2025 Base Projections and Review Process

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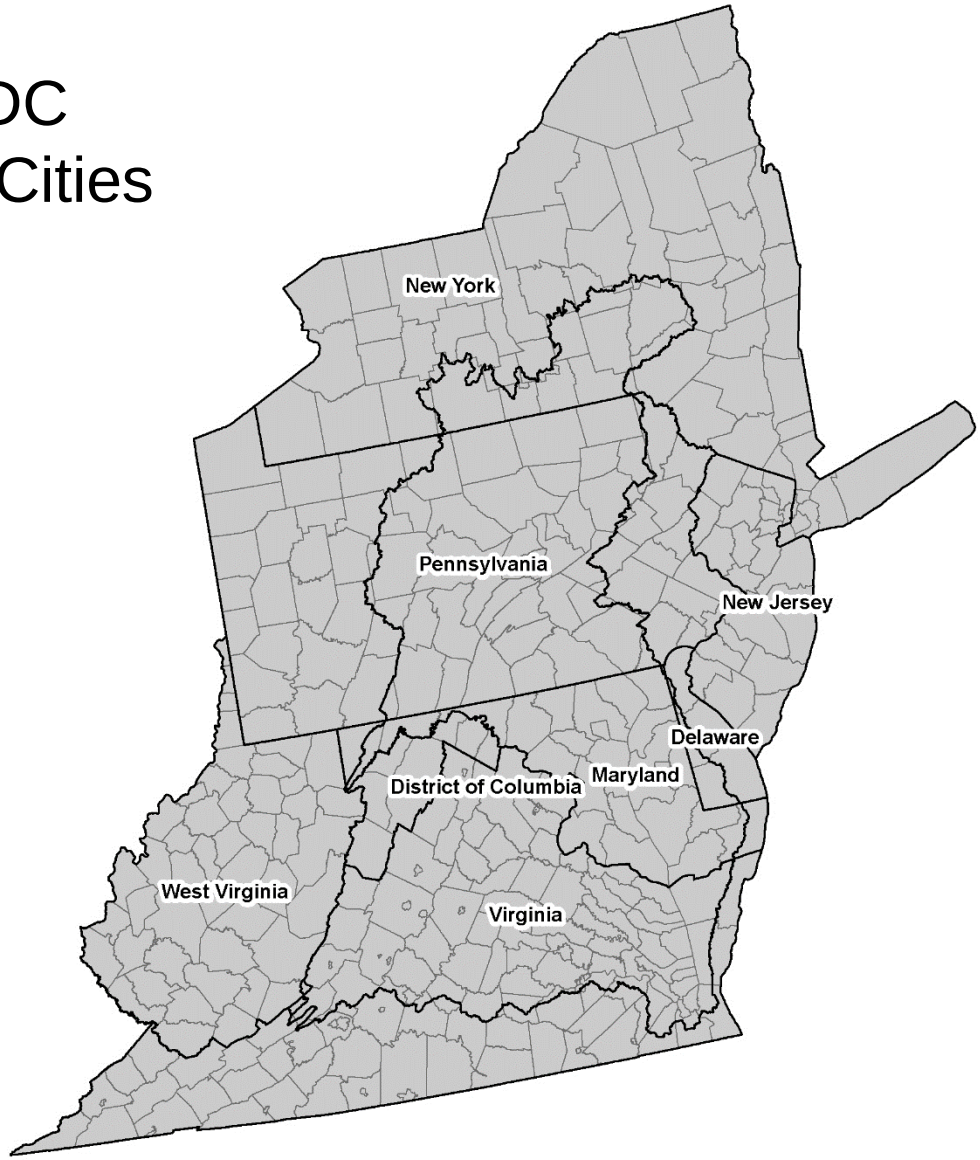
U.S. Geological Survey

Land Use Workgroup
April 5, 2017

Chesapeake Bay Future Land Use Scenario Domain

7 States and DC
367 Counties/Cities
191,300 mi^2



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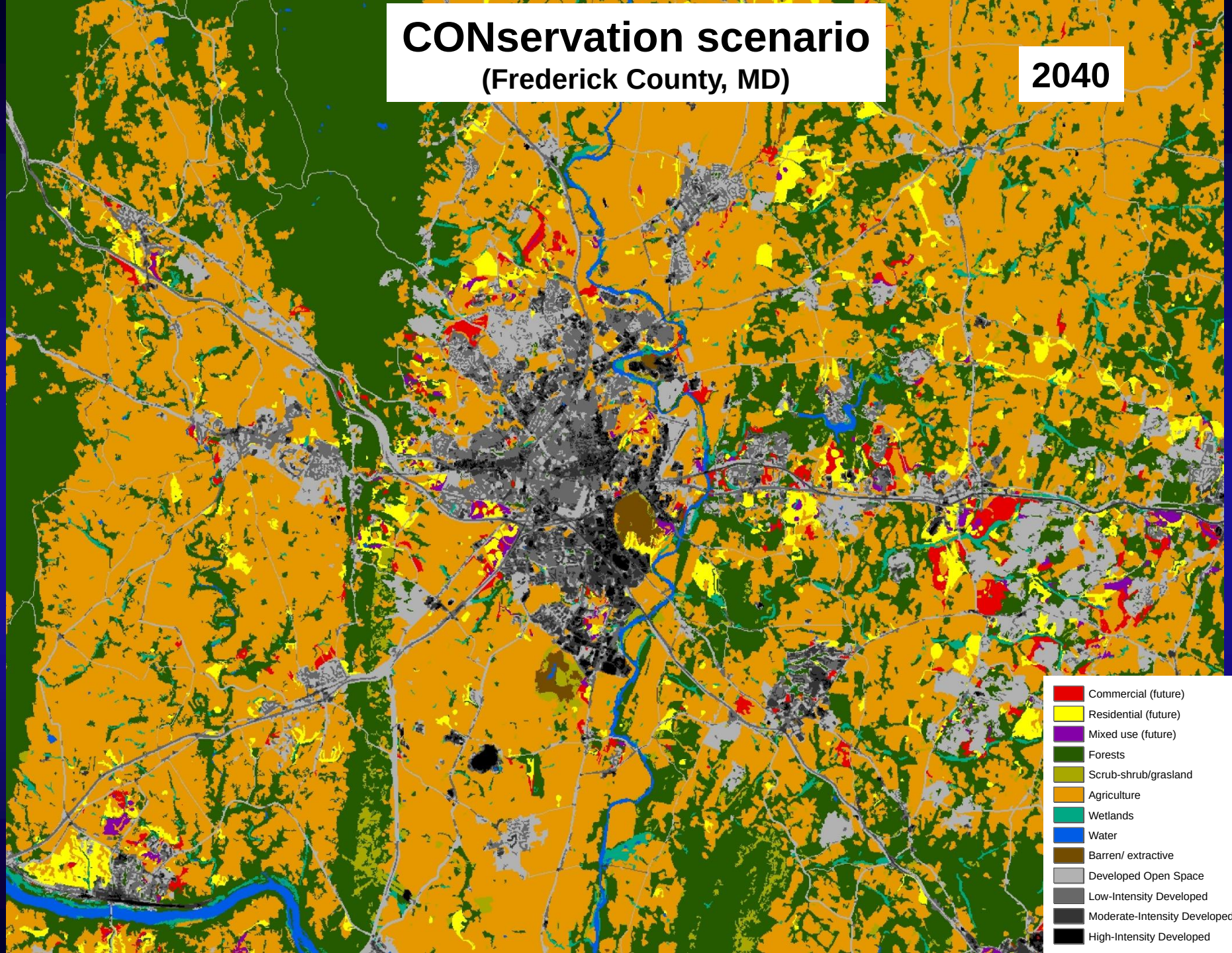
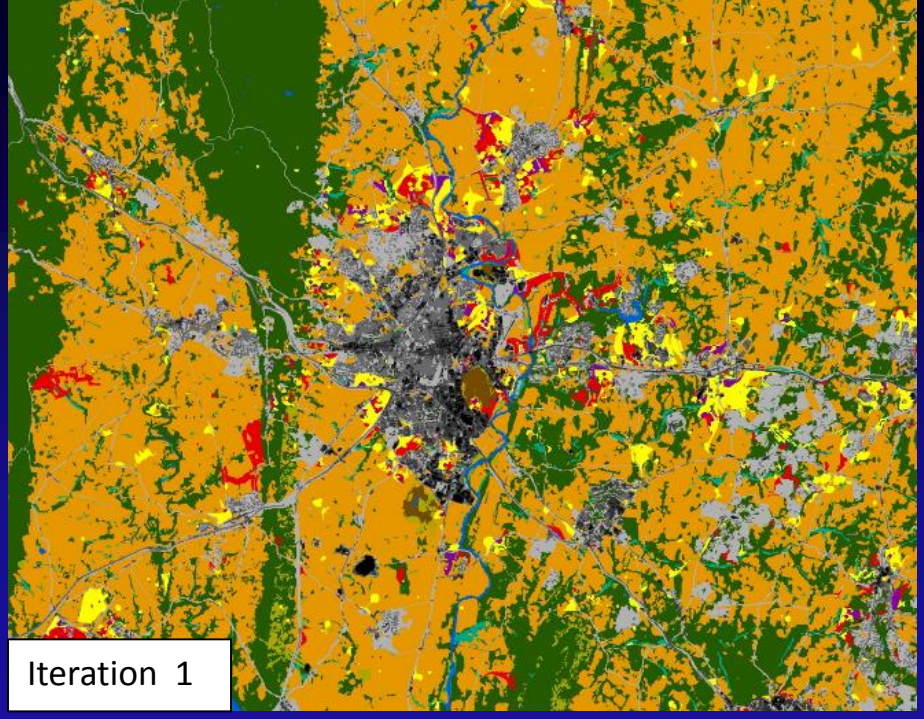
CONservation scenario

(Frederick County, MD)

2040

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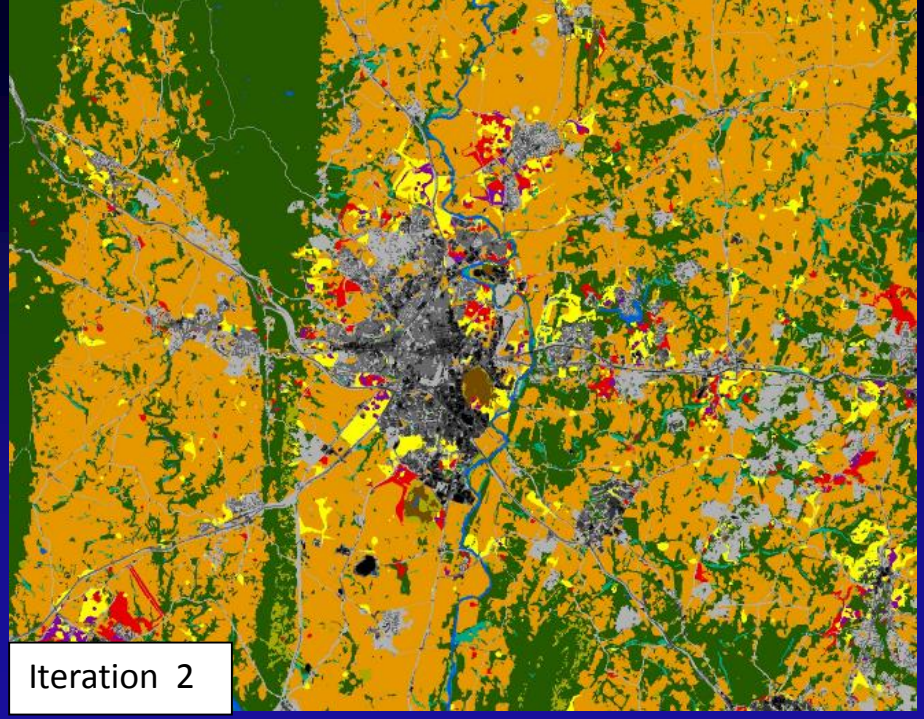
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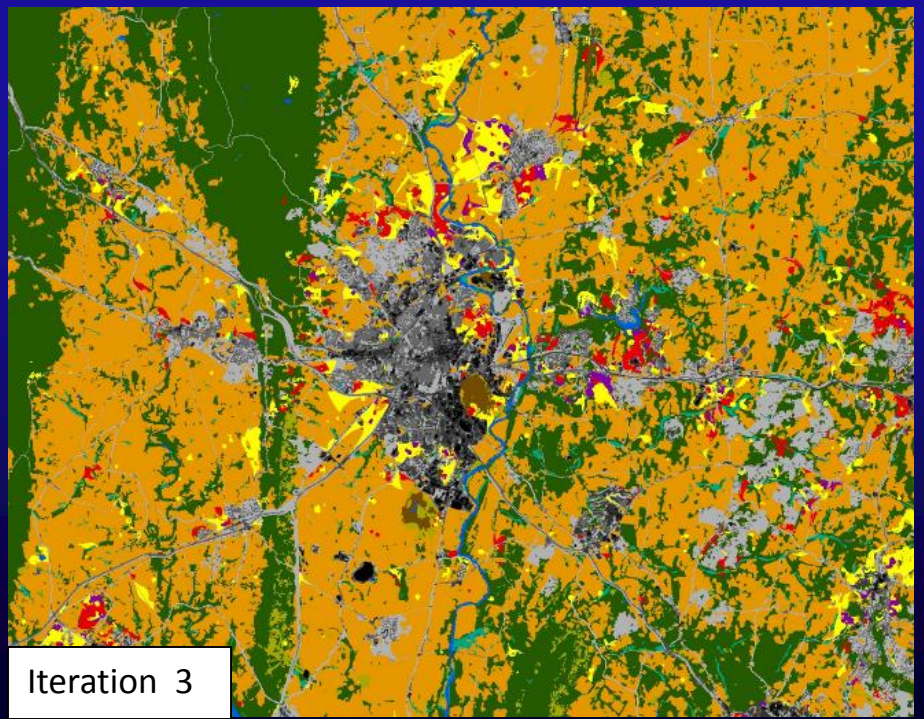
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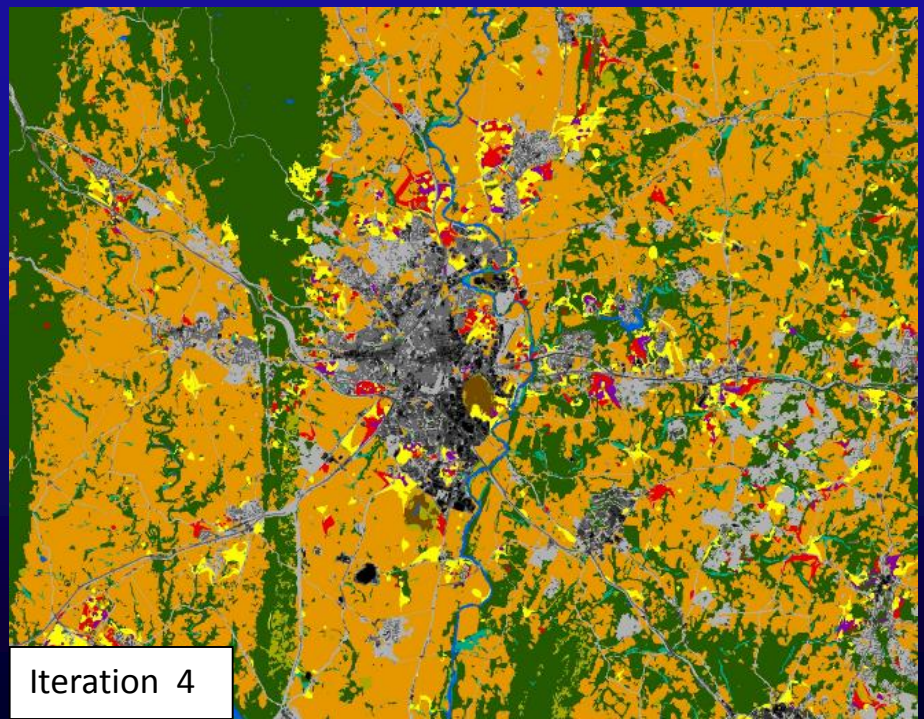
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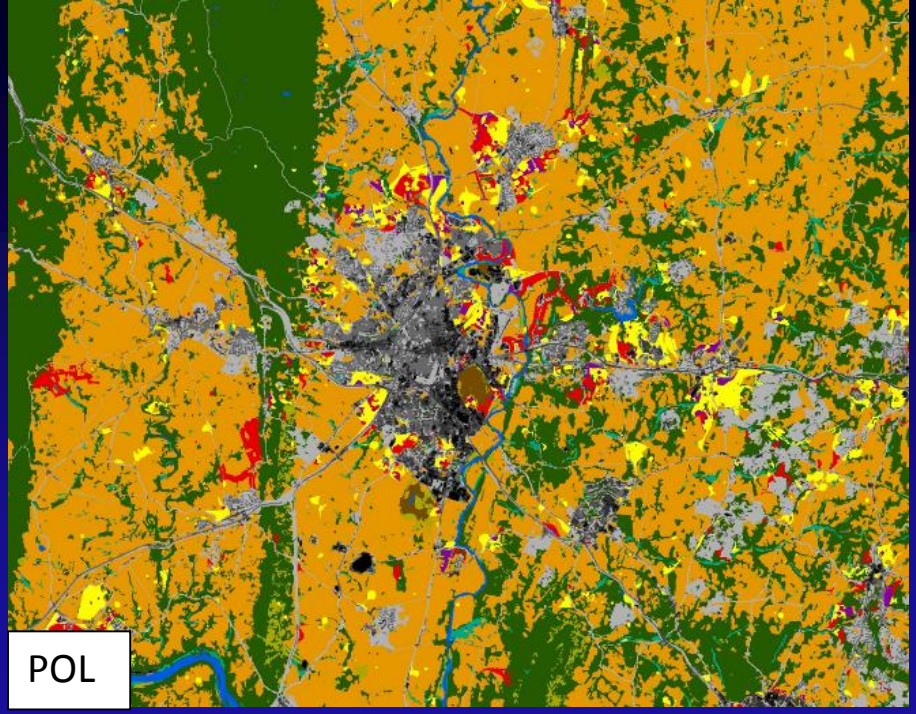
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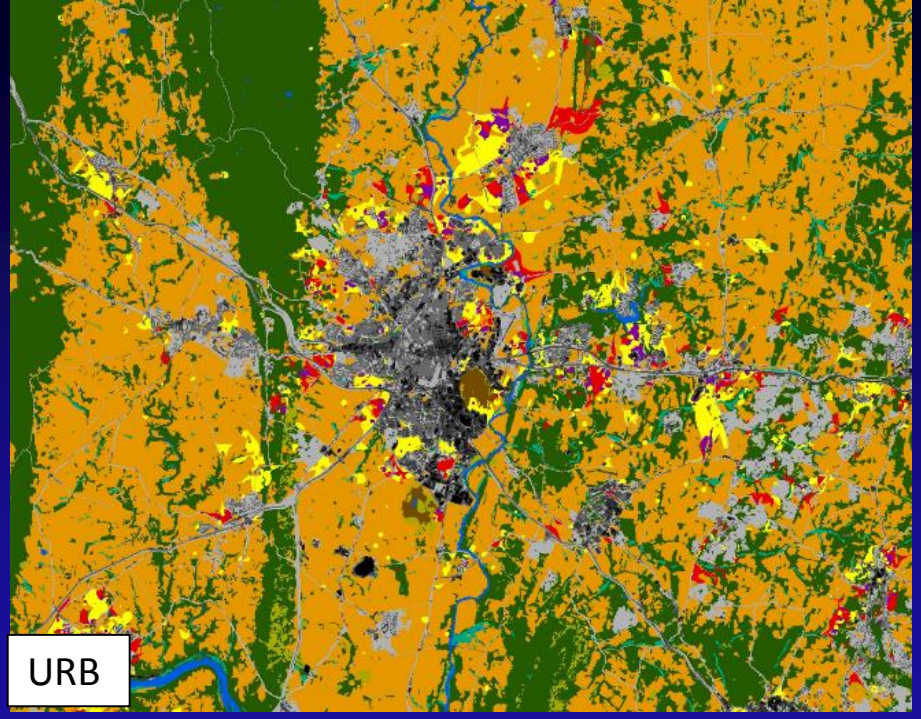
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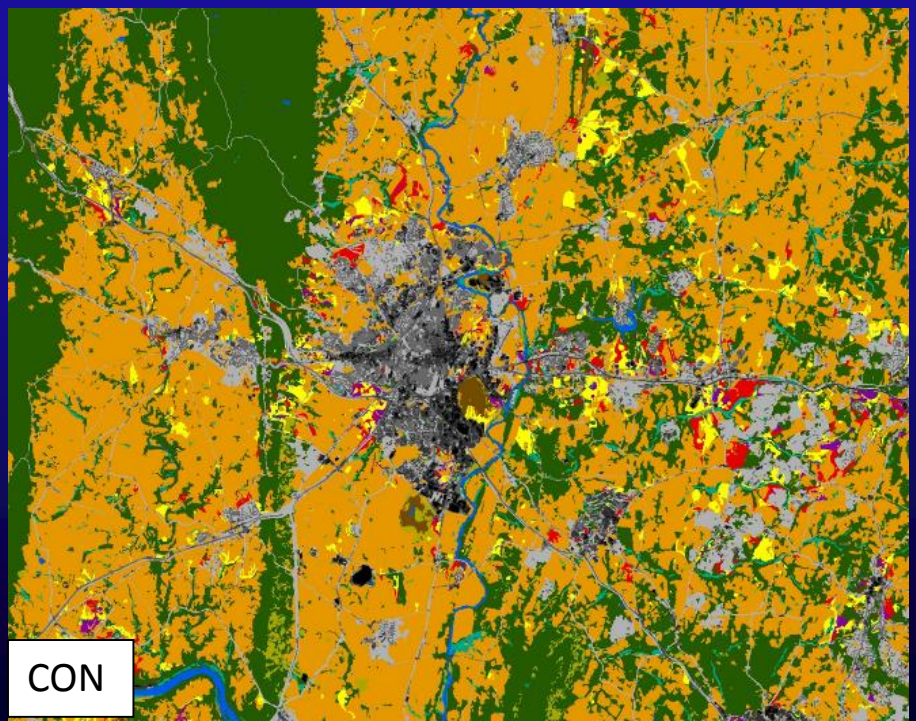
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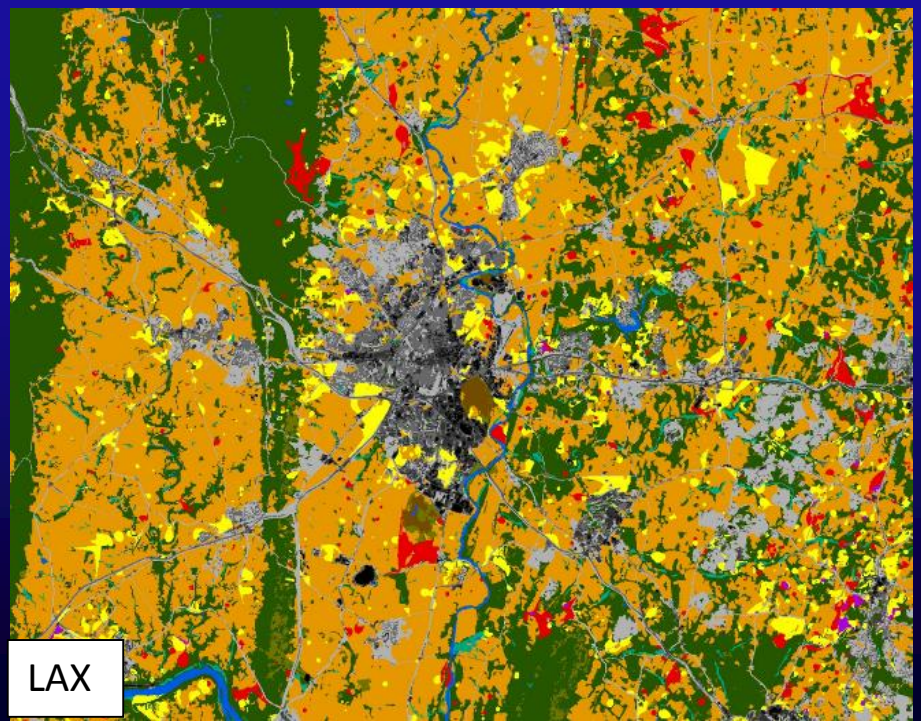
LAX

		Housing Change		Total Employment	
		2001-2010		2003 - 2010	
FIPS	County	Urban_%	Rural_%	Urban_%	Rural_%
24001	Allegany	37%	63%	85%	15%
24003	Anne Arundel	97%	3%	97%	3%
24005	Baltimore	94%	6%	98%	2%
24009	Calvert	58%	42%	66%	34%
24011	Caroline	42%	58%	57%	43%
24013	Carroll	79%	21%	79%	21%
24015	Cecil	63%	37%	82%	18%
24017	Charles	76%	24%	80%	20%
24019	Dorchester	52%	48%	74%	26%
24021	Frederick	81%	19%	85%	15%
24023	Garrett	2%	98%	49%	51%
24025	Harford	86%	14%	88%	12%
24027	Howard	91%	9%	96%	4%
24029	Kent	27%	73%	41%	59%
24031	Montgomery	97%	3%	98%	2%
24033	Prince George's	98%	2%	99%	1%
24035	Queen Anne's	41%	59%	63%	37%
24037	St. Mary's	57%	43%	70%	30%
24039	Somerset	62%	38%	76%	24%
24041	Talbot	62%	38%	84%	16%
24043	Washington	84%	16%	92%	8%
24045	Wicomico	84%	16%	91%	9%
24047	Worcester	88%	12%	83%	17%
24510	Baltimore City	100%	0%	100%	0%

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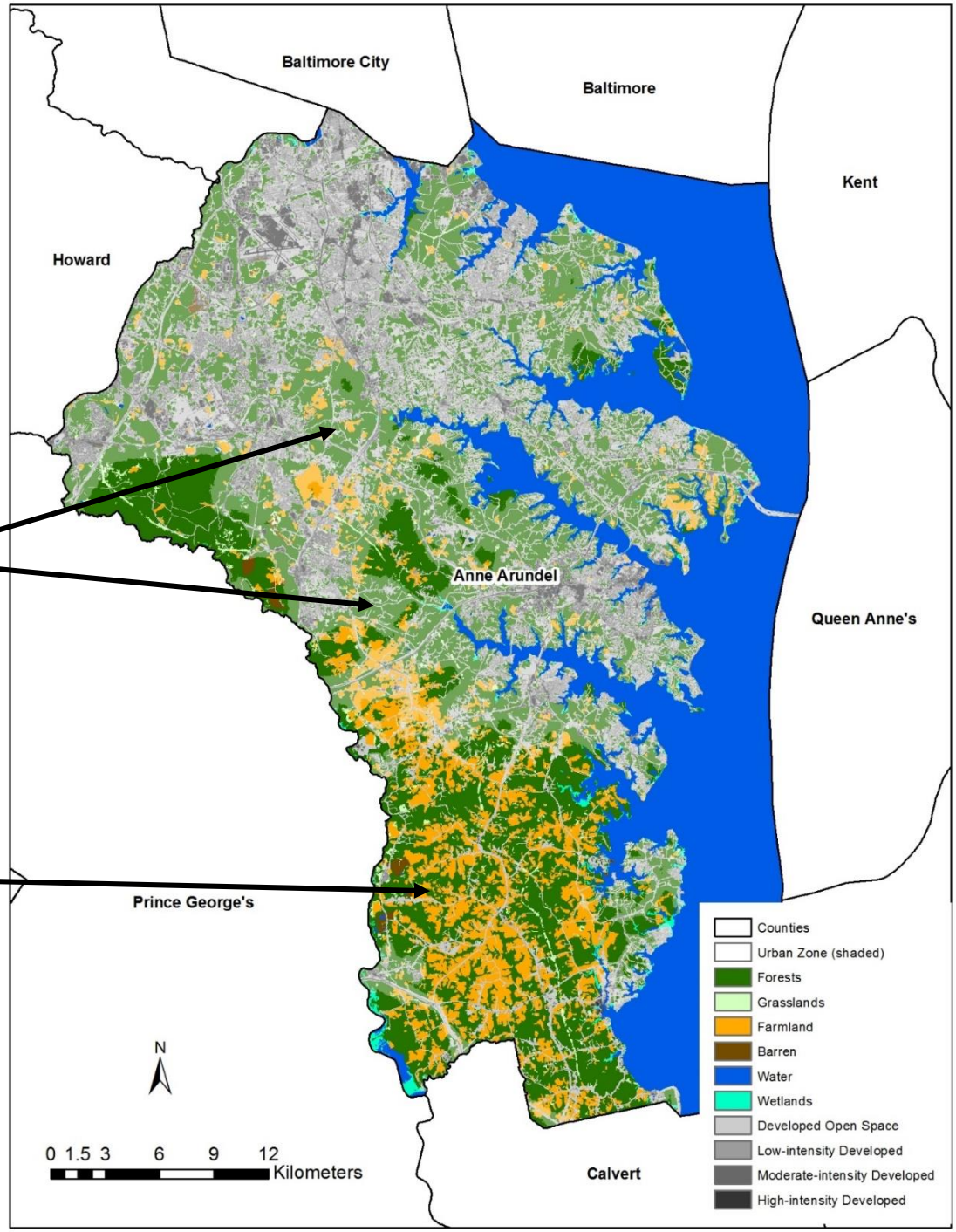
Why development may disproportionately impact forests:

Unprotected forests within the urban zone with high demand for land and probability of development

Agriculture dominant in rural zone but demand for land is relatively low



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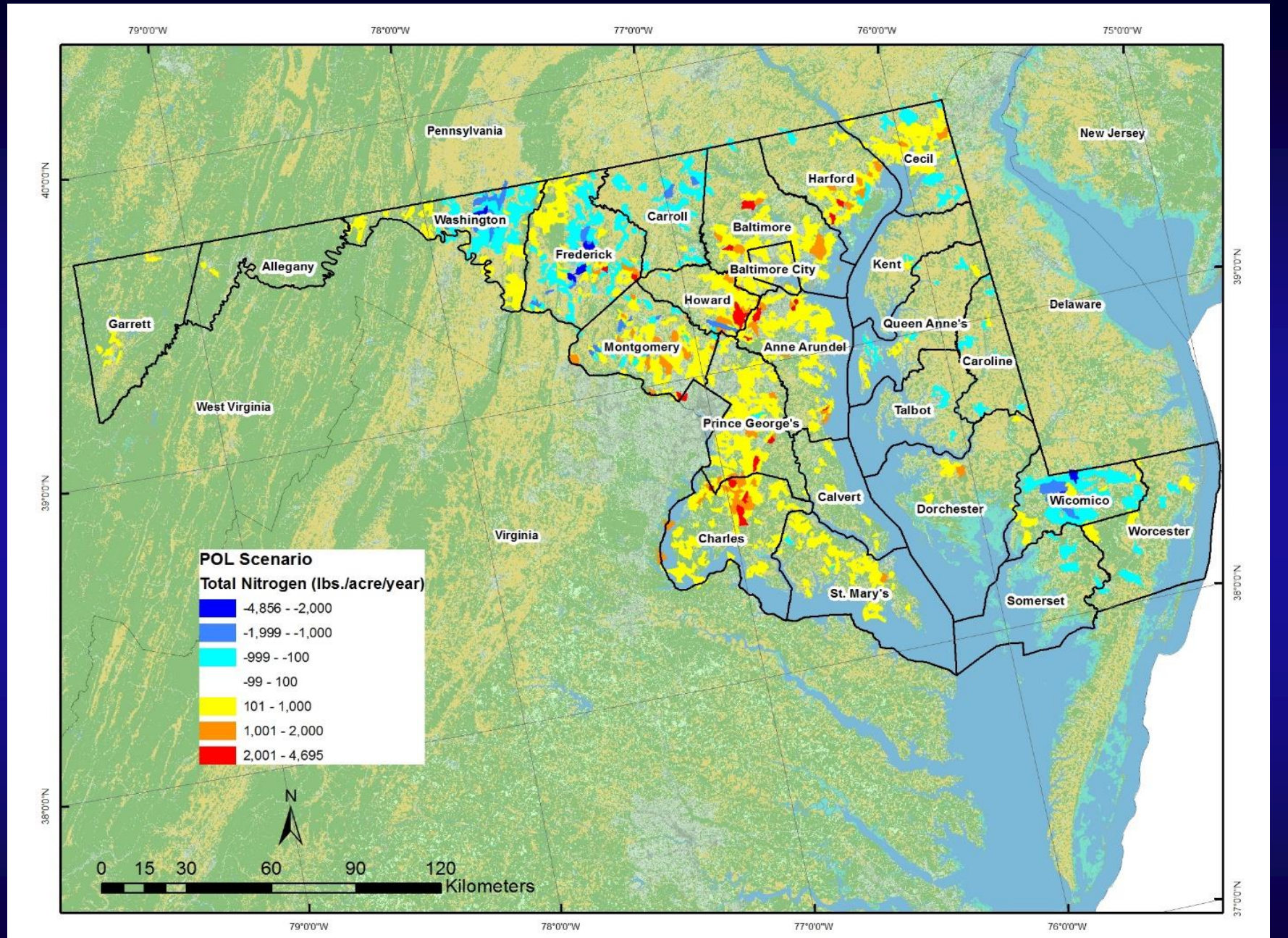
79°0'0"W
78°0'0"W
77°0'0"W
76°0'0"W
75°0'0"W
40°0'0"N
39°0'0"N
38°0'0"N
37°0'0"N
Pennsylvania
New Jersey
Cecil
Harford
Washington
Carroll
Baltimore
Frederick
Baltimore City
Kent
Allegany
Howard
Delaware
Garrett
Queen Anne's
Montgomery
Anne Arundel
Caroline
West Virginia
Talbot
Prince George's
Calvert
Wicomico
Dorchester
Virginia
Charles
Worcester
St. Mary's
Somerset
POL Scenario
Total Nitrogen (lbs./acre/year)
-4,856 - -2,000
-1,999 - -1,000
-999 - -100
-99 - 100
101 - 1,000
1,001 - 2,000
2,001 - 4,695
N
0 15 30 60 90 120
Kilometers

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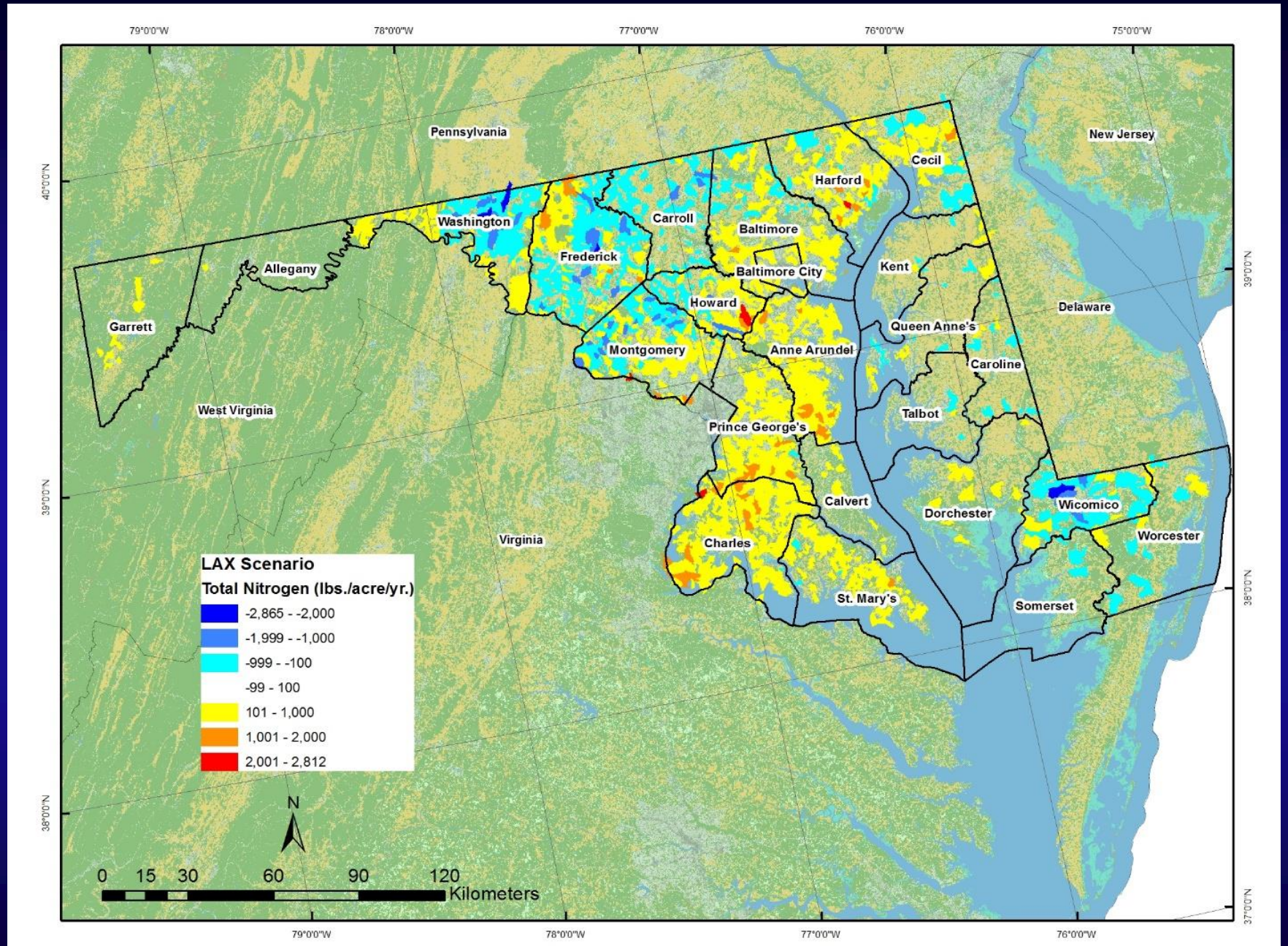
79°0'0"W
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39°0'0"N
38°0'0"N
37°0'0"N
Pennsylvania
New Jersey
Cecil
Harford
Washington
Carroll
Baltimore
Frederick
Baltimore City
Kent
Allegany
Howard
Delaware
Garrett
Queen Anne's
Montgomery
Anne Arundel
Caroline
West Virginia
Talbot
Prince George's
Calvert
Wicomico
Dorchester
Virginia
Worcester
Charles
St. Mary's
Somerset
LAX Scenario
Total Nitrogen (lbs./acre/yr.)
-2,865 - -2,000
-1,999 - -1,000
-999 - -100
-99 - 100
101 - 1,000
1,001 - 2,000
2,001 - 2,812
N
0 15 30 60 90 120
Kilometers

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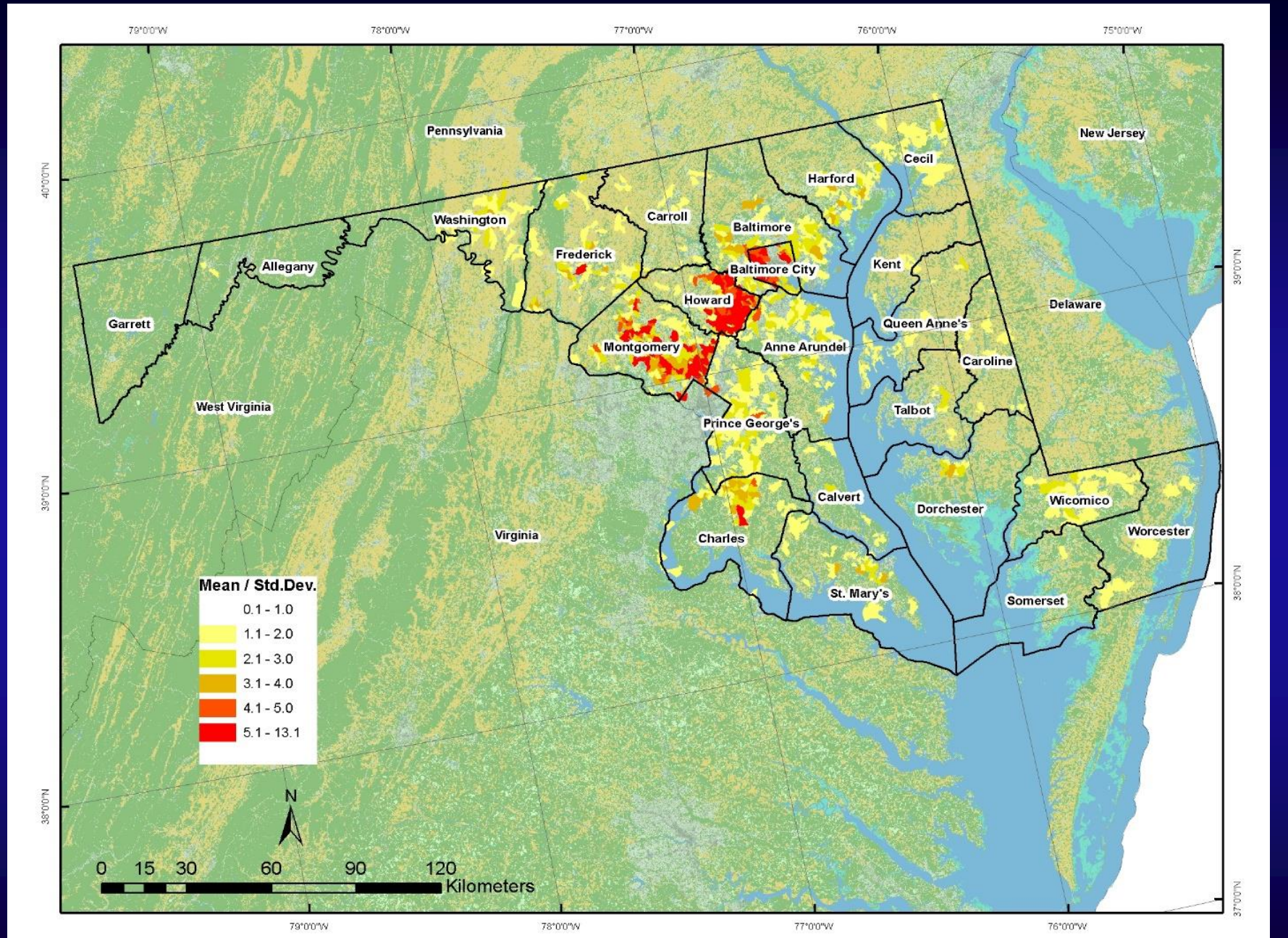
79°0'0"W
78°0'0"W
77°0'0"W
76°0'0"W
75°0'0"W
40°0'0"N
39°0'0"N
38°0'0"N
37°0'0"N
Pennsylvania
New Jersey
Cecil
Harford
Washington
Carroll
Baltimore
Frederick
Baltimore City
Kent
Allegany
Howard
Delaware
Garrett
Queen Anne's
Montgomery
Anne Arundel
Caroline
West Virginia
Talbot
Prince George's
Calvert
Dorchester
Wicomico
Virginia
Charles
Worcester
St. Mary's
Somerset
Mean / Std.Dev.
0.1 - 1.0
1.1 - 2.0
2.1 - 3.0
3.1 - 4.0
4.1 - 5.0
5.1 - 13.1
N
0 15 30 60 90 120
Kilometers

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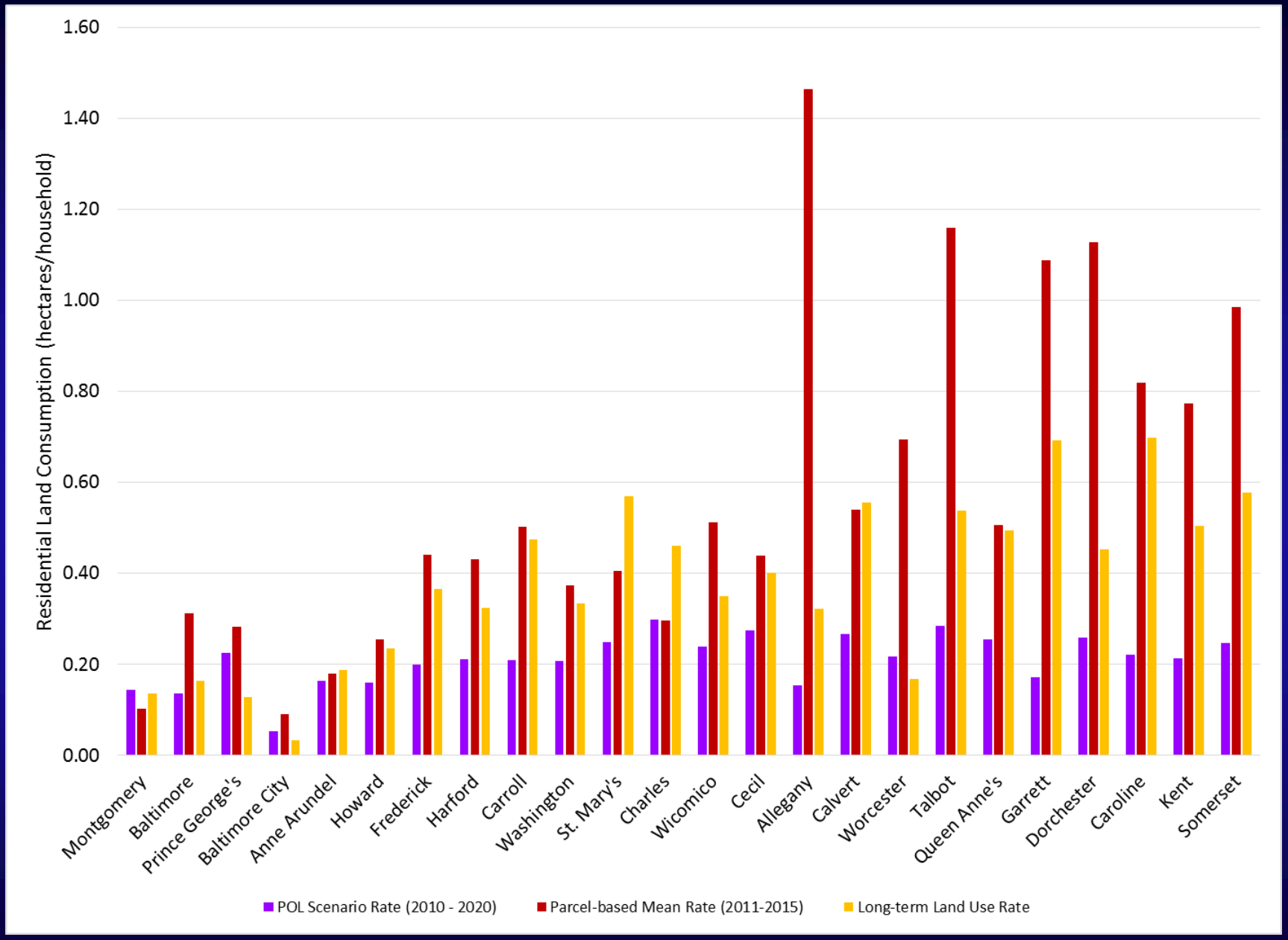
Residential Land Consumption (hectares/household)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Montgomery
Baltimore
Prince George's
Baltimore City
Anne Arundel
Howard
Frederick
Harford
Carroll
Washington
St. Mary's
Charles
Wicomico
Cecil
Allegany
Calvert
Worcester
Talbot
Queen Anne's
Garrett
Dorchester
Caroline
Kent
Somerset
POL Scenario Rate (2010 - 2020)
Parcel-based Mean Rate (2011-2015)
Long-term Land Use Rate

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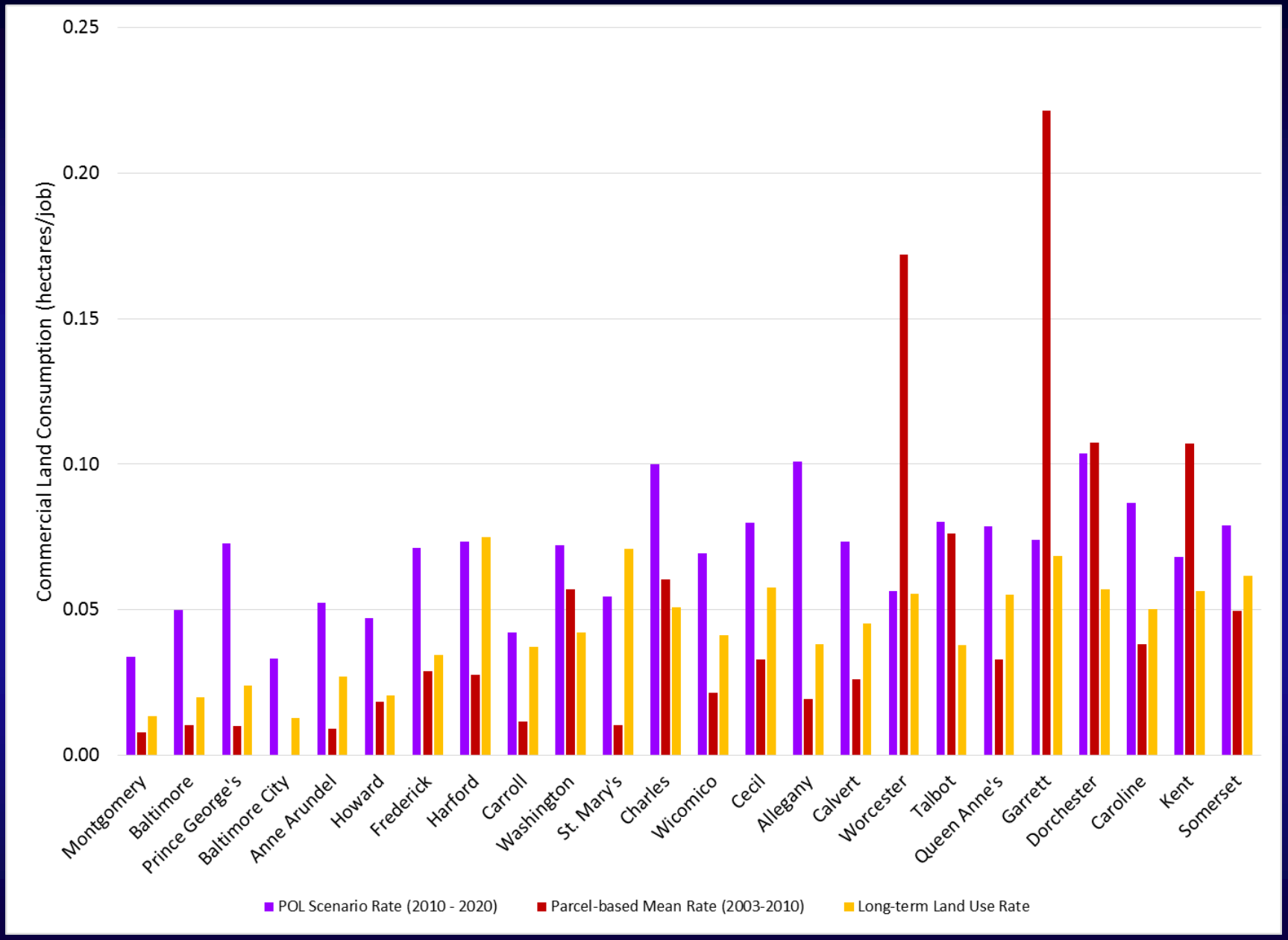
Commercial Land Consumption (hectares/job)
0.25
0.20
0.15
0.10
0.05
0.00
Montgomery
Baltimore
Prince George's
Baltimore City
Anne Arundel
Howard
Frederick
Harford
Carroll
Washington
St. Mary's
Charles
Wicomico
Cecil
Allegany
Calvert
Worcester
Talbot
Queen Anne's
Garrett
Dorchester
Caroline
Kent
Somerset
POL Scenario Rate (2010 - 2020)
Parcel-based Mean Rate (2003-2010)
Long-term Land Use Rate

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FIPS	Name	CBLCM Infill	Residential Infill		Commercial Infill	
		2001-2010	2001-2010	2011-2015	2003-2010	2011-2015
24001	Allegany	19.9%	31.5%	34.0%	70.8%	19.1%
24003	Anne Arundel	44.3%	43.9%	53.5%	47.9%	62.9%
24005	Baltimore	54.8%	53.9%	59.9%	97.4%	94.5%
24009	Calvert	23.6%	14.3%	11.6%	73.4%	46.5%
24011	Caroline	5.1%	6.9%	16.7%	25.0%	81.1%
24013	Carroll	26.4%	23.9%	24.4%	17.8%	12.1%
24015	Cecil	20.6%	13.9%	41.6%	50.5%	71.9%
24017	Charles	18.0%	13.8%	23.7%	52.3%	63.5%
24019	Dorchester	10.2%	16.8%	38.4%	2.3%	0.5%
24021	Frederick	26.1%	25.8%	52.7%	53.5%	32.2%
24023	Garrett	1.1%	2.8%	5.4%	4.2%	0.8%
24025	Harford	32.5%	31.0%	31.2%	48.1%	37.1%
24027	Howard	37.2%	36.6%	36.1%	88.5%	73.4%
24029	Kent	7.0%	10.0%	11.3%	4.7%	100.0%
24031	Montgomery	56.4%	42.7%	48.7%	98.1%	92.3%
24033	Prince George's	49.2%	36.7%	48.7%	60.0%	97.6%
24035	Queen Anne's	12.0%	12.3%	33.9%	82.8%	32.0%
24037	St. Mary's	16.6%	7.3%	20.5%	9.4%	43.5%
24039	Somerset	24.4%	20.4%	29.7%	7.4%	10.5%
24041	Talbot	11.0%	19.1%	48.0%	15.6%	34.1%
24043	Washington	23.6%	21.9%	36.4%	15.7%	43.2%
24045	Wicomico	19.9%	19.4%	24.2%	5.2%	49.2%
24047	Worcester	55.4%	46.0%	58.3%	32.3%	48.8%
24510	Baltimore City	81.2%	97.4%	97.1%	100.0%	99.0%

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Scenario Results For Review

Scales: P6 Land-River Segments & Counties

1. New development acres
2. Proportion of new development on sewer
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. Δ Total Nitrogen (# / acre / yr.)
7. Δ Total Phosphorus (# / acre / yr.)
8. Δ Total Sediment (tons / acre / yr.)

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Future Scenario Results for Maryland

POL Scenario	2020	2030	2040
Total Development	27,858	53,610	72,360
Forest Loss	13,795	25,699	34,075
Farmland Loss	9,980	20,223	27,947
Forest:Farm Conversion Ratio	1.38	1.27	1.22

URB Scenario	2020	2030	2040
Total Development	23,179	44,221	59,318
Forest Loss	11,353	20,877	27,559
Farmland Loss	8,243	16,693	22,921
Forest:Farm Conversion Ratio	1.38	1.25	1.20

CON Scenario	2020	2030	2040
Total Development	24,848	48,404	63,203
Forest Loss	14,094	26,149	33,473
Farmland Loss	9,289	19,481	26,175
Forest:Farm Conversion Ratio	1.52	1.34	1.28

LAX Scenario	2020	2030	2040
Total Development	38,677	74,625	102,369
Forest Loss	17,288	32,737	44,576
Farmland Loss	16,515	32,481	44,896
Forest:Farm Conversion Ratio	1.05	1.01	0.99

Conclusions:

Infill, redevelopment, and densification achieve the greatest reductions in future greenfield development, minimizing impacts to BOTH forests and farms.

Conserving prime farmland and large forest tracts (>250 acres) ensures that the most valuable natural assets remain intact.

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Scenario 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. Other?

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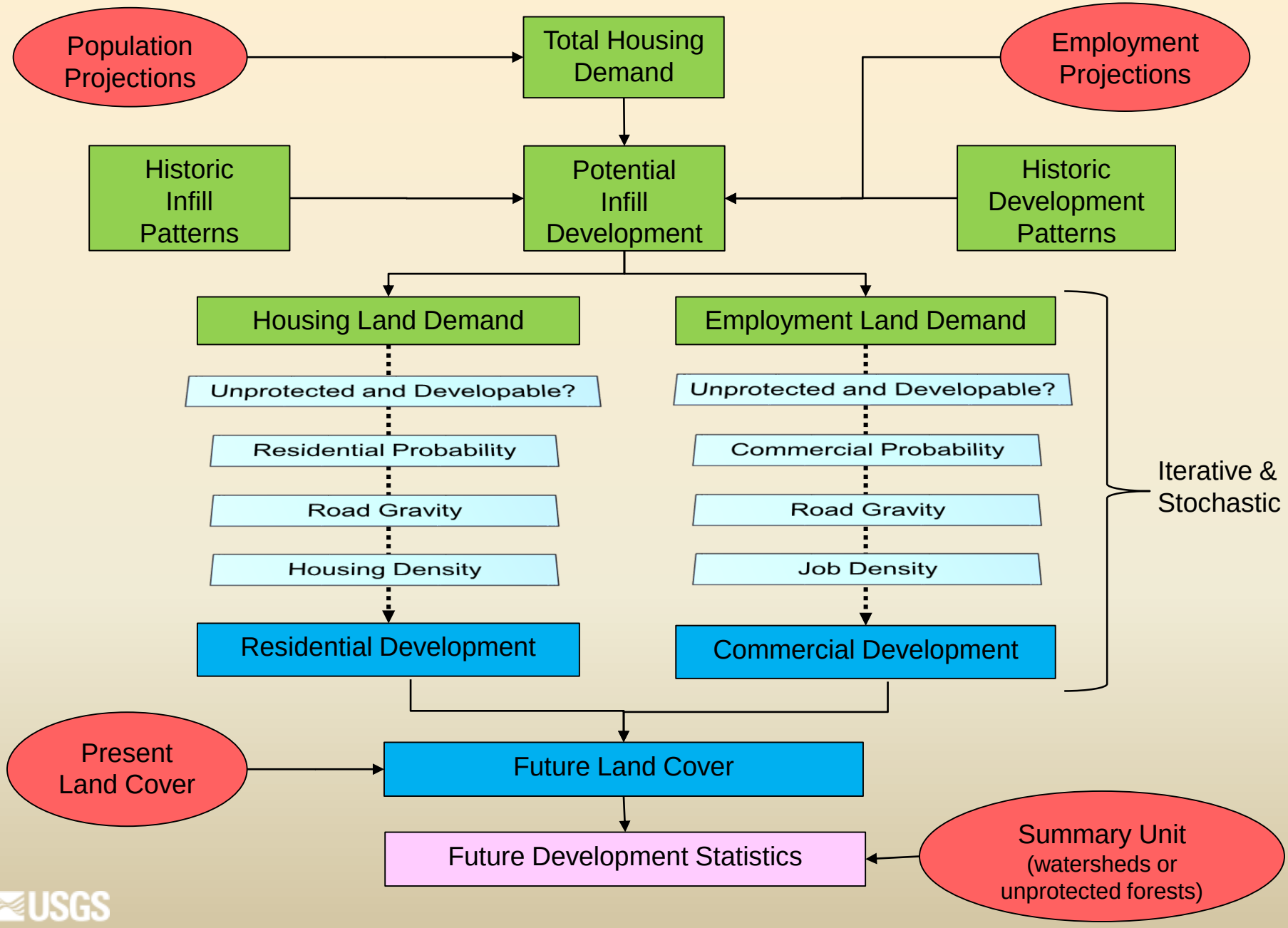
science for a changing world

Chesapeake Bay Land Change Model v3a



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