Topic D –Climate Education Session August 21, 2024

Panelists will address the following Board Questions

1. How does FEMA distinguish a climate-related event from a non-climate-related event?
2. Has the Federal government defined what is a climate-related event?
3. What are climate services?
4. What is the availability of federal spending information for climate-related events?
5. Do agencies have the capabilities to report spending for climate-related events?

The Board will have an opportunity for a Q&A after all panelists have presented

Disclaimer: Views expressed are those of the speakers. The Board expresses its views in official publications.

FEMA will address question #1:

How does FEMA distinguish a climate-related event from a natural disaster/non-climate-related event?

FEMA Risk Assessment

Federal Accounting Standards Advisory Board (FASAB) Session

8/21/2024

FEMA

Jesse Rozelle, Program Manager
Natural Hazards Risk Assessment Program
FEMA | Resilience | RAPID | EMD

Risk

Threat/Hazard

Technological Hazards

- Hazmat Release (Chemical)
- Hazmat Release (Radiological)
- Utility Interruption
- Dam Failure
- Transportation Accident
- Pipeline Explosion
- Water Contamination

Human Caused Threats

- Cyber Attack
- Active Shooter
- Explosive Devices
- Complex Coordinated Terrorist Attack (CCTA)
- Biological Attack
- Civil Disturbance
- Radiological Attack
- Chemical Attack
- Food/Water Attack
- Arson
- Improvised Nuclear Attack
- Aircraft as a Weapon

Natural Hazards

- Hurricane/Tropical Storm
- Flooding
- Tornado
- Severe Storm/Thunderstorm
- Wind
- Winter Weather
- Lightning
- Landslide
- Earthquake
- Tsunami/Seiche
- Volcano
- Hail
- Heat
- Avalanche
- Heat/Extreme Heat
- Drought
- Wildfire

Exposure

Built Environment

Infrastructure

Utility Systems

- Potable Water
- Wastewater
- Electrical Power
- Oil and Gas
- Communications

Transportation

- Railroads
- Subway/Light rails
- Roadways
- Bridges
- Tunnels
- Trains
- Airports
- Sea Ports
- Sea Travel
- Bus Stations

Buildings

- Residential
- Commercial
- Industrial
- Government
- Religious
- Agricultural
- Education

People

Vulnerability

Built Environment

- Poor Building Codes
- Lack of Building Codes

Socio-Economic

Social Vulnerability

- Income/Poverty Level
- Unemployment
- Housing Cost Burden
- Lack of Adequate Housing
- Education
- Health Insurance Coverage
- Age Dependencies
- Access and Functional Needs
- Lack of Vehicles
- Access to Public Transportation
- Single-Parent Households
- English Language Proficiency

Coping Capacity

Community Resilience

Institutional

- Governance
- Disaster Risk Reduction
- Preparedness and Response Capabilities

Infrastructure

- Physical Infrastructure
- Access to Water, Sanitation And Hygiene
- Access to Health Care
- Access to Communications

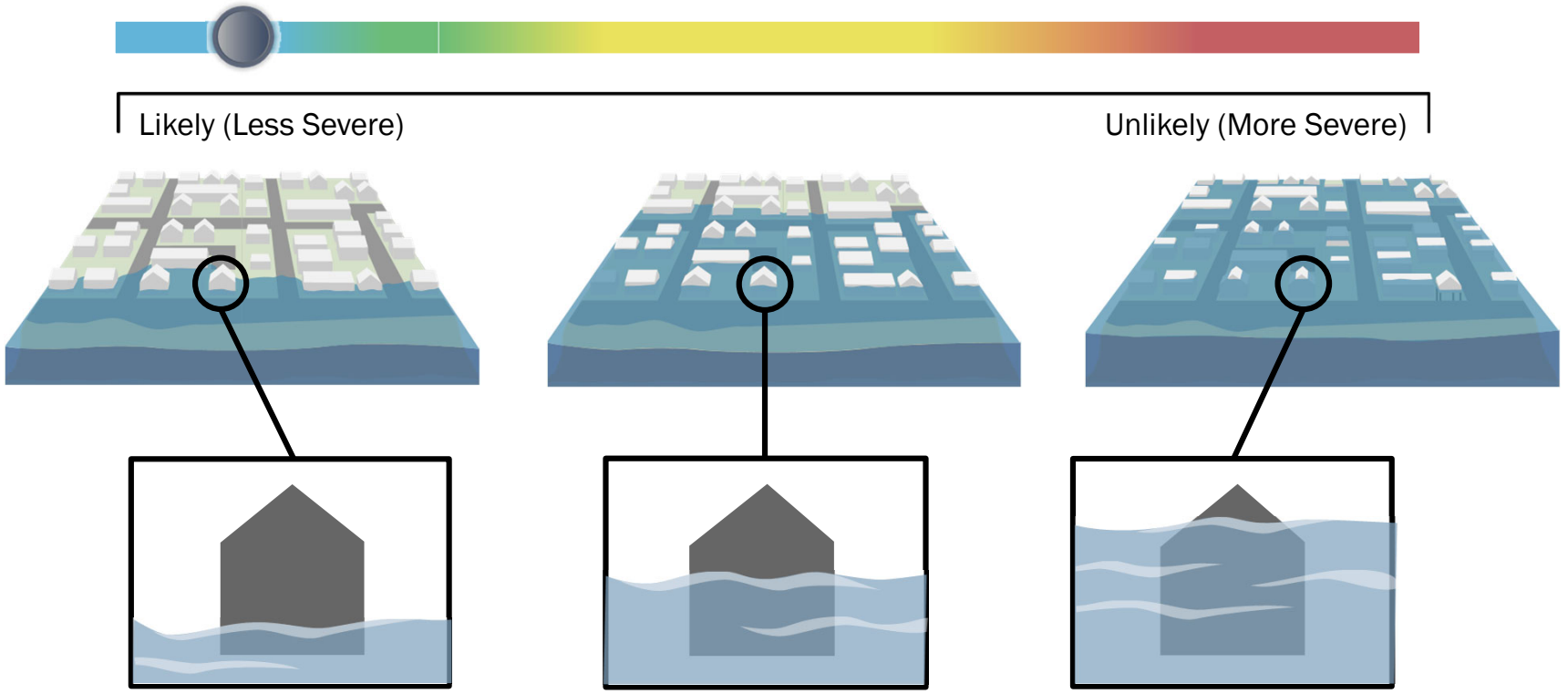
Environmental

- Local Food Suppliers
- Natural Flood Buffers
- Efficient Energy Use
- Pervious Surfaces
- Efficient Water Use

**This does not highlight all components of risk, just highlights. This is a work in progress.*

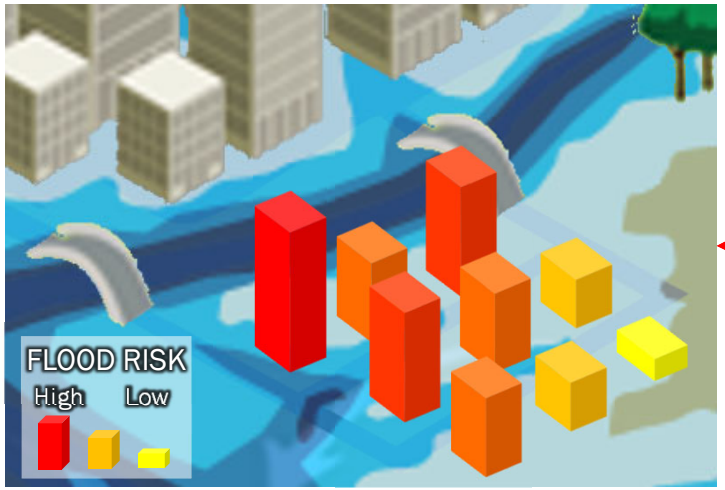
Risk - the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society, or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and coping capacity.
Hazard/Threat - a process, phenomenon, or human activity that may cause loss of life, injury, or other health impacts, property damage, social and economic disruption, and environmental degradation.
Exposure - the situation of people, infrastructure, housing, production capacities, and other tangible assets located in hazard-prone areas.
Vulnerability - the conditions determined by physical, social, economic, and environmental factors or processes which increase the susceptibility of an individual, a community, assets, or systems to the impact of hazards.
Coping Capacity - the means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster.
Adaptive Capacity – the arrangements and processes that enable adjustment through learning, adaptation, and transformation.

