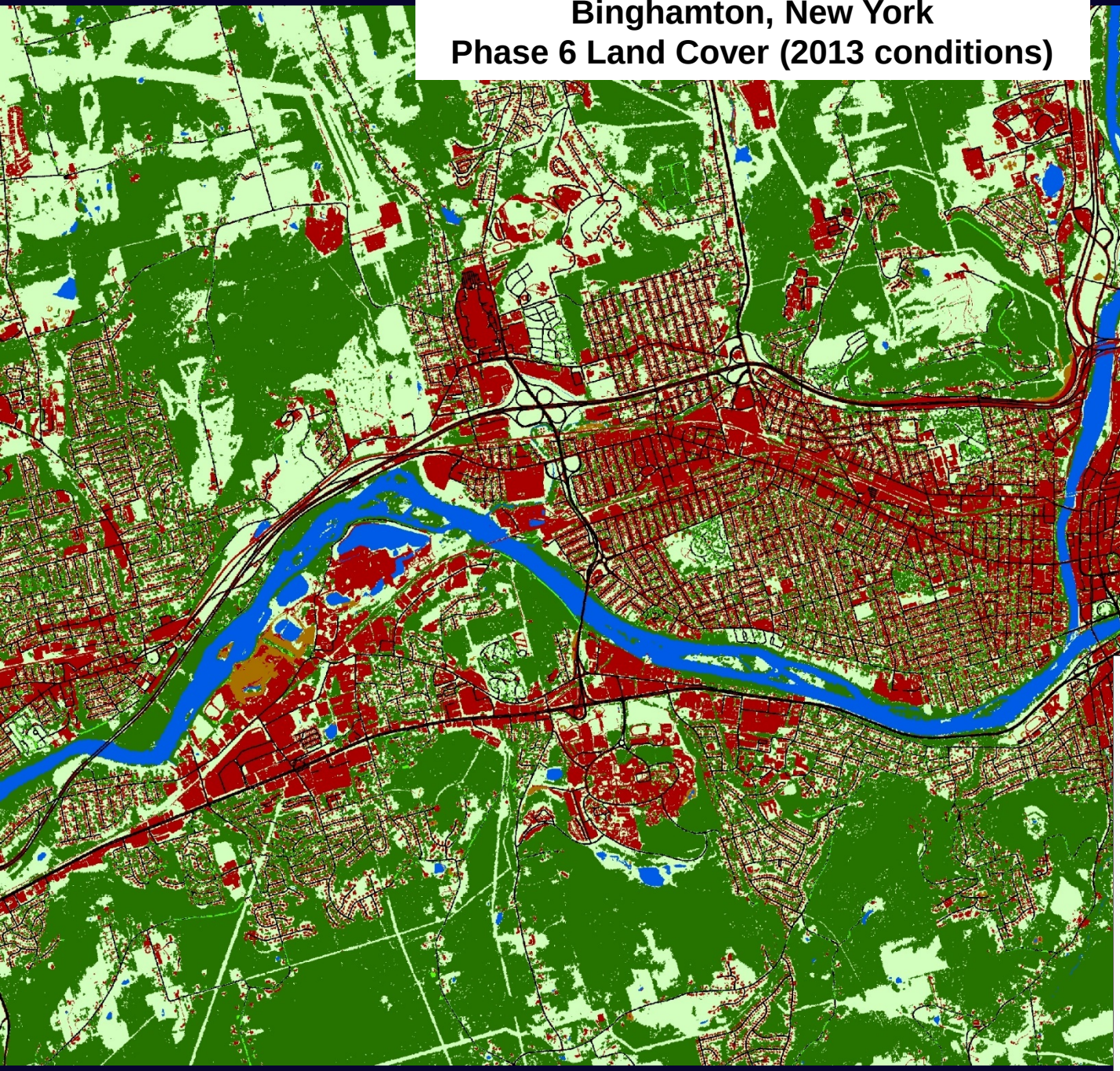
U.S. Department of the Interior
U.S. Geological Survey

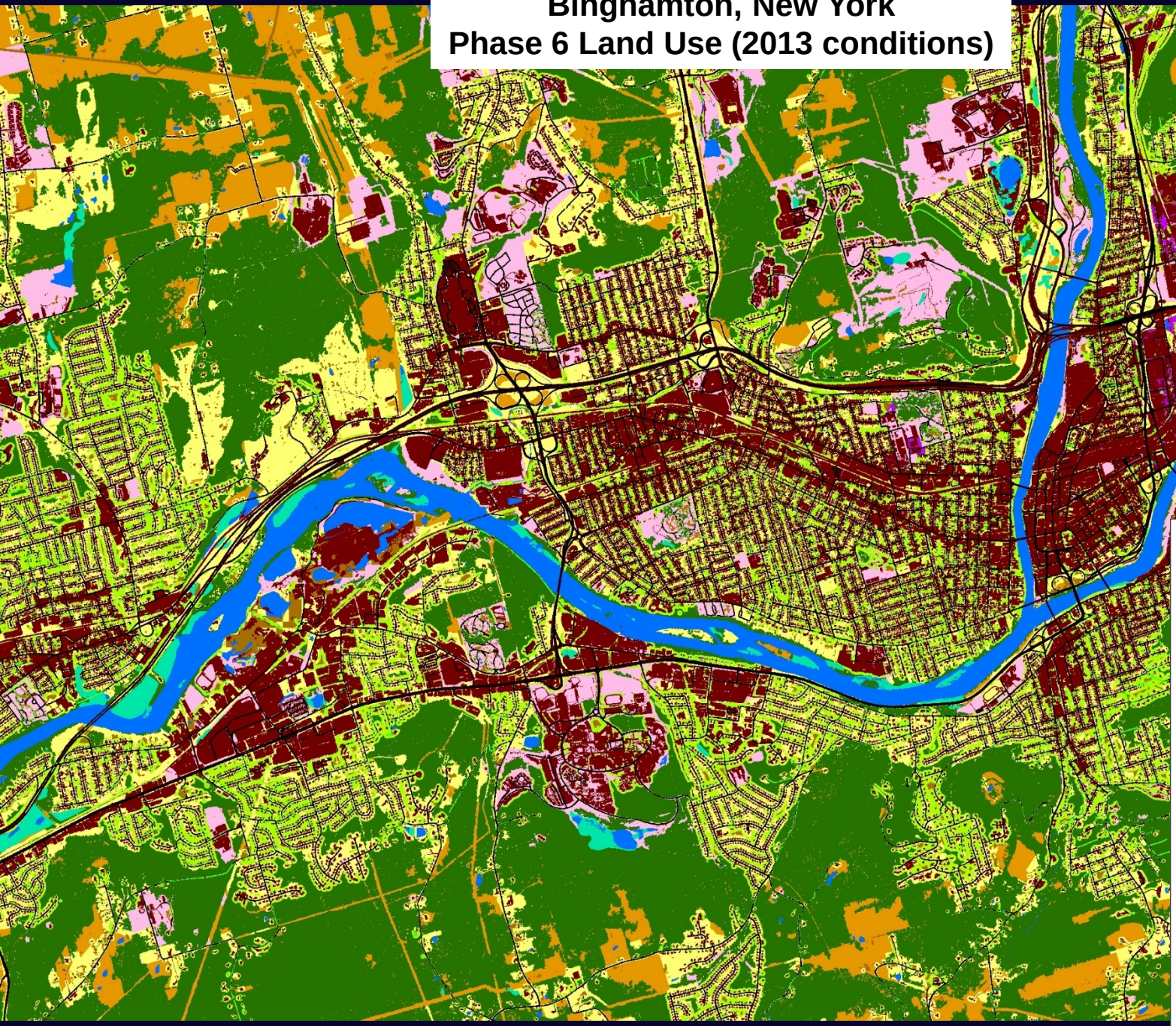
Binghamton, New York
Phase 5.3.2 Land Use/Cover (2006 conditions)



