Chesapeake Bay Program
A Watershed Partnership

Chesapeake Bay Program's Land Use Workgroup

Co-Chairs:
Karl Berger, Metropolitan Washington Council of Governments
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Coordinator:
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Phase 6 Land Uses (proposed)

(i.e., major source sectors)

	Connected	Regulated	Federal
Impervious developed			
Residential (rural, low, medium, high-density)	Y / N	Y / N	Y / N
Commercial/ Industrial	Y / N	Y / N	Y / N
Institutional	Y / N	Y / N	Y / N
Roads	Y / N	Y / N	Y / N
Construction	Y / N	Y / N	Y / N
Pervious developed			
Open space	Y / N	Y / N	Y / N
Turf grass (low v high risk)	Y / N	Y / N	Y / N
Urban tree canopy	Y / N	Y / N	Y / N

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Phase 6 Land Uses (proposed)

(i.e., major source sectors)

Barren (surface mines & quarries)

Wastewater

- Population on sewer
- Households on septic
  - commercial, mass drain fields, shallow drain fields, failing systems, direct discharges, distance to waterway

Natural

- Forests
  - Upland
  - Floodplain/ riparian
  - Harvested
  - Disturbed
- Wetlands
  - Upland
  - Floodplain
  - Tidal emergent
- Beaches
- Water

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Phase 6 Land Uses (proposed)

(i.e., major source sectors)

Agriculture

Farmsteads

- Impervious vs Pervious
- Regulated (CAFOs) vs Unregulated

Crops

- Grain/forage
- Vegetables
- Hay
- Grass v Legumes

Pasture

Nurseries

- Covered
- Uncovered

Orchards

Sod farms

Idle/fallow land

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Local Land Use Data Request

Data informing current conditions

- land use, current and historic (1980+) with keys to interpret codes
- land cover (e.g., impervious surfaces, tree canopy, turf grass, herbaceous vegetation)
- extractive areas (e.g., quarries, active and reclaimed surface mines, shale gas pads and related pipelines and roads)
- sewer service areas (current and proposed)
- stormwater regulated areas (MS4's, CSO's), storm drain networks

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Data informing future conditions

- zoning (consistent with latest comprehensive plan) with keys to interpret codes, generalized as appropriate)
- priority funding areas, urban area demarcation lines, urban renewal/reinvestment zones, etc.
- planned and/or permitted developments
- protected lands (including parks, recreation areas, and other county-owned lands unavailable for future development)
- special environmental protection areas* (e.g., Chesapeake Bay Critical Areas, riparian buffers, erosion prone soils, flood zones, habitat protection)
- rail transit stations (current and proposed)
- conservation priority areas (e.g., agricultural districts, large forest tracks)
- planned transportation improvements

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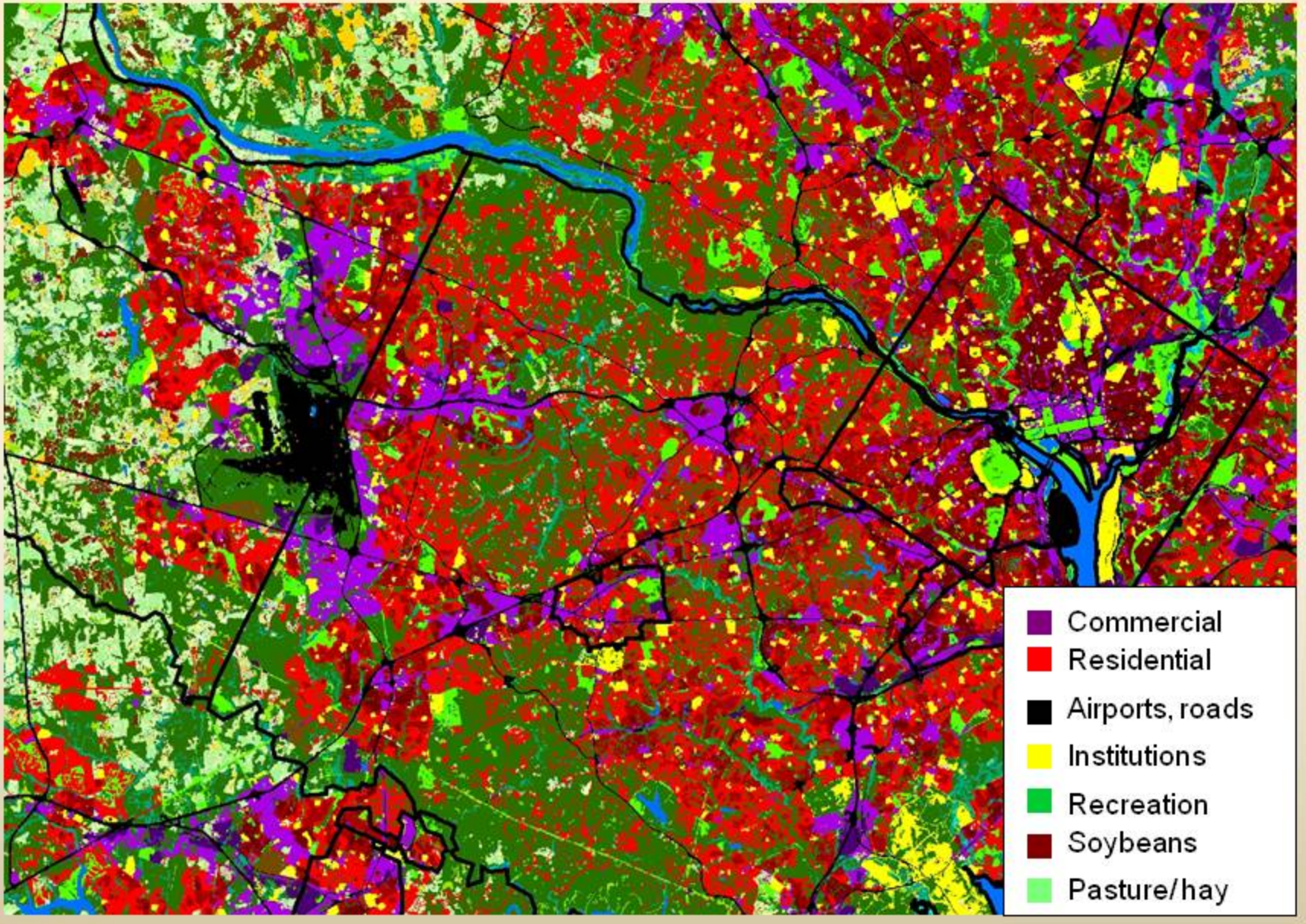
Urban land cover re-classed to land use + Cropland Data Layer



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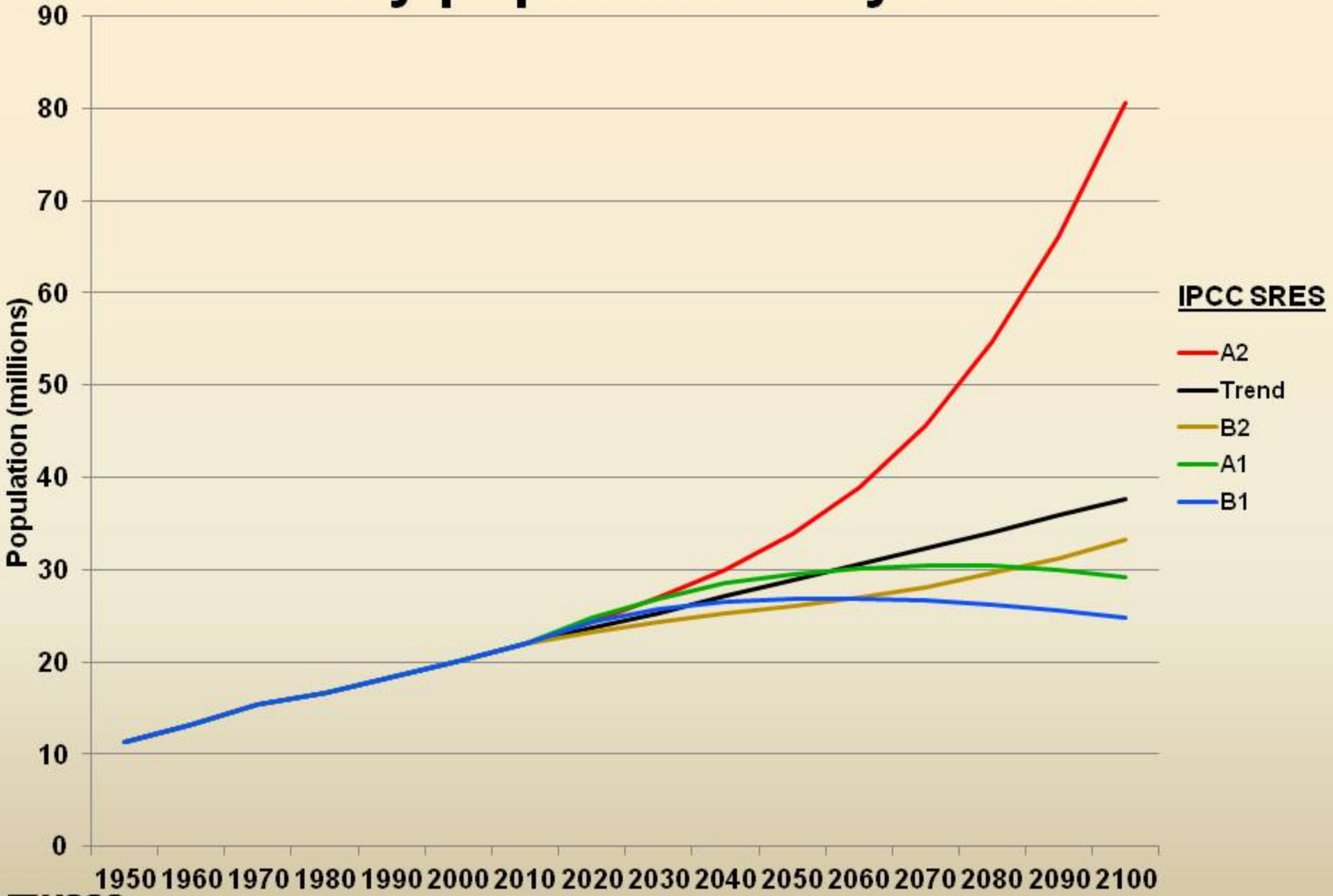
Future Bay population: beyond 2030



