

Frederick County Water Resources Element

Frederick County Planning
Commission
December 20, 2023



Drinking
Water



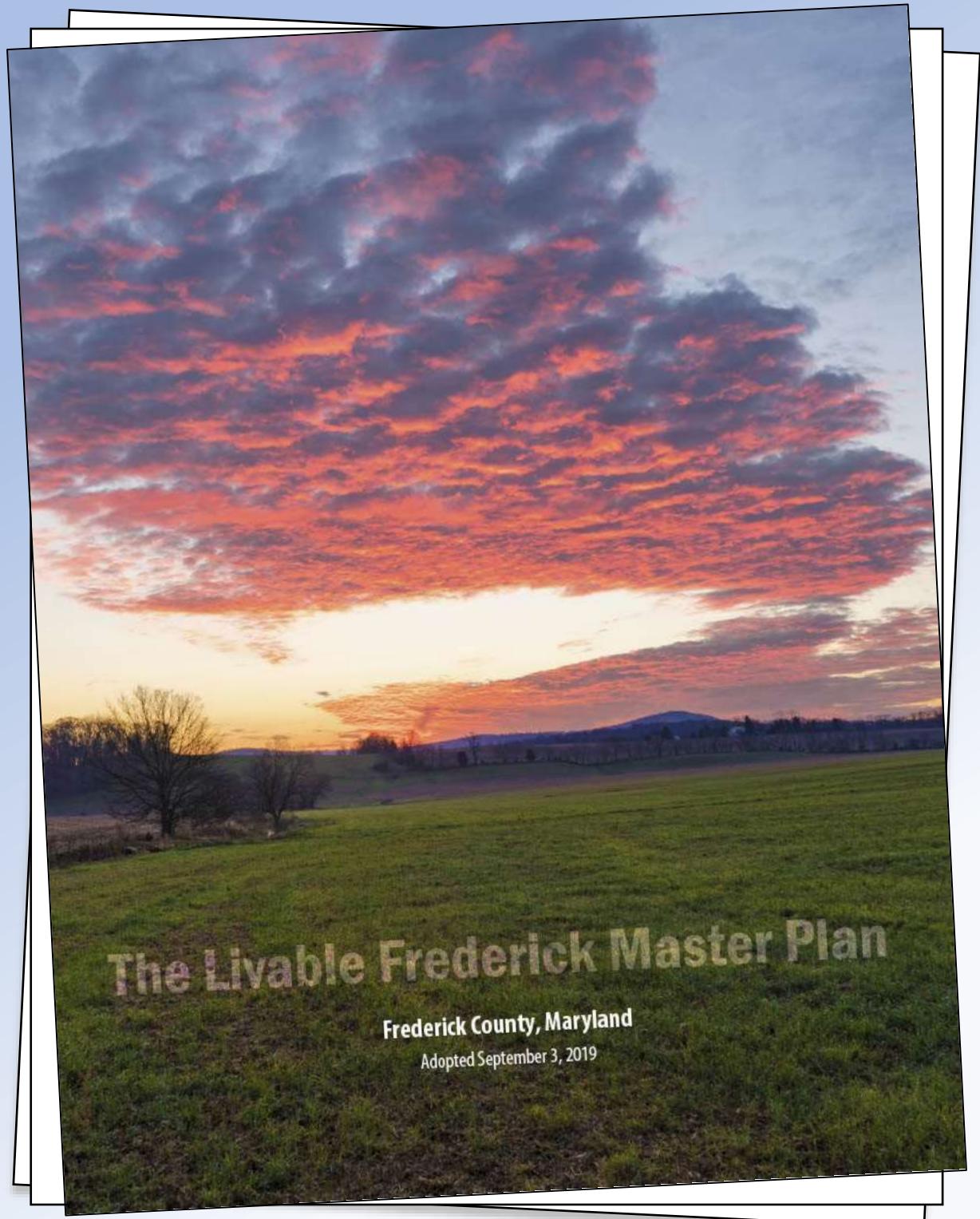
Wastewater



Stormwater



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LFMP Goals & Initiatives

Goal 4.2.1 (Water) Quality

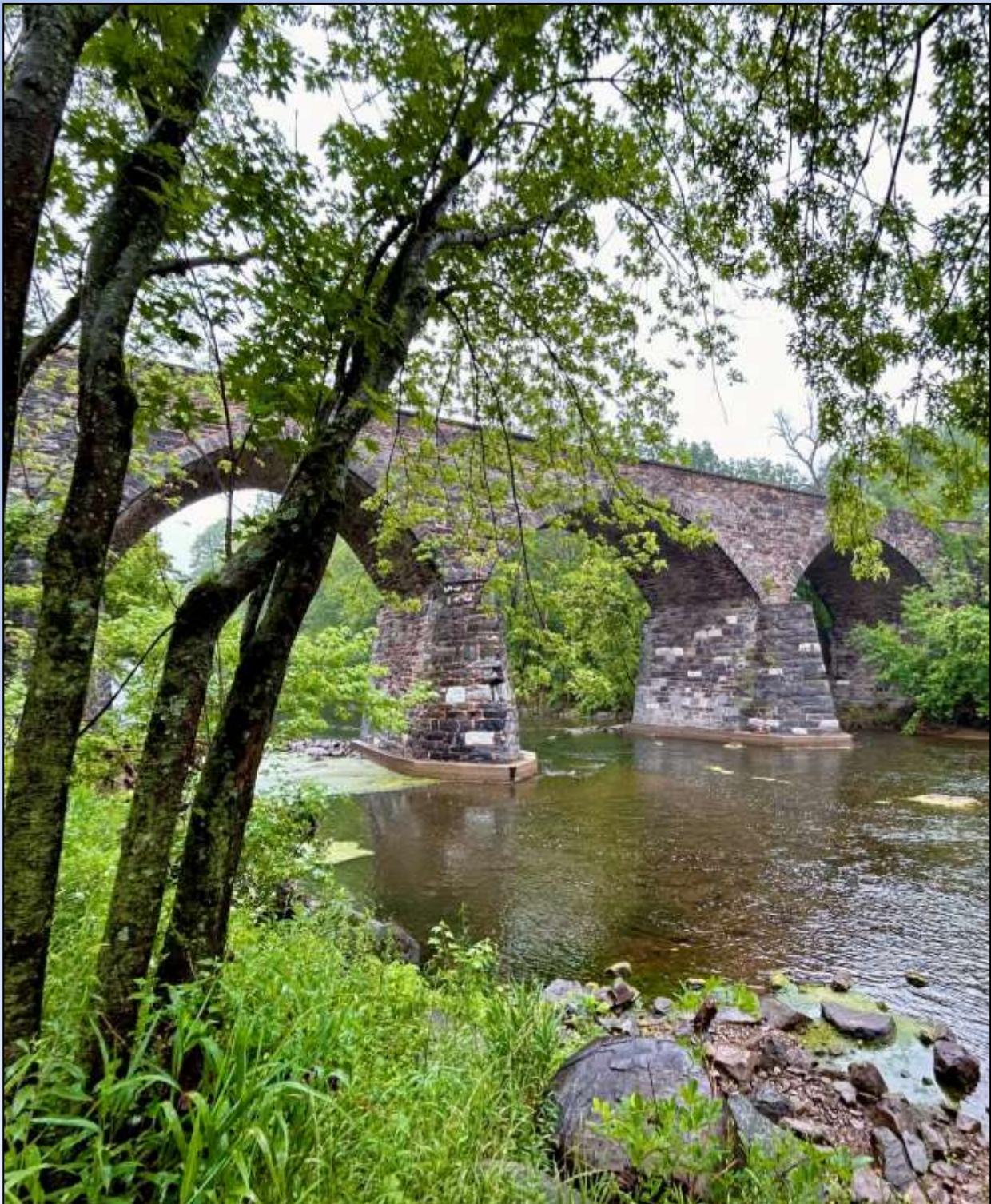
Goal 4.2.2 Supply and Treatment Infrastructure

Initiative 4.2.2.1 Water and Sewer Adequacy

Supporting Initiative 4.2.2.1.2



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Impacts to Source Waters

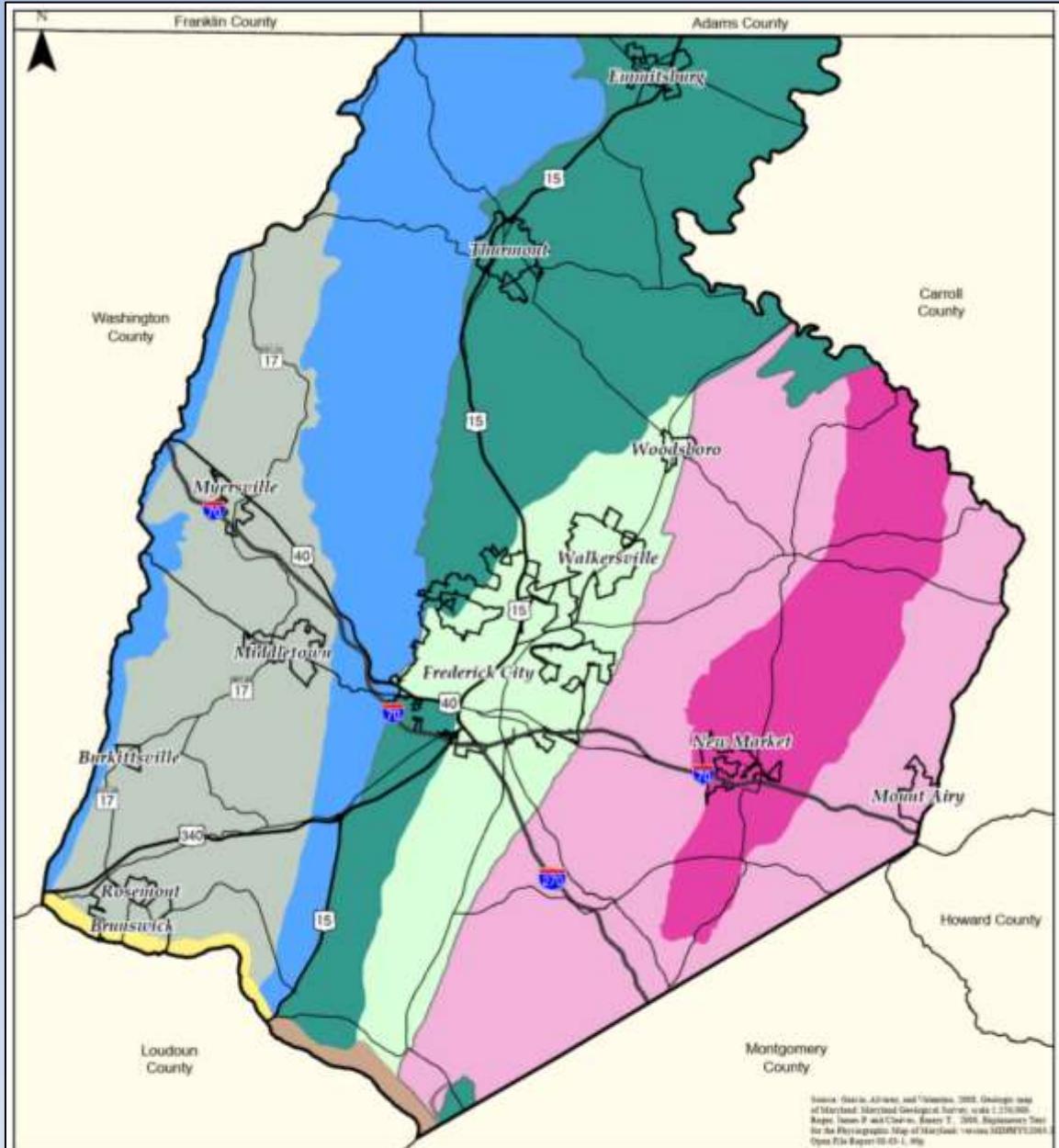
- Drinking water is secured from surface waters or subsurface aquifers
- Withdrawal limits are set by MDE Water Management Administration (Water Appropriation or Use Permit, a.k.a. WAUP)
- Water Balance Methodology or 7-day-10-year low flow (7Q10)



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Subsurface Water Sources

- Aquifers cross political boundaries and are characterized by USGS, MGS, MDE based on hydrogeomorphic conditions
- DWSU holds and maintains WAUPs from MDE/WMA for groundwater withdrawals.
- Several county and municipal systems rely entirely on groundwater withdrawals



Regions within Physiographic Provinces

Piedmont Lowland Section

Chesapeake Gorges Region
Limestone Lowland Region
Mesozoic Lowland Region

Piedmont Upland Section

Harford Plateaus and Gorges Region
Wakefield Valley & Ridge Region

Northern Blue Ridge Section

Catoctin-South Mountain Region
Chesapeake Gorges Region
Middletown Valley Region



Frederick County, Maryland
Division of Planning and Permitting
Frederick County GIS

Disclaimer: NAD 1983 StatePlane Maryland FIPS 1000 Feet
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the map's original intent. 10/20/2023 1000ftScale_Parcels

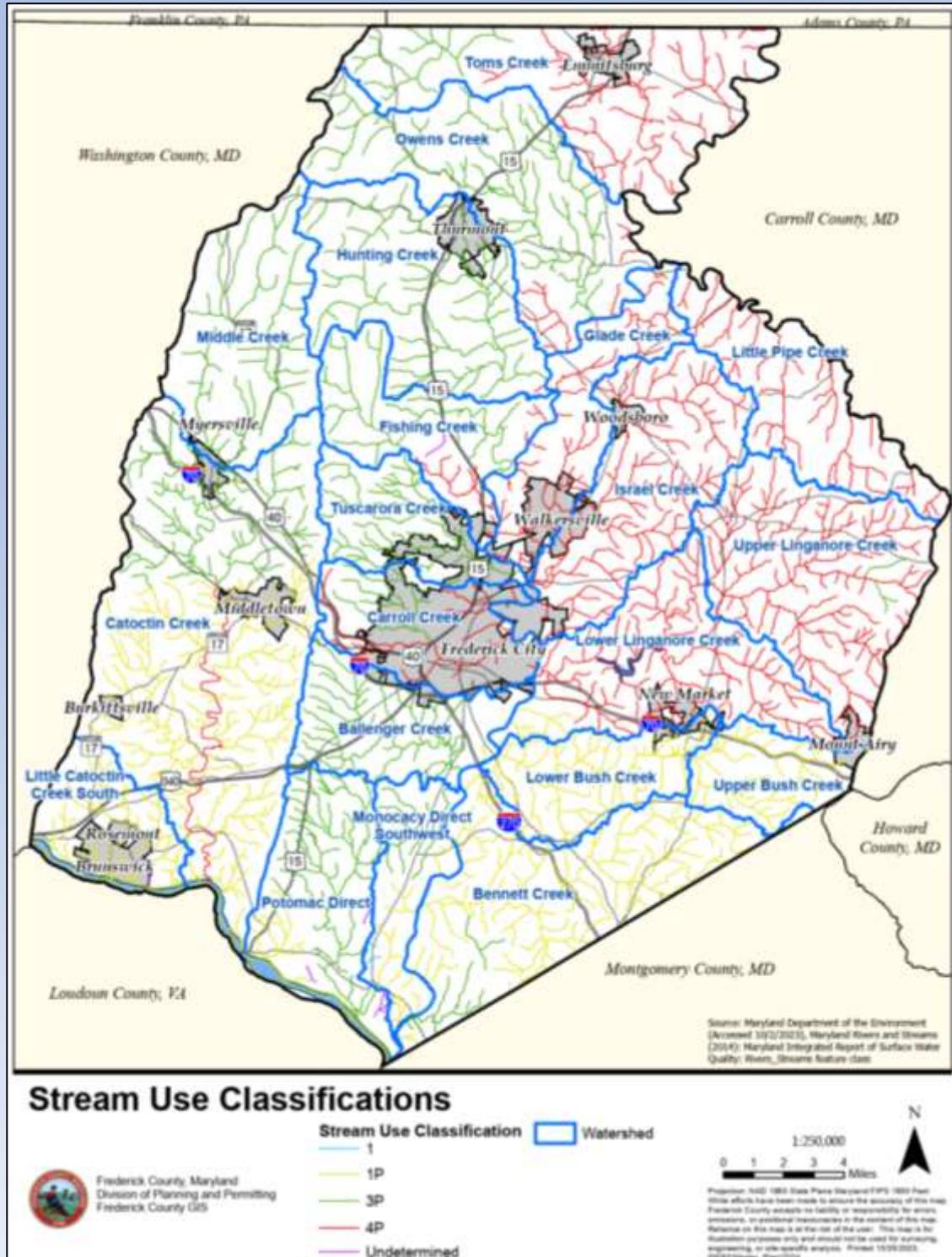
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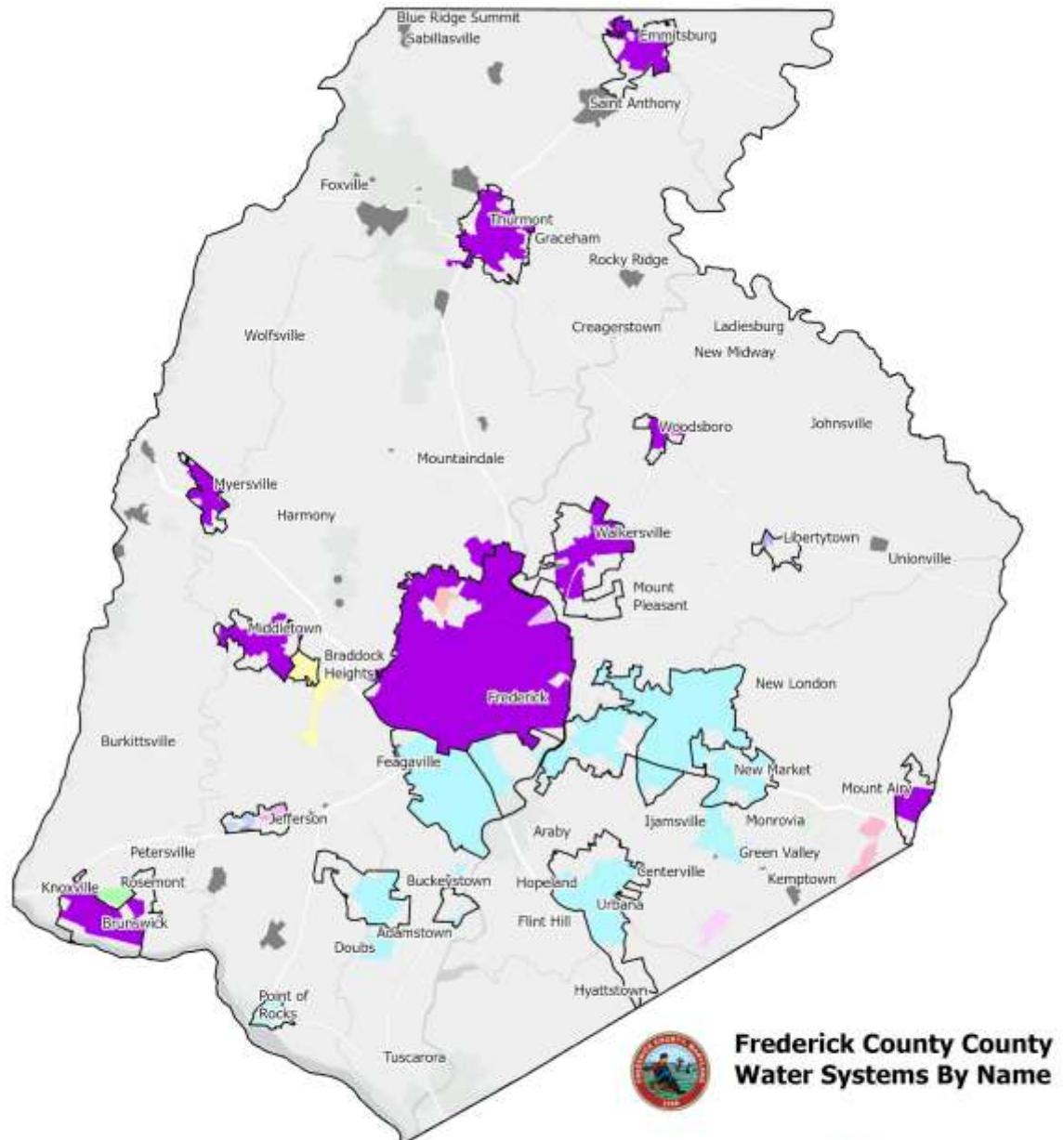


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Surface Drinking Water Sources

- Surface water sources include the Potomac River, Monocacy River, Catoctin Creek, Linganore Creek, and Fishing Creek
- May be supplemented by reservoir storage (Linganore Creek, Turkey Creek, Fishing Creek)
- DWSU holds and maintains WAUPs from MDE/WMA for surface water withdrawals





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This map is provided for illustrative purposes only.

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Drinking Water Systems

- 16 regional, publicly owned Community Water Systems or CWS (7 county systems, 9 municipal system) +4 sub-regional county systems
- Fort Detrick & Mount St. Mary's University operate separate systems along with some other small, privately owned systems
- Overlap exists between County and Municipal Boundaries/Systems



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Table 2.01

Water Supply and Demand by Service Area							
Service Area	Permitted Withdrawal (avg. MGD) ⁽¹⁾	Permitted Withdrawal (max. MGD) ⁽¹⁾	Existing Treatment Capacity (MGD) ⁽¹⁾	Existing Demand (MGD) ⁽²⁾	Maximum Demand Monthly Average (MGD) ⁽³⁾	Projected Demand 2035 (MGD)	Projected Demand 2050 (MGD)
Rosemont ⁽⁴⁾	1.350	2.000	2.000	0.010	0.019		
Copperfield	0.029	0.047	0.029	0.040	0.056		
Cambridge Farms	0.062	0.100	0.062	0.042	0.048		
Fountaindale South	0.280	0.420	0.280	0.181	0.263		
White Rock	0.030	0.045	0.030	0.022	0.036		
Samhill Estates	0.156	0.260	0.155	0.086	0.115		
Bradford	0.017	0.028	0.017	0.013	0.017		
Knolls of Windsor	0.107	0.177	0.107	0.067	0.085		
Libertytown Apartments	0.008	0.012	0.009	0.003	0.006		
Libertytown East	0.016	0.024	0.016	0.007	0.010		
Waterside ⁽⁵⁾	-	-	-	0.076	0.099		
Cloverhill ⁽⁵⁾	0.084	0.125	0.083	0.100	0.179		
New Design	16.000	26.000	25.000	6.281	11.784		
TOTALS	18.139	29.238	27.788	6.927	12.719	0.000	0.000

(1) Information obtained from Frederick County Water & Sewerage Plan - Approved - February 2, 2021 (as amended December 28, 2022) - Table 3.04

(2) Average of 2020 - 2022 WTP flow data provided by Frederick County

(3) The max demand monthly average is the maximum average daily flow for a single calendar month from the 2020 - 2022 WTP flow data provided by Frederick County

(4) Rosemont water is supplied by the City of Brunswick, permitted withdrawal and treatment capacity data corresponds to Brunswick data

(5) Water is supplied and treated by the City of Frederick, DWSU operates the distribution



Stem-Haines-Saylor Farm in Union Bridge, MD by Frederick County Historic Preservation Staff

Individual Well Use

- Approximately 30,000 wells
- Declining as a percentage of overall service as more new development utilizes public water facilities
- Up to 80% of withdrawals returned through septic systems



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Commercial & Agricultural Use

- Withdrawals associated with these uses typically meet the 5,000 gpd threshold for WAUPs
- Agricultural irrigation, recreation facilities (golf courses), camps and churches, dewatering operations (quarries), etc.



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Drinking Water Issues

PFAS

What are PFAS?

PFAS (per- and poly-fluoroalkyl substances) are synthetic chemicals that do not occur naturally. Strong carbon-fluorine bonds in PFAS make them resistant to degradation and thus highly persistent in the environment. Industry uses PFAS to make a wide variety of products such as apparel, paper, plastics, and food packaging.



Health effects of exposure

Most people in the United States have been exposed to PFAS. Current scientific research suggests that exposure to high levels of certain PFAS may lead to adverse health outcomes. However, research to assess the health effects of exposure to PFAS is still ongoing.

U.S. EPA, "Our Current Understanding of the Human Health and Environmental Risks of PFAS"

PFAS releases in TRI

The **hazardous waste management** sector reports the most releases. Most PFAS releases are **disposed of in regulated landfills**.

U.S. EPA TRI, Reporting Year 2021

44 facilities submitted TRI forms for PFAS for 2021

Facilities initiated 11 source reduction activities for PFAS in the past 2 years.

U.S. EPA TRI, Reporting Year 2021



Natural Hazards Mission Area, USGS, 2023.

<https://www.usgs.gov/media/images/sinkhole-frederick-maryland>

- Water Conservation
- Per- and Polyfluoroalkyl substances (PFAS)
- Karst topography and GWUDI



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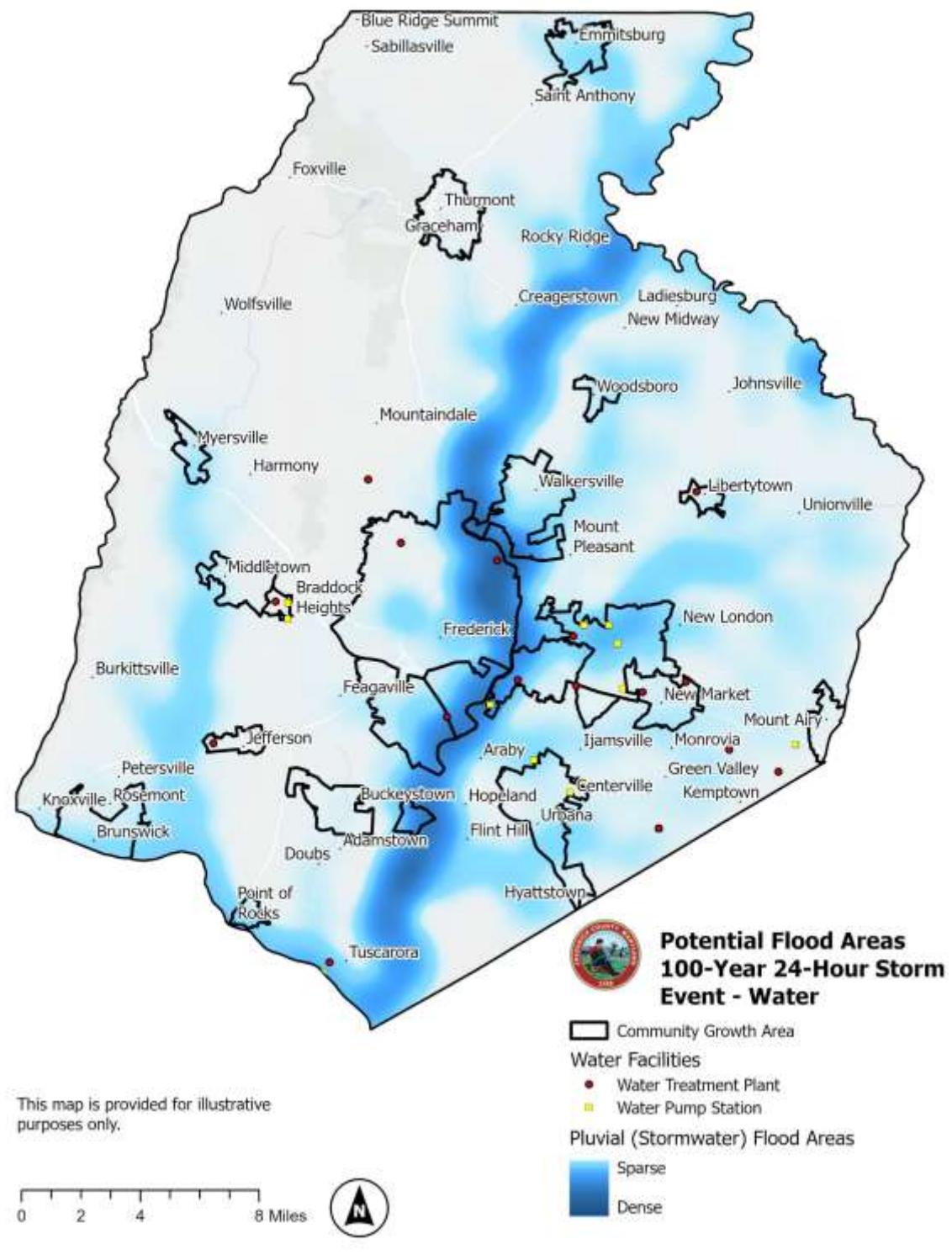


Drinking Water and Equity

- Susceptibility of groundwater sources and associated expenses
- Areas served by adjacent municipalities



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... and a Changing Climate

- Drinking water facilities located in or near existing floodplains
- Impacts of drought on the ability of waterways to maintain the 7Q10 flow-by requirements while meeting withdrawal and supply needs



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Drinking
Water



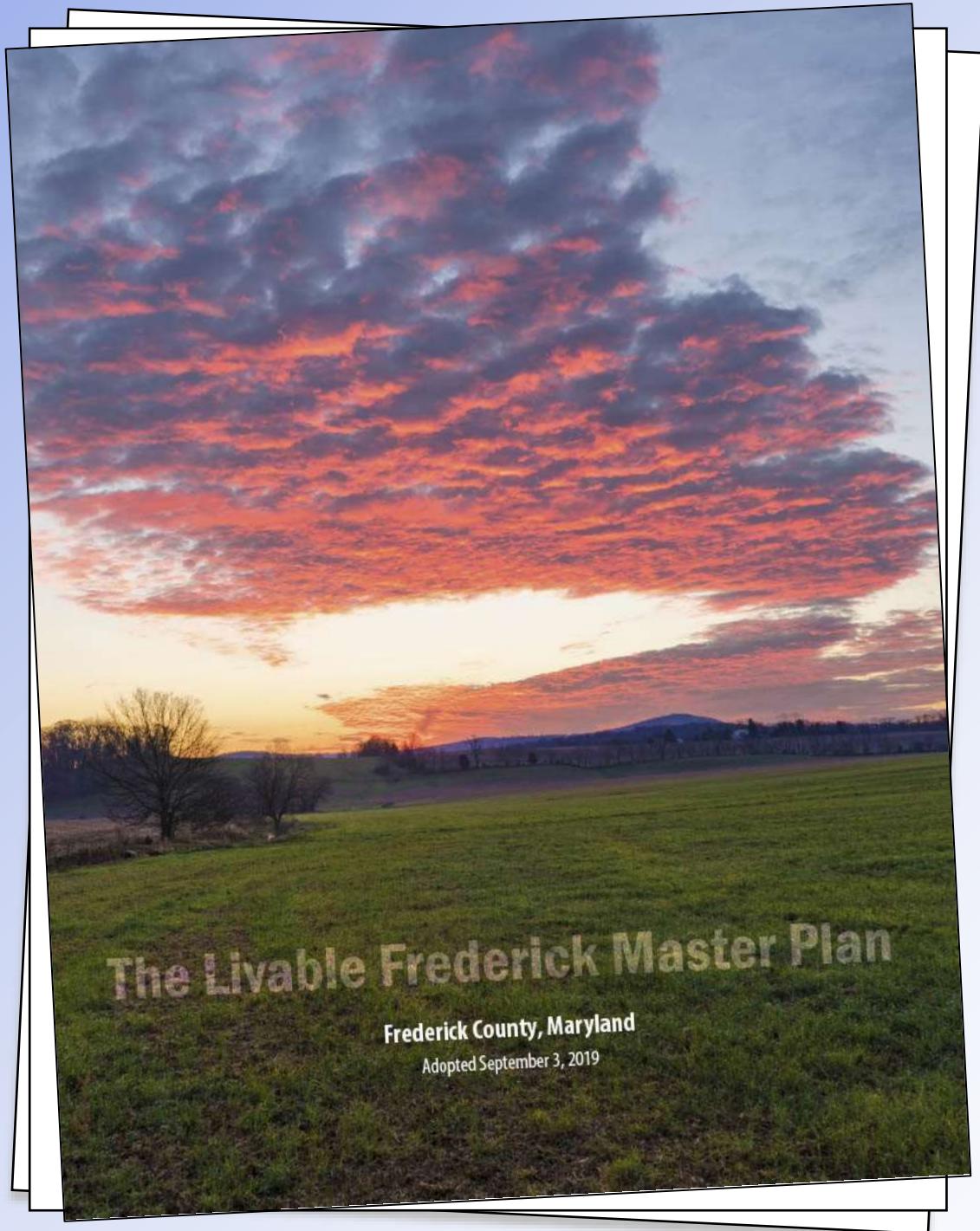
Wastewater



Stormwater



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LFMP Goals & Initiatives

Goal 4.4.1 Climate Resiliency

Initiative 4.4.1.3 Stormwater Impacts

Supporting Initiative 4.4.1.3.1 and 4.4.1.3.2

Stormwater: Where It Flows, Everything Goes



When it rains, snows, or sleets, water hits hard surfaces and takes anything on that surface with it, through drains, pipes, and ditches to local rivers, lakes, and streams.

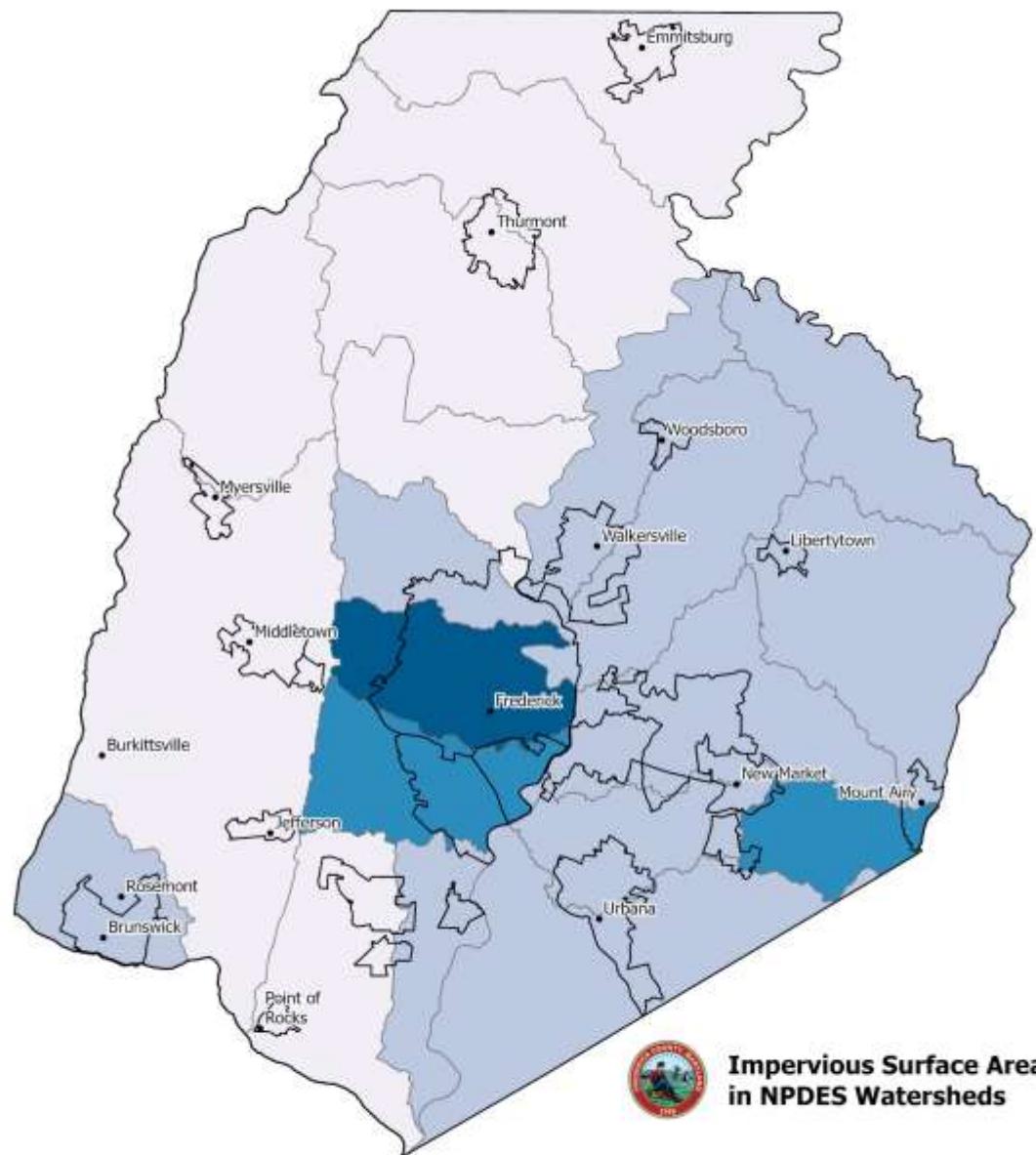
Where Stormwater Flows, Everything Goes

Credit: <https://www.epa.gov/npdes/stormwater-smart-outreach-tools>

Some Stormwater Management Practices



https://frederickcountymd.gov/DocumentCenter/View/300401/oes_bmpbro_maintenance_81723?bidId=
<https://frederickcountymd.gov/DocumentCenter/View/319045/pondmgmtguide>
<https://www.montgomerycountymd.gov/DEP/contact/sediment-erosion.html>
<https://www.visitfrederick.org/blog/stories/post/the-bridges-and-fountains-of-carroll-creek-park/>



Impervious Surface Area in NPDES Watersheds

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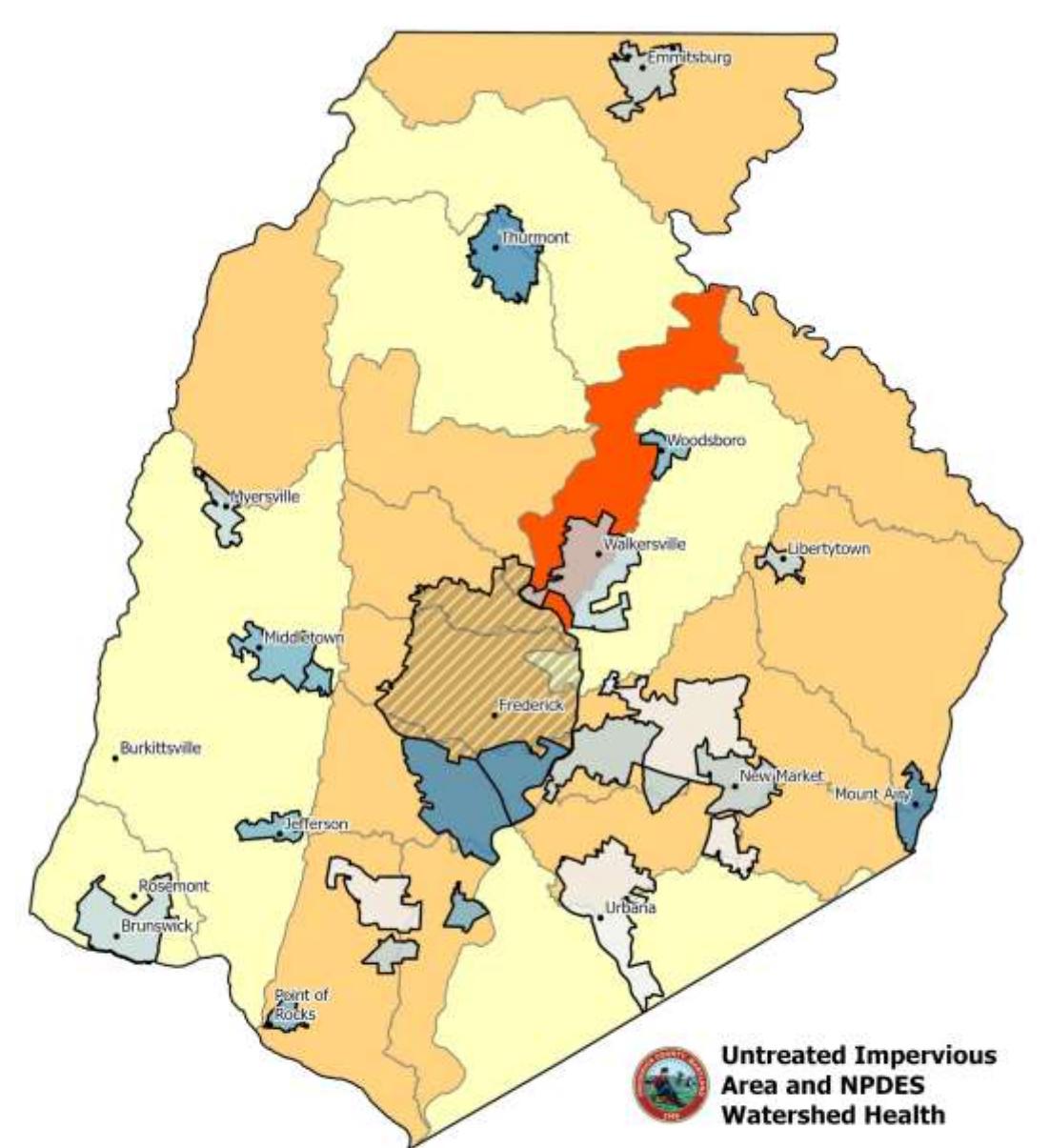


NPDES Watersheds

Impervious Area, % of Total

- < 5 %
- 5 - 10 %
- 10 - 20 %
- > 20 %

Community Growth Areas



Untreated Impervious Area and NPDES Watershed Health

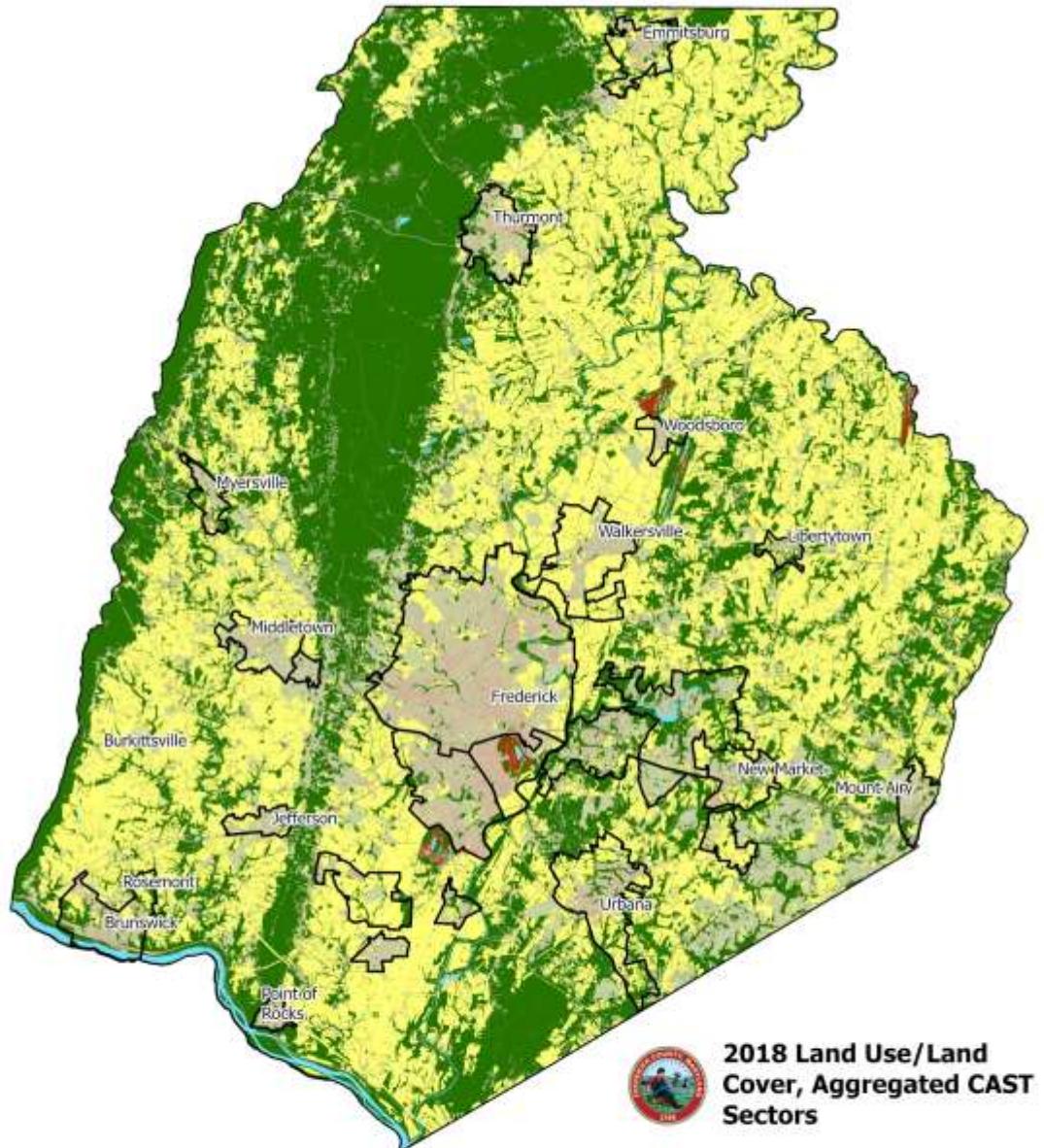
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0 2 4 8 Miles



Untreated Impervious Area, % of CGA Benthic Index of Biotic Integrity (BIBI)

- < 10 % Fair (3.00 - 3.99)
- 10 - 15 % Poor (2.00 - 2.99)
- 15 - 20 % Very Poor (1.00 - 1.99)
- 20 - 30 %
- No Data Community Growth Areas (CGAs)



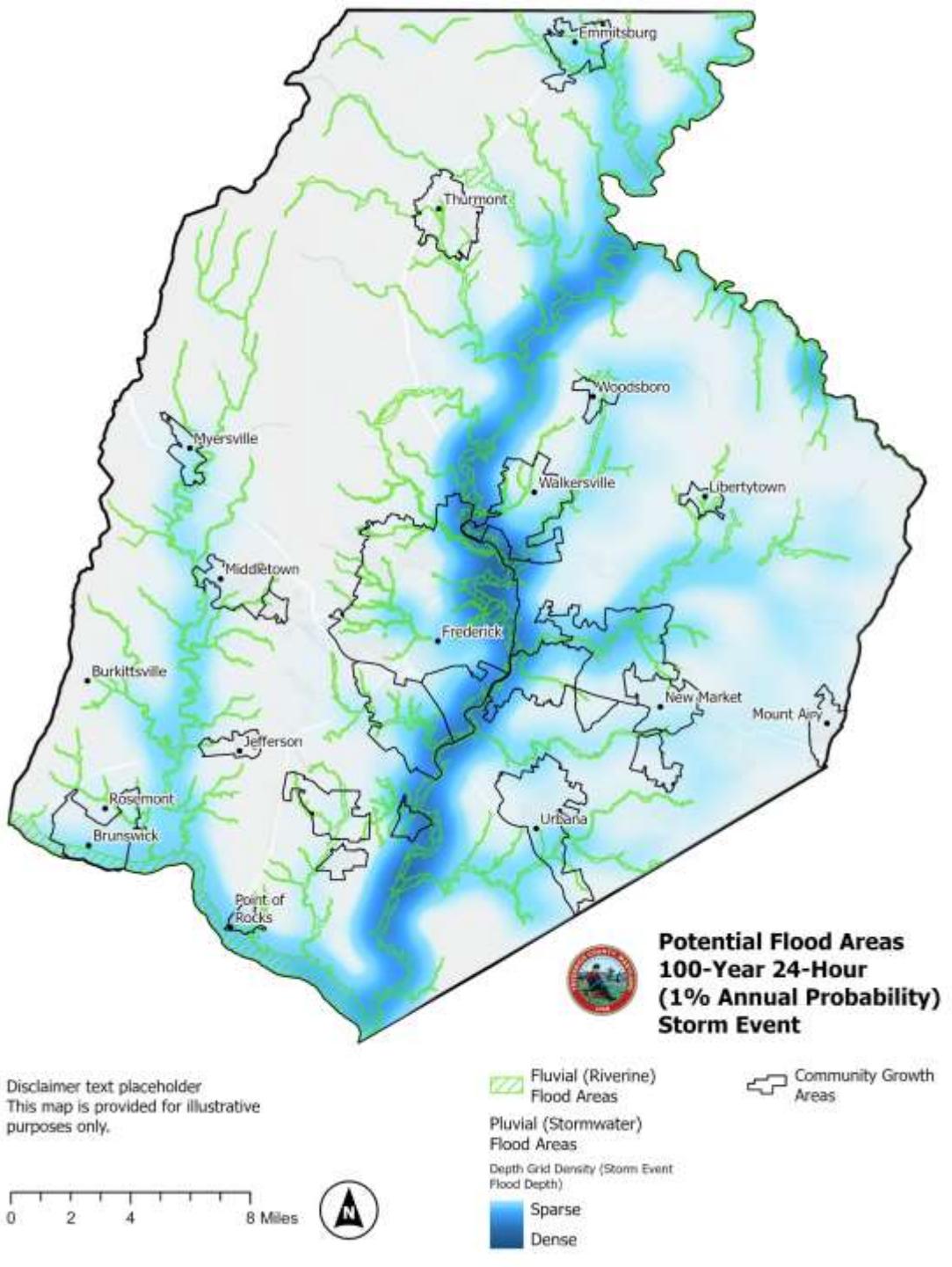
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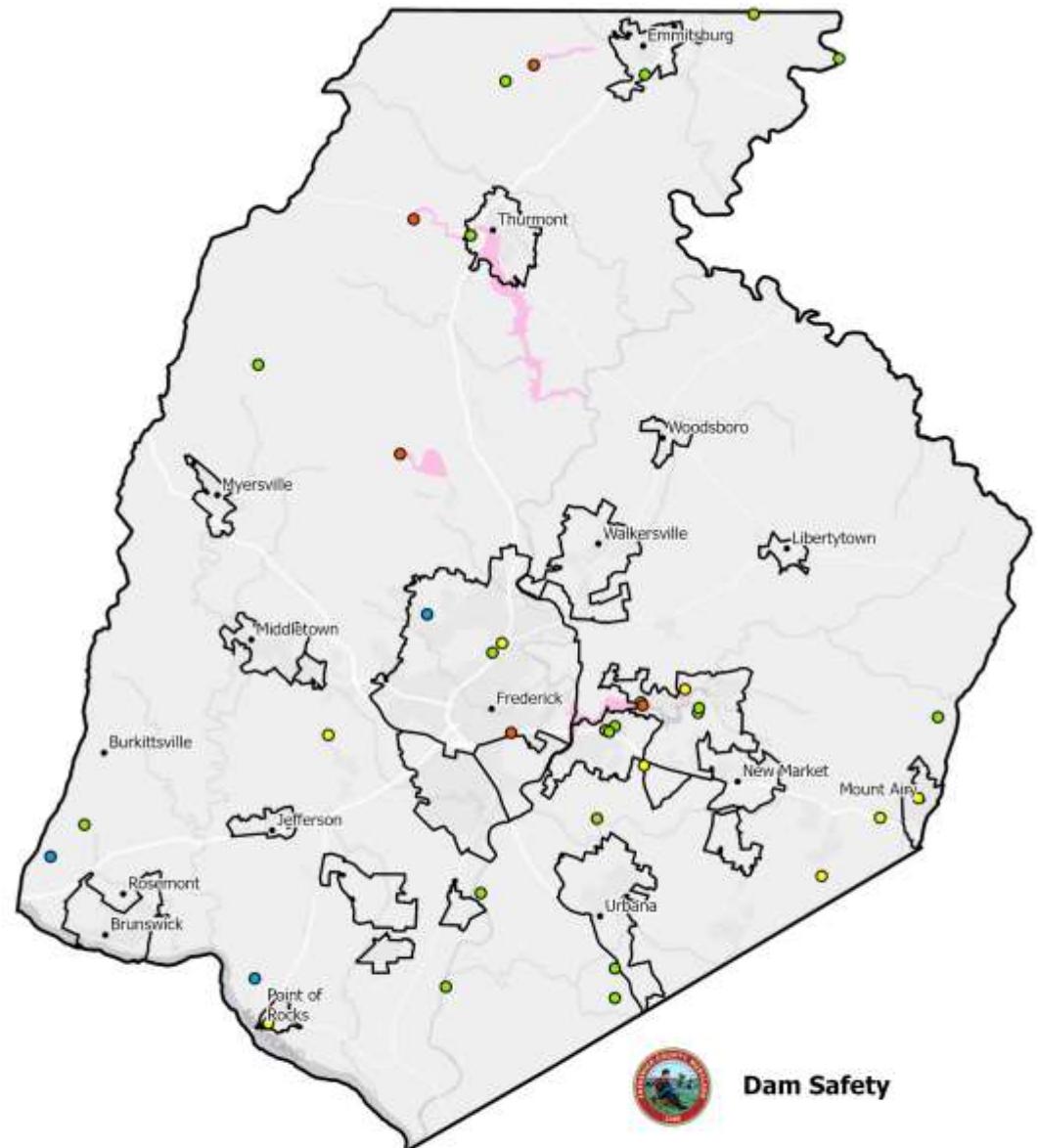
Land Use / Land Cover

- Pollutants come from more than urban stormwater runoff
- Land Use / Land Cover analysis can be used to estimate *nonpoint* pollution
- Can also be used to estimate impacts of future land use change



Potential Flood Areas

- FEMA floodplains only represent one specific type of flood risk (riverine/fluvial).
- Pluvial/stormwater model prepared for Frederick County's 2022 Hazard Mitigation Plan provides enhanced picture of flood risk.



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0 2 4 8 Miles



Dam Safety

- Dam Safety hazard categories are based on damage that may occur if the dam fails, not structural integrity of the dam
- Dam failures can affect State assets, critical facilities (necessary before, during, and after disasters), and homes and businesses



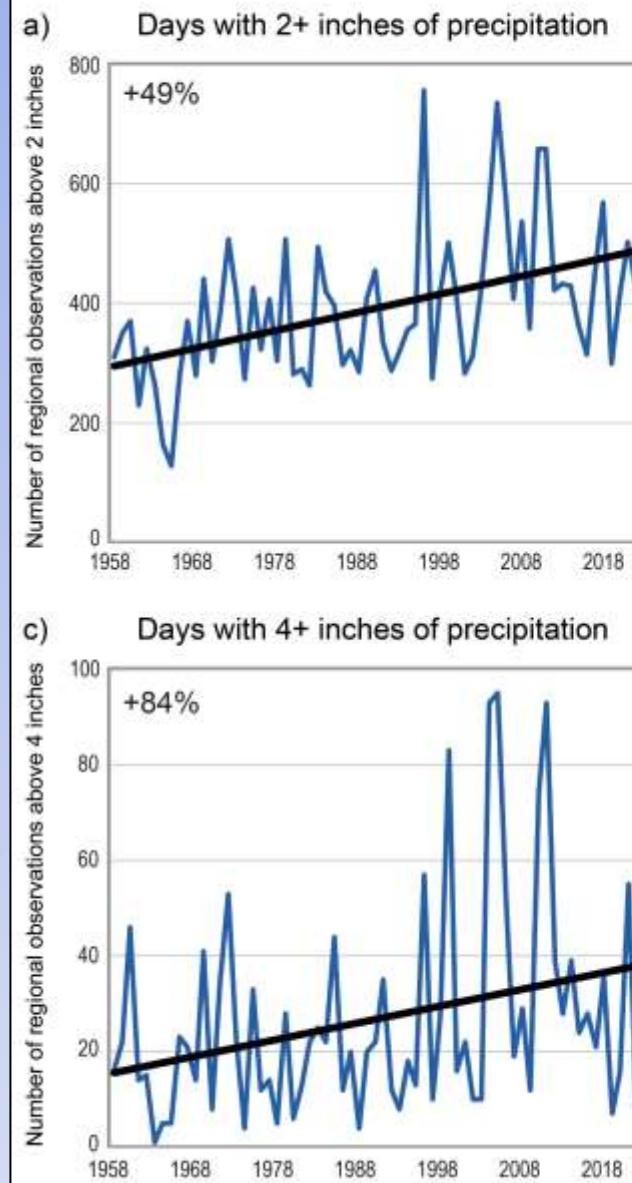
Stormwater and Equity

- Flooding or flood risk
- Age and/or failure rate of stormwater facilities
- Infrastructure investments



<https://www.stacylevy.com/projects/missing-waters>

Trends in Extreme Precipitation in the Northeast



... and a Changing Climate

- Increasing frequency and intensity of storms
- Drought can impact TMDL goals and can worsen flooding when precipitation returns
- Increased stream temperature
- More areas can be anticipated to be in FEMA floodplains