Future Land Use Scenarios for the Chesapeake Bay Watershed

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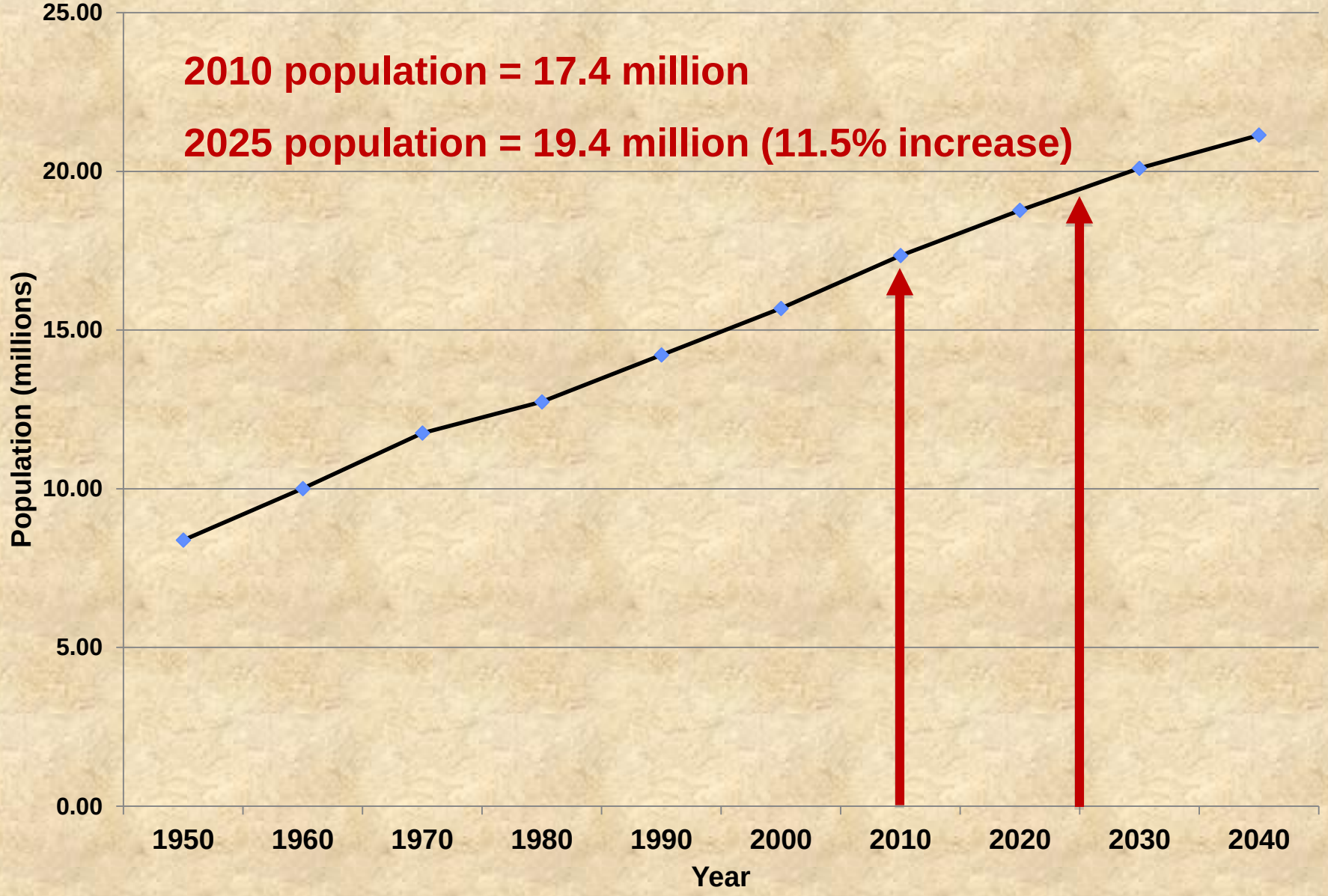
U.S. Department of the Interior
U.S. Geological Survey

Role of Future Land Use Scenarios:

1. A basis for “accounting for growth" in the Phase III WIPs.
2. Benchmarks for developing and evaluating state offset strategies.
3. A framework for crediting land conservation and land use regulatory actions.
4. Information for identifying forests and farms at risk from development.

USGS

Chesapeake Bay Watershed PopulationTrends



USGS

Chesapeake Bay Future Scenarios

(from June 7th "Local Government Forum")

"Historical Trends": previous patterns of growth replicated into the future.

"Current Policy": growth focused towards local areas zoned or projected to accommodate it.

"Current Policy Plus": "Current Policy" combined with growth focused in areas with planned infrastructure (e.g., roads, sewer, and water)

"Utopia": "Current Policy Plus" combined with aggressive land conservation, accelerated infill/redevelopment, and upzoning urban and downzoning rural areas.

*Additional considerations: soil restrictions, internet access, sea-level rise, and specific state/county policies (e.g., MD's Septic Bill and Ag Preservation Act).

USGS

Chesapeake Bay Future Scenarios
(run in September 2017)

“Historical Trends”: previous patterns of growth replicated into the future.

“Current Policy”: growth focused towards local areas zoned or projected to accommodate it.

USGS

Accounting for Growth

Urban Sector:
Accounting for the impact of 2 million additional people (2010 – 2025).

