
SPRAWL
1945 – 2005
R. I. P.

Today's Vision for Tomorrow's Reality: What are the population and land use change issues that define what future restoration is possible?

Peter Claggett

Research Geographer
USGS Eastern Geographic Science Center
* Cherokee Nations
** USGS MD-DE-DC Water Science Center

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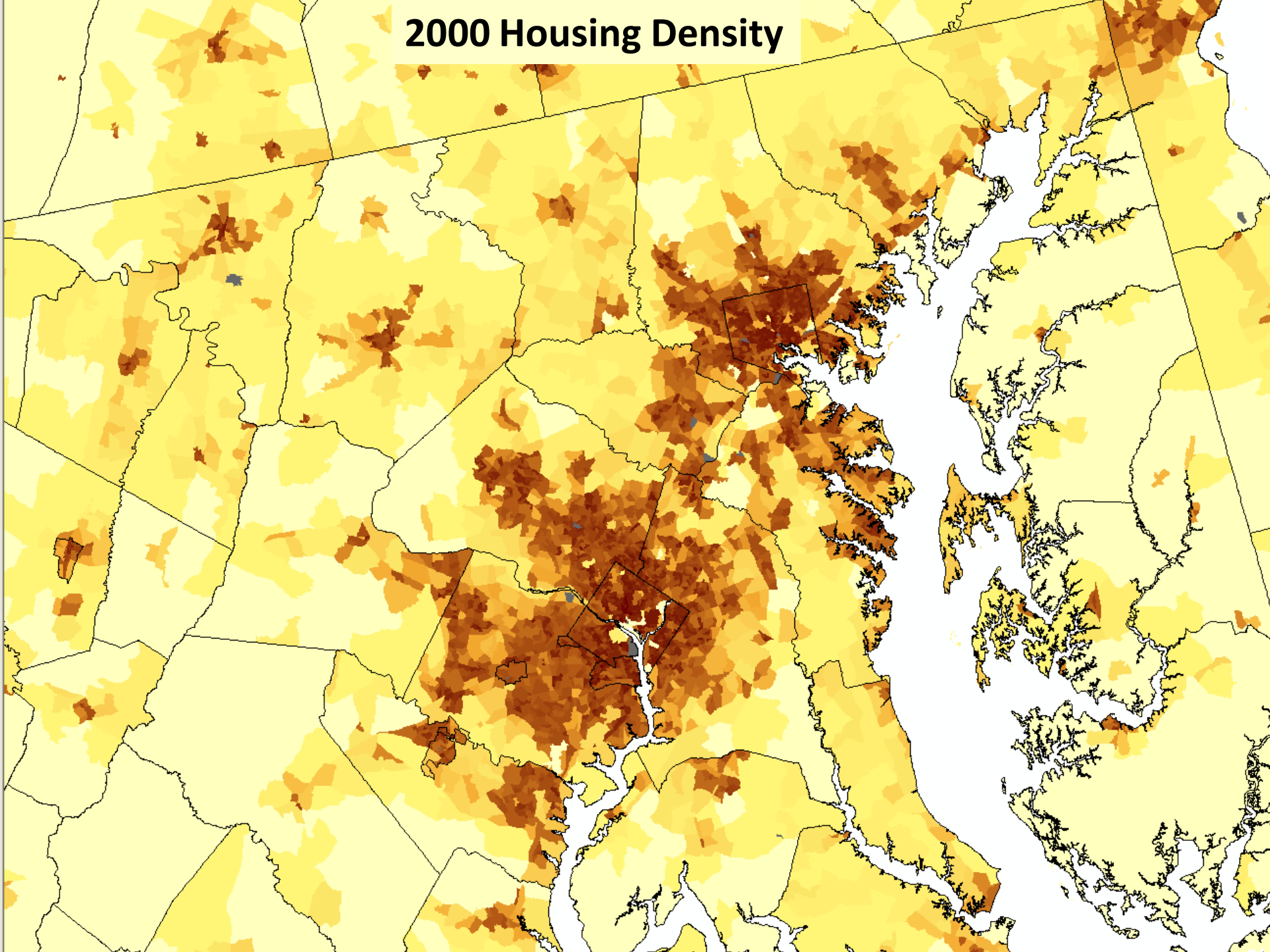
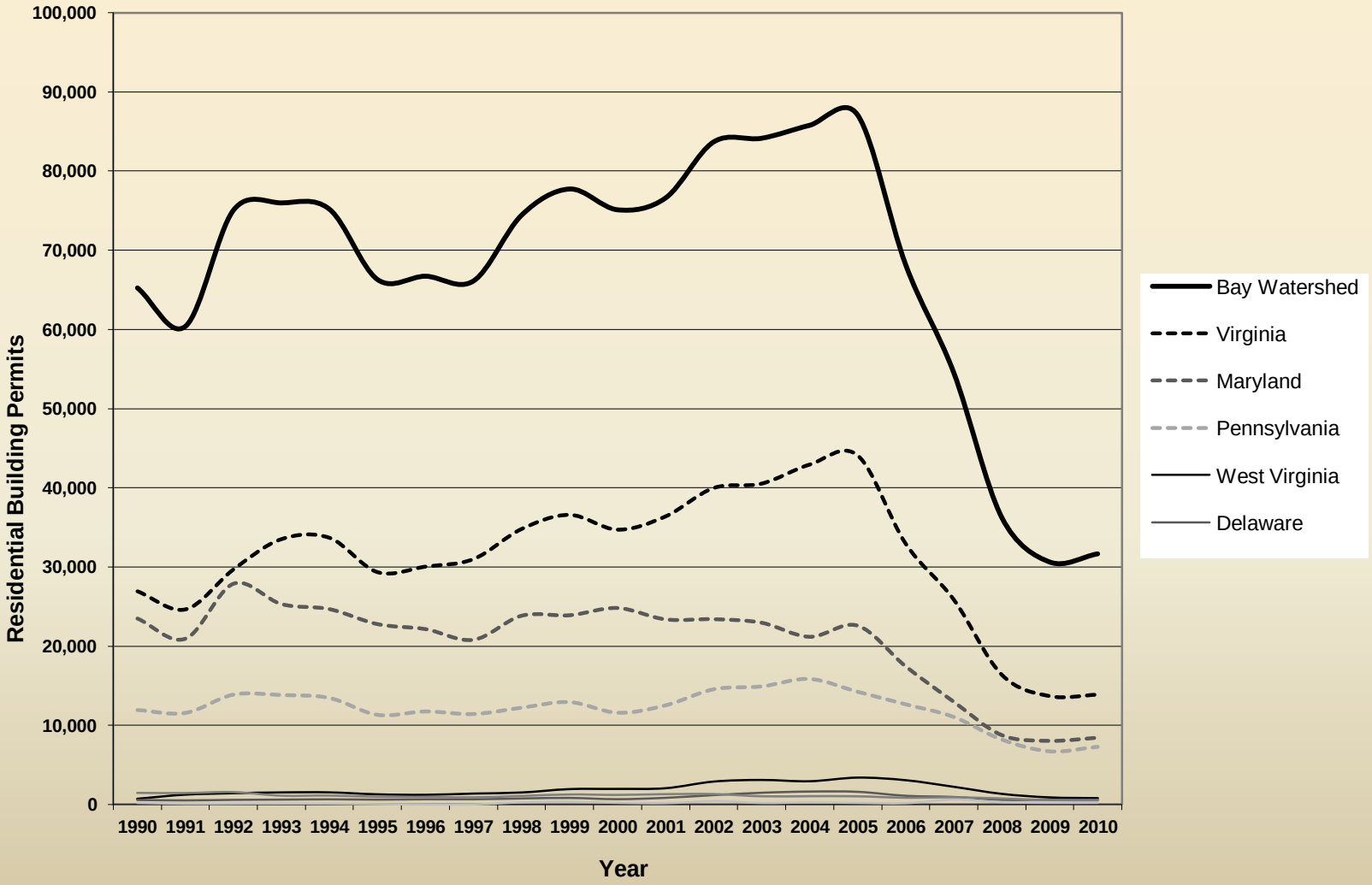
•U.S. Department of the Interior
•U.S. Geological Survey

