Chesapeake Bay Program
A Watershed Partnership

2019 Land Use Update for 2020-2021 Milestone Period

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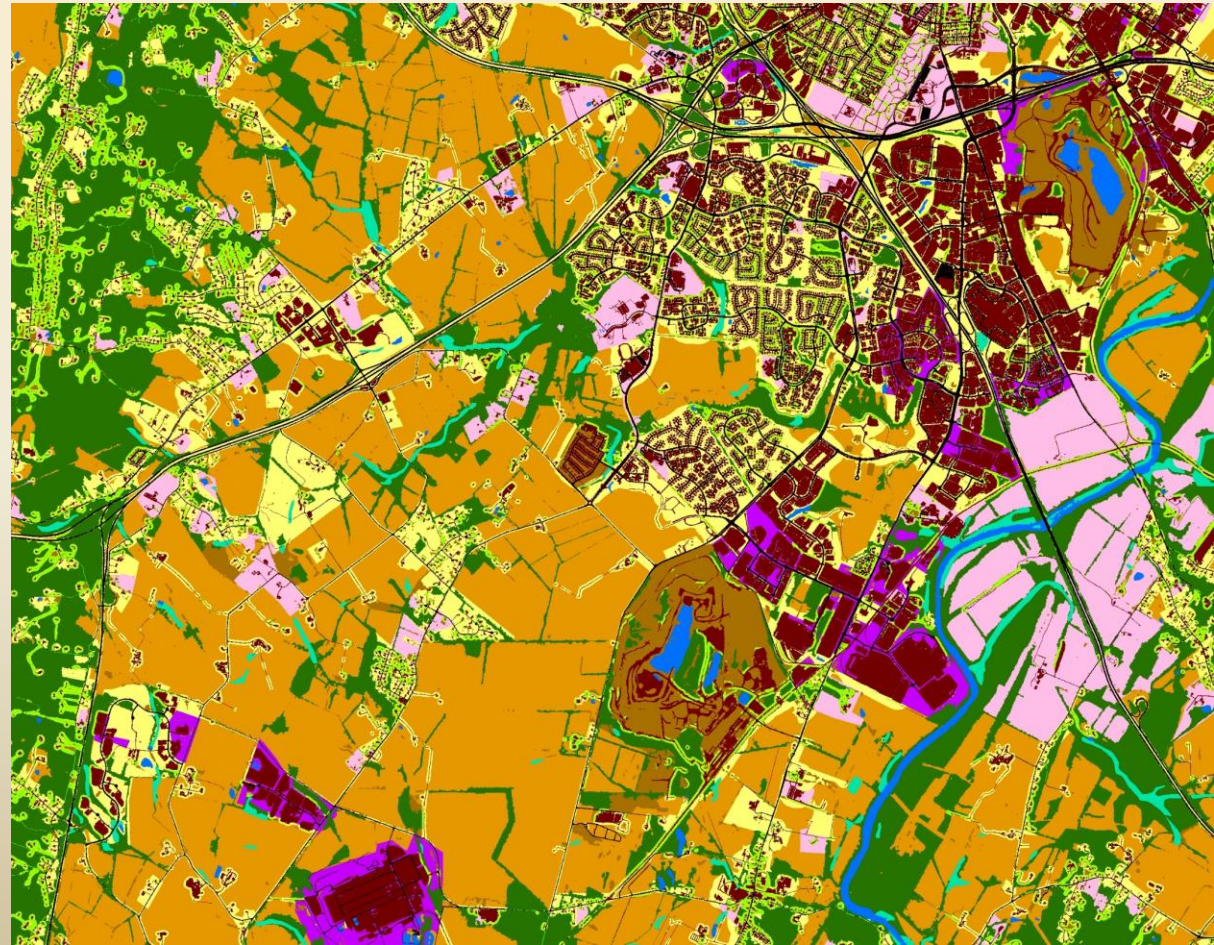
Land Use Workgroup Meeting

