

## Future Urbanization in the Chesapeake Bay Watershed

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Chesapeake Bay Program's Local Government Forum  
 June 7, 2017

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

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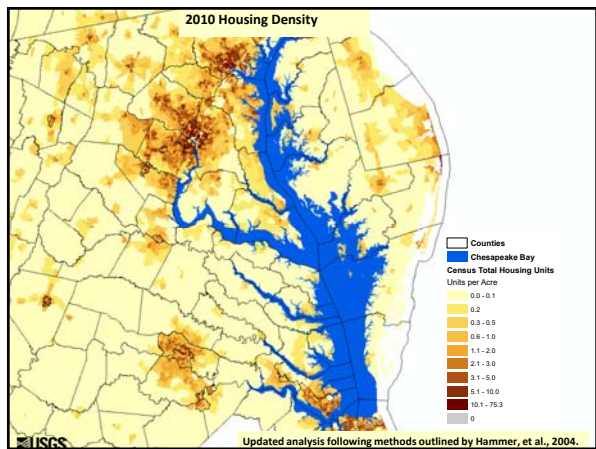
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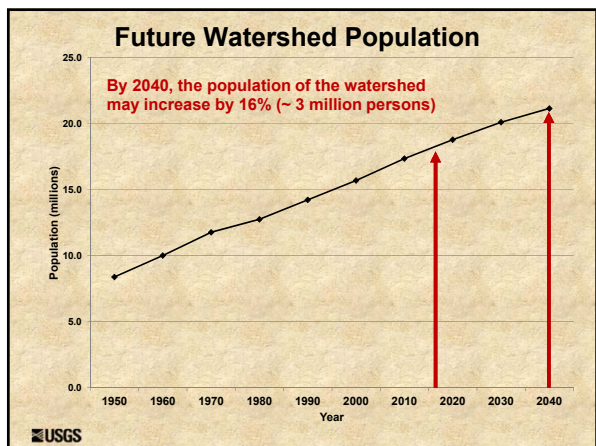
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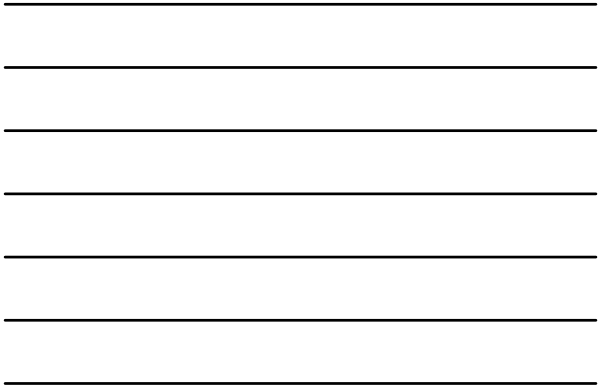
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Estimated proportion of housing change (2000 – 2010) that did not result in an expected amount of land use change.



Example:	
Montgomery County, MD	
Population Change (2010-2040):	225.3
Suitable Land for Growth:	138.0
Development Pressure:	1.63




Example #1: Growing slower than expected

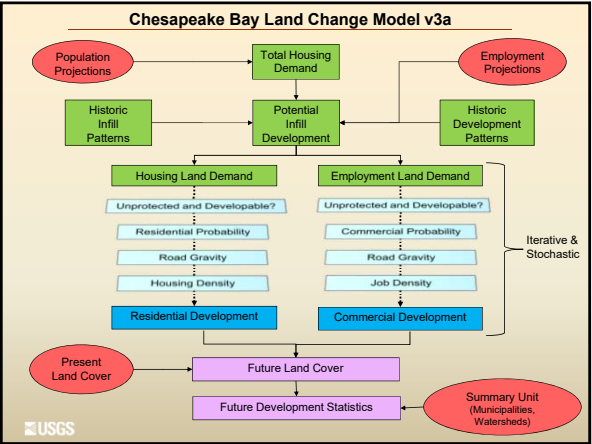
<u>Loudoun County, VA</u>	
2040 Projected Population:	492,517
2040 Trends (2000 – 2015):	715,459

Example #2: Growing faster than expected

<u>District of Columbia</u>	
2040 Projected Population:	940,687
2040 Trends (2000 – 2015):	811,060