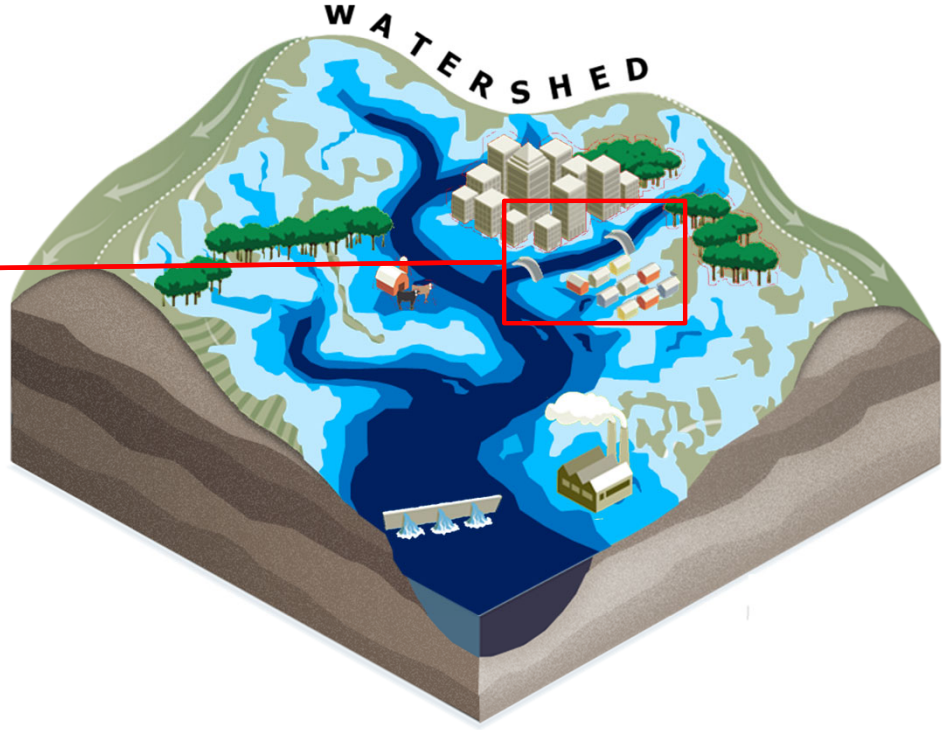
Natural Hazard Risk Assessment – Probability and Intensity

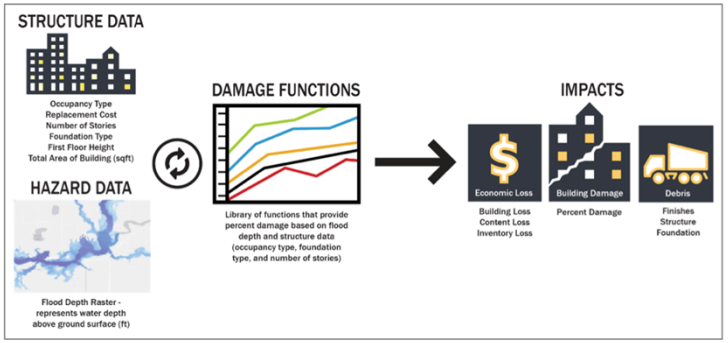


FEMA

Exposure Analysis and Loss Modeling

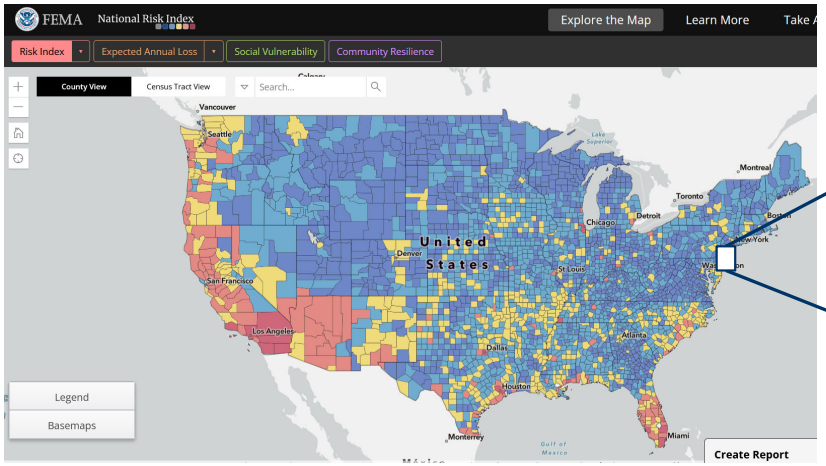


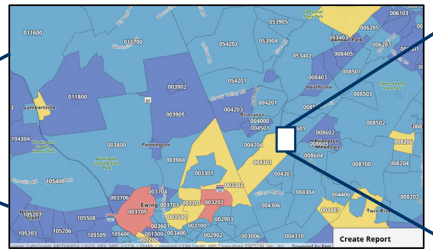




NHRAP Scale and Application Focused Initiatives

National Risk Index





Hazus

National Level

Community Level

Structure Level

Contact and Resource Information

Jesse Rozelle
Program Manager
Natural Hazards Risk Assessment Program/Hazus
FEMA Resilience | RAPID | EMD
jesse.rozelle@fema.dhs.gov

Hazus

- Hazus | FEMA.gov
- Hazus Hurricane Wind Results Dashboard (arcgis.com)

National Risk Index

- National Risk Index for Natural Hazards | FEMA.gov
- Community Disaster Resilience Zones | FEMA.gov
- Community Disaster Resilience Zones (arcgis.com)

NOAA will address question #2:

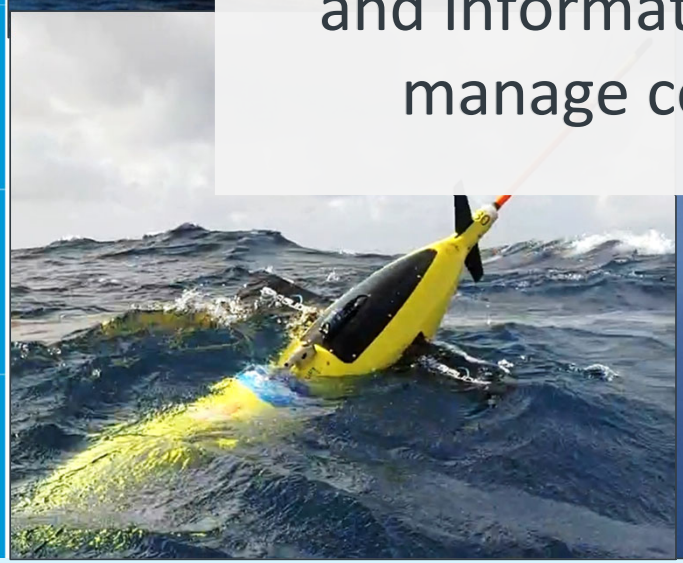
Has the Federal Government defined what is a climate-related event?

