

PRESENTED BY TEXAS TECH UNIVERSITY

# ***TAMEST*** **NATURAL HAZARDS SUMMIT**

*Responding  
to and  
Mitigating  
the Impacts*

**LUBBOCK, TEXAS**

**05.16.2022**

**#NATURALHAZARDSSUMMIT**



# Theme One:

## **PREDICTION AND WARNING FOR TORNADOES**



# Panel: Climate Change, Drought, and Economics of Warning

## MODERATOR



**KISHOR MEHTA,  
PH.D. (NAE)**

**P. W. Horn Professor of  
Civil, Environmental  
and Construction  
Engineering  
Texas Tech University**

## SPEAKERS



**KATHARINE  
HAYHOE, PH.D.**

**Paul Whitfield Horn  
Distinguished  
Professor  
Texas Tech  
University**



**KEN RAINWATER,  
PH.D.**

**Professor  
Texas Tech  
University**



**KEVIN SIMMONS,  
PH.D.**

**Professor Emeritus  
of Economics  
Austin College**



## A body in a barrel, ghost towns, a crashed B-29: What other secrets are buried in Lake Mead?



THE COLORADO  
RIVER IS IN  
CRISIS, AND IT'S  
GETTING WORSE  
EVERY DAY



## No exaggeration: Record lows at Lake Powell and Lake Mead call for drastic action

### New Mexico wildfire rampages on as fresh blaze engulfs California mansions

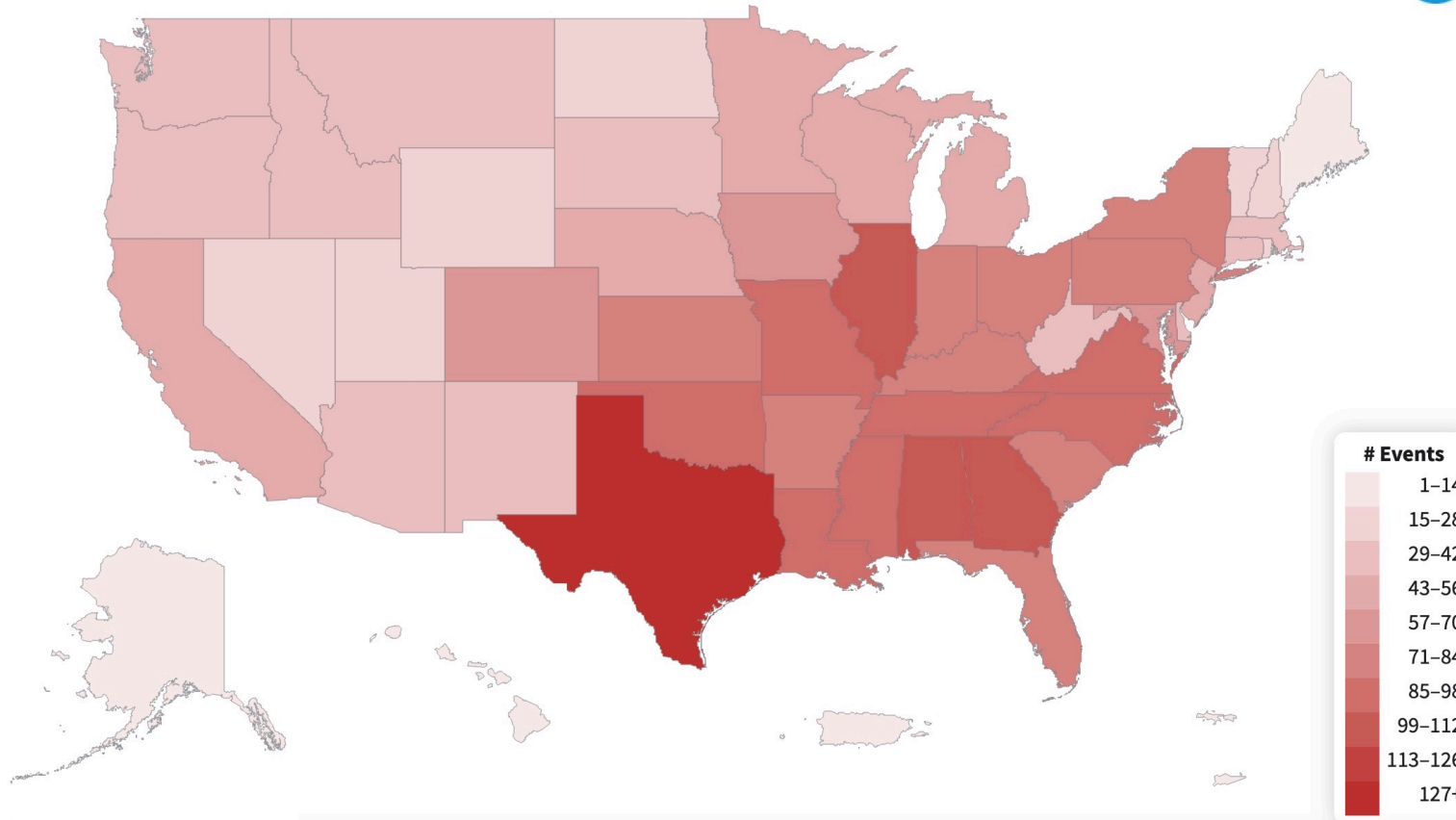
Challenging weather hampers firefighting in New Mexico, while in  
California, wealthy coastal enclave goes up in flames



