Phase 7 Land Use Process

Peter Claggett, Research Geographer
Lower Mississippi-Gulf Water Science Center, U.S. Geological Survey

CBP Urban Stormwater Workgroup Meeting
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U.S. Department of the Interior
U.S. Geological Survey

USGS
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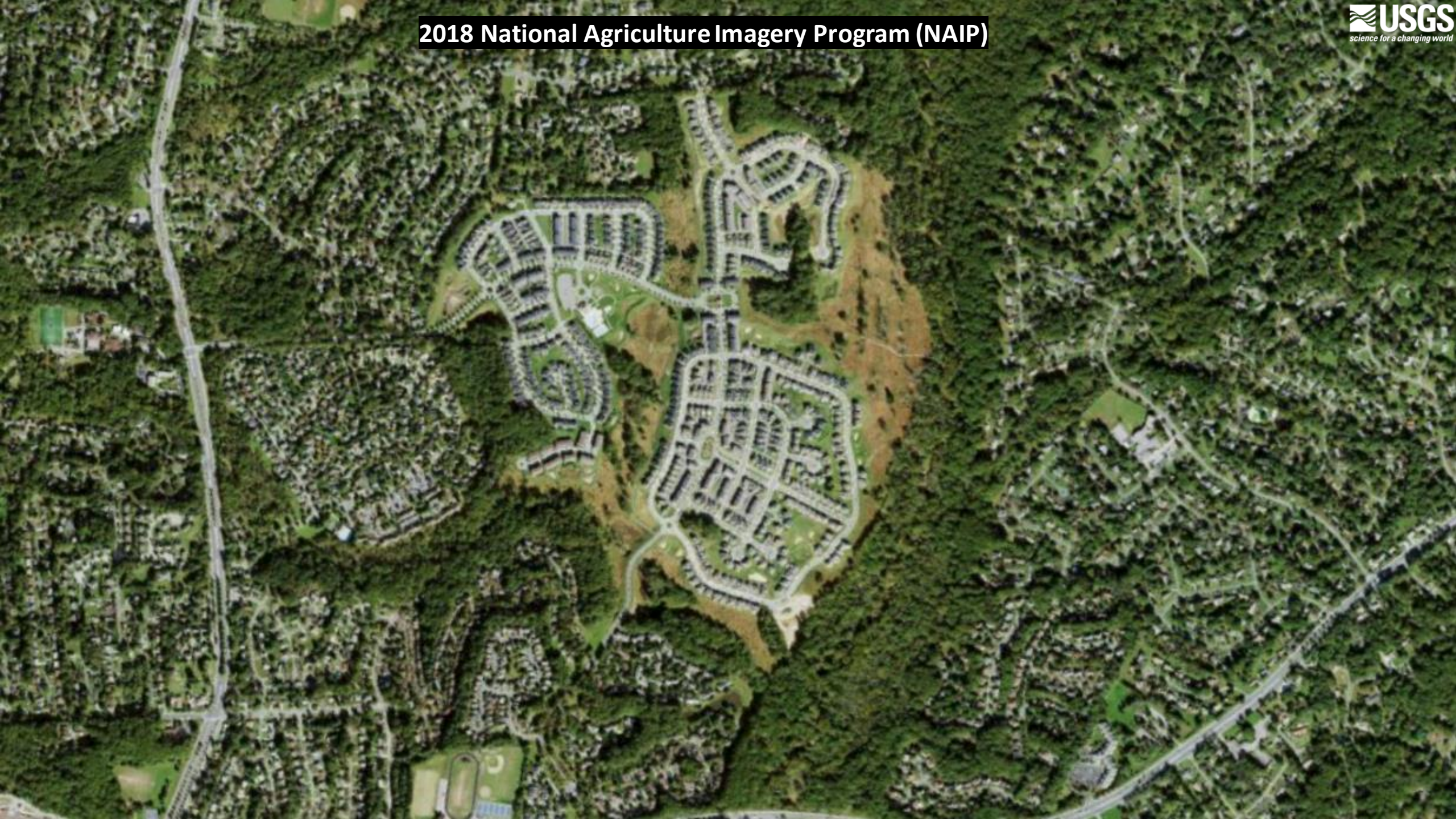
Completed LULC Products for a 99,000 mi^2 Region

