Alternative Future Scenarios for the Chesapeake Bay Watershed Model

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

Definitions

Future Land Use Scenario:

A logically-coherent storyline and associated set of plausible assumptions of factors influencing land use change over a specified period of time.

"Business as Usual" Scenario:

The continuation of historic rates and types of land use changes under the assumption that the past is prologue to the future.

Alternative Future Land Use Scenarios:

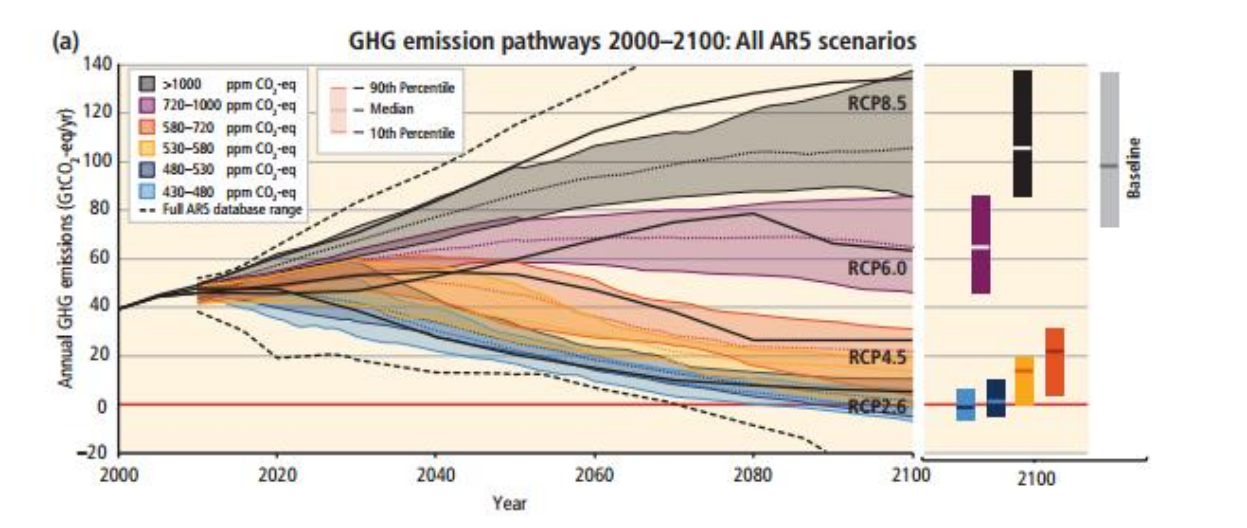
A set of alternative scenarios (usually 3-5 including "Business as Usual") that represent the range of plausible futures.

Why Alternative Future Scenarios?

1. To characterize and quantify land use policies and associated institutional controls as water quality Best Management Practices.