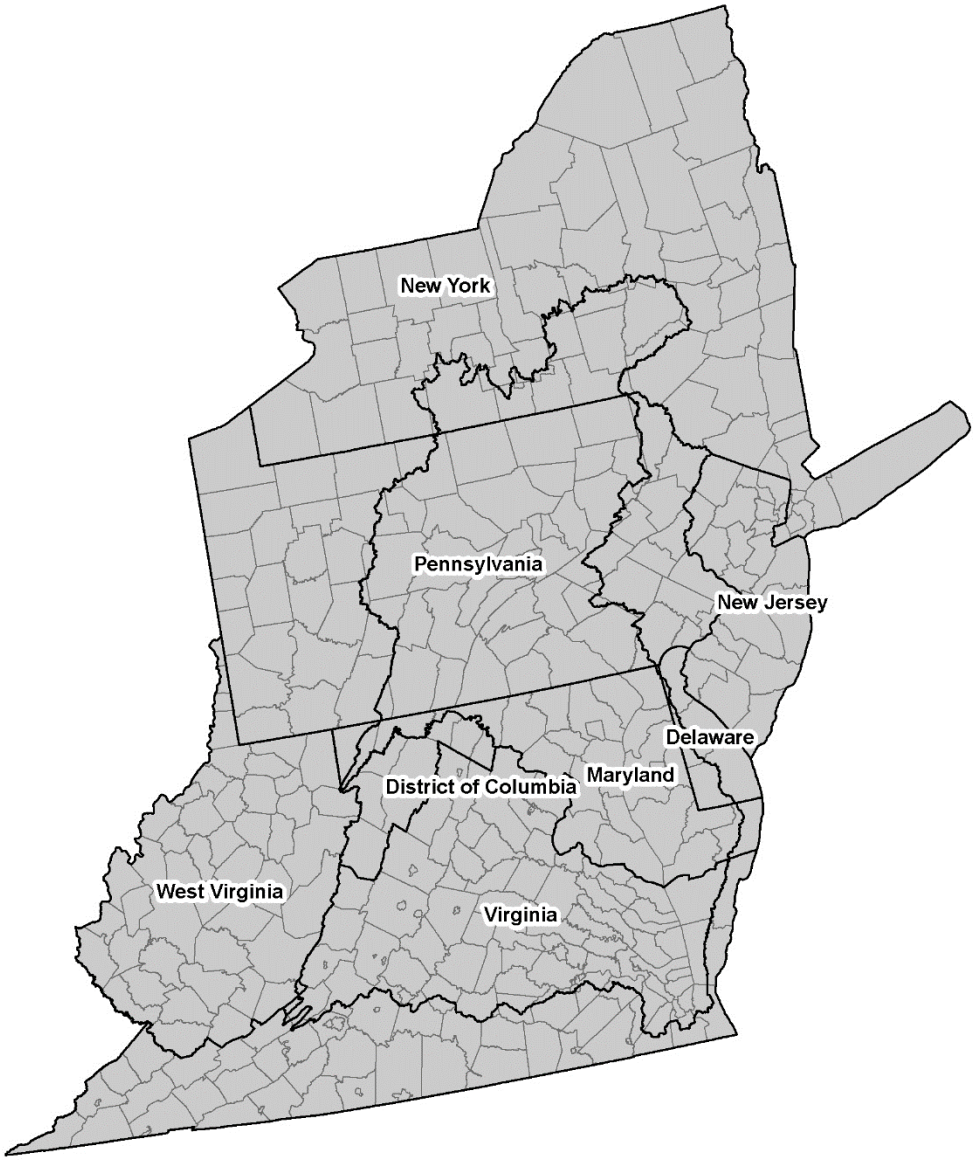
Per-capita impacts are greatest if growth occurs in forested areas converted to 1-5 acre lots on septic near the Bay.

Per-capita impacts are minimized if growth is accommodated through infill and redevelopment within areas served by pubic sewer.

Expected growth could be offset by land use regulatory actions, land conservation, or other actions that reduce the footprint of future development and/or concentrate growth in areas with adequate infrastructure (e.g., roads, schools, sewer).

USGS

Chesapeake Bay Future Land Use Scenario Domain



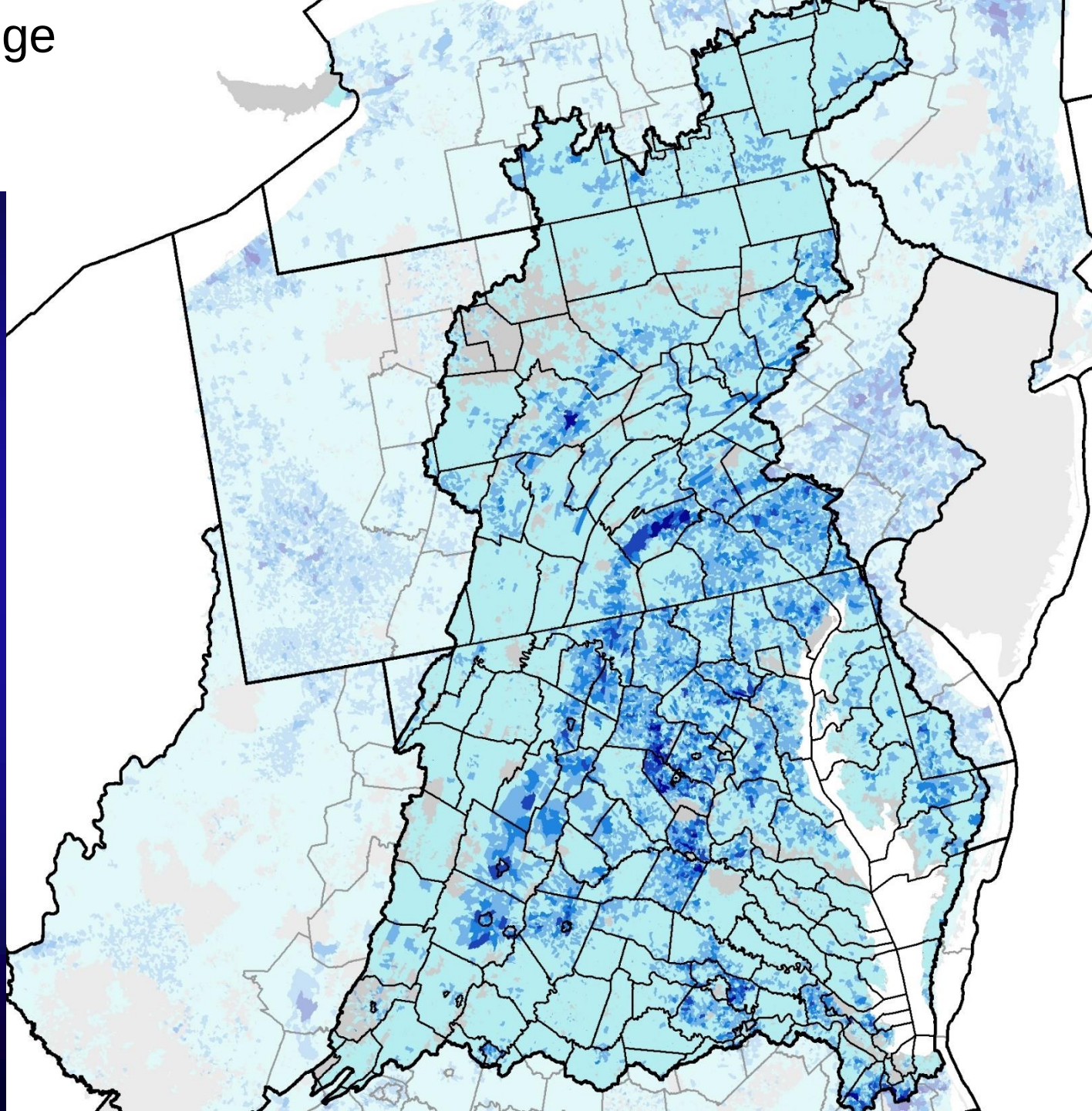
USGS

Chesapeake Bay Land Change Model
"Historic Trends" Scenario

- Incorporates national data from PADUS, NAVTEQ, US Census Bureau, Bureau of Labor Statistics, Bureau of Economic Analysis, Multi-Resolution Land Characteristics Consortium.
- Incorporates local data (parcels, land use, and zoning).
- Incorporates CBP's high-res developed land uses and protected lands.
- Simulates infill/redevelopment by county.
- Simulates residential and commercial development in five year increments at 30m resolution with parameterization at the state and county levels.
- Results summarized by NHDv1, NHDv2, HUC12, Municipalities/Tracts, and Phase 6 model units.