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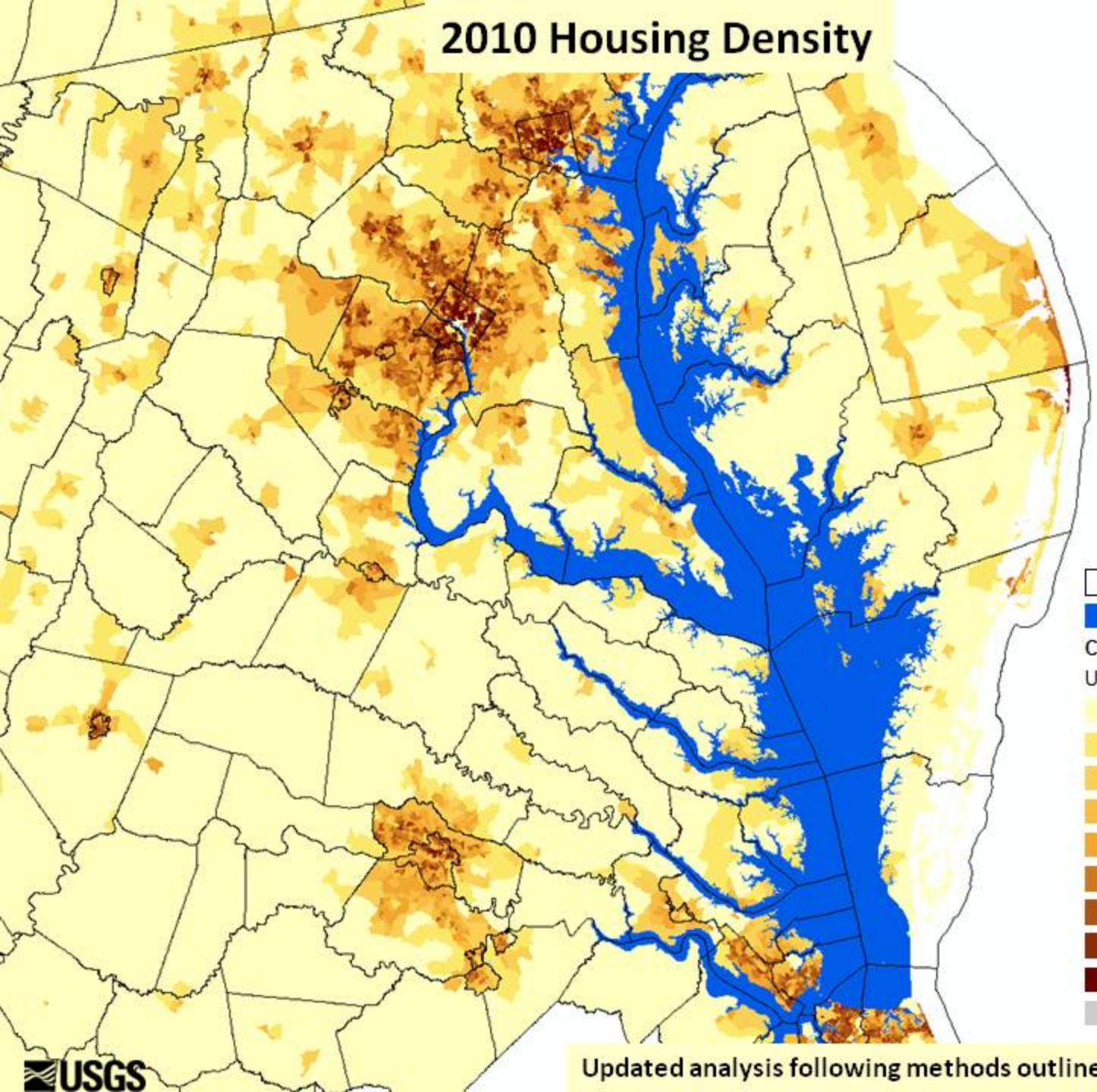
2010 Housing Density



Counties
Chesapeake Bay
Census Total Housing Units
Units per Acre
0.0 - 0.1
0.2
0.3 - 0.5
0.6 - 1.0
1.1 - 2.0
2.1 - 3.0
3.1 - 5.0
5.1 - 10.0
10.1 - 75.3
0