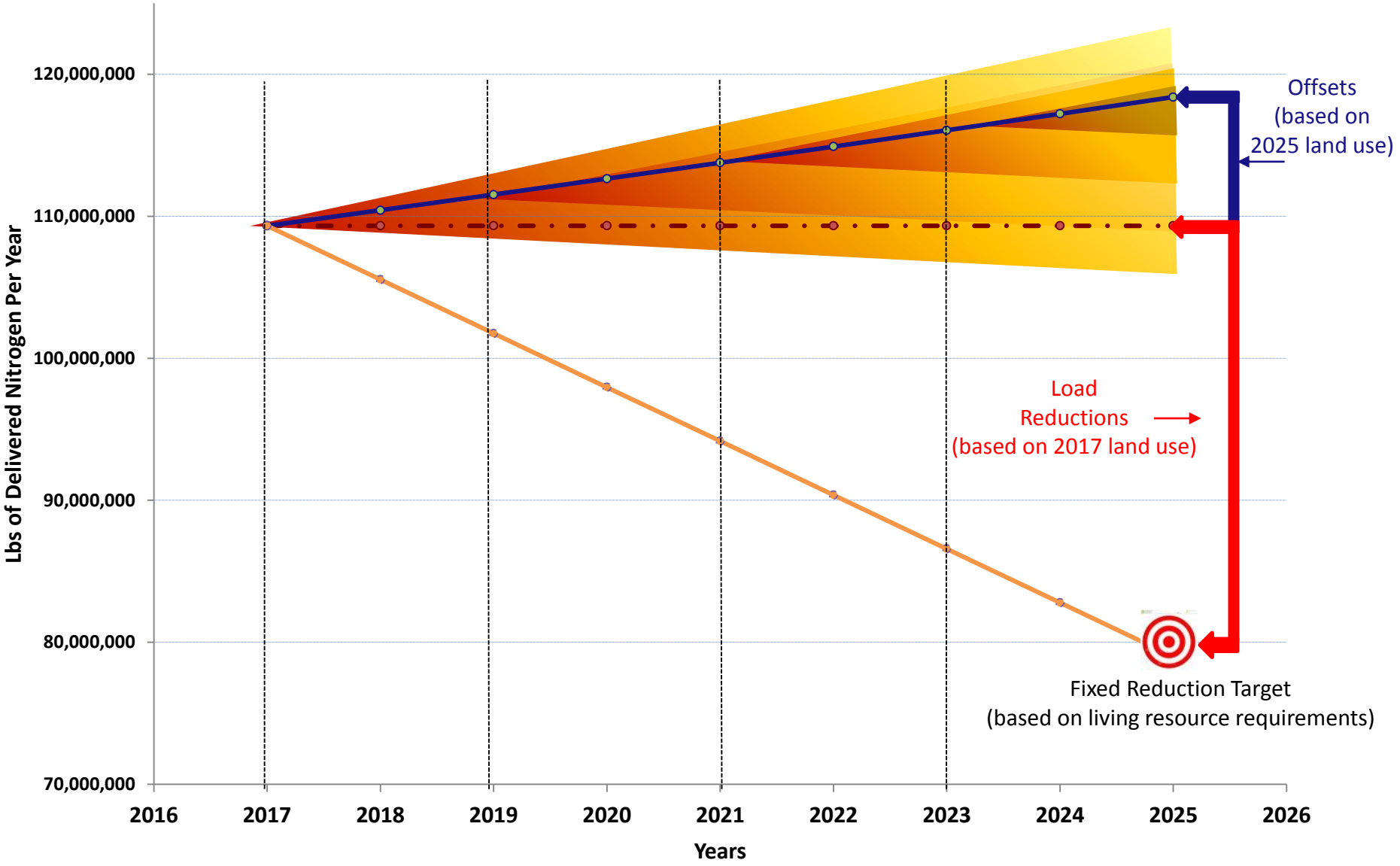
2. To bound the uncertainties associated with any particular scenario.

3. To provide a framework for re-evaluating and continually improving our assumptions and characterization of trends- acknowledging that over the long term, no single scenario is the “most likely”.



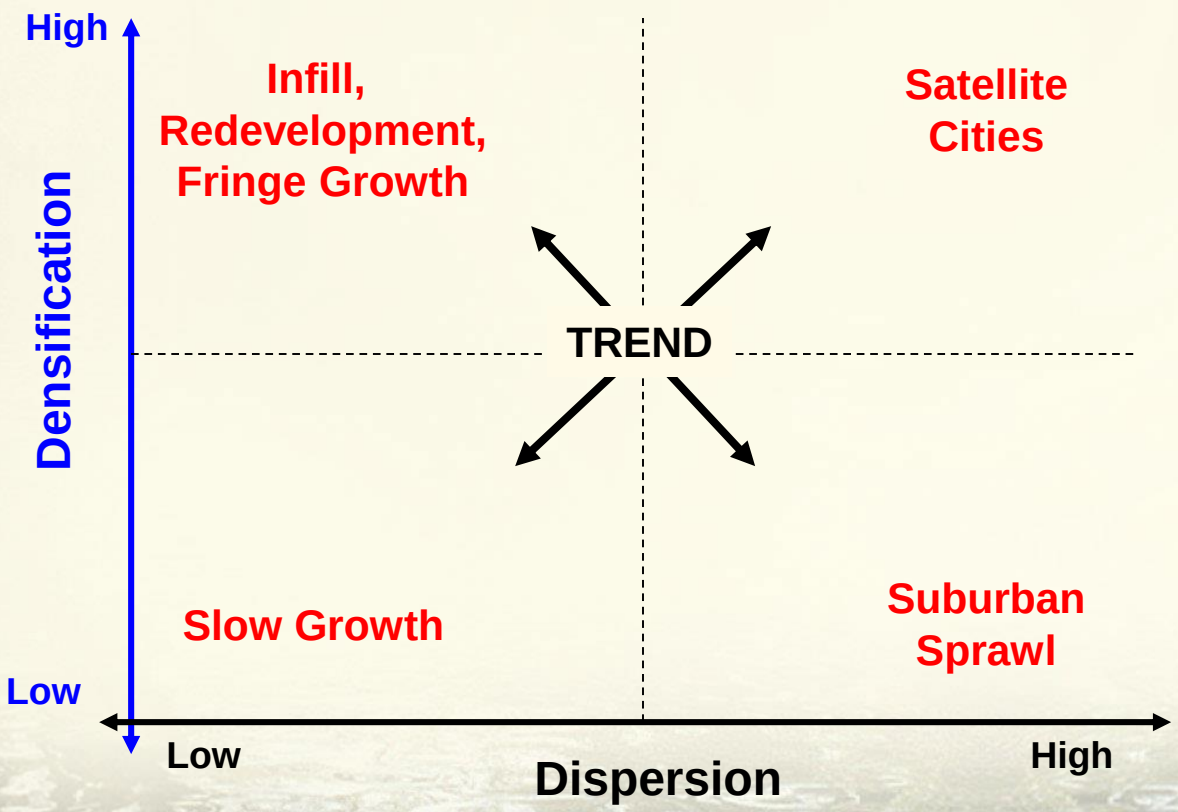
IPCC, Climate Change 2014 Synthesis Report: Summary for Policymakers

