

*Maryland Association of Floodplain and Stormwater Managers
Annual Conference – November 8, 2018*

Adapting Stormwater Management for Coastal Floods

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Goal: Transform water information service delivery to better meet and support evolving societal needs

Objectives:

Build Strategic Partnerships for Water Information Services

Strengthen Water Decision Support Tools and Networks

Revolutionize Water Modeling, Forecasting, and Precipitation Prediction

Enhance and Sustain Water-Related Observations

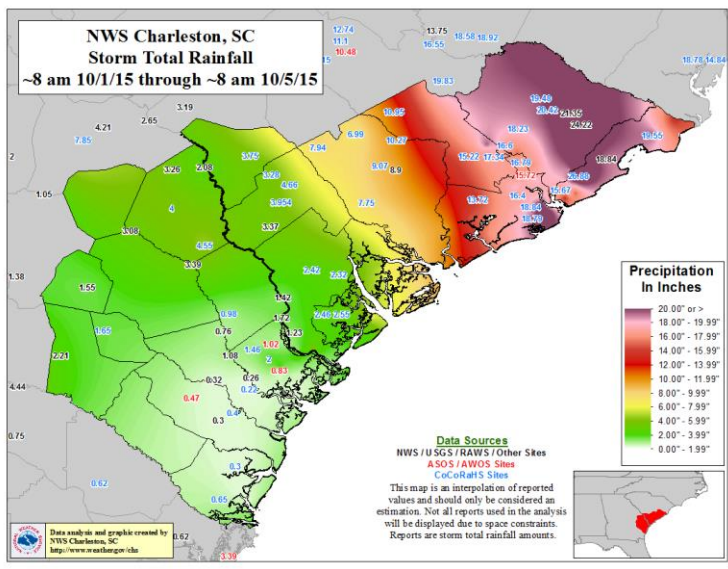
Accelerate Water Information Research and Development and Research Transitions



Assessing User Needs Around “Too Much Water”

- **Help on how to use existing tools** preferred over new tools
- **Training** is the most voiced reason for not using existing tools
- Lack of data standardization and **local-scale data**
- Understanding **interactions among different sources of flooding** (coastal, riverine, stormwater)
- “Pain point” in understanding location, timing, and impacts of **combined coastal and rainfall-runoff flooding**
- Guidance on how to incorporate water considerations into **scenario planning**
- Help understanding how to modify stormwater **infrastructure standards** (e.g., sizing, performance)
- **Achieving a two-fer**: how to tackle water quantity problems with water quality/NPDES activities
- Help **earning CRS credits**, including those that call for considering sea-level rise