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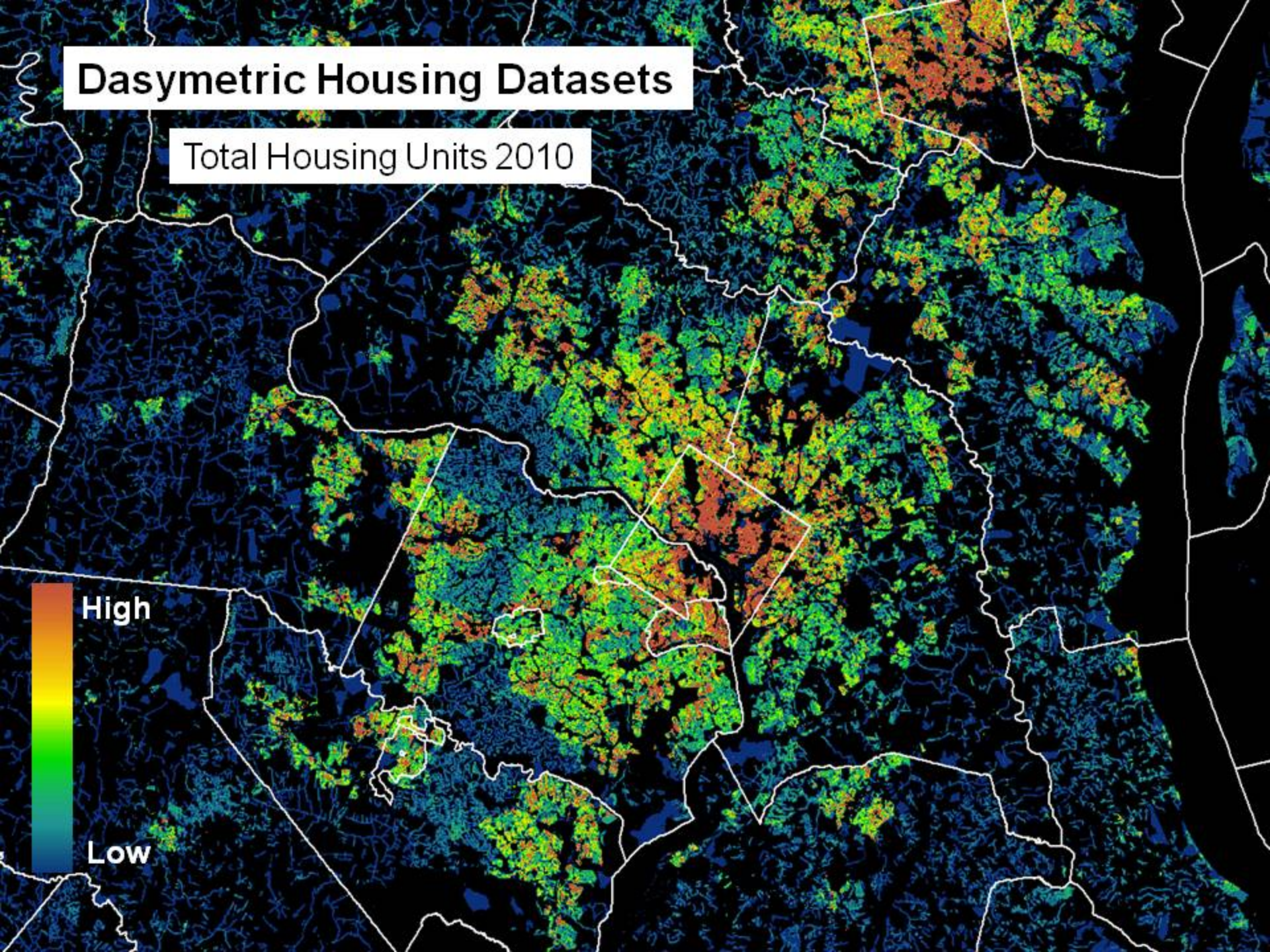
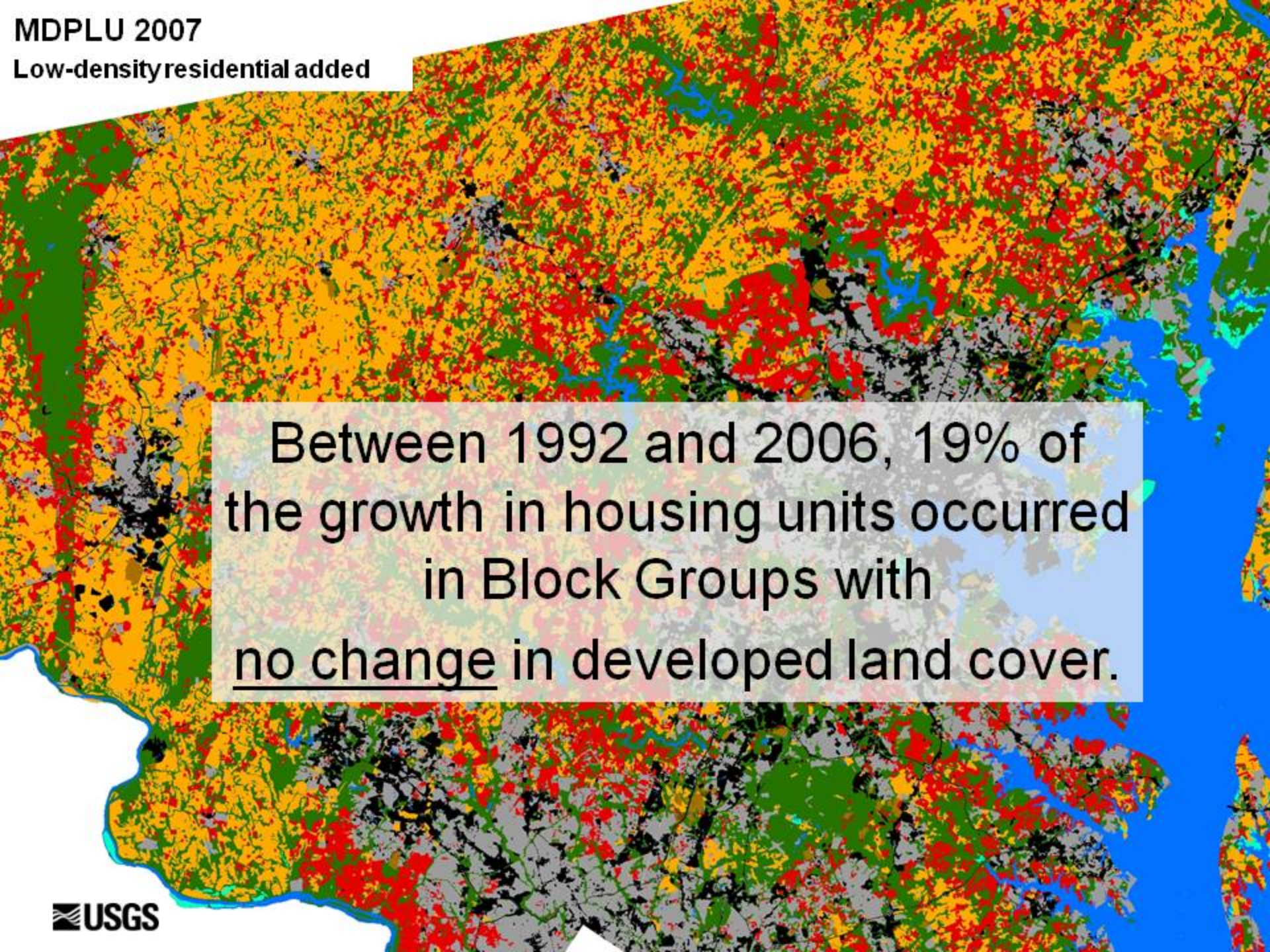
Updated analysis following methods outlined by Hammer, et al., 2004.


Dasymetric Housing Datasets
Total Housing Units 2010
High
Low


MDPLU 2007
Low-density residential added
Between 1992 and 2006, 19% of the growth in housing units occurred in Block Groups with no change in developed land cover.
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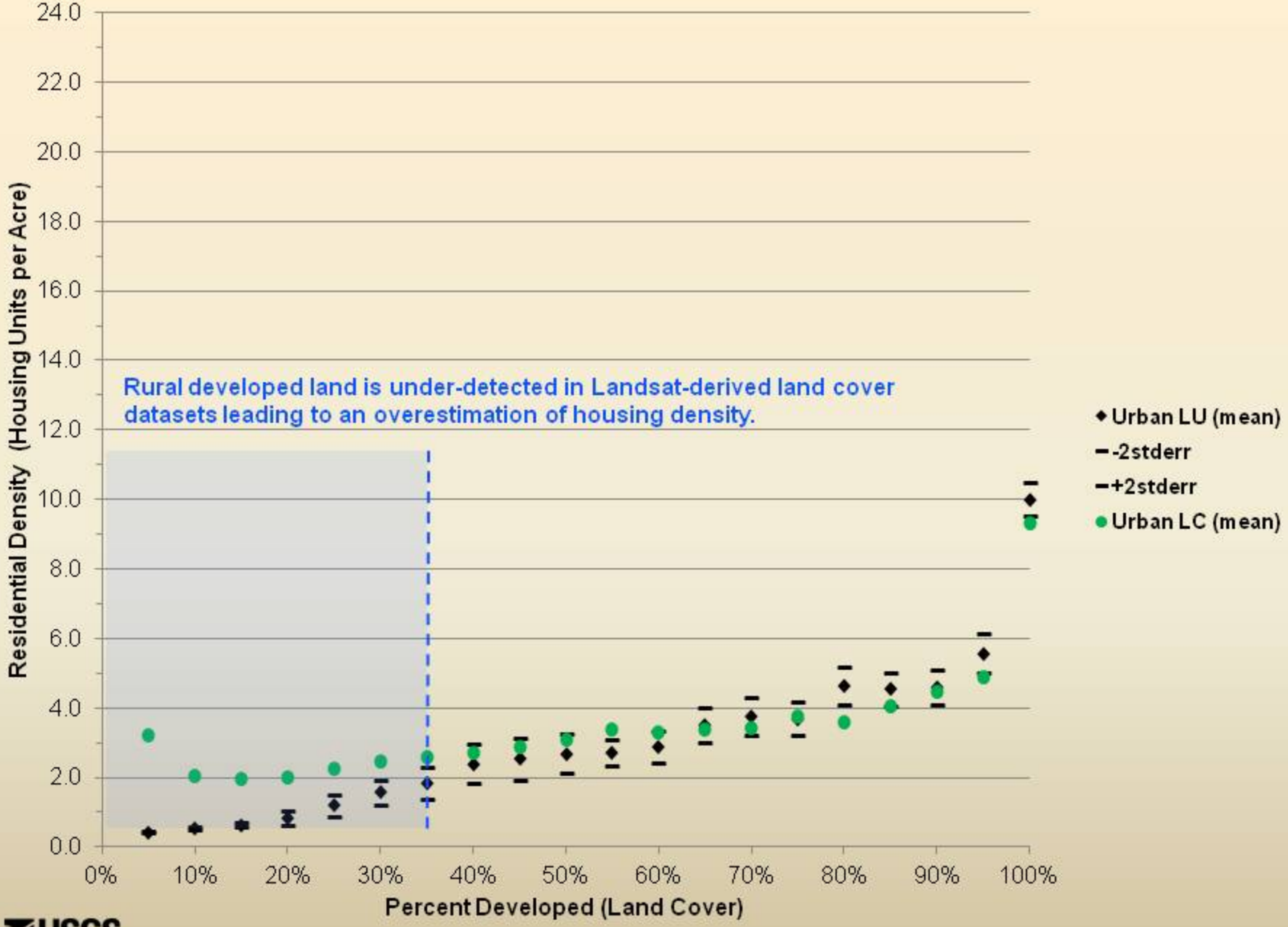
Potential Causes for Under-detection of Urban LC Change (1992 – 2006)



