Future Land Use Scenarios for the Chesapeake Bay Watershed

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WQGIT Face-to-Face Meeting
September 26, 2017

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

Role of Future Land Use Scenarios:

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

2. Benchmarks for developing and evaluating state offset strategies.

3. A framework for crediting land conservation and land use regulatory actions.

4. Information for identifying forests and farms at risk from development.

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).

Land Use Workgroup Recommendations

- Approve use of growth models in concept
    - Chesapeake Bay Land Change Model (CBLCM)
    - MDP Land Use model

- Recommend dropping the "Historic Trends" scenario and focusing on "Current Policy" scenario, renaming it as "Current Zoning" because:
    - Zoning decisions have shaped historic trends;
    - Local jurisdictions more likely to accept a scenario that includes their zoning information.

- Implement minor refinements to the CBLCM

Some Important Caveats

- Concerns raised about how land use changes will translate to changes in loads in the WSM.

- Growth models are not accurate at the parcel scale, use should be restricted to coarser scales, e.g., LRSEGs, HUC12s, Counties, etc.

- Growth models and future forecasts should be continually updated every two-years through 2025.

Evaluating Growth Models: Next Steps

- Review of tabular and spatial data by state partners and local governments.

- Further refine the "Current Zoning" scenario and review during fall LUWG meetings.

- Continue working on alternative future scenarios identified during Local Government Forum:
    - "Current Zoning Plus"
    - "Utopia"

Chesapeake Bay Watershed PopulationTrends
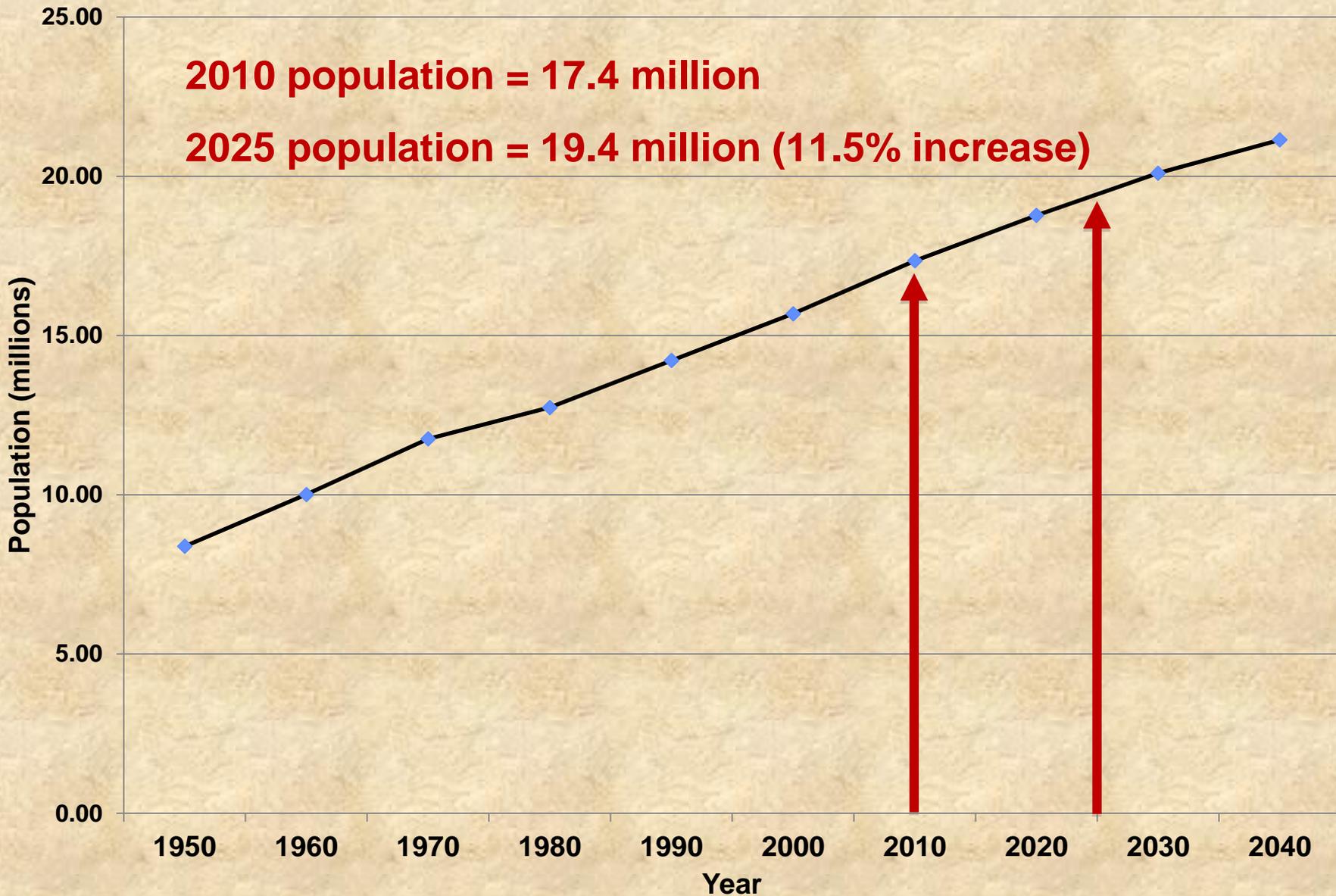
2010 population = 17.4 million

2025 population = 19.4 million (11.5% increase)

Chesapeake Bay Future Scenarios
(run in September 2017)

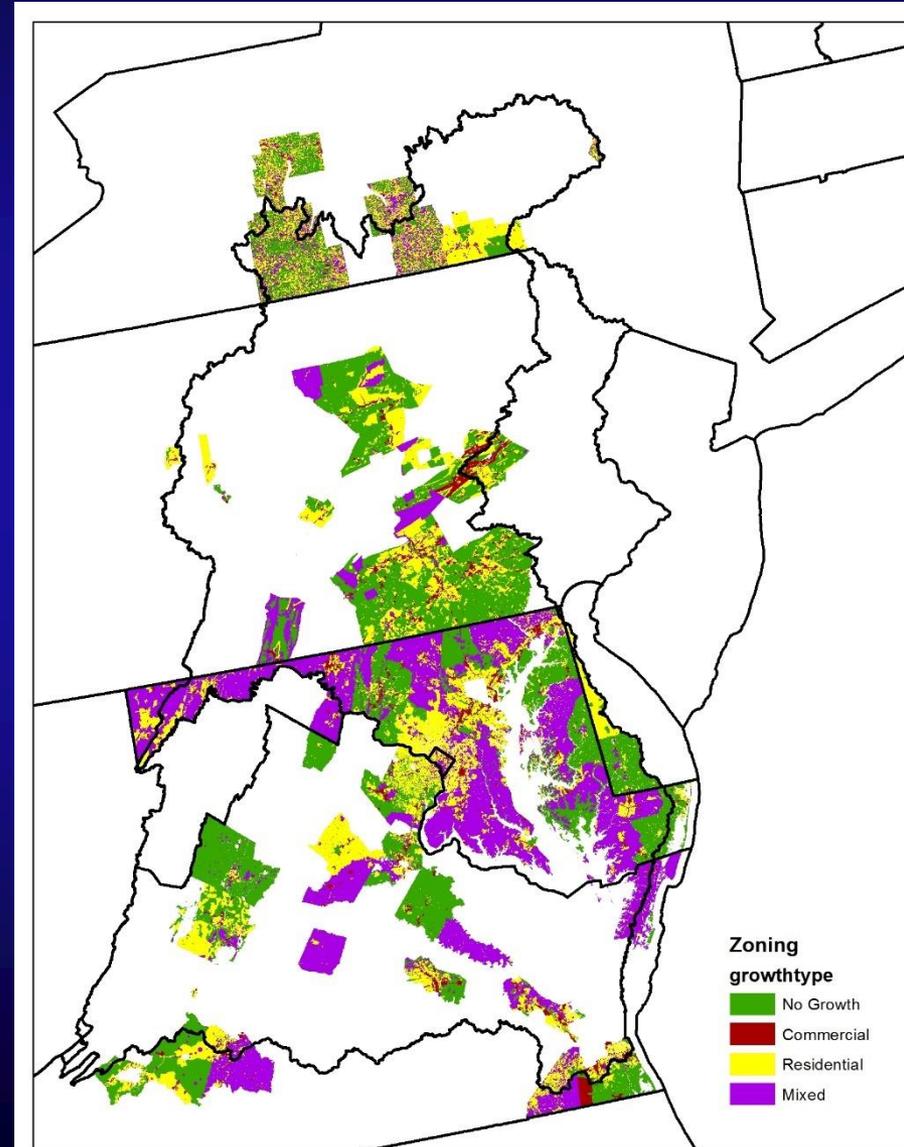**"Historical Trends":** previous patterns of growth replicated into the future.