Goal:
Update 2014 - 2025 land use data in CAST

- Impervious Roads (IR)
- Impervious Non-Roads (INR)
- Tree Canopy over Impervious (TCI)
- Turf Grass (TG)
- Tree Canopy over Turf (TCT)
- Forest (FORE)
- Wetland, Other (WLO)
- Wetland, Floodplain (WLF)
- Water (WAT)
- Mixed Open (MO)
- Cropland (CRP)
- Pasture (PAS)



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Create a 2017 land use dataset

1. Update high-resolution land cover within Landsat-satellite derived "Hot Spots":

- Excludes Virginia due to issues with 2014 land cover and 2018 NAIP imagery
- 2013/14 land cover data updated with 2017 aerial imagery in Maryland
- Developed decision rules to relate land cover change to Phase 6 land uses.

2. Update high-resolution land cover everywhere using 2016 National Land Cover Dataset:

- For Virginia only
- Update based on change in impervious cover from 2011-2016 and for all other classes from 2013-2016.
- Developed decision rules to relate land cover change to Phase 6 land uses. These rules will be reviewed by the LUWG in September.

3. How does NLCD change (2013-2016) compare to High-res change (2013-2017)?

- High-res change:

IR_chng	INR_chng	TCI_chng	TG_chng	TCT_chng	FORE_chng	WLO_chng	WLF_chng	WAT_chng	MO_chng	CRP_chng	PAS_chng
3,307	8,908	1,631	16,741	6,304	(49,343)	(2,721)	(2,314)	1,197	15,203	(873)	2,073

- NLCD change:

IR_chng	INR_chng	TCI_chng	TG_chng	TCT_chng	FORE_chng	WLO_chng	WLF_chng	WAT_chng	MO_chng	CRP_chng	PAS_chng
5,715	14,573	2,621	10,097	8,945	(40,959)	(196)	(738)	173	17,280	(11,781)	(5,707)

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2017 Land Use Decision Rules (High-res "Hot Spot" change)

Imperv. Roads	Imperv. NonRoads	Barren	Herbaceous	Trees	Water
2,208	6,264	10,823	25,952	(46,443)	1,197

Impervious Roads (IR): mapped change in "Imperv Roads" + relative developed proportion of increased barren land

Imperv.Roads or… Imperv.Roads + Barren * (IR_{13} / (IR_{13} + INR_{13} + TCI_{13} + TG_{13} + TCT_{13}))

Impervious Non-Roads (INR): same method as used for IR but with relative proportions of INR

Tree Canopy over Impervious (TCI): inferred with co-occurrence of development and forest loss

max((Imperv.Roads + Imperv.NonRoads, Barren) * TCI_{13} / (IR_{13} + INR_{13})

Turf Grass (TG): assumed to always occur; same method as TCI but using relative proportions of TG

Tree Canopy over Turf (TCT): inferred with co-occurrence of development and forest loss; same as TCI but using relative proportions of TCT

Forest (FORE): relative fraction of mapped change in "Trees" minus relative fraction of change in TCI and TCT

"Trees" * ($FORE_{13}$ / ($FORE_{13}$ + WLO_{13} + WLF_{13})) – ((TCI_{17}+ TCT_{17}) * ($FORE_{13}$ / ($FORE_{13}$ + WLO_{13} + WLF_{13}))

Wetland, Other (WLO): same method as used for Forest but with relative proportions of WLO

Wetland, Floodplain (WLF): same method as used for Forest but with relative proportions of WLF

Water (WAT): mapped change in "Water"

Mixed Open (MO): if agriculture in county is declining, 2012 – 2017, assign remaining change acres to this class, otherwise apportion remaining change using relative herbaceous fraction, e.g., RemainingChange * MO_{13} / (MO_{13} + CRP_{13} + PAS_{13})

Cropland (CRP): if agriculture in county is declining, 2012 – 2017, set to zero, otherwise apportion remaining change using relative herbaceous fraction, e.g., RemainingChange * CRP_{13} / (MO_{13} + CRP_{13} + PAS_{13})

Pasture (PAS): same method as used for Cropland but with relative proportions of PAS