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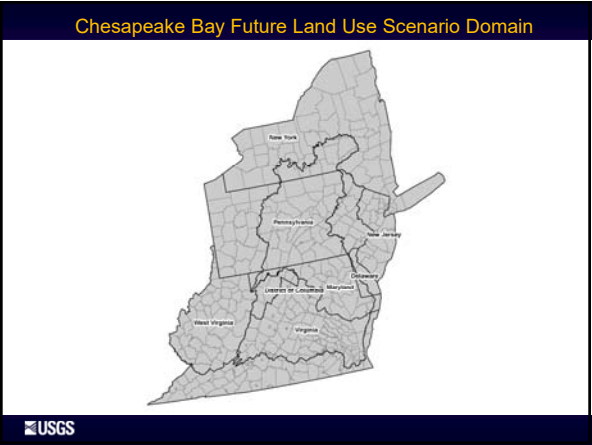
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**R<sup>2</sup> Values for Logistic Regressions**

State	Residential	Commercial
Delaware	0.766	0.555
District of Columbia	n/a	n/a
Maryland	0.778	0.718
New York	0.871	0.867
Pennsylvania	0.835	0.821
Virginia	0.901	0.869
West Virginia	0.908	0.921

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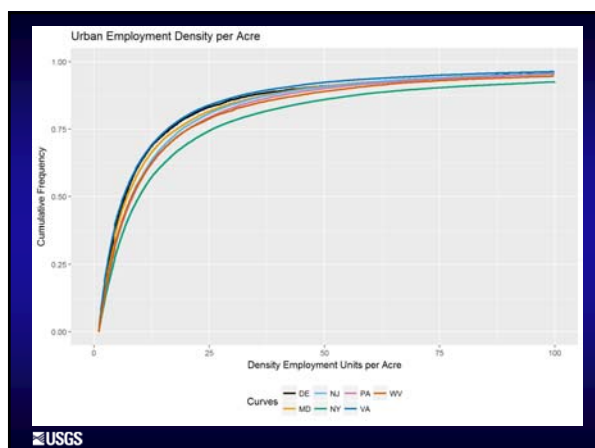
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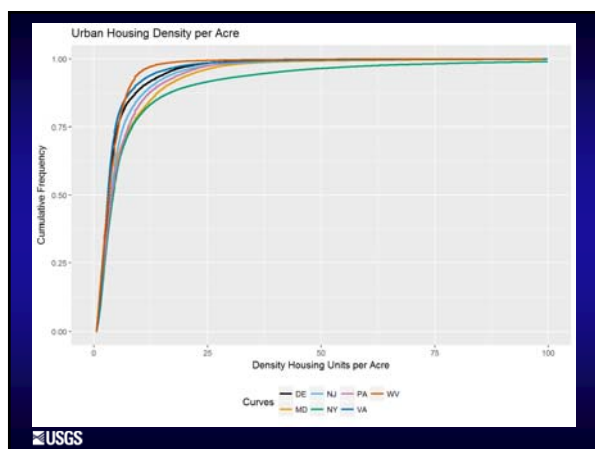
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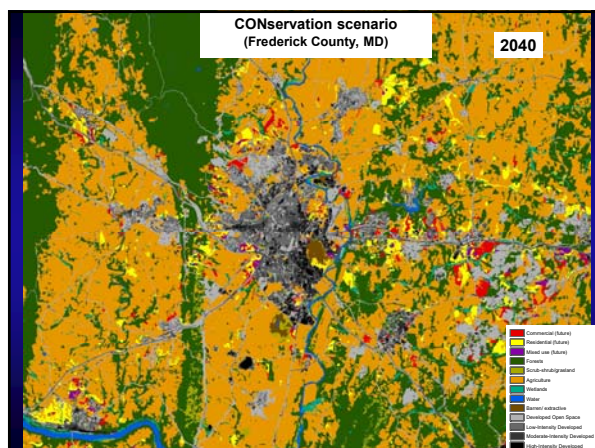
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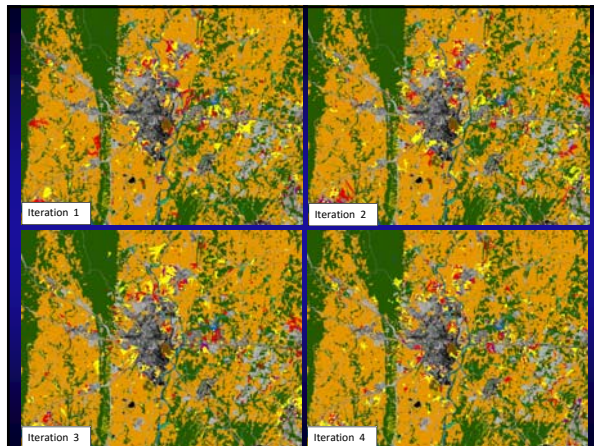
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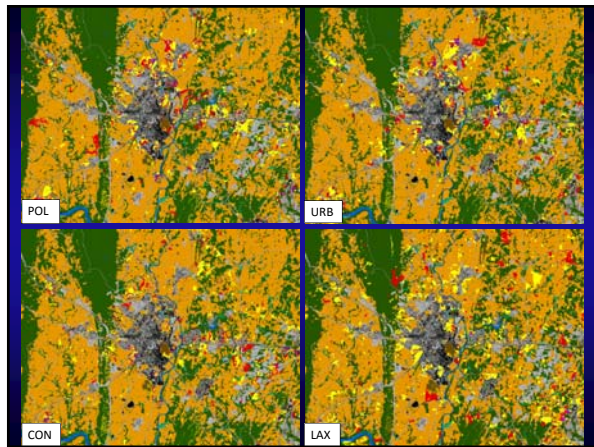
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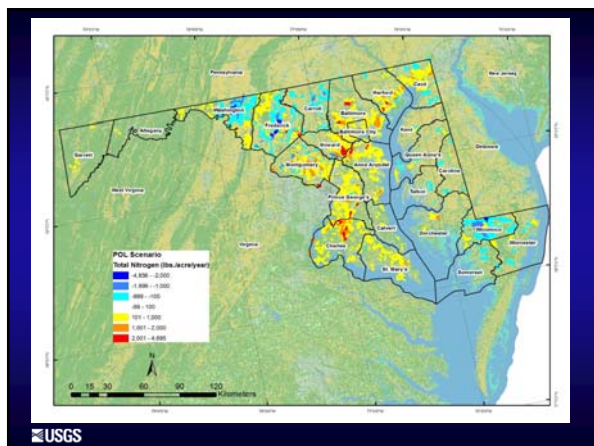
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### What can be changed in the model?