Wildfires leap 'from home to home' in California while blaze burns in New Mexico - video



# 1980-2021 Billion-Dollar Weather and Climate Disasters (CPI-Adjusted)



## United States

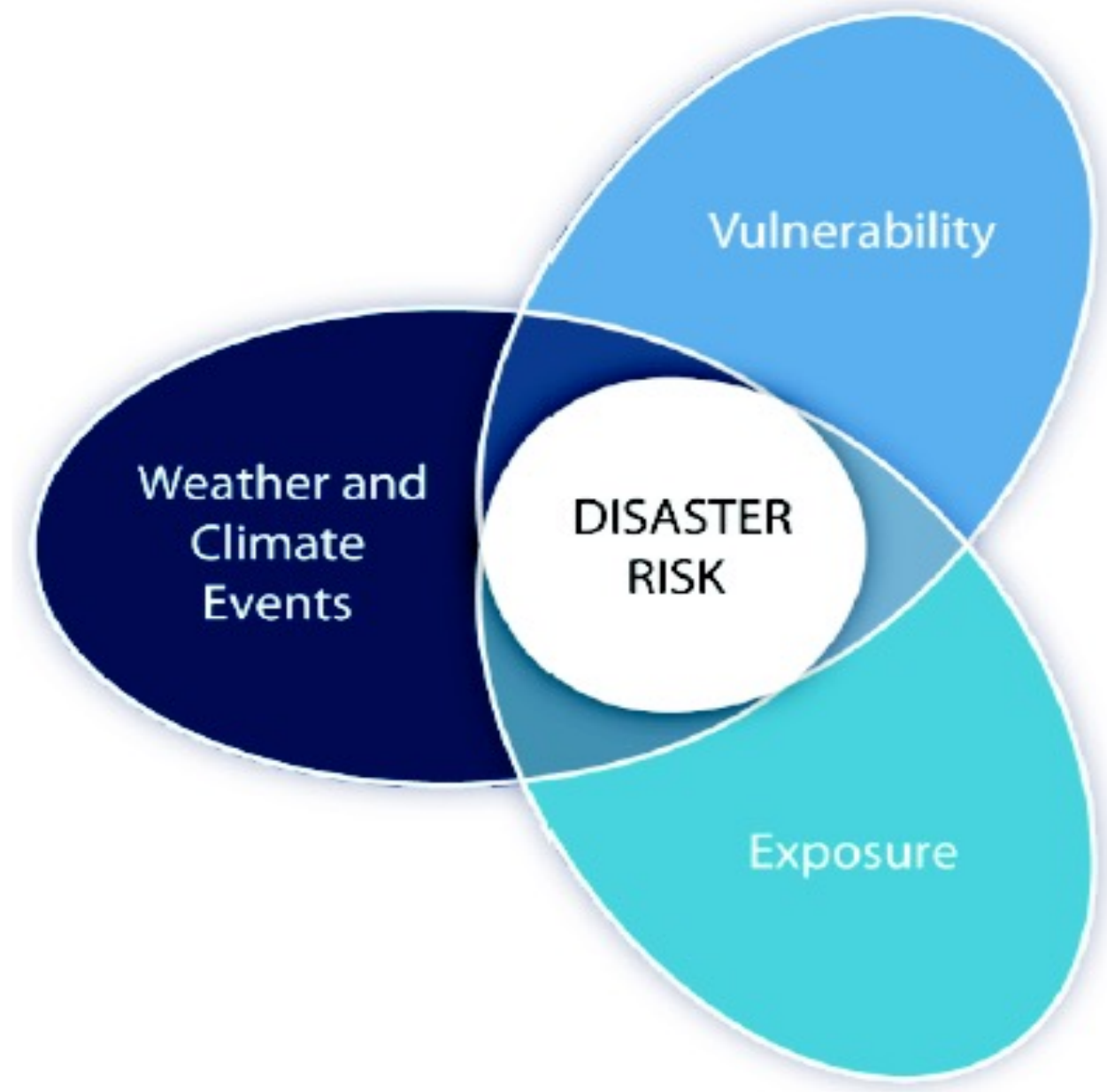
<span style="color: brown;">■</span> Drought:	29	<span style="color: blue;">■</span> Flooding:	36	<span style="color: lightblue;">■</span> Freeze:	9	<span style="color: green;">■</span> Severe Storm:	152
<span style="color: yellow;">■</span> Tropical Cyclone:	57	<span style="color: orange;">■</span> Wildfire:	20	<span style="color: purple;">■</span> Winter Storm:	20	<span style="color: red;">■</span> All Disasters:	323