2000 Housing Density



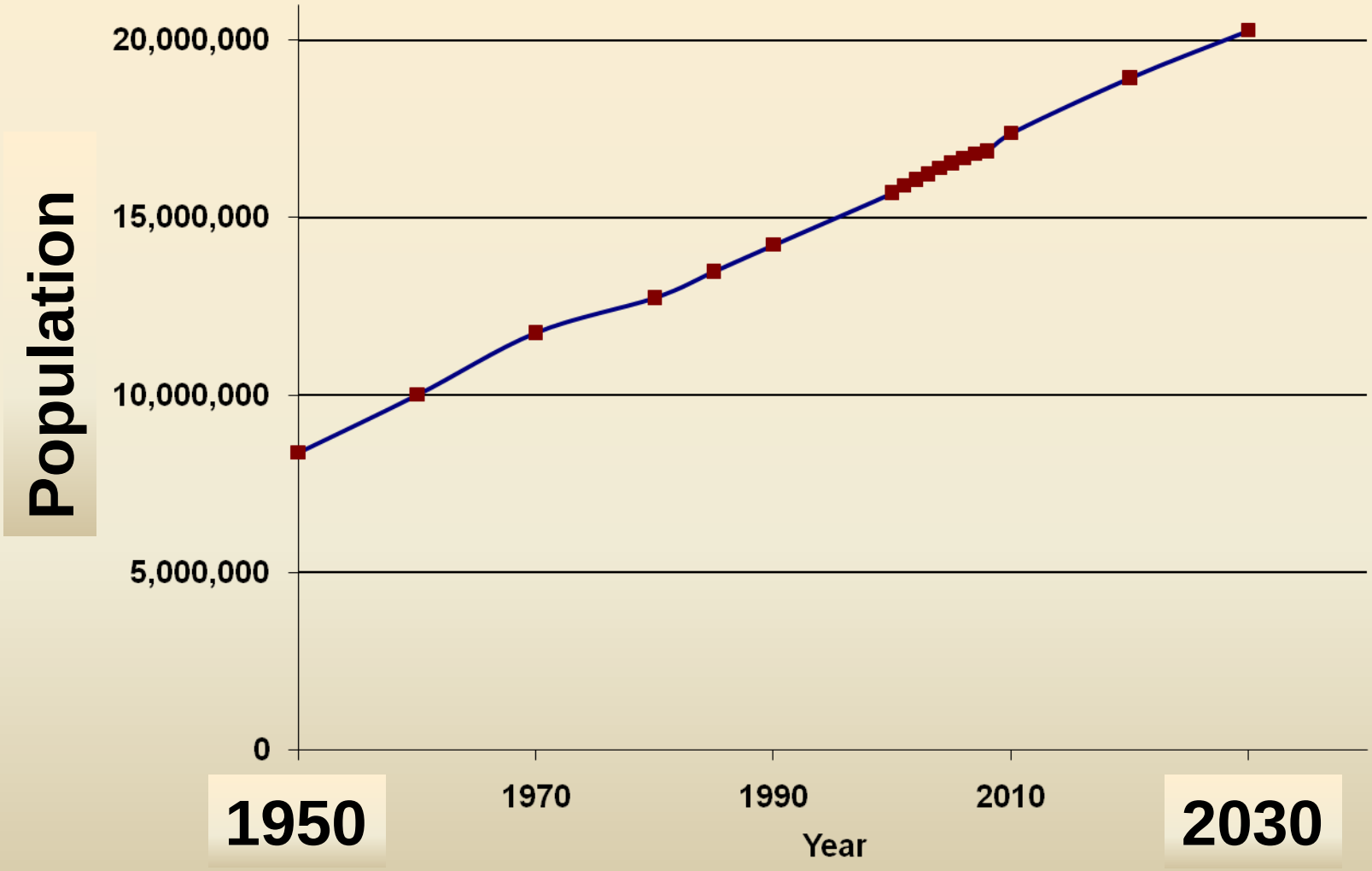
The Past is not Prologue:

Building permit trends (1990 – 2010)

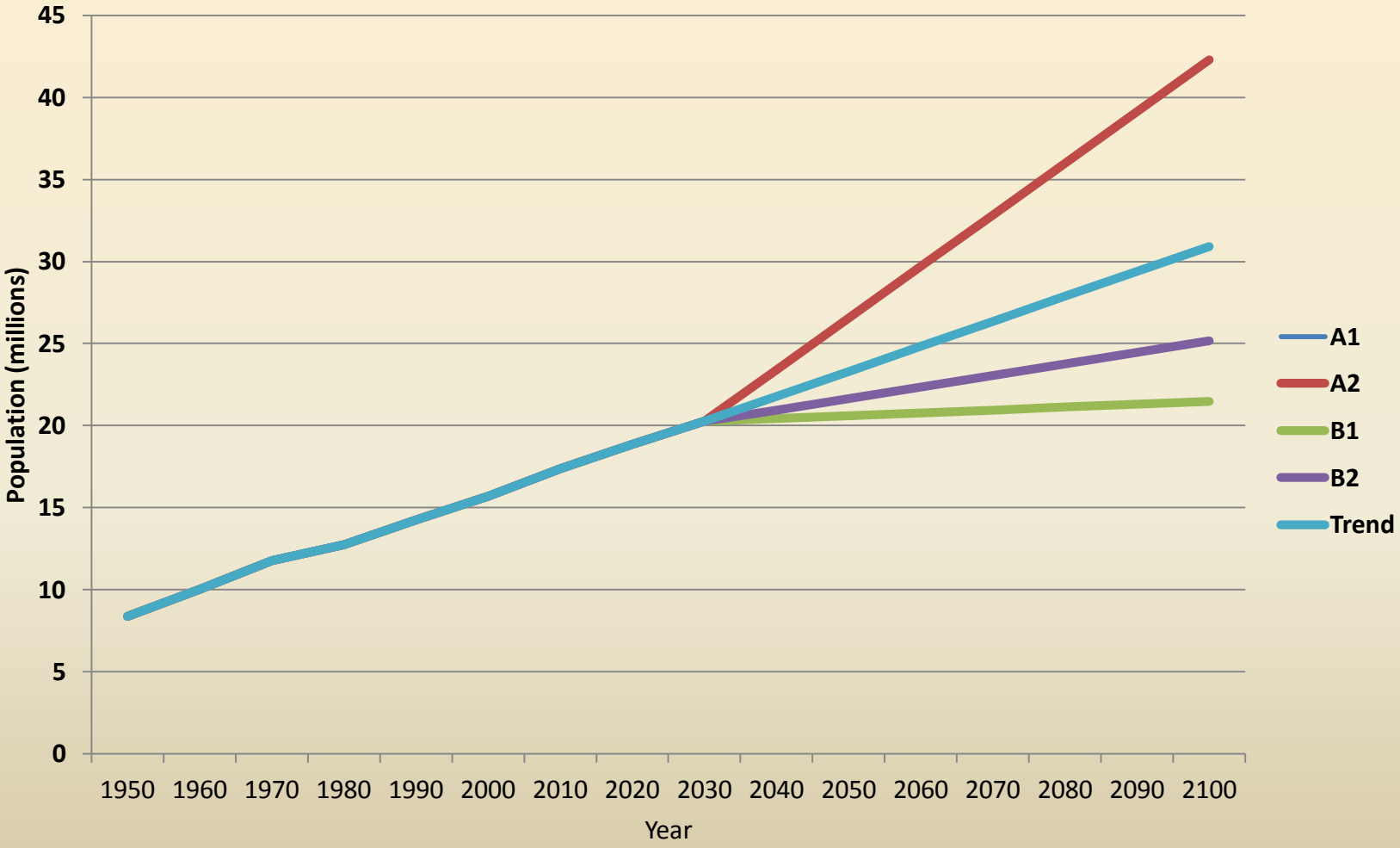


USGS

Bay Watershed
Population Trends (1950 – 2030)



Future Bay population: 2030 and beyond



The end of sprawl…

Persistently high gas prices

Restricted consumer credit

High home prices with investment risk

Improved urban living conditions

Δ Infrastructure investment mentality

Awareness of the true costs of sprawl

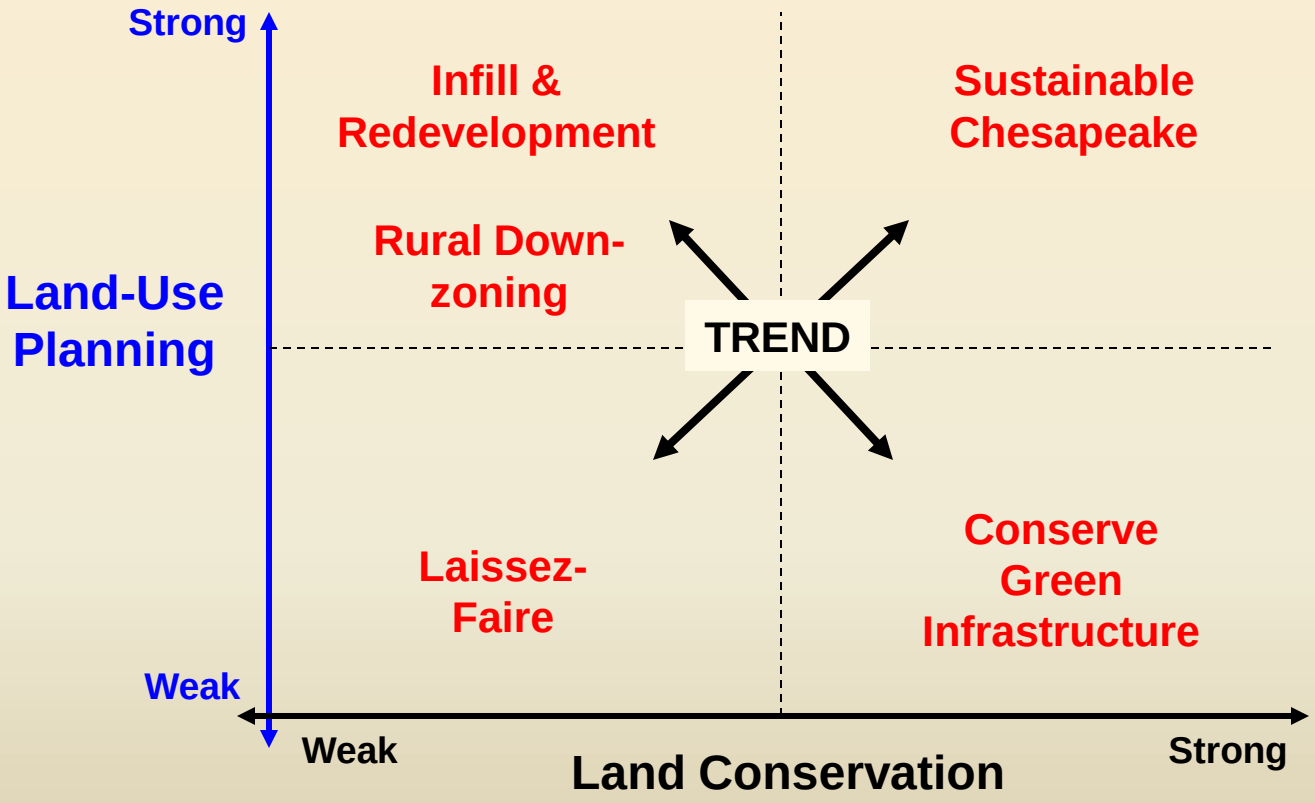
↑ Mixed-use zoning and subdivision ordinances

Neighborhood and building design innovations

The end of sprawl… really?