1. Demand for greenfield development
  - population and employment projections, infill/ redevelopment rates
2. Land available for development
  - zoning, easements, comprehensive plans, environmental constraints
3. Development capacity and density
  - zoning, subdivision ordinances, Transfer of Development Rights, Impact fees, urban service areas
4. Factors influencing the likelihood of development
  - proximity to recent development and/or employment centers, current land use (farms or forests), accessibility, amenities and dis-amenities, slope and other environmental constraints
5. Other
  - urban/rural boundaries; summary units (e.g., municipalities, watersheds), demand units (e.g., counties, metro areas, commuter sheds), densification rates; attractiveness of new development to roads and to areas of recent growth



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### Scenario Results For Review Scales: P6 Land-River Segments & Counties

1. New development acres
2. Future population on sewer and septic
3. Residential land consumption rate (acres / household)
4. Commercial land consumption rate (acres/ job)
4. Forest acres converted to development
5. Farmland acres converted to development
6.  $\Delta$  Total Nitrogen (# / acre / yr.)
7.  $\Delta$  Total Phosphorus (# / acre / yr.)
8.  $\Delta$  Total Sediment (tons / acre / yr.)



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### Optional Evaluation Metrics Scale: P6 Land-River Segments & Counties

1. New impervious per capita
2. Large forest patches converted / total forest converted
3. Prime soils converted / total farmland converted
4. Forest and farmland fragmentation
5. Concentration or excess of manure
6. Loss of BMPs (due to the conversion of farmland)