Case in Point: October 2015 Flood – Charleston, SC



Extreme
Rainfall



High Tide

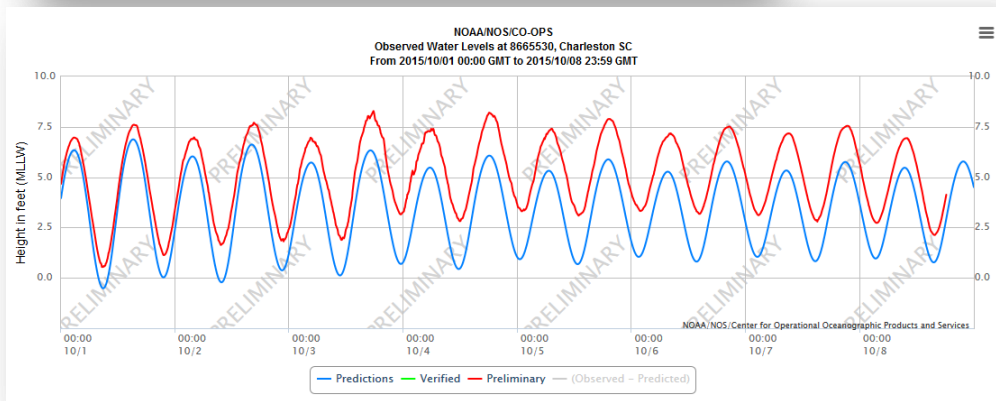


Onshore
Winds



Storm drain

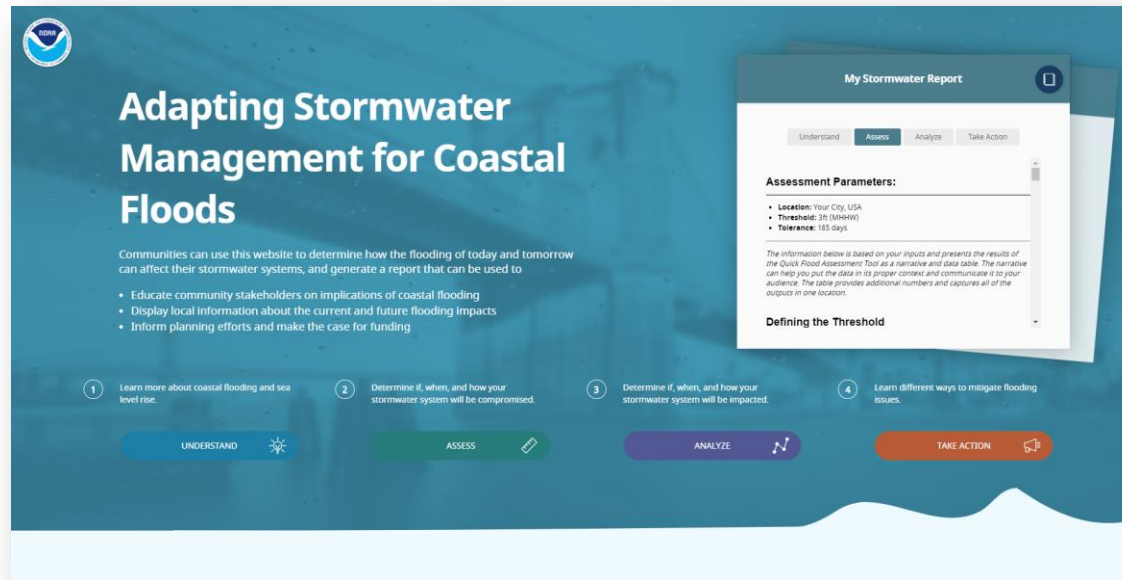
Image: Chuck Burton, AP



User-Driven Product Design

- ✓ **Address combined flooding:** how today's and tomorrow's coastal floods affect stormwater and floodplain management
- ✓ **Content relevant to multiple audiences:** stormwater managers, floodplain managers, land use planners, public works personnel
- ✓ **“Not another tool”:** rather, connect existing data, models, tools, and resources that are meaningful at the local level
- ✓ **Go beyond helping user assess the issue:** provide options for taking action, and give them something tangible to take away
- ✓ **Provide “hooks” for future resources:**
 - Coastal/riverine model coupling (via the National Water Model)
 - Complementary products that provide a deeper dive

Adapting Stormwater Management for Coastal Floods



Provides information, tools, and methods to examine:

- Flooding from coastal inundation
- Impacts on community-level stormwater issues
- When and where communities might expect to see impacts
- What communities can do about it

Adapting Stormwater Management for Coastal Floods: Understand the Issue

Coastal total water levels at an ocean or large lake shoreline can be defined as the combination of tidal variation, regional oceanographic effects (such as the El Niño-Southern Oscillation), storm surge (including wave setup), local wave action, and long-term sea level rise or lake level change. Water seiches or tsunamis could be included with these elements where they are key contributors to coastal flooding, but these sources are not included on this website.

What Contributes to Coastal Flooding?

Current Sea Level

Regional Oceanographic
VIEW

Highest Tide / King Tide
VIEW

King Tide with Rainfall
VIEW



Wind Waves
VIEW

Storm Surge
VIEW

Sea Level Rise
Add Sea Level Rise to view impacts.

Location plays a large role in the proportional influence of each coastal element, especially during extreme water level events. Variations in astronomical tides can be a principal factor in Alaska, whereas in other places storm surge (Galveston, Texas) and [wave runup](#) (San Francisco, California) primarily drive high water levels.