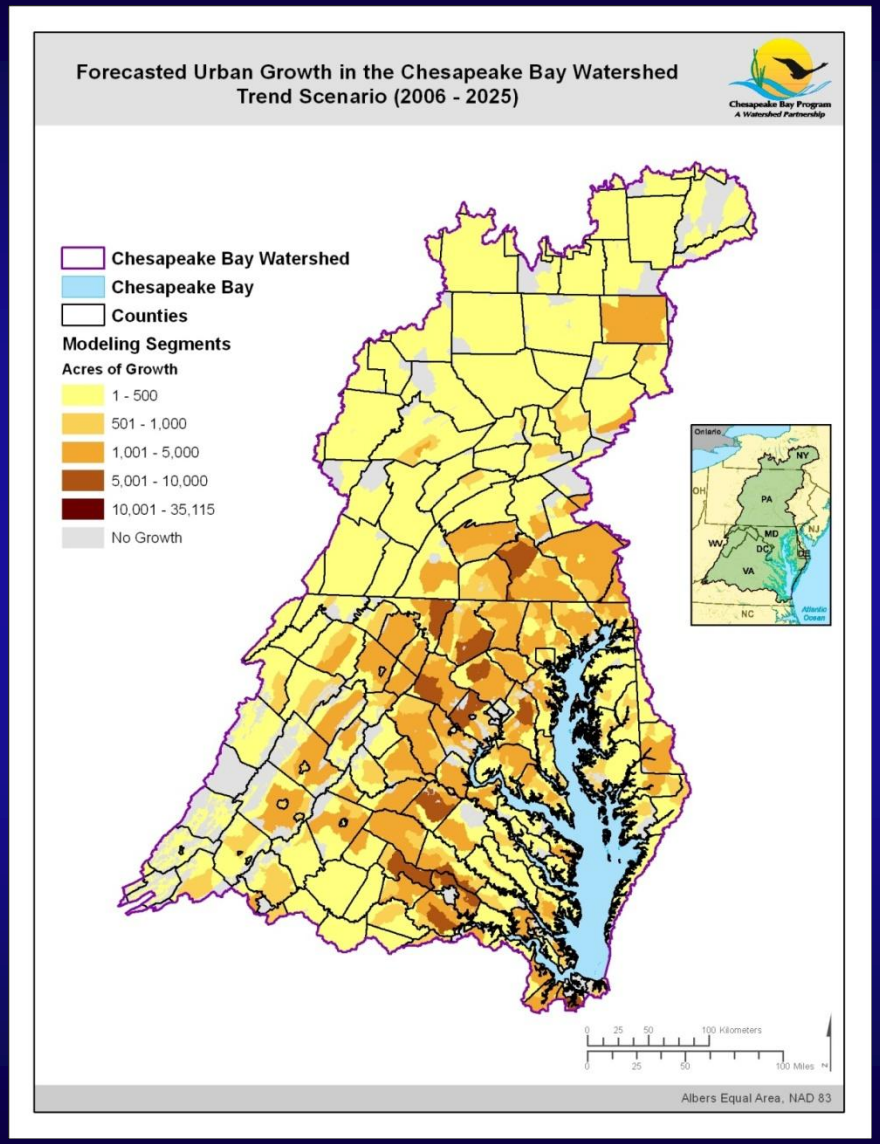
- Economy will bounce back
- Persistent attraction of rural communities
- Long commute and gas price issues overcome by internet, cloud computing, flexi-place schedules, and the Prius
- Land-use planning still weak in rural communities
- Communities need tax revenue and citizens resist tax increases
- Farmers nearing retirement; relying on land value for security
- Farming not attractive to younger generations
- Resources for land conservation are scarce

Chesapeake Bay Alternative Future Development Scenarios



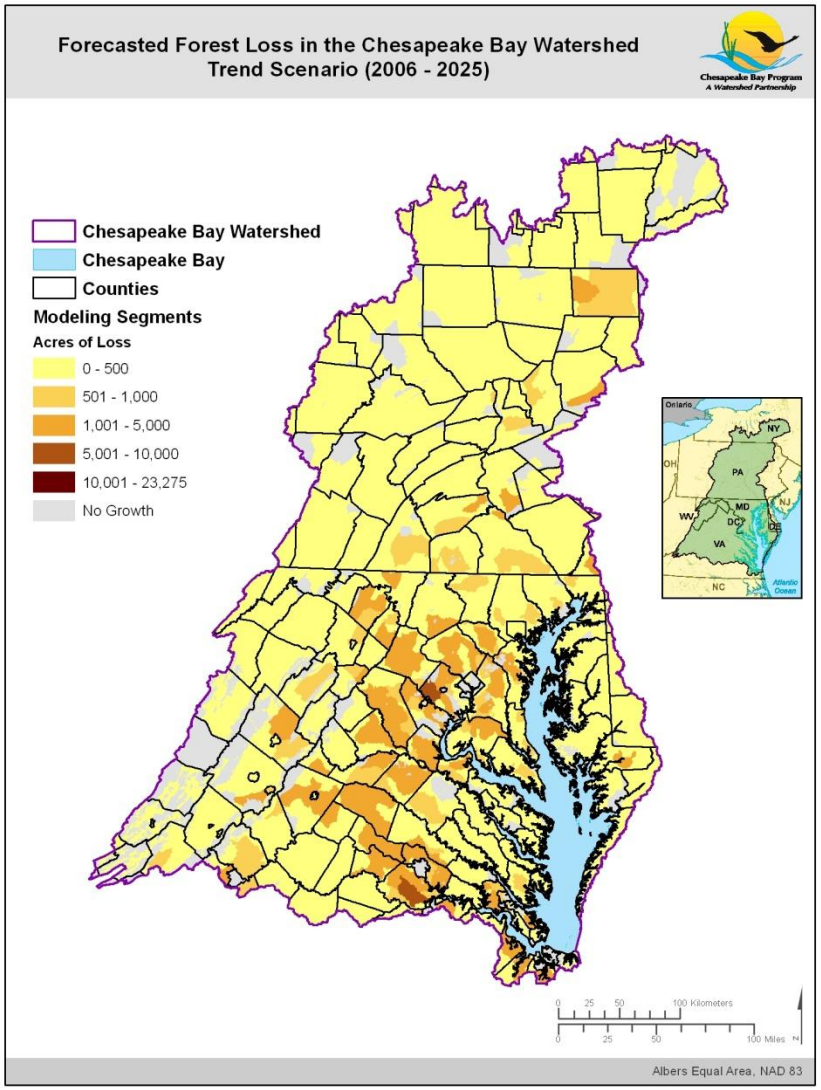
Forecasted Urban Growth in the Chesapeake Bay Watershed

(2006 – 2025)

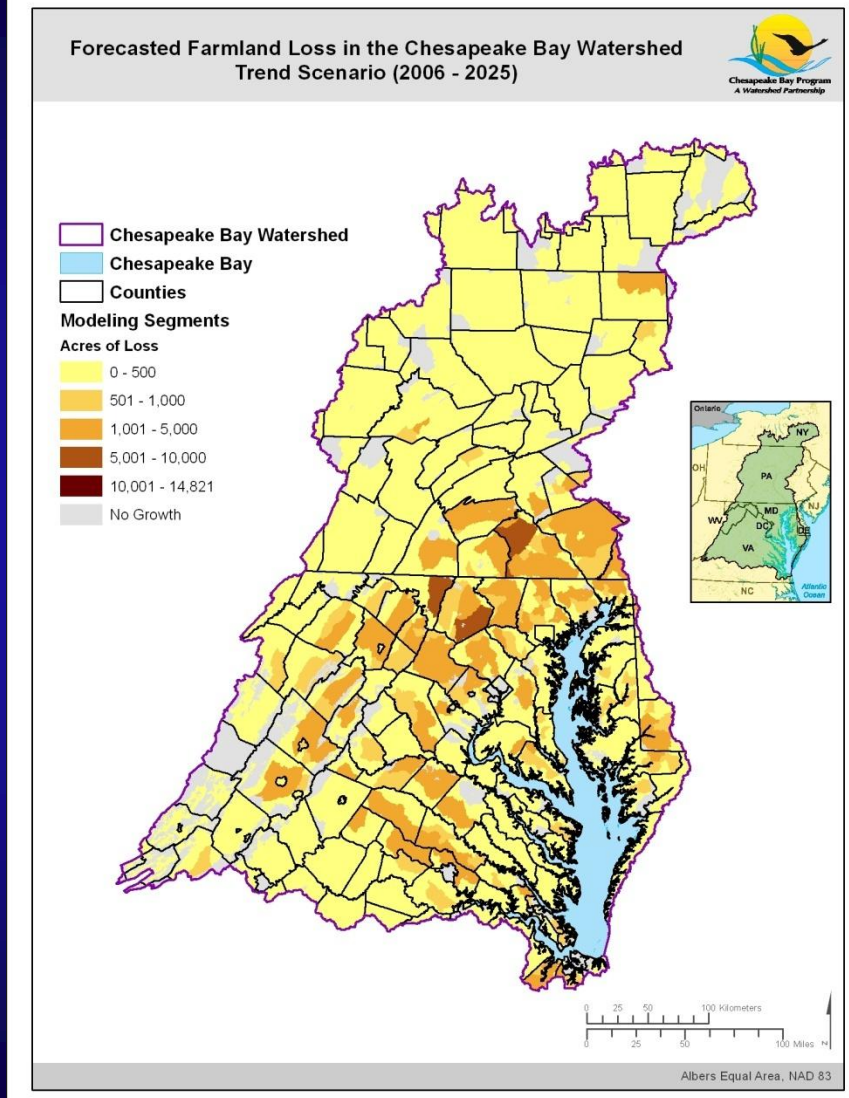


USGS

Forest Loss (2006 – 2025)



Farmland Loss (2006 – 2025)