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

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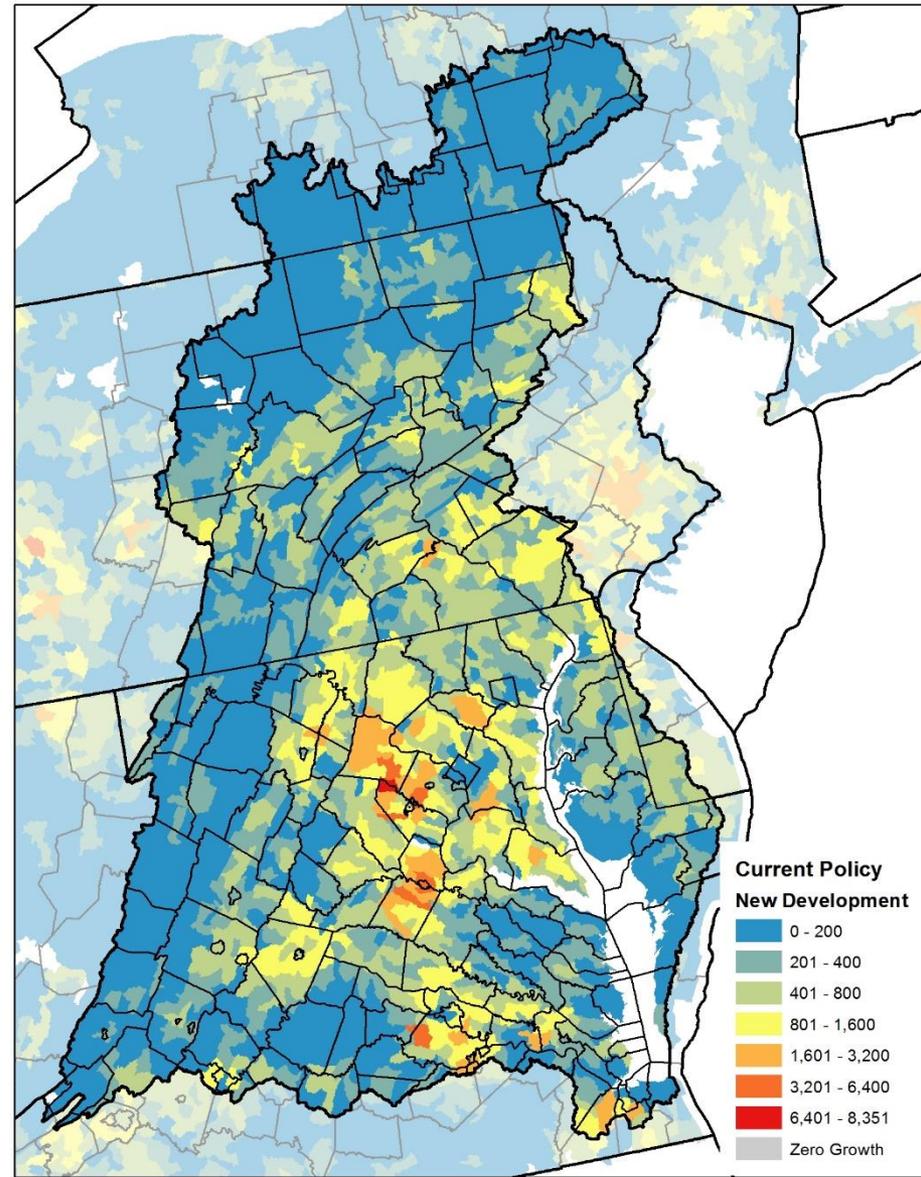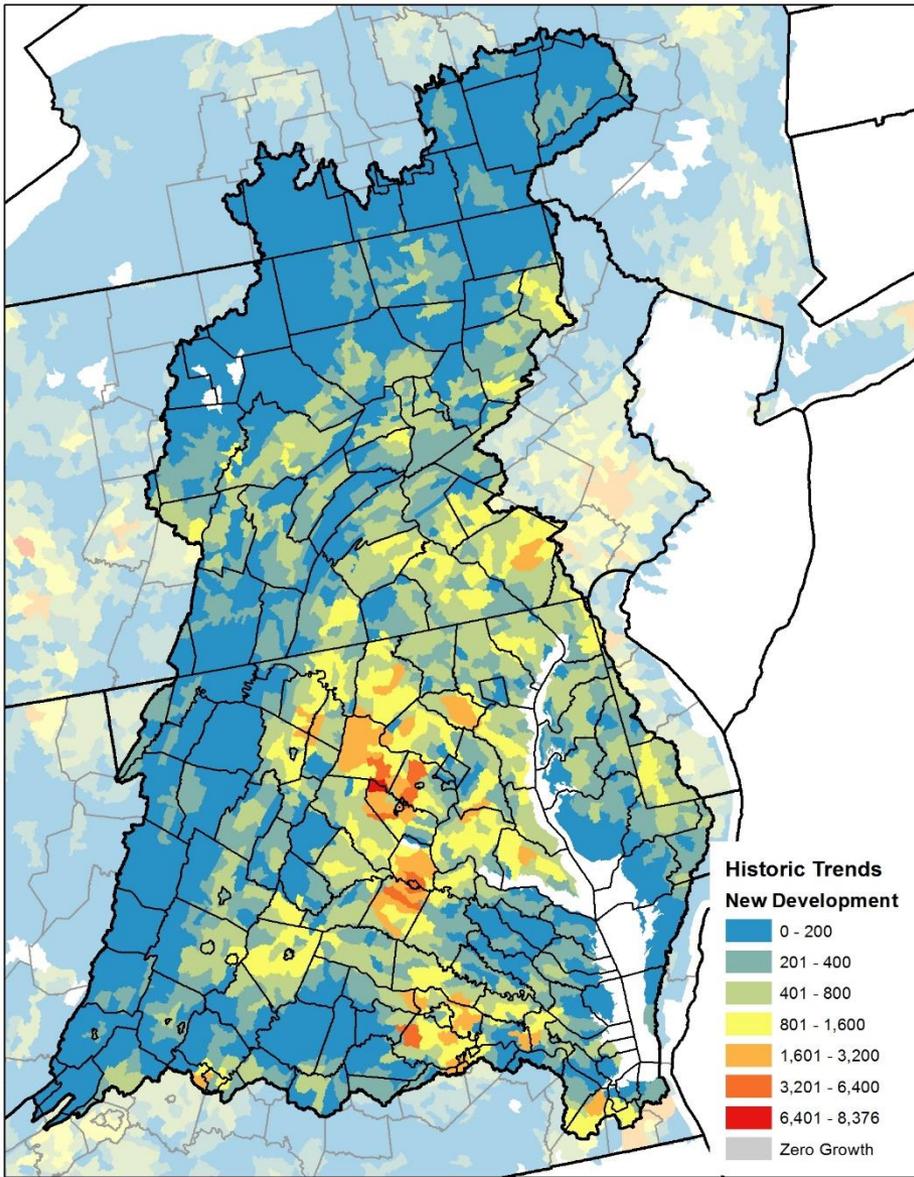# Chesapeake Bay Land Change Model
"Current Zoning" Scenario

Generalization of Local Zoning:

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

Zoning growthtype
- No Growth
- Commercial
- Residential
- Mixed

USGS

"Historical Trends"

"Current Zoning"

Historic Trends
New Development

- 0 - 200
- 201 - 400
- 401 - 800
- 801 - 1,600
- 1,601 - 3,200
- 3,201 - 6,400
- 6,401 - 8,376
- Zero Growth

Current Policy
New Development

- 0 - 200
- 201 - 400
- 401 - 800
- 801 - 1,600
- 1,601 - 3,200
- 3,201 - 6,400
- 6,401 - 8,351
- Zero Growth

# Accounting for Urban Growth

Urban Sector:
Accounting for the impact of 2 million additional people (2010 – 2025).

Per-capita impacts are greatest if growth occurs in forested areas converted to 1-5 acre lots on septic near the Bay.