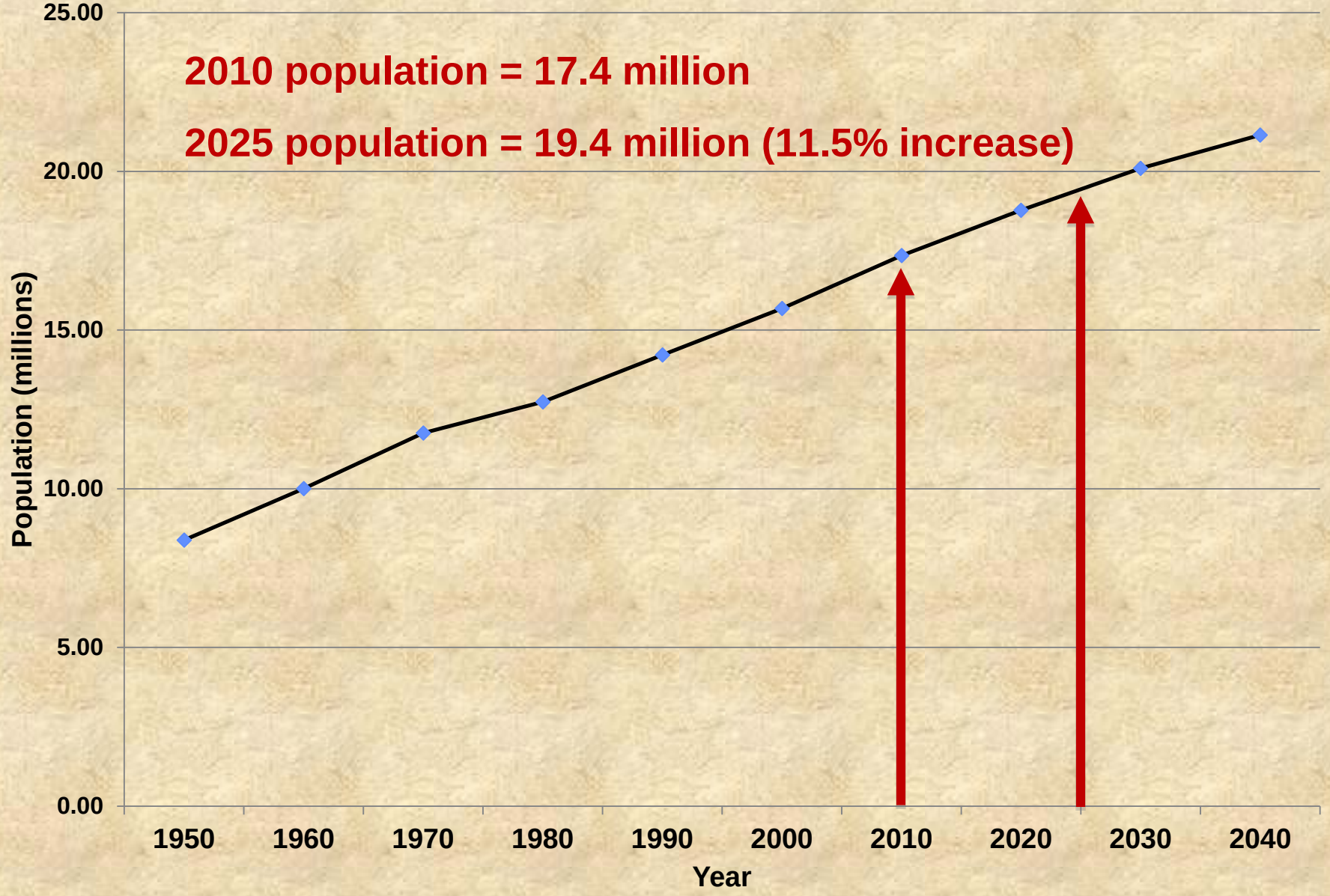
Binghamton, New York
Phase 6 Land Cover (2013 conditions)



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



Chesapeake Bay Watershed PopulationTrends



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WQGIT Decisions (9/26/17)

1. Use the CBLCM and MD Land Use Model to establish growth projections, with the opportunity to provide data or alternative modeling approaches in future years.

2. Use 2025 growth projections to account for growth in the Phase III WIPs.

3. Update the growth projections every 2 years with the best available data to inform the development of the two-year milestones.

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Chesapeake Bay Land Change Model (CBLCM) Applications:

1. A basis for “accounting for growth" in the Phase III WIPs.

2. Benchmarks for developing and evaluating state offset strategies.

3. Quantify threats to forests, farms, and wildlife habitats from urbanization.

4. Assess rates of conservation needed to achieve desired future conditions.

5. Evaluate the affects of land conservation and land use regulations on pollutant loads to the Bay (for potential credits).

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Chesapeake Bay Future Scenarios

(from June 7th "Local Government Forum")

"Historical Trends": previous patterns of growth replicated into the future.

"Current Policy": growth focused towards local areas zoned to accommodate it.

"Current Policy Plus": "Current Policy" combined with growth focused in areas with planned infrastructure (e.g., roads, sewer, and water)

"Utopia": "Current Policy Plus" combined with aggressive land conservation, accelerated infill/redevelopment, and upzoning urban and downzoning rural areas.

*Additional considerations: soil restrictions, internet access, sea-level rise, and specific state/county policies (e.g., MD's Septic Bill and Ag Preservation Act).

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Chesapeake Bay FY'18 Scenarios

"Historical Trends": previous patterns of growth replicated into the future (complete)

"Current Zoning": growth focused towards local areas zoned to accommodate it (November 15th).

"Utopia": aggressive land conservation, accelerated infill/redevelopment, protection of wetlands, riparian forest buffers, and floodplains, and up-zoning urban and down-zoning rural areas, avoiding growth in areas subject to sea-level rise and storm surge (January 15th).

*Additional considerations: avoiding development on soils that don't perc and in built-out parcels.

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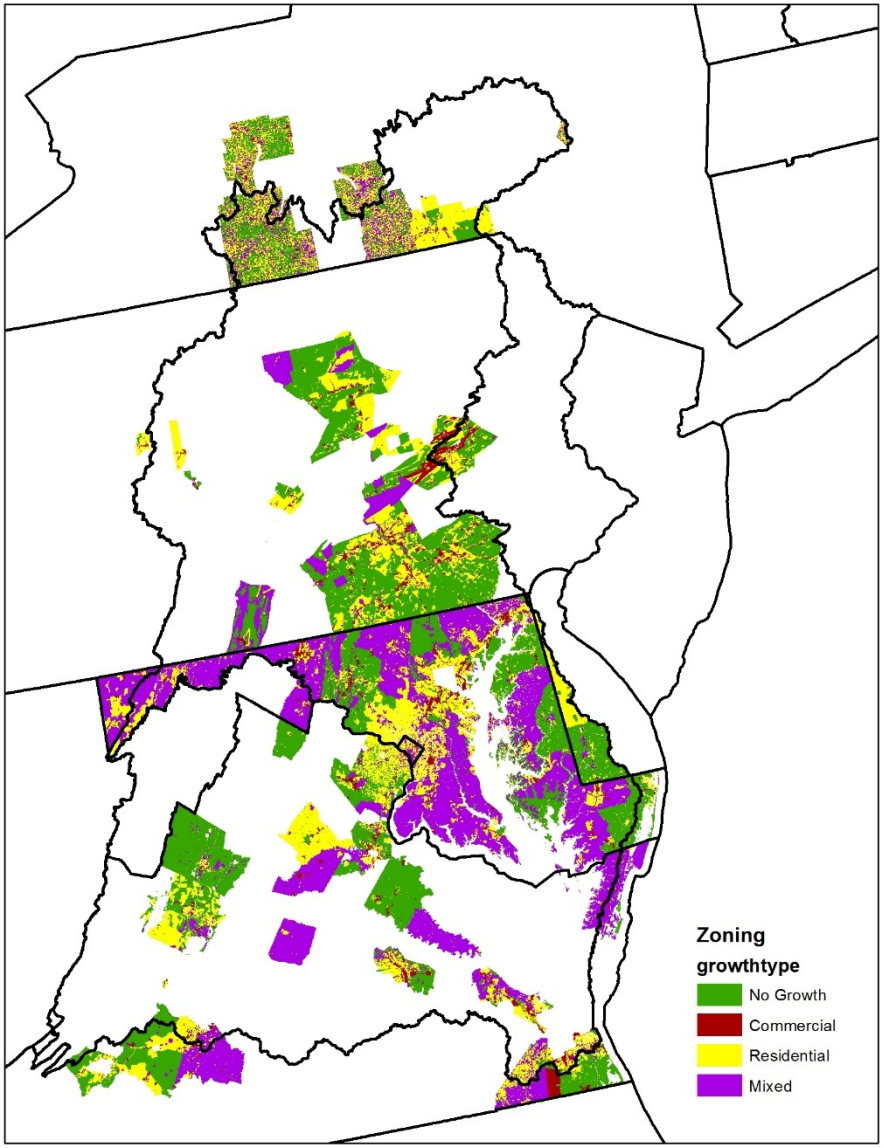
Chesapeake Bay Land Change Model
"Current Zoning" Scenario

Generalization of Local Zoning:

- No growth (conservation)
- Residential
- Commercial
- Mixed



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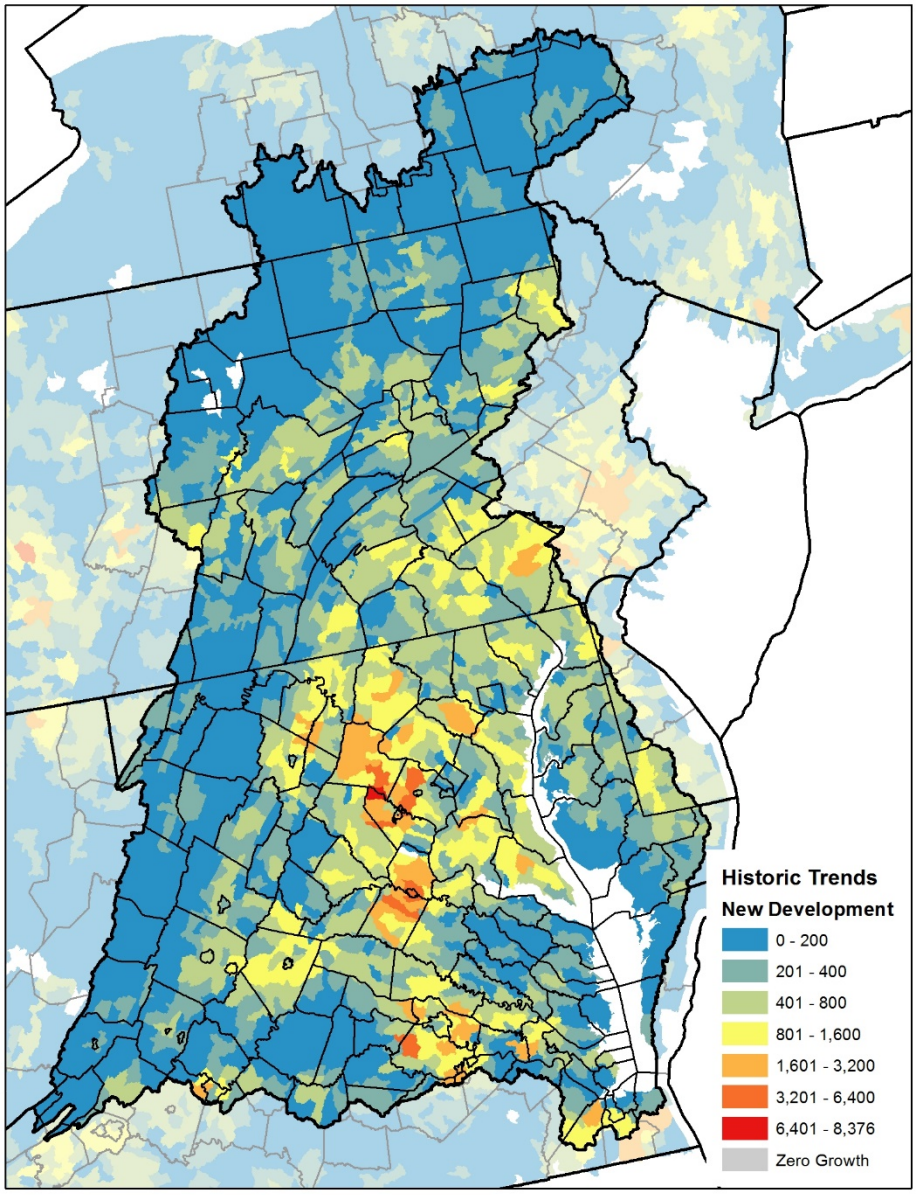
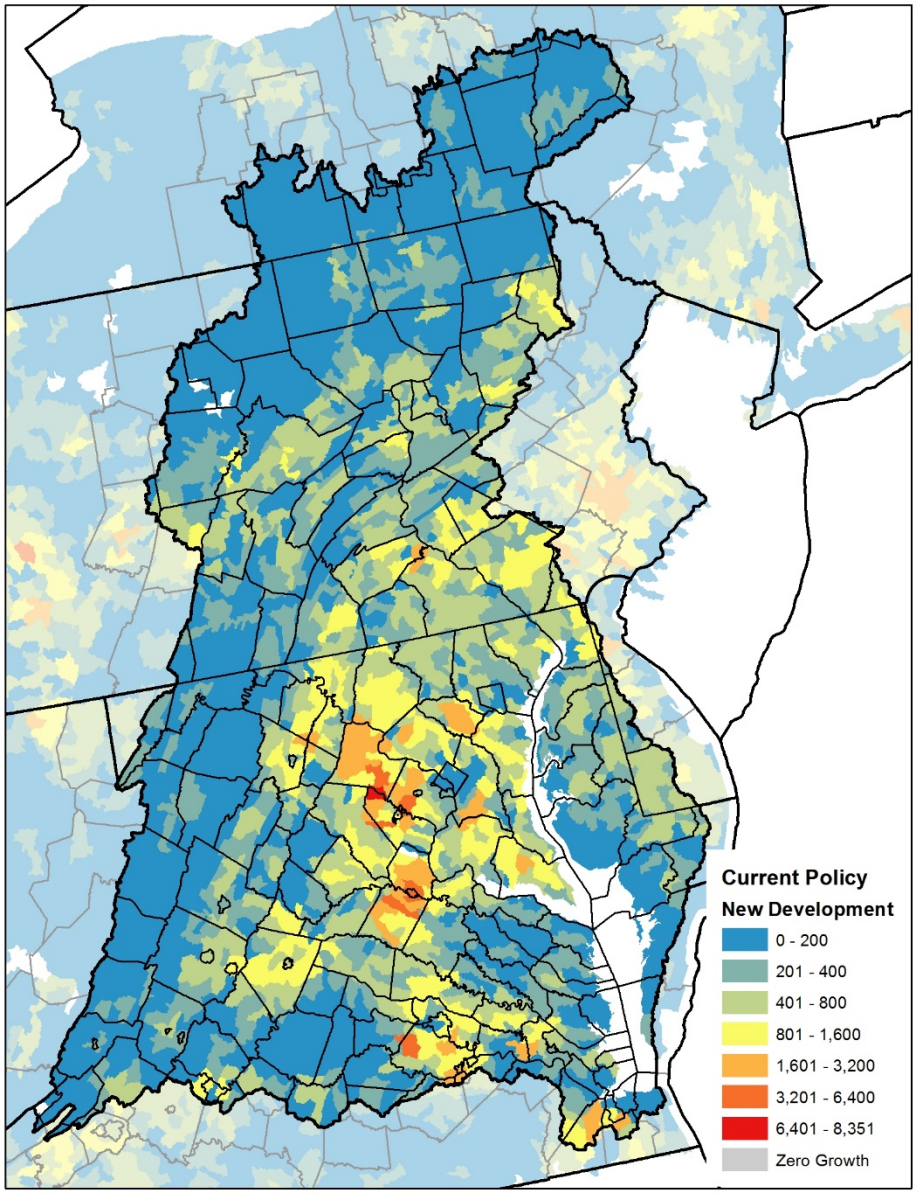
“Historical Trends”



“Current Zoning”



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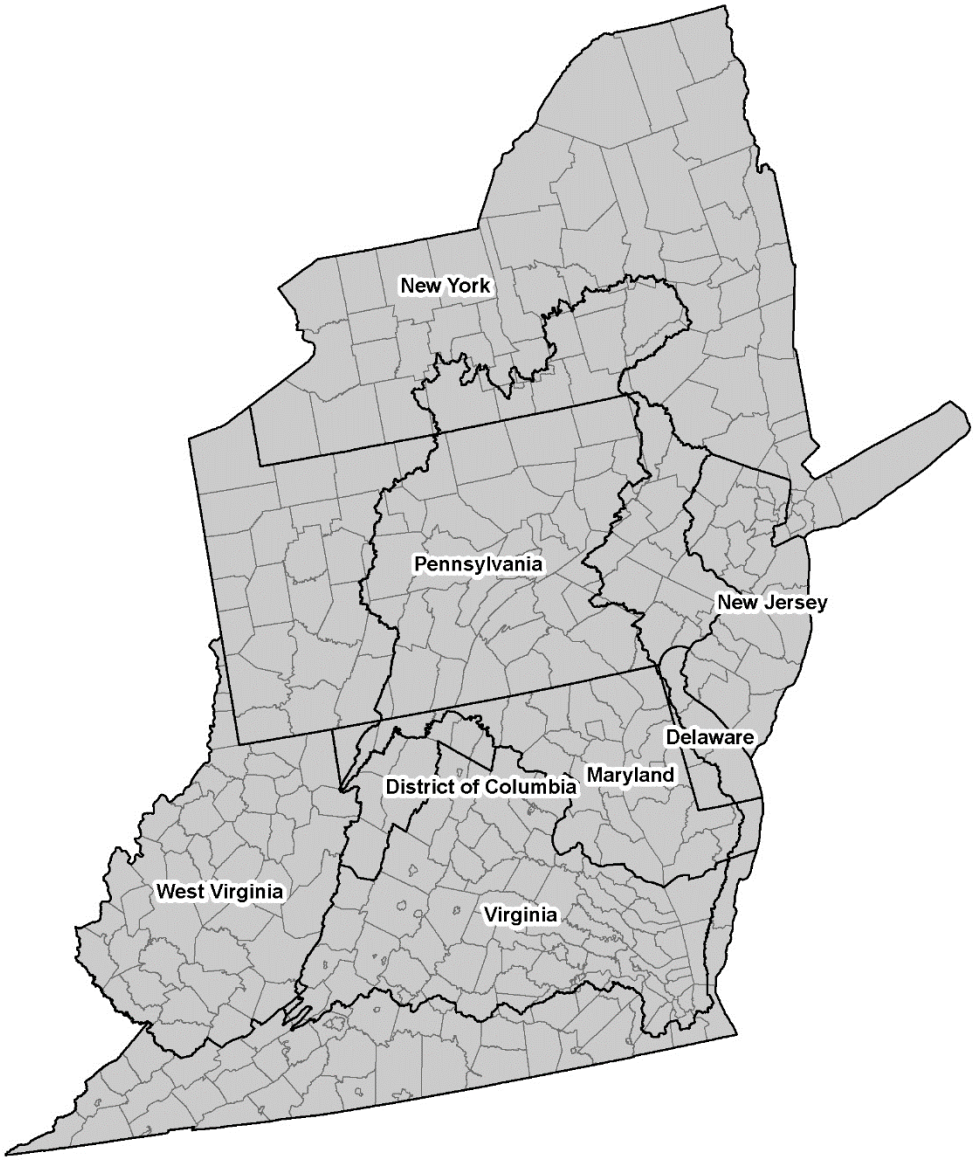
Chesapeake Bay Future Land Use Scenario Domain