2017 Land Use Decision Rules (NLCD change)

Impervious	Trees over Turf	Turf Grass	Herbaceous	Trees	Water
22,908	8,945	10,097	(236)	(41,888)	173

Impervious Roads (IR): mapped change in "Impervious" * relative proportion of impervious roads to all types of impervious cover

"Impervious" * IR_{13} / (IR_{13} + INR_{13} + TCI_{13})

Impervious Non-Roads (INR): same method as used for impervious roads but with relative proportion of INR

Tree Canopy over Impervious (TCI): same method as used for impervious roads but with relative proportion of TCI

Turf Grass (TG): inferred with co-occurrence of development and loss of "Herbaceous" at pixel scale as the pervious portion of developed areas

Tree Canopy over Turf (TCT): inferred with co-occurrence of development and loss of "Trees" at pixel scale as the pervious portion of developed areas

Forest (FORE): relative fraction of mapped change in "Trees" minus relative fraction of change in TCI and TCT

Trees * ($FORE_{13}$ / ($FORE_{13}$ + WLO_{13} + WLF_{13})) – ((TCI_{17}+ TCT_{17}) * ($FORE_{13}$ / ($FORE_{13}$ + WLO_{13} + WLF_{13}))

Wetland, Other (WLO): same method as used for Forest but with relative proportions of WLO

Wetland, Floodplain (WLF): same method as used for Forest but with relative proportions of WLF

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Pasture (PAS): same method as used for Cropland but with relative proportions of PAS

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Updating 2025 Current Zoning Scenario

Updated:

Population Estimates

Population Projections

Protected Lands (from 2016 ed. to 2018 ed.)

Sewer Service Areas

No update to local zoning data:

- Data received from ~90 of 206 localities. Generalizing these data requires a minimum of 1-2 hours per datasets. LUWG will discuss the potential for updating these data for priority counties and for those with already generalized zoning classes.

Updated Population Estimates:

- From v2016 to v2018 which affects all years from 2011 – 2018.

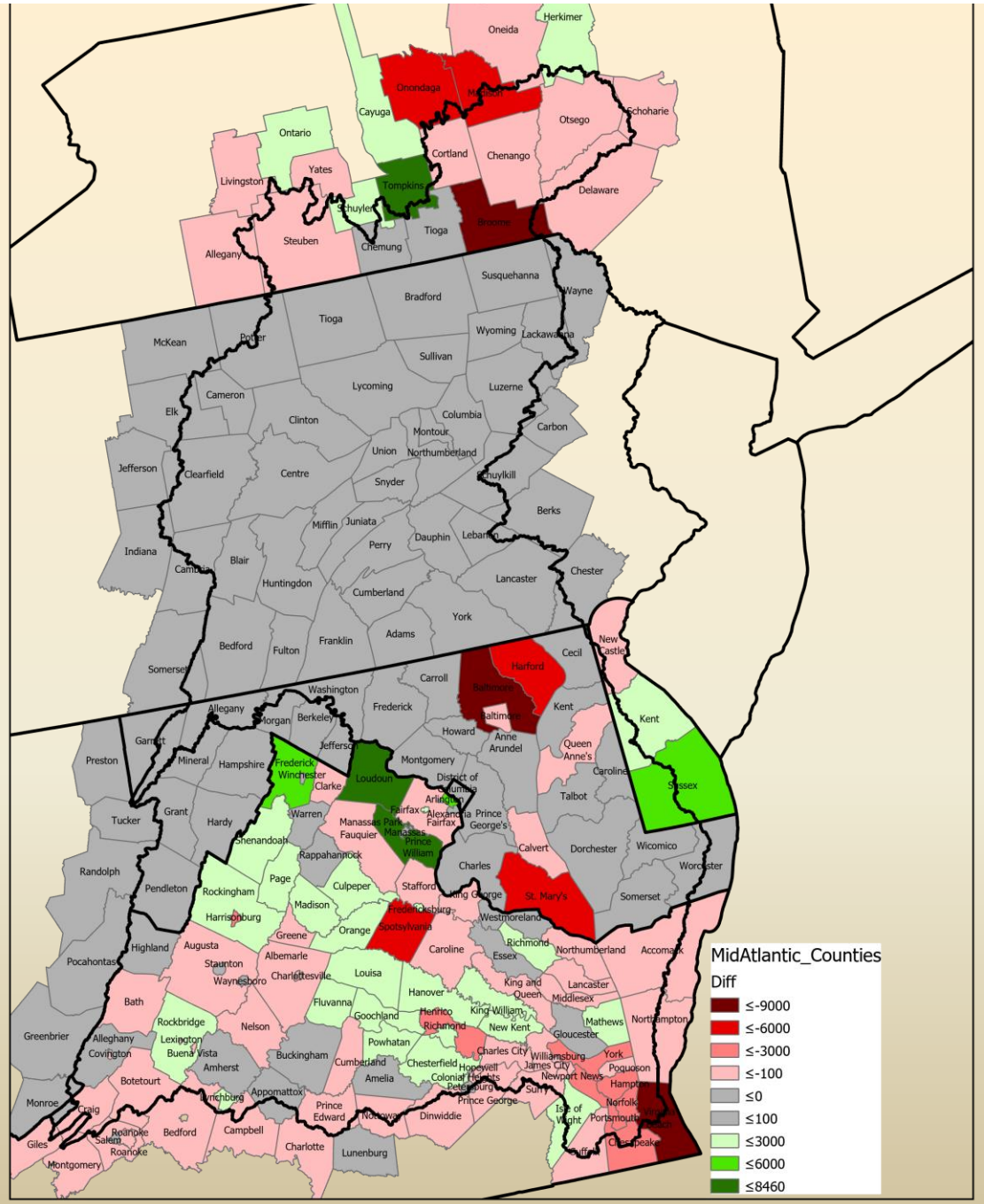
Updated Population Projections:

- Virginia (from 2017 ed. to 2019 ed.)
- New York (from 2011 ed. to 2018 ed.)
- Delaware (from 2016 ed. to 2018 ed.)
- Metropolitan Washington Council of Governments (from 2016 v9.0 to 2018 v9.1)
- Baltimore Metropolitan Council (Round 9) added

Land Use Change (2013 – 2025):

	Development	Natural	Agriculture
cz2019	274,571	(230,834)	(43,737)
cz2017	303,246	(185,537)	(117,710)

Difference in projected population change: 2010 - 2025



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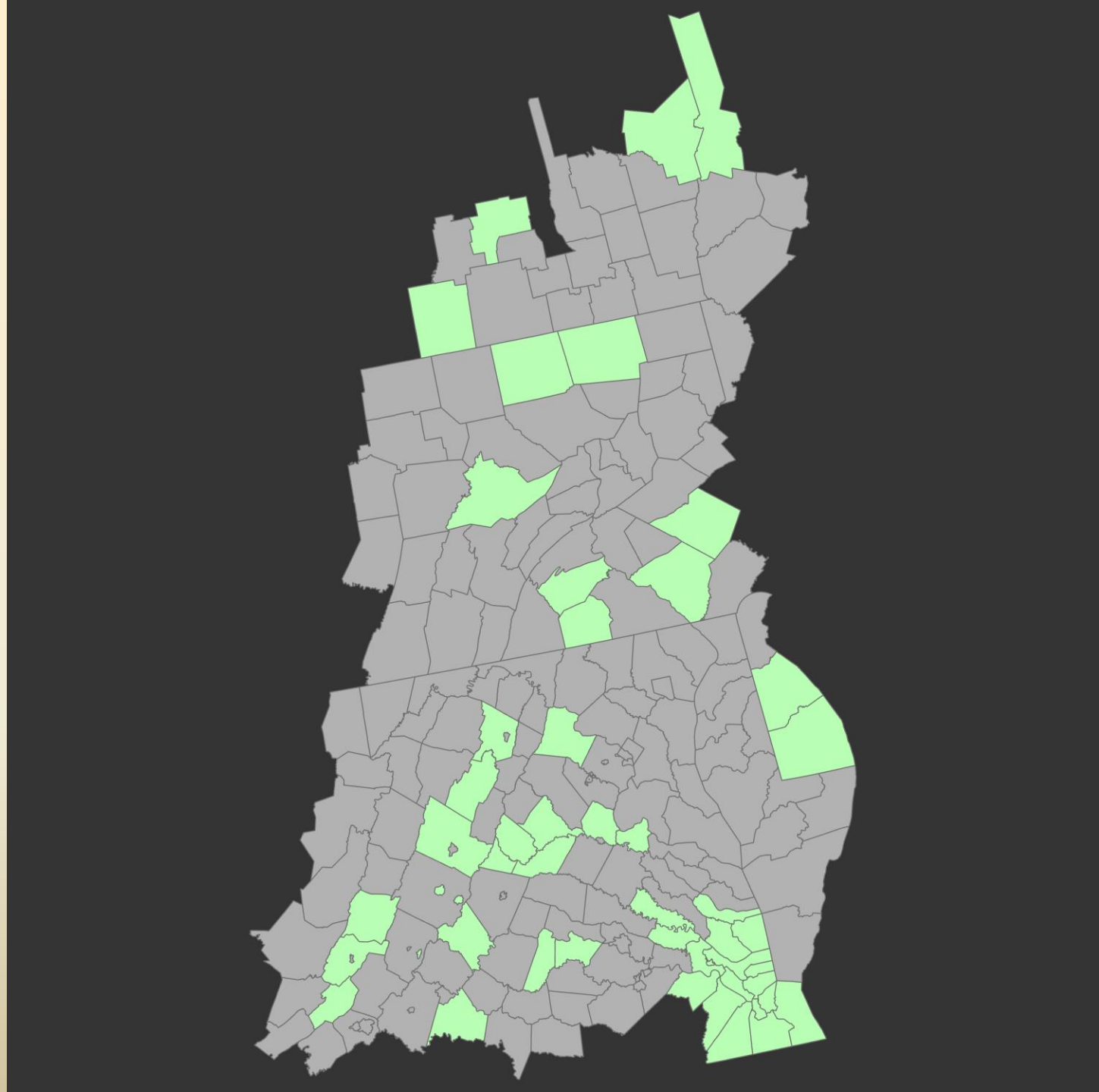
Sewer Data:

Used updated sewer service areas for 51 local jurisdictions.

Result:

Updated population on sewer and septic systems for 2013, 2017 and 2025.