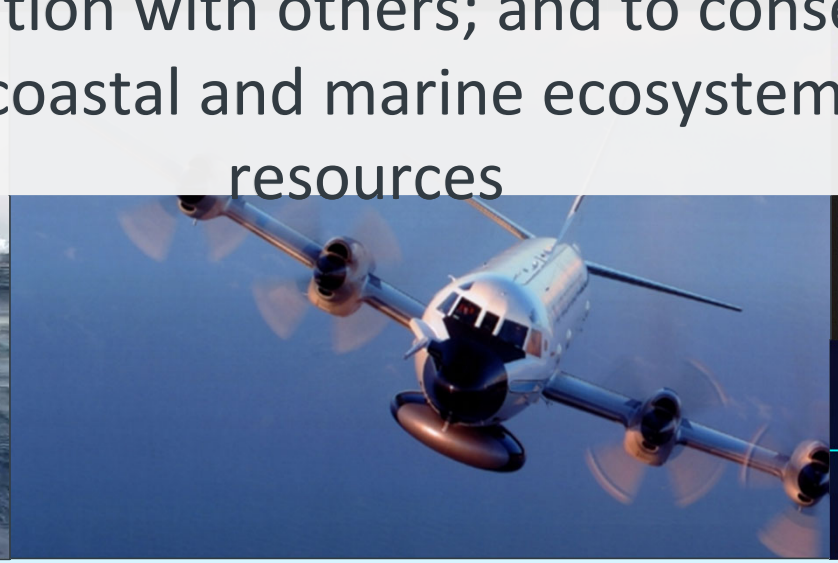
NOAA's approach to Weather and Climate disasters

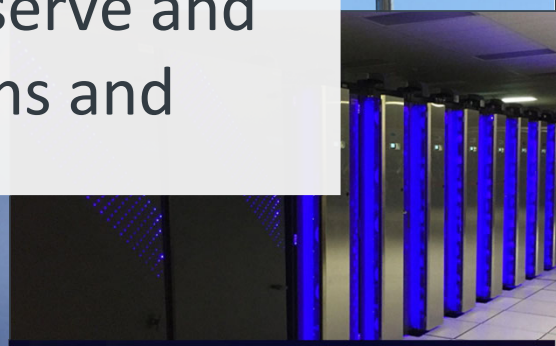
Dr. Sarah Kapnick
Chief Scientist
National Oceanic and Atmospheric Administration
chief.scientist@noaa.gov

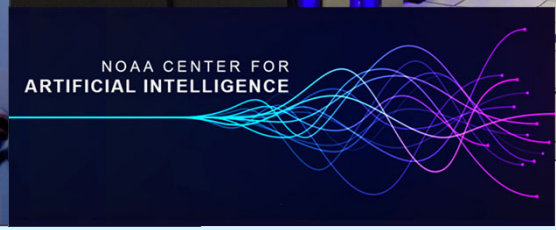
NOAA's Mission

To understand and predict changes in climate, weather, oceans, and coasts; to share that knowledge and information with others; and to conserve and manage coastal and marine ecosystems and resources









NOAA Line Offices

National Weather Service (NWS)

NOAA's National Weather Service is building a Weather-Ready Nation by providing better information for better decisions to save lives and livelihoods

National Ocean Service (NOS)

NOAA’s National Ocean Service provides research and services to grow America’s coastal economies

National Marine Fisheries Service (NMFS)

NOAA Fisheries provides science-based conservation and management for sustainable fisheries and aquaculture, marine mammals, endangered species, and their habitats

National Environmental Satellite, Data, and Information Service (NESDIS)

Gathering data to monitor and understand our dynamic planet

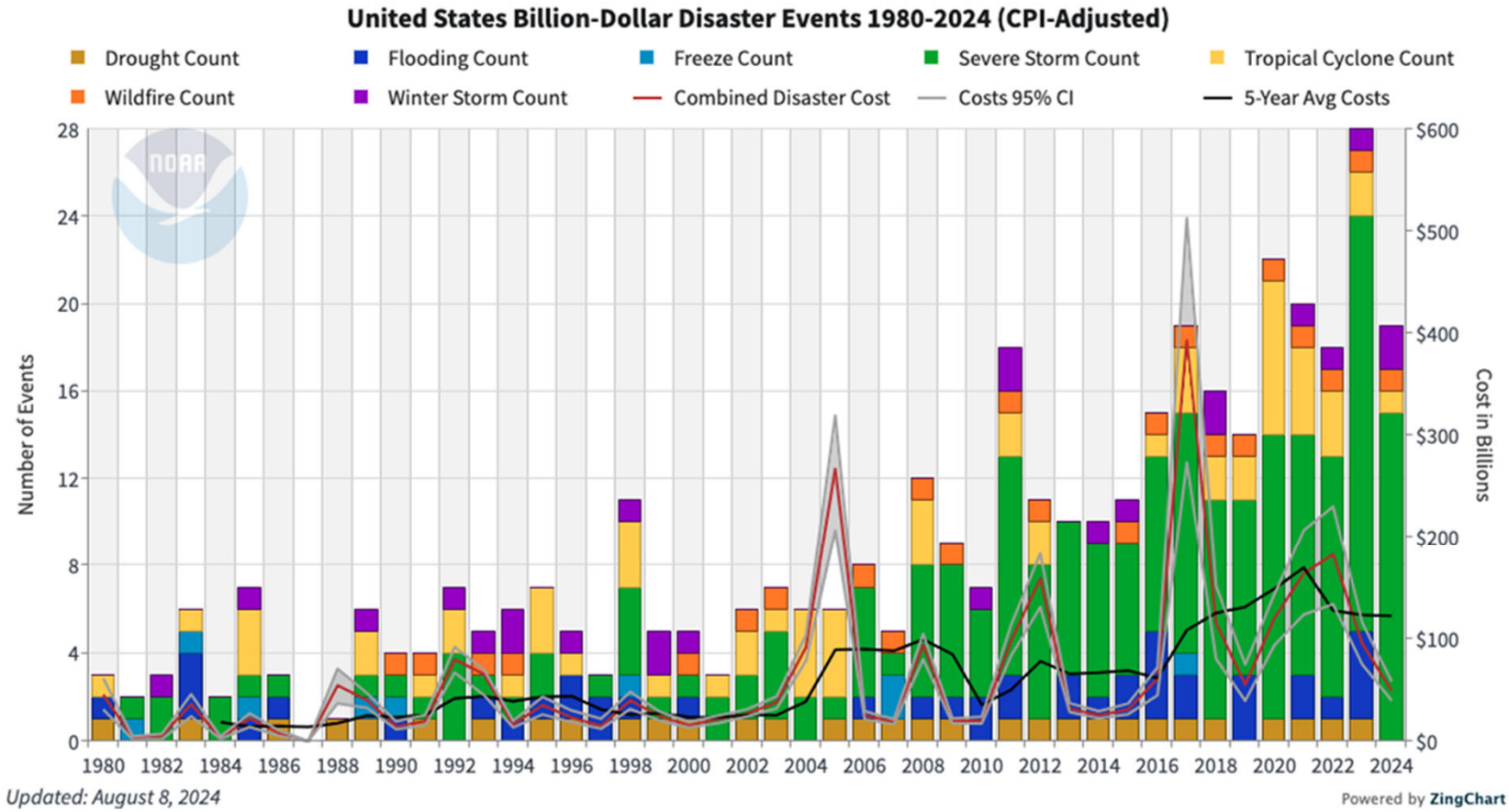
Office of Oceanic and Atmospheric Research (OAR)