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Chesapeake Bay Land Change Model
"Current Zoning" Scenario

- Incorporates national data from PADUS, NAVTEQ, US Census Bureau, Bureau of Labor Statistics, Bureau of Economic Analysis, Multi-Resolution Land Characteristics Consortium.
- Incorporates local data (parcels, land use, and zoning).
- Incorporates CBP's high-res developed land uses and protected lands.
- Simulates infill/redevelopment by county.
- Simulates residential and commercial development in five year increments at 30m resolution with parameterization at the state and county levels.
- Results summarized by NHDv1, NHDv2, HUC12, Municipalities/Tracts, and Phase 6 model units.

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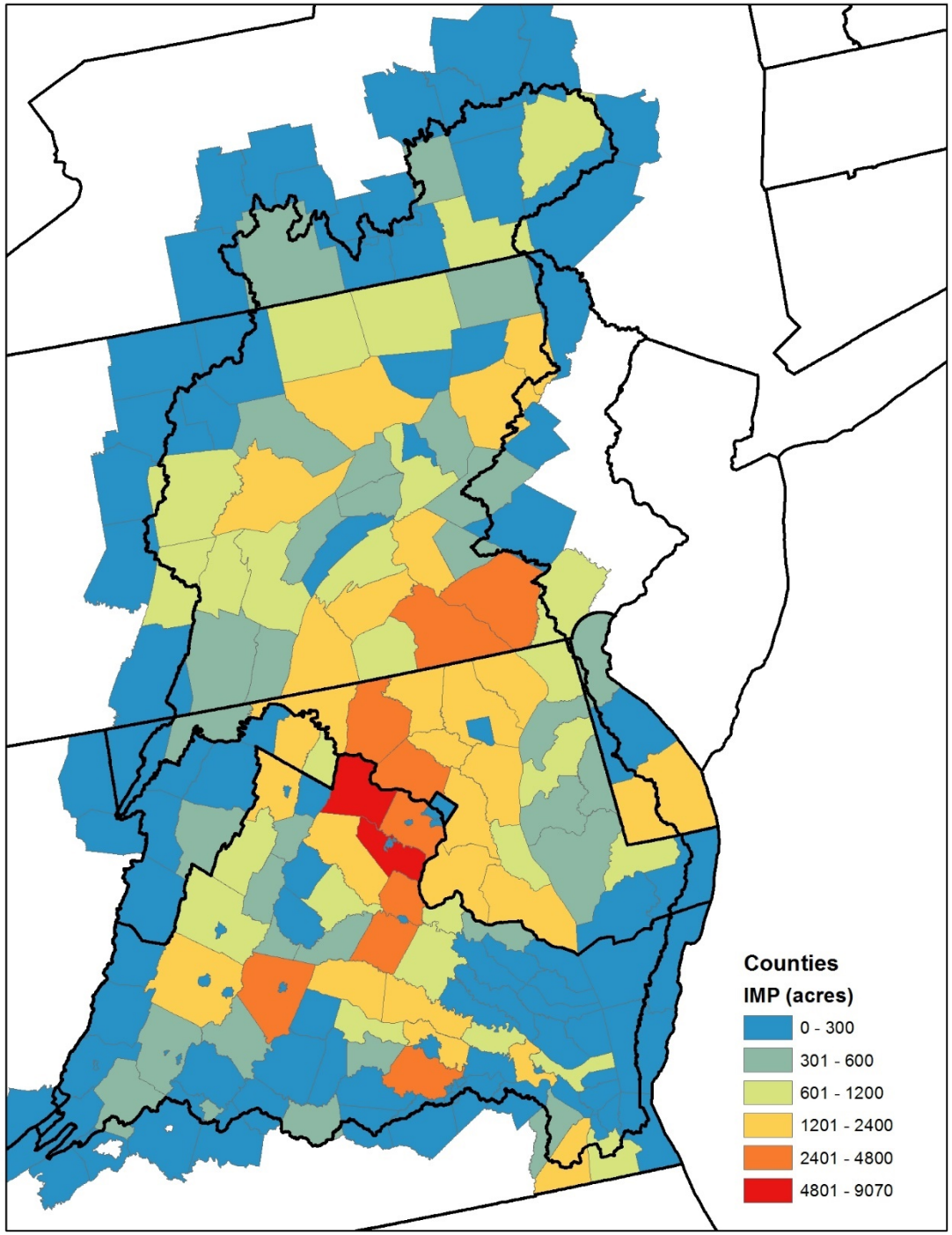
Forecasted Growth in Impervious Surfaces (2013 – 2025) "Current Zoning"



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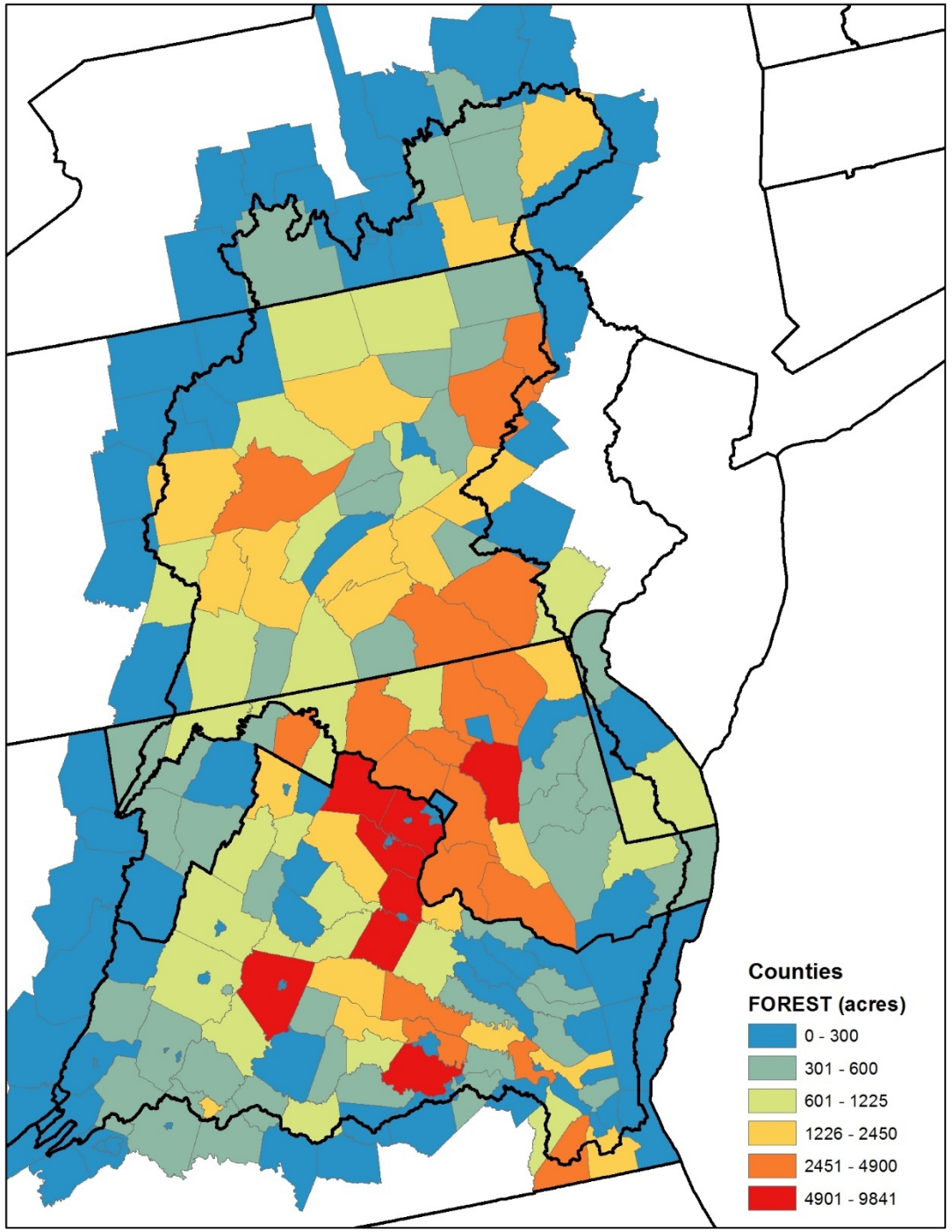
Forecasted Conversion of Forests (2013 – 2025) "Current Zoning"