Per-capita impacts are minimized if growth is accommodated through infill and redevelopment within areas served by pubic sewer and where investments can reduce loads from neighboring areas.

Expected growth can be offset by <u>land use regulatory actions</u>, <u>land conservation</u>, or other actions that reduce the footprint of future development and/or concentrate growth in areas with adequate infrastructure (e.g., roads, schools, sewer).
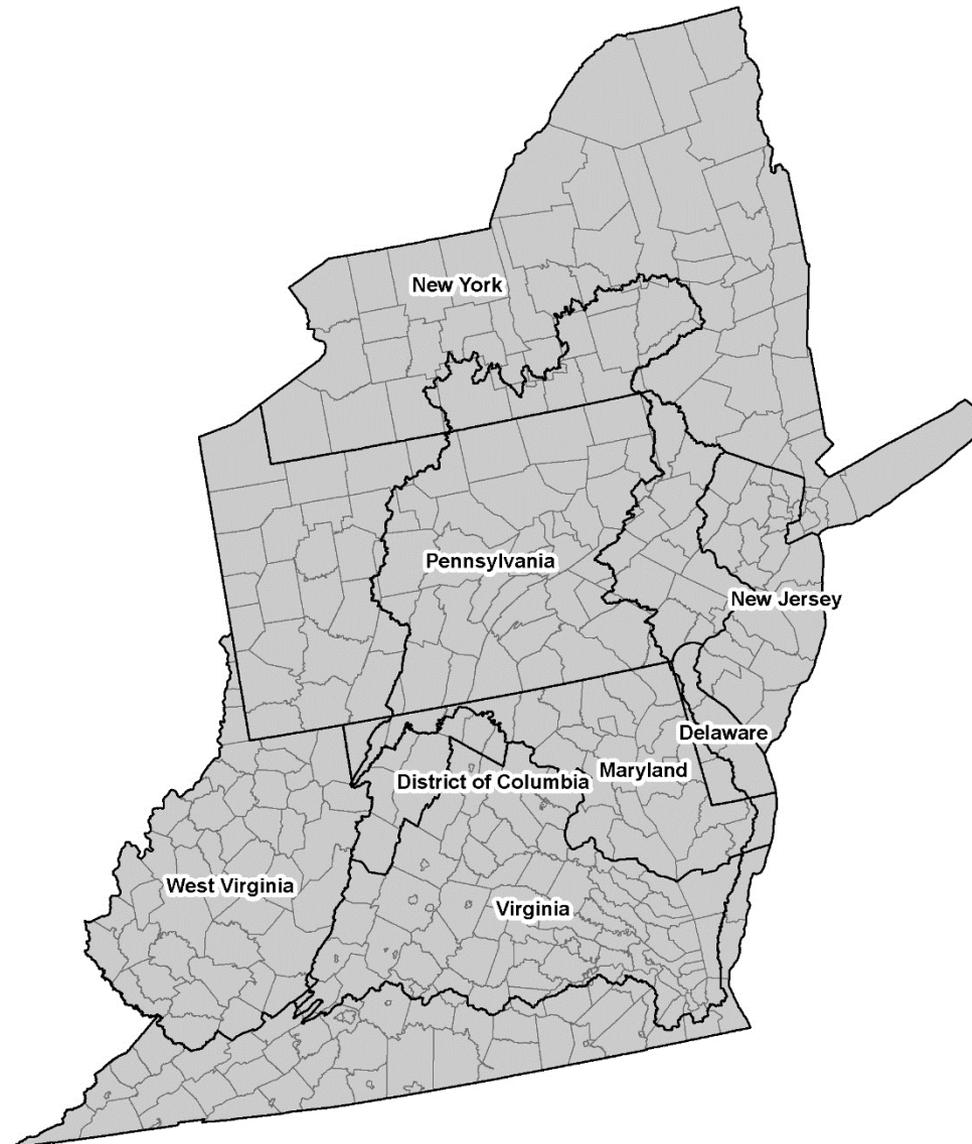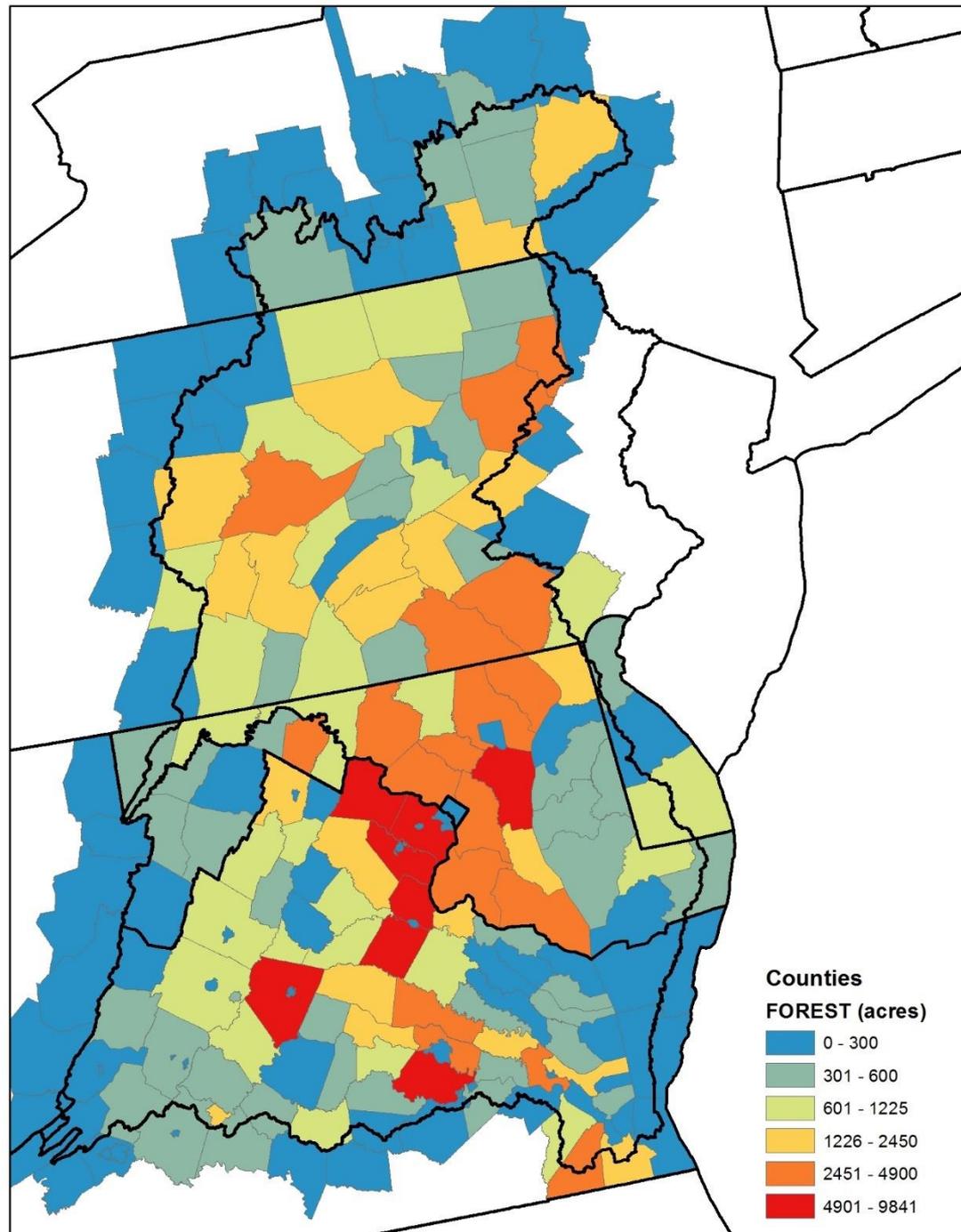
Chesapeake Bay Land Change Model
"Current Zoning" Scenario