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Significance of Land Use Data

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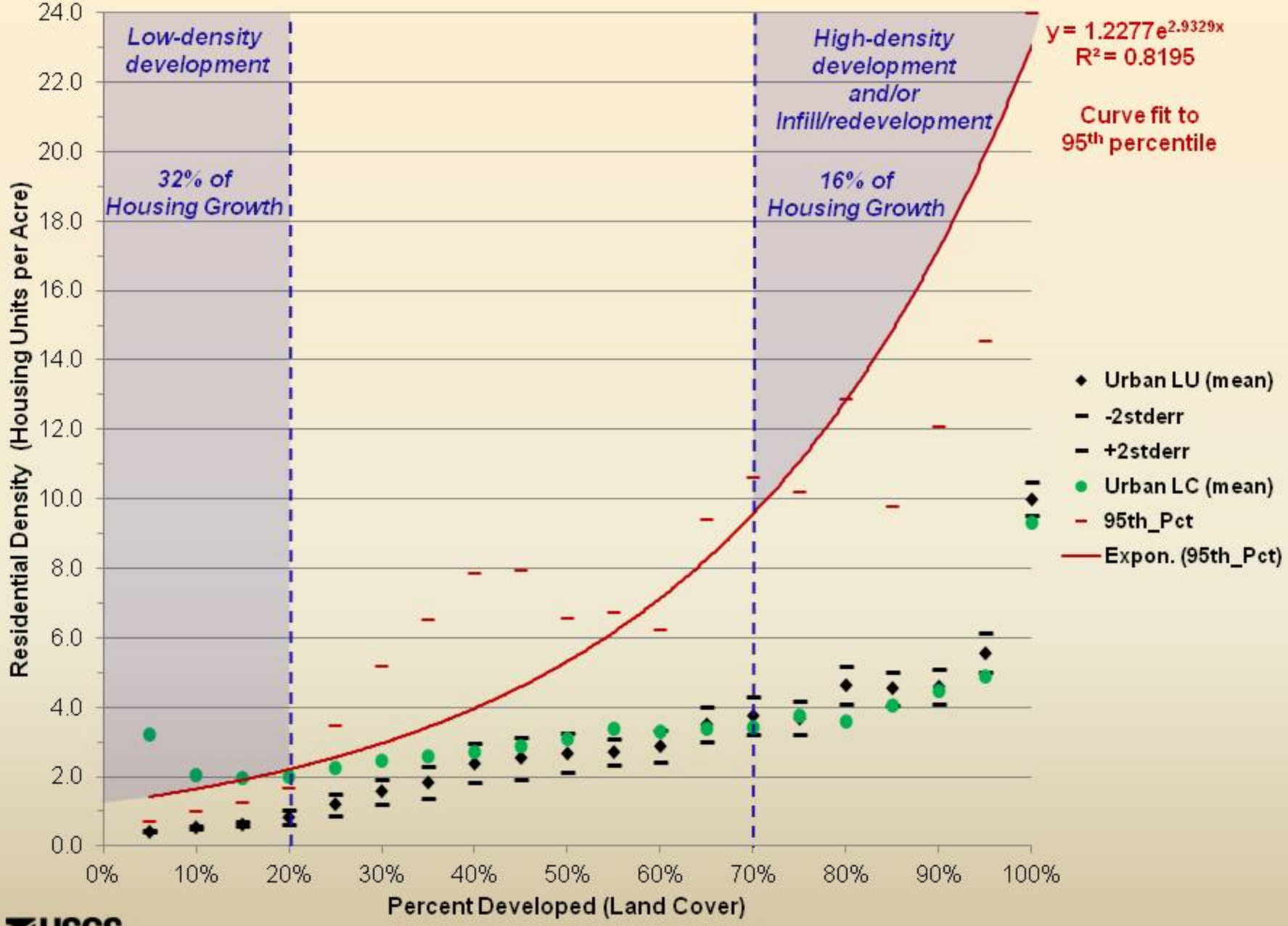
- Land use data are critical for establishing load allocations and guiding implementation of the Chesapeake Bay TMDL;

- Differences between local and CBP land use data have hampered planning and reporting local implementation efforts in support of Watershed Implementation Plans (WIPs).

Potential Causes for Under-detection of Urban LC Change (1992 – 2006)



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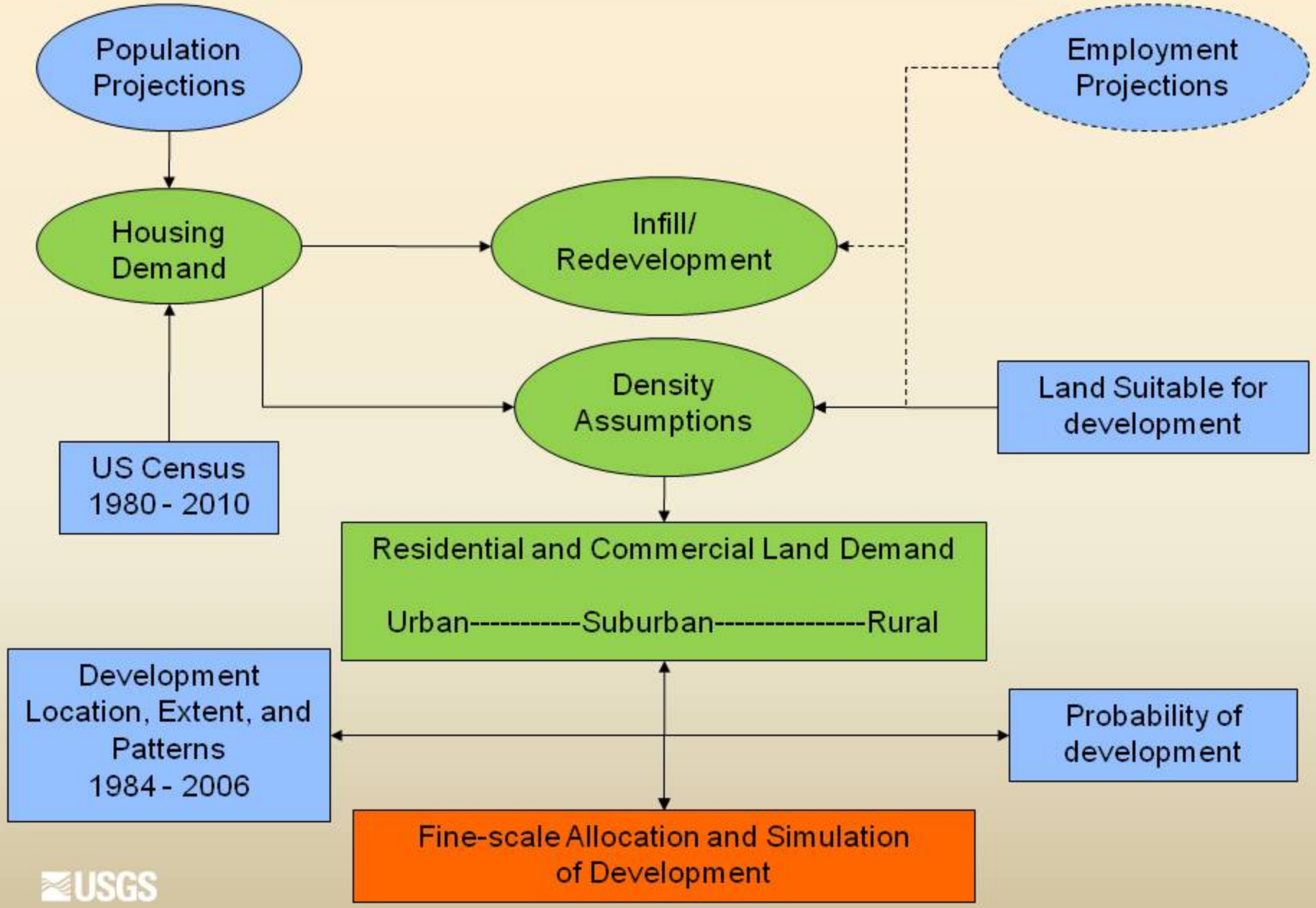
CBLCM v3a



