Maryland
Department of
the Environment

Classifying Septic Drainfield Soils in Maryland

A spatial characterization of Zone 1 soils as described in the report,
Nutrient Attenuation in Chesapeake Bay Watershed Onsite Wastewater Treatment Systems

Chesapeake Bay Program Wastewater Treatment Workgroup
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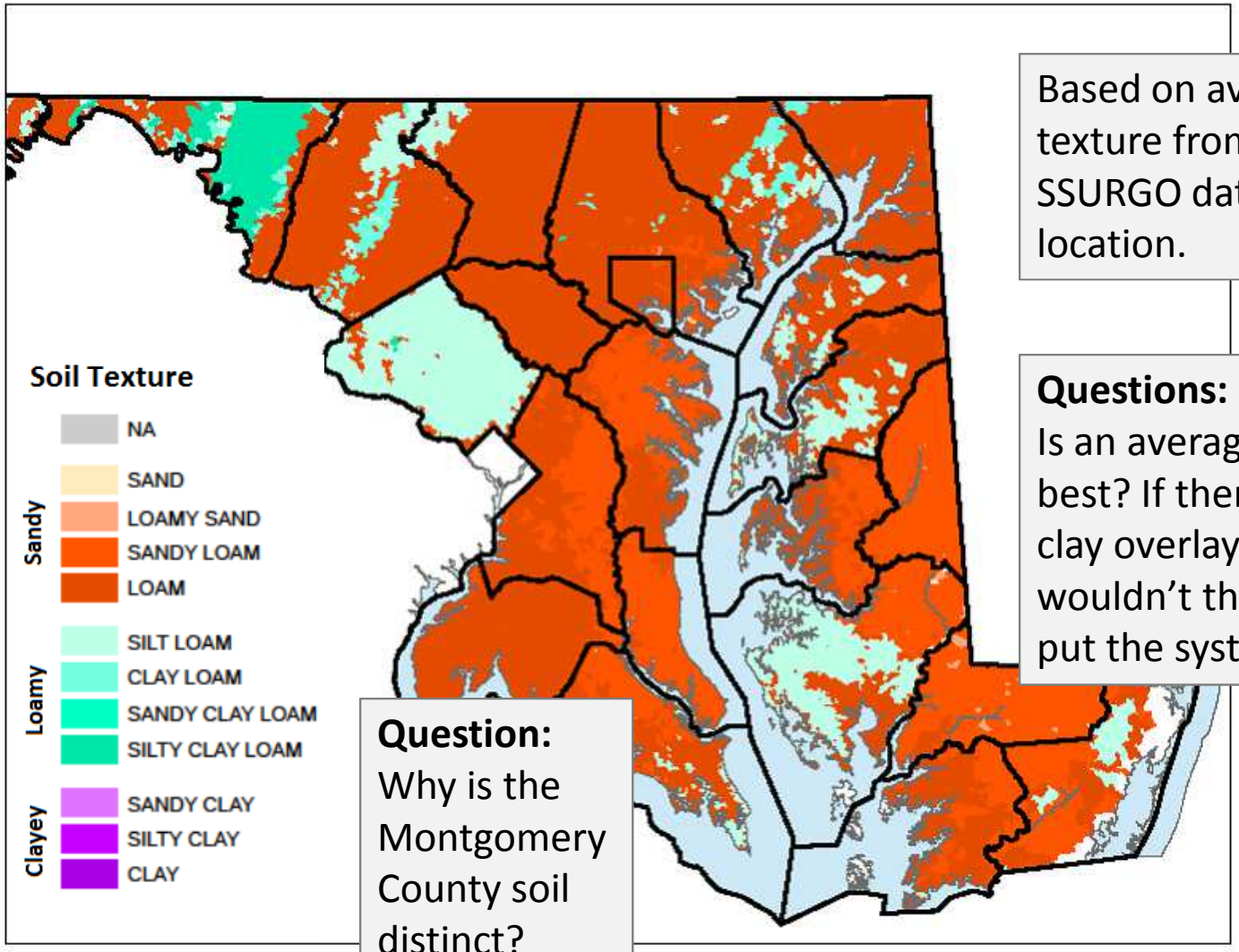
Outline

- CBP's drainfield soil texture results from SSURGO
- A look at SSURGO results by depth
- Results of surveys of county health directors
- Interpretation of survey results
- Conclusions

CBP Soil Texture Map

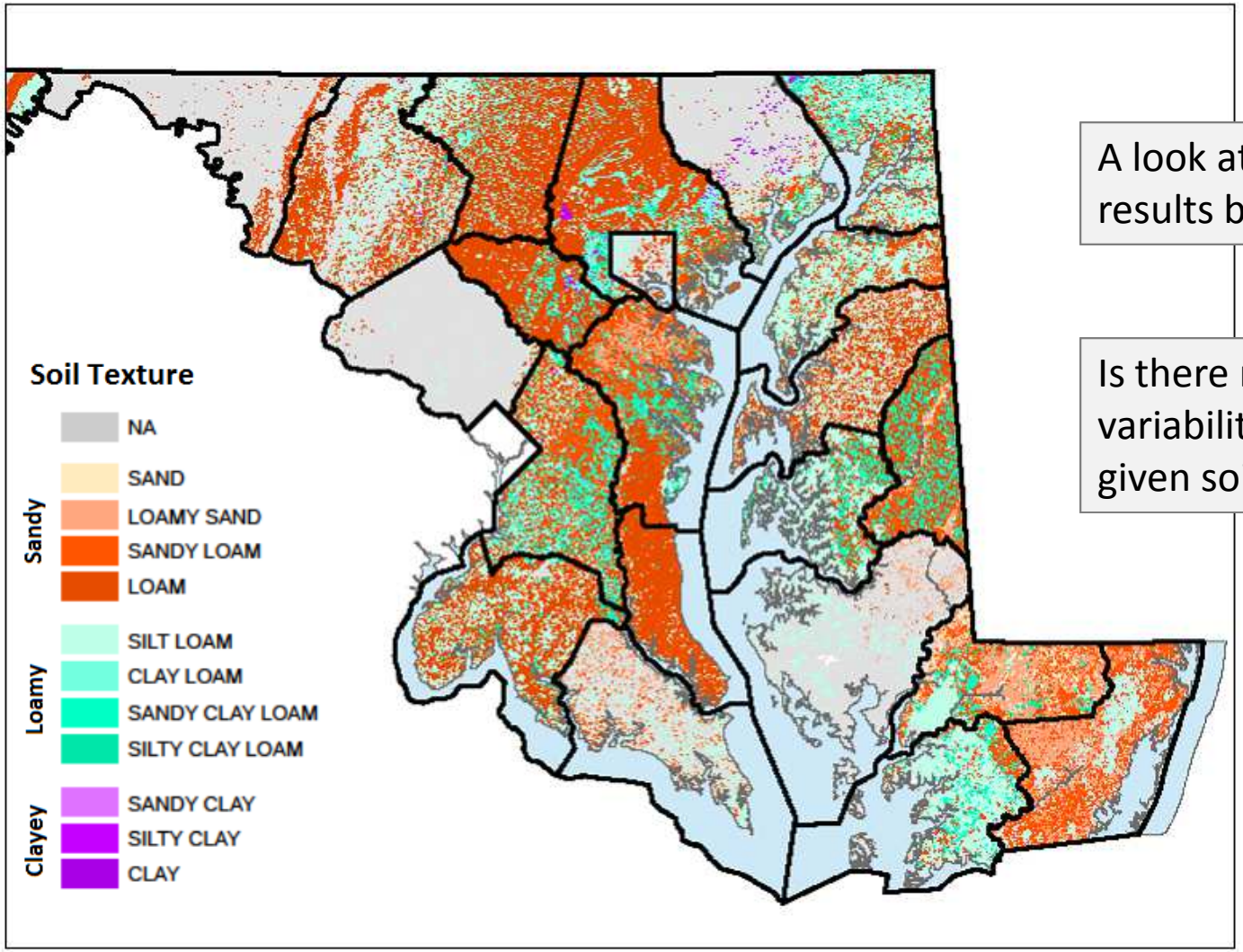


Based on average soil texture from available SSURGO data for a given location.

Questions:
Is an averaging approach best? If there's a layer of clay overlaying sand, wouldn't the installers put the system in sand?

Question:
Why is the Montgomery County soil distinct?

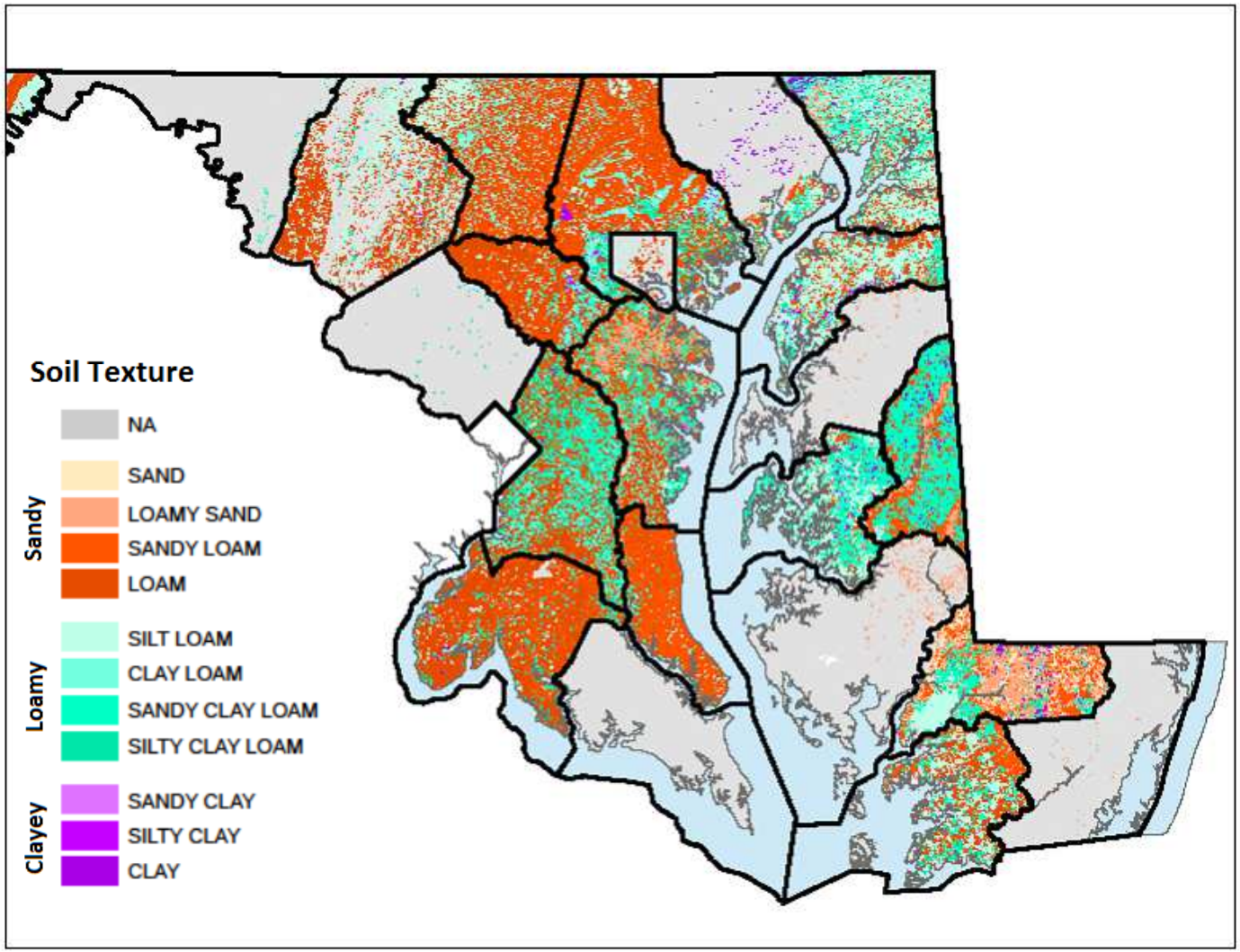
SSURGO Soil Texture at 1' depth



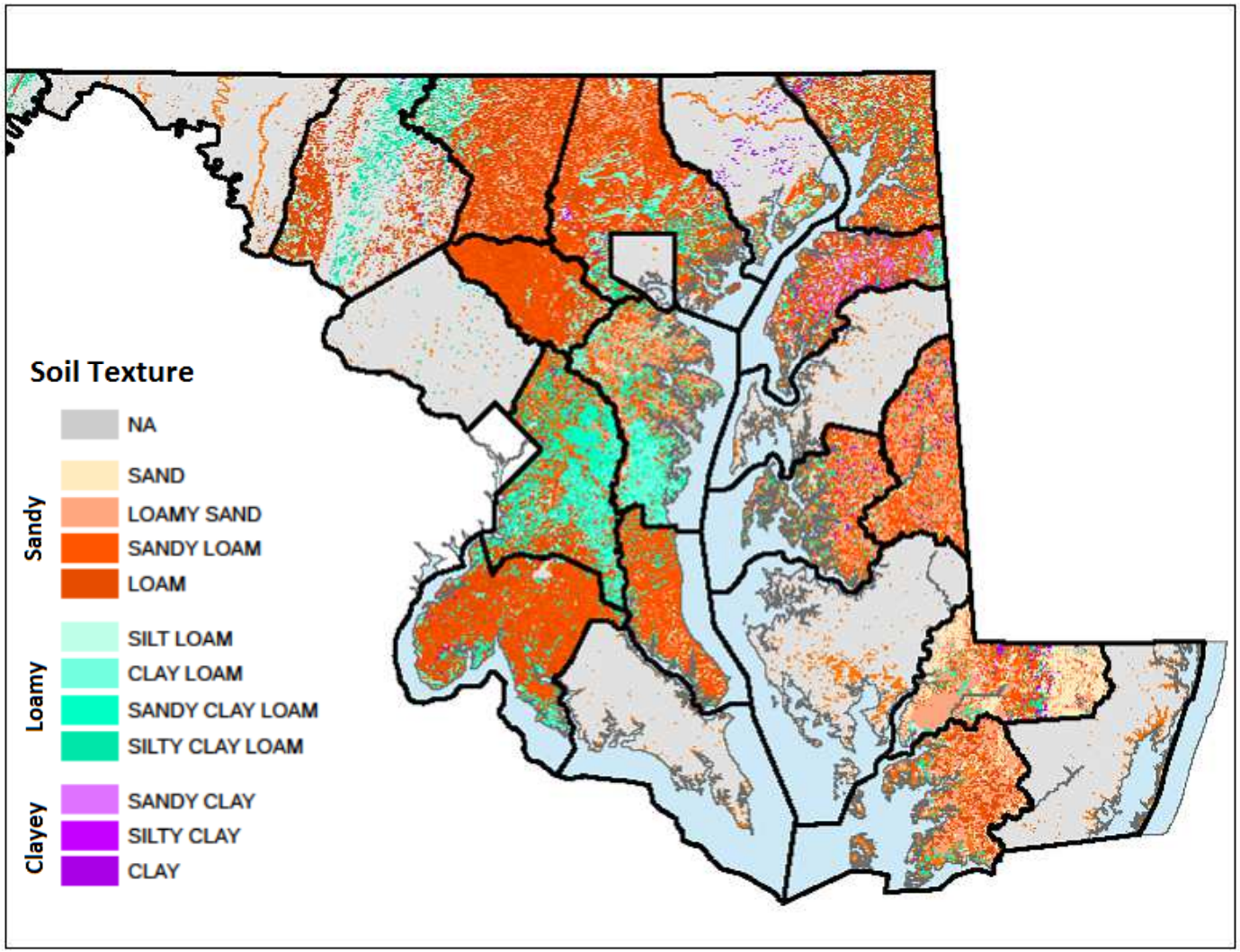
A look at SSURGO results by depth …

Is there much variability within a given soil column?

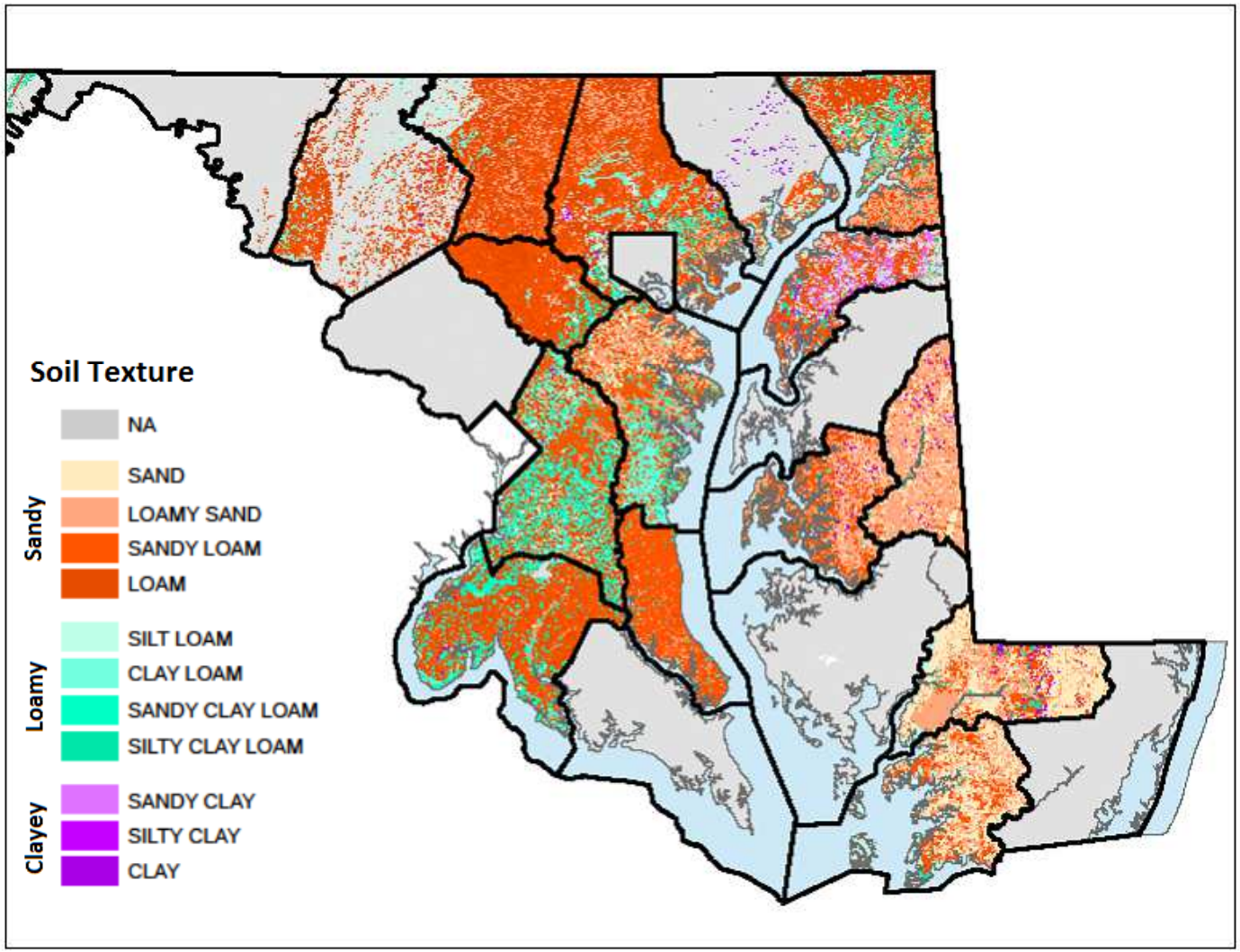
SSURGO Soil Texture at 2’ depth



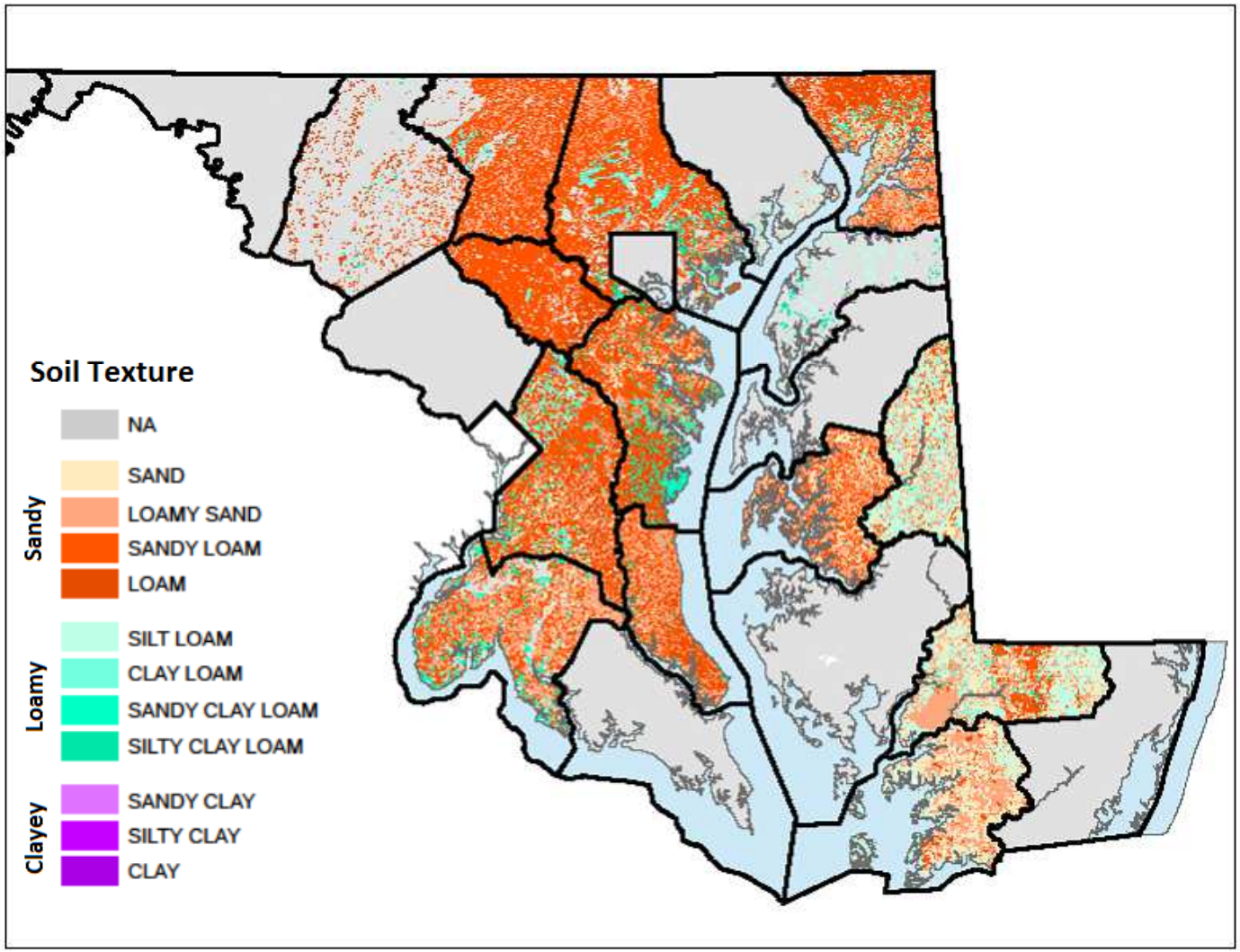
SSURGO Soil Texture at 3’ depth



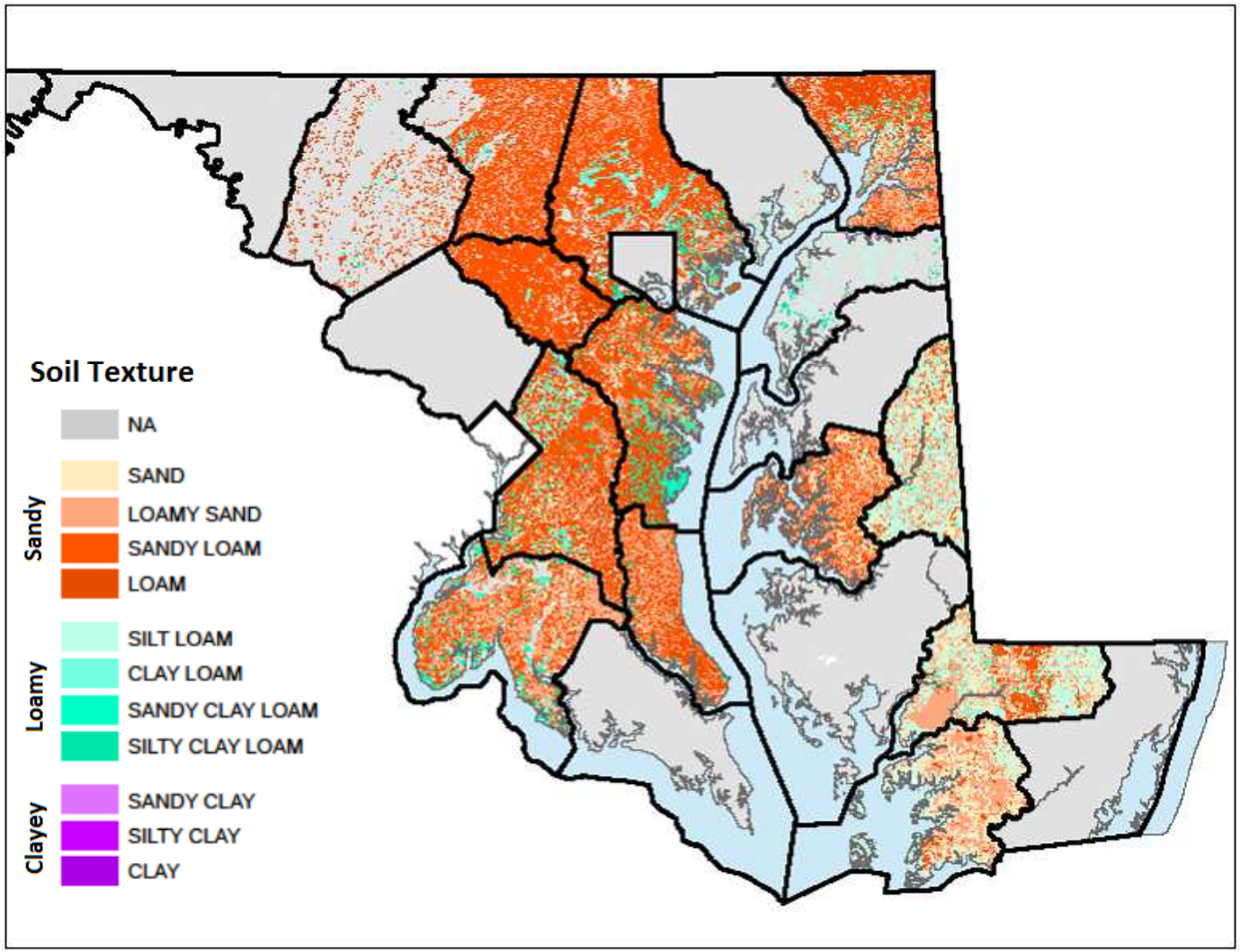
SSURGO Soil Texture at 4’ depth



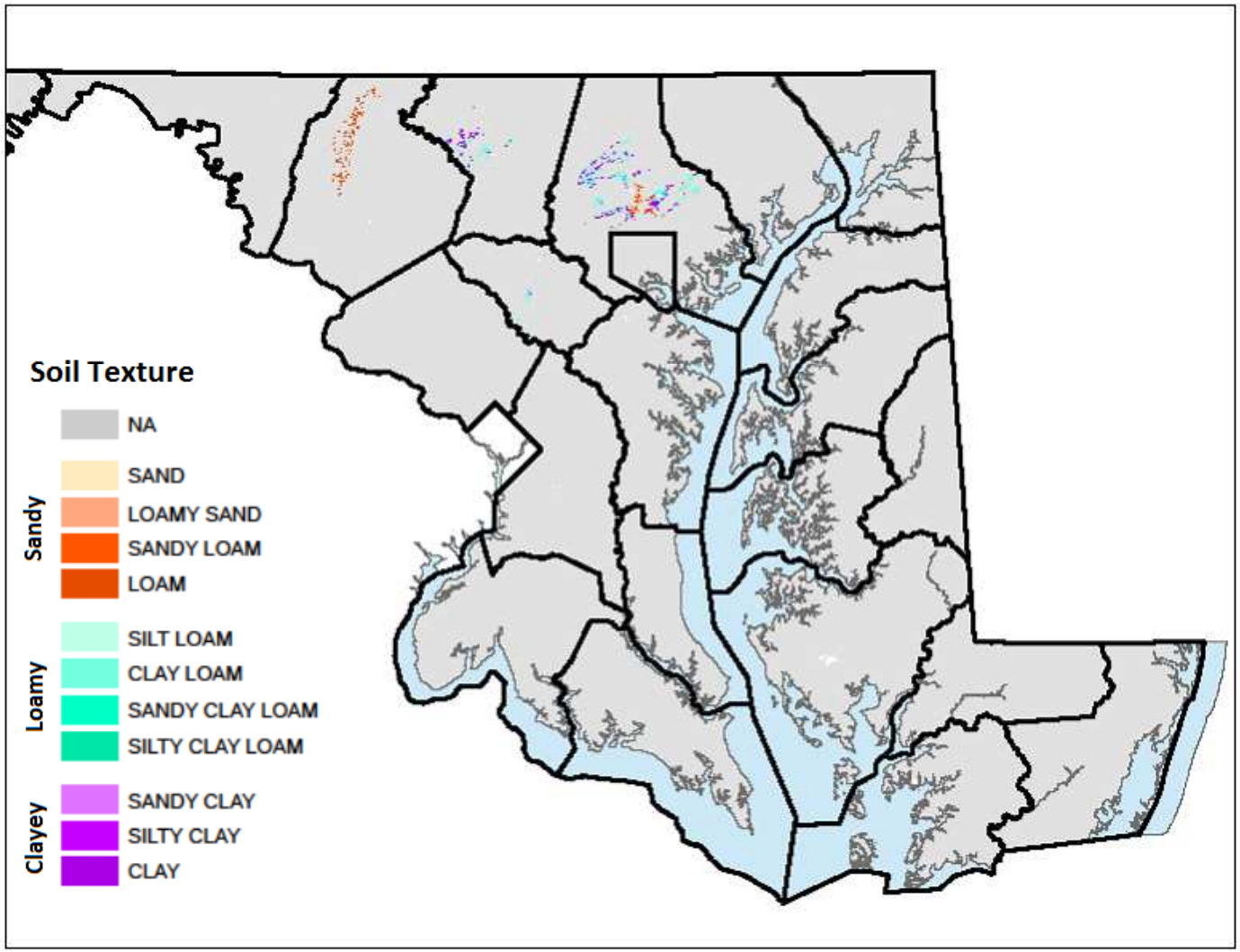
SSURGO Soil Texture at 5’ depth



SSURGO Soil Texture at 6’ depth



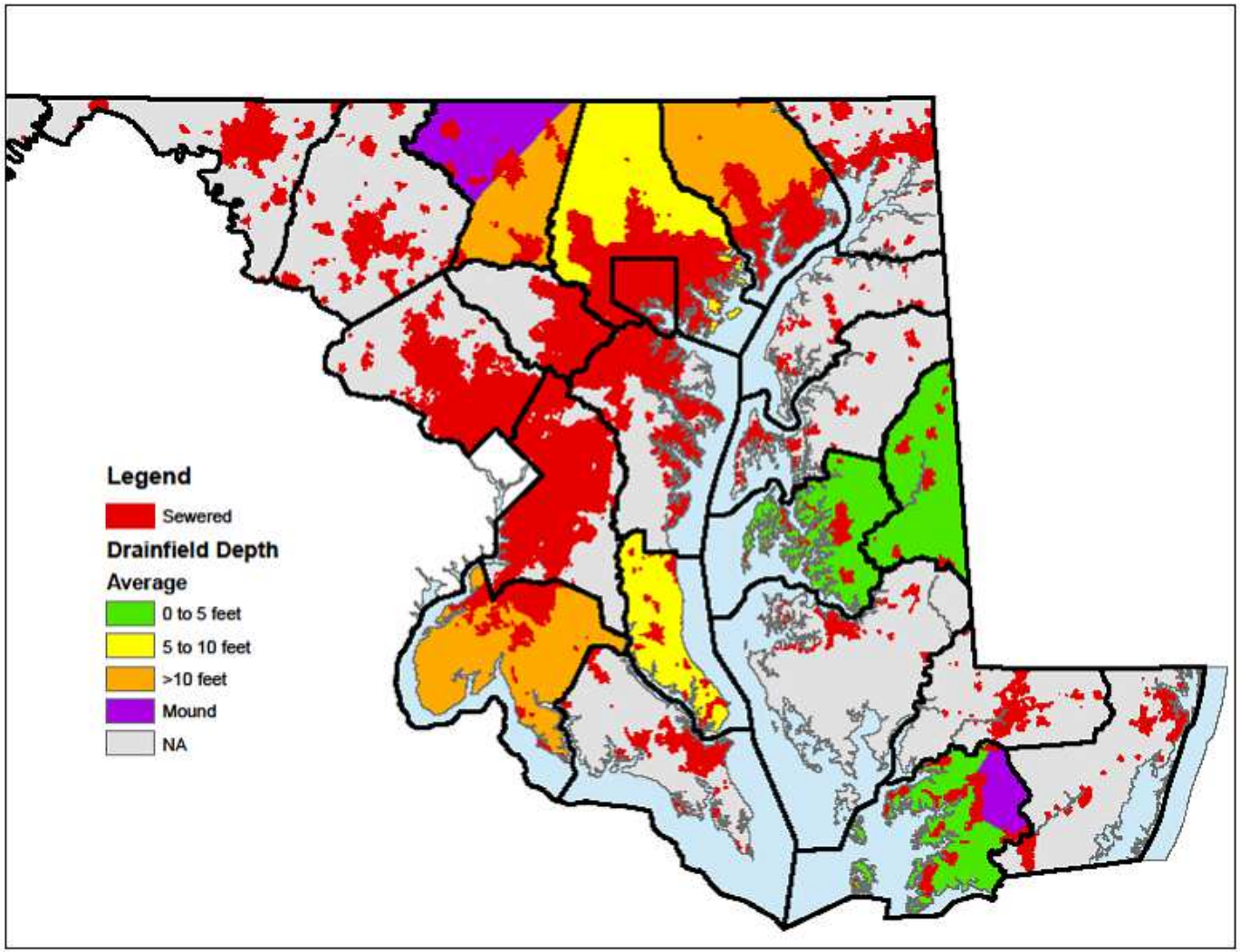
SSURGO Soil Texture at 7’ depth



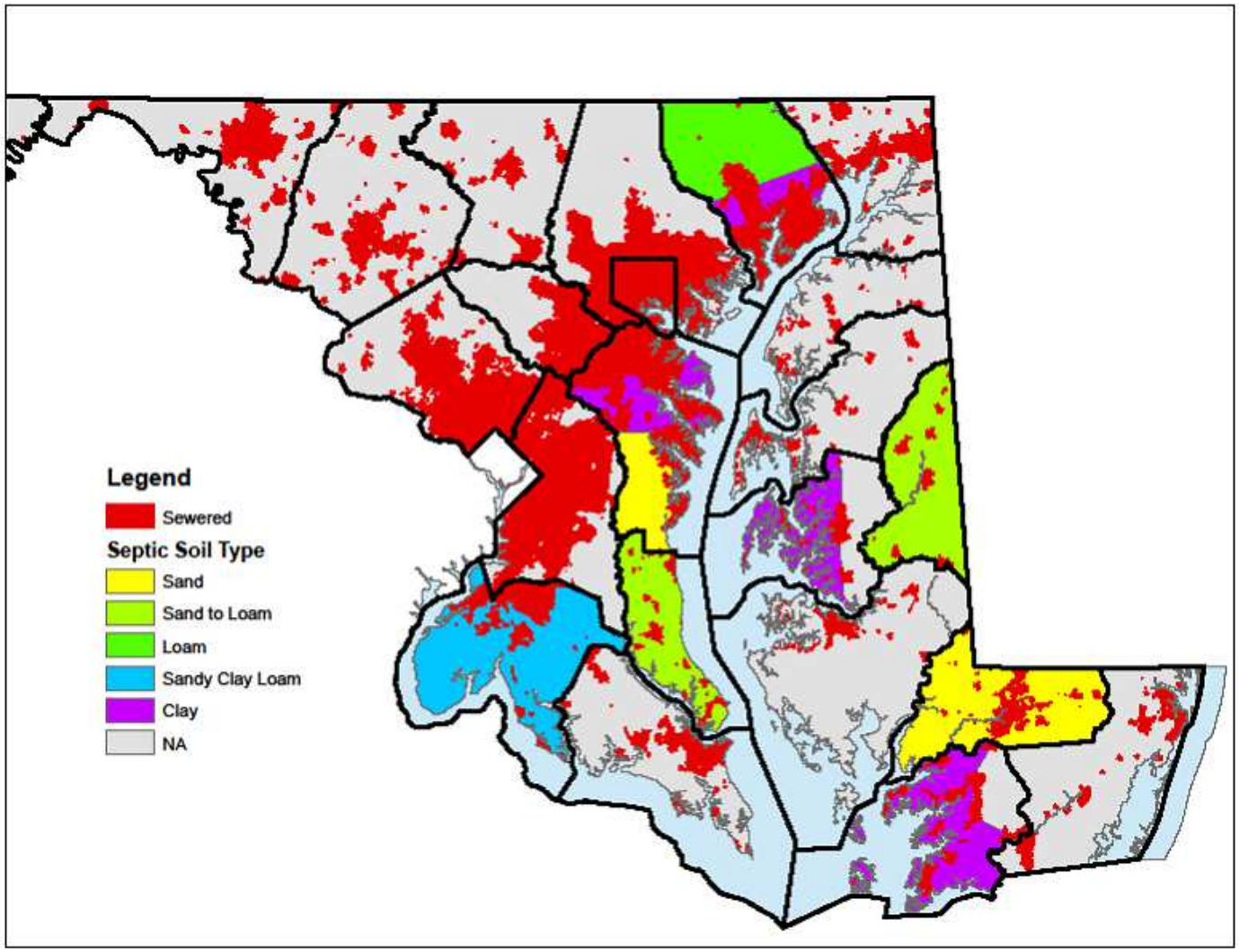
Results of Comparison

- Some locations vary between sandy and loamy soils
- The SSURGO data doesn't go very deep
  - Typically 6 feet or less
  - Experts have stated that Maryland has a lot of deep systems
  - Maybe SSURGO is not appropriate for defining drainfield soil type in Maryland
  - Alternative approach: Survey of county health departments to determine soil type

Survey Results: System Depth



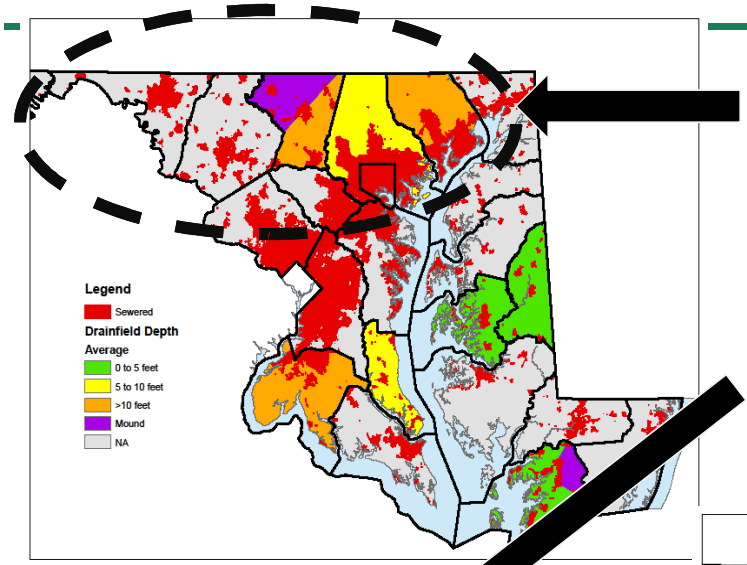
Survey Results: Drainfield Soil



Interpreting Survey Data

- Assumptions:
  - Assume that systems are never installed in clayey soil textures: sandy clay, silty clay & clay
    - SSURGO maps for counties that identified drainfield clay soils showed clay loams, corresponding to “loamy” textures in the Expert Panel Report
  - Assume that deep systems are installed in hydraulically conductive soils: sand, loamy sand, sandy loam & loam
  - Assume mounded systems are constructed using hydraulically conductive soils: sand, loamy sand, sandy loam & loam
  - Assume that systems have a full treatment zone (meaning no groundwater discharges) since systems without a full treatment zone were not addressed in the report

Northern Maryland

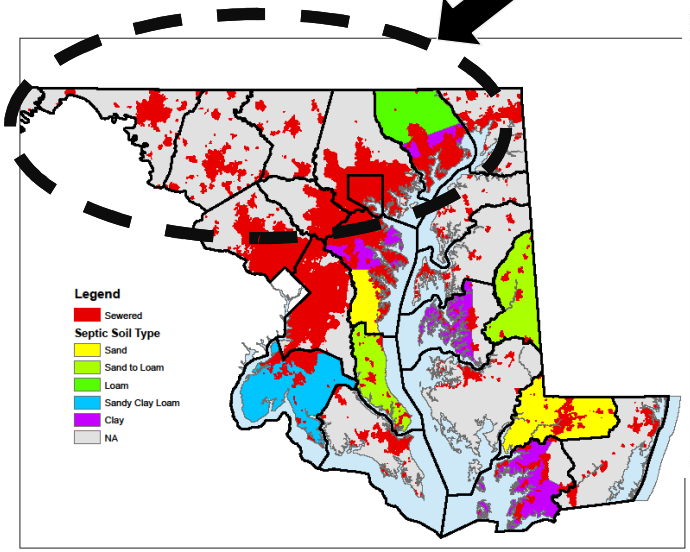


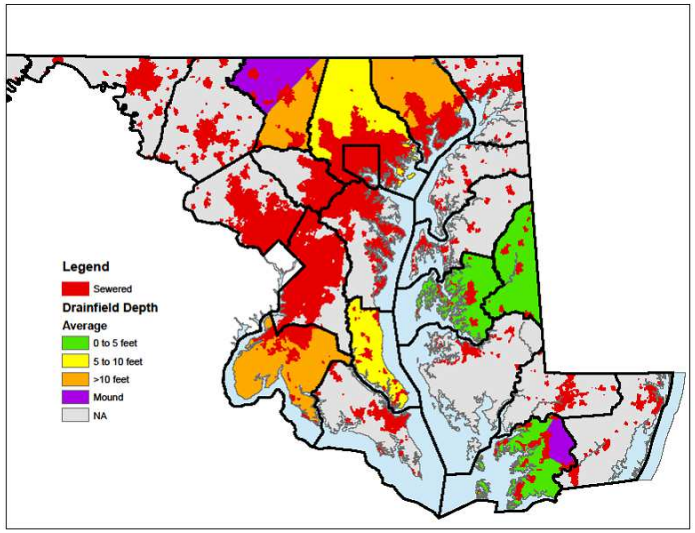
Depth characteristics

- Deep systems and mounded systems
- Deep systems are mostly below the 6'-zone covered by SSURGO

Soil characteristics

- Harford County identifies loamy soils in north and clay in south
- Southern Harford County is mostly sewered





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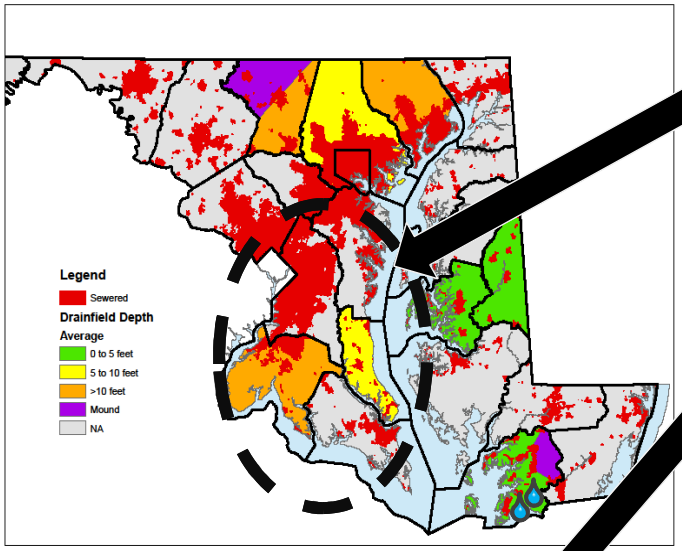
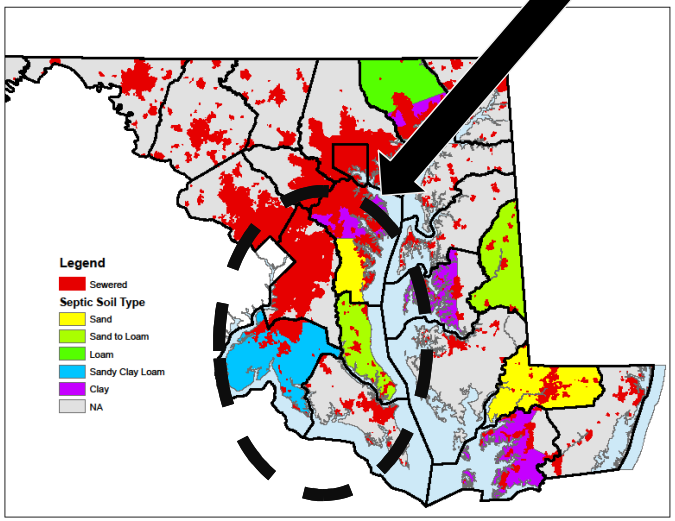
Southern Maryland





Depth characteristics

- Moderately-deep to deep systems
- Systems are mostly below the 6'-zone covered by SSURGO
- Many systems discharge to groundwater

Soil characteristics

- Charles County soils are silt clay soils on top of sandy clay loam soils
- Calvert County soils are 60% sandy and 40% loamy
- Anne Arundel has clay in north with clay over sand in south
- Northern Anne Arundel County is largely sewered

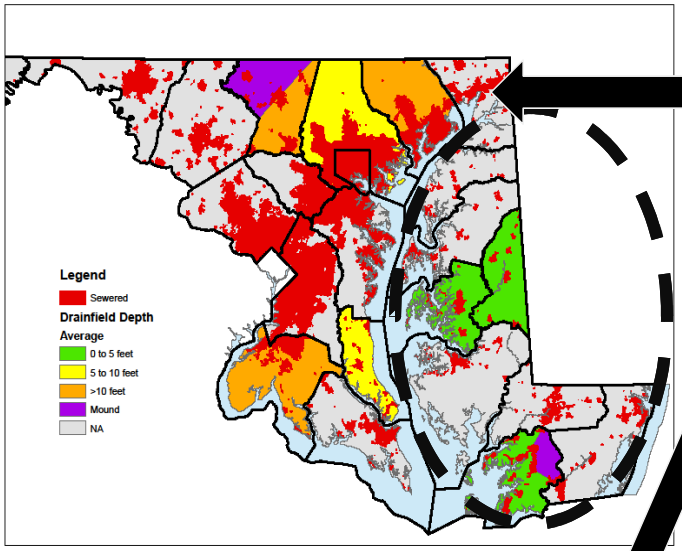
Assumptions

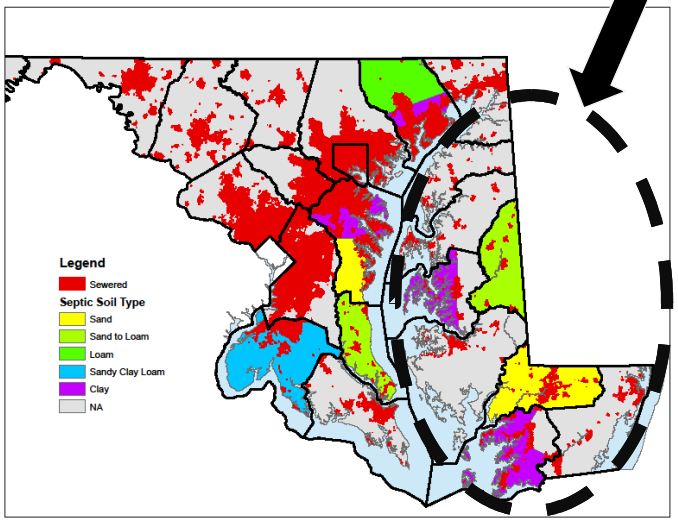
- Assume consistent septic soil patterns for counties east of the Patuxent River and west of the Patuxent River

Conclusions:

- Assign sandy to loamy soils to southern Anne Arundel and Calvert Counties
- Assign loamy to silty soils for Prince George's Charles and St Mary's Counties
- Assign loamy to silty soils for northern Anne Arundel County

Eastern Shore



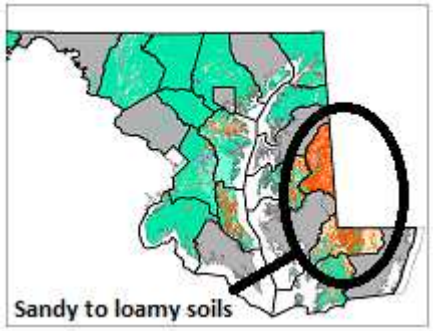


Depth characteristics
- Mostly shallow systems
- Mounded systems inland in lower eastern shore
- Systems discharge to groundwater in coastal areas

Soil characteristics
- Sandy soils inland
- Clay in coastal areas extending down to water table above sandier soils. Systems tend to be installed in sandy soils below the water table

Assumptions
- Inland systems are installed in the sandy horizon shown in the SSURGO data at the 3'- to 4'-depths
- Coastal systems are installed in sand regardless of water table depth

SSURGO: 3'-depth



Conclusion: Assign sandy to loamy soils to all systems on the lower eastern shore

Conclusions

- It is difficult to quantitatively assess soil conditions in a given area,
  - Given the depth of Maryland's septics, health department surveys seem to be more valid in Maryland than the SSURGO data
- Within the framework laid out in the Septic Attenuation Expert Panel Report for Zone 1:
  - Assign "sandy" soil classes to all regions except Southern Maryland, south of the Patuxent
  - For these other counties, assign a "loamy" soil type
- Consider investigating the implications of addressing groundwater systems