**Wherever we live**

**WE ARE AT RISK FROM NATURAL CLIMATE  
AND WEATHER DISASTERS**

**BUT TODAY, THOSE RISKS ARE INCREASING**





AMERICA

## New Census Data Show Texas Cities Are Growing Faster Than All Other States

May 24, 2018 · 6:59 PM ET

TEXAS

# Census: Texas again leads US in population growth, California continues to slip

LOCAL // HOUSTON

## Dissecting Houston's massive infrastructure



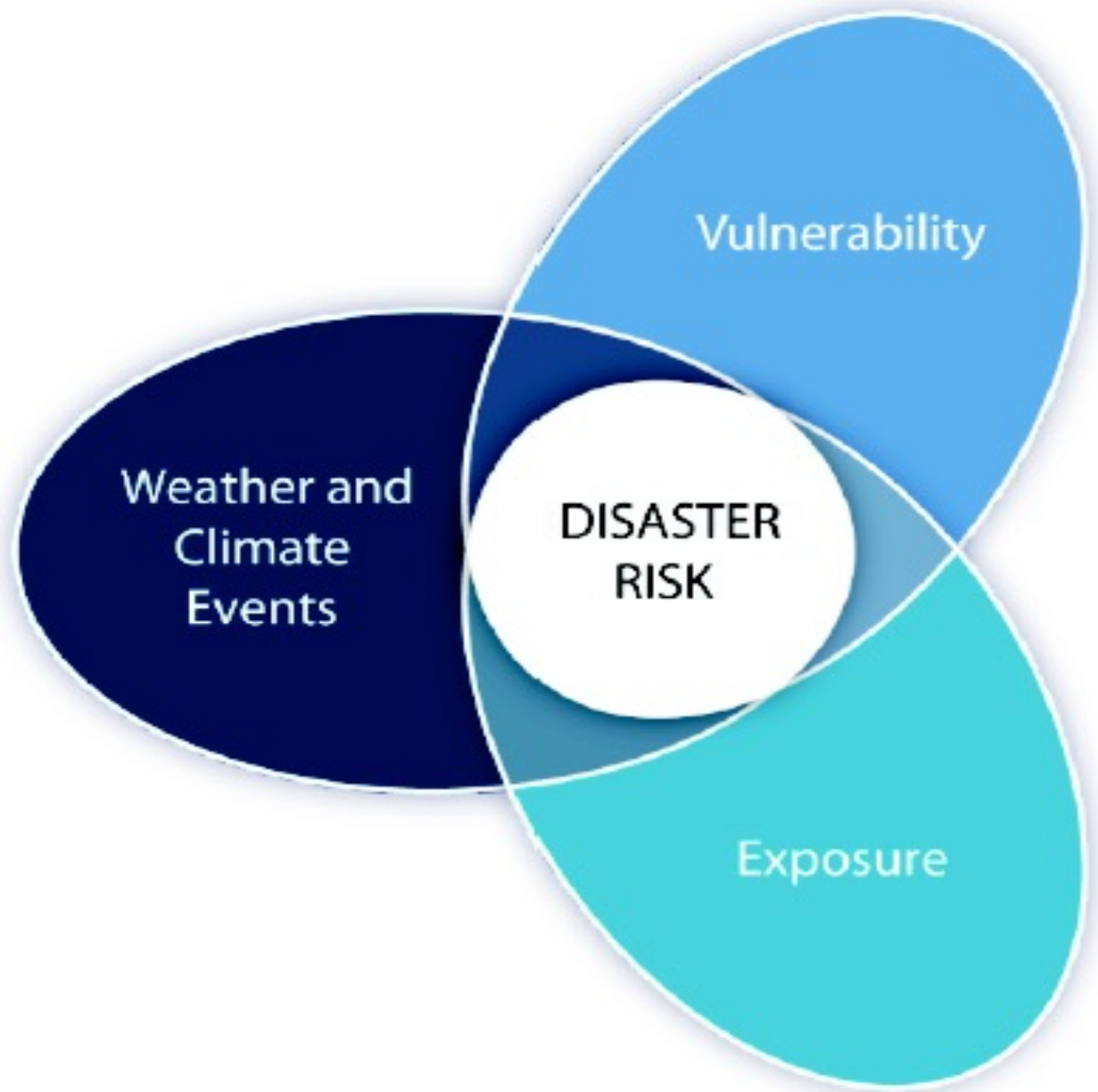
John D. Harden

Jan. 9, 2017

Updated: Jan. 12, 2017 5:42 p.m.