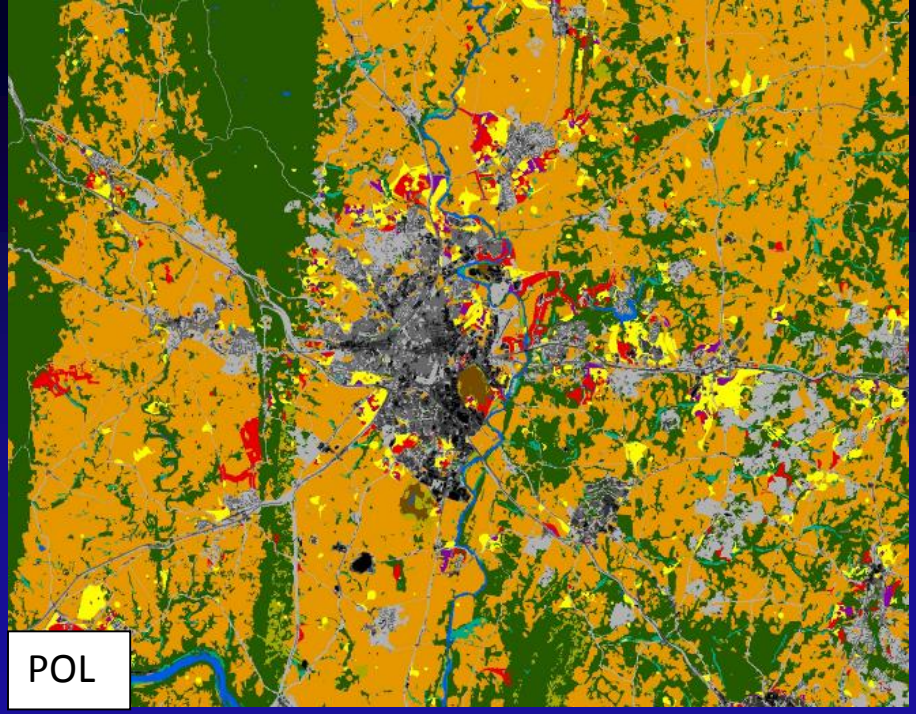
Conceptual Phase 3 WIP Scenario for Nitrogen Offsets