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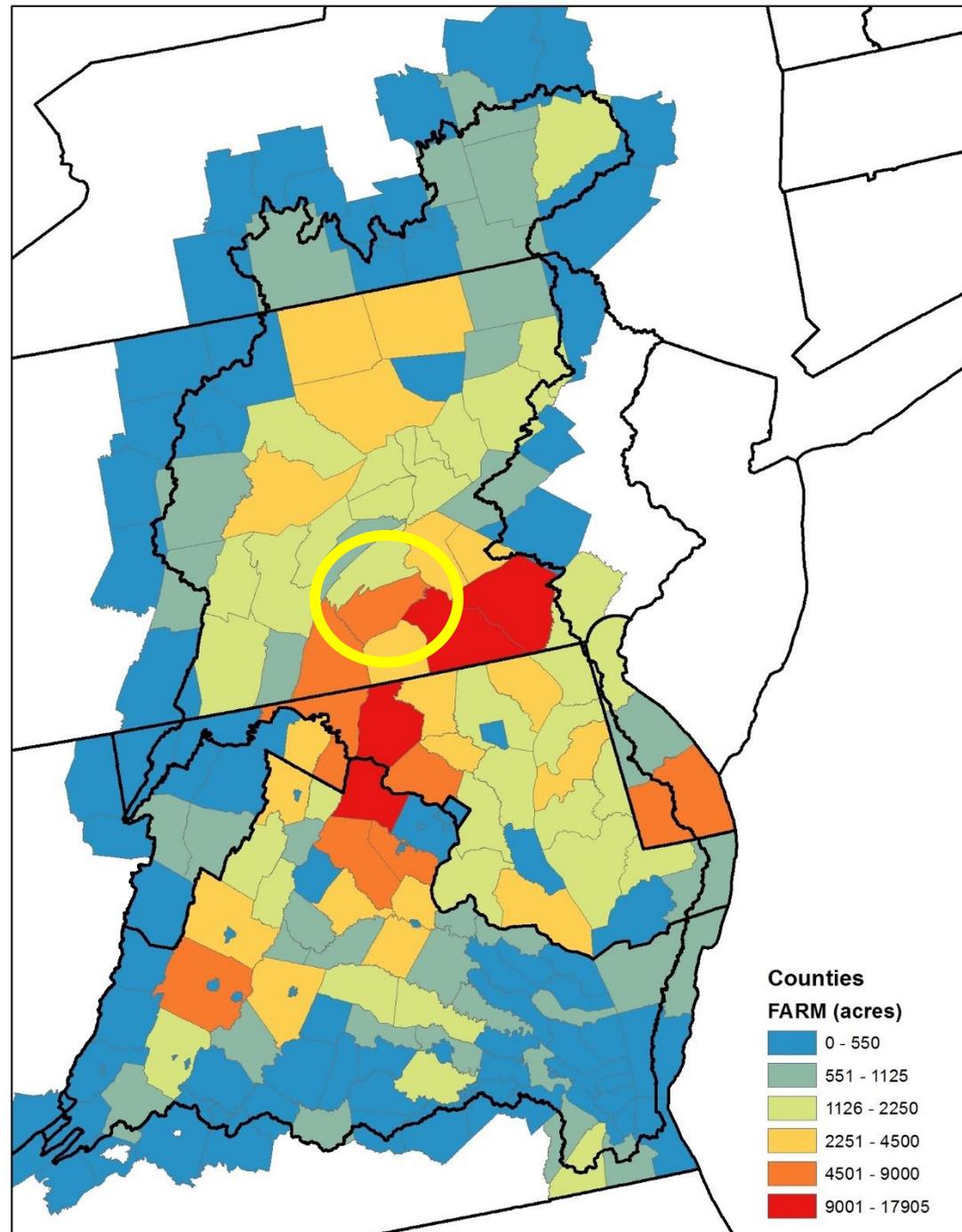
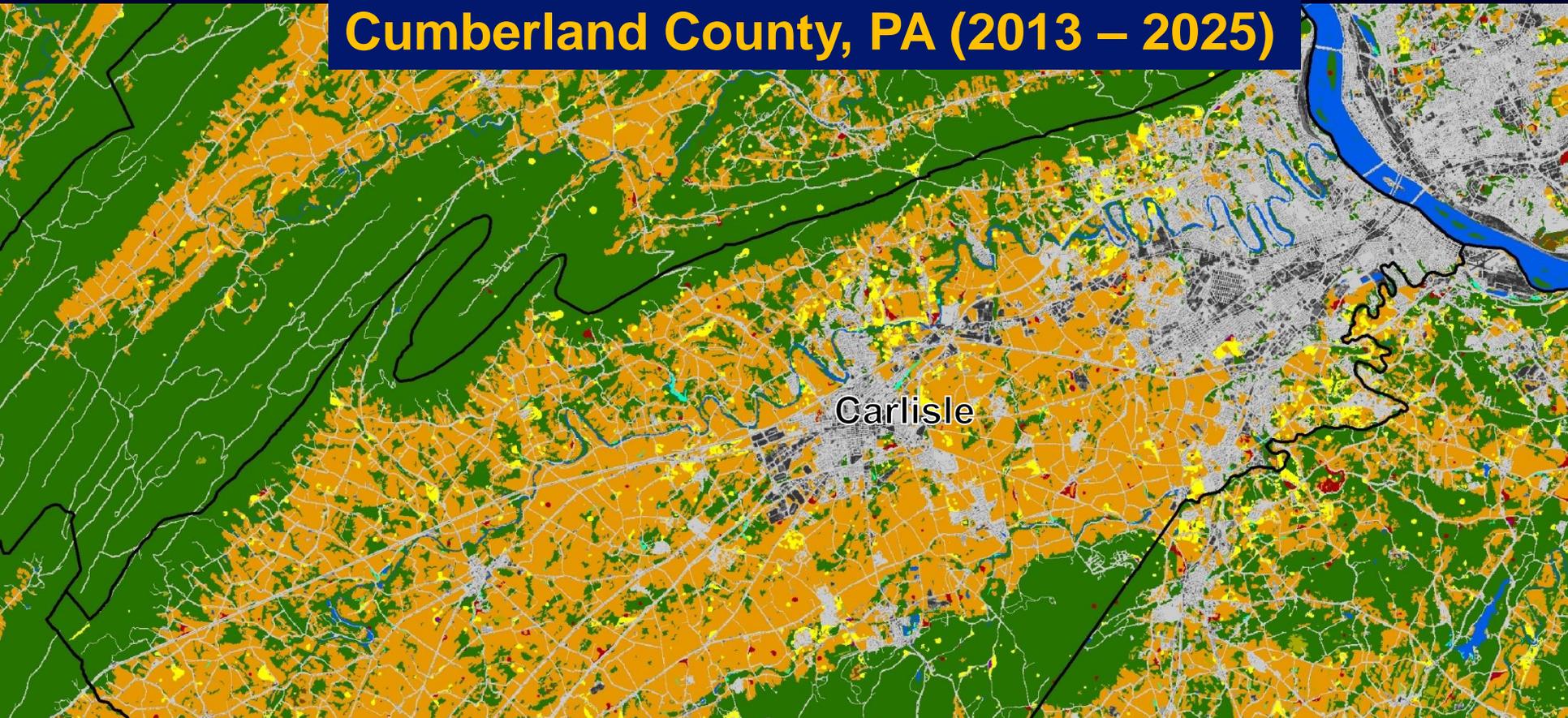**Forecasted Growth in Impervious Surfaces (2013 – 2025) "Current Zoning"**

Counties
IMP (acres)
- 0 - 300
- 301 - 600
- 601 - 1200
- 1201 - 2400
- 2401 - 4800
- 4801 - 9070