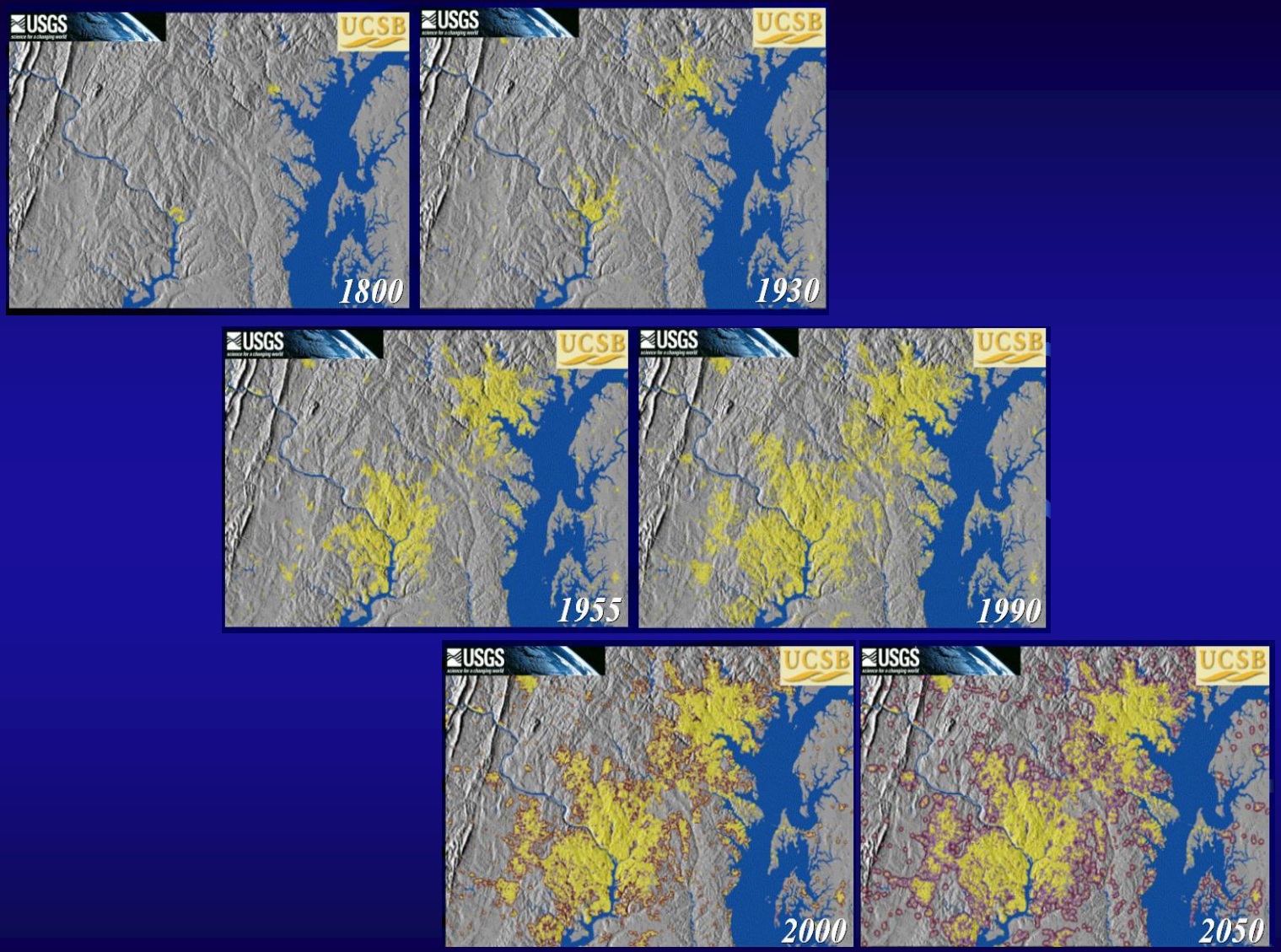
USGS

Chesapeake Bay Land Cover Data Series

1984 1992 2001 2006 2011

USGS

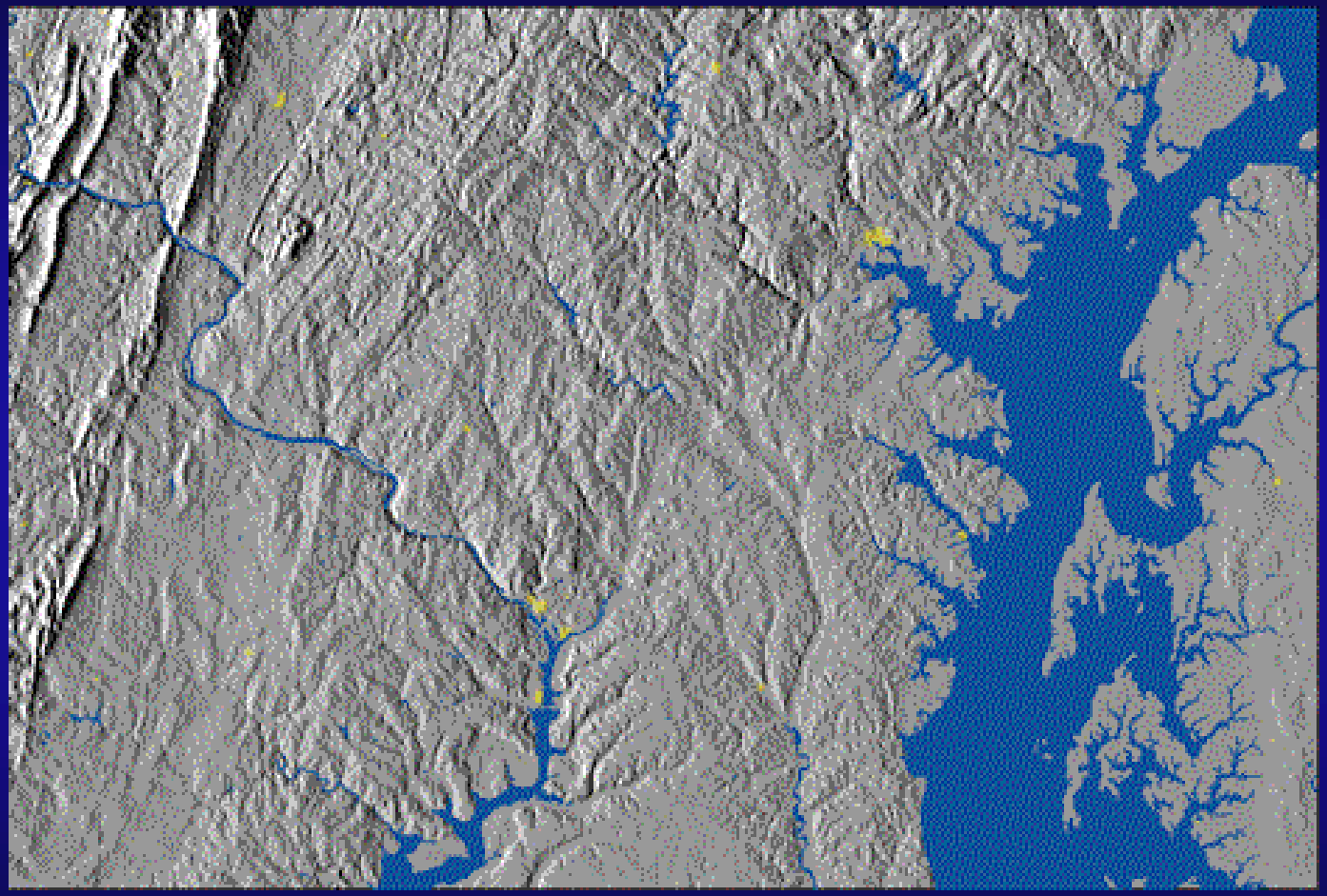
Urban Development (1800 – 2050), Washington D.C. – Baltimore Bay region



Clarke and Gaydos, 1998.

USGS

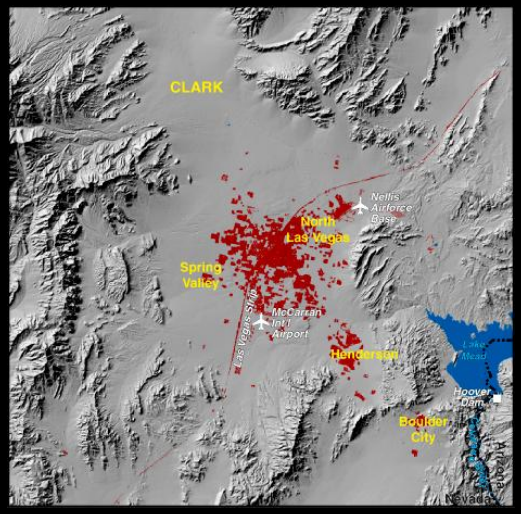
Urban Development (1790 – 2050)
Washington D.C. – Baltimore Bay region

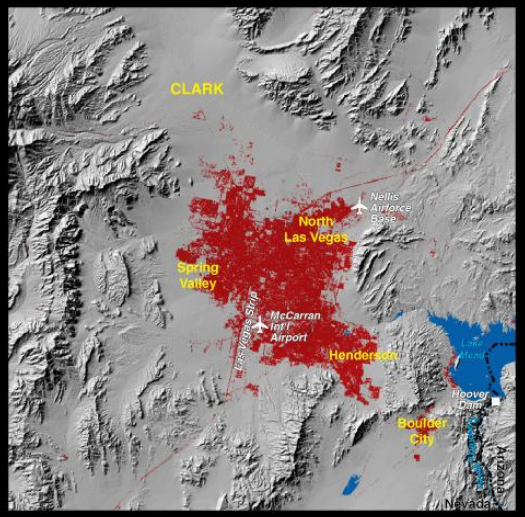


Clarke and Gaydos, 1998.