Conceptual Alternative Future Development Scenarios

Chesapeake Bay Program
A Watershed Partnership

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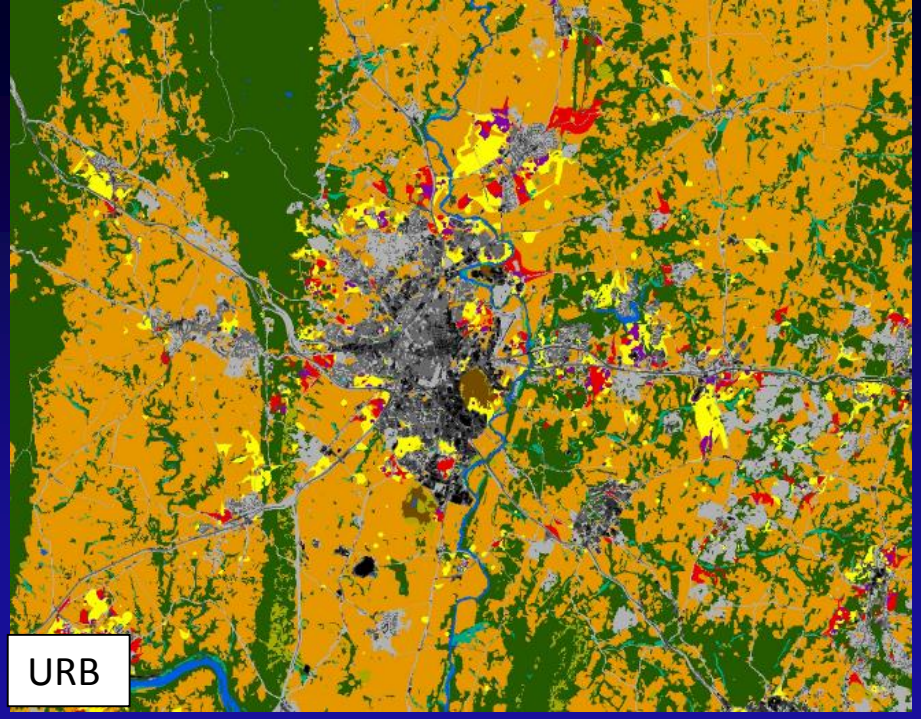