NOAA Research provides cross-agency research and technological innovation to improve our lives

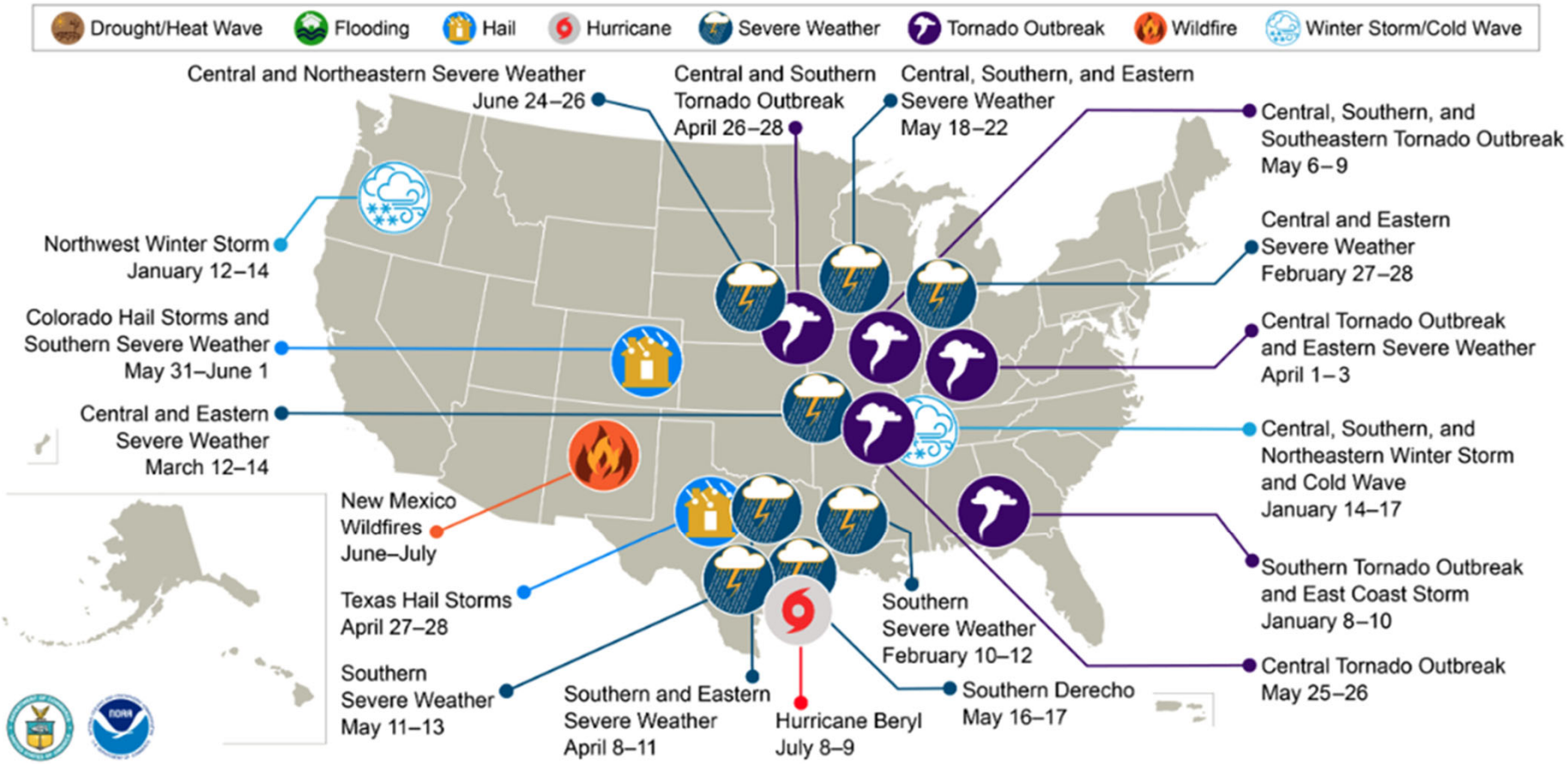
Office of Marine and Aviation Operations (OMAO)

NOAA's Office of Marine and Aviation Operations administers the NOAA fleet of ships and aircraft, and trains divers to safely facilitate Earth observation, hosting the NOAA Corps

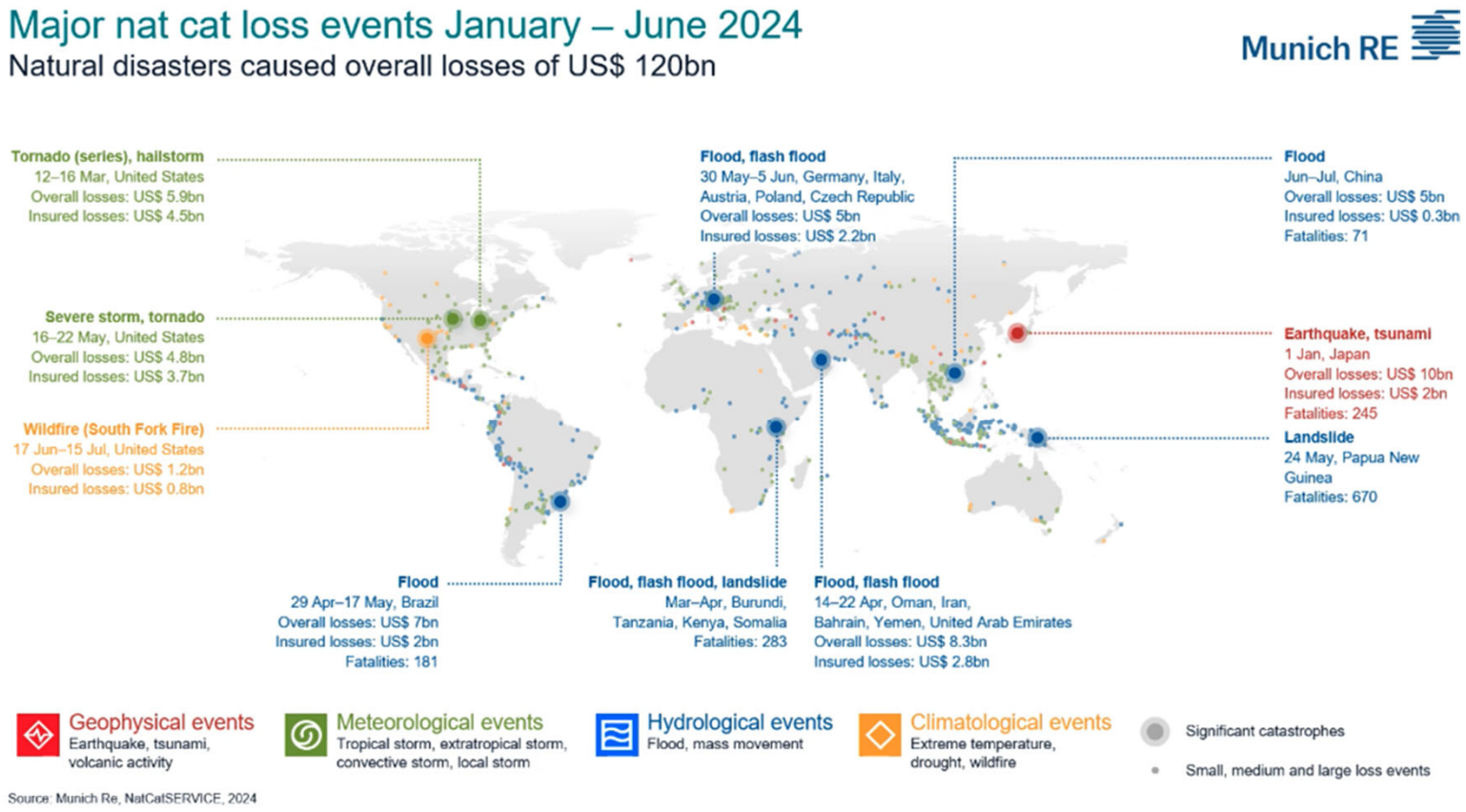
U.S. Extreme Weather and Climate Events: Cost & Number