# America's Infrastructure Scores a

# C-

**There is a water main  
break every two  
minutes**

**and an estimated 6 billion  
gallons of treated water lost  
each day in the U.S., enough to  
fill over 9,000 swimming pools.**

**Growing wear and tear  
on our nation's roads**

**have left 43% of our public  
roadways in poor or mediocre  
condition, a number that has  
remained stagnant over the past  
several years.**

**There are 30,000 miles  
of inventoried levees  
across the U.S.,**

**and an additional 10,000 miles  
of levees whose location and  
condition are unknown.**





# TEXAS GRADES



AVIATION  
**B-**



BRIDGES  
**B-**



DAMS  
**D+**



DRINKING WATER  
**C-**



ENERGY  
**B+**



FLOOD RISK MITIGATION  
**C-**



LEVEES  
**D**



PARKS AND RECREATION  
**C-**



HIGHWAYS AND ROADS  
**D+**



SOLID WASTE  
**B**



TRANSIT  
**B-**



WASTEWATER  
**D**

# Texas Was Warned a Decade Ago Its Grid Was Unready for Cold

- Grid regulators investigated cold snap in 2011 that cut power
- Federal recommendations to avoid repeat incident went unheeded

## Texas Faces Another Day of High Heat, Straining Power Grid

- Five of six gas plants that tripped offline are back online
- Grid operator says it has enough supply to meet demand

By Naureen S Malik, Mark Chediak, and Brian Eckhouse

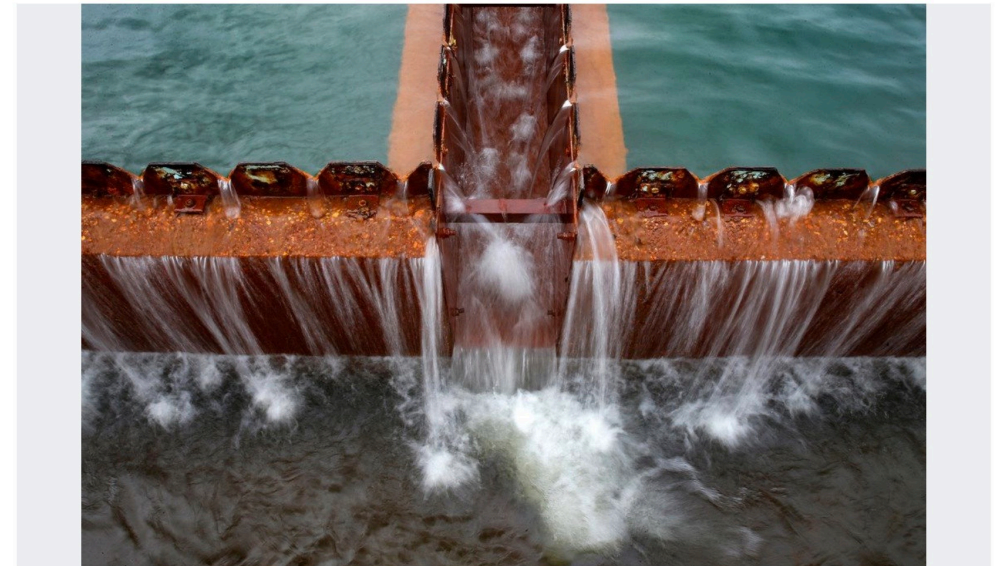
May 14, 2022, 11:09 a.m. CDT *Updated on May 14, 2022, 3:06 p.m. CDT*