Land Use and Land Use Change (62-classes, 1-meter): 2013/14 and 2017/18 and 2021/22

Land Use and Land Use Change (18-classes, 10-meter)

- Tabular summaries by county, NHD+ catchment (accumulated), 24K NHD catchment (accumulated)


2018 National Agriculture Imagery Program (NAIP)
USGS
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2018 Land Use
USGS
Science for a changing world
Riparian Zone
FACET Streams (1:100k)
GenLandUse
Water
Impervious Roads
Impervious Structures
Impervious, Other
Tree Canopy over Impervious
Turf Grass
Pervious Developed, Other
Tree Canopy over Turf Grass
Forest
Tree Canopy, Other
Harvested Forest
Natural Succession
Cropland
Pasture/Hay
Extractive
Wetlands, Tidal Non-forested
Wetlands, Riverine Non-forested
Wetlands, Terrene Non-forested


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Science for a changing world
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Phase 6 Roll-up of High-Res Land Use Classes

1. **Impervious, Roads (1)**
   - 20 Roads

2. **Impervious, Non-Roads (6)**
   - 21 Structures
   - 22 Other Impervious (Parking lots, driveways)
   - 31 Extractive Impervious
   - 32 Solar Field Panel Arrays (?)
   - 90 Agricultural Structures
   - 91 Animal Operation Impervious

3. **Tree Canopy Over Impervious (5)**
   - 23 TC over Roads
   - 24 TC over Structures
   - 25 TC over Other Impervious
   - 94 TC over Agricultural Structure
   - 95 TC over Animal Operation Impervious

4. **Turf Grass (1)**
   - 27 Turf Grass

5. **Tree Canopy over Turf Grass (1)**
   - 26 Tree Canopy over Turf Grass

6. **Forest (6)**
   - 40 Forest
   - 41 Tree Canopy, Other
   - 53 Riverine Wetlands Tree Canopy
   - 54 Riverine Wetlands Forest
   - 63 Terrene Wetlands Tree Canopy
   - 64 Terrene Wetlands Forest

7. **Mixed Open (14)**
   - 15 Bare Shore
   - 28 Bare Developed (reconciliation required)
   - 30 Extractive Barren
   - 33 Solar Field Barren
   - 34 Solar Field Herbaceous
   - 35 Solar Field Shrubland
   - 36 Suspended Succession Barren
   - 37 Suspended Succession Herbaceous
   - 38 Suspended Succession Shrubland
   - 42 Natural Succession Barren
   - 43 Natural Succession Herbaceous
   - 44 Natural Succession Shrubland
   - 45 Harvested Forest Barren (not reported)
   - 46 Harvested Forest Herbaceous (not reported)

8. **Wetlands, Riverine Non-forested (4)**
   - 50 Riverine Wetlands Barren
   - 51 Riverine Wetlands Herbaceous
   - 52 Riverine Wetlands Shrubland
   - 55 Riverine Wetlands Harvested Forest

9. **Wetlands, Terrene Non-forested (4)**
   - 60 Terrene Wetlands Barren
   - 61 Terrene Wetlands Herbaceous
   - 62 Terrene Wetlands Shrubland
   - 65 Terrene Wetlands Harvested Forest

10. **Cropland (5)**
    - 80 Cropland Barren
    - 81 Cropland Herbaceous
    - 82 Orchards and Vineyards Barren
    - 83 Orchards and Vineyards Herbaceous
    - 84 Orchards and Vineyards Shrubland

11. **Pasture / Hay (4)**
    - 85 Pasture/Hay Barren
    - 86 Pasture/Hay Herbaceous
    - 92 Animal Operation Barren
    - 93 Animal Operation Herbaceous

