

Climate Change and Maryland's NPDES MS4 Permits

October 21, 2022

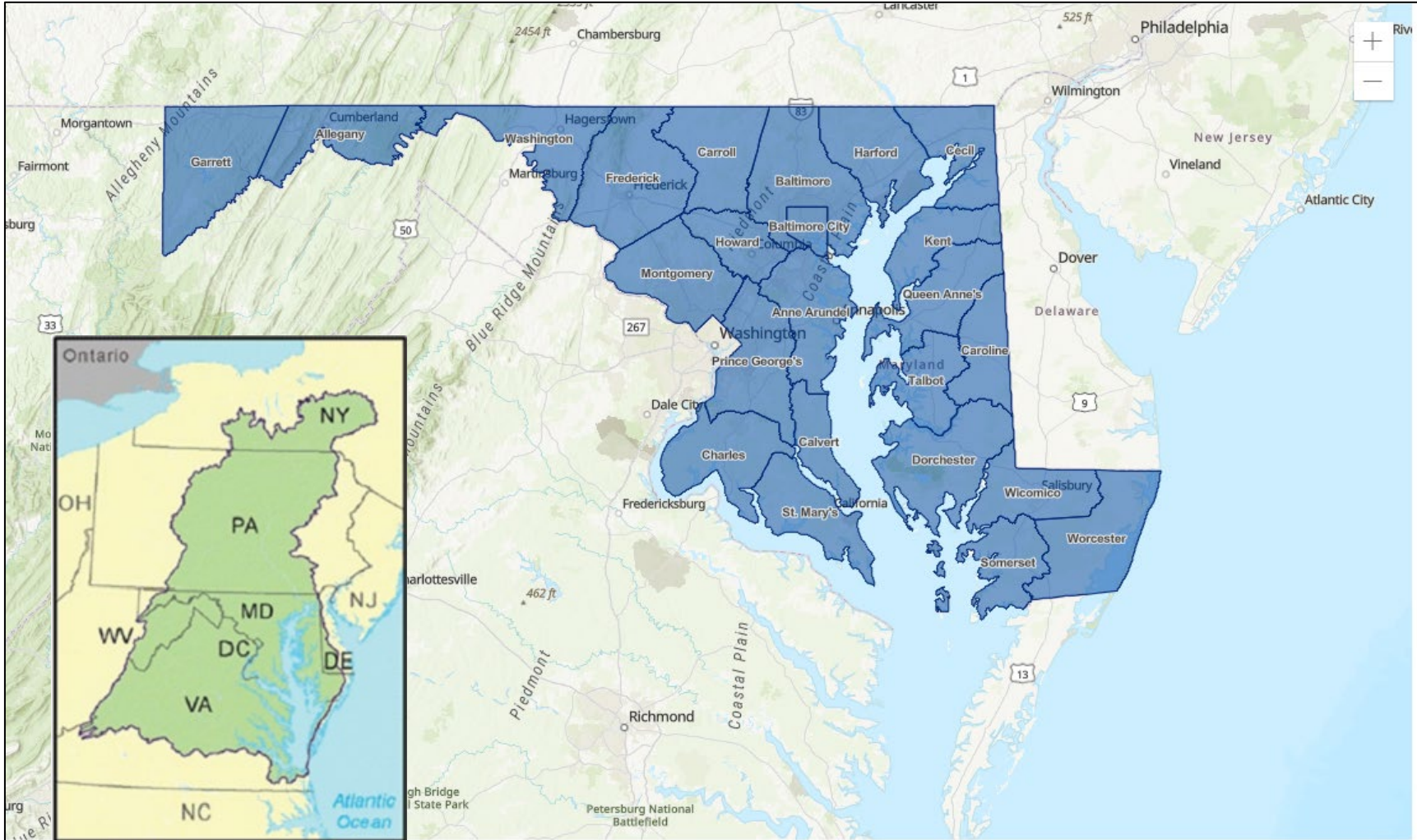
ACWA 2022 National Stormwater Roundtable



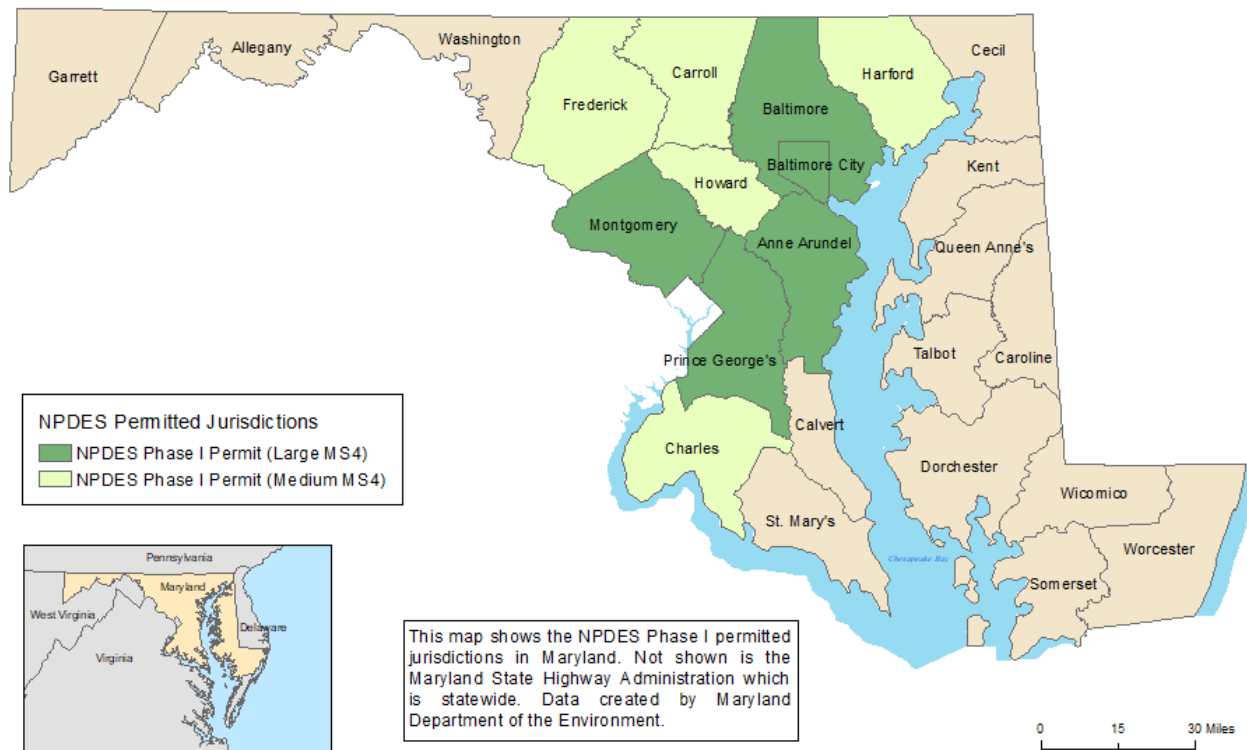
Outline



- Maryland's stormwater management requirements
- Climate change impacts and flooding
- Modifying Maryland's stormwater regulations
- Stormwater resiliency questions
- Maryland's NPDES MS4 permits



NPDES Phase I Permitted Jurisdictions in Maryland



Maryland SWM Laws & NPDES MS4 Permits

- All local jurisdictions are required to implement a stormwater management program that requires development projects to meet state minimum stormwater management standards.
- All Phase I and Phase II NPDES MS4 permitted jurisdictions are required to implement a stormwater management program that meets minimum state law requirements.
- Any changes to the state stormwater management regulations become incorporated into the NPDES Phase I and Phase II MS4 permits

Stormwater Management Requirements in Maryland

1982 - 2000

2 and 10 year Quantity Management



2000 - 2009

WQv, CPv, Quantity Management as Required



2009 - current

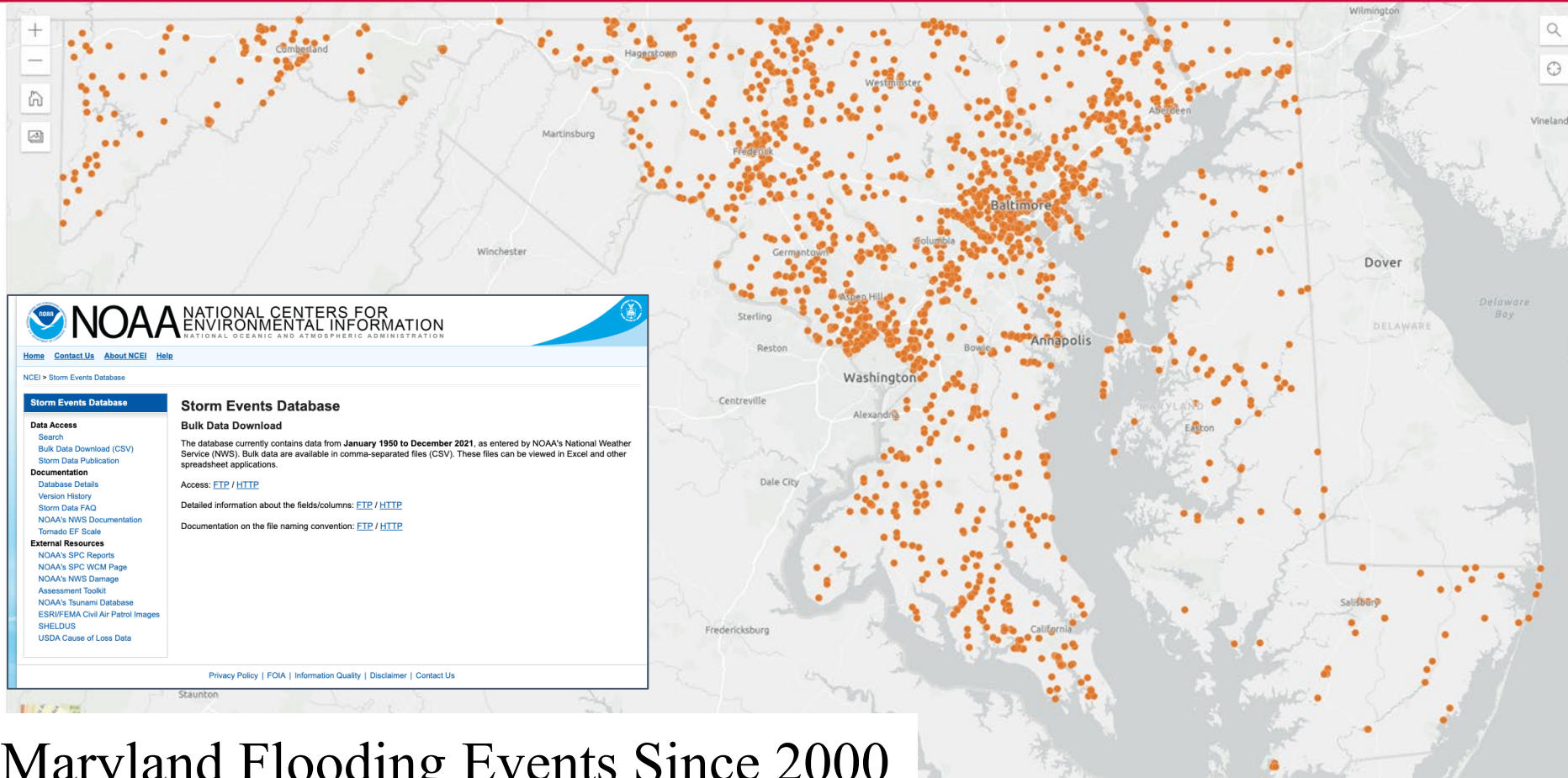
ESD to MEP, Quantity Management as Required



Some Recent Rainfall Events

Event Date	Location	Total Precipitation and Storm Duration
September 10, 2020	College Park	4.5 inches in 2.5 hours
August 21, 2018	Forestville	3.18 inches in 1.0 hours
September 29, 2016	Salisbury	7.41 inches overnight
September 29, 2016	Snow Hill	9 inches overnight
July 30, 2016	Ellicott City	5.96 inches in 2 hours
August 13, 2014	Queenstown	9.92 inches in 24 hours
August 13, 2014	Dundalk	8.75 inches in 24 hours
August 13, 2014	Linthicum	8.03 inches in 24 hours
June 13, 2014	Clear Spring	5 inches in 2 hours





» Maryland Flooding Events Since 2000

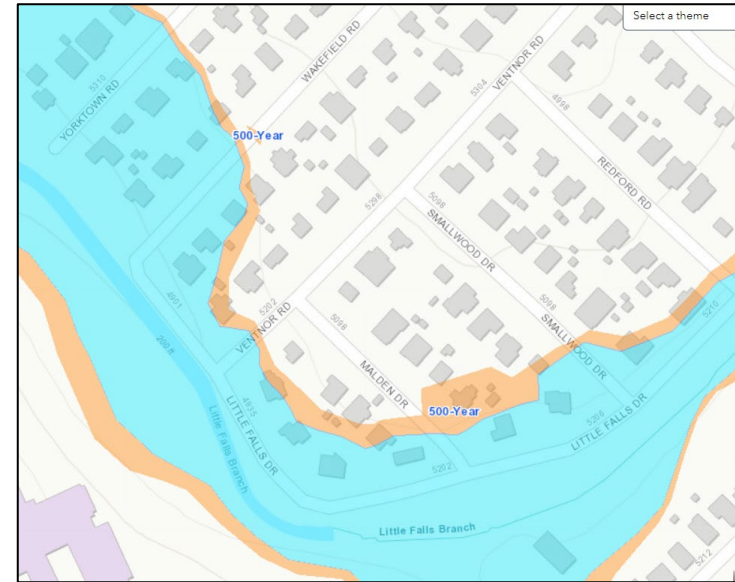
Pluvial Flooding and SW Conveyance Systems

- Piped urban stream systems
- Undersized culverts
- Clogged, broken pipes and channels
- Sizing determined at local level
- State and local design inconsistencies



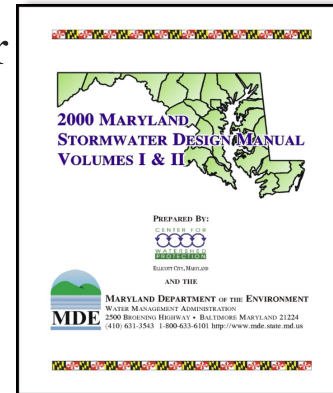
FEMA Floodplains and SW Conveyance

- Pluvial flooding areas are not included on floodplain maps.
- Many jurisdictions lack information and data on the location, capacity and condition of their stormwater conveyance systems.
- These closed conveyance systems are not well defined on maps.
- Most closed systems are designed to safely convey the runoff from a 10 year 24 hour storm event.



Maryland State SWM Requirements

- Water Quality Management - Environmental Site Design (ESD) to Maximum Extent Practicable (MEP) for 2.7 inches of rainfall
- Water Quantity Management - Quantity management for the 2-year or 10-year storm is required when the local jurisdiction “determines that additional stormwater management is necessary because historical flooding problems exist and downstream floodplain development and conveyance system design cannot be controlled.”
- Water Quantity Management - 100 year quantity management for interjurisdictional watersheds (Jones Falls, Gwynns Falls, Herring Run, Carroll Creek)
- No state standard for conveyance system design



Need for Data Sharing and Coordination

- Little or no continuity or communication between adjacent communities and/or counties on SWM infrastructure data.
- Lack of standards for collecting and sharing conveyance information.



Advancing Stormwater Resiliency in Maryland

What We Have:

- No state regulations for stormwater conveyance system design
- Conveyance systems outside of the FEMA floodplain are often not mapped or modeled
- Data needed to map, model, or characterize these systems is difficult to obtain and generally not available and there is currently no standard for collecting and reporting this data.
- SWM requirements for new development may be different in adjacent communities
- There is little to no communication and coordination on flooding issues and data sharing between jurisdictions and at various levels of government

What We Need:

- A system, tool, and process that can:
 - Coordinate and communicate across jurisdictions and government levels
 - Collect and share data and ensure data consistency
 - Analyze the watershed, conveyance system, and identify possible solutions
- Funding, technology, training

Stormwater Resiliency Questions

1. What will climate predictions mean to our stormwater conveyance systems that are already stressed? Or to the many residential, commercial, or institutional structures currently located in our 100 year floodplains?
2. Should our SWM requirements for new and redevelopment account for future climate projections?
3. Should climate change predictions be factored into how we determine our local and FEMA floodplain boundaries?



Stormwater Resiliency Questions

1. What precipitation data should we be using for SWM design storm?
 - a. Existing precipitation or future climate change projections
 - b. Shorter duration storm events (e.g., 3 hour or 6 hour), or continue using 24 hour storm data, or both
2. What type of quantity management design criteria should we be considering?
 - a. Statewide quantity mandates for all new development, redevelopment
 - b. Additional requirements for watersheds with known flooding events
 - c. Should watershed studies and flood management plans be mandated jurisdiction-wide
3. Should there be state mandated stormwater conveyance design criteria?
4. How do we ensure that new criteria do not make flooding worse?

Maryland's Proposed SW Regulation Changes



- Update Maryland's Precipitation Data
 - 2006 NOAA Atlas 14, *Precipitation-Frequency Atlas of the United States, Volume 2*
 - RAND Corporation future projected IDF curves for the Chesapeake Bay Watershed based on the current NOAA Atlas 14 Volume 2 precipitation data with a range of predictions for future climate change
<https://midatlantic-idf.rcc-acis.org/>
- Update SW Quantity Management Requirements
- Require Watershed Studies in Priority Watersheds

Similar Mid-Atlantic State Actions

- Virginia Beach (VA) – 20% increase on Atlas 14 precipitation values for new development as input into a watershed model
- Hampton Roads Planning District (VA) – considering incorporating a climate precipitation change factor
- Virginia Department of Transportation (DOT) – 20% increase on Atlas 14 precipitation values for bridge design
- New York State DOT – 10-20% increase on Atlas 14 precipitation values for culvert and natural channel design - based on regions
- Pittsburgh (PA) – Managing post development peak flows calculated using 2100 year climate change precipitation data back to existing condition peak flows calculated using the most recent Atlas 14 precipitation data

Watershed Studies and Watershed Prioritization



Current:

- 27 state created watershed studies in 1995
- Local initiatives for watershed studies in response to recent flooding
- MD Hazard Mitigation Plan recognizes importance of watershed studies for flood management
- MD law requires that alternative minimum stormwater standards be based on a MDE approved watershed study

New:

- Develop a statewide watershed prioritization approach
- Require H&H studies and flood management plans for priority watersheds.
- Develop watershed specific quantity management requirements.

NPDES MS4 Permits and Climate Change

- Watershed Management Credit: a 25% increase in the ISR credit for more water quality treatment volume from a minimum of 1 inches up to 3 inches.
- Maintain and inspect stable stormwater conveyance and capacity to receiving waters.
- Develop and implement written procedures for performing stormwater conveyance system inspections for MS4 owned property.

Thank you!

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Maryland
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