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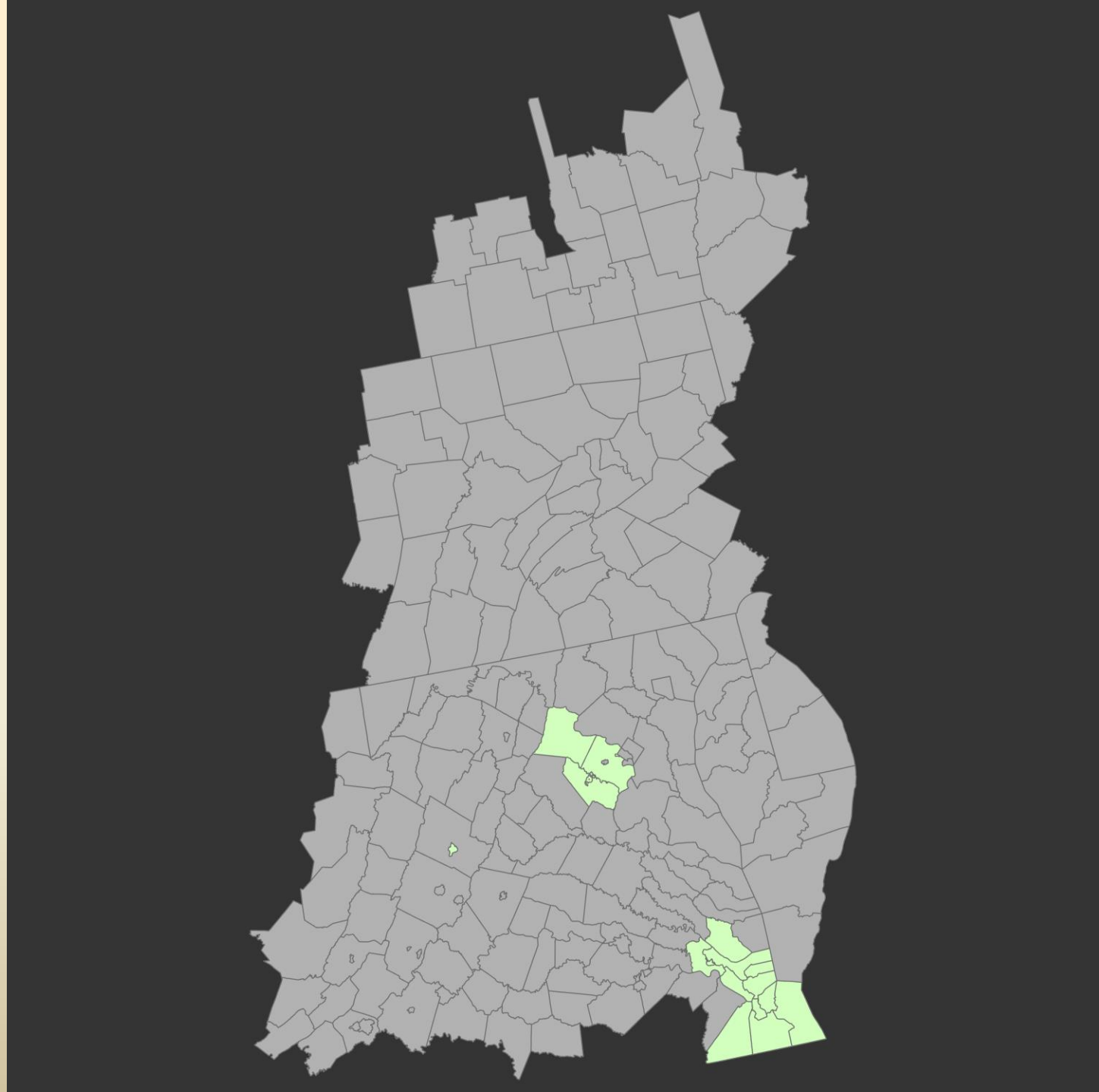
MS4 Data:

Used updated MS4 areas for 19 local jurisdictions in Virginia.

Result:

Changed Phase 6 summary units (LRSEGs + Regulated Areas + Federal Lands)