12. **Water (4)**
    - 11 Lakes & Reservoirs
    - 12 Riverine Ponds
    - 13 Terrene Ponds
    - 14 Streams and Rivers (visible water)

Water Quality Model Classes (7)
- 10 Tidal Waters
- 70 Tidal Wetlands Barren
- 71 Tidal Wetlands Herbaceous
- 72 Tidal Wetlands Shrubland
- 73 Tidal Wetlands Tree Canopy
- 74 Tidal Wetlands Forest
- 75 Tidal Wetlands Harvested Forest

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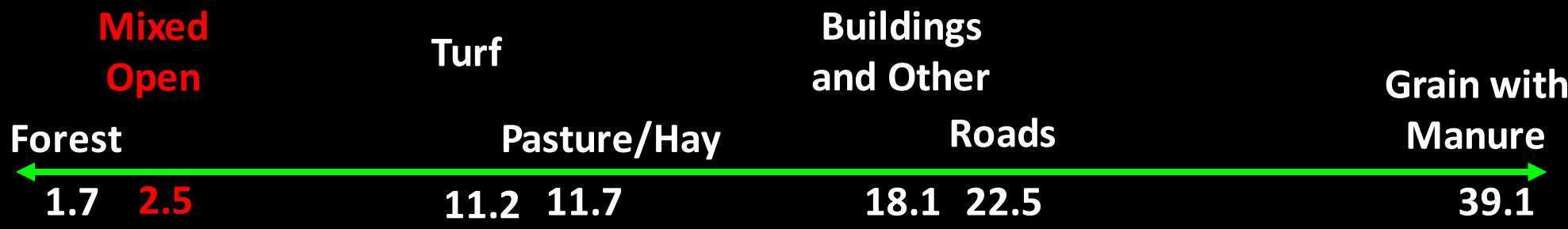
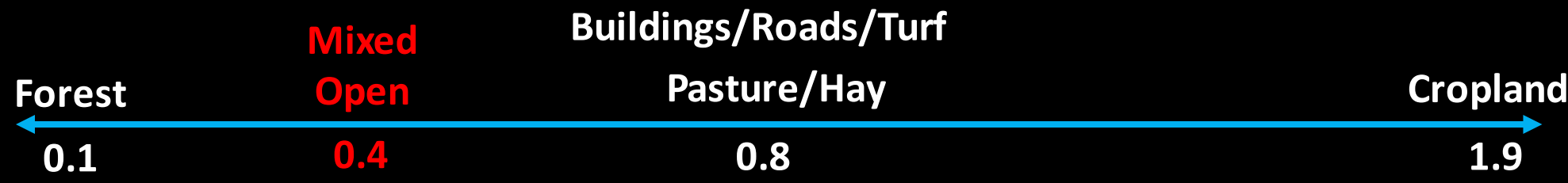
**** Represents assumed composition of "mixed open" based on assigned loading rates***

****May require reconciliation with reported acreages***

Average P6 Land Use Nutrient Export Rates



Nitrogen Export Rate (lbs./acre/yr.)



Phosphorus Export Rate (lbs./acre/yr.)

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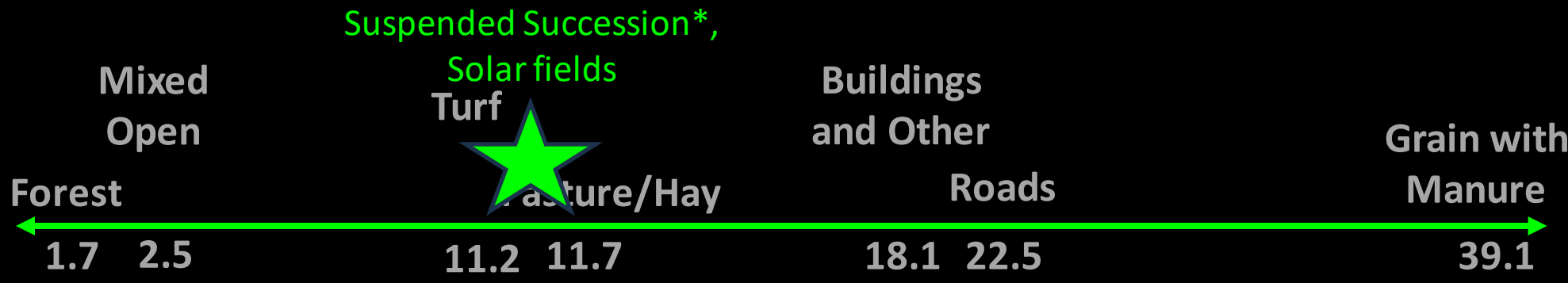

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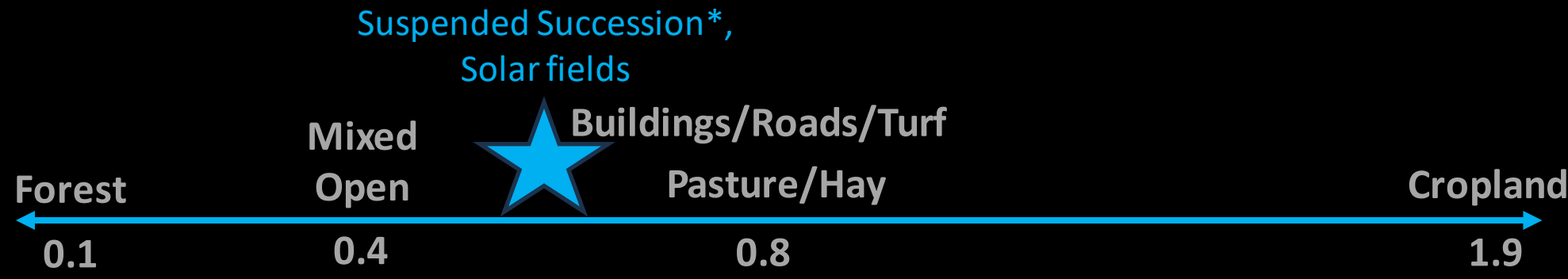


Phosphorus Export Rate (lbs./acre/yr.)

*Suspended succession = road rights-of-way, landfills, reclaimed surface mines, utility transmission lines

Potential Stormwater-relevant Phase 7 LULC Changes

- Consider a new land use class for “Developed Open Space”
  = Suspended Succession* and Solar Pervious

- Develop new land-to-water factors
  - Feature densities by NHD catchment (e.g, ponds, channels/ditches, roads)
  - Land use connectivity to streams, e.g., “effective impervious surface”

- Reconcile mapped and backcast construction reported acreages (USWG - lead)

- Reconcile of mapped ponds with reported stormwater ponds (USWG- lead)

- Update MS4 coverages

- Update septic methodology

* Road rights-of-way, landfills, reclaimed surface mines, utility transmission lines

MS4 Permit and Mapping Status

DC: Latest permit 12/2023, no updated spatial layer, Young.Tsuei@dc.gov

DE: ?

MD: next update planned for 2027, Nicole Christ, Nicole.christ@maryland.gov

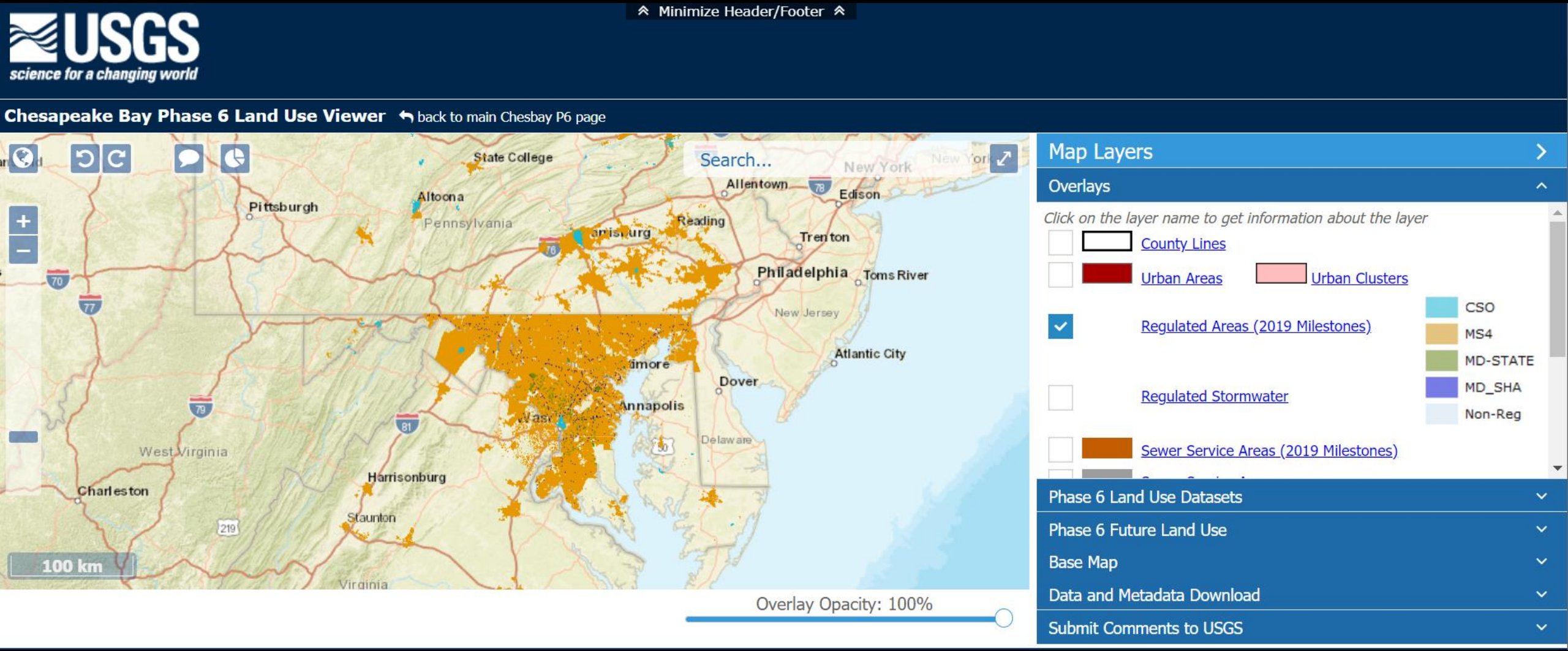
NY: latest permit 12/2023, no additional planned updates, Chiappetta, Christina M (DEC) Christina.Chiappetta@dec.ny.gov

PA: general permit update in 03/2025, will rely on Census urban areas and EPA guidance for mapping, Jamie Eberl, jeberl@pa.gov

VA: staggered permit update schedule between 01/2025 to 02/2026, Norm Goulet

WV: update to permit and mapped MS4 footprint underway, Jeff Smith, samuel.g.smith@wv.gov

Mapped MS4 and CSS Areas



https://chesapeake.usgs.gov/phase6/map

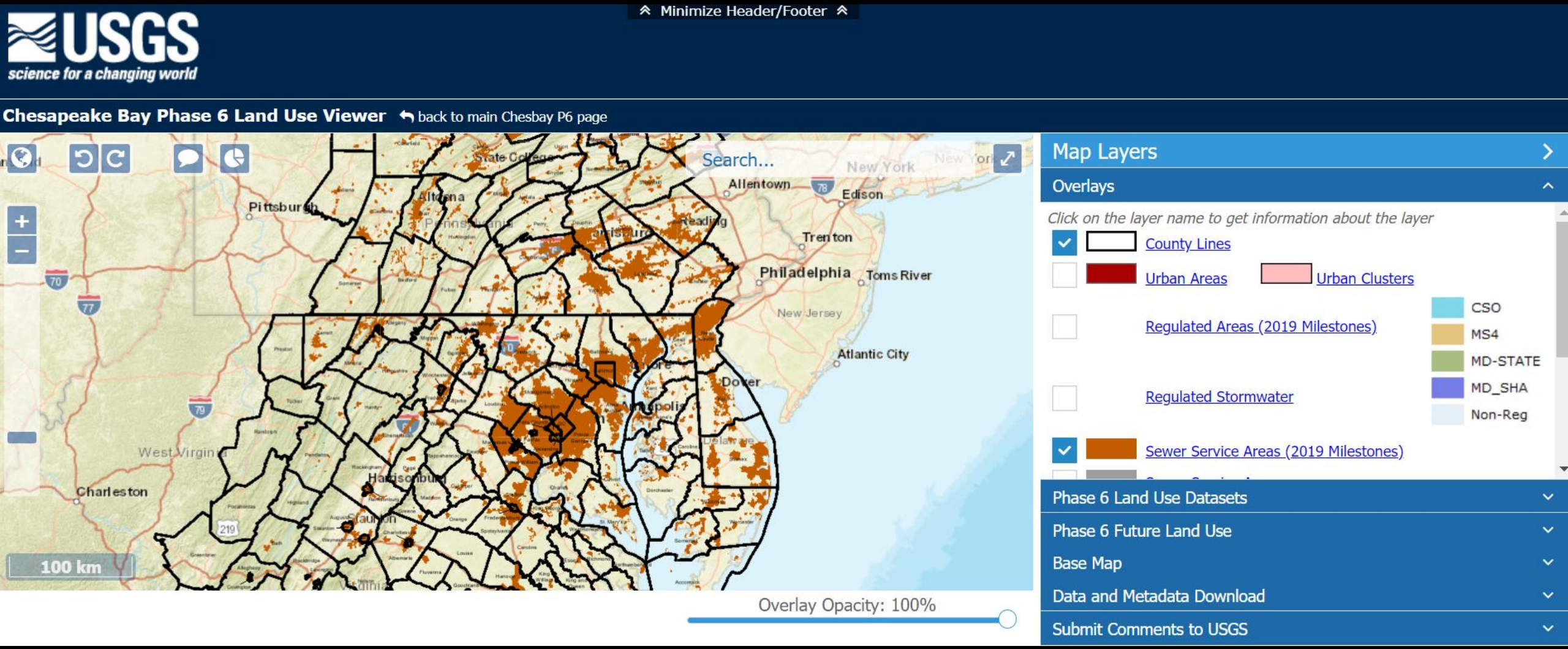
Phase 6 Septic Methodology

Overlay recent (2010) housing distribution data on sewer service area footprints that were submitted to CBPO or modeled by CBPO to estimate 2010 sewered populations (within the footprint) and septic populations (outside the footprint).

Backcast population on sewer and septic in proportion to changes in county-level population.

Forecast population on sewer and septic based on patterns of future development simulated using the Chesapeake Bay Land Change Model.

Phase 6 Septic Methodology



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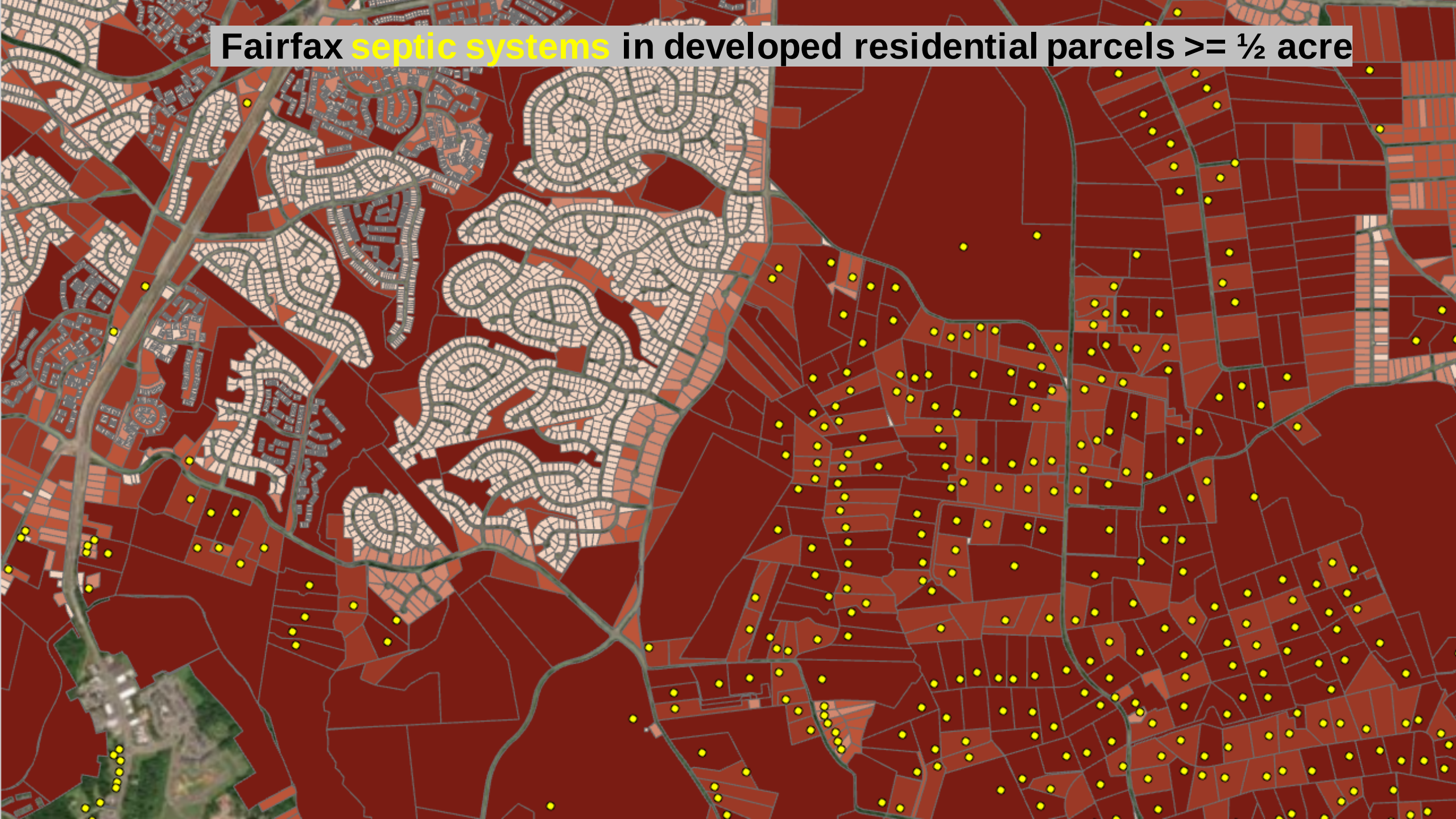
Phase 7 Septic Methodology

Why change?

1) Comparison between estimated Phase 6 septic data and local data highlighted omission errors (there's more septic systems than we're estimating).

2) Limited septic system data and mapped sewer service area data were available in 2017 to evaluate the septic system estimates.

3) Septic systems are commonly associated with larger residential lot sizes (> 0.5 acre). Tax parcel (lot sizes) data are now available nationally.


Fairfax septic systems in developed residential parcels >= ½ acre

Phase 7 Septic Methodology

Change how?

1) Collect septic system and/or drain field point data from local jurisdictions.

2) Evaluate size, type (residential vs commercial), and development intensity thresholds applied to tax parcels to more accurately map active septic systems.

Discussion Questions

1) Is the USWG interested in exploring a unique loading rate for "Developed Open Space"? Lead? Interested party?

2) What level of involvement does the USWG want to have regarding the development of new land-to-water factors for different land uses?

3) What group should oversee updates to the septic methodology for Phase 7? - LUWG, WWTWG, or USWG

4) How best to update sewer service areas footprints? – Post for review? Solicit most recent polygon GIS data?

5) How best to update MS4 areas? - Post for review? Solicit most recent polygon GIS data?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