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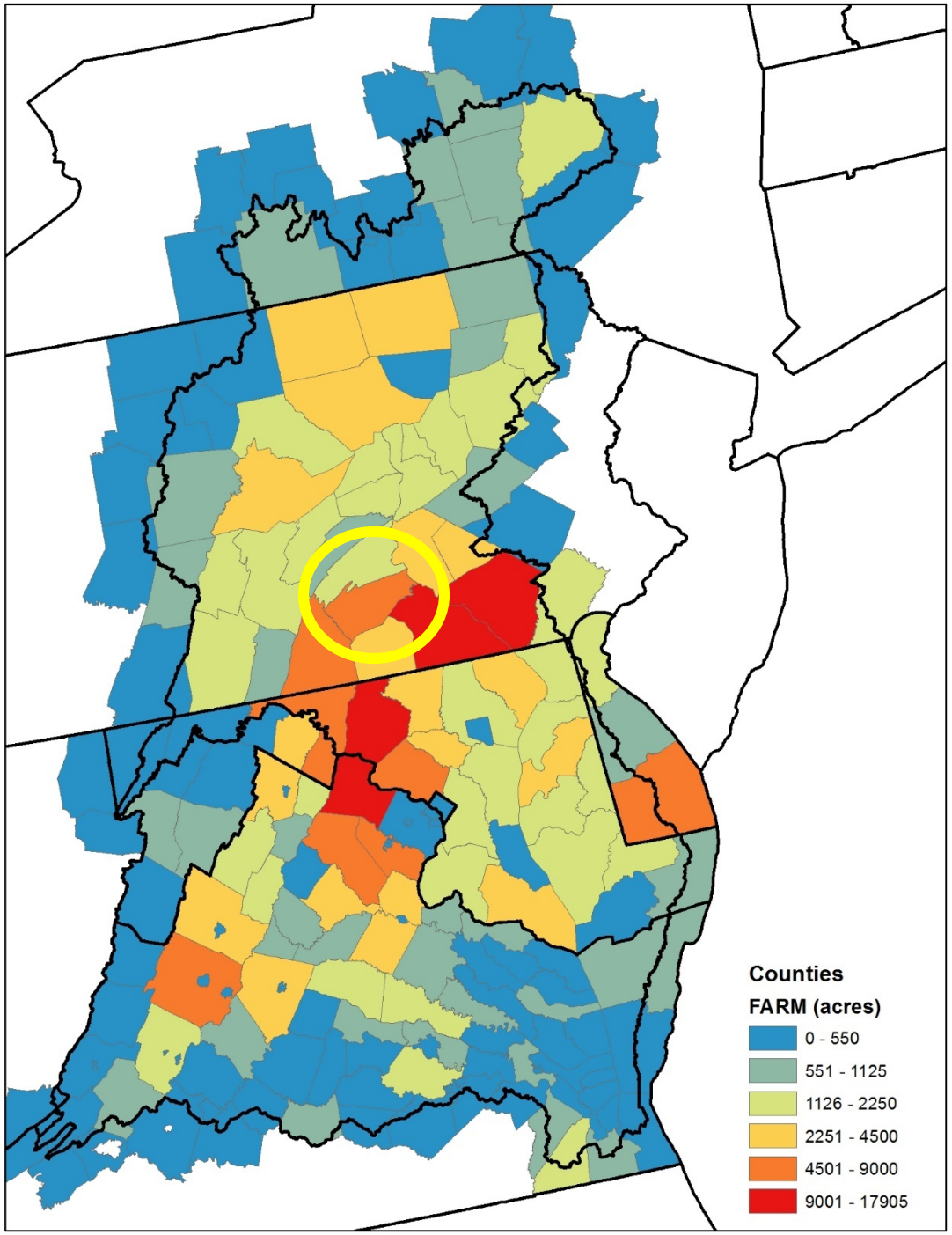
Forecasted Conversion of Farmland (2013 – 2025) "Current Zoning"



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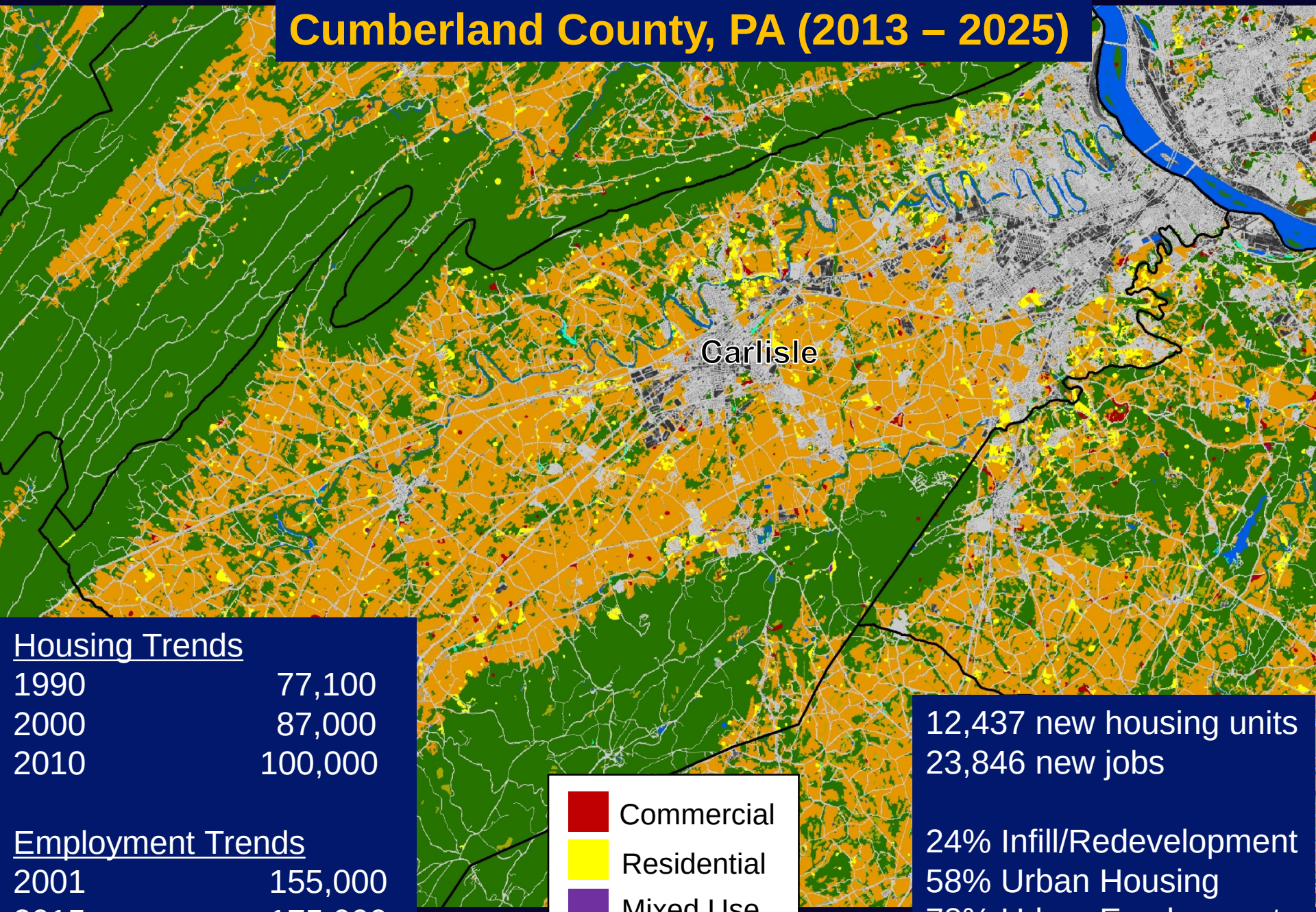
Cumberland County, PA (2013 – 2025)