Adapting Stormwater Management for Coastal Floods: Quick Flood Assessment Tool

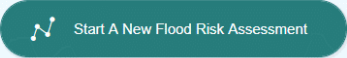
 

Assess Flood Risks

The Quick Flood Assessment Tool automates what used to be a time-consuming task—calculating current and future coastal flood frequency and impacts at user-defined thresholds.

You will need to specify three inputs as you go through the tool. Guidance will be provided.

- 1 The closest NOAA tide gauge (selected via map)
- 2 A coastal flood threshold (critical threshold)
- 3 Tolerable number of days of coastal flooding



The tool provides information on

- A user-defined coastal flood threshold
- Changing water-level return periods
- Sea level rise effects on the user's threshold
- The number of high-tide flooding days and how it might change in the future
- How often significant flood events might occur in the future

The resulting outputs will be useful for decision-making, sharing your message with others, and working through the [Detailed Impact Analysis methodology](#) of this website.

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Adapting Stormwater Management for Coastal Floods: Quick Flood Assessment Results → My Stormwater Report

My Stormwater Report

Understand **Assess** Analyze Take Action

Assessment Parameters:

- **Location:** Charleston, SC
- **Threshold:** 4.3ft (MHHW)
- **Tolerance:** 24 days

The information below is based on your inputs and presents the results of the Quick Flood Assessment Tool as a narrative and data table. The narrative can help you put the data in its proper context and communicate it to your audience. The table provides additional numbers and captures all of the outputs in one location.

Defining the Threshold

Charleston, SC has a critical flood threshold of 4.3ft Mean Higher High Water (MHHW), which represents the water level at which flooding becomes a problem. Another way to refer to this threshold is 6.92ft North American Vertical Datum of 1988 (NAVD88), which is the datum for most flood elevations. In addition, these numbers, in meters, are 1.31m MHHW and 2.11m NAVD88.

Changing Return Periods

The current return period for this water level, based on the period of record for Charleston, SC, is 200 years, which has a 0.5% chance of occurring or being exceeded once in any given year. In the future, it will take 2.46ft (0.75m) of water level increase from sea level rise to change the current year to a 2 year (50% per year) return period.

The Threshold Becomes the Norm

As sea level rises, critical thresholds will be reached by the average highest tides (MHHW), causing daily impacts. This will happen sooner under higher sea level rise scenarios.