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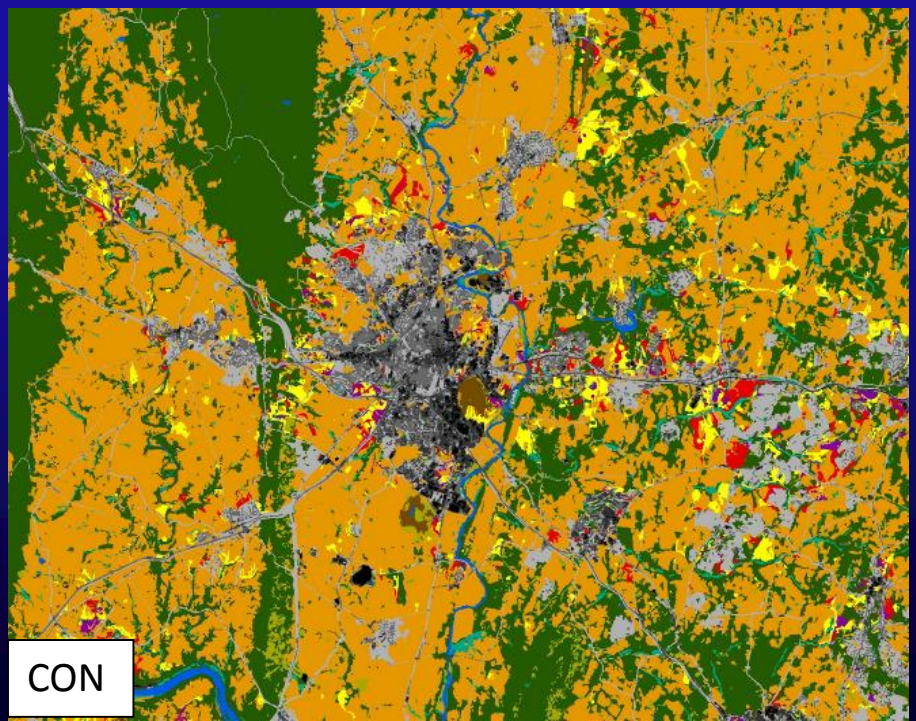
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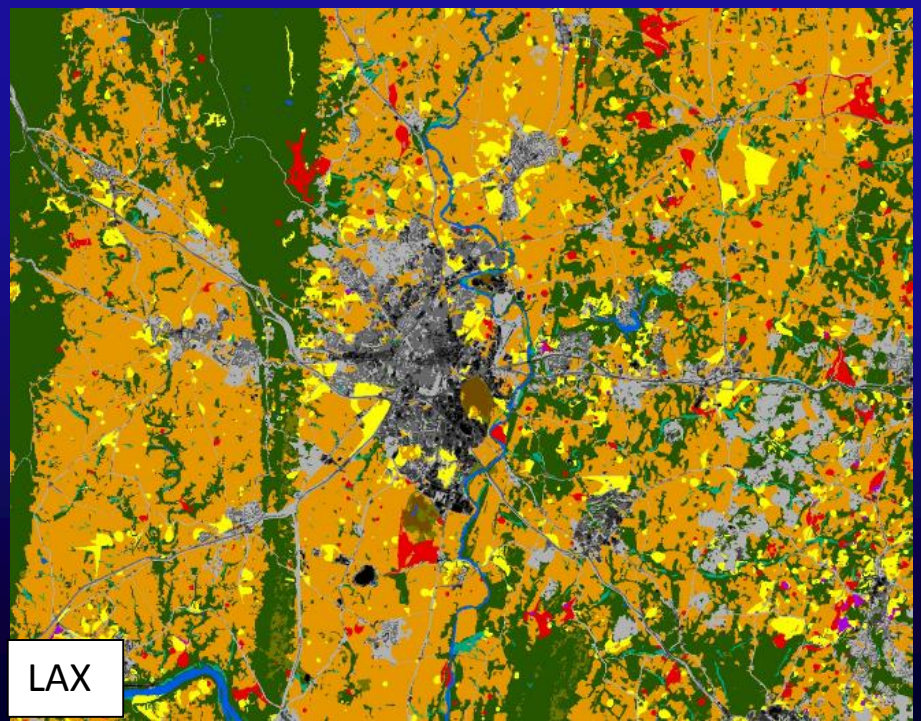