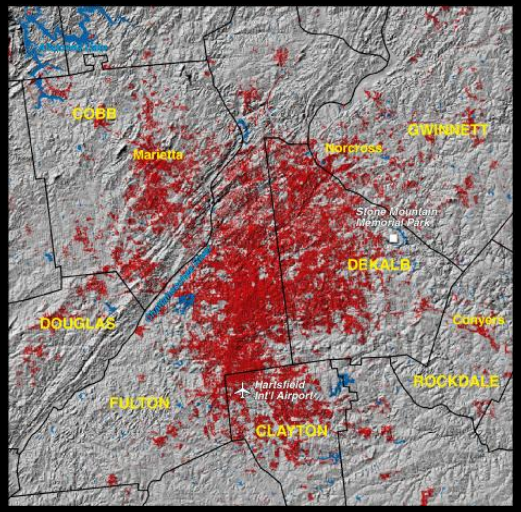
USGS

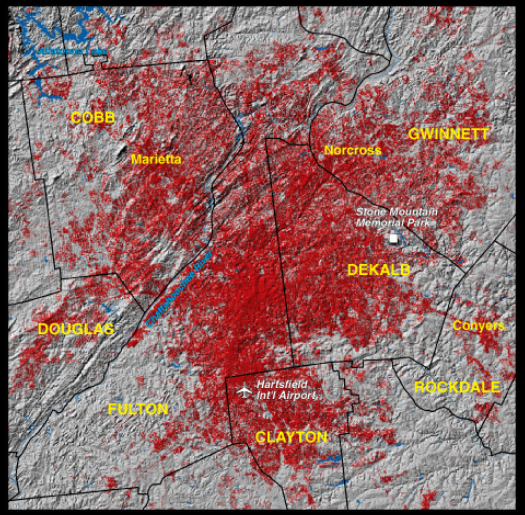
Historical Comparisons of Metropolitan Regions:





Las Vegas (1973 – 1992)

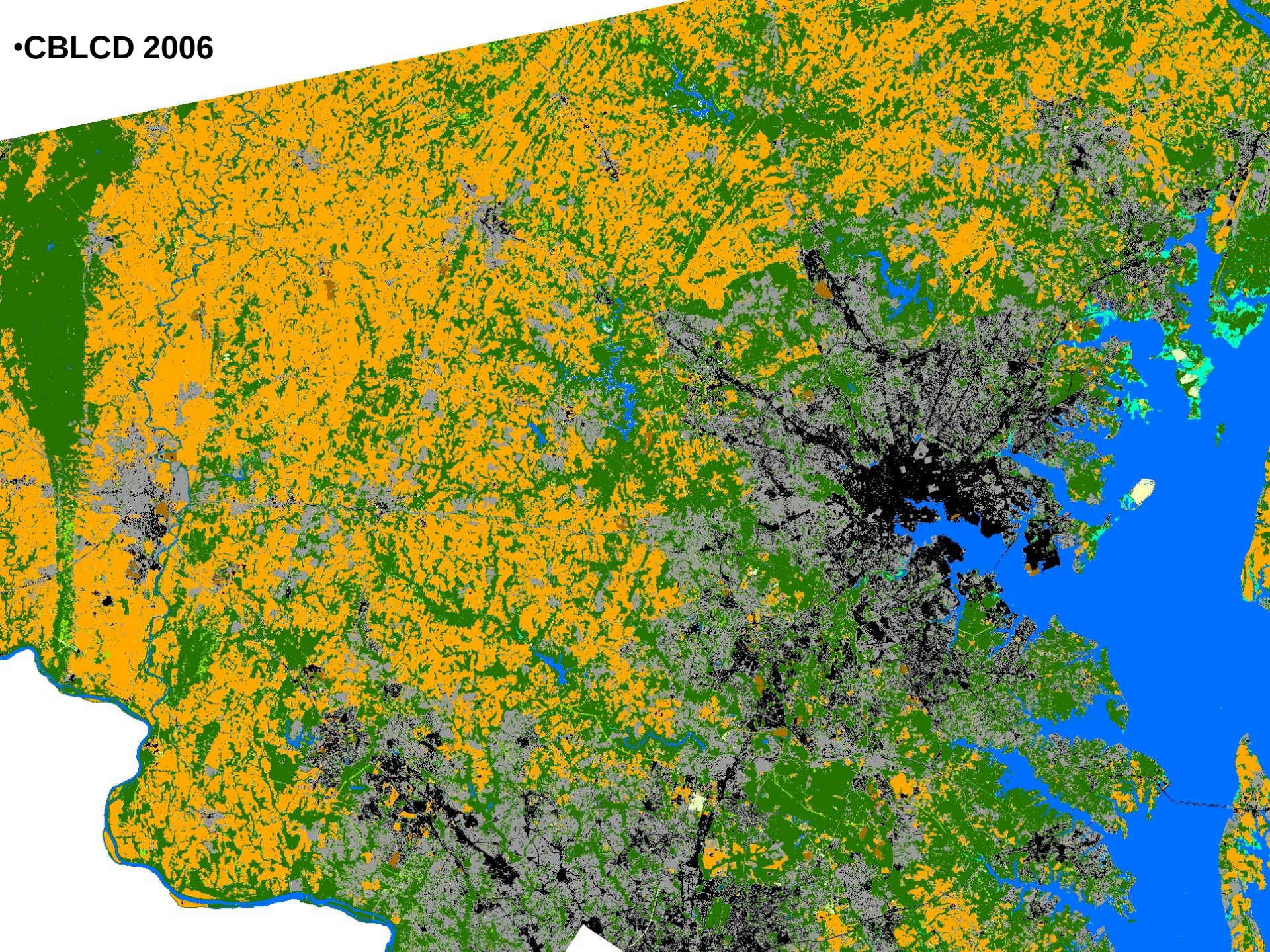




Atlanta (1973 – 1992)

