Future Urbanization in the Chesapeake Bay Watershed

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

By 2040, the population of the watershed may increase by 16% (~3 million persons)
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): 225,354
Suitable Land for Growth: 138,000
Development Pressure: 1.63

Example #1: Growing slower than expected
Loudoun County, VA
2040 Projected Population: 492,517

Example #2: Growing faster than expected
District of Columbia
2040 Projected Population: 940,687
### Chesapeake Bay Land Change Model v3a

- Population Projections
- Total Housing Demand
- Historic and Potential Urban Development
-就业
- Future Land Cover
- Summary Unit Statistical Framework

### Chesapeake Bay Future Land Use Scenario Domain

### R² Values for Logistic Regressions

<table>
<thead>
<tr>
<th>State</th>
<th>Residential</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaware</td>
<td>0.766</td>
<td>0.555</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Maryland</td>
<td>0.778</td>
<td>0.718</td>
</tr>
<tr>
<td>New York</td>
<td>0.871</td>
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<tr>
<td>Pennsylvania</td>
<td>0.835</td>
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<tr>
<td>Virginia</td>
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</tr>
<tr>
<td>West Virginia</td>
<td>0.908</td>
<td>0.921</td>
</tr>
</tbody>
</table>
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)
5. Forest acres converted to development
6. Farmland acres converted to development
7. Δ Total Nitrogen (# / acre / yr.)
8. Δ Total Phosphorus (# / acre / yr.)
9. Δ 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)
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.

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.