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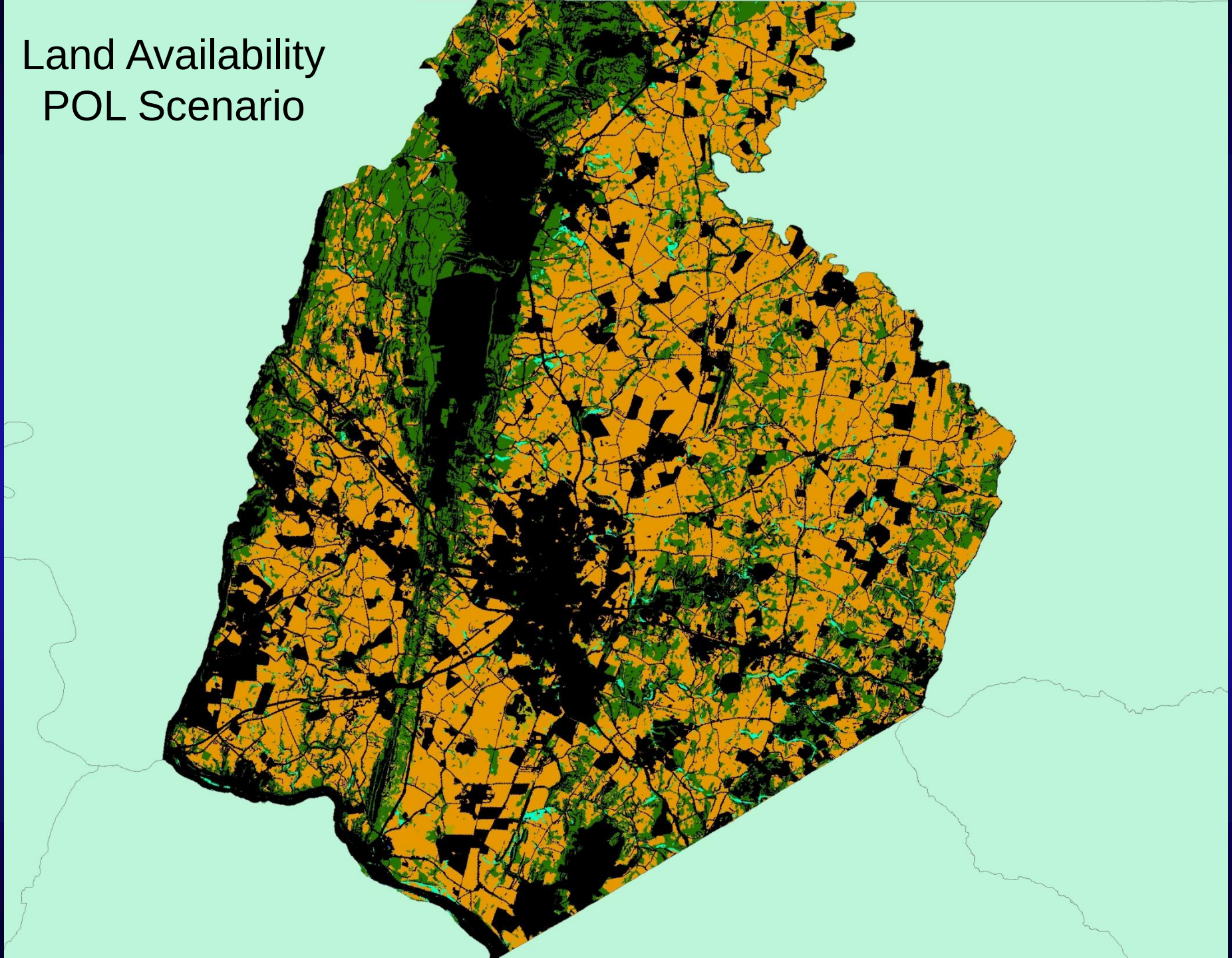
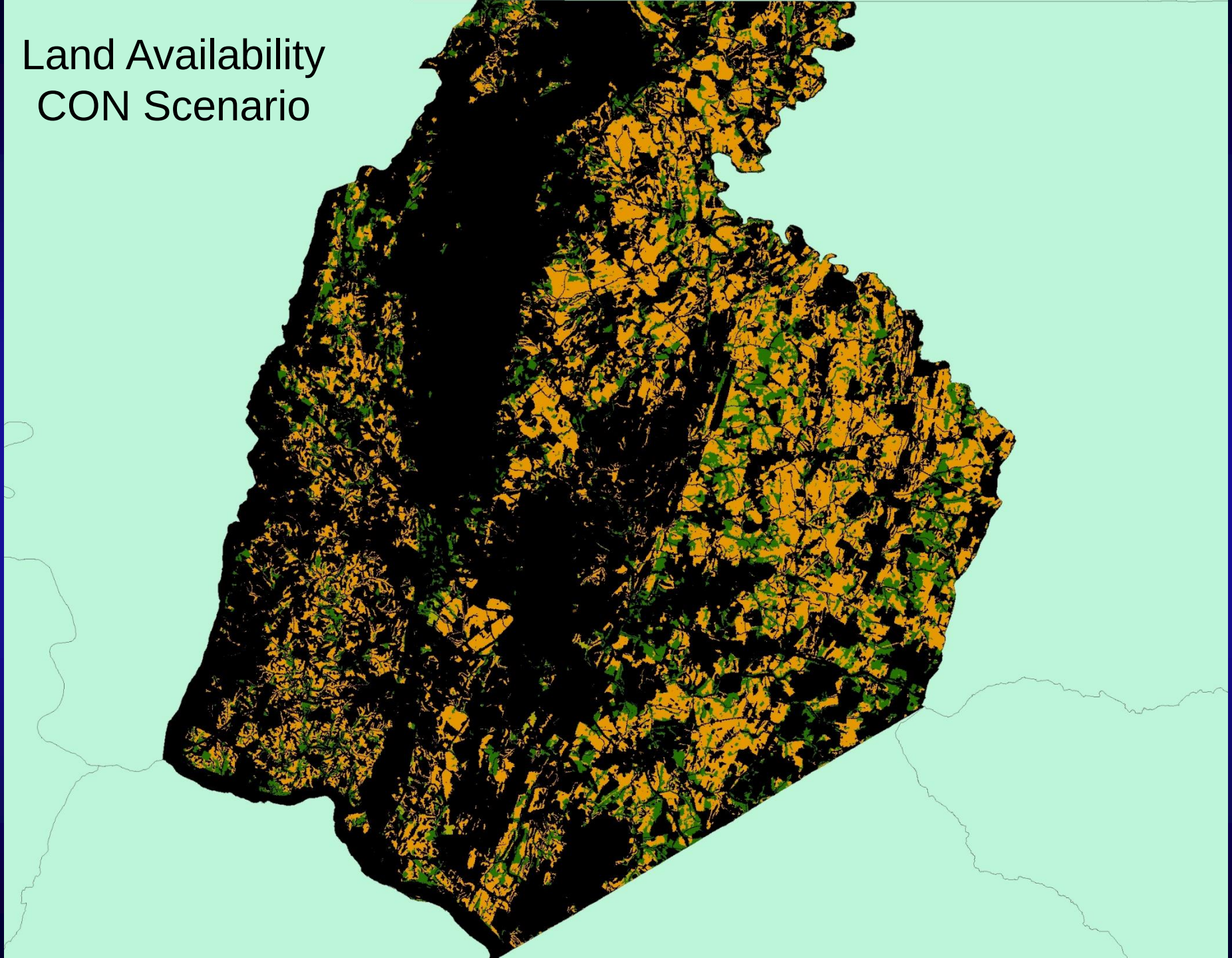
Land Availability
POL Scenario



