Sanitary Sewer Exfiltration: Optional Reporting

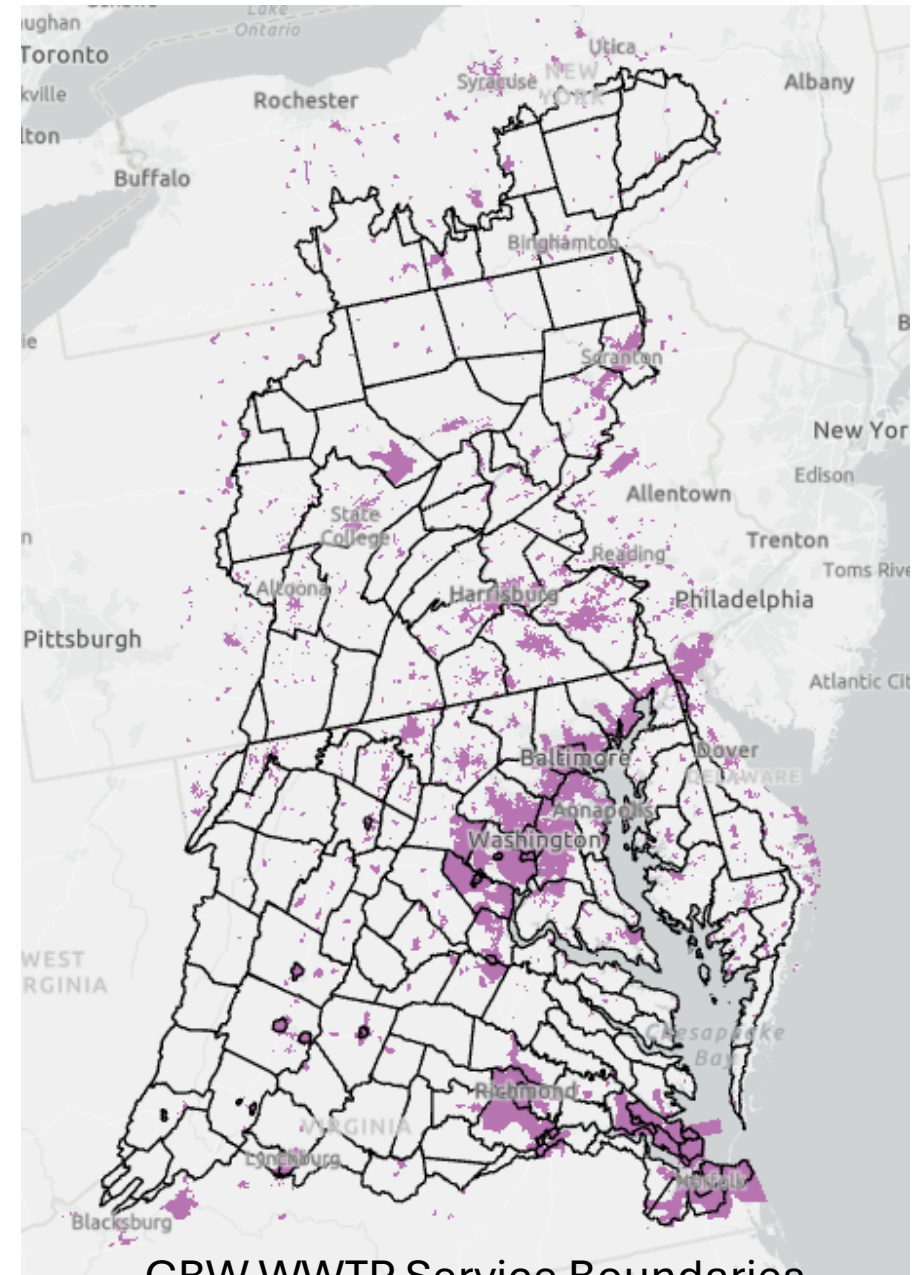## Wastewater Treatment Workgroup

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CBW WWTP Service Boundaries

Agenda

1. Standardized Scale of Reporting

2. Default for Fraction Gravity Line

3. Reporting Time Scale

4. Defining Rehabilitation

Spatial representation

- The P7 Summary Units will be used as the fundamental unit for the model (combination of NHD+ catchment, P7 LRsegs, MS4s, CSOs, federal facilities)
- Dry weather flow (DWF) will be defined by facility reporting and service areas (generally larger spatial scale than P7 Sum Units).
- Facilities are not always linked to their service areas.
  - Facilities are assigned to the service area they reside in.
  - If a facility is not in a service area, it is assigned to the service area it shares a model unit with (currently P6 LRseg, but will update to P7 units).
  - When there are multiple facilities within a single service area polygon, their DWF is summed for that polygon and distributed based on P7 Sum Unit sewer served population.
    - CSO and MS4 polygons are always separated

Scale of reporting – Standardization Options

1. Phase 7 Land-River Segment (LRseg) Scale
   a) All Sanitary Sewer Service Area (SSSA) within the P7 LRseg receive a uniform value
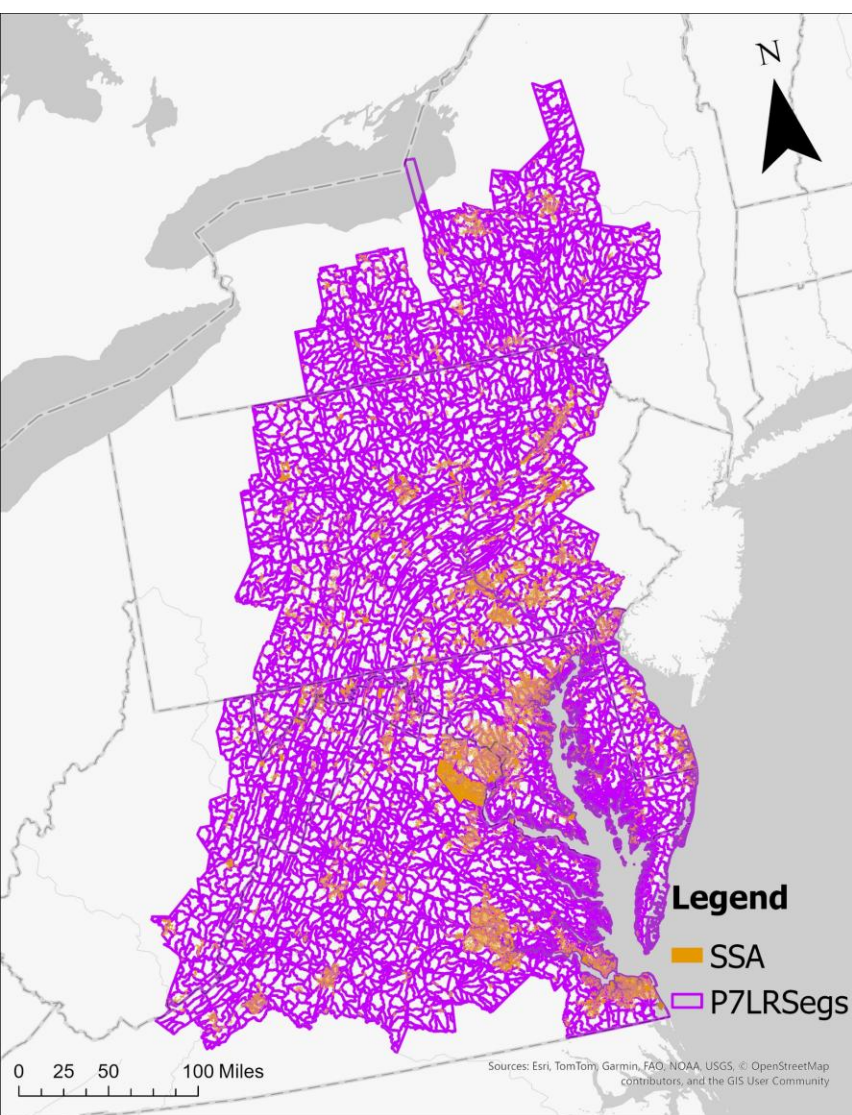   b) Value applied to model units within SSSA

OR 2. NPDES IDs
   a) Like Dry Weather Flow (DWF), will be linked to SSSA through the model unit it shares
   b) If there are multiple values for outfalls within the same model unit, take a flow weighted average for the SSSA
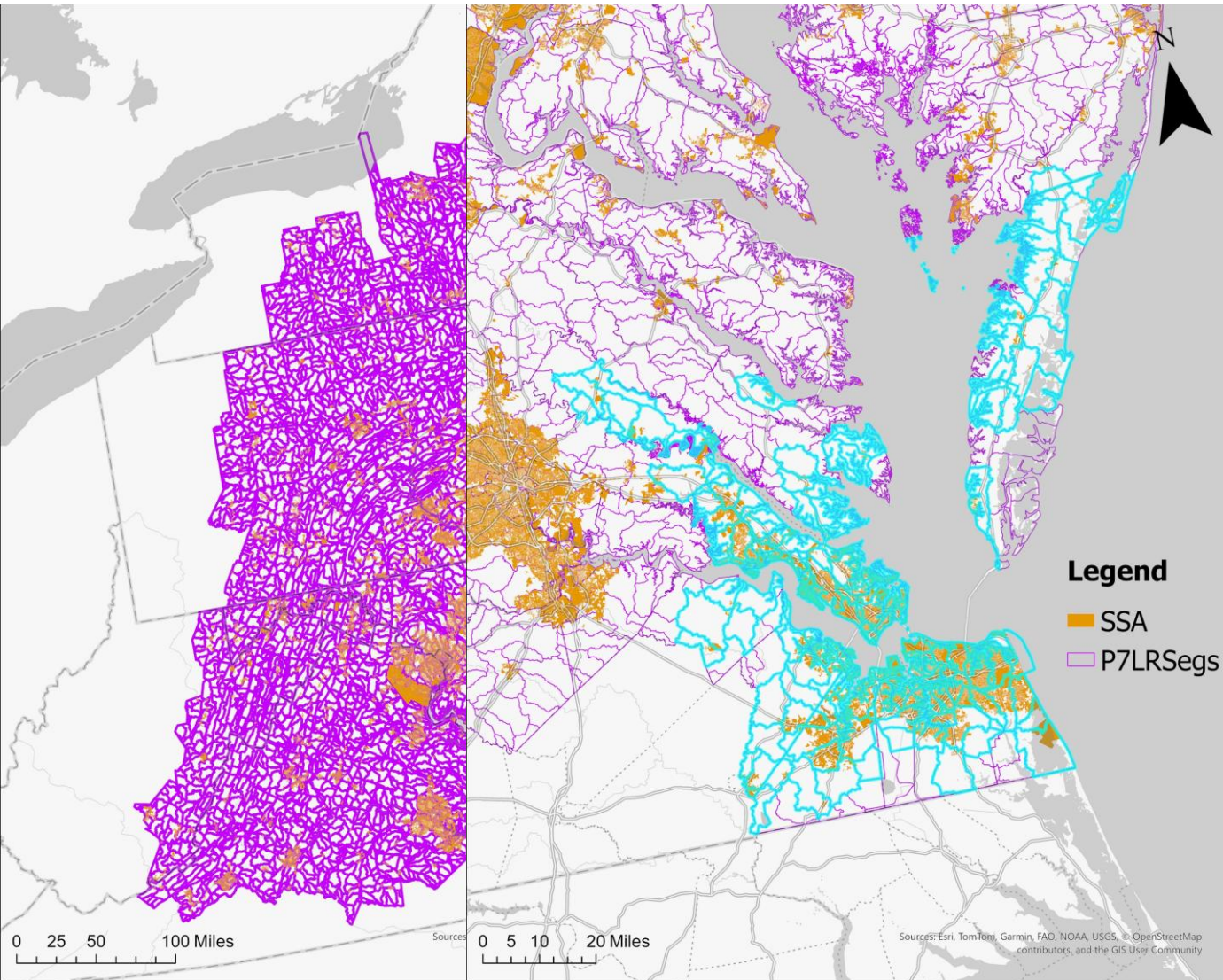
OR 3. Custom Service Area
   a) Provide overall footprint of SSSA
   b) All SSSA within footprint receive the optional value uniformly
   c) Value applied to model units within SSSA

P7 Land-River Segment – Example for HRSD
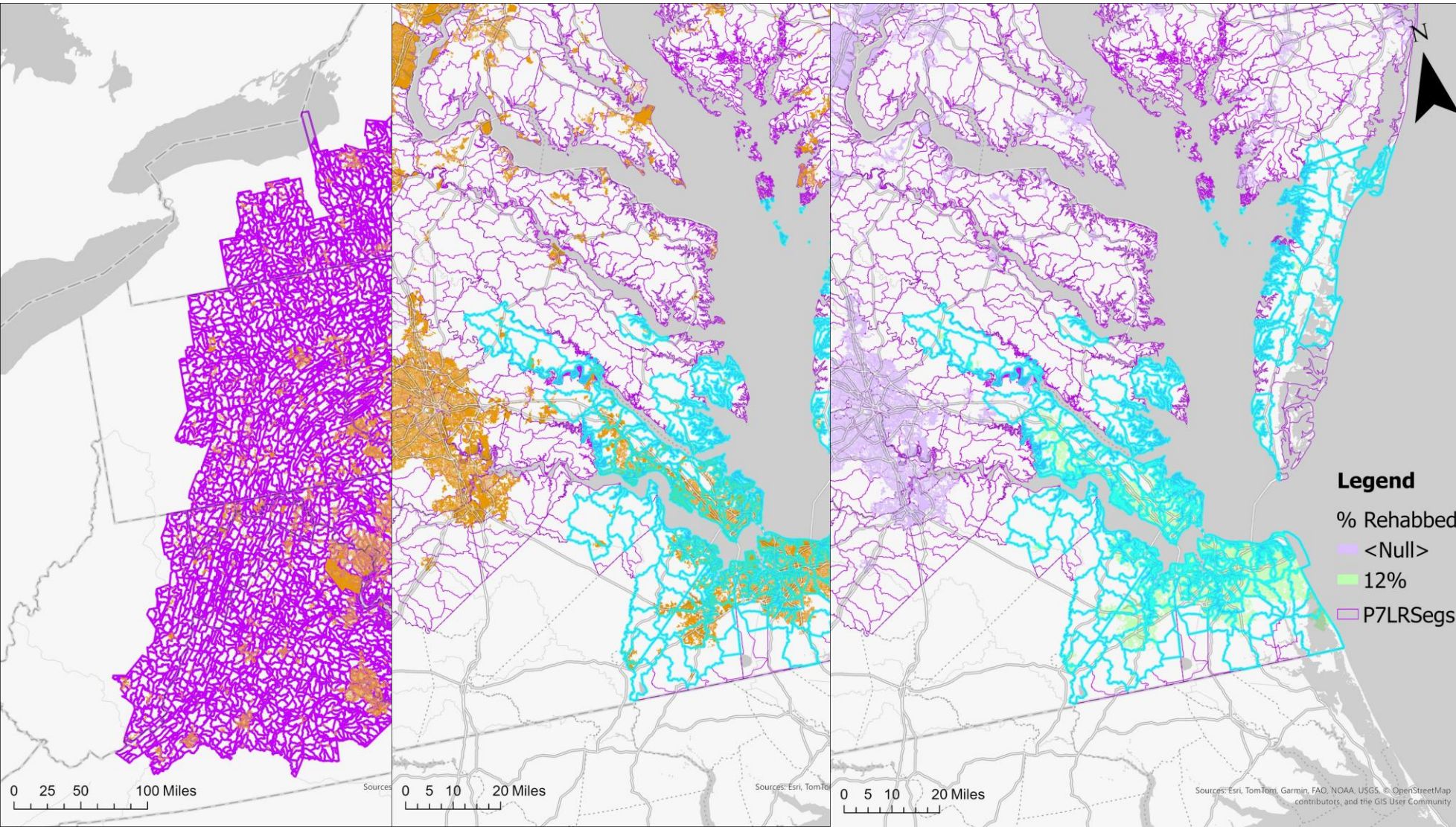

1. Sewer Service Areas
Assigned to P7 LRsegs

P7 Land-River Segment – Example for HRSD

Legend
- SSA
- P7LRSegs

1. Sewer Service Areas Assigned to P7 LRsegs

2. Define Geographic Extent of Data Submitted

P7 Land-River Segment – Example for HRSD
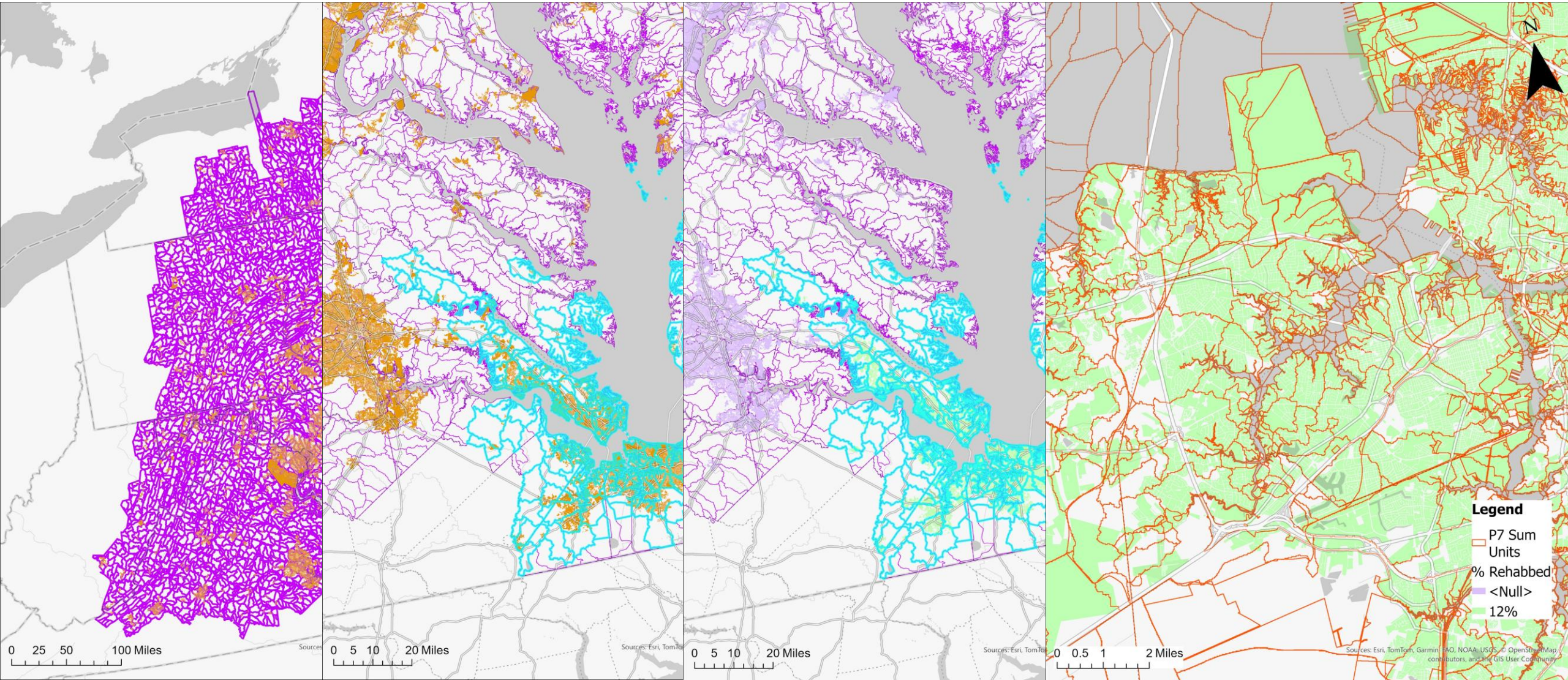

Legend

% Rehabbed
- <Null>
- 12%
- P7LRSegs

1. Sewer Service Areas Assigned to P7 LRsegs

2. Define Geographic Extent of Data Submitted

3. Apply Fraction Rehabilitated Uniformly

P7 Land-River Segment – Example for HRSD

Legend

P7 Sum Units

% Rehabbed
<Null>
12%

1. Sewer Service Areas Assigned to P7 LRsegs

2. Define Geographic Extent of Data Submitted

3. Apply Fraction Rehabilitated Uniformly
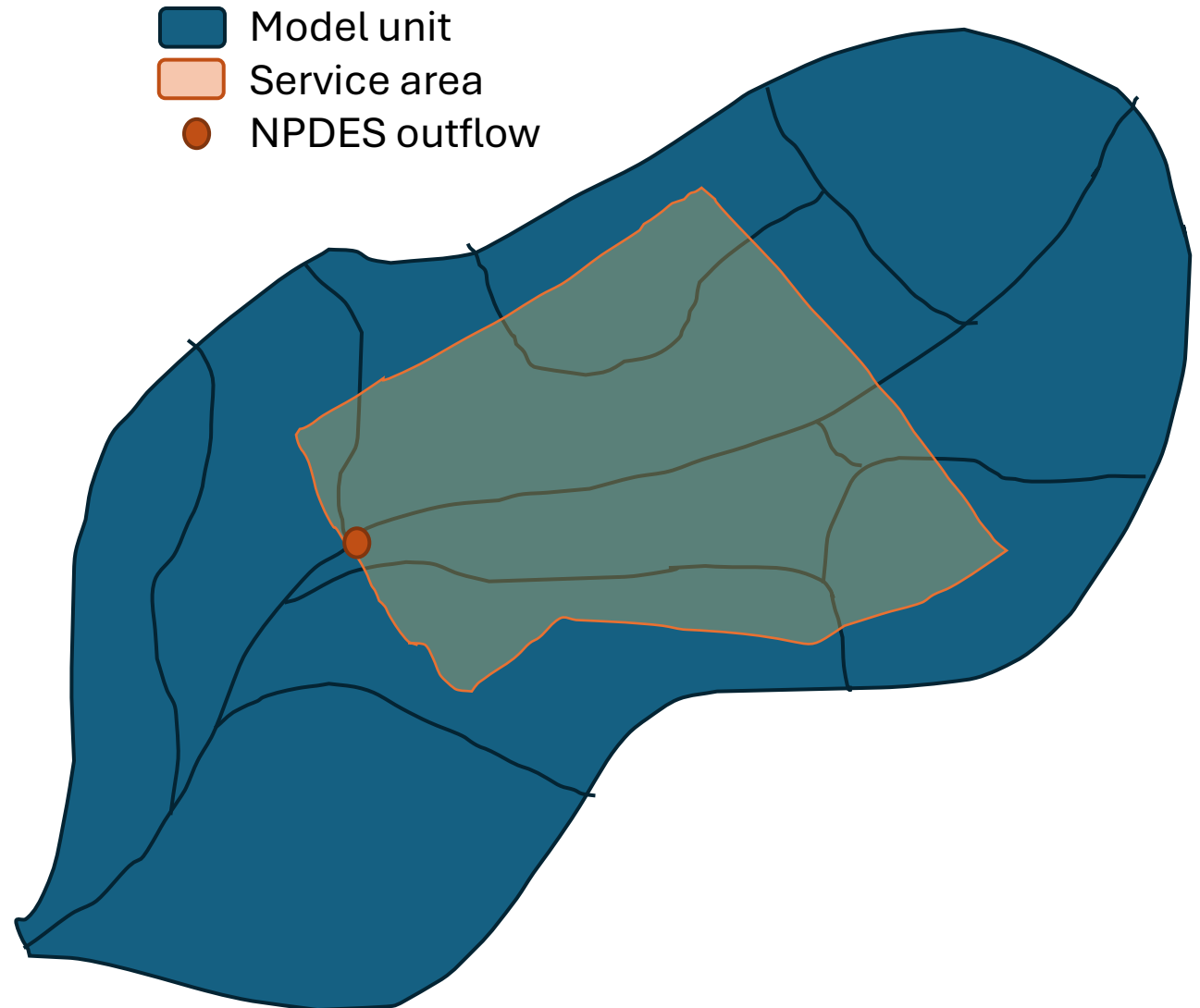
4. Convert to Model Units

NPDES Outflow ID

Dry Weather Flow
- DWF from outflow is assigned to service boundary polygon that it is inside of
- DWF is then distributed to each model unit within the service boundary based on the sanitary sewer served population

Optional Reporting
- The values submitted for this outflow would be assigned to the whole service area and then the model units within it.

Legend:
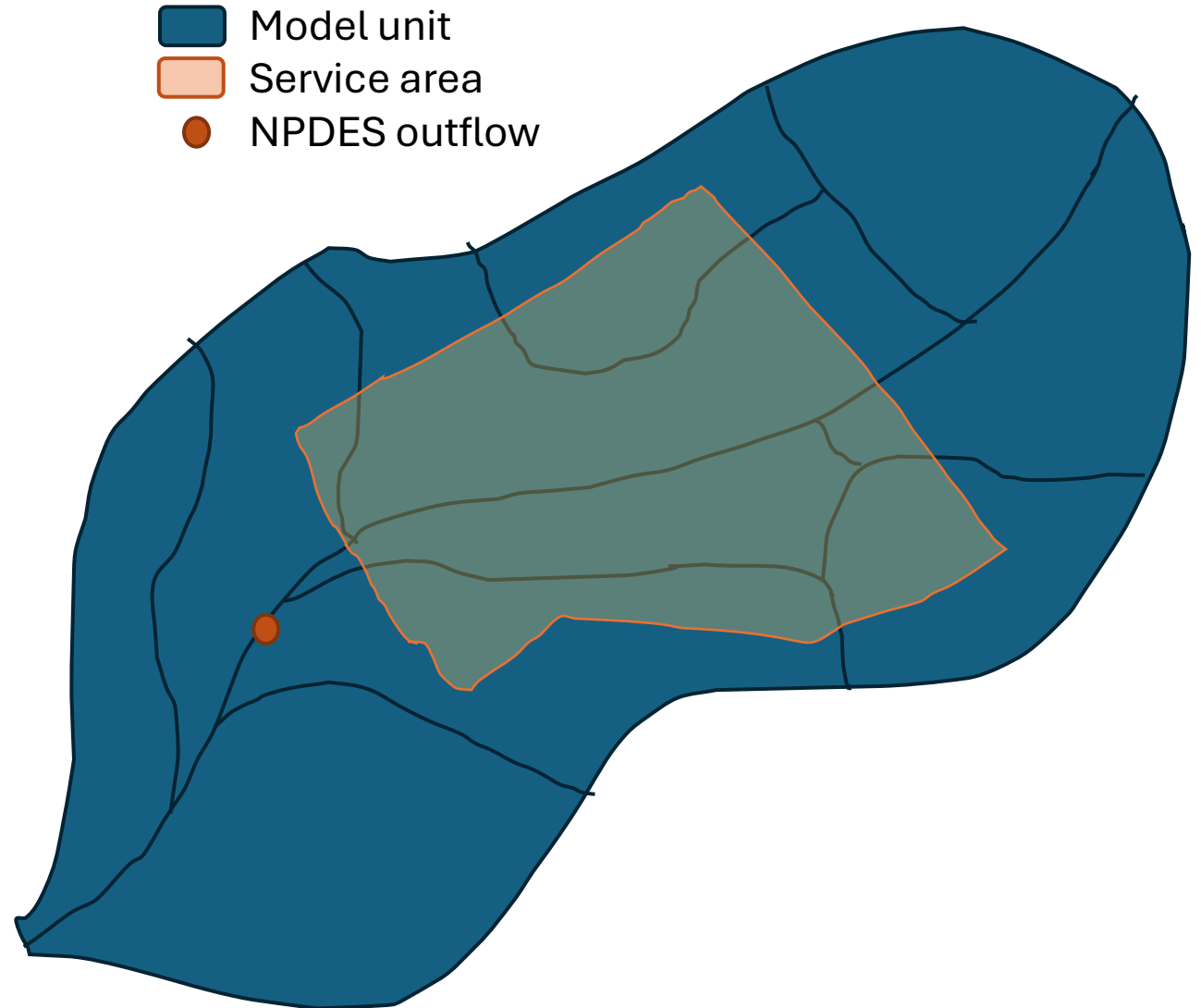- Model unit
- Service area
- NPDES outflow

NPDES Outflow ID

Dry Weather Flow
- The outflow is outside the service boundary, but assigned to the service boundary it shares a model unit with
- All outflows must be linked to a service area. If it can't be linked with sum-units it will be linked with LRsegs.
- DWF is then distributed to each model unit within the service boundary based on the sanitary sewer served population

Optional Reporting
- The values submitted for this outflow would be assigned to the whole service area and then the model units within it.

Legend:
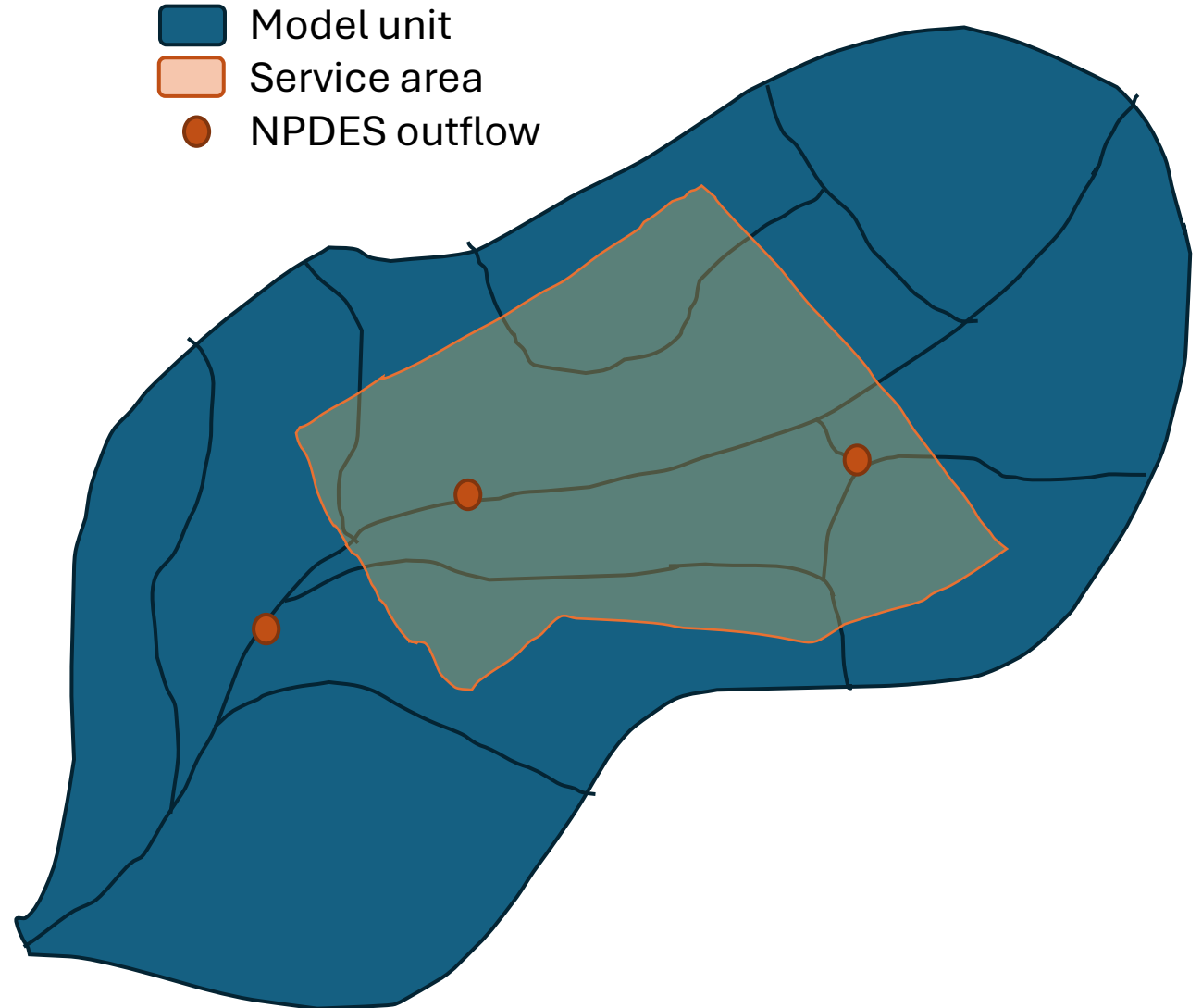- Model unit
- Service area
- NPDES outflow

NPDES Outflow ID

Dry Weather Flow
- Multiple outflows associated with the same service boundary are summed
- DWF is then distributed to each model unit within the service boundary based on the sanitary sewer served population

Optional Reports
- If reporting a single value for the service area, then the same value would be submitted for all outflows associated with the service area.
- If reporting different values for each outflow, the value for the service area would be a flow weighted average.

Percent Gravity Defaults

- 95% - US Environmental Protection Agency (USEPA). (2007). Innovation and research for water infrastructure for the 21st century: Research plan.

- 92.5% - Thomson, J., Morrison, R. S., Sangster, T., & Hayward, P. (2010). *Inspection Guidelines for Wastewater Force Mains*. Water Environment Research Foundation.

Proposal: 95% gravity lines as default for non-coastal plains model units

Percent Gravity Defaults: Coastal Plains

Hampton, VA

* 92%

* https://www.hampton.gov/601/Wastewater-Operations

York Co, VA

* 85%

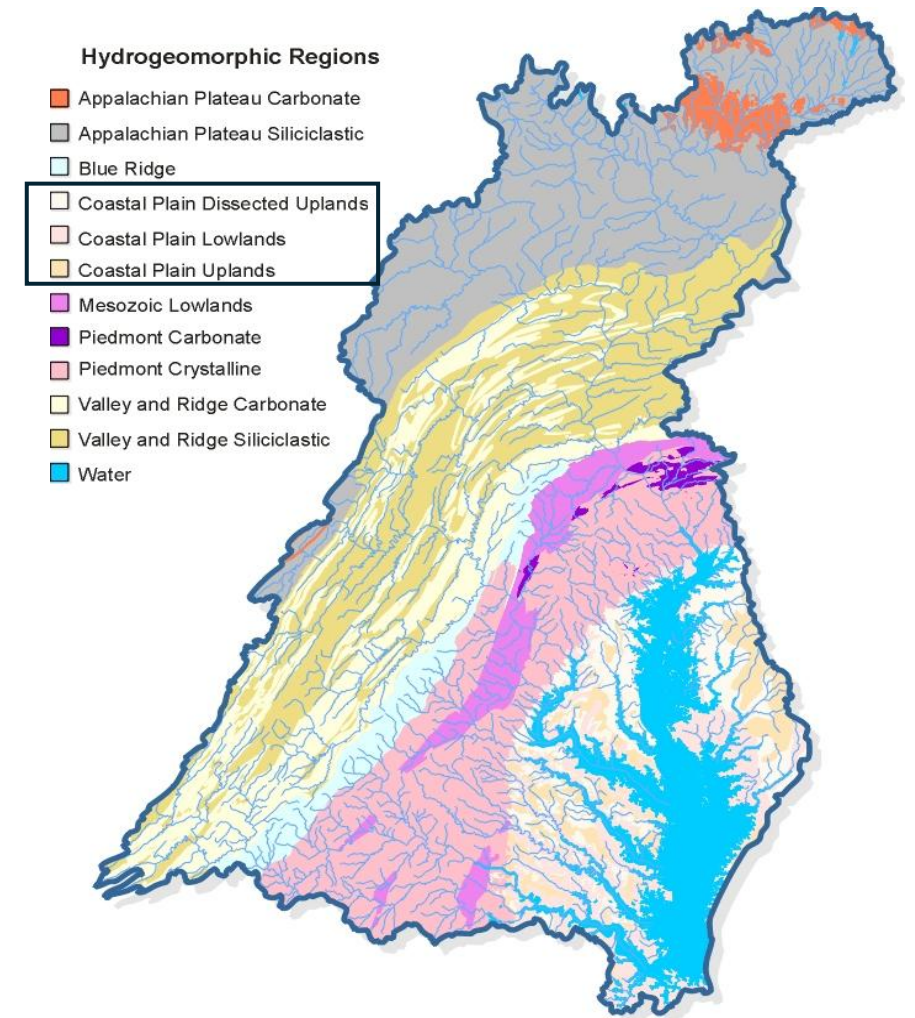* https://yorkcounty.gov/1934/Utilities

Full HRSD Locality

* 83%

* Ivy Ozmon, Hampton Roads Planning District Commission

St. Mary's Co, MD

* 57%

* https://gis.metcom.org/agendas_minutes/FY2024_AnnualReportFINAL030
52025.pdf

Proposal: 90% gravity lines as default for coastal plains model units

Hydrogeomorphic Regions

- Appalachian Plateau Carbonate
- Appalachian Plateau Siliciclastic
- Blue Ridge
- Coastal Plain Dissected Uplands
- Coastal Plain Lowlands
- Coastal Plain Uplands
- Mesozoic Lowlands
- Piedmont Carbonate
- Piedmont Crystalline
- Valley and Ridge Carbonate
- Valley and Ridge Siliciclastic
- Water

Percent Gravity Mains: Summary

Defaults:
- Coastal Plains: 90%
- Everywhere Else: 95%

Reported values are backcasted

Reporting Time Scale

Two Options:

- 10 yr Sum - Directly report the value of new and newly rehabbed within the last 10 yr timeframe.

OR

- Annual - Report the % of the system that is new or newly rehabilitated for each year.

In both scenarios, missing values are interpolated from the last reported value (up to 3yrs) with no backcasting.

Example

	Annual (%)	10-yr CAST (%)
2007	0.92	0.92
2008	0.68	1.61
2009	0.65	2.26
2010	0.81	3.07
2011	0.01	3.07
2012	1.00	4.07
2013	0.75	4.82
2014	0.36	5.19
2015	0.61	5.79
2016	0.54	6.33
2017	0.48	5.89
2018	0.71	5.92
2019	0.04	5.30
2020	0.58	5.08
2021	0.29	5.37
2022	0.81	5.18
2023	0.01	4.44
2024	0.00	4.08

Defining Rehabilitation

For the purposes of estimating sanitary sewer exfiltration loads, rehabilitation is the systematic repair, renewal, or replacement of existing sanitary sewer pipes, joints, and laterals to restore hydraulic integrity and to prevent or reduce infiltration of groundwater into the system and unintended exchange of wastewater with surrounding soils, groundwater, or stormwater conveyances.

Decisions Requested for the 2/26/26 Meeting

- Choose Spatial Scale Standardization (**Choose 1**)
  - P7 Land-River Segment
  - NPDES ID
  - Custom
- Approve Percent Gravity Main Default Values (Or Amend and Approve)
- Choose Reporting Time Scale (**Choose 1**)
  - 10-year sum
  - Annual
- Approve Definition New or Newly Rehabilitated (Or Amend and Approve)