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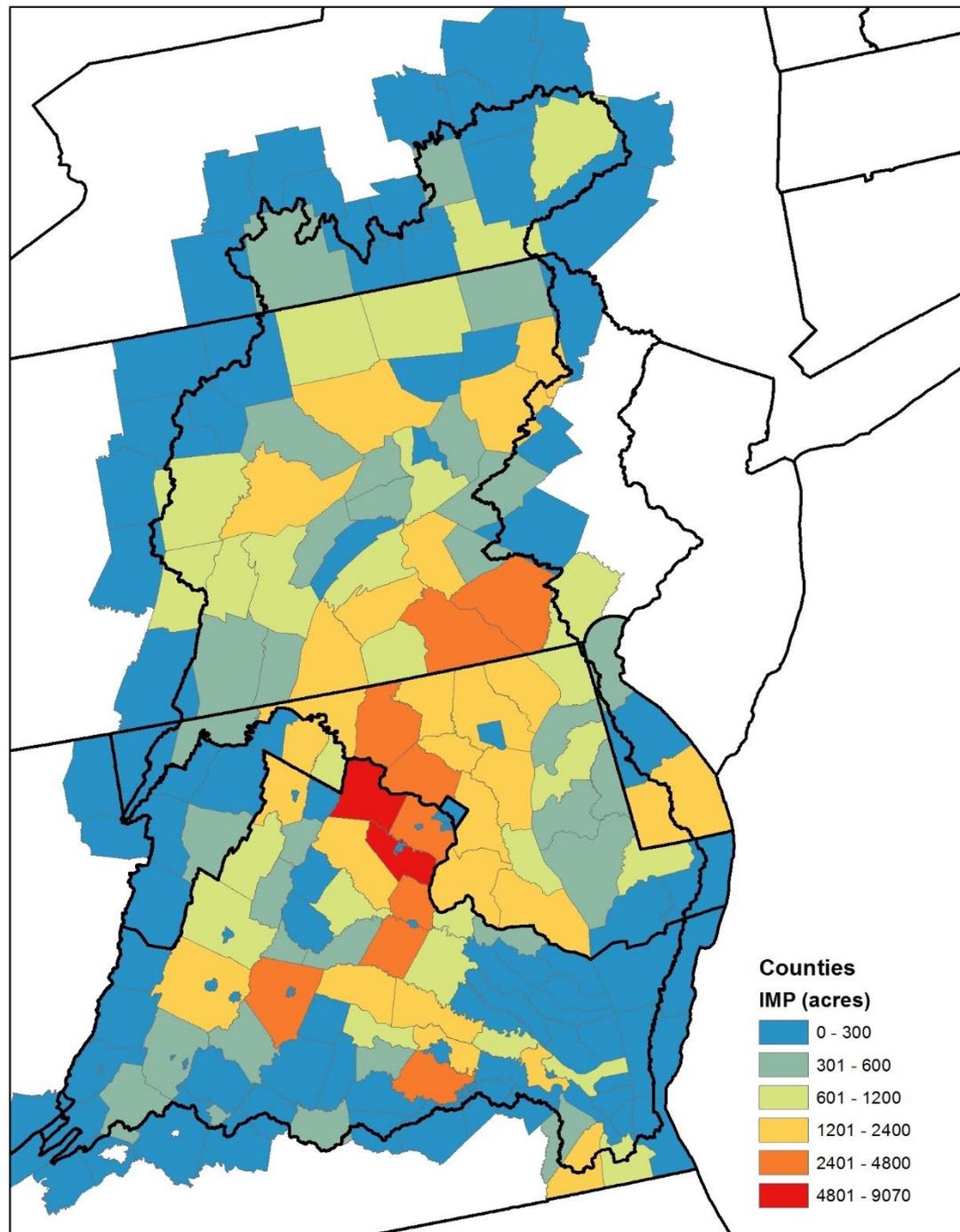
Forecasted Conversion of Forests (2013 – 2025) "Current Zoning"

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

Counties
FARM (acres)

- 0 - 550
- 551 - 1125
- 1126 - 2250
- 2251 - 4500
- 4501 - 9000
- 9001 - 17905

USGS

Cumberland County, PA (2013 – 2025)