Housing Trends

1990	77,100
2000	87,000
2010	100,000

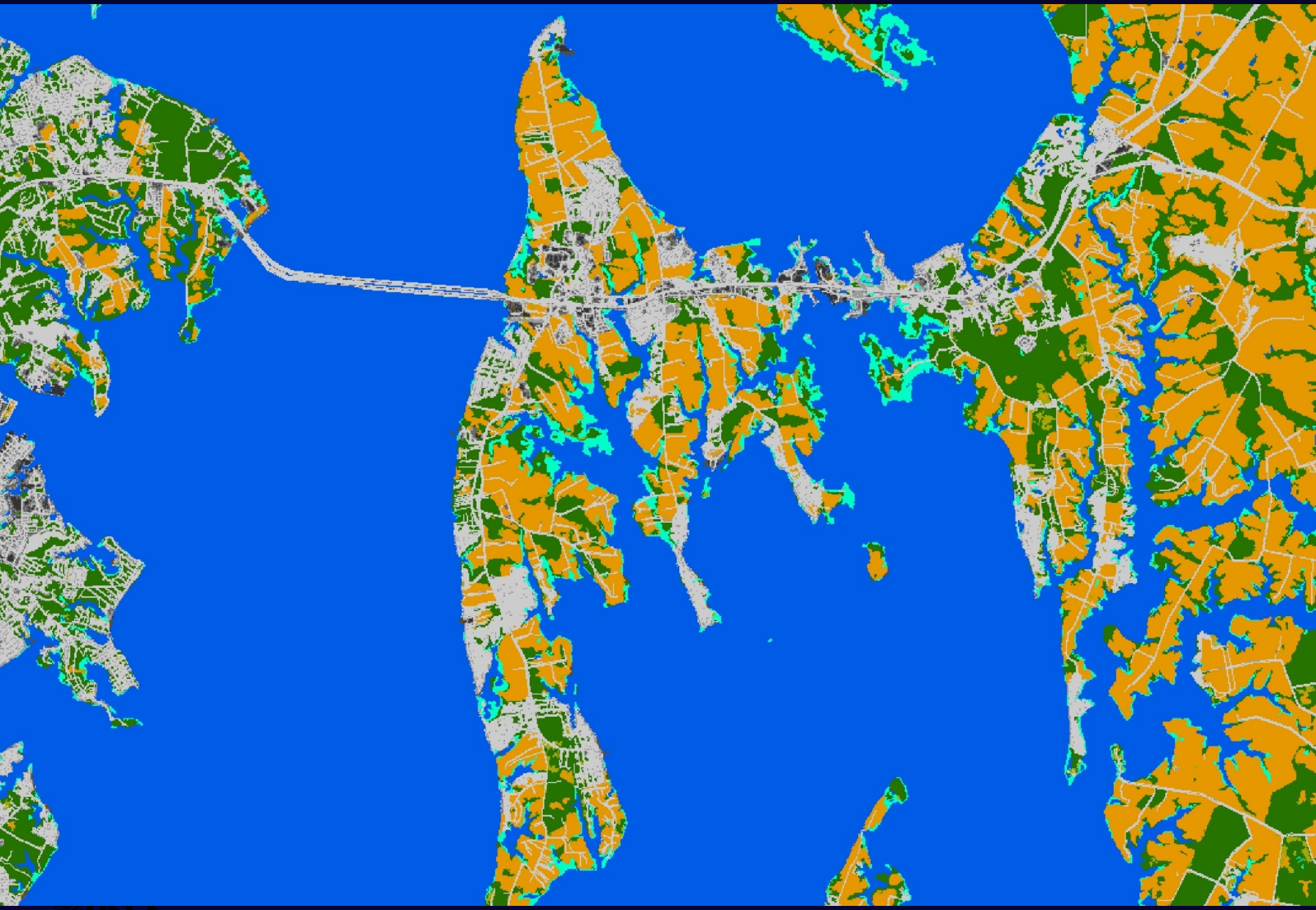
Employment Trends

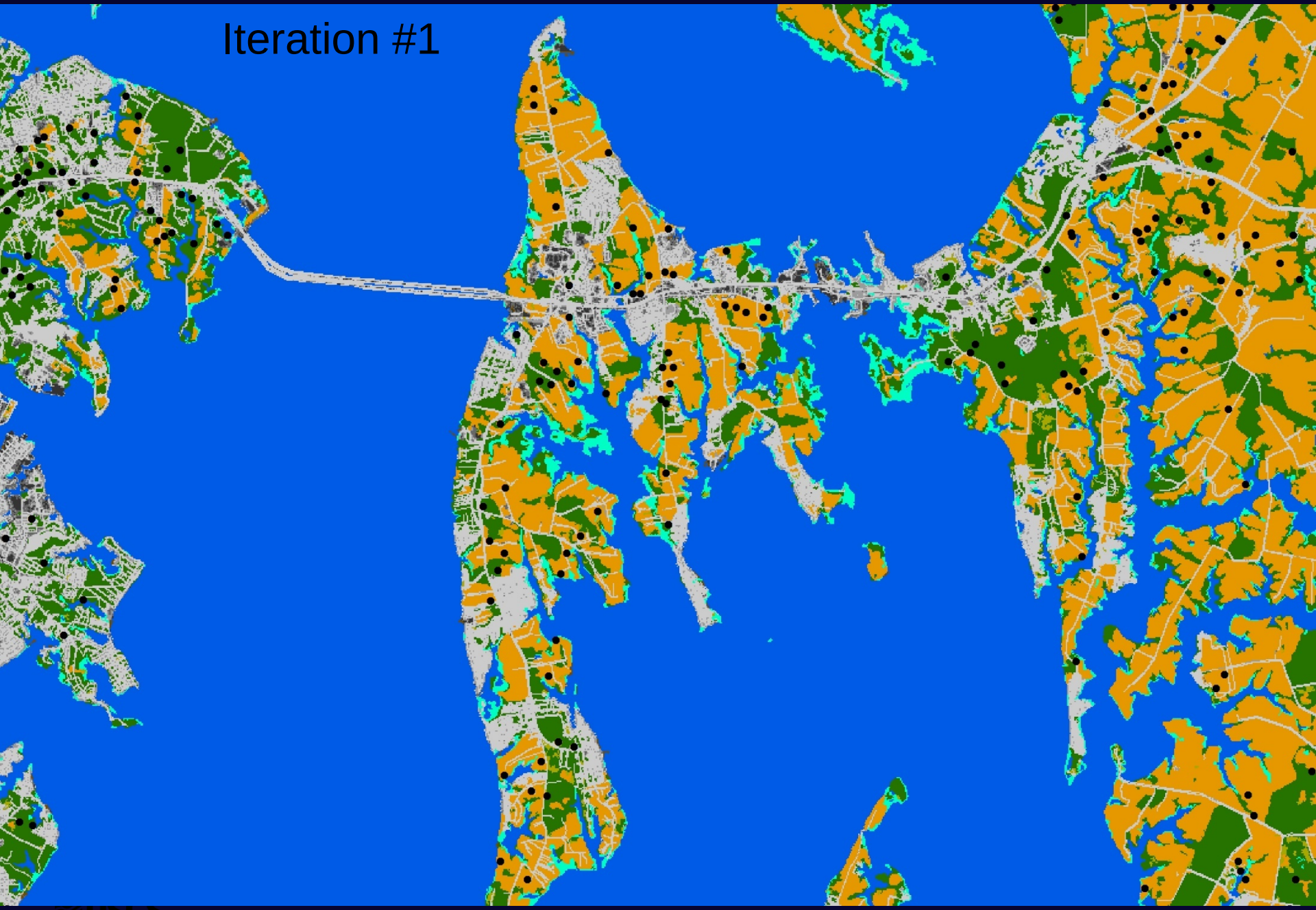
2001	155,000
2015	175,000

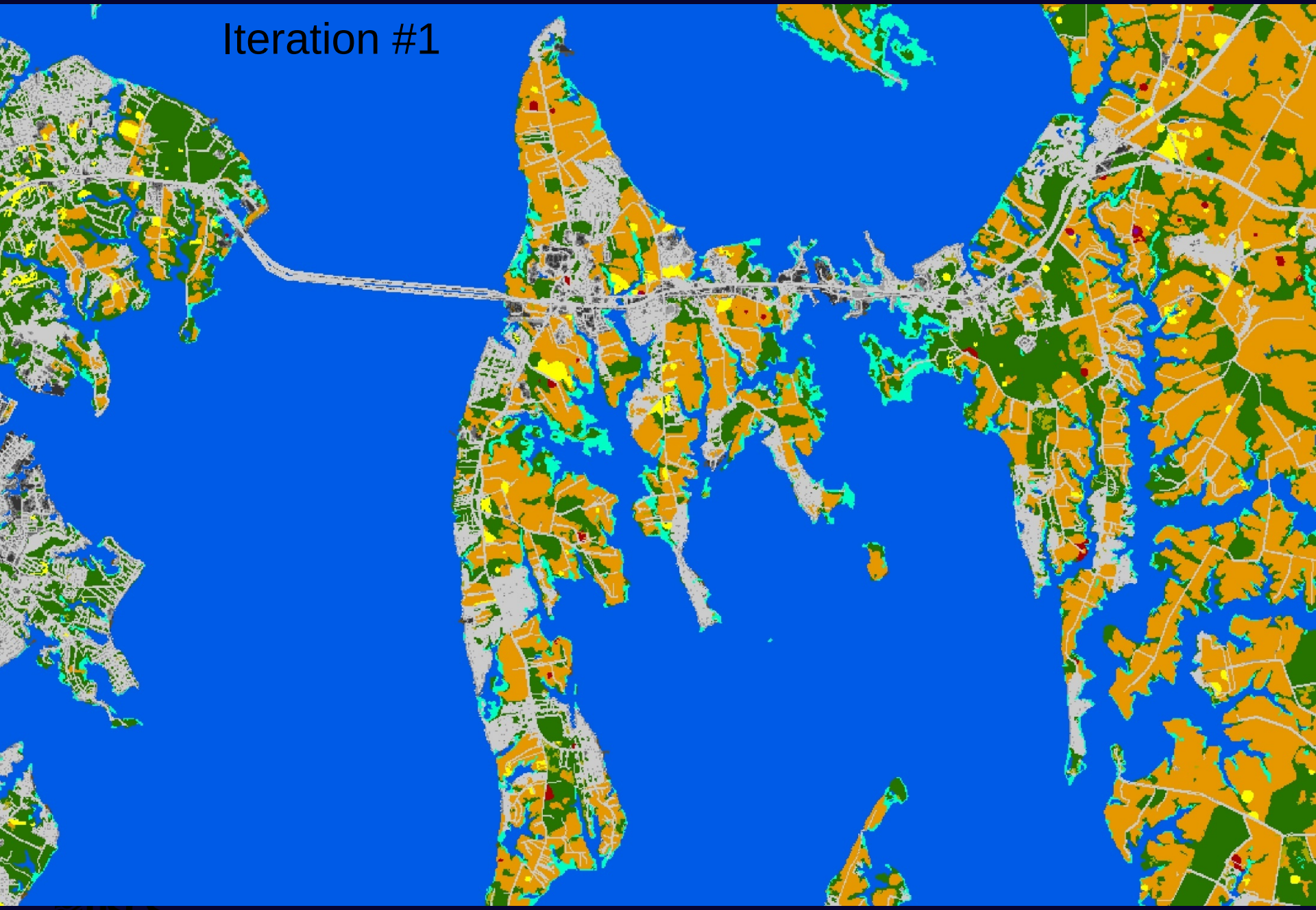
12,437 new housing units
23,846 new jobs