U.S. 2024 Billion-Dollar Weather and Climate Disasters



*This map denotes the approximate location for each of the **19 separate billion-dollar weather and climate disasters that impacted the United States through July 2024.***



https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2024/natural-disaster-figures-first-half-2024.html

" Weather-related natural disasters, especially in North America, are prominent once again in the loss statistics for the first half-year. In addition, there has been flooding in regions where it is extremely rare, such as Dubai. It is considered highly likely that climate change plays a part in this trend. Climate change entails evolving risks that everyone – society, the economy, and the insurance sector alike – will have to adapt to, so as to mitigate the growing losses from weather-related events." –Thomas Blunck, Munich Re Management Board

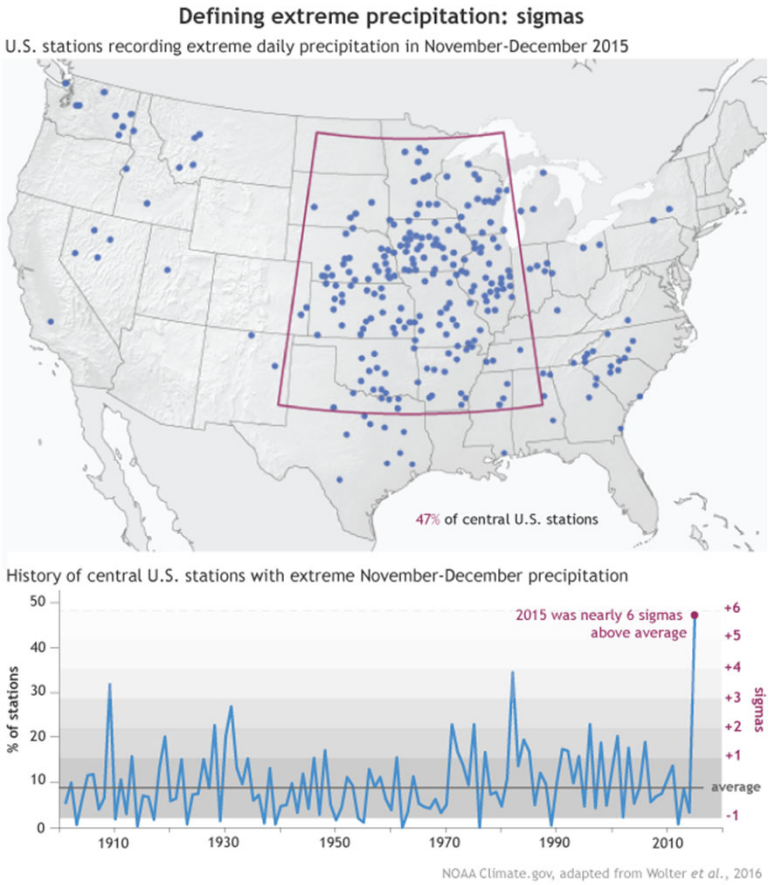
What can’t an extreme event attribution tell us?

- Extreme event attribution cannot definitively state that global warming "caused" a specific event, as it's not a simple yes or no scenario.
- It assesses whether global warming contributed to the mix of factors that lead to extreme weather, rather than being the sole cause.
- While global warming may influence an event, it is not the only factor, emphasizing the complexity of attributing specific events to climate change.

“I wonder what would happen if I halved the global warming...?”

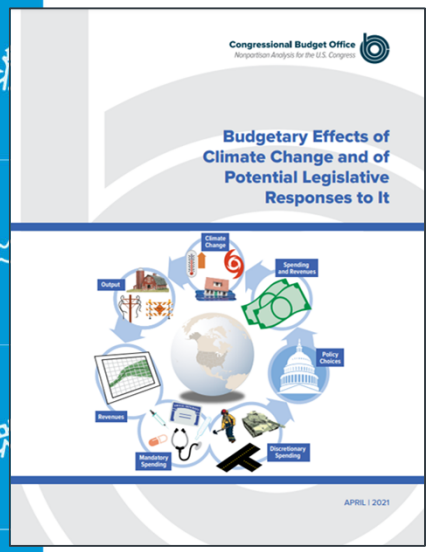
How do experts define an extreme event?

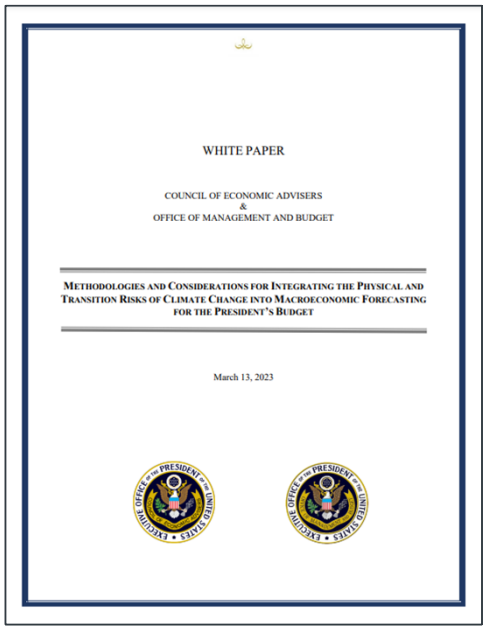
- The severity of an extreme event is described in terms of "sigmas," representing how far an observation deviates from the average, with sigma being shorthand for standard deviation.
- Most climate data observations fall within 1 or 2 sigmas of the average. A high-sigma event, like a "5-sigma" rain event, indicates extreme deviation from the norm, placing it at the far end of the observed range.
- Extreme events can also be defined by their probability of occurrence over time. Using historical data, experts estimate how frequently such events occur, known as their average return period or recurrence interval.