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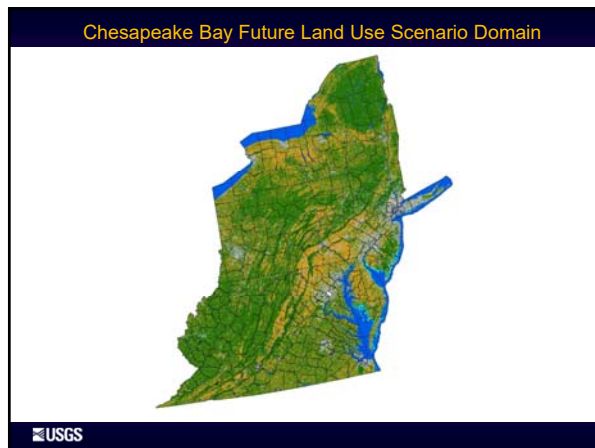
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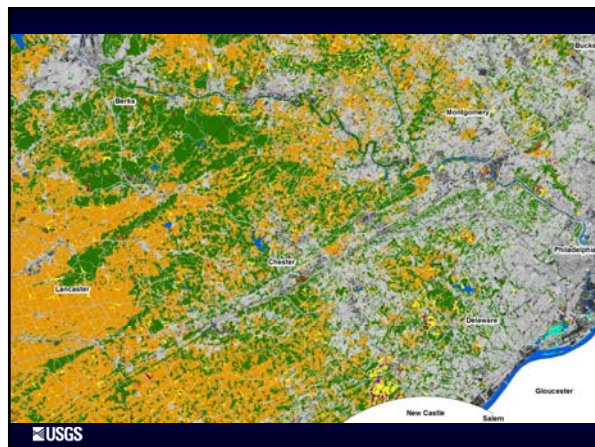
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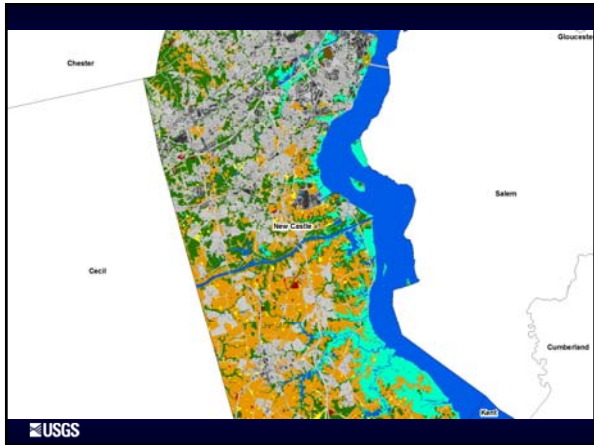
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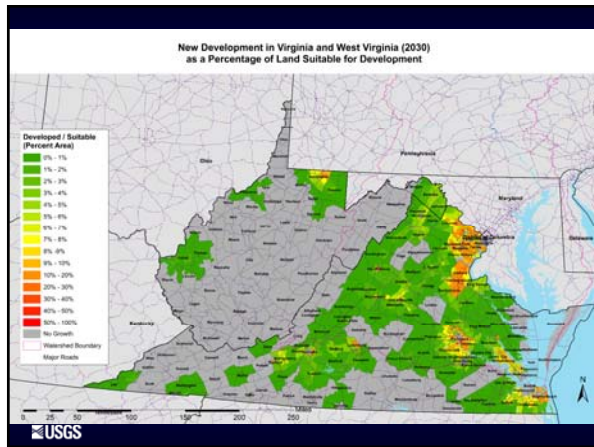
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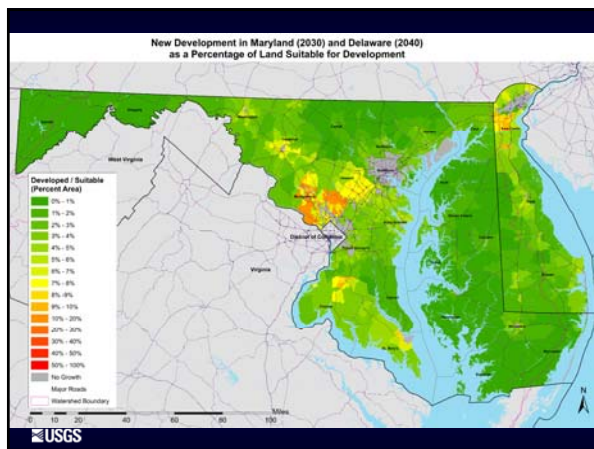
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**Future Land Use Scenarios:**

Logically-coherent storylines and assumptions of factors influencing land use change that represent a full range of plausible futures.

**Why?**

To help jurisdictions account for potential future growth in pollutant loads as required by the Chesapeake Bay TMDL.

To inform long-range development, restoration, and conservation plans.

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**Potential Alternative Future Scenarios**

**"Historical Trends":** patterns over previous decade(s) prevail.

**"Current Policy":** growth focused in areas with infrastructure and capacity.

**"Land Conservation":** more aggressive conservation of forests and farms.

**"Rural Character":** up-zone urban areas and down-zone rural areas.

**"Infill and Redevelopment":** direct more growth into urban areas.

**"Transportation Corridors":** growth focused along major transportation corridors.

**"Deregulated and Less Managed":** patterns driven by private sector and free market.

**"Amenity based":** growth focused along coasts and adjacent to public lands.

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