24% Infill/Redevelopment
58% Urban Housing
78% Urban Employment


Kent Island
Queen Anne's County
Maryland
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




Iteration #1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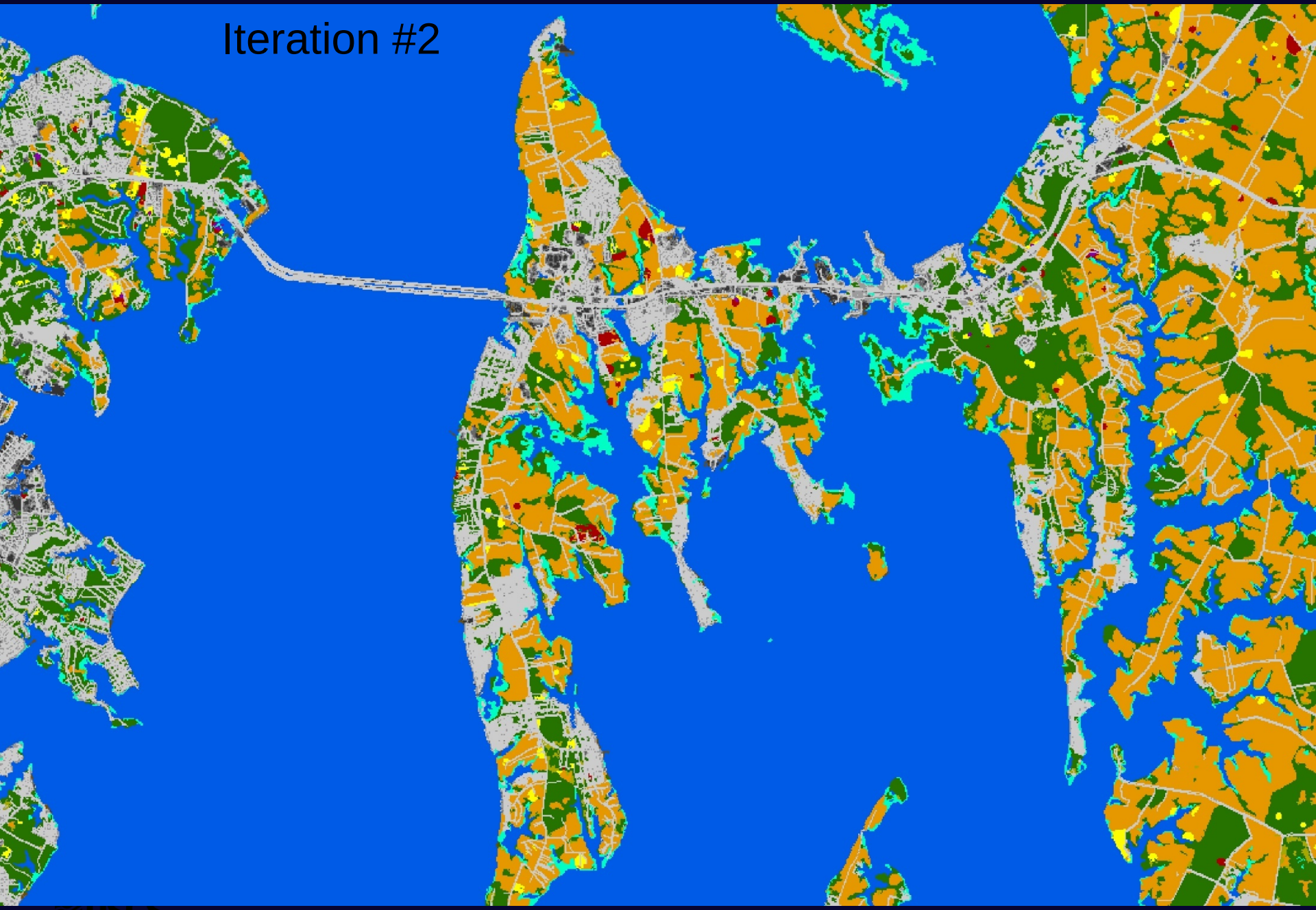
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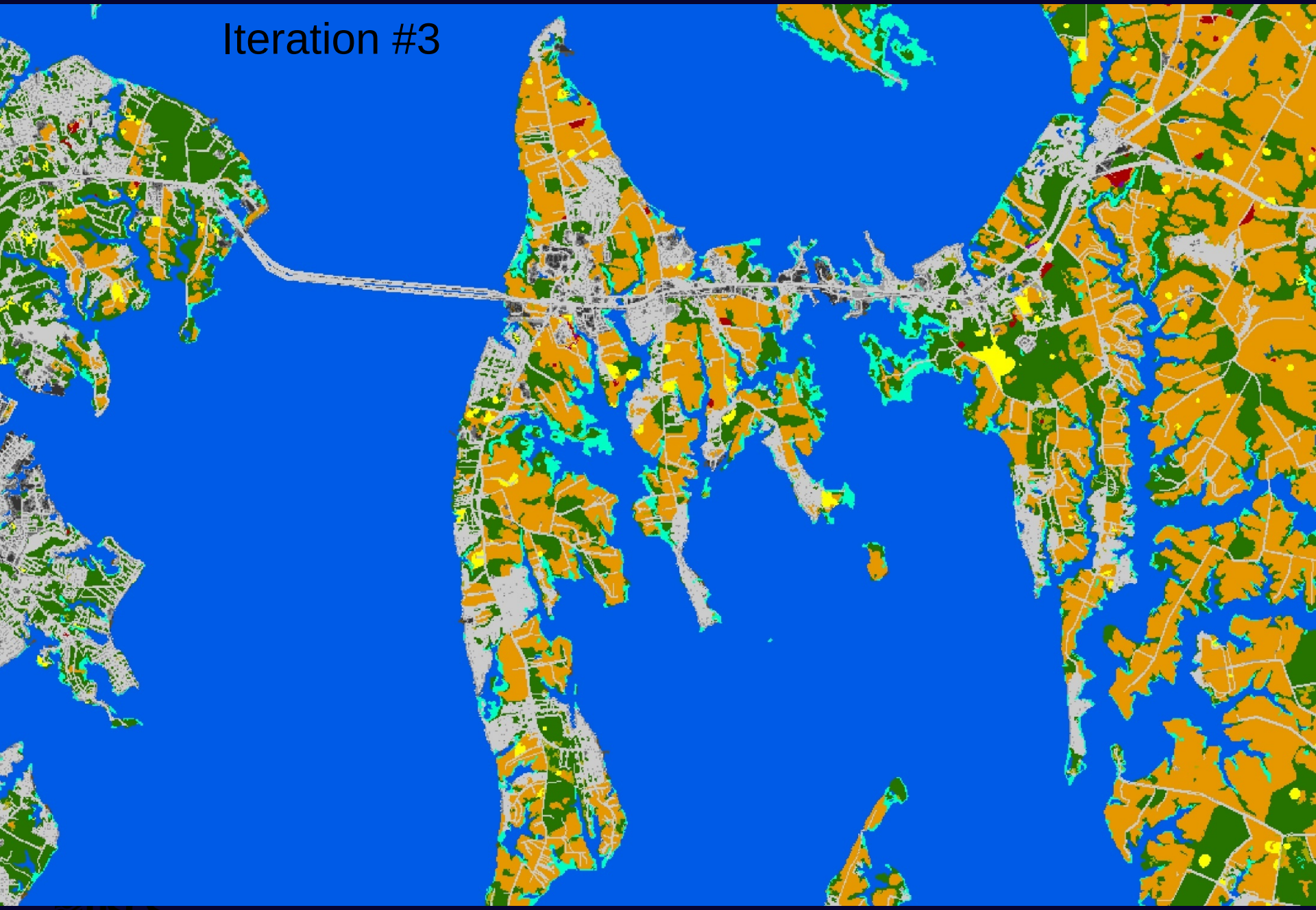
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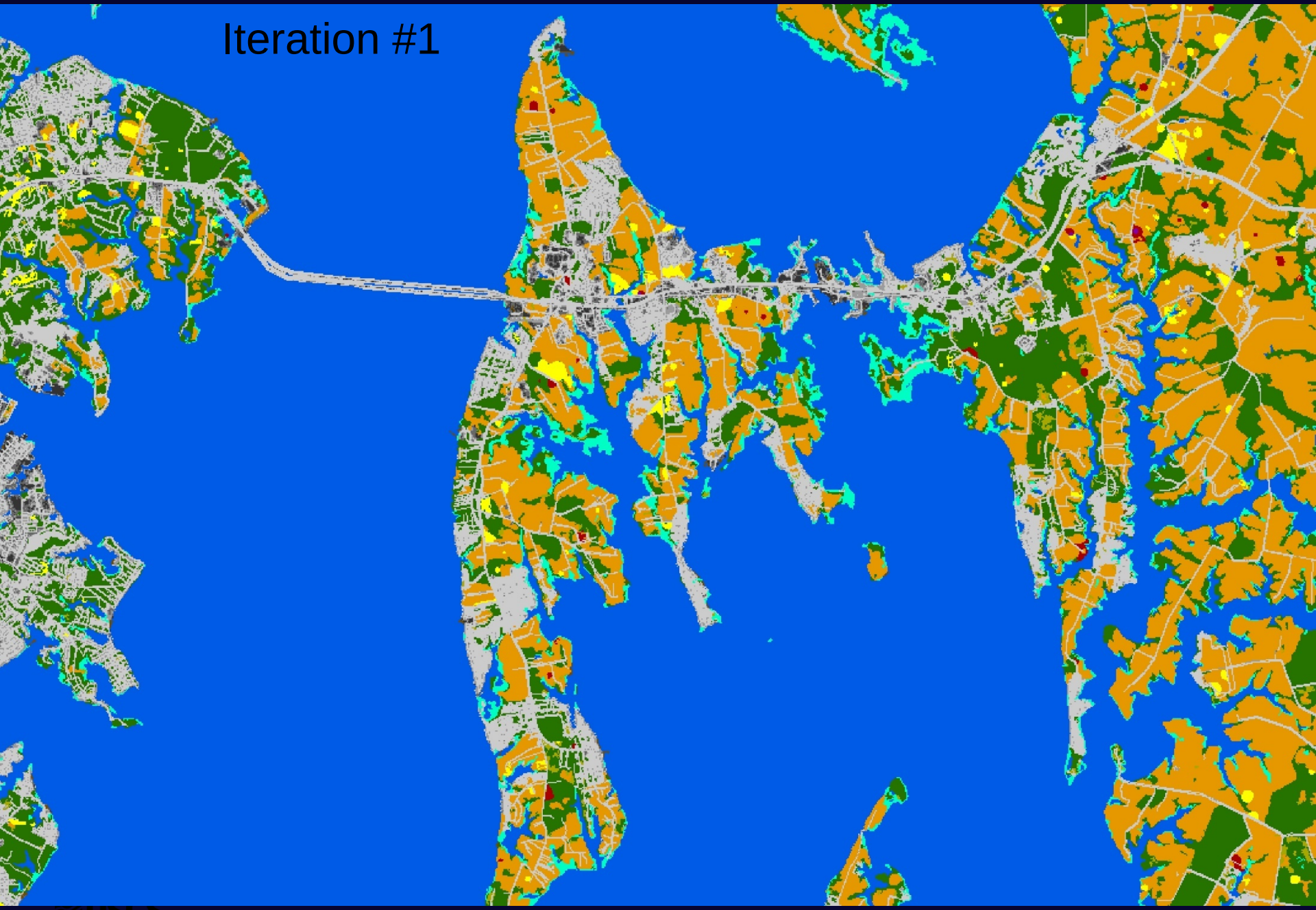
Iteration #1