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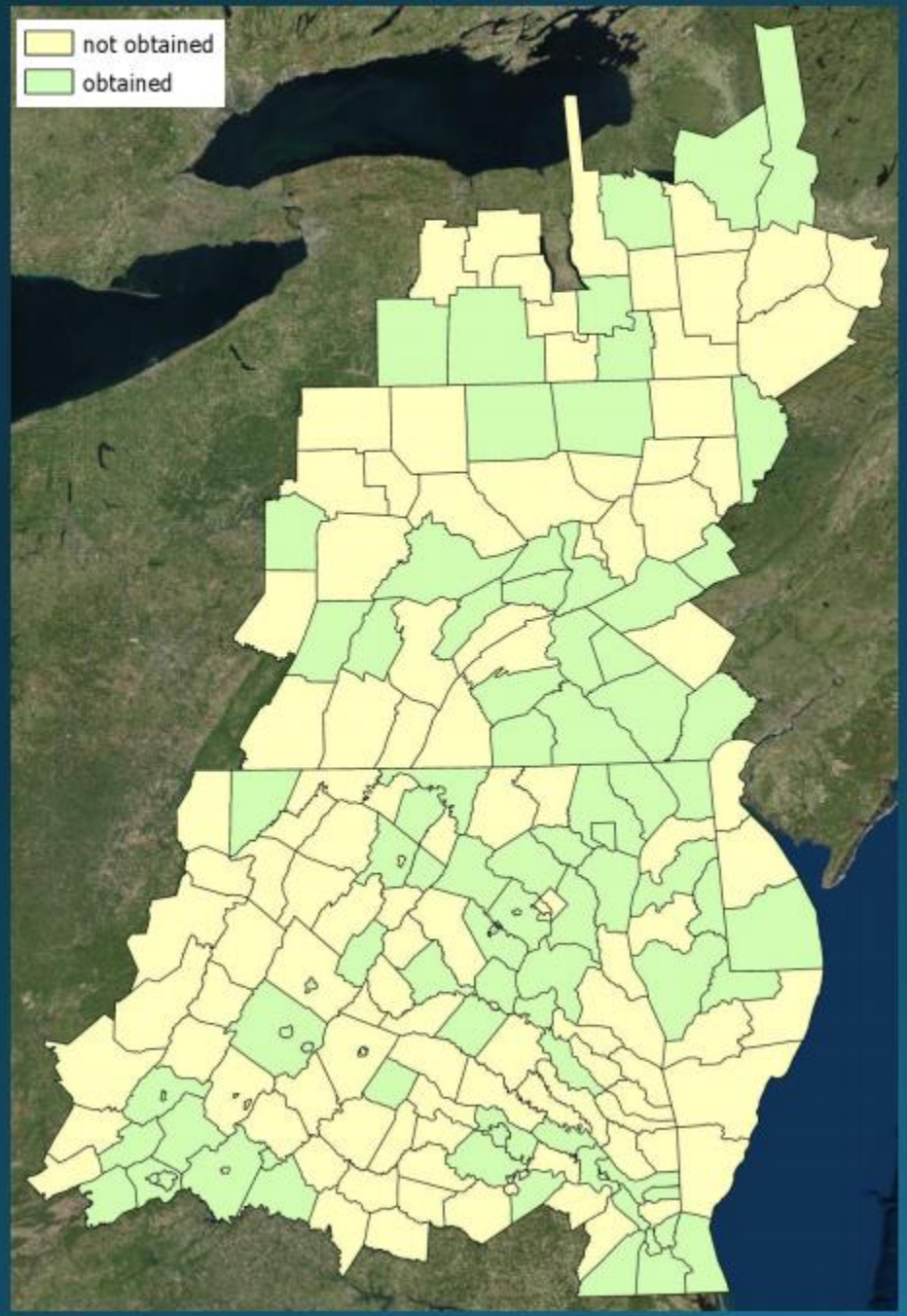