Land Availability
CON Scenario



Alternative Futures: Accounting for Growth in the Chesapeake Bay Watershed
USGS sponsored workshop on September 15, 2011

"Business As Usual" (with zoning): direct growth to areas either zoned for it and/or with necessary infrastructure and capacity to support it.

"Land Conservation": protect state and local priority conservation areas.

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

"Sustainable Chesapeake": combine the "land conservation" and "rural character" scenarios with protective buffers around all streams, shorelines, and wetlands.

"Infill and Redevelopment": direct 50% and 75% of future growth into urban areas.

https://pubs.usgs.gov/of/2012/1216/OFR2012-1216.pdf

Proposal for Developing Alternative Future Scenarios

1. Revisit 2011 Alternative Future Scenario Workshop Proceedings
   - Recommend changes to the proposed scenarios

2. Identify policies and associated institutional controls that should be evaluated as water quality BMPs.
   - Solicit input from LGAC during their March 23rd meeting

3. Make assumptions about effects of policies and institutional controls on densities, infill, land protection, etc.

4. Agree on data and assumptions associated with a “Business As Usual” scenario.

5. Agree on data and assumptions associated with a full range of alternative future scenarios.

6. If needed, restrict the set of alternative future scenarios to a representative sample.

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“Business As Usual” Scenario Data

Timeline? Every 5-years from 2015 – 2040 (6 intervals)

Land Use Baseline: 2013 Phase 6 Land Use Dataset

Population and Employment Projections: latest from States and WashCOG

Short-term Housing/Population/Employment Trends:
2007 – 2013 (ACS & LEHD at Block Group scale)

Long-term Housing/Population/Employment Trends:
1990 – 2010 (Decennial Census at Block/County scale)

Land Cover Trends: 2001 – 2011 (National Land Cover Database)

Protected Lands: Protected Areas Database of the United States v1.4

Infill/redevelopment rates:
assessed via housing, employment, and land cover trends

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“Business As Usual” Scenario Assumptions
(the future will be like the 2000’s)

Fixed proportions of “urban” vs “rural” growth based on 2000-2010 trends.

Fixed infill/redevelopment rates based on 2000-2010 trends

All projected population and employment accommodated within each county/city

Urban development patch sizes over 2000’s fixed into the future

Housing and Employment density distributions fixed based on densities of change over 2000’s.

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Alternative Scenario Considerations

Use of zoning surrogates such as sewer service areas or proximity measures

Change in the proportions of urban and rural growth

Change in housing and employment densities

Change in the rates and locations of infill & redevelopment

Use of regions rather than counties to constrain projected growth
e.g., Baltimore-Washington metro area or I-95 corridor

Investments in land protection and regulations for conserving farmland, forests, streams, and wetlands

Sea-level rise

Consistency with other studies
e.g., USACE Comprehensive Plan, Climate Change emission scenarios