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CBLCM v3a: a “new” patch-based land change model

CBLCM v1 (w/ SLEUTH)

CBLCM v3a (patch-based)

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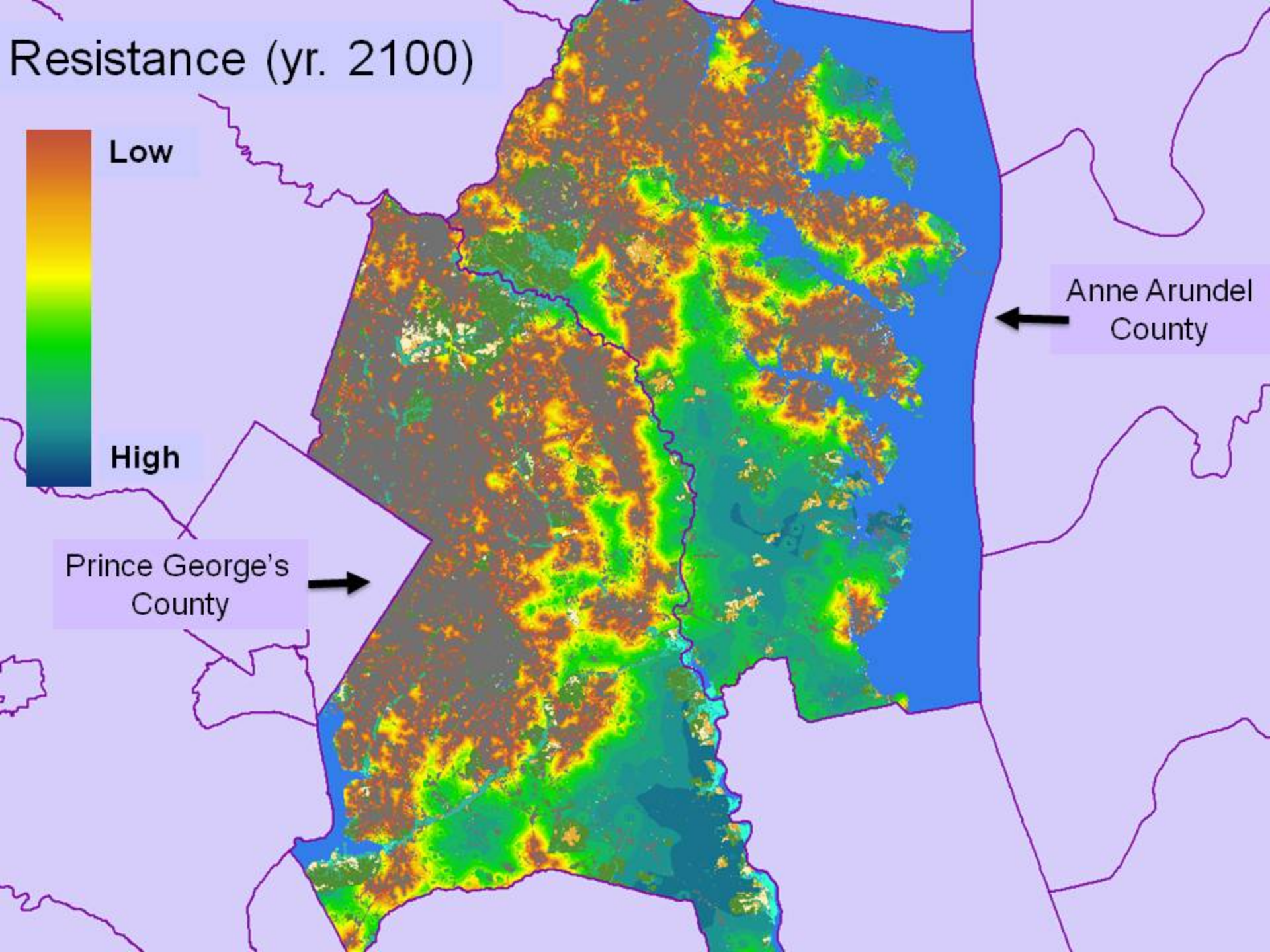
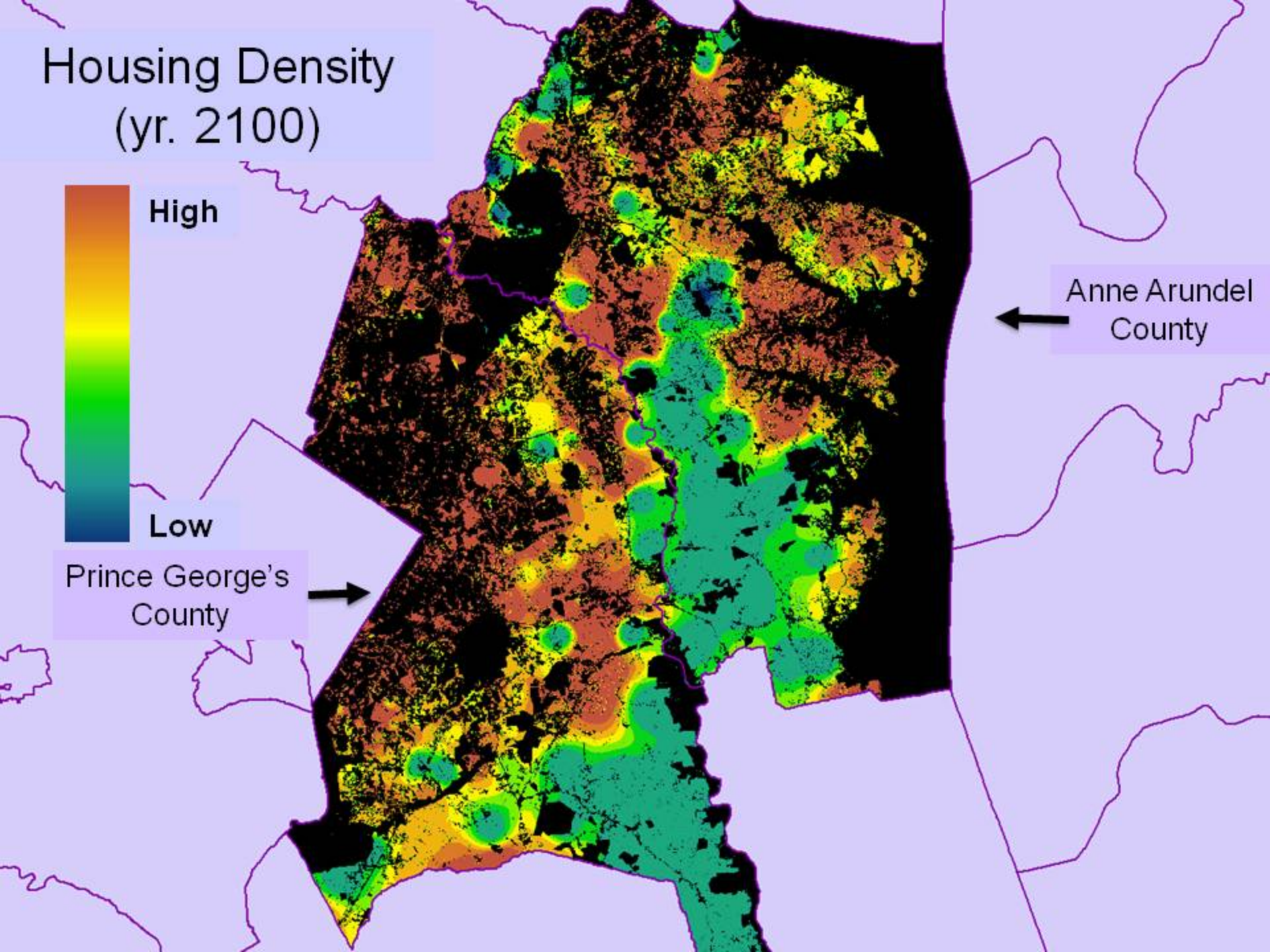
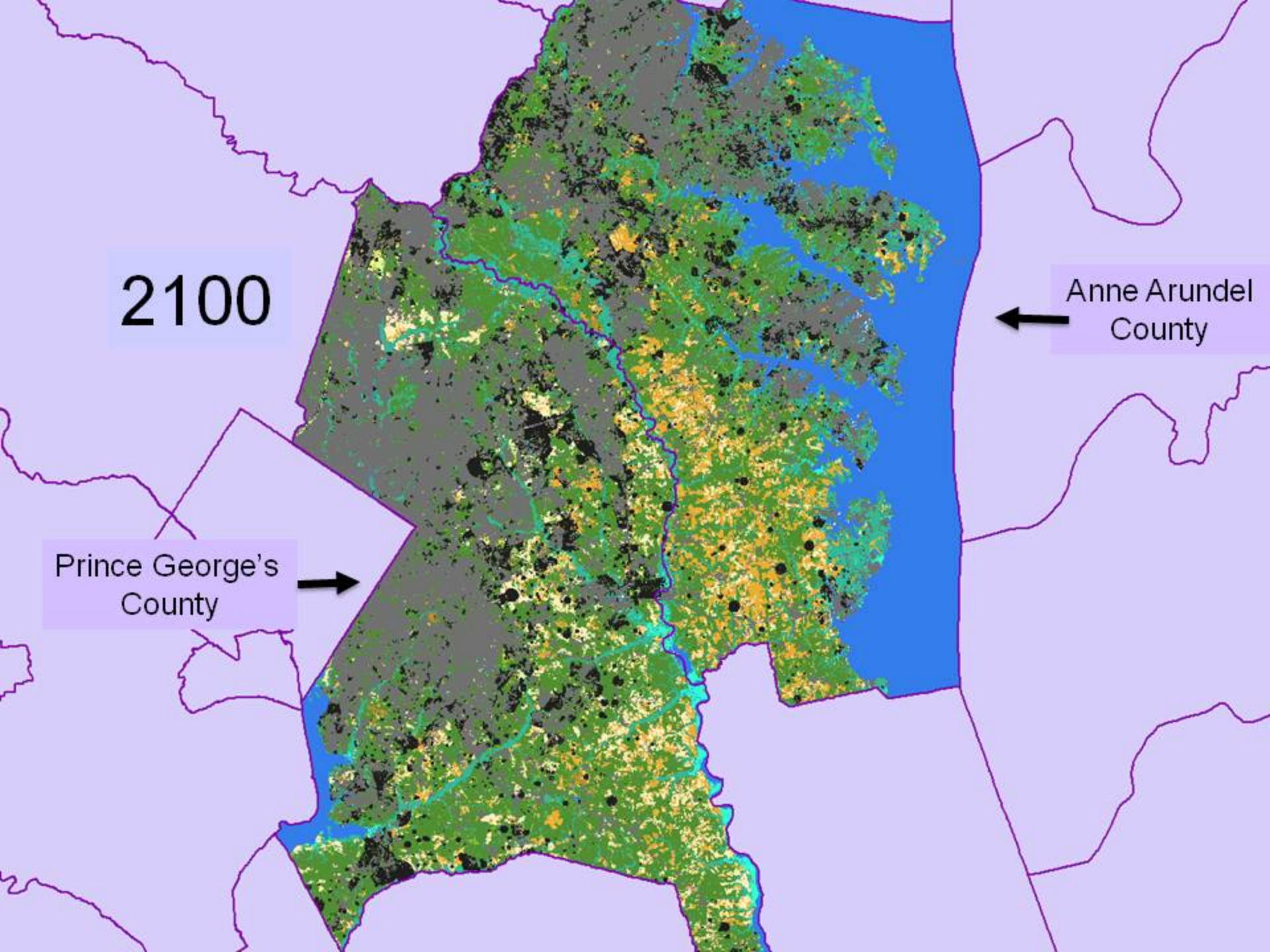
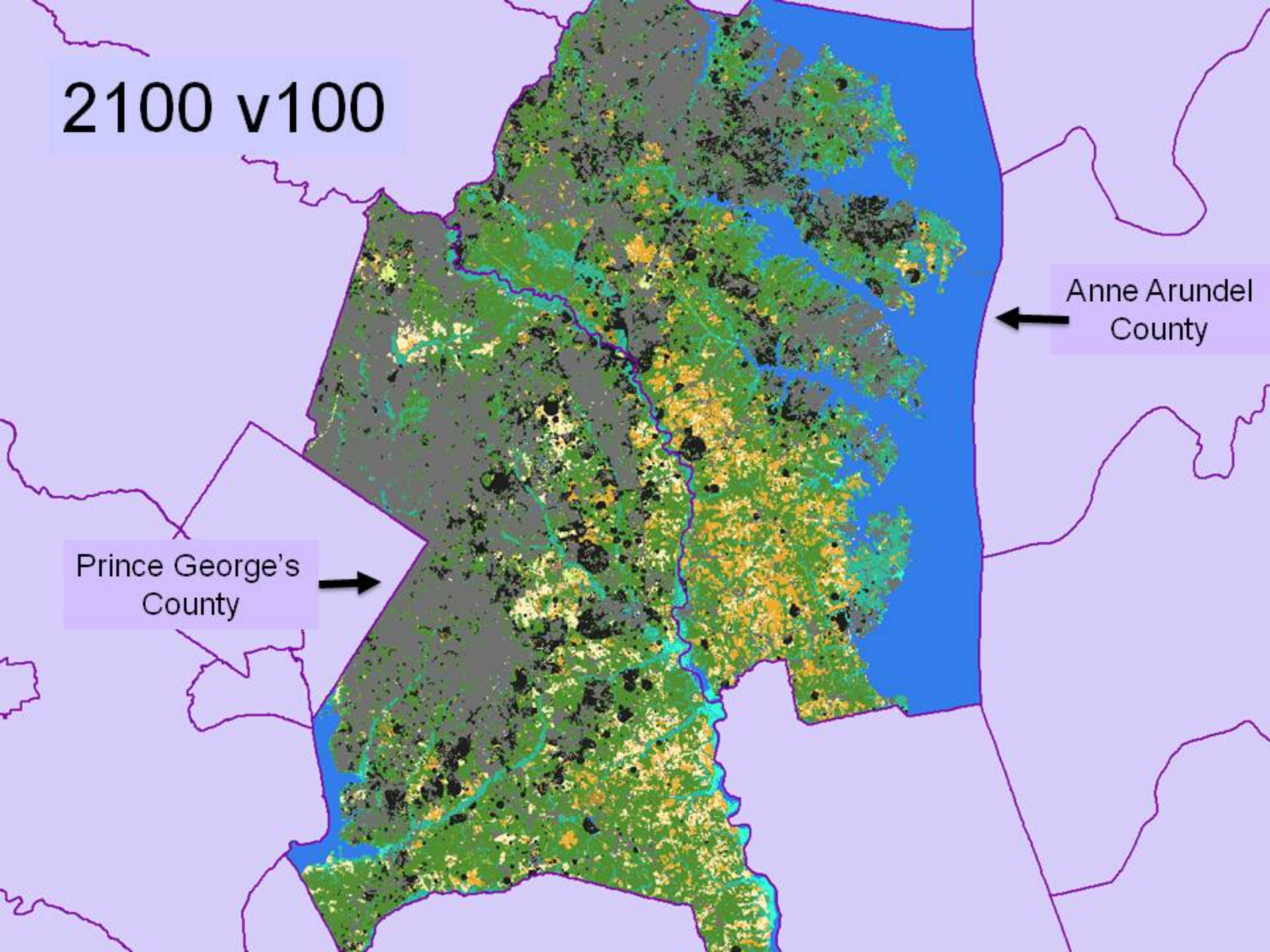
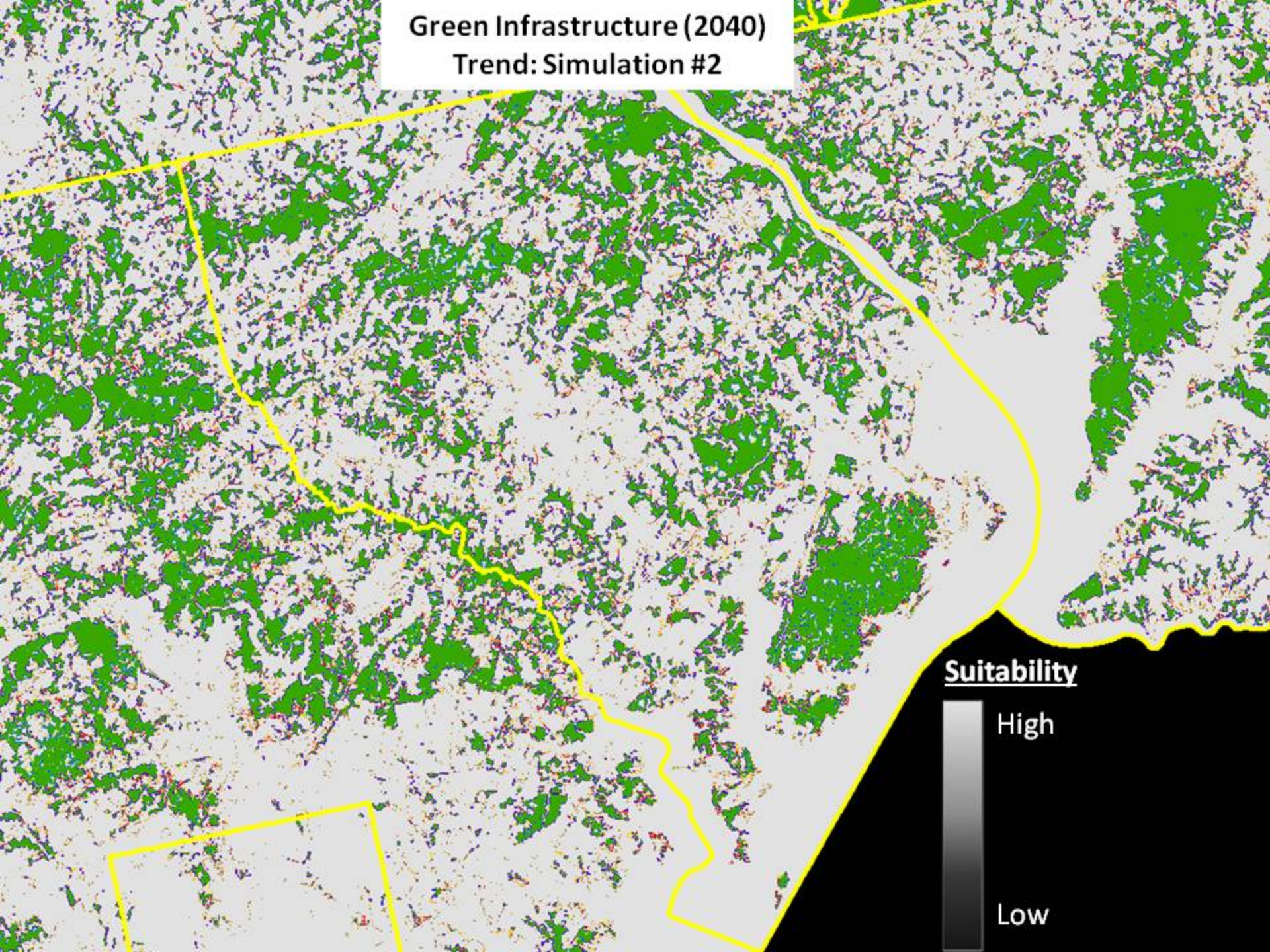

