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# Too Much or Too Little Water

## Responsibilities of Stormwater Professionals

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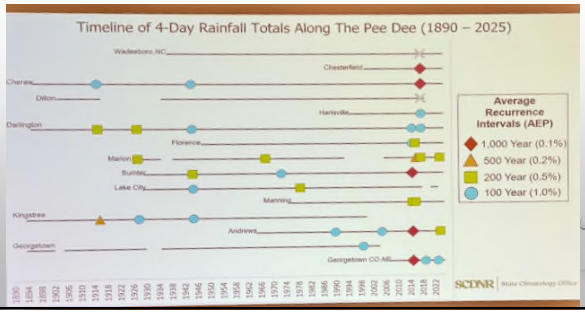
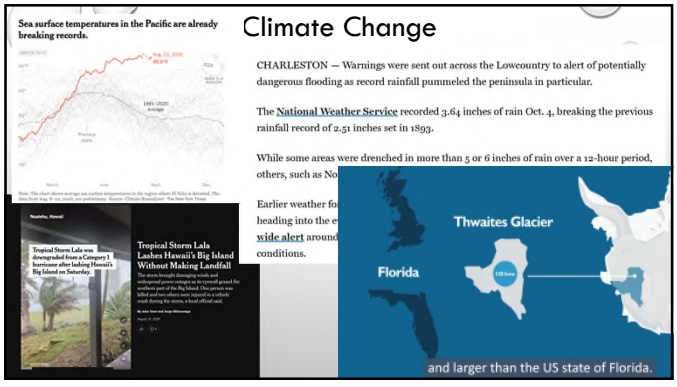
## Too Much Water



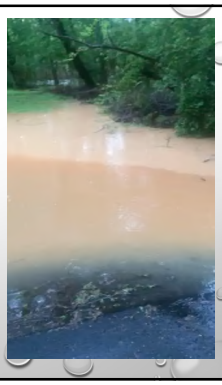

## Climate Change



## Resilience

- 100 Year Flood Plain Doesn't Mean Much After Helene
- 100 Year Return Interval doesn't mean much with Climate Change
  - Increased storm frequency and intensity
  - City Of Mauldin and Beaufort County (landlocked) Require100-Year, 24-hour critical design storm
  - Revise your Design Manual to incorporate 25, 50, or (preferably) 100 yr design storm
- SC Office of Resilience – Mitigation grants- $10 million total – applications close Jan 15, 2027
- Storm Water Utility needed to properly fund your Stormwater Department/Program (usefully spend all of annual funds)

## Bad Design and Failed Implementation



## Resilience
and
Protecting the Public Welfare

- BMPs – Require proper Design, Installation, and Maintenance
  - When engineered plans don't control rate of runoff or sed; require design engineer to fix it
    - A Prof Eng (PE) has duty to protect the public as well as client
  - Apply fines and Use Stop Work Orders
- Add to Ordinance that owner/developer/contractor/engineer who causes downgradient flooding/sediment required to remedy
  - Apply that ordinance when needed
  - Include in ordinance if downgradient damage not remedied, MS4 can perform remedial work and place lien on offending property to reimburse MS4 for remedy costs

## Too Little Water

- SC Has already experienced significant recent Droughts
  - 1998-2002, 2007-2009, 2010-2013, 2015-2016, 2024(after Helene) – Present
    - Lake Moultrie in 2016 =>
- Stormwater System (including subsurface detention) – first flush =>
- Bacteria double production with 10$^{O}$C Increase
- Roadways – first flush
  - Emerging Contaminants - PFAS, microplastics (including Tire Wear Products)





## Too Little Water
When the rain begins again

- Implementing effective and cost viable BMPs for when the rain does come
  - Non-Structural and Source Control (development plans-less impervious, more green space-and grading plans, good housekeeping, street sweeping, erosion and sediment controls, litter and trash management)
  - Biofiltration and Bioretention (grass buffers, rain gardens, bioswales)
  - Ponds and Wetlands (including constructed wetlands)

## Too Little Water
For extended droughts

- Inspect, Maintain, Repair and Upgrade Stormwater Systems
- California Plans to Save Torrential El Nino's Torrential Rain for Later
  - Tax new impermeable land (2.5 cents per foot => $300 million annually for LA County)
  - Replenish Groundwater Aquifers to provide drinking water storage
    - Porous infrastructure and Infiltration Basins
    - Green Spaces to cool neighborhoods
  - Off stream Reservoirs to provide drinking water storage
    - Texas and California (CA - 1.5 million acre-ft reservoir from Sacramento River could supply 4.5 million homes for a year)