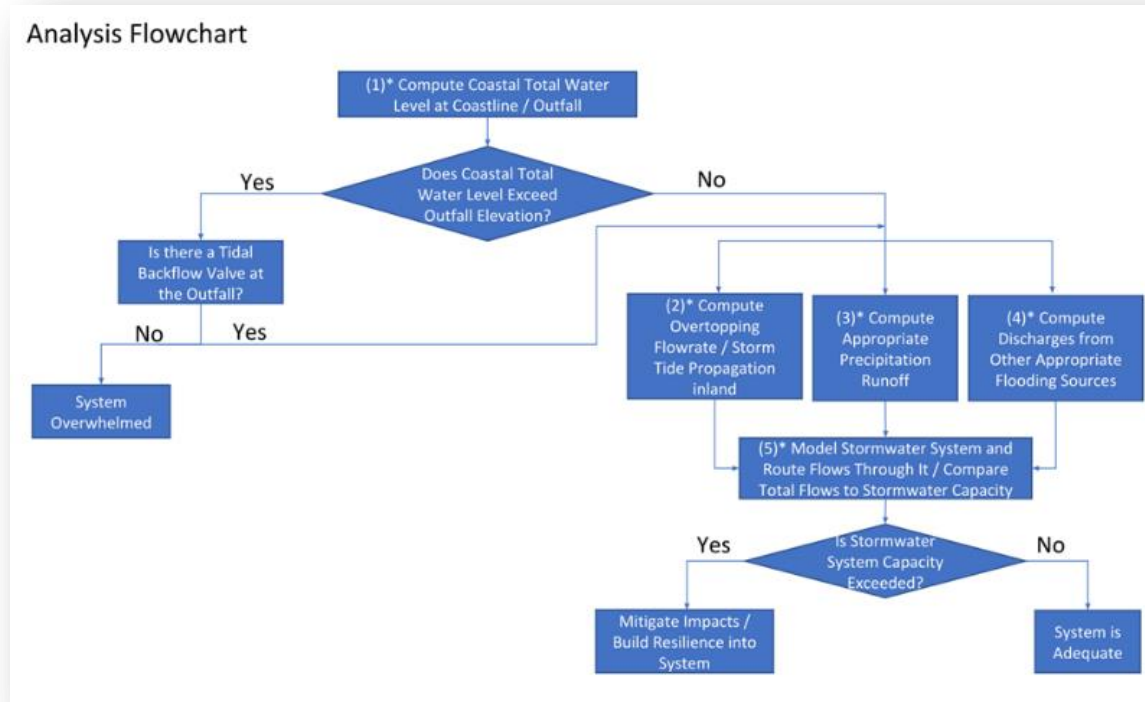
- Under the Low sea level rise scenario, your critical flood threshold of 4.3ft above MHHW will still be above the future MHHW in 2100.
- Under the Intermediate-Low sea level rise scenario, your critical flood threshold of 4.3ft above MHHW will still be above the future MHHW in 2100.
- Under the Intermediate-High sea level rise scenario, your critical flood threshold of 4.3ft above MHHW will become the new MHHW in 2100.
- Under the High sea level rise scenario, your critical flood threshold of 4.3ft above MHHW will become the new MHHW in 2070.
- Under the Extreme sea level rise scenario, your critical flood threshold of 4.3ft above MHHW will become the new MHHW in 2050.

NOTE: This analysis is based on sea level rise curves that start in the year 2000. While coast lines are green here, the data are not (i.e., by 2050 instead of by 2095). The yearly data were created through a spline interpolation between known decadal data points.

When High Tide Flooding Becomes a Problem

Print My Report

Adapting Stormwater Management for Coastal Floods: Analyze Stormwater Systems



- Detailed methods (basic, intermediate, advanced) to assess impacts of coastal floods on stormwater system
- Companion guide – basic and intermediate analyses for Charleston, SC

Adapting Stormwater Management for Coastal Floods: Take Action

- **Action Area 1 – Planning**

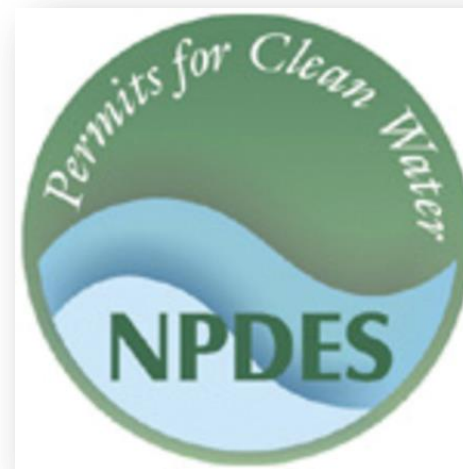
Highlights the array of plans that can articulate stormwater or coastal flooding challenges, related risk management goals, and a path forward.

- Action Area 2 – Regulations, Standards, and Guidance
- Action Area 3 – On-the-Ground Measures
- Action Area 4 – Funding
- Case Studies – Pulling It All Together



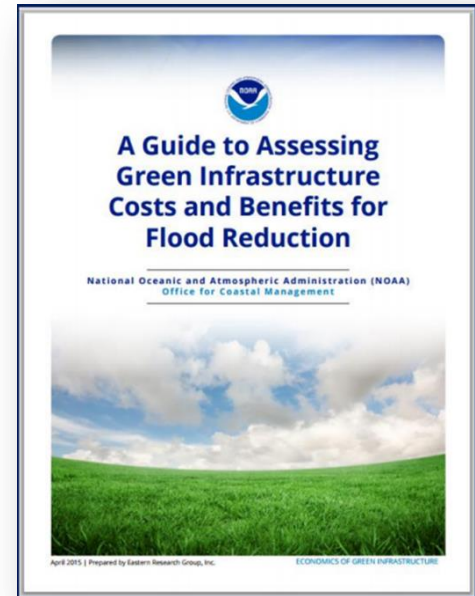
Adapting Stormwater Management for Coastal Floods: Take Action

- Action Area 1 – Planning
- **Action Area 2 – Regulations, Standards, and Guidance**
Outlines existing regulations and formal guidance that could be modified to reflect combined flood hazards and address multiple goals (e.g., water quality)
- Action Area 3 – On-the-Ground Measures
- Action Area 4 – Funding
- Case Studies – Pulling It All Together



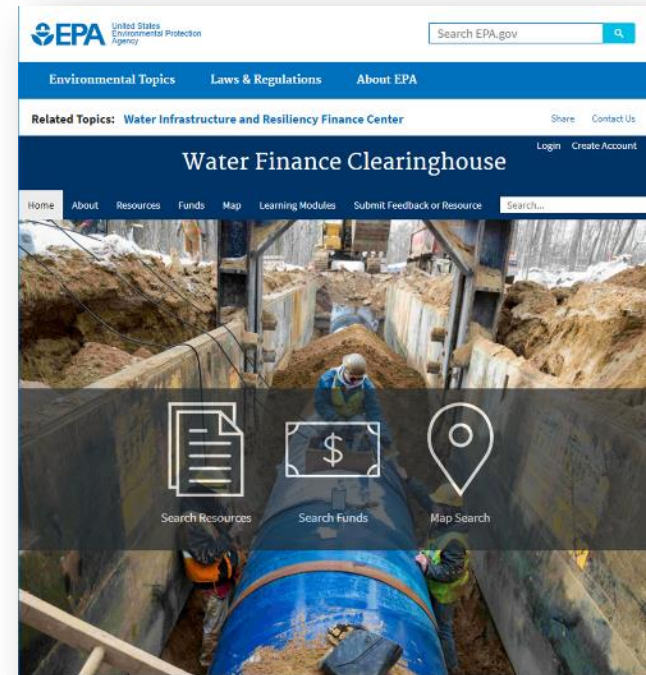
Adapting Stormwater Management for Coastal Floods: Take Action

- Action Area 1 – Planning
- Action Area 2 – Regulations, Standards, and Guidance
- **Action Area 3 – On-the-Ground Measures**
Provides examples of on-the-ground measures and best management practices (BMPs) that communities could employ under one or more overarching strategies
- Action Area 4 – Funding
- Case Studies – Pulling It All Together



Adapting Stormwater Management for Coastal Floods: Take Action

- Action Area 1 – Planning
- Action Area 2 – Regulations, Standards, and Guidance
- Action Area 3 – On-the-Ground Measures
- **Action Area 4 – Funding**
 - Outlines strategies for funding and provides link to existing tools and programs that can be leveraged to fund actions
- Case Studies – Pulling It All Together



Adapting Stormwater Management for Coastal Floods: Take Action

- Action Area 1 – Planning
- Action Area 2 – Regulations, Standards, and Guidance
- Action Area 3 – On-the-Ground Measures
- Action Area 4 – Funding
- **Case Studies – Pulling It All Together**



Massachusetts Coastal
Zone Management -
Climate Impacts on Best
Management Practices



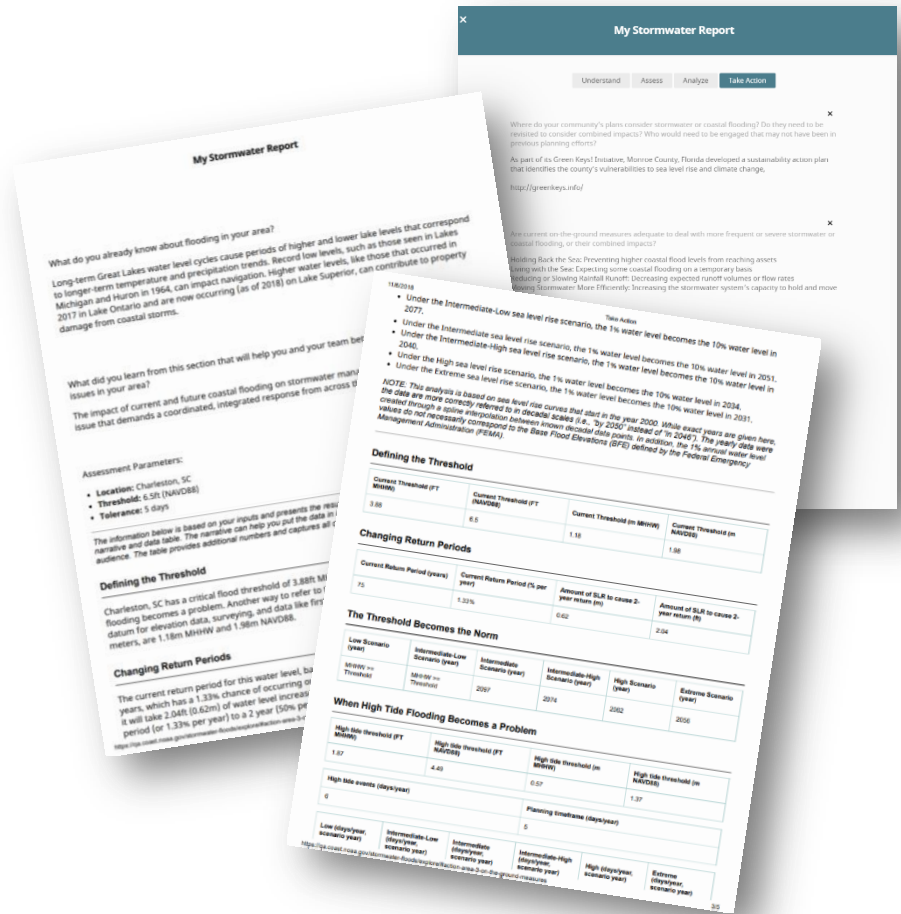
City of Wilmington, North
Carolina – Community
Resilience Pilot



City of Olympia,
Washington – Engineered
Response to Sea Level
Rise

Adapting Stormwater Management for Coastal Floods: My Stormwater Report

- Enter responses to prompting questions throughout all sections
- Copy/paste links and notes
- Download or print
- Information is not saved once you leave the site

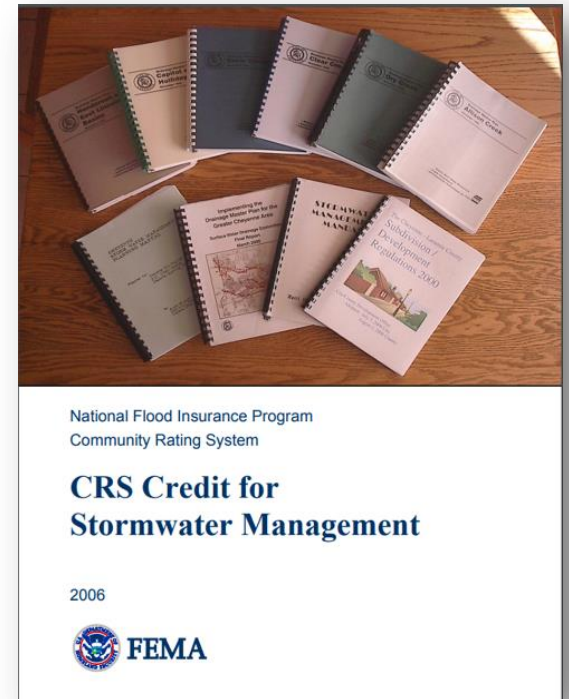


What's Next?

- Go Live! November 9?

<https://coast.noaa.gov/stormwater-floods/>

- Stakeholder Outreach and Engagement
- Planning for Version 2
 - Companion learning products focused on applications
 - Enhance linkages to community hazard mitigation goals
 - Improve discovery of relevant actions and help to build a strategy
 - Enhance data and analysis content



For More Information

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