Resistance (yr. 2100)
Low
High
Anne Arundel County
Prince George's County

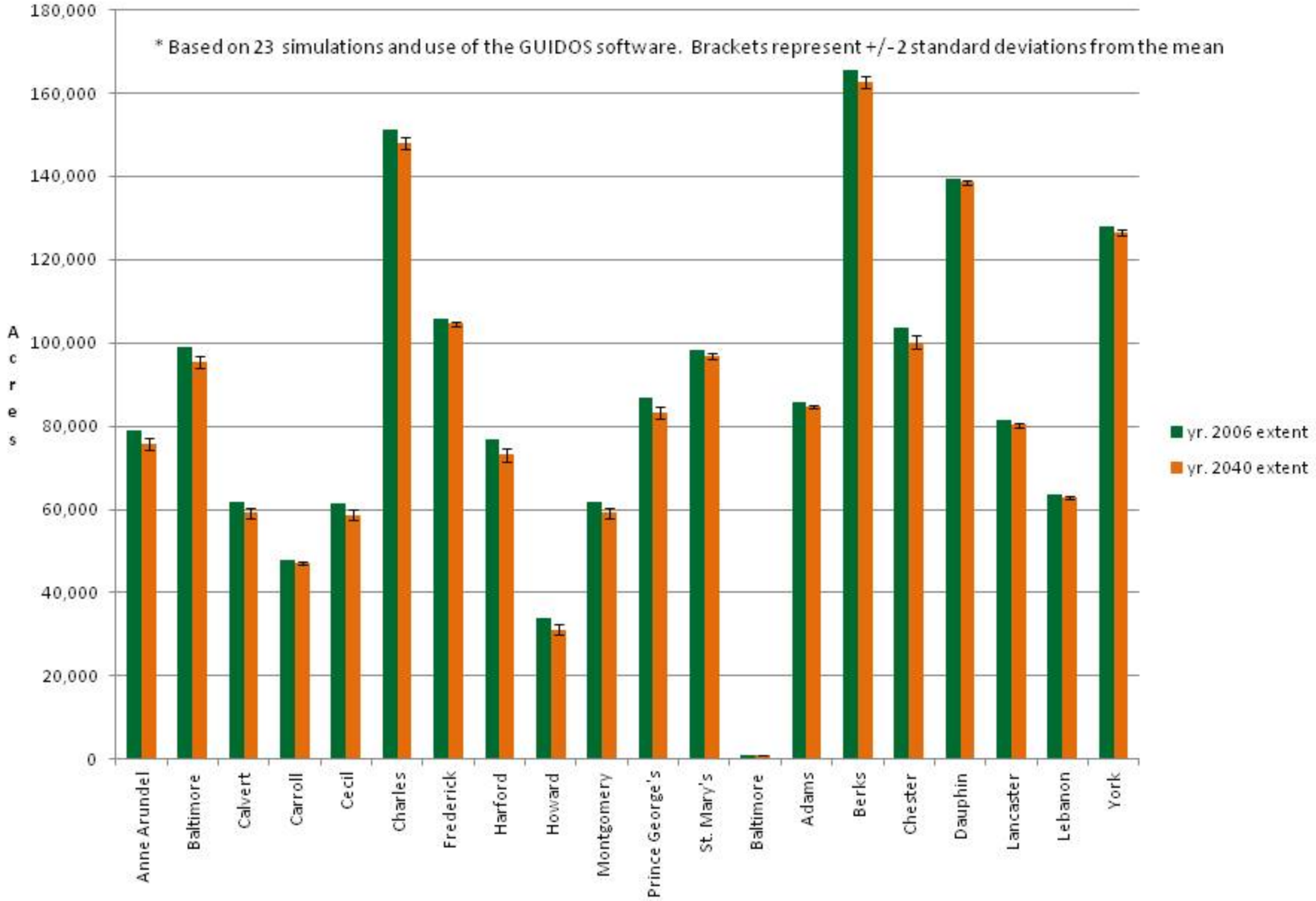

Housing Density
(yr. 2100)
High
Low
Prince George's
County
Anne Arundel
County


2100
Anne Arundel County
Prince George's County

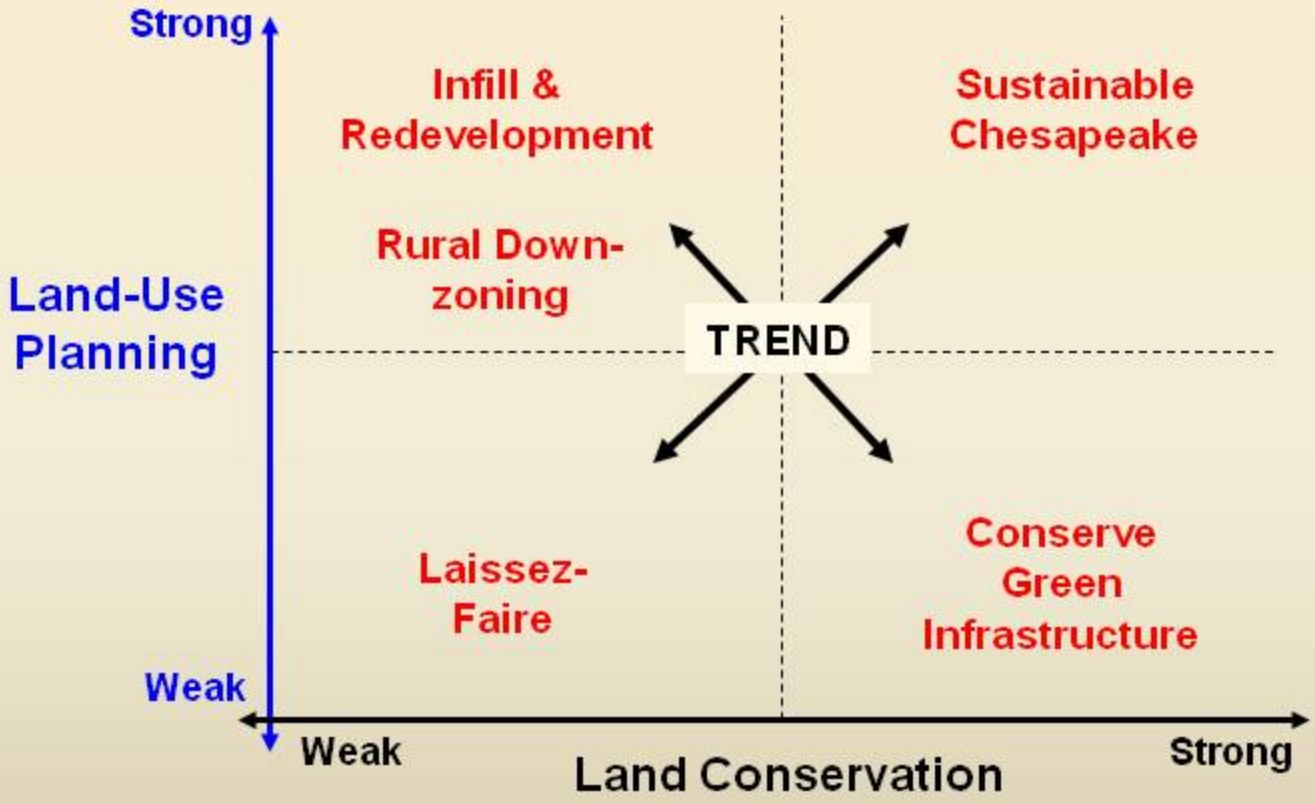

2100 v100
Anne Arundel County
Prince George's County


Green Infrastructure (2040)
Trend: Simulation #2
Suitability
High
Low

Change in Core Forest Extent 2006 - 2040



Chesapeake Bay Alternative Future Development Scenarios



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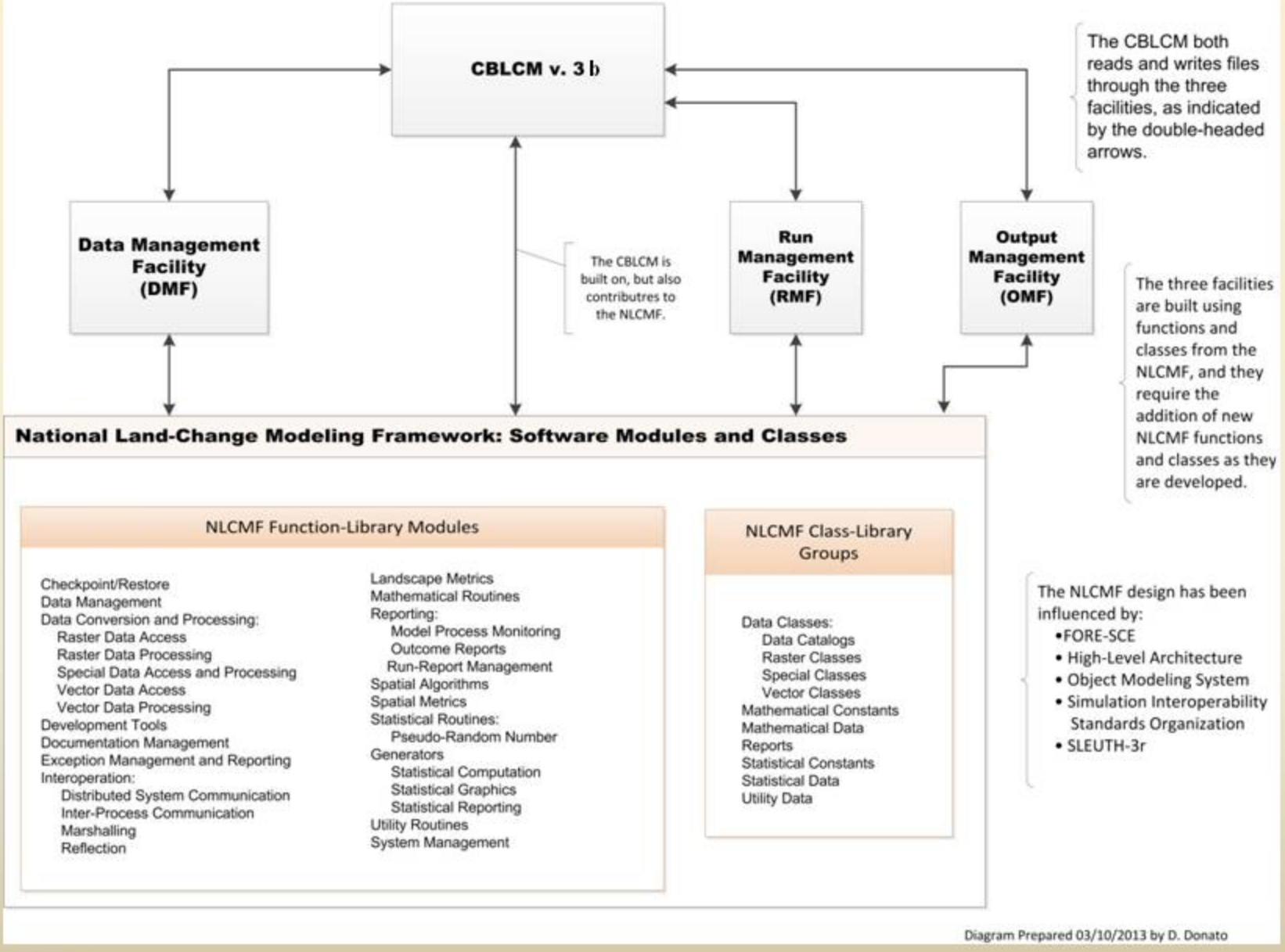
Estimating Impervious Cover and Turf Grass in the Chesapeake Bay Watershed

Model Version	Impervious Surface (circa 2001/02)	Pervious Surface (circa 2001/02)
CBLCD (land cover)	809,318	2,341,577
Phase 5.3.2 (land use)	1,269,030	3,398,732

Source:

Claggett, et al., submitted. Estimating the Extent of Impervious Surfaces and Turf Grass Across Large Regions. *Journal of the American Water Resources Association*

Diagram: Relationship of CBLCM v. 3, the NLCMF, and the NLCMF Management Facilities



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Land Use Workgroup Mission Statement

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By April 2015:

Ensure that scientifically and locally credible land use data inform the suite of Chesapeake Bay Program (CBP) models and accounting systems.

Tier 1 Priorities

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1. Improve the spatial, temporal, and categorical representation of urban, natural, and agricultural land uses on non-federal and federal lands.

2. Consider basing the Phase III WIPs on a year 2025 land use to facilitate crediting of water quality benefits derived from land conservation and land-use planning.