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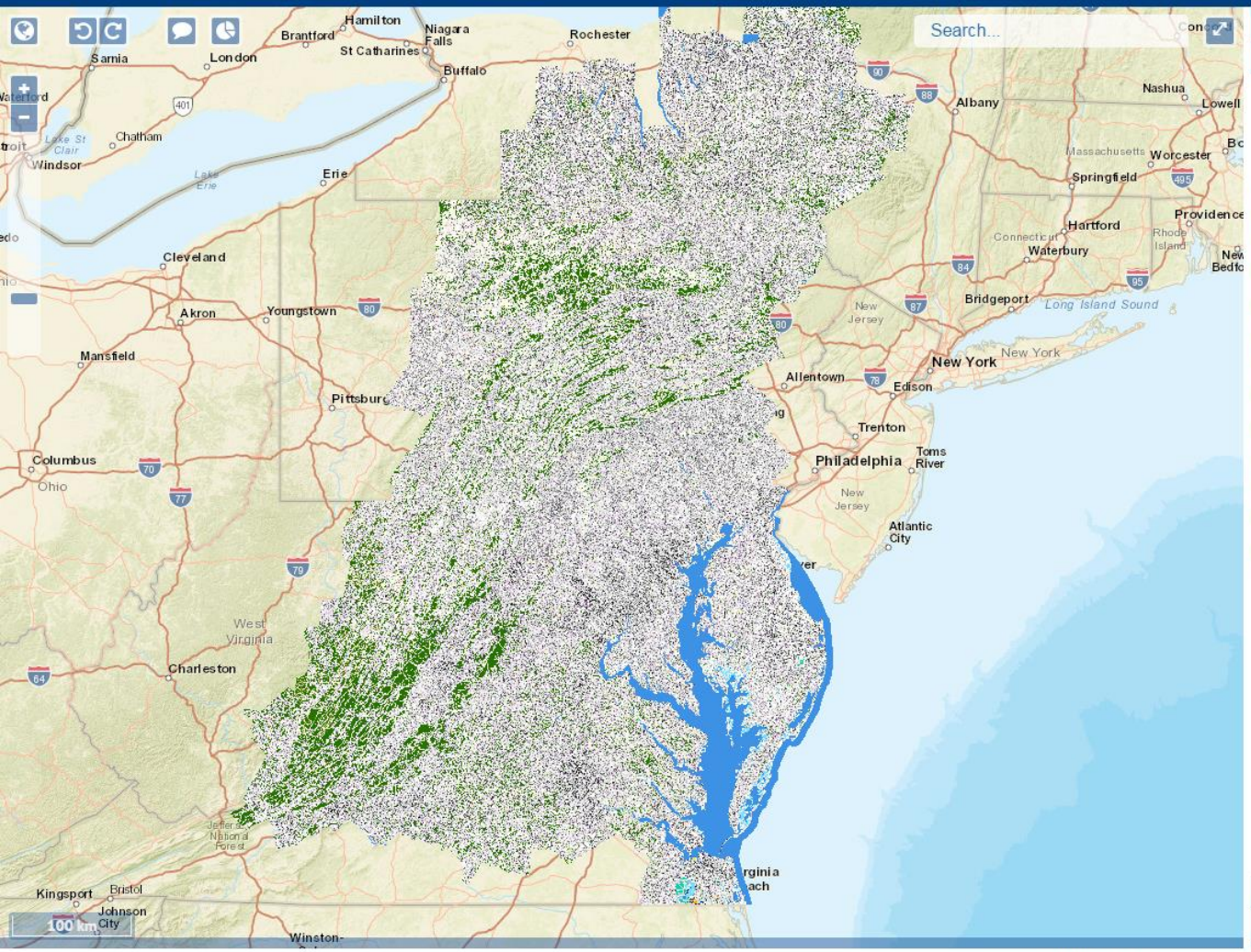
Chesapeake Bay Phase 6 Land Use Viewer

back to main Chesbay P6 page



Overlay Opacity: 100%

Map Layers

Phase 6 Land Use Datasets

County Status
Completed | Pending | Not Started

Click on the layer name to get information about the layer

Check All | UnCheck All

- Impervious Roads
- Impervious Non-Roads
- Tree Canopy Over Impervious
- Tree Canopy Over Turf Grass
- Turf Grass
- Mixed Open
- Forest
- Tidal Wetland
- Non-tidal Floodplain Wetland
- Non-tidal Other Wetland
- Open Water
- Cropland
- Pasture

Overlays

Base Map

Data and Metadata Download

Submit Comments to USGS

Chesapeake Bay Phase 6 Land Use Viewer
URL: https://chesapeake.usgs.gov/phase6/map
Questions and Feedback: gstubbs@usgs.gov

Phase 6 Error Rates for 2013 conditions

Census of Agriculture (2012):

- Mean: 83.8% (59.8% - 95.2%) (0.05 – 0.95 percentiles)
- Applied to cropland, pasture, mixed open, and turf grass
- VA Turf Grass assigned an accuracy of 72%. VA crop and pasture may receive accuracies of 95% and 91% respectively.

Impervious roads: 92% (74% - 100%)

Impervious Non-Roads: 93% (88% - 97%)

Tree Canopy over Impervious: 59% (19% - 92%)

Tree Canopy over Turf Grass: 94% (83% - 99%)

Water: 98% (96% - 100%)

Forest: 98% (96% - 99%)

Wetlands: 95% assigned to all because NWI was “burned in”

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