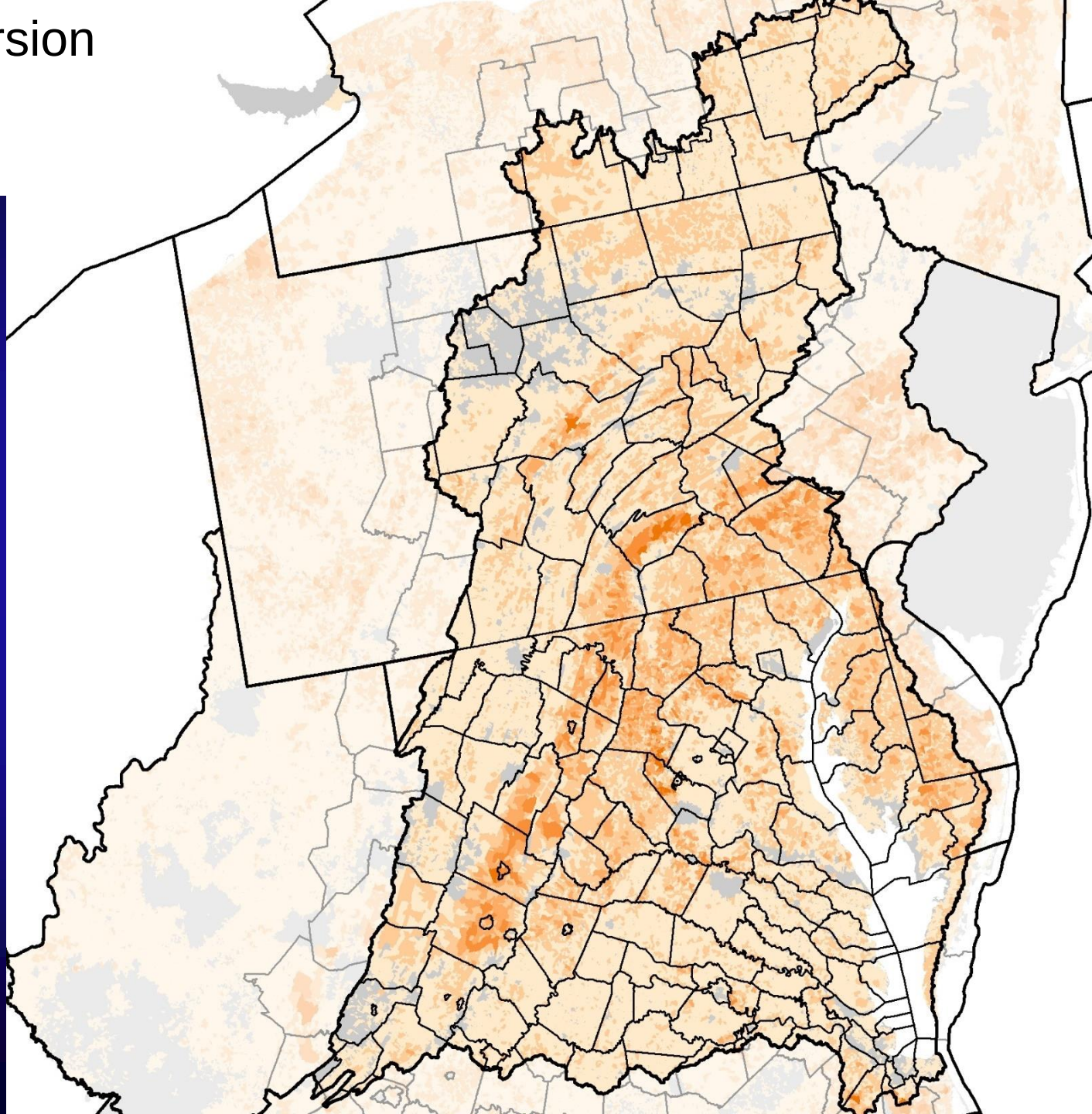
USGS

Impervious Change 2013 – 2025 (NHDv2)