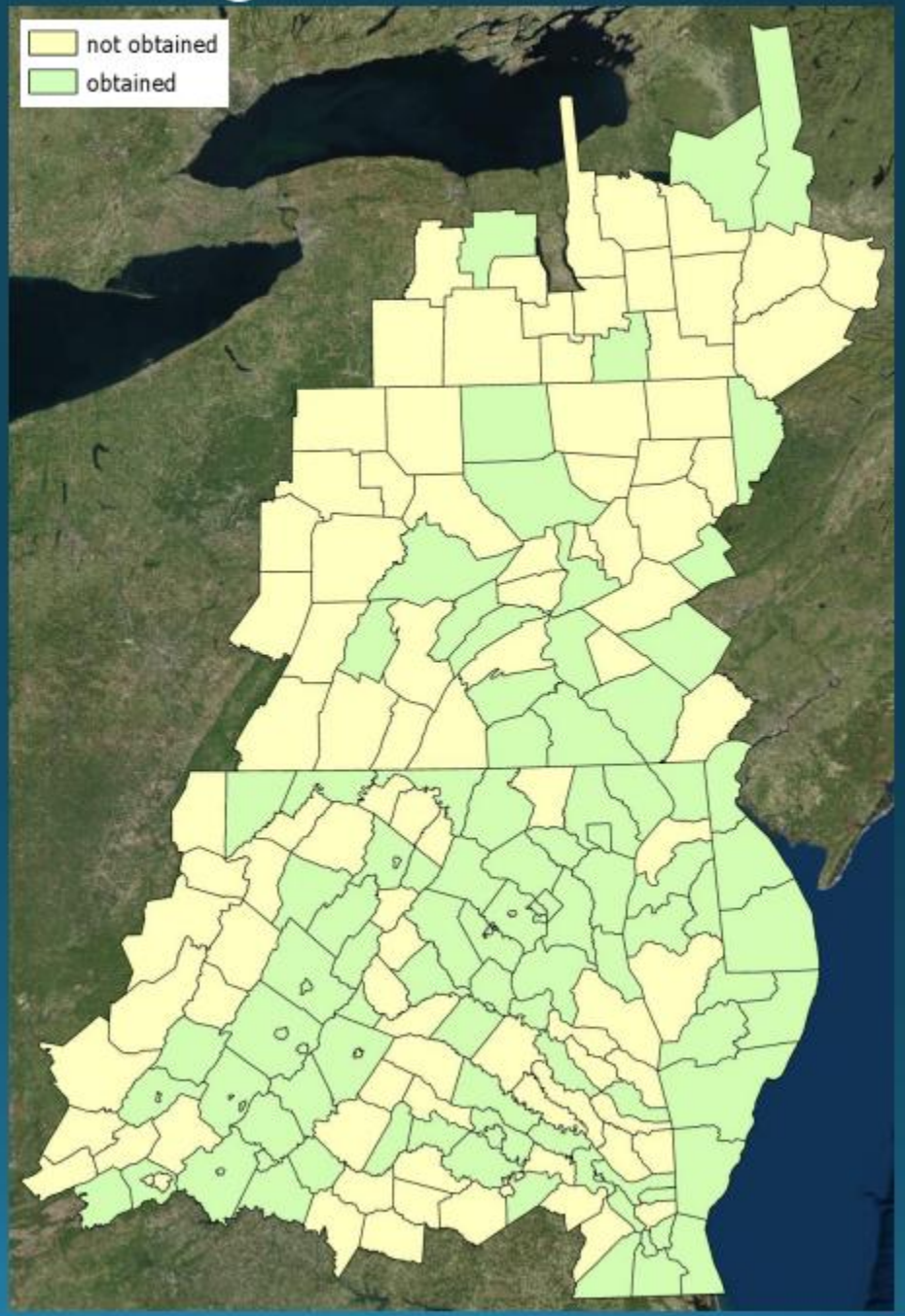
Land Use/Land Cover