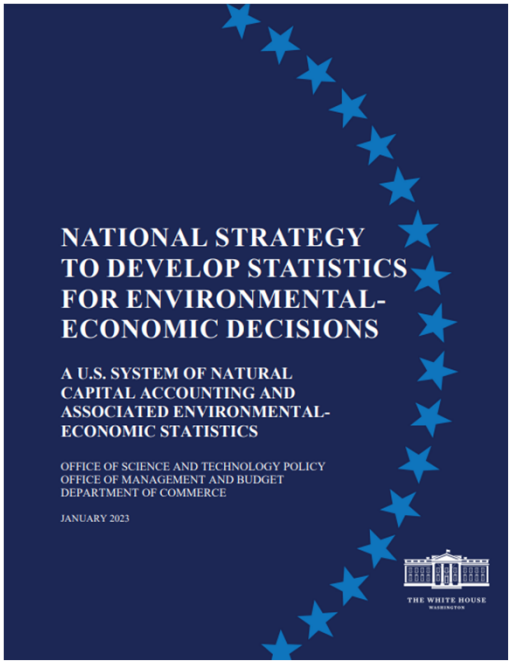


Sigmas are a way of describing the range of natural variability in a climate characteristic. (**map**) In 2015, nearly half of central U.S. stations with at least a 100-year history recorded extreme precipitation in November-December according to a NOAA analysis. (**graph**) More than half of the years on record are within plus or minus 1 sigma (darkest shading) of the average (gray line). Only a handful of years are outside of 2 sigmas. At nearly +6 sigmas from average, the 2015 season (purple dot) was far outside the range of normal variability. NOAA Climate.gov graphic adapted from Figures A1.1(h) and A1.2 (e) in Wolter *et al.*, 2016.

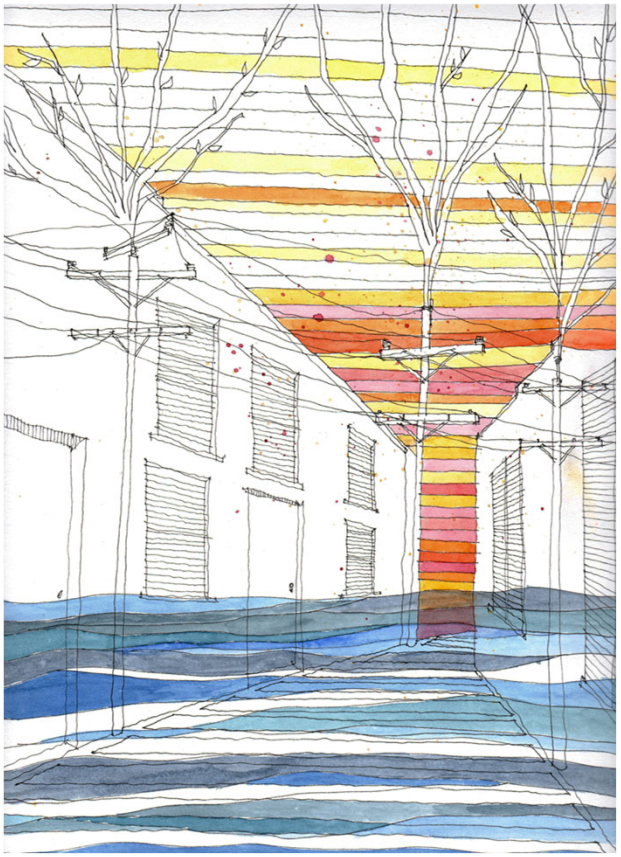
Critical Challenge: Limited understanding of our economic exposure and vulnerabilities

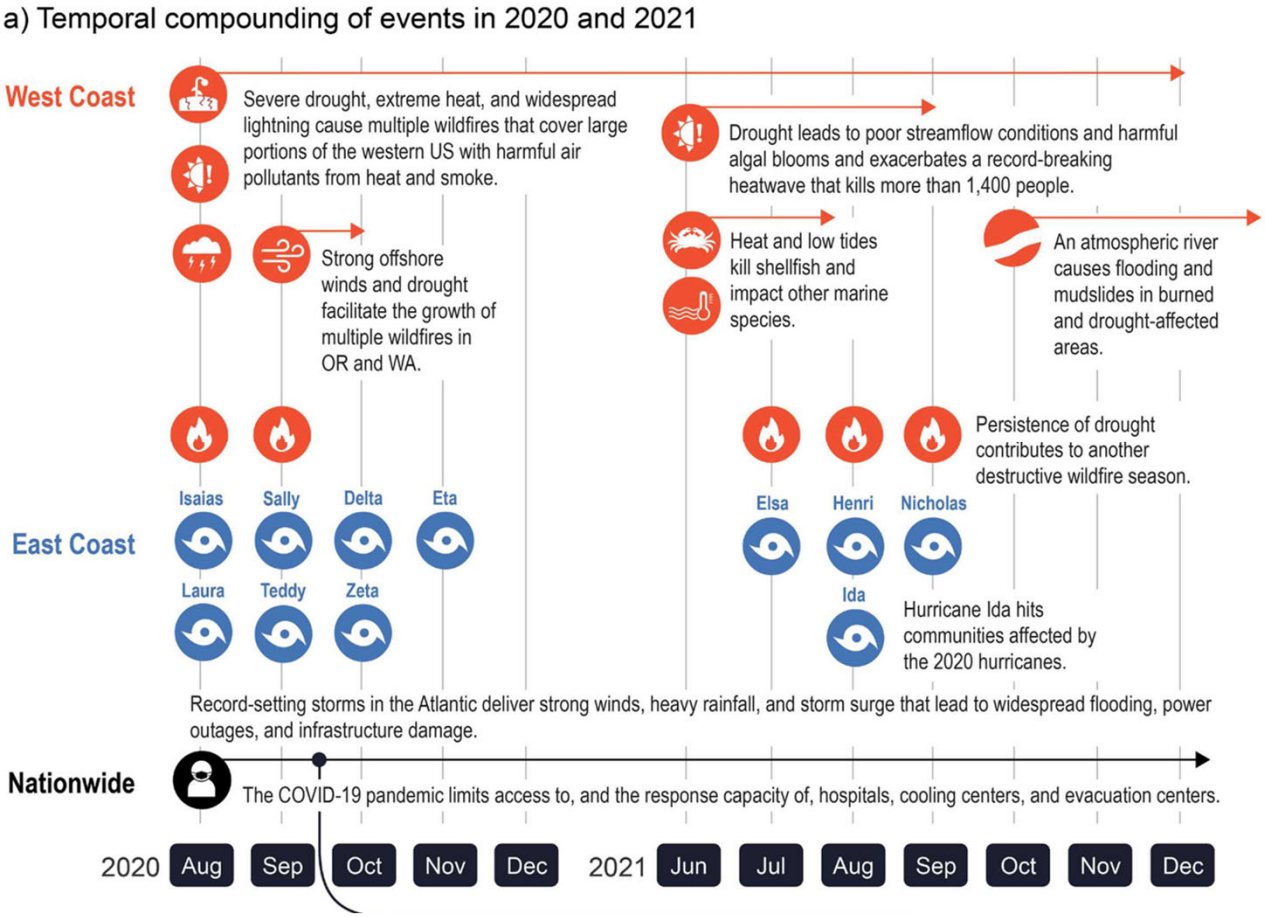






Emerging Concern: Compound risks: More than the sum of their parts





NOAA Climate Information Resources

NCEI: https://www.ncei.noaa.gov/
Sea Level Rise Viewer: https://coast.noaa.gov/slr/
NOAA Climate.gov: https://www.climate.gov/
U.S. Climate Resilience Toolkit: https://toolkit.climate.gov/
Climate Mapping for Resilience and Adaptation: https://resilience.climate.gov/
National Integrated Heat Health Information System: https://www.heat.gov/
National Integrated Drought Information System: https://www.drought.gov/
Climate Adaptation Partnerships Program: https://cpo.noaa.gov/Divisions-Programs/Climate-and-Societal-Interactions/CAP-RISA
Billion Dollar Weather and Climate Disasters: https://www.ncei.noaa.gov/access/billions/
Global Climate Report: https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202301
An Evidence-based Collaborative Framework for Improving Predictive Capabilities
2022 Sea Level Rise Technical Report

Bureau of Land Management will address question #3:

What are climate services?

