Webinar How Extreme Weather Trends Impact Transportation Networks



Speakers

Presentation:

Deb Matherly, Principal Planner, WSP

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State Updates:

Ed Sniffen, Deputy Director, Hawaii DOT

Moderator:

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Transportation Resilience



What is resilience?

"The ability to prepare and plan for, absorb, recover from, or more successfully adapt to adverse events."

(Disaster Resilience: A National Imperative, National Research Council, 2012)

"The capacity of individuals, communities, institutions, businesses and systems within a city to thrive, no matter what kind of chronic stresses and acute shocks they experience."

(100 Resilient Cities)





U.S. 2019 Billion-Dollar Weather and Climate Disasters

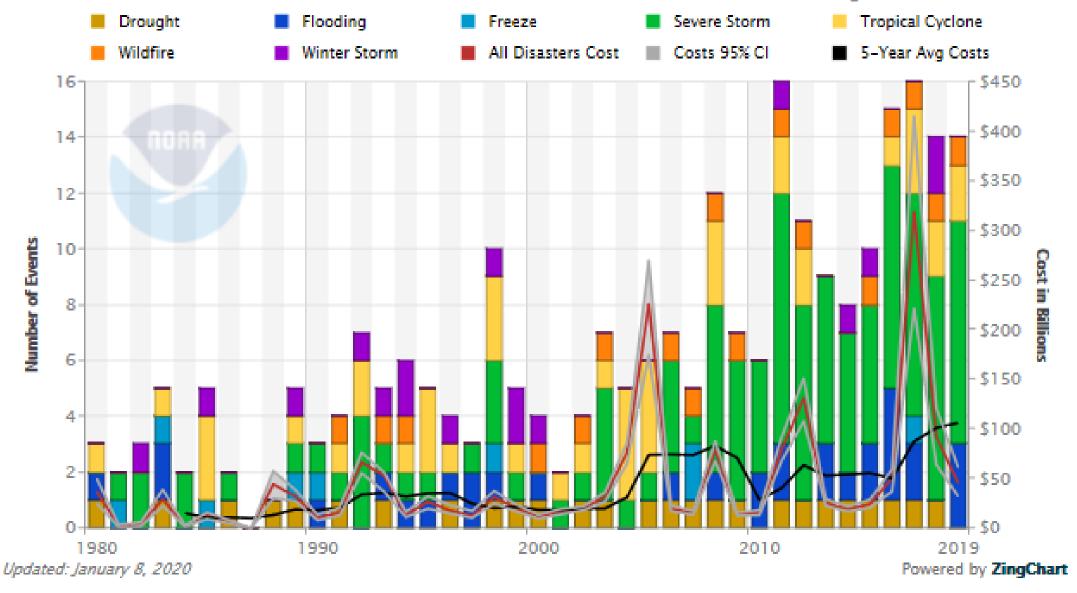






This map denotes the approximate location for each of the 14 separate billion-dollar weather and climate disasters that impacted the United States during 2019.

United States Billion-Dollar Disaster Events 1980-2019 (CPI-Adjusted)





NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2020). https://www.ncdc.noaa.gov/billions/

Major Participants*	Major Events and Resources
American Association of State Highway Transportation Officials (<i>AASHTO</i>) American Public Transportation	Resilience Peer Exchange 11/2017; Centers of Excellence library; webinars; coordinate with DOTs, TRB and FHWA
Association (APTA)	
National Academies of Science, Engineering & Medicine, Transportation Research Board (TRB)	Denver Resilience Innovations Summit & Exchange (RISE) Summit 10/2018; TR2019 11/2019; TRB reports, webinars and implementation projects
Federal Highway Administration (FHWA)	Pilot studies, peer exchanges, guides, hydraulic engineering & other circulars, webinars, reports
Federal Transit Administration (<i>FTA</i>)	



^{*} This presentation is neither sponsored or endorsed by the cited agencies. This table and pictures/ examples are presented for context.



Project background

- What You Can Do?
- Key Questions to Ask
- Common Challenges

Primer for CEOs and senior executives on implications and dimensions of resilience and the potential impact on agency programs.



Why is resilience important?

- "Whatever you call it, customers expect this work to be done. They expect us to keep things working."
- "A DOT is uniquely positioned to take action, look at design scenarios, and has the opportunity to develop action solutions as an infrastructure agency."
- A resilient transportation system improves safety and mobility, saves money and improves the agency's respect and reputation.



No agency is an island

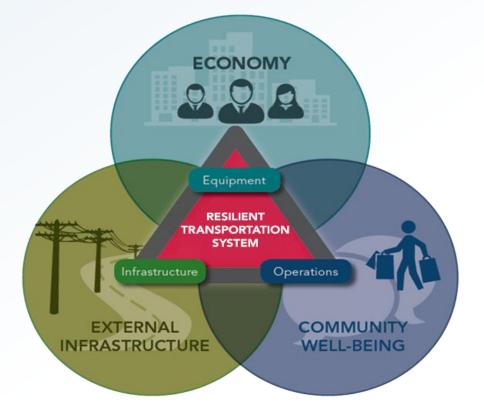
- Act on critical interdependencies
- Find common causes to pool resources with sister agencies







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Understand risks and hazards

- Apply best risk practices to design standards, materials procurement, cybersecurity, bridge management, and more
- Develop risk tolerance policy for facilities or assets too important to fail
- Identify critical corridors for commerce, emergency lifelines, at-risk communities





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Implement resilience throughout

- Resilience is most effective when "baked in" to everyone's job and mindset—like safety
- Resilience applies to every major business function
- Support cross-functional collaboration and coordinated decision making

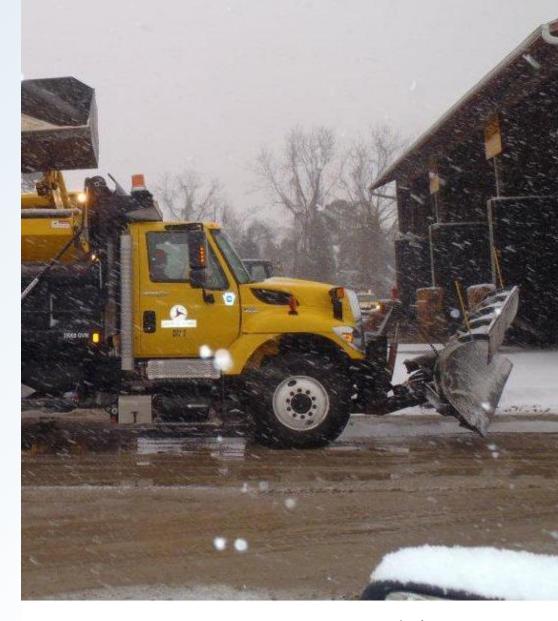


Resilience graphic from "Improving the Resilience of Transit Systems Threatened by Natural Disasters", TRB 2017.



Treasure operations and maintenance

- Hands-on understanding is crucial
- Many DOTs include O&M in planning, programming, and design teams
- Oregon DOT uses maintenance dispatch data + weather data to map vulnerable areas
- Alabama DOT purchased equipment that doubles as snow plows



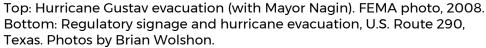
Craven County, NC - Source NCDOT website



Include emergency operations and response

- Train, exercise and learn
- Probe crisis incidents for efficiencies to apply everyday
- Employ everyday practices in emergencies
- Build resilience into recovery plans and use the disaster recovery period to advocate for resilience







Incorporate resilience into design and engineering

- Build and prevent scour issues upfront in bridge design
- Design facilities [to seismic standards] to provide transport to key lifeline facilities in a response situation



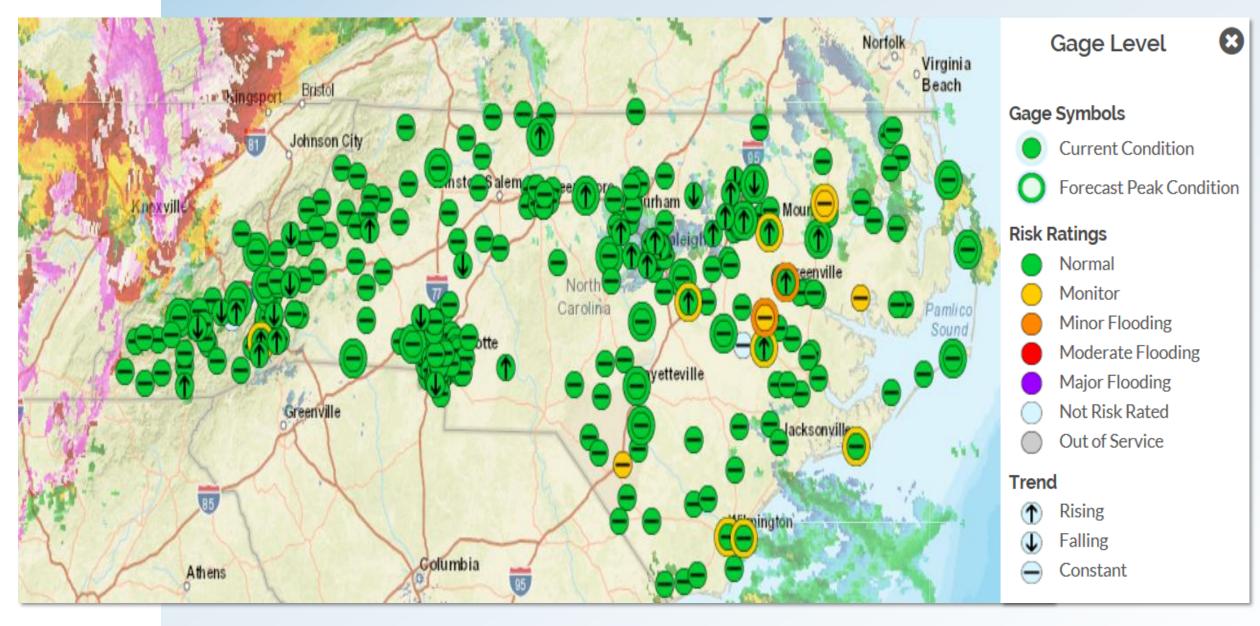


Examine technology and materials through a resilience lens

- Explore innovative techniques and materials
- Use materials that better address current & future conditions
- Automated monitoring systems improve responses, public safety









How to become more resilient

- Consider long-term life cycle in all sectors
- Embrace innovation in technology, operations, materials, information sharing
- Use risk awareness and criticality to prioritize asset management
- Encourage collaboration across regions and divisions/ cross-functional teams for planning, programming, design

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Leadership's critical role

- Promote and model the importance of resilience
- Engage actively in resilience work

- Seek partners in other states, local governments, private and non-profit organizations
- Recognize that small changes have big results over time



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Key questions to ask

- What are the most likely things that could happen and what impacts will there be?
- Is our planning proactive including using "what if" scenarios for new threats and realities?
- What are alternative approaches for adapting infrastructure and operations?
- Do we have resilience measures in our strategic, operations and capital planning?





Key Take-Aways

- Many resilience practices represent minor adaptations to existing processes, not big changes (though some will require significant investments)
- Resilience is most effective when woven into the fabric of the organization—internal and external
- CEOs that make resilience a priority may be saving their own jobs, as well as helping their agency, their state and their communities



Questions?

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State Updates:

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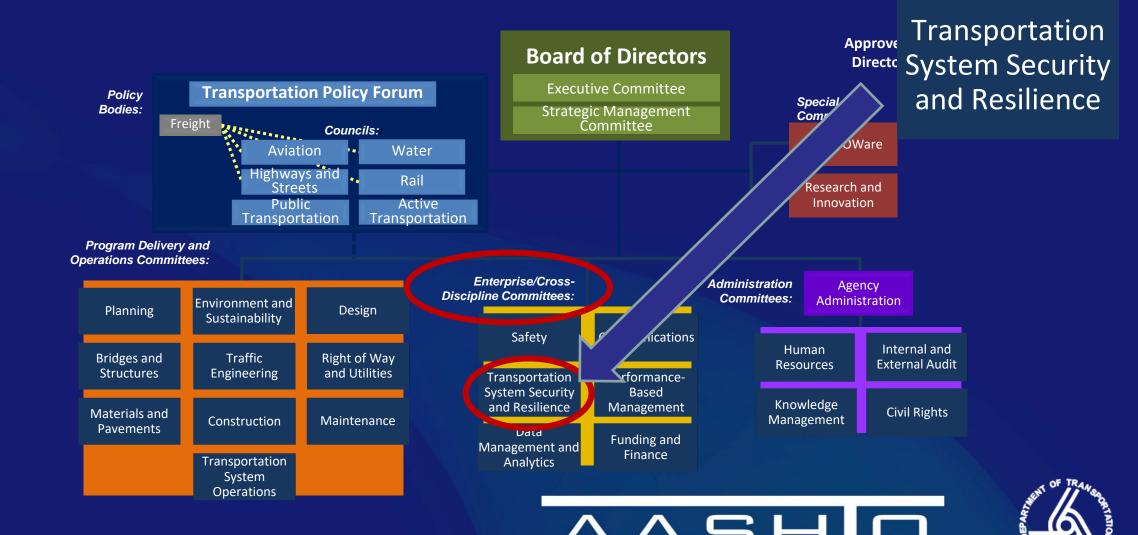


How Extreme Weather Trends Impact Transportation Networks

National Association of Governors February 12, 2020

Ed Sniffen, Hawaii Department of Transportation

AASHTO Committees (Representatives from States)



THE VOICE OF TRANSPOR ATION

AASHTO Resilience Peer Exchange



- Participants: 36 State DOTs; FHWA; TRB
- Activities: Keynote Presentations, Facilitated Breakouts

- Hosted by AASHTO's Center for Environmental Excellence
- November 6-7, 2017







Key Findings

- Leadership Buy-In: Agency leadership support is critical for institutionalizing resiliency into an organization's culture.
- Stress Economic Impacts: Framing resiliency in terms of risk, economic impacts, and return on investment can bolster support.
- Widespread Incorporation: Designers and engineers rely on established manuals and procedures from AASHTO and Federal agencies. Resilient design practices need to be incorporated into these resources.











AASHTO & Resilience: Of Interest

Center Website Portal:

- Links to available climate tools for state partners.
- Resilience "portal": design tools, data, analytics and data best practices.
- Risk analysis frameworks.

Resilience Webinar Series: Presents material on key issues including:

- Managed retreat;
- Workforce development and training needs for emerging engineers.

<u>Peer Exchanges:</u> Organize and hold a series of regional peer exchanges to focus on regional approaches to address resilience.





What Hawaii is doing



<u>Creating policies</u> for adaptation, protection or managed retreat that take communities and funding into account.



<u>Prioritizing sites</u> and designing mitigation measures with experts.



<u>Collaborating</u> with stakeholders on land use, access, and other considerations. Creating resiliency reports.



Aligning State, County, Federal and community agencies. Future decisions for roads require more than just DOT buy-in.

Mahalo

Ed Sniffen

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Thank You!

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