Carlisle

Housing Trends

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

Employment Trends

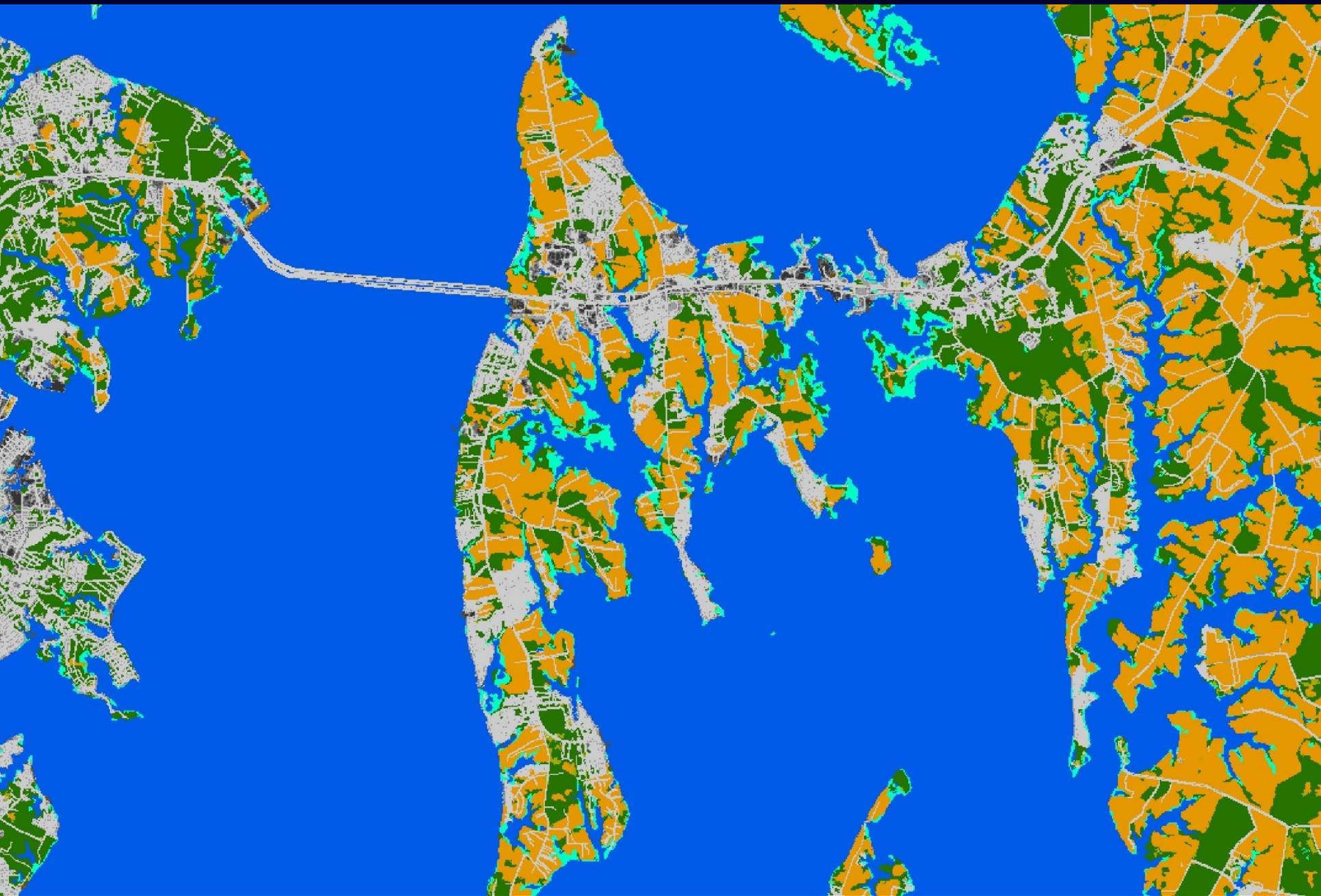|	
2001	155,000
2015	175,000

Legend:
- 🟥 Commercial
- 🟨 Residential
- 🟪 Mixed Use

12,437 new housing units
23,846 new jobs

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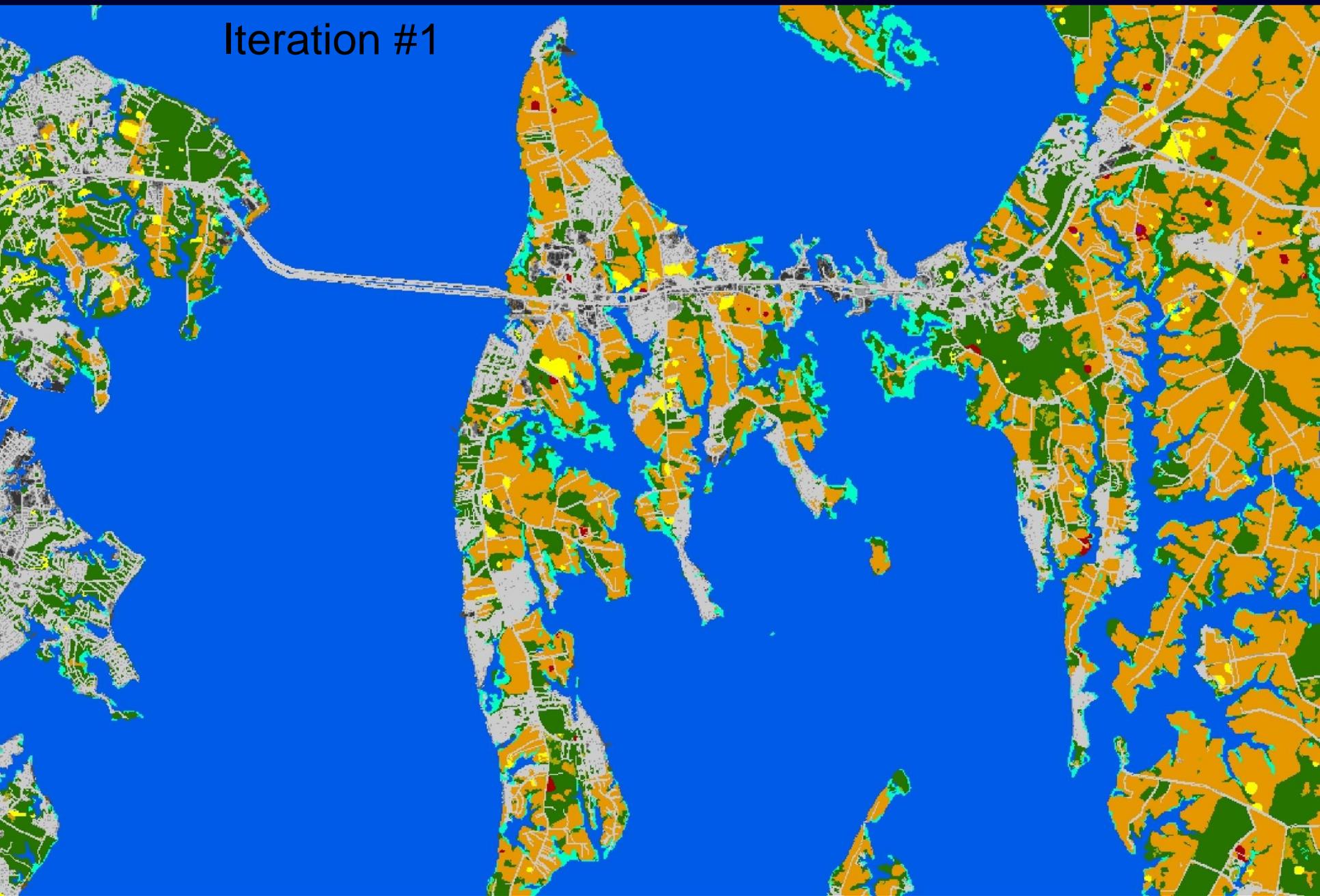78% Urban Employment

Kent Island
Queen Anne's County
Maryland
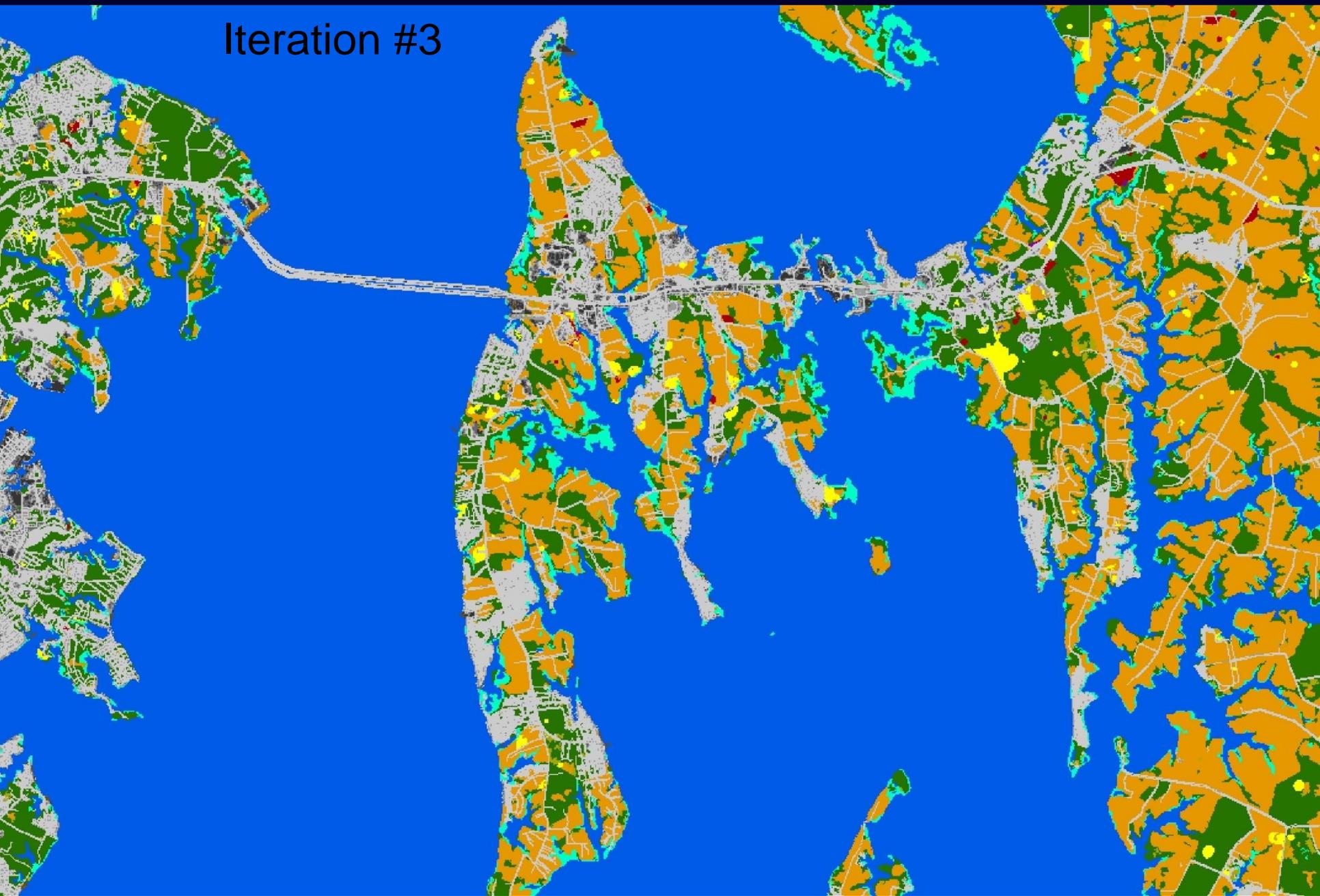
USGS
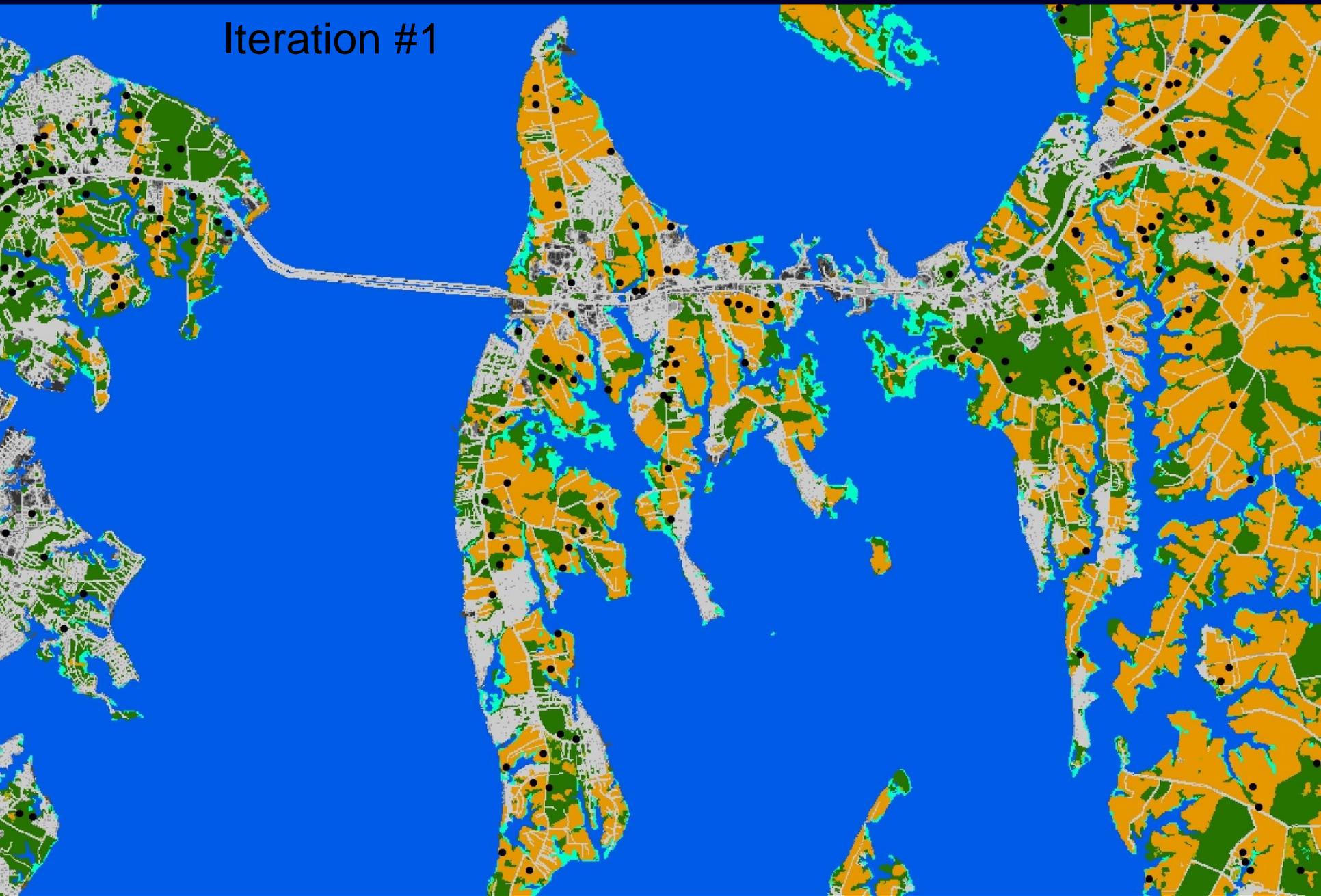
Iteration #1