● LIVE ON BLOOM  
Watch Live TV  
Listen to Live F

OPINION

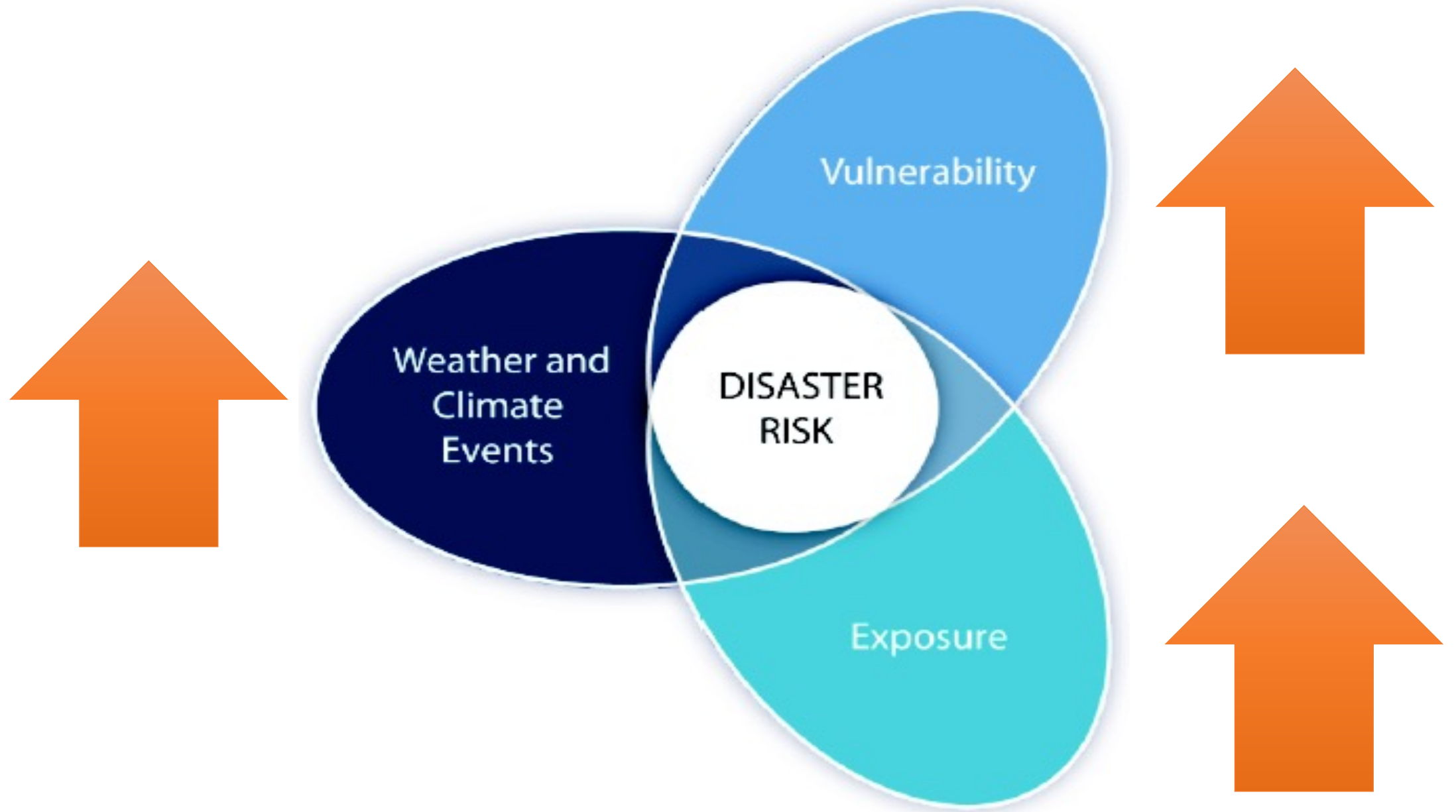
## If you think the Texas electrical grid is fragile, take a look at our water infrastructure

Texas' water infrastructure needs hundreds of billions in investment to serve a growing population amid a changing climate.



Water flows through a sedimentation basin at the North Texas Municipal Water District 400-acre treatment plant in Wylie on Thursday, February 15, 2018. North Texas Municipal and Dallas Water Utilities are preparing for the big increases in demand in the coming decades as well as taking into account the ever present threat of drought. (Tom Fox / Staff Photographer)





**SIX**

**SIX**



**SEVEN**



**Climate  
change is  
loading the  
weather dice  
against us**





## Texas Billion-Dollar Disaster Events 1980-2021 (CPI-Adjusted)

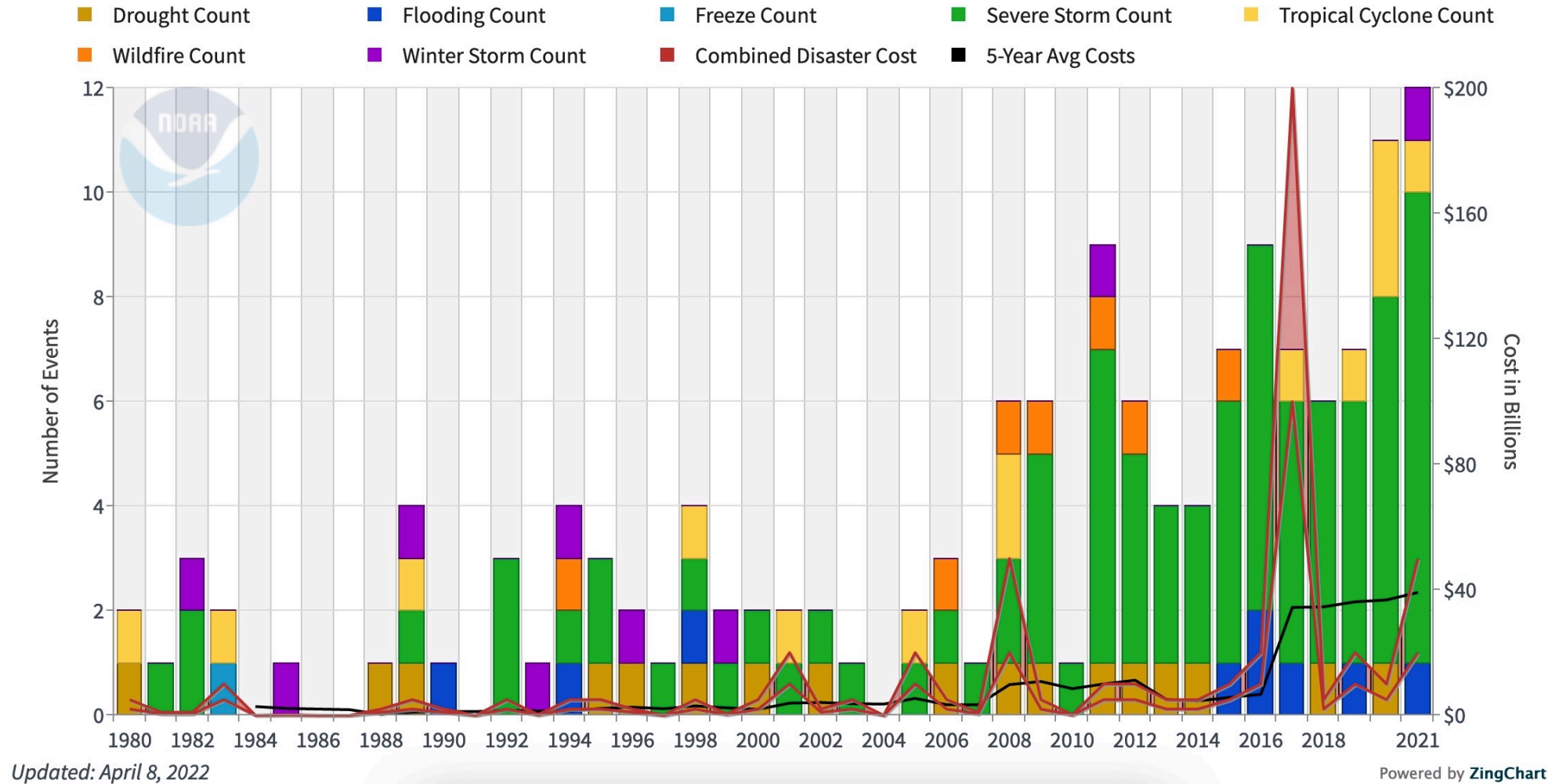
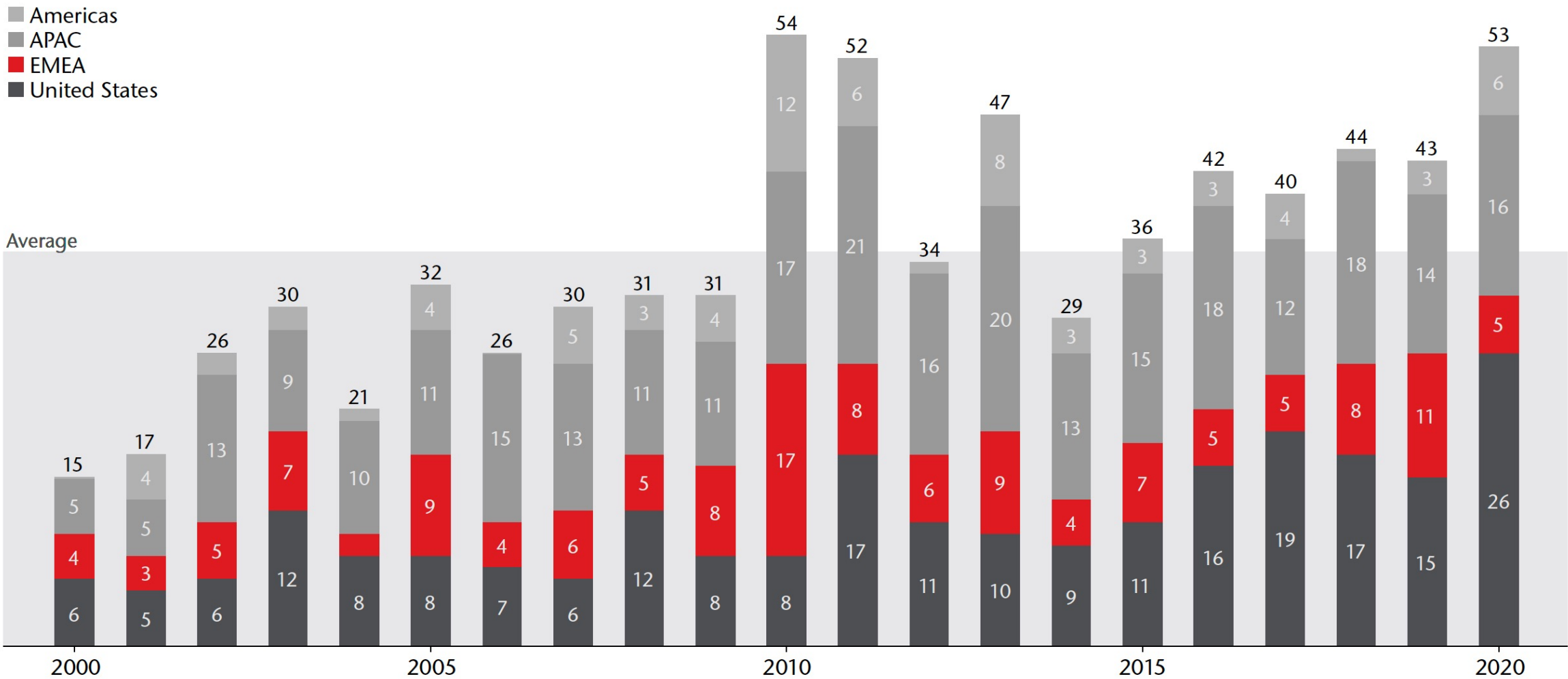




Exhibit 6: Global Billion-Dollar Economic Loss Events

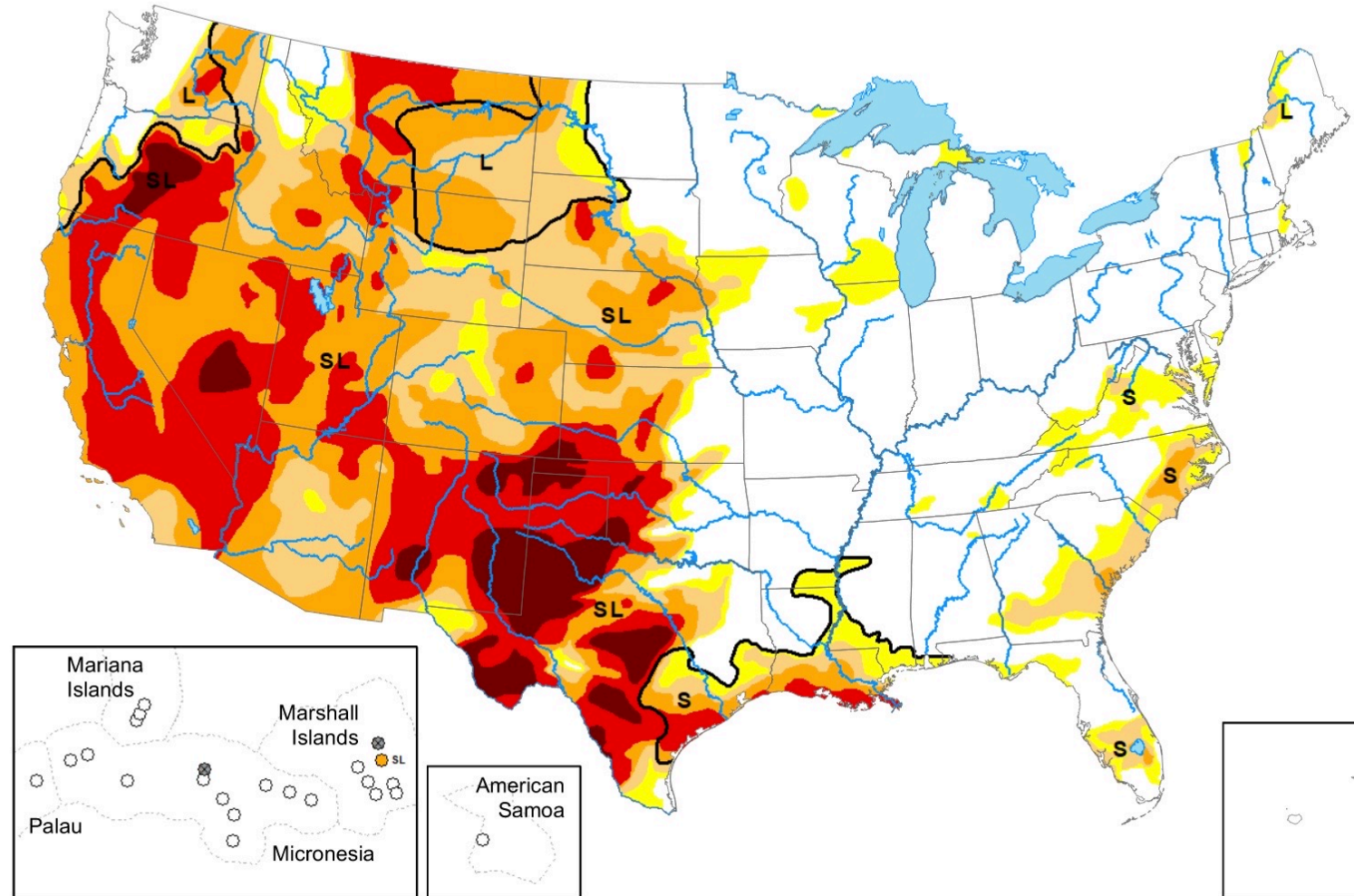


Note: Exhibit 6 includes events which reached the billion-dollar-plus (USD) threshold after an inflation-adjustment based on the 2020 U.S. Consumer Price Index.  
Data: Aon (Catastrophe Insight)

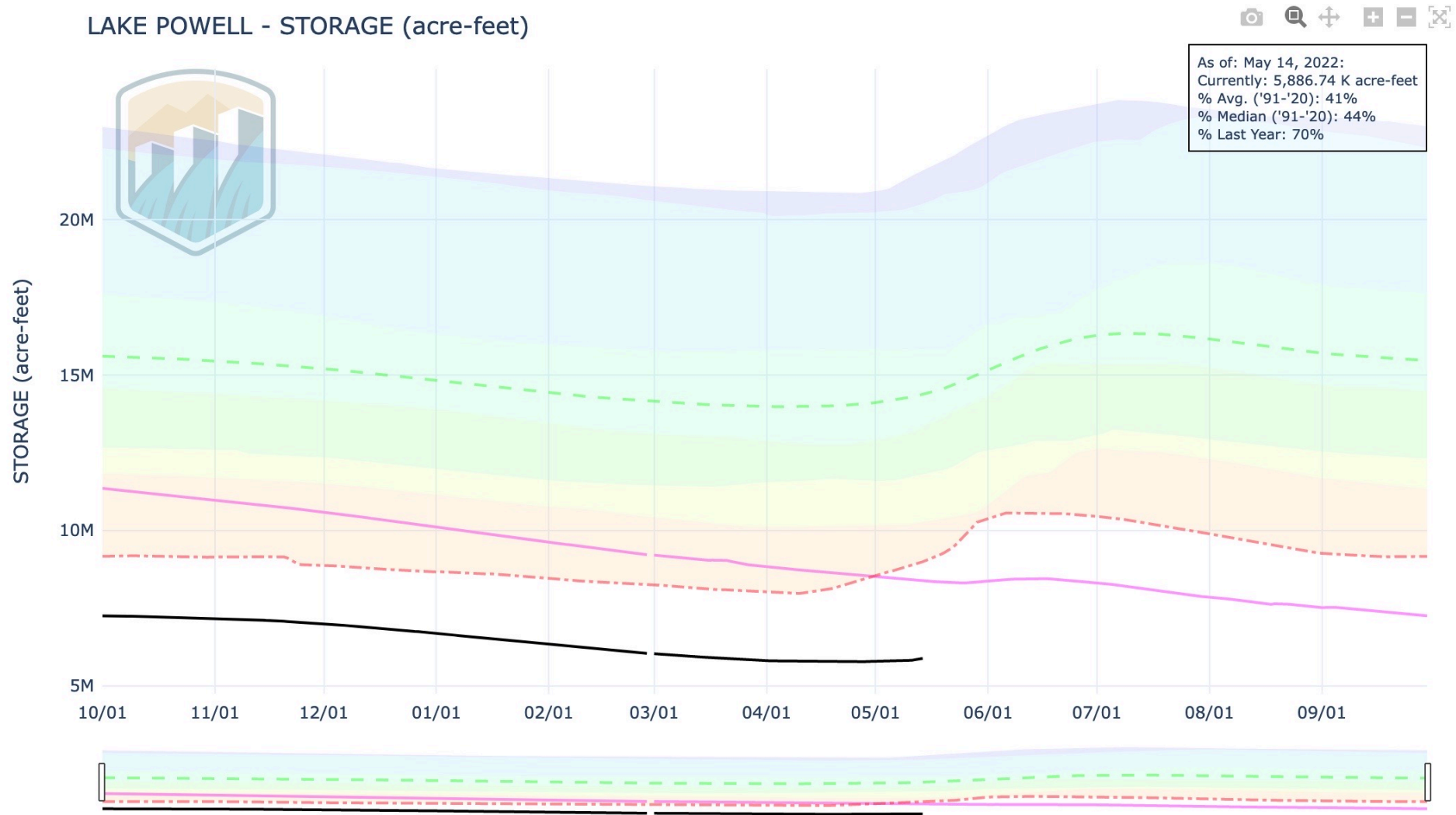


Map released: May 12, 2022

Data valid: May 10, 2022



# LAKE POWELL - STORAGE (acre-feet)



Created: 05/15/22 04:30 PM UTC

All data considered provisional and subject to revision.

Brief Communication | [Published: 14 February 2022](#)

## Rapid intensification of the emerging southwestern North American megadrought in 2020–2021

[A. Park Williams](#) ✉, [Benjamin I. Cook](#) & [Jason E. Smerdon](#)

[Nature Climate Change](#) **12**, 232–234 (2022) | [Cite this article](#)

8751 Accesses | 8 Citations | 3434 Altmetric | [Metrics](#)

The current Southwest drought is the driest megadrought—defined as a drought lasting two decades or longer — since at least the year 800.

It exceeds the severity of a late-1500s megadrought that previously had been identified as the driest in 1,200 years.

~19% of the drought in 2021 was attributable to anthropogenic climate trends.



PLANNING FOR THE  
FUTURE BASED ON THE  
PAST IS LIKE DRIVING  
DOWN A ROAD,  
LOOKING IN THE REAR-  
VIEW MIRROR.







IT WORKS ...  
WHEN  
CLIMATE IS  
RELATIVELY  
STABLE





MORE PEOPLE + INFRASTRUCTURE TO BE EXPOSED  
=  
SIGNIFICANT CURVE



MORE PEOPLE + INFRASTRUCTURE TO BE EXPOSED  
+  
CRUMBLING, UNPREPARED AND/OR POORLY DESIGNED  
INFRASTRUCTURE  
=  
EVEN MORE EXTREME CURVE

MORE PEOPLE + INFRASTRUCTURE TO BE EXPOSED

+

CRUMBLING, UNPREPARED AND/OR POORLY DESIGNED  
INFRASTRUCTURE

+

MORE FREQUENT, INