



NOAA
RESEARCH

2019 Resilient Counties Luncheon

Addressing Threats due to Adverse Weather Patterns

NOAA Research for Planning and Preparedness

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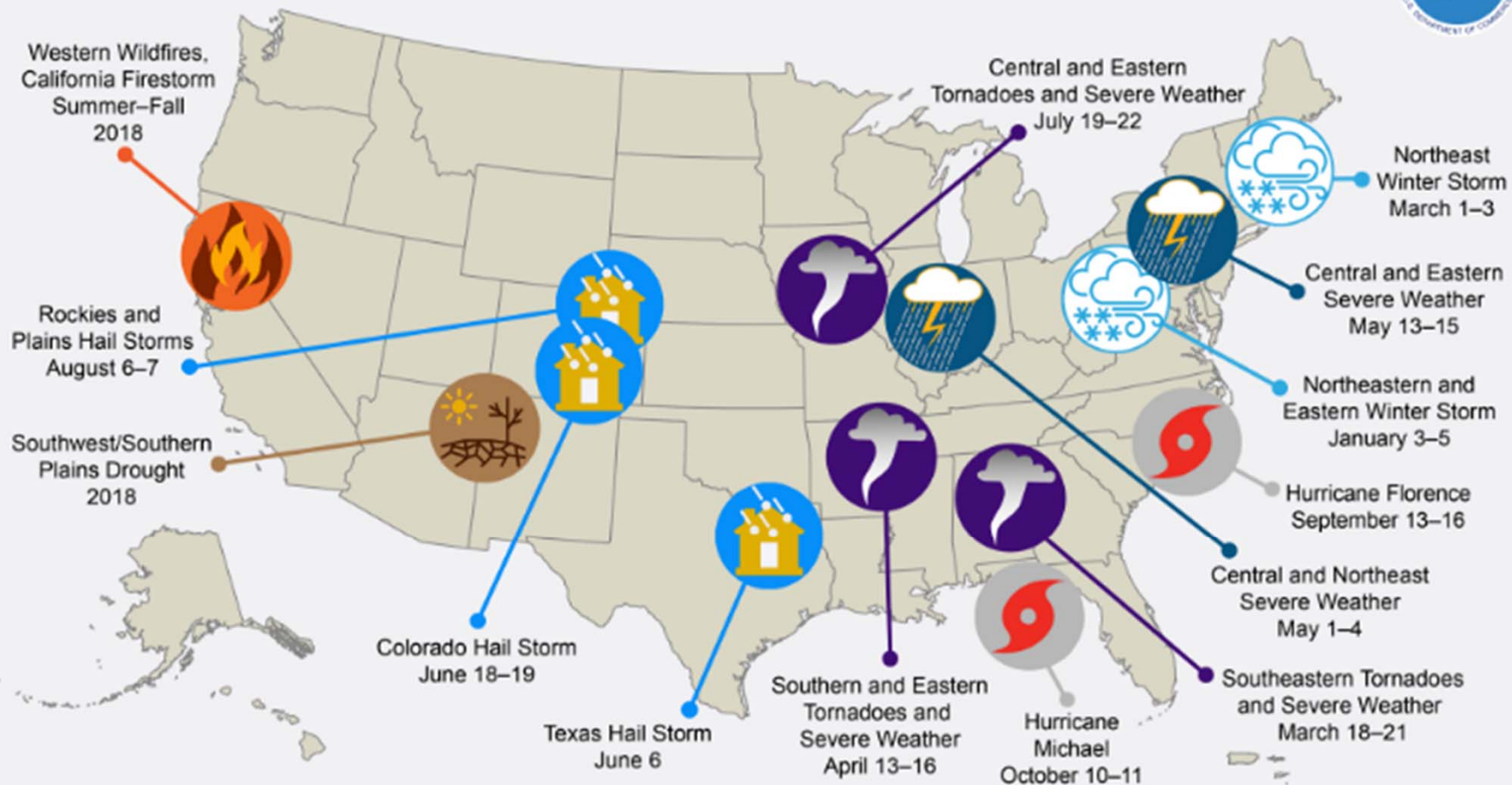


**Climate is what we expect,
weather is what we get.**

Mark Twain



U.S. 2018 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the 14 separate billion-dollar weather and climate disasters that impacted the United States during 2018.

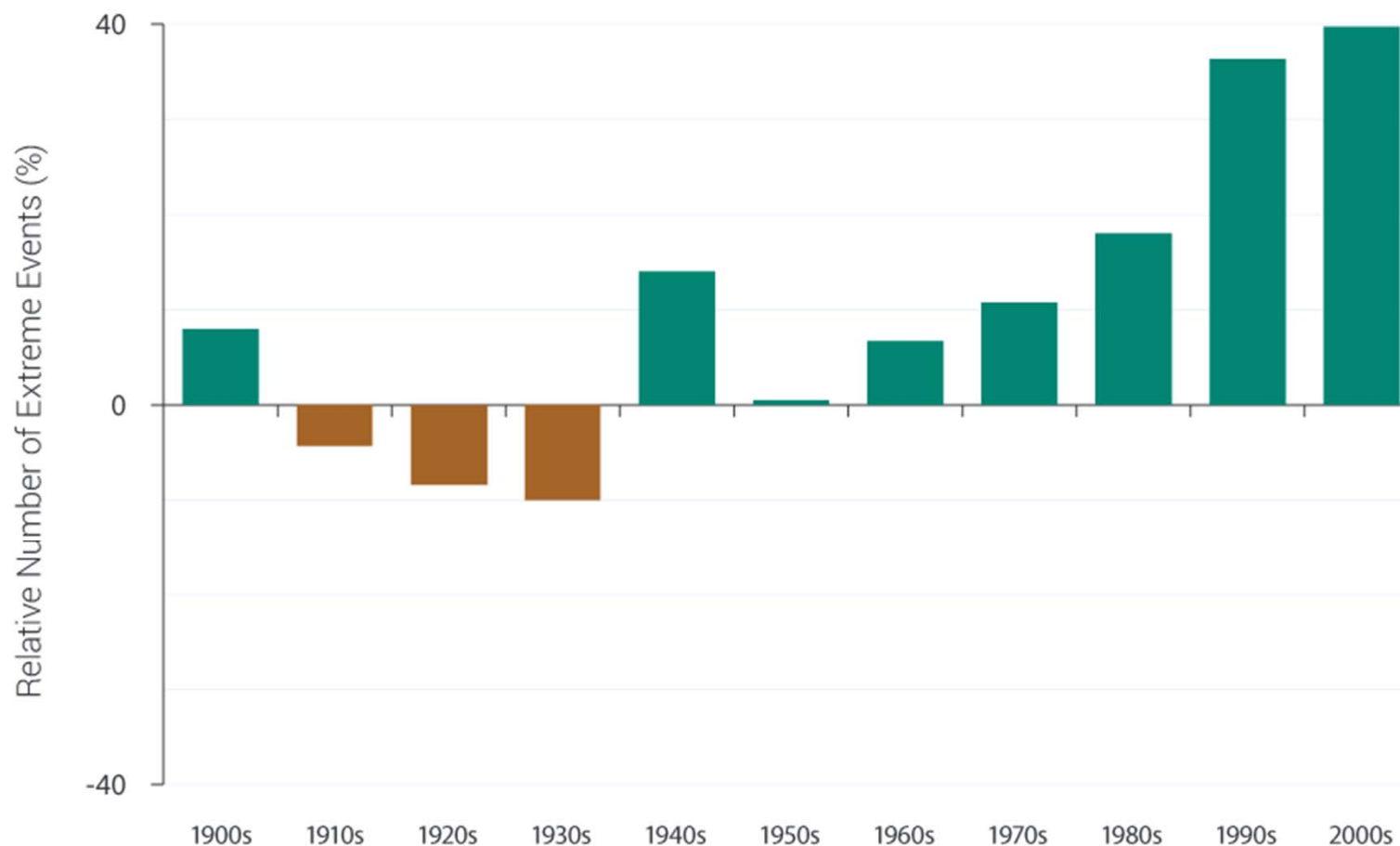
Source: National Centers for Environmental Information; NOAA





Observed US Trends in Heavy Precipitation

Observed U.S. Trends in Heavy Precipitation



Source: US National Climate Assessment; 2018





Social trends increase our vulnerability to extremes... in heat, in precipitation, storm surge, wildfires....

- Concentration of development (coasts)
- Aging population
- Increasing urbanization
- Increasing populations in the West



***Where and how can our research
help communities and businesses
improve planning and preparedness?***





Science and services networks



**Social Science to
Improve Daily
Forecasts in Alaska**



Western Alaska



**Communicating Storm
Surge Levels to Protect
Infrastructure**



Port of Houston, Texas

**Better Risk
Communication for Fire
Managers**

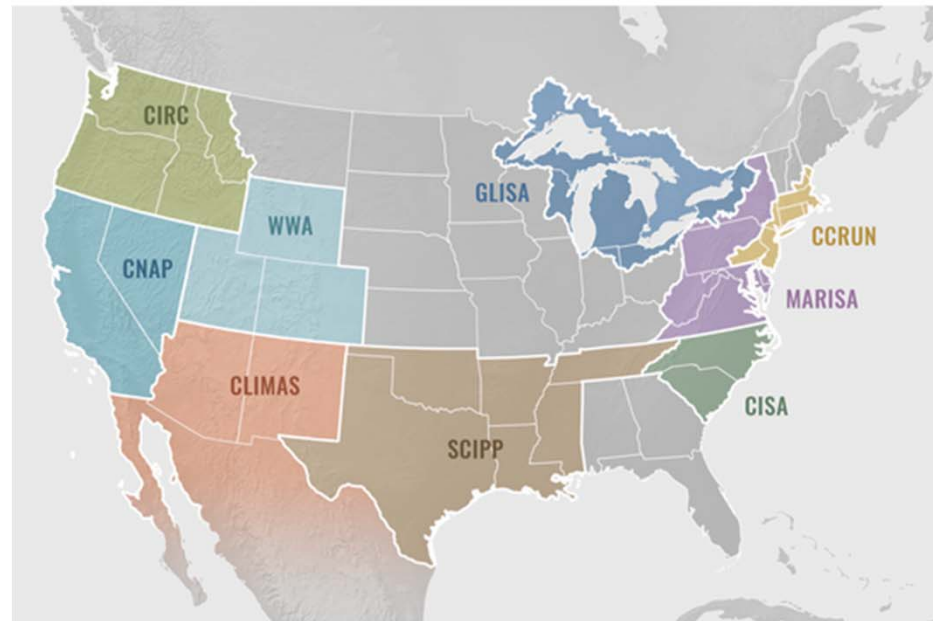


California and Nevada



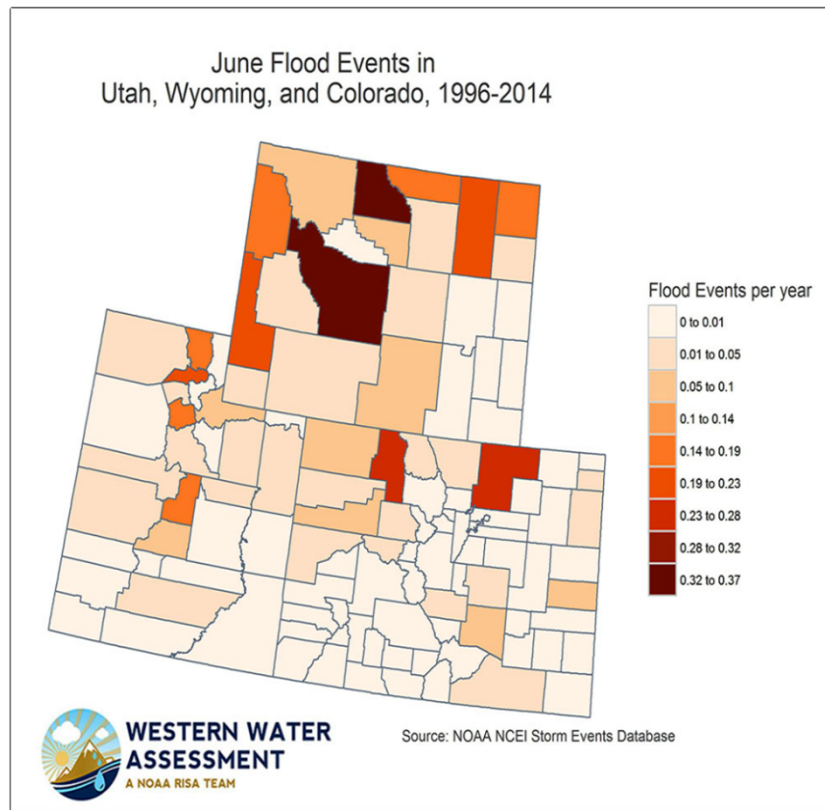
Research Programs that Support “the last mile” – planning and preparedness

- ‘Boots on the ground’ trusted science and stakeholder experts
- In-depth knowledge of regional needs
- Extending value of NOAA data and products





EXAMPLE: Bringing NOAA data to Wyoming hazard mitigation plans



Wyoming Region 1
Regional Hazard Mitigation Plan
Campbell, Crook, Johnson, Sheridan and
Weston Counties

Public Review Draft
August 2018

WWA/RISA



EXAMPLE: Assessing impacts of floods in coastal communities



Carteret County Health Department
Charleston County Emergency
Management (South Carolina)

Susceptibility of Public Health Impacts from Flooded Water, Wastewater and Public Health Infrastructure

A Guidebook and Tools for Community Level Assessment

About the Project

Coastal infrastructure is becoming increasingly vulnerable to hazards including extreme precipitation events, stronger storm surge, riverine flooding and rising seas. Knowing that there is an intimate connection between infrastructure and public health, it is important to engage local communities in assessing the susceptibility of their populations to health risks from infrastructure failure. This project, funded by NOAA's [Coastal and Ocean Climate Applications Program](#), brought together diverse groups of decision-makers to better understand the cascading public health impacts from water infrastructure vulnerability due to flooding and to develop an assessment that fosters preventive activities to increase resilience. A group of research partners from the South Carolina Sea Grant Consortium, Carolinas Integrated Sciences and Assessments, East Carolina University, North Carolina Sea Grant, Old Dominion University, and Virginia Tech piloted this process in Charleston, SC and Morehead City, NC.



Photo / Minh Phan

Purpose of the Project

The purpose of this project was to develop a method of assessing the resilience of public water and wastewater systems to flooding as well as the access to health care facilities, and therefore, to improve the health outcomes of communities when faced with tropical storms, increased tidal flooding, and extreme rain events. Using a simple model of $Susceptibility = Vulnerability - Resilience$, resources and tools were developed to help communities lower their susceptibility to the public health impacts from these events.

Development of Tools

Two cities – Morehead City, NC and Charleston, SC – were selected to develop the tool based





EXAMPLE: Simple Planning Tool for Arkansas



SCIPP/RISA



Bentonville and Siloam Springs -- APA



EXAMPLE: Understanding Changes in Extremes in San Diego



CNAP/RISA







EXAMPLE: Supporting water resource and community planners



Water Resources Dashboard: a one-stop location for water-relevant data sets.

Designed through case studies on extreme events and risk management





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THE CLIMATE EXPLORER

Explore graphs and maps of historical and projected climate variables for any county in the contiguous United States.

Select a location

View by variable

Weather & Tidal Stations

New here? Take the tour

Designed by Habitat Seven



From the NOAA Nat'l Ocean Service – Office of Coastal Management:

The screenshot shows a NOAA website page with a blue background featuring water droplets. On the left is a vertical blue sidebar with icons for weather, a person, a fish, a microscope, a beaker, and a person working. The main content area has the NOAA logo at the top left, followed by the title 'Adapting Stormwater Management for Coastal Floods' in large white text. Below the title is a paragraph: 'Communities can use this website to determine how the flooding of today and tomorrow can affect their stormwater systems, and generate a report that can be used to'. This is followed by a bulleted list: '• Educate community stakeholders on implications of coastal flooding', '• Display local information about the current and future flooding impacts', and '• Inform planning efforts and make the case for funding'. At the bottom of the main area are four numbered steps: 1. Learn more about coastal flooding and sea level rise. 2. Calculate current and future coastal flood frequency and impacts. 3. Determine if, when, and how your stormwater system will be impacted. 4. Learn different ways to mitigate flooding issues. Below these steps are four colored buttons: UNDERSTAND (blue), ASSESS (green), ANALYZE (purple), and TAKE ACTION (orange), each with an icon. On the right side, there is a 'My Stormwater Report' overlay with a title bar, a close button, and four tabs: Understand, Assess, Analyze, and Take Action. The 'Understand' tab is active, showing text about launching the tool, a definition of coastal total water levels, and a note about location's role in flooding.

Adapting Stormwater Management for Coastal Floods

Communities can use this website to determine how the flooding of today and tomorrow can affect their stormwater systems, and generate a report that can be used to

- Educate community stakeholders on implications of coastal flooding
- Display local information about the current and future flooding impacts
- Inform planning efforts and make the case for funding

- 1 Learn more about coastal flooding and sea level rise.
- 2 Calculate current and future coastal flood frequency and impacts.
- 3 Determine if, when, and how your stormwater system will be impacted.
- 4 Learn different ways to mitigate flooding issues.

UNDERSTAND

ASSESS

ANALYZE

TAKE ACTION

My Stormwater Report

Understand Assess Analyze Take Action

Before launching the tool, what do you already know about the combined effects of coastal flooding and rainfall on your city's stormwater systems? Have you already performed any analyses?

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 levels related to seiches or tsunamis could be included with these elements where they are key contributors to coastal flooding, but these sources are not evaluated as a part of this website.

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 runoff (San Francisco, California) primarily drive



Coastal County Snapshots

[LAUNCH](#)

GEOGRAPHY

Coastal counties, including U.S. territories

BASED ON

Multiple authoritative data sets

TIME COMMITMENT

Approx. 15 minutes

NOAA Office for Coastal Management

Overview

This online tool provides managers and citizens with easy-to-understand charts and graphs that describe complex coastal data. Users select a county of interest and the website does the rest, creating a helpful educational tool for governing bodies and citizen groups. Current snapshot topics include flood exposure, wetland benefits, and ocean and Great Lakes jobs.

Tell us how your county uses the snapshots.

Features

- Assess your county's exposure and resilience to flooding
- Learn how your county benefits economically from the ocean or Great Lakes
- Examine the benefits your county receives from its wetlands





A few more NOAA resources....



- Nat'l Ocean Service (NOS):
<https://coast.noaa.gov/digitalcoast/tools/slr>



- National Weather Service (NWS):

www.weather.gov/wrn



- National Centers for Environ. Info. (NCEI)

www.ncei.gov



- NOAA Research:

- www.climate.gov; www.drought.gov





Thank you

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