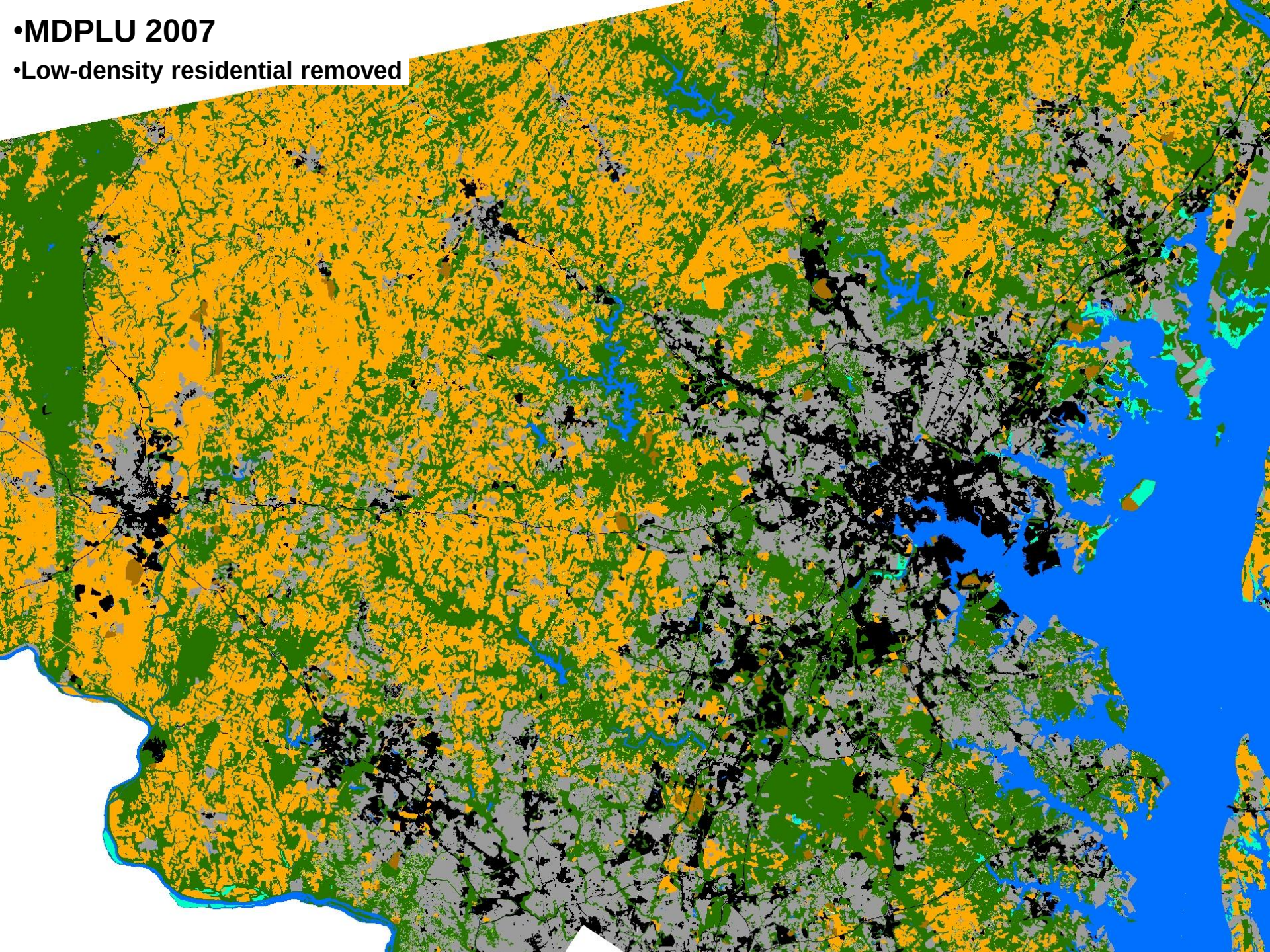
Auch, et al., USGS Circular 1252

•CBLCD 2006



•**MDPLU 2007**

•**Low-density residential removed**



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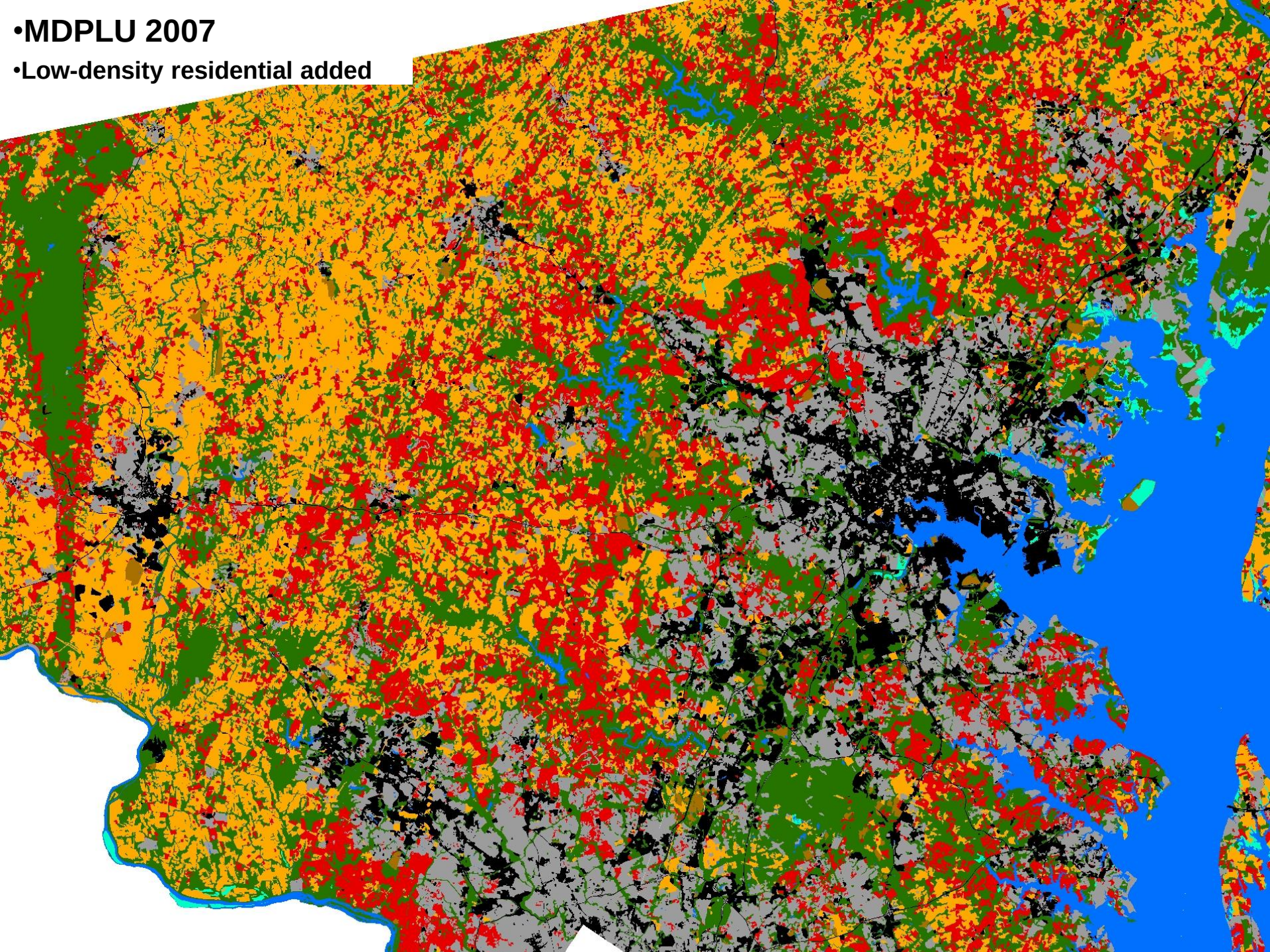


Landsat Land Cover Change: 1984 –2006

- Tree canopy decreased 439,000 acres.
- Urban area increased 355,000 acres.
- Cropland and pasture decreased 93,000 acres.

CBP Modeled Land Use Change: 1985 –2005

- Other (forest) lands decreased 105,000 acres.
- Urban area increased 960,000 acres.
- Cropland and pasture decreased 856,000 acres.

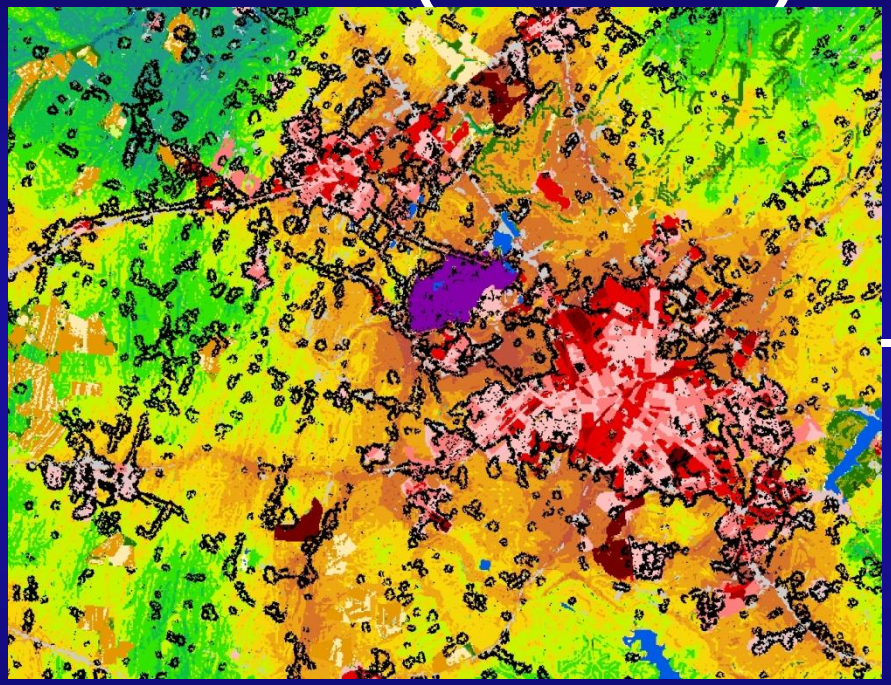
USDA FIA Trends

- Forest loss is occurring at rate of 100-acres per day (~730,000 acres over 20 years)

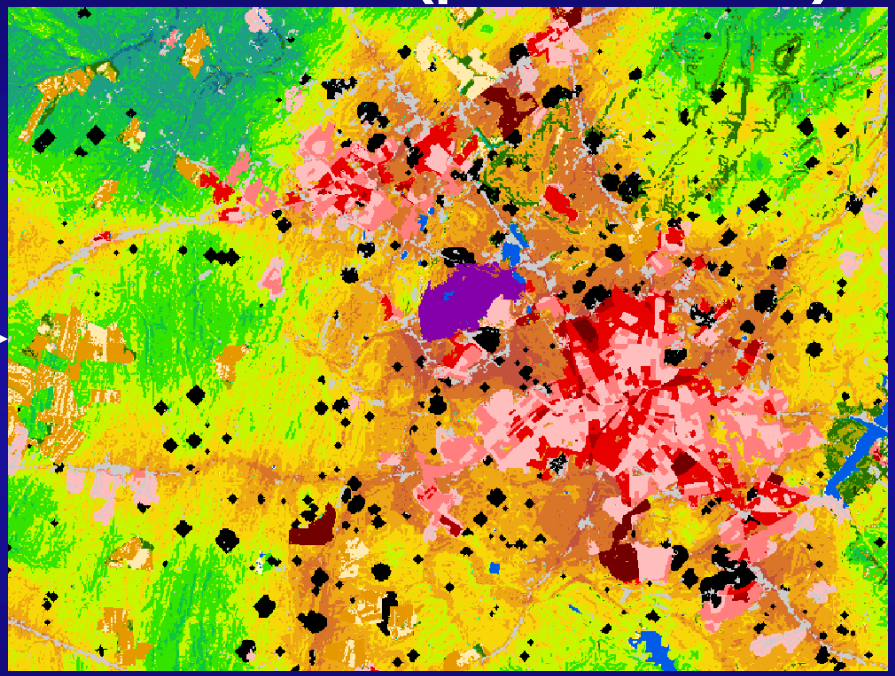
USGS

CBLCM v3: a new patch-based land change model

CBLCM v1 (w/ SLEUTH)



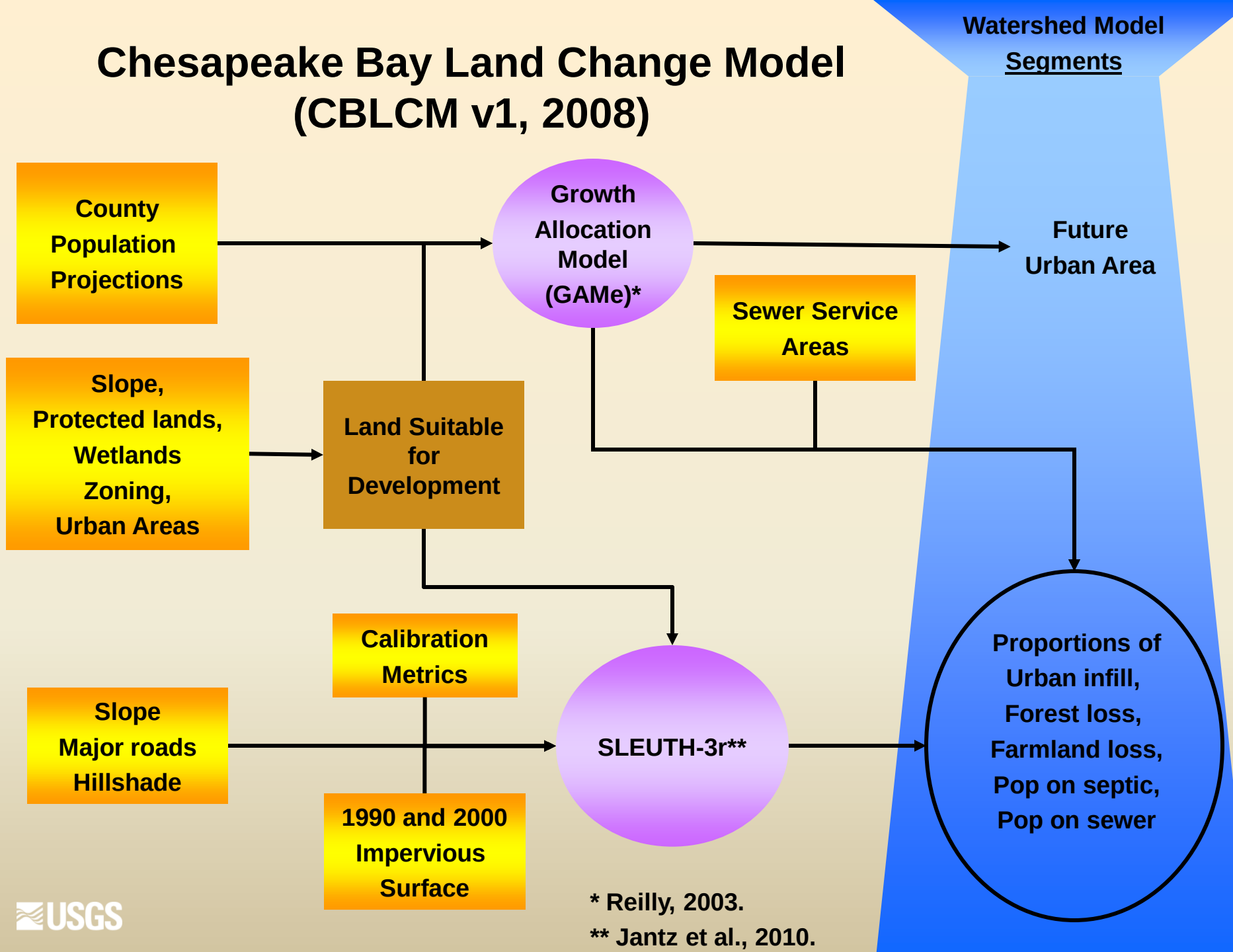
CBLCM v3 (patch-based)



Probability surface

USGS

Chesapeake Bay Land Change Model (CBLCM v1, 2008)

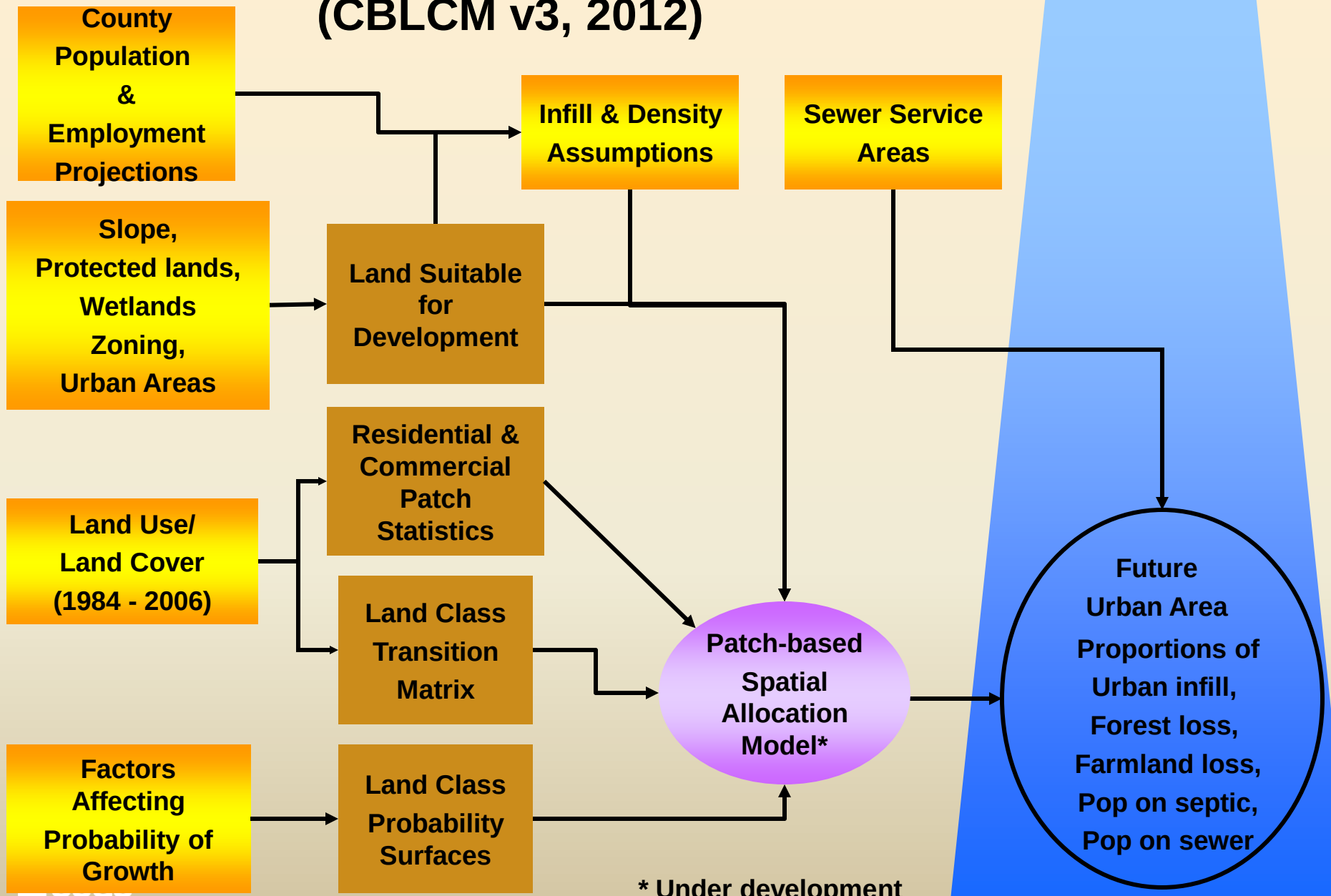


USGS

* Reilly, 2003.

** Jantz et al., 2010.

Chesapeake Bay Land Change Model (CBLCM v3, 2012)



Potential Role of Land Change Monitoring and Modeling in developing Offset Strategies

Chesapeake Bay Program
A Watershed Partnership

1. Estimate future offset demands

   - and compare with offset capacity

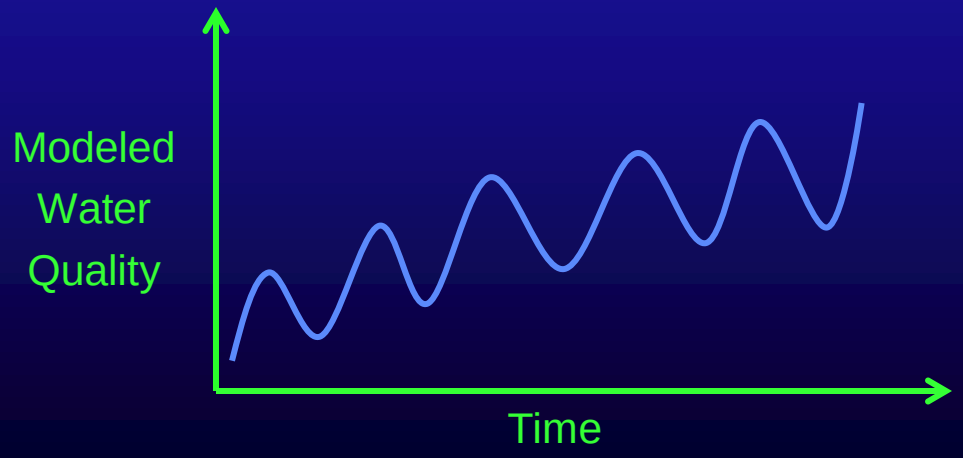
2. Incorporate accountability into state offset programs.

3. Create a quantifiable measure of *reasonable assurance* that accounts for land protection, strength of anti-degradation policies, land-use ordinances and regulations, and offset ratios and trade restrictions within healthy watersheds.

Accountability for Offsets?

2-year milestones:

Best Management Practices	Land Use Change
5 stormwater detention basins	
10-acres reforestation	OFFSETS?
2000-ft forested stream buffers	



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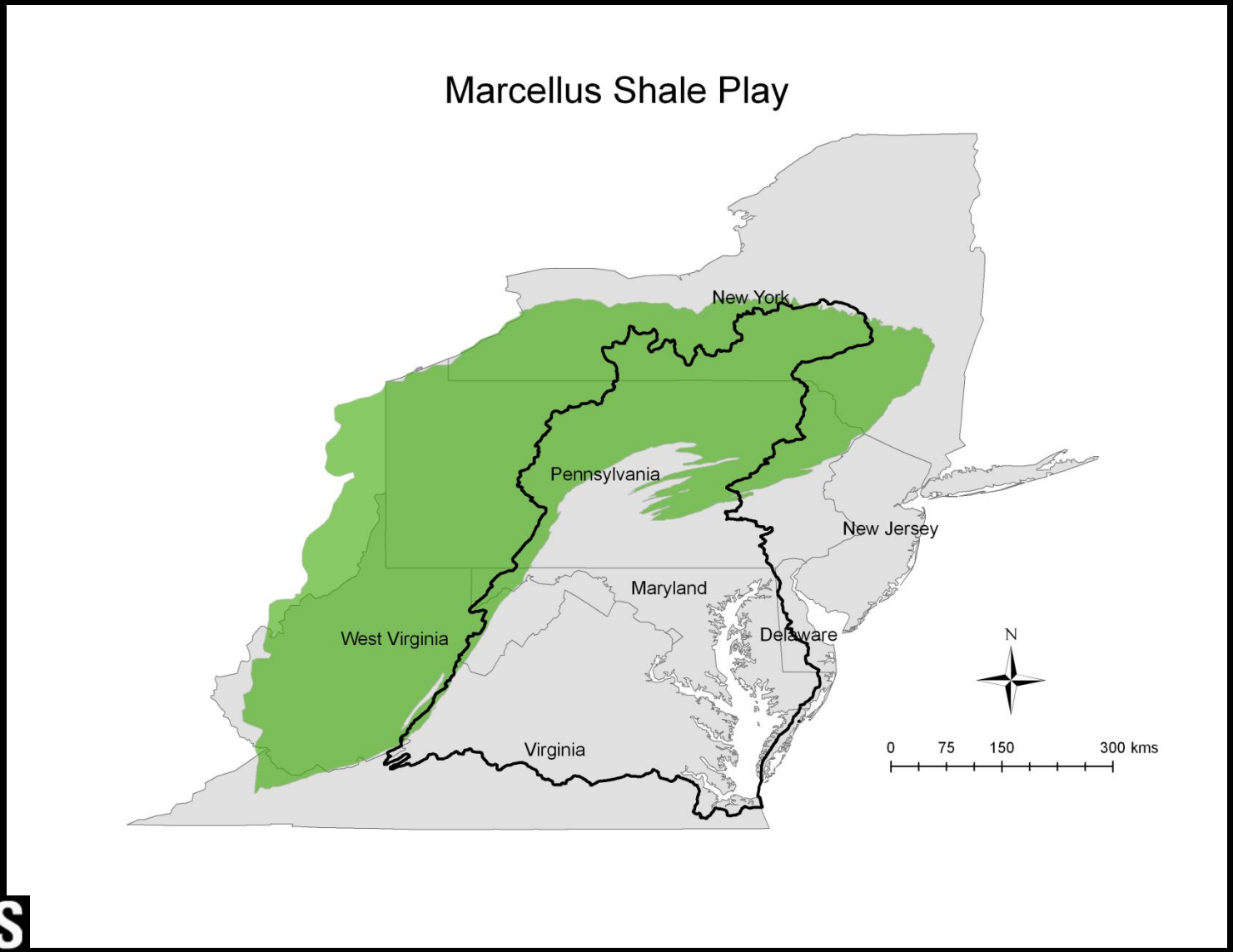
Where are the Gas and Oil Shale Plays?
Chesapeake Watershed



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science for a changing world

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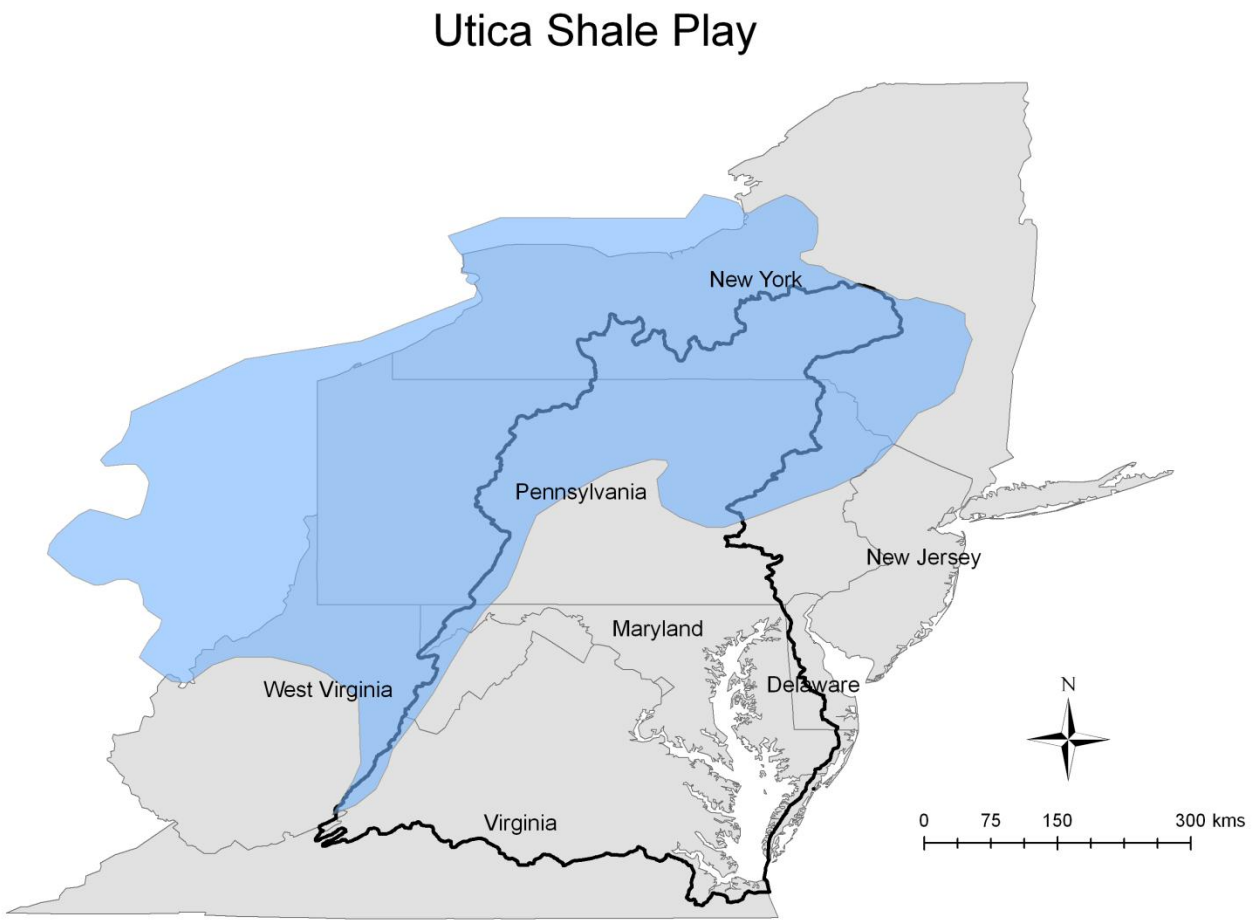

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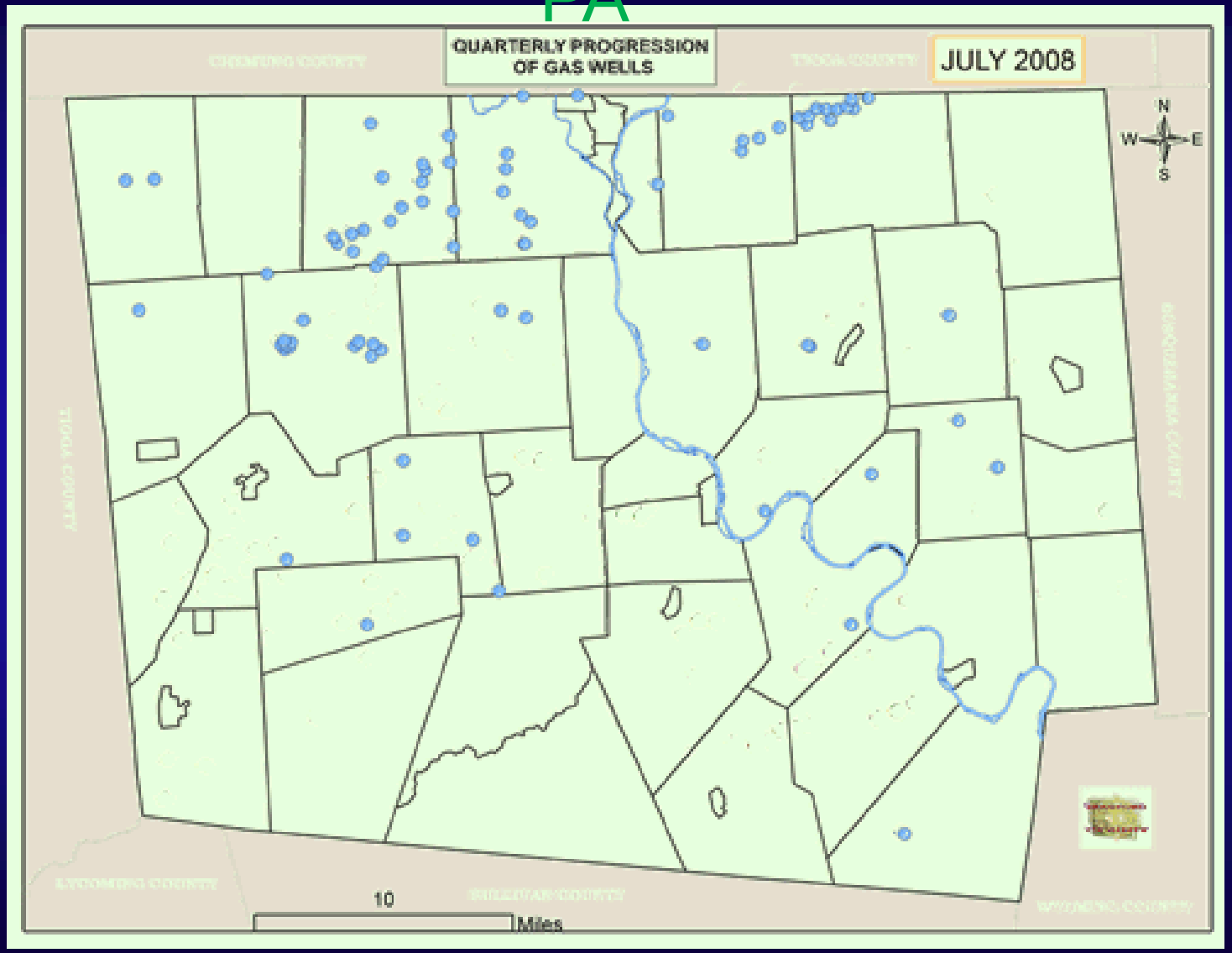
•Recent Well Development in Bradford County, PA



•http://www.bradfordcountypa.org/Natural-Gas.asp?specifTab=2

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