3. Investigate differential loading rates for new land use classes.

LUWG Workplan (Jan 2013 – April 2015)

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	2013						
Major Tasks	Jan	Feb	Mar	Apr	May	Jun	Jul
Inventory local LULC							
Explore Issues and develop protocol for using local LULC							
Explore probabilistic LULC estimate							
Explore backcasting and forecasting options (1984 - 2017)							
Explore backcasting and forecasting options for 2025							
Implement backcasting and forecasting methods							
Compile suggested changes to LULC classes							
Develop categorical crosswalk between local LULC and P532 LULC							
Coordinate the development of loading rates for new LULC classes							
Develop methods to map new LULC classes							
Reconcile local LULC with Census of Agriculture							
Develop impervious surface and tree canopy coefficients							
Evaluate land use generalizations, assumptions, and scenarios							
Review impact of applying new LULC in CBPO models							
Finalize land use dataset and submit for WQGIT approval							

Phase 5.3.2 Urban Land Uses

	Regulated	Unregulated	Combined Sewer
Pervious	✓	✓	✓
Impervious	✓	✓	✓
Construction	✓		✓
Extractive	✓	✓	✓

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Phase 5.3.2 Agricultural Land Uses

- Manure-eligible High Till
- Manure-eligible Low Till
- Other Row Crops
- Fertilized Hay
- Unfertilized Hay
- Alfalfa
- Pasture
- Degraded Riparian Pasture
- Nursery
- Afo / Cafo
- Nutrient Man. High Till
- Nutrient Man. Low Till
- Nutrient Man. Row Crops
- Nutrient Man. Fertilized Hay
- Nutrient Man. Alfalfa
- Nutrient Man. Pasture
-
-
-

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Phase 5.3.2 Natural Land Uses

- Open Water
- Wooded / Open
- Disturbed Forest