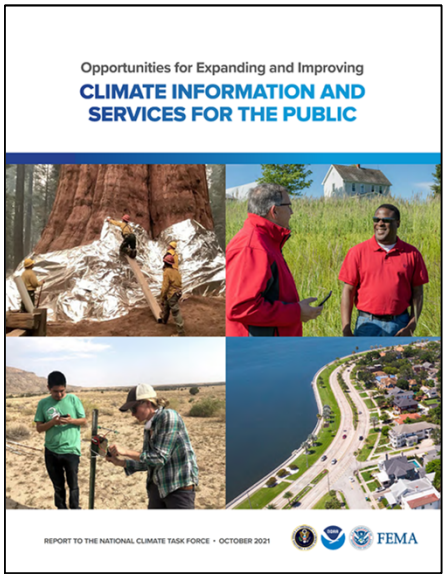
U.S. Department of the Interior
Bureau of Land Management

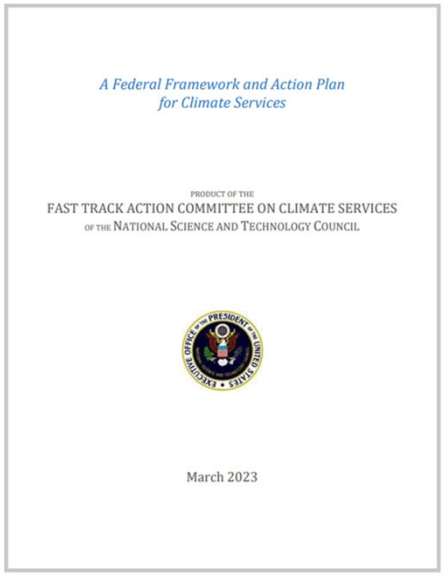
Building a whole-of-government framework for climate services

Julian Reyes, PhD
Climate Adaptation Program Lead
Bureau of Land Management

EO 14008 catalyzed renewed interest in enhancing Federal climate services

"We envision a future in which every American, every community, and every business has access to usable climate services that empower them to prepare, respond, and be resilient to climate change."





A Federal Framework and Action Plan for Climate Services

- Developed from the NSTC Fast Track Action Committee (FTAC) on Climate Services
- Key elements:
  - **Develop a coherent and durable framework** for coordinating federal climate services
  - **Develop a common understanding** of the scope of climate services across the Federal Government
  - **Identify both opportunities and gaps** associated with existing capabilities and governance
  - **Recommend key actions** to advance the federal enterprise

Toward a common understanding of climate services

scientifically-based, usable information, products, and activities that enhance knowledge and understanding about the impacts of climate change on potential decisions and actions

Effective and equitable climate services implementation will balance

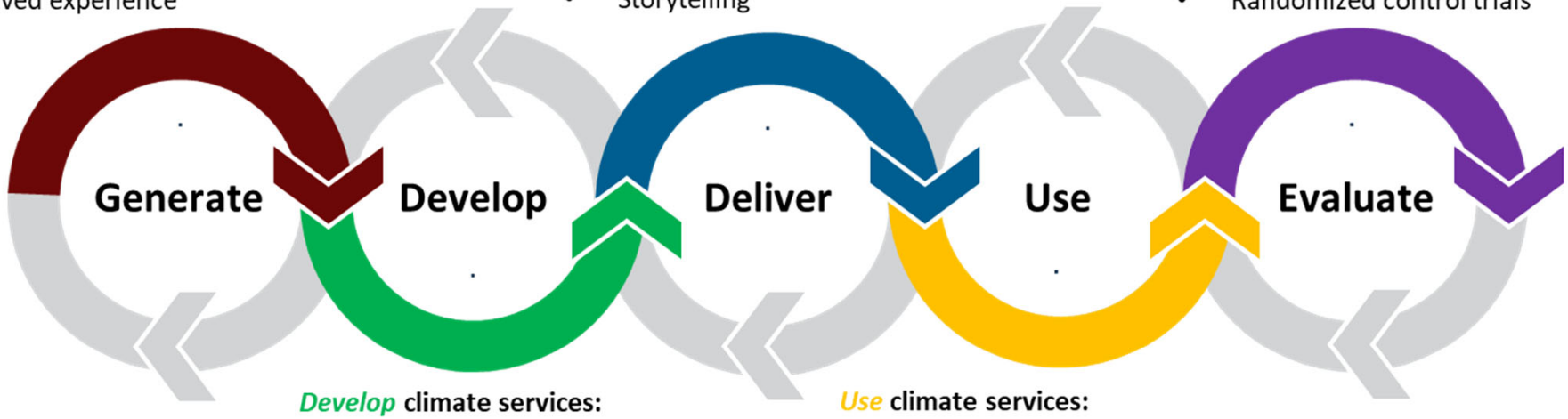
- Sustainable engagement with information users
- Advancing and grounding services in sound science

Recognizing diverse producers and users of climate services

Generate **climate information:**
- Observations
- Modeling and simulation
- Indigenous and traditional knowledge
- Lived experience

Deliver **climate services:**
- Mapping and visualization
- Extension services
- Training and capacity building
- Storytelling

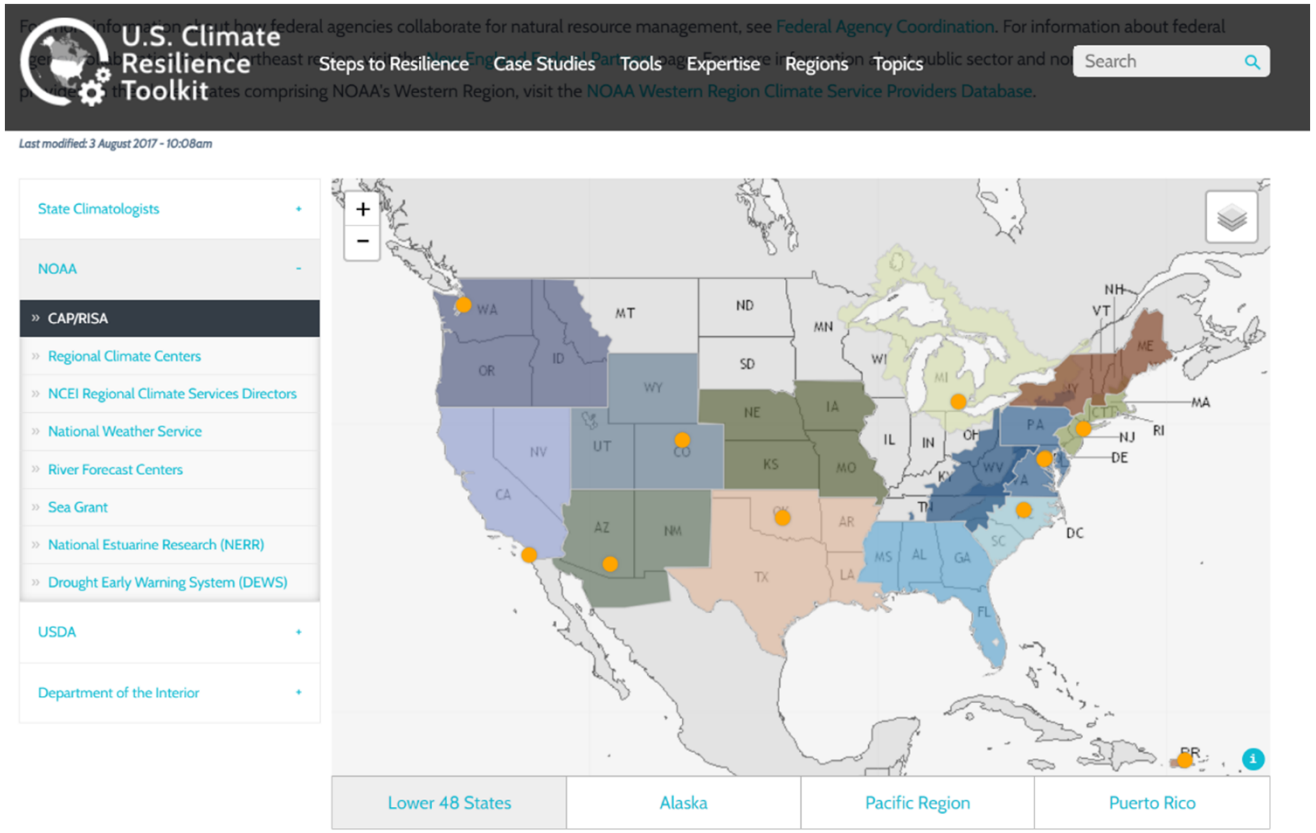
Evaluate **climate services:**
- Peer review
- User surveys
- Benefit/cost analysis
- Randomized control trials



Develop **climate services:**
- Science translation
- User engagement
- Design co-production
- Application development

Use **climate services:**
- Risk assessment
- Hazard mitigation
- Project design and planning
- Investing and asset management

Climate services that are place-based, people-centered



U.S. Climate Resilience Toolkit: Find Local and Regional Experts

NOAA

- CAP/RISA
- Regional Climate Centers
- Drought Early Warning System

USDA Climate Hubs

DOI USGS Climate Adaptation Science Centers

https://toolkit.climate.gov/help/partners

U.S. Global Change Research Program

BLM is a *superuser* of climate information and services

- BLM needs the entire suite of climate services – data, tools, information, and technical assistance – to support decision making processes like NEPA
  - Examples include vulnerability assessments, tools with climate projection data, etc

- Therefore, BLM must leverage existing partnerships and relationships with *producers* of climate services to maximize benefit to BLM
  - Producers include USGS and their CASCs, other Federal agencies, interagency structures, universities, private sector, and NGOs

Julian Reyes | jreyes@blm.gov

GAO will address questions #4 and #5:

#4 - What is the availability of federal spending information for climate-related events?

#5 - Do agencies have the capabilities to report spending for climate-related events?

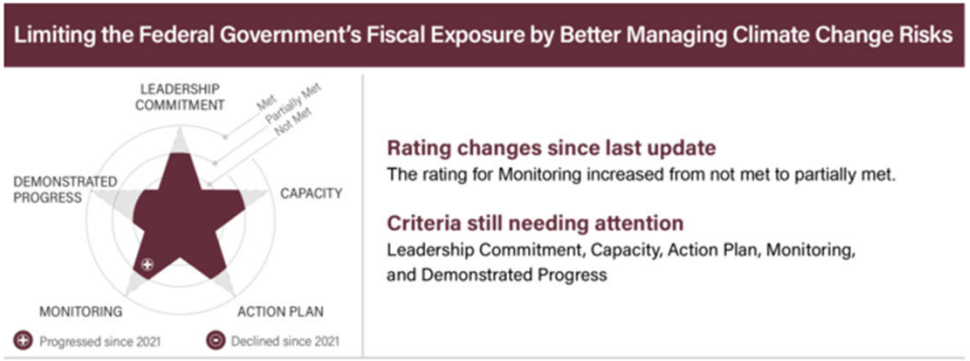
Climate Resilience

What has GAO learned about the availability of information on climate-related financial risks and agencies' capacity to report that information?

August 21, 2024, FASAB Board meeting

High-Risk List

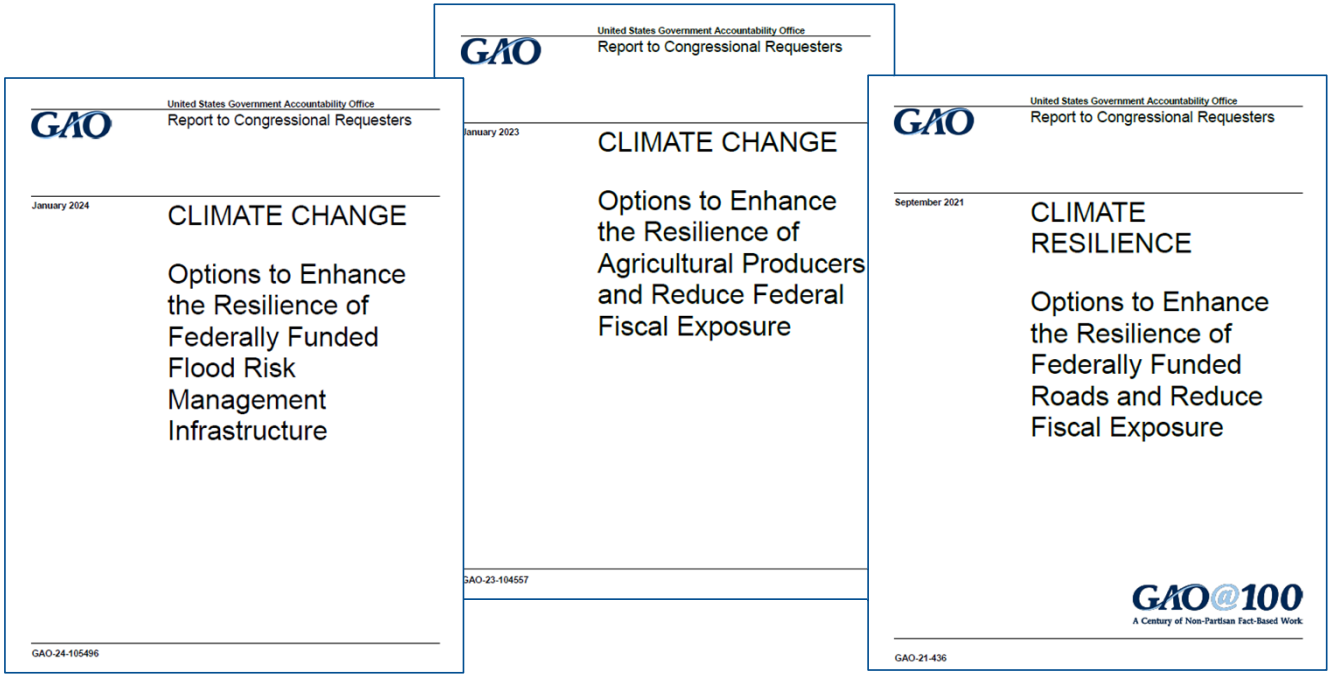
Source: Leonard Zhukovsky/stock.adobe.com. | GAO-23-106203



Opportunities to Limit Federal Fiscal Exposure to Climate Change

Source: GAO. | GAO-22-106046

GAO's Climate Resilience Work



Sources of Information on Federal Climate-Related Financial Risks

Organizational Arrangement for Prioritizing Climate Resilience Investments (Ongoing)

1. National climate resilience strategic plan
2. National climate information system
3. Expanding the use of climate economics information
4. Consistent approach for prioritizing federal climate resilience investments
5. Community-driven climate migration pilot program

Q&A