Iteration #1

Iteration #2

≥USGS

Iteration #3

USGS
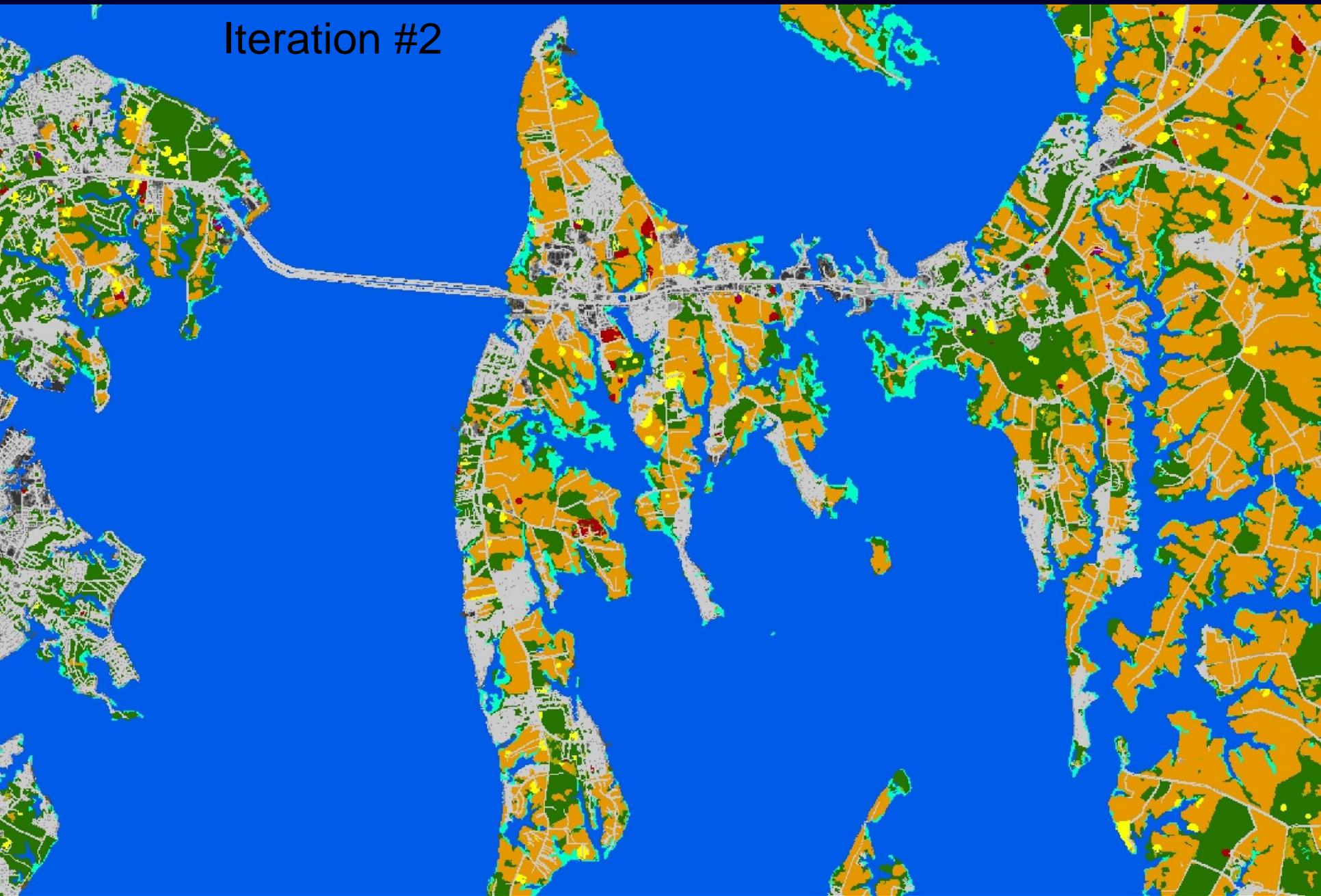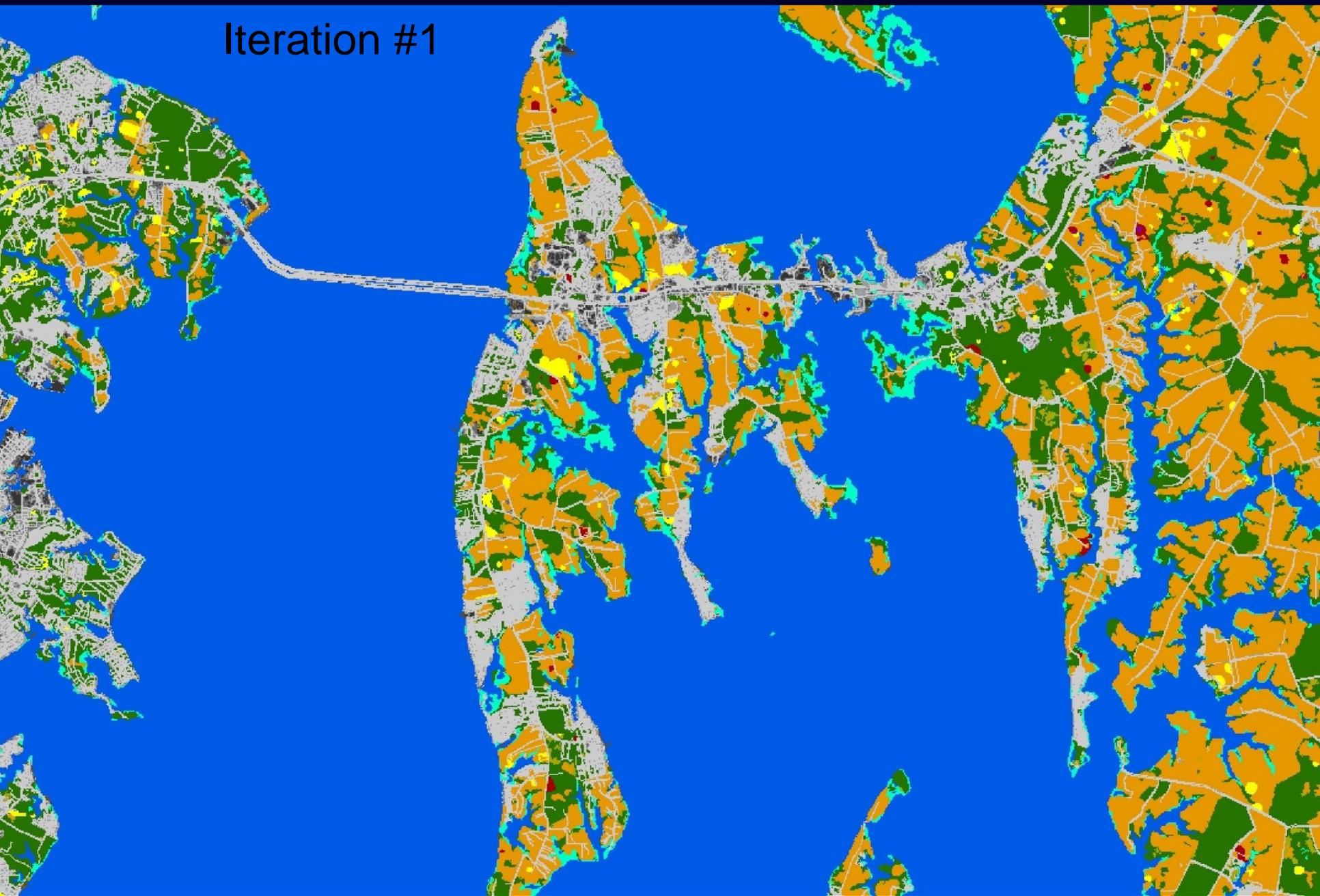
Iteration #1

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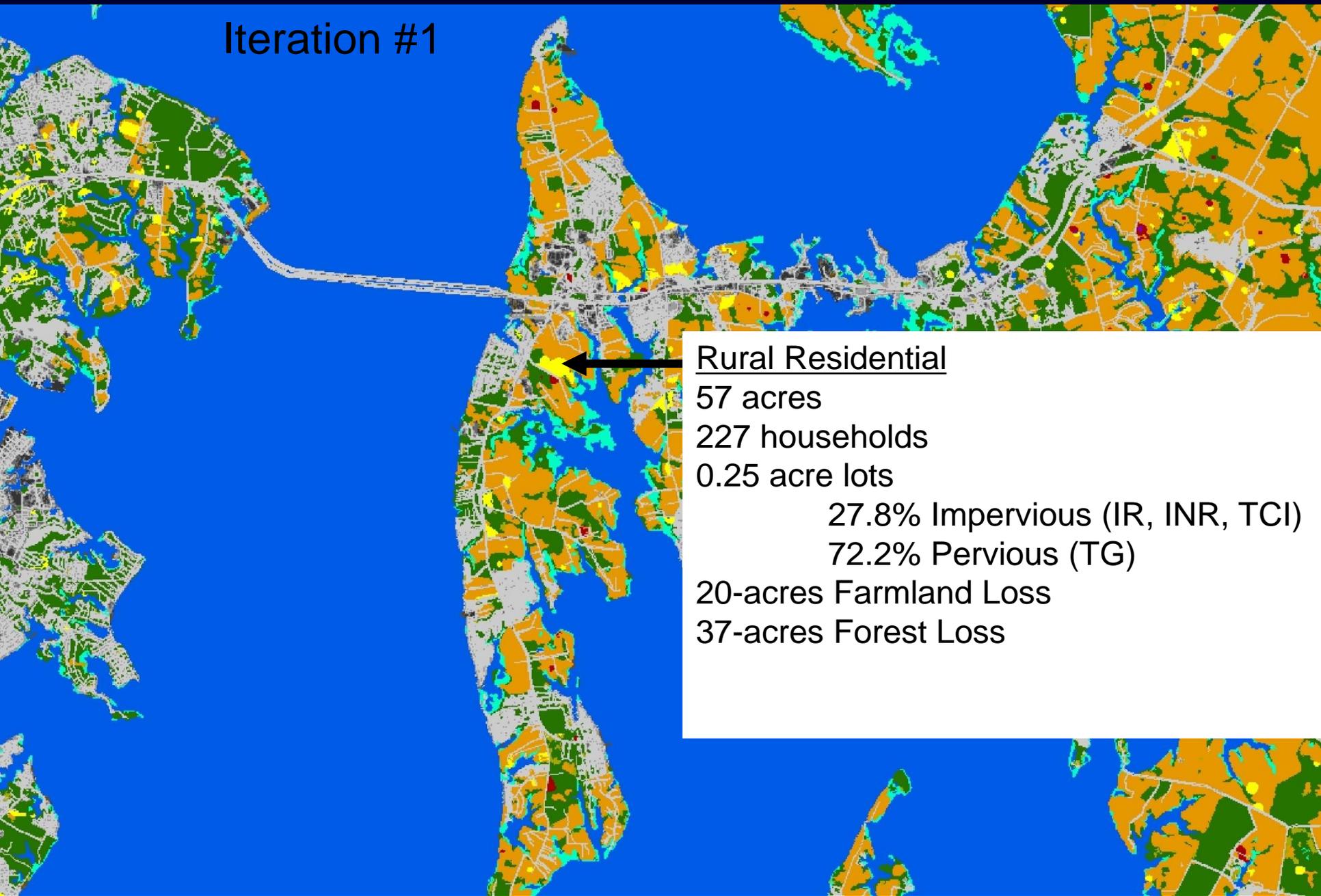
Rural Residential
57 acres
227 households
0.25 acre lots
      27.8% Impervious (IR, INR, TCI)
      72.2% Pervious (TG)
20-acres Farmland Loss
37-acres Forest Loss

USGS

Draft "Current Zoning" Scenario Results
District of Columbia 2013 - 2025

Demand:

  84,060 new housing units

130,379 new jobs

    89% infill/ redevelopment

Impact:

266 acres of greenfield development:

      120 acres impervious

       55 acres turf grass

        1 acres trees over turf

        0 acres mixed open

      89 acres forest

0% of change on farmland

100% of growth on sewer

Draft "Current Zoning" Scenario Results
Delaware 2013 – 2025 (Bay watershed)

<u>Demand:</u>

55,339 new housing units

49,133 new jobs

    30% infill/ redevelopment (weighted average)

<u>Impact:</u>

11,895 acres of greenfield development:

        1,818 acres impervious

        7,014 acres turf grass

          755 acres trees over turf

          218 acres mixed open

        2,090 acres forest

66% of development on farmland

91% of growth on sewer

USGS

Draft "Current Zoning" Scenario Results
Maryland 2013 – 2025 (Bay watershed)

<u>Demand:</u>

248,547 new housing units

413,789 new jobs

    40% infill/ redevelopment (weighted average)

<u>Impact:</u>

128,455 acres of greenfield development

    25,766 acres impervious

    63,873 acres turf grass

    14,005 acres trees over turf

     2,322 acres mixed open

    22,489 acres forest

43% of development on farmland

72% of growth on sewer

Draft "Current Zoning" Scenario Results
New York 2013 – 2025 (Bay watershed)

Demand:

46,919 new housing units

57,350 new jobs

   21% infill/ redevelopment (weighted average)

Impact:

19,244 acres of greenfield development:

      3,487 acres impervious

      8,246 acres turf grass

      1,623 acres trees over turf

        209 acres mixed open

      5,678 acres forest

37% of development on farmland

80% of growth on sewer

Draft "Current Zoning" Scenario Results
Pennsylvania 2013 – 2025 (Bay watershed)

Demand:

236,750 new housing units

345,246 new jobs

25% infill/ redevelopment (weighted average)

Impact:

181,180 acres of greenfield development:

      34,041 acres impervious

      86,275 acres turf grass

      13,829 acres trees over turf

       2,782 acres mixed open

      44,253 acres forest

49% of development on farmland

62% of growth on sewer

Draft "Current Zoning" Scenario Results
Virginia 2013 – 2025 (Bay watershed)

Demand:

418,300 new housing units

758,412 new jobs

32% infill/ redevelopment (weighted average)

Impact:

291,686 acres of greenfield development:

     61,860 acres impervious

     124,261 acres turf grass

     30,505 acres trees over turf

     3,505 acres mixed open

     71,555 acres forest

31% of development on farmland

75% of growth on sewer

Draft "Current Zoning" Scenario Results
West Virginia 2013 – 2025 (Bay watershed)

Demand:

22,899 new housing units

18,964 new jobs

    6% infill/ redevelopment (weighted average)

Impact:

21,163 acres of greenfield development:

        3,979 acres impervious

        10,372 acres turf grass

        2,091 acres trees over turf

          415 acres mixed open

        4,306 acres forest

52% of development on farmland

36% of growth on sewer

WQGIT Approval of LUWG's Recommendations

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WQGIT Approval of LUWG's Recommended Next Steps

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WQGIT Decisions

1. Recommend using 2025 growth projections in the development of the Phase III WIPs.

2. Recommend updating the growth projections every 2 years with the best available data to inform the development of milestones.