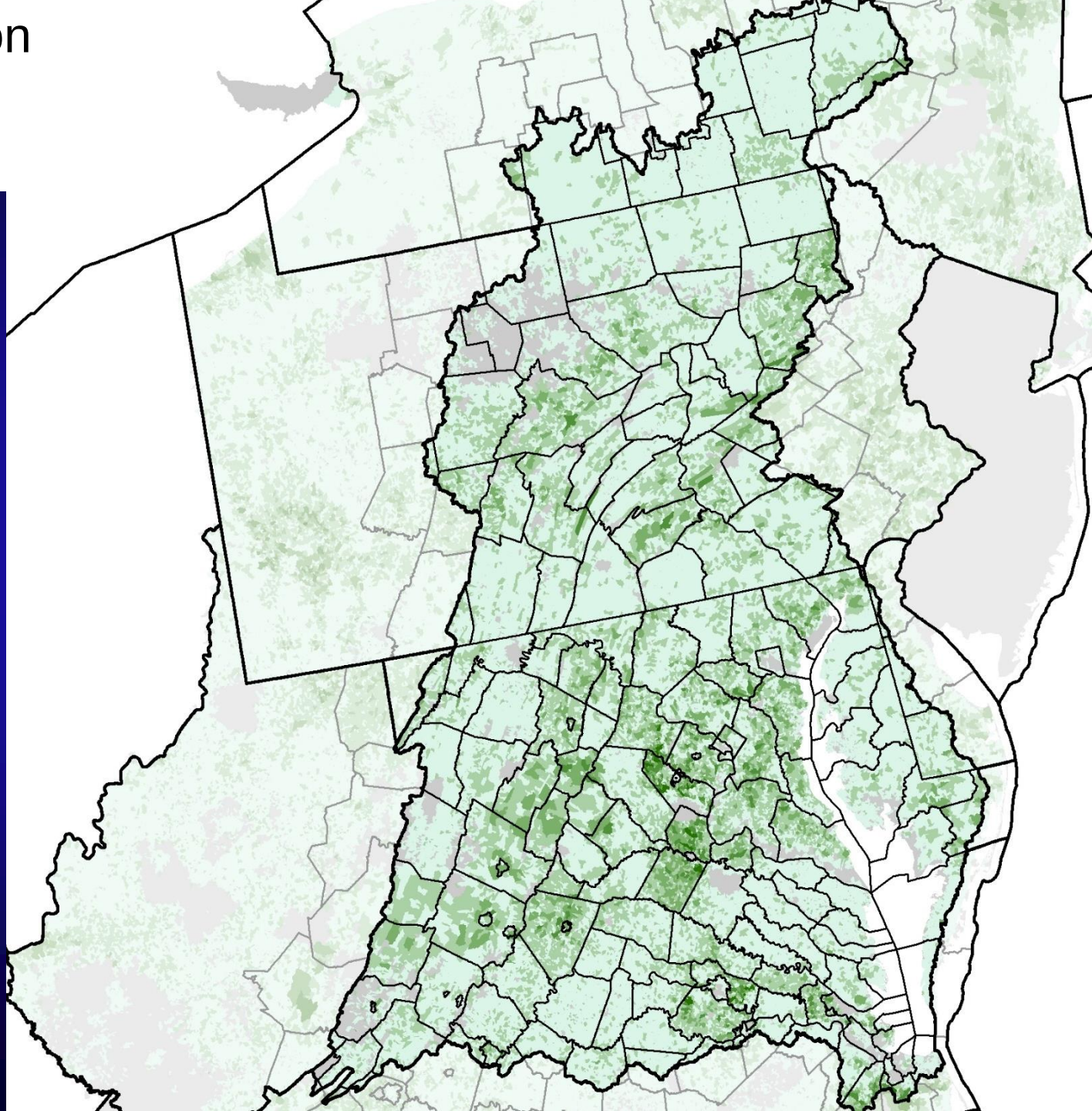
USGS

Farmland Conversion 2013 – 2025 (NHDv2)



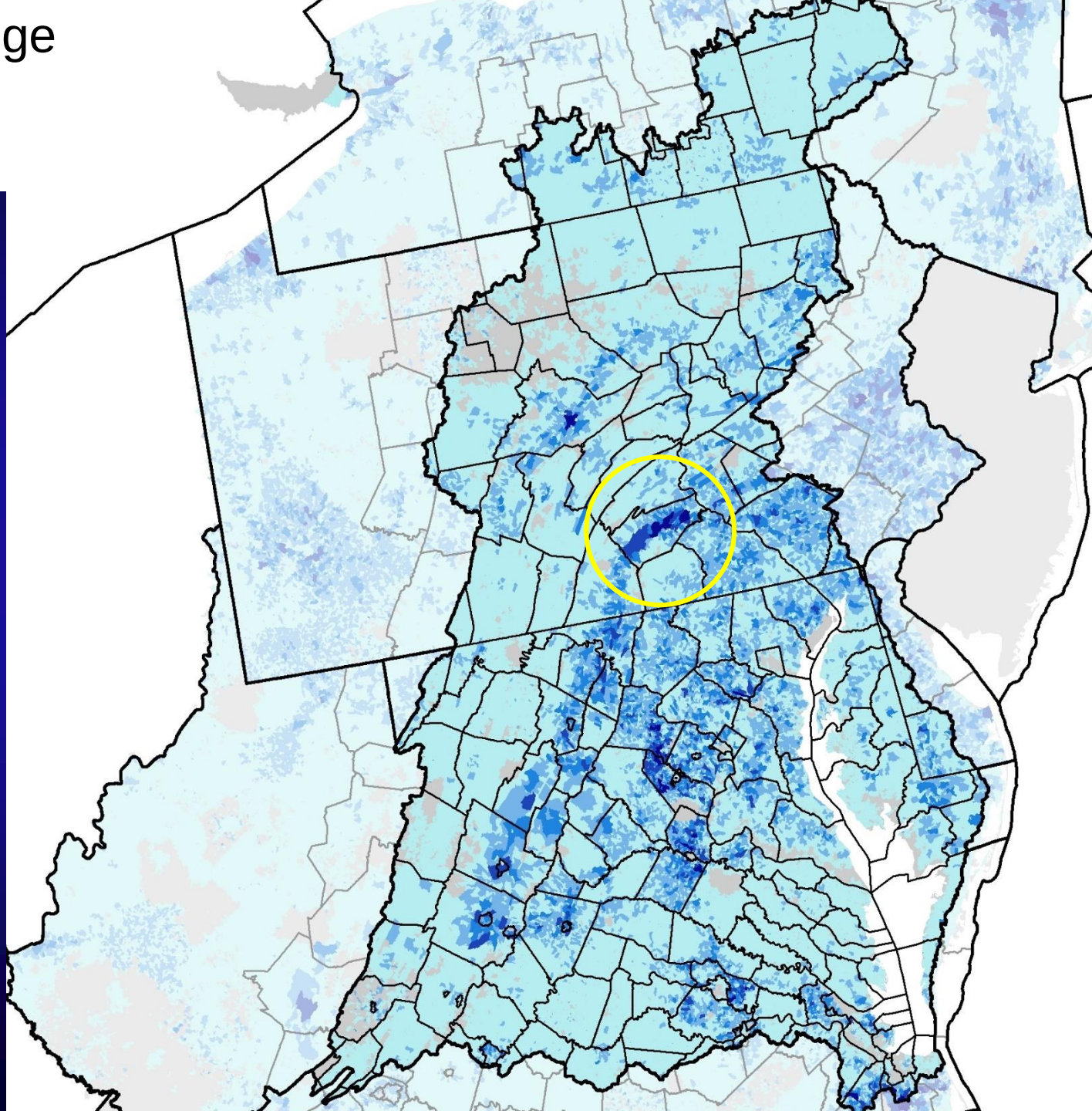
USGS

Forest Conversion 2013 – 2025 (NHDv2)



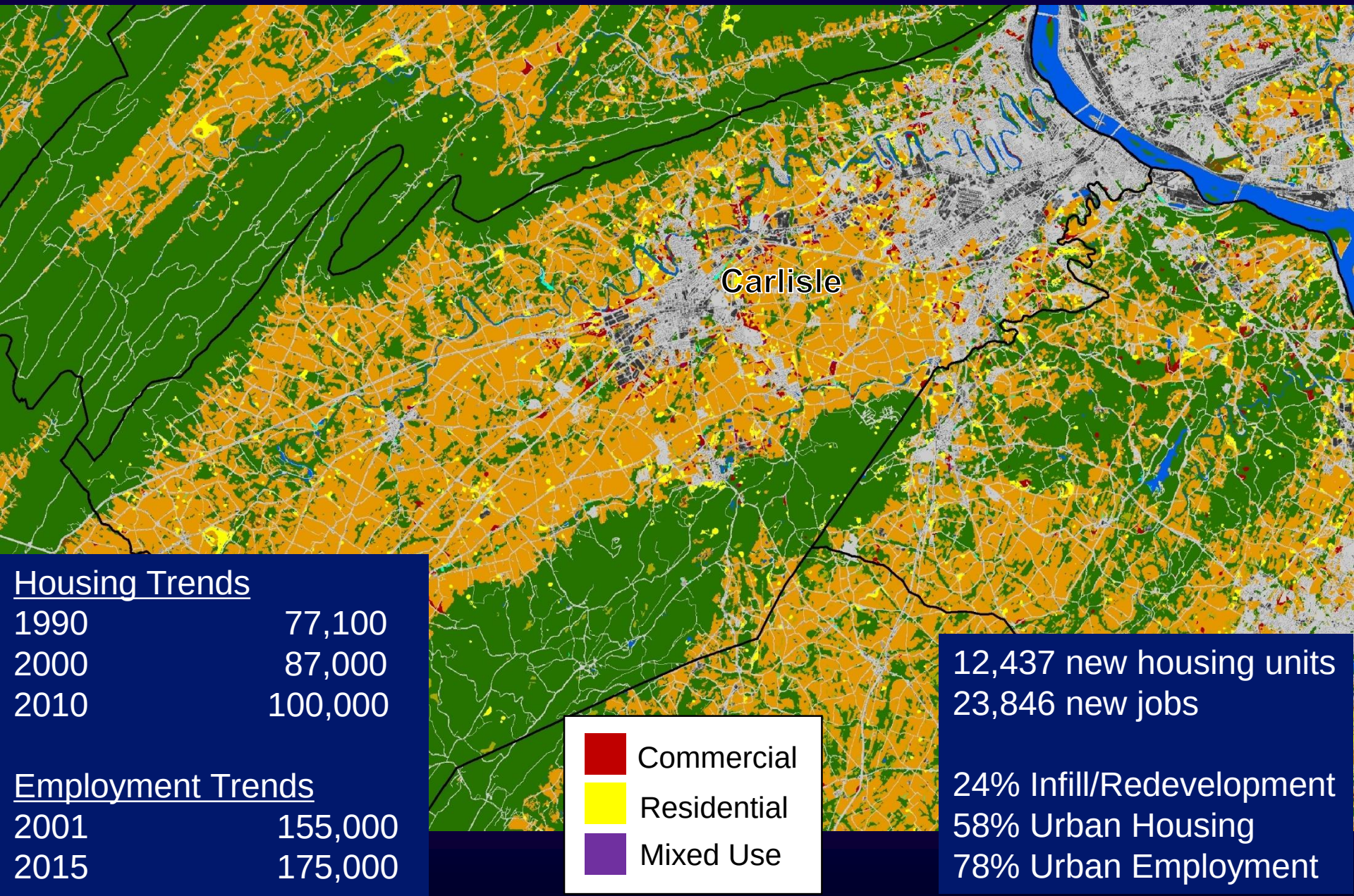
USGS

Impervious Change 2013 – 2025 (NHDv2)



USGS

Cumberland County, PA (2013 – 2025)



Housing Trends

1990	77,100
2000	87,000
2010	100,000

Employment Trends

2001	155,000
2015	175,000

12,437 new housing units
23,846 new jobs

24% Infill/Redevelopment
58% Urban Housing
78% Urban Employment


Montgomery
Prince George's
District of Columbia
Arlington
Falls Church
Fairfax
Alexandria

“Historic Trends” Scenario Results
District of Columbia 2013 - 2025

Demand:

84,060 new housing units

130,379 new jobs

Impact:

388 acres of greenfield development:

206 acres impervious

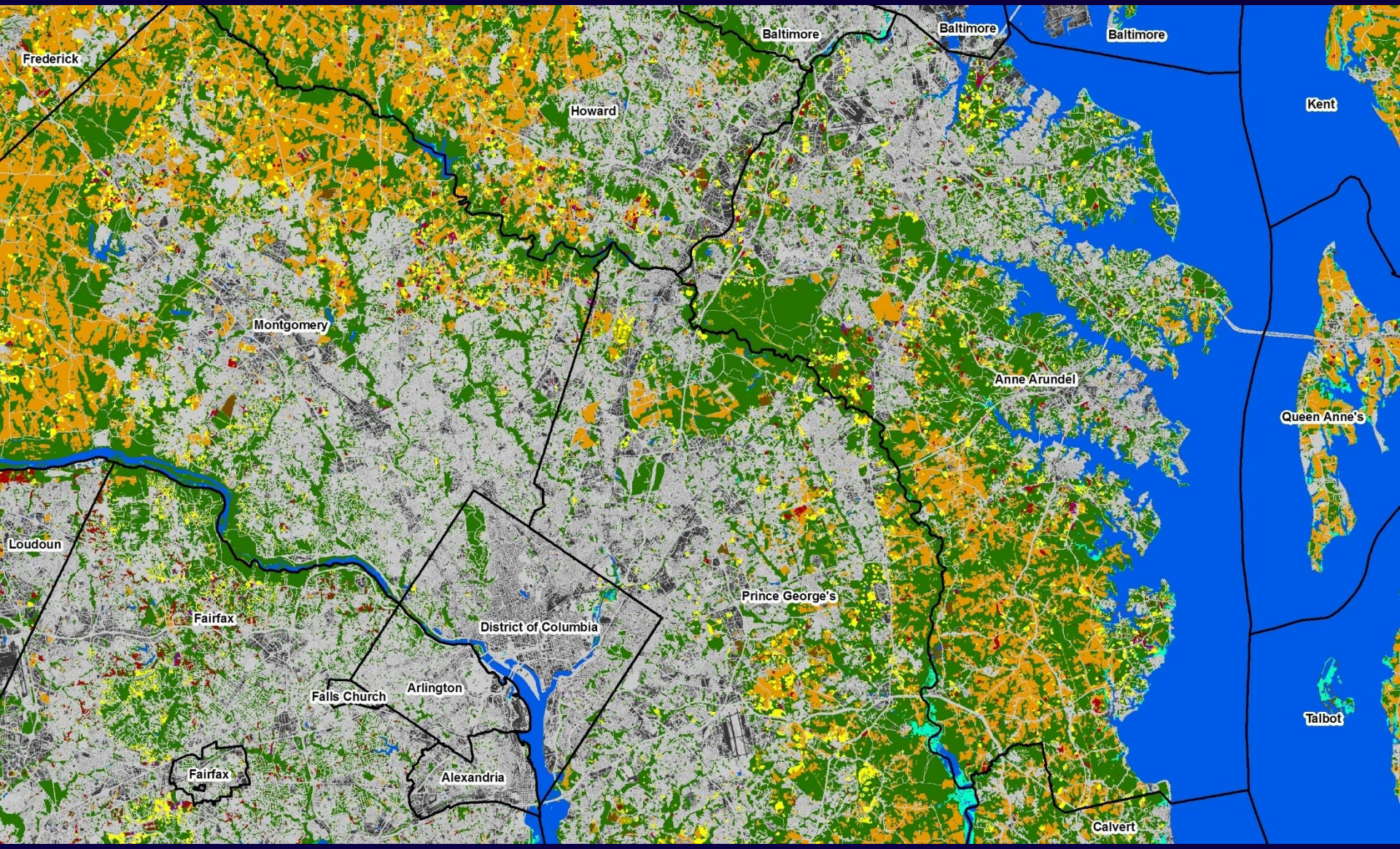
52 acres turf grass

0 acres mixed open

131 acres forest

100% change in pop on sewer

USGS


Frederick
Baltimore
Baltimore
Baltimore
Howard
Kent
Montgomery
Anne Arundel
Queen Anne's
Loudoun
Prince George's
Fairfax
District of Columbia
Arlington
Falls Church
Talbot
Fairfax
Alexandria
Calvert

USGS

“Historic Trends” Scenario Results
Maryland 2013 - 2025

Demand:

248,547 new housing units

413,789 new jobs

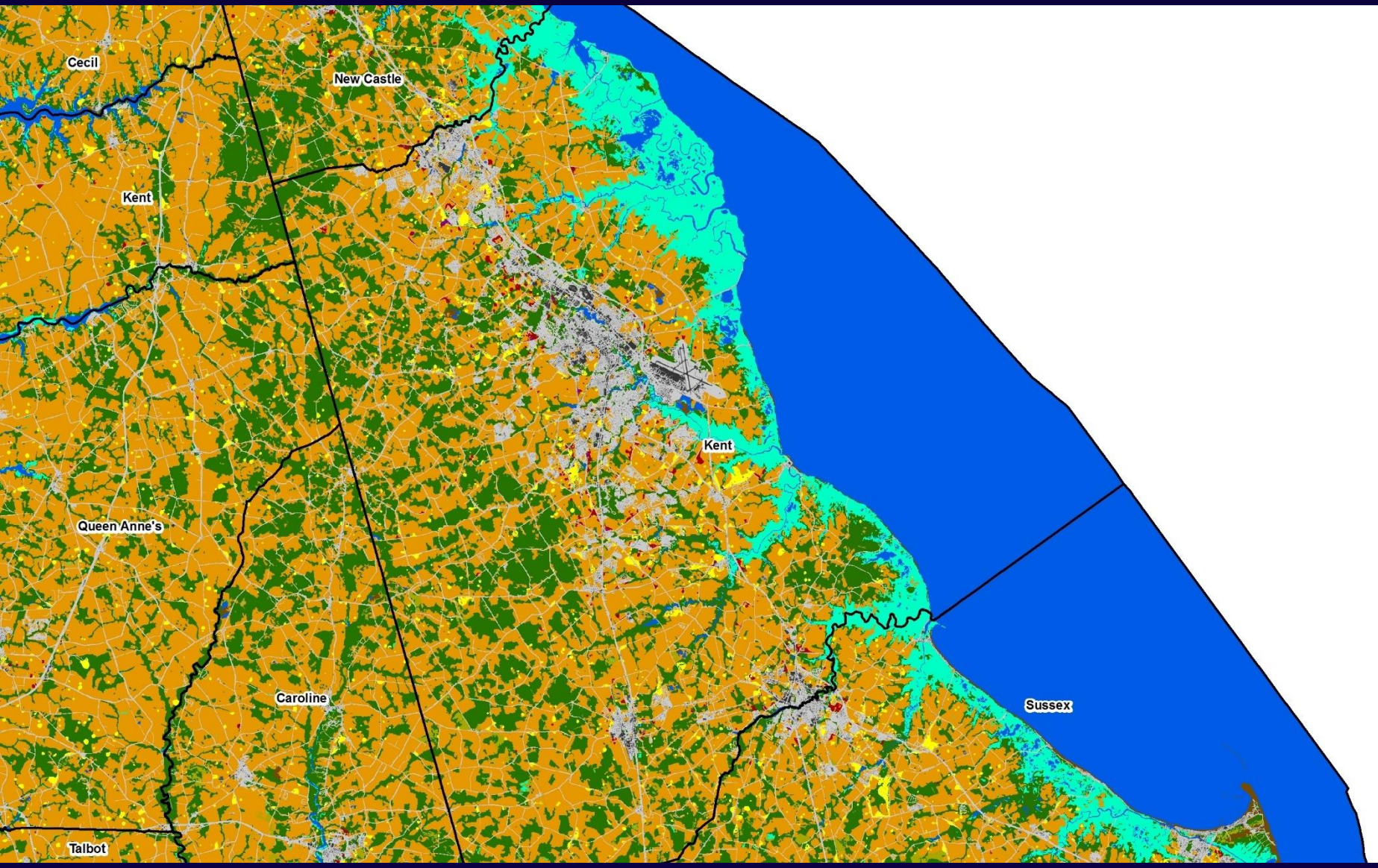
Impact:

161,135 acres of greenfield development:

- 40,380 acres impervious
- 96,180 acres turf grass
- 744 acres mixed open
- 23,831 acres forest

66% change in pop on sewer

USGS


Cecil
New Castle
Kent
Kent
Queen Anne's
Caroline
Talbot
Sussex

USGS

“Historic Trends” Scenario Results
Delaware 2013 - 2025

Demand:

55,339 new housing units

49,133 new jobs

Impact:

41,709 acres of greenfield development:

10,309 acres impervious

27,771 acres turf grass

163 acres mixed open

3,466 acres forest

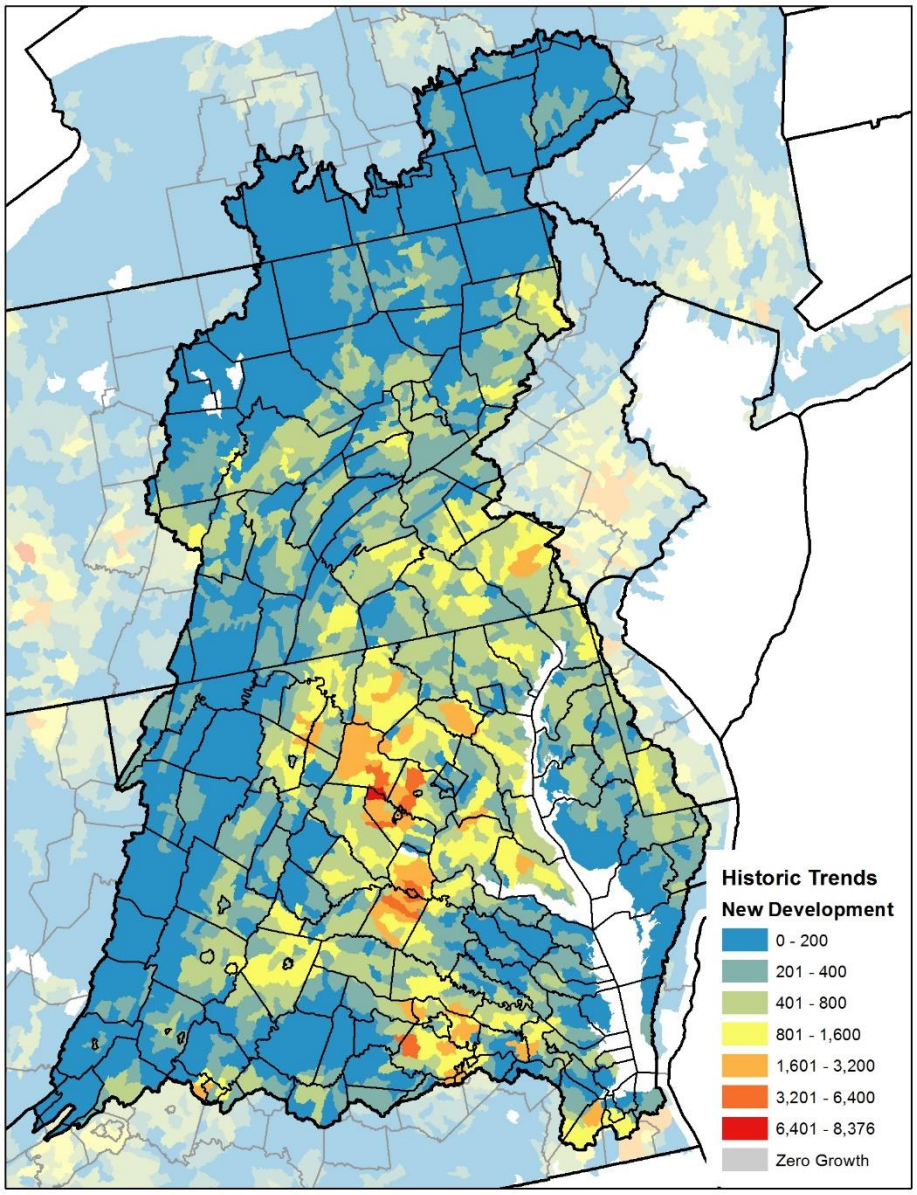
67% change in pop on sewer

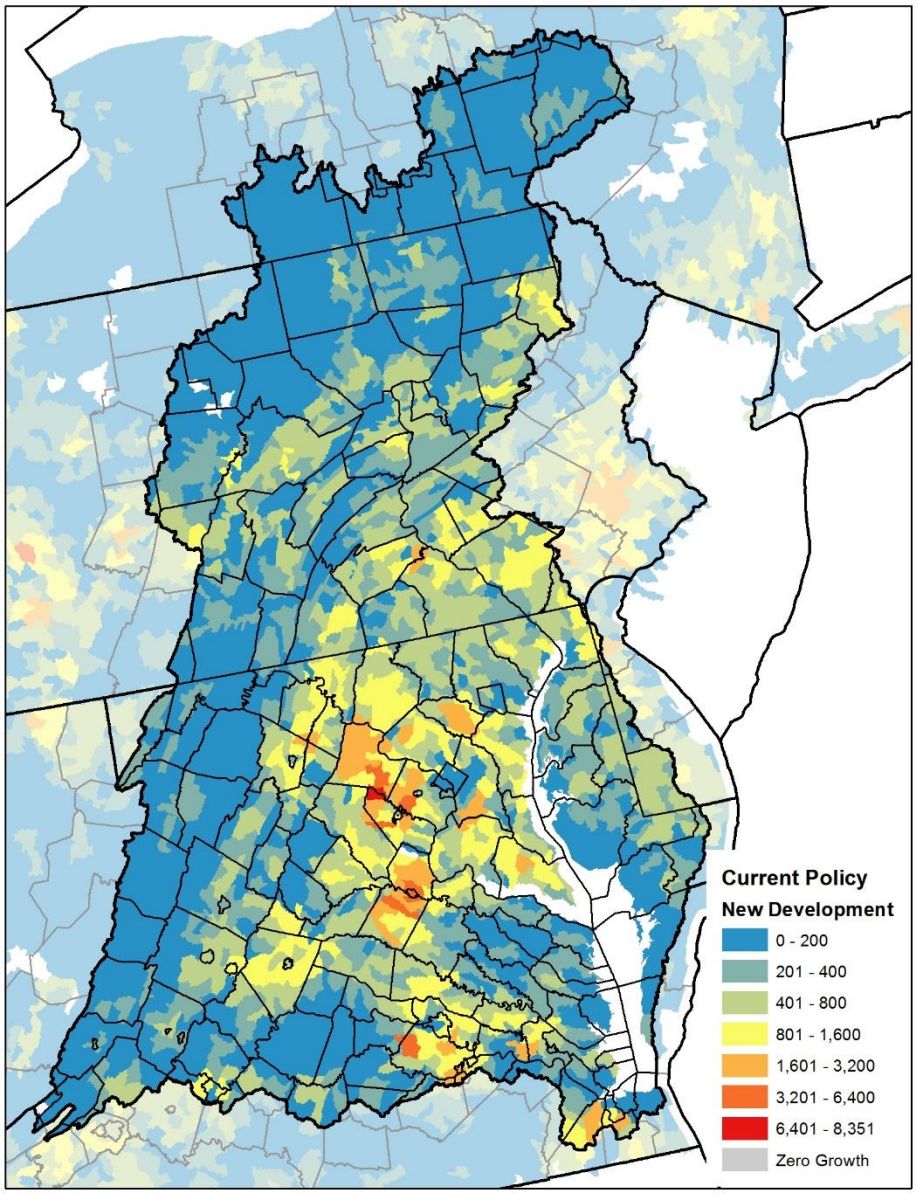
USGS

Chesapeake Bay Land Change Model
"Current Policy" Scenario

- Incorporates local zoning:
  - Conservation / Highly-restricted growth
  - Residential
  - Commercial
  - Mixed

USGS


Historic Trends
New Development
0 - 200
201 - 400
401 - 800
801 - 1,600
1,601 - 3,200
3,201 - 6,400
6,401 - 8,376
Zero Growth


Current Policy
New Development
0 - 200
201 - 400
401 - 800
801 - 1,600
1,601 - 3,200
3,201 - 6,400
6,401 - 8,351
Zero Growth

USGS

DC	IMP_13	PERV_13	NAT_13	AG_13	MIX_13	IMP_01_13	PERV_01_13	NAT_01_13	AG_01_13	MIX_01_13	IMP_13_25	PERV_13_25	NAT_13_25	AG_13_25	MIX_13_25
CSO	9,162	2,873	227	0	346	1,254	420	-458	0	-1,215	1	0	-1	0	0
MS4	9,653	7,036	1,764	0	627	338	257	-438	0	-157	66	26	-91	0	-1
NonREG	2,098	1,676	3,361	0	893	83	61	-107	0	-38	53	30	-83	0	0
DC Total	20,912	11,586	5,353	0	1,865	1,675	737	-1,003	0	-1,409	120	56	-175	0	-1
DE	IMP_13	PERV_13	NAT_13	AG_13	MIX_13	IMP_01_13	PERV_01_13	NAT_01_13	AG_01_13	MIX_01_13	IMP_13_25	PERV_13_25	NAT_13_25	AG_13_25	MIX_13_25
CSO	80	59	1	0	17	1	1	0	0	-2	0	0	0	0	0
MS4	1,522	4,782	10,729	10,102	2,227	414	1,249	-91	-1,136	-436	306	1,279	-342	-1,035	-207
NonREG	100,366	178,857	416,671	382,338	68,560	17,230	34,203	-9,451	-33,843	-8,139	6,282	22,735	-7,128	-19,169	-2,717
DE Total	101,968	183,698	427,401	392,440	70,804	17,646	35,453	-9,543	-34,979	-8,577	6,588	24,013	-7,470	-20,204	-2,924
MD	IMP_13	PERV_13	NAT_13	AG_13	MIX_13	IMP_01_13	PERV_01_13	NAT_01_13	AG_01_13	MIX_01_13	IMP_13_25	PERV_13_25	NAT_13_25	AG_13_25	MIX_13_25
CSO	4,012	4,365	2,201	0	949	128	144	-104	0	-168	34	87	-67	0	-54
MD_SHA	27,023	16,679	15,570	1,671	5,064	2,786	1,793	-2,519	-680	-1,380	112	260	-277	-38	-57
MD_STATE	7,629	10,081	52,481	2,398	7,568	881	1,289	-1,357	-117	-696	287	676	-697	-103	-163
MS4	323,486	659,338	1,136,083	682,243	126,883	35,656	80,280	-43,262	-53,965	-18,710	19,577	57,879	-38,106	-33,876	-5,467
NonREG	104,242	262,145	1,615,265	789,951	119,095	12,797	32,323	-19,319	-21,673	-4,129	7,843	25,655	-13,787	-18,347	-1,361
MD Total	466,392	952,608	2,821,601	1,476,263	259,559	52,248	115,829	-66,561	-76,434	-25,082	27,853	84,558	-52,934	-52,365	-7,103
NY	IMP_13	PERV_13	NAT_13	AG_13	MIX_13	IMP_01_13	PERV_01_13	NAT_01_13	AG_01_13	MIX_01_13	IMP_13_25	PERV_13_25	NAT_13_25	AG_13_25	MIX_13_25
CSO	5,546	5,007	1,401	0	738	16	11	-24	0	-2	15	28	-37	0	-6
MS4	13,576	17,722	18,353	4,589	1,673	342	461	-439	-257	-107	159	333	-407	-64	-21
NonREG	304,807	559,457	6,333,429	2,853,861	219,694	19,768	37,369	-18,748	-34,680	-3,709	10,090	29,909	-16,561	-22,086	-1,347
NY Total	323,929	582,187	6,353,182	2,858,450	222,105	20,125	37,841	-19,212	-34,937	-3,818	10,264	30,270	-17,005	-22,150	-1,375
PA	IMP_13	PERV_13	NAT_13	AG_13	MIX_13	IMP_01_13	PERV_01_13	NAT_01_13	AG_01_13	MIX_01_13	IMP_13_25	PERV_13_25	NAT_13_25	AG_13_25	MIX_13_25
CSO	47,216	38,706	19,415	0	7,508	815	671	-667	0	-819	348	733	-867	0	-214
MS4	208,735	346,783	227,669	131,935	53,675	24,578	43,984	-14,007	-38,616	-15,939	7,895	20,381	-12,238	-12,089	-3,947
NonREG	478,552	1,141,133	12,096,006	4,060,074	674,726	37,397	91,577	-46,296	-73,480	-9,198	38,948	115,728	-58,023	-88,266	-8,376
PA Total	734,504	1,526,622	12,343,091	4,192,009	735,909	62,789	136,232	-60,969	-112,096	-25,956	47,191	136,843	-71,128	-100,355	-12,537
VA	IMP_13	PERV_13	NAT_13	AG_13	MIX_13	IMP_01_13	PERV_01_13	NAT_01_13	AG_01_13	MIX_01_13	IMP_13_25	PERV_13_25	NAT_13_25	AG_13_25	MIX_13_25
CSO	9,856	6,600	1,655	0	801	865	591	-795	0	-661	43	68	-109	0	-3
MS4	286,637	332,383	150,393	16,402	54,653	37,294	46,300	-49,903	-10,172	-23,519	6,204	11,820	-14,070	-1,627	-2,324
NonREG	506,482	1,140,107	11,450,296	2,776,418	311,372	87,568	198,993	-173,412	-88,833	-24,316	68,921	177,281	-142,355	-91,385	-12,441
VA Total	802,976	1,479,090	11,602,344	2,792,821	366,827	125,727	245,883	-224,109	-99,005	-48,495	75,168	189,169	-156,534	-93,012	-14,768
WV	IMP_13	PERV_13	NAT_13	AG_13	MIX_13	IMP_01_13	PERV_01_13	NAT_01_13	AG_01_13	MIX_01_13	IMP_13_25	PERV_13_25	NAT_13_25	AG_13_25	MIX_13_25
CSO	1,810	2,418	794	0	380	141	201	-102	0	-240	7	12	-12	0	-7
MS4	10,922	34,744	106,535	44,011	5,222	3,355	10,540	-3,163	-9,552	-1,180	1,810	5,166	-2,935	-3,807	-234
NonREG	77,400	188,113	3,953,273	647,139	80,482	8,416	21,710	-14,359	-13,649	-2,118	4,495	13,533	-7,371	-9,827	-828
WV Total	90,132	225,275	4,060,601	691,149	86,084	11,912	32,451	-17,624	-23,201	-3,538	6,311	18,711	-10,318	-13,635	-1,069

Questions

- What are jurisdictions'/at-large members concerns and positions?
- If a 2025 forecasted condition option is selected, which scenario is preferred? "Historic Trends" or "Current Policy"?
- Will choosing one option over another allow for "crediting for conservation"?
- Does EPA have a preference we should communicate at the September 25-26 WQGIT meeting?

USGS