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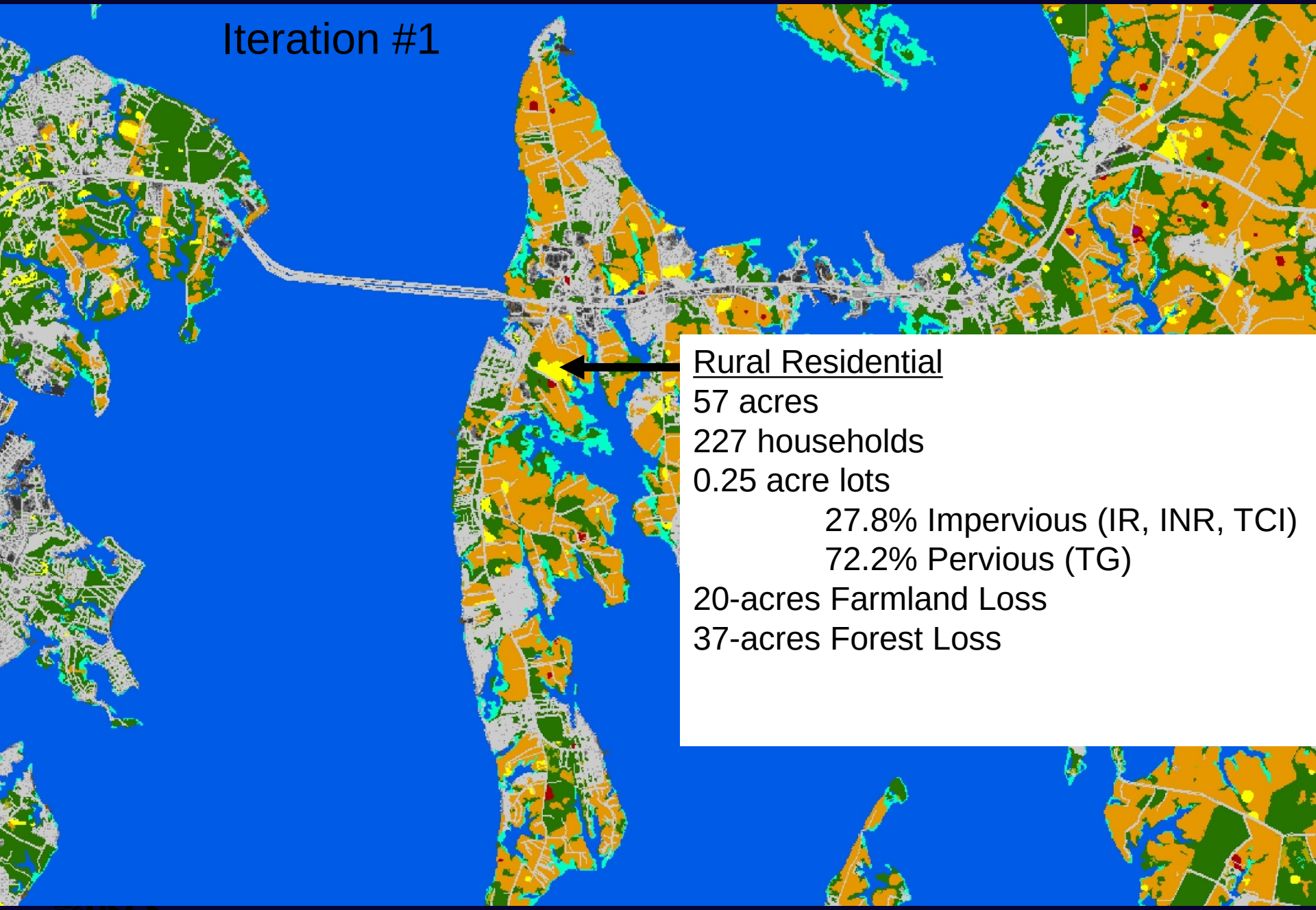

Rural Residential
57 acres
227 households
0.25 acre lots
27.8% Impervious (IR, INR, TCI)
72.2% Pervious (TG)
20-acres Farmland Loss
37-acres Forest Loss

CBLCM Next Steps

1. Continue comparisons between CBLCM, MDP model, and State-supplied data on land use change

2. Complete refinements to “Current Zoning” scenario
   - Refine urban vs rural boundaries.
   - Automate infill/redevelopment calculations.
   - Consider use of parcel data and SSURGO soils to identify additional unsuitable areas for development.

3. Develop data and code for Utopia scenario
   - Estimate “demand” for conservation and code simulation of conservation as a “land use”.
   - Map average sea-level rise/storm surge inundation areas.
   - Develop rules for adjusting densities and infill rates.

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