Zoning



CONSERVATION INNOVATION CENTER
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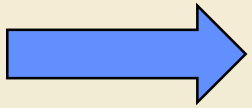
When and where to update zoning?

Zoning Codes for One County

BSC	H	R-1-B
C-1	I-1	R-1-C
C-1-E	I-2	R-1-D
C-1-VC	I-MU	R-1-E
C-2	MI	R-2
C-3	OIC	R-3
C-4	OR-1	R-4
C-5-DC	OR-2	R-5
C-5-DE	OS	R-6
C-5-G	PC-1	R-7
C-5-HS	PC-2	R-8
C-5-HT	PC-3	R-9
C-5-IH	PC-4	TOD-1
C-5-TO	R-1	TOD-2
EC-1	R-10	TOD-3
EC-2	R-1-A	TOD-4



Deciphering and translating local zoning codes to CBLCM values requires 1-3 hours per county

CBLCM Zoning Classes

Residential
Commercial
Mixed
Excluded

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When and where to update zoning for 2019 Milestones?

Prioritization Options

1. Update only within states that will update their WIPs with 2019 Milestone data
2. Update only within states that have adopted land policy BMPs in their WIPs:
    - Maryland
    - Pennsylvania
    - West Virginia
    - Virginia (Rappahannock PDC jurisdictions only)

3. Update only for counties with very generalized zoning (e.g., can be done quickly)
4. Don’t update zoning until January 2021

What updated 2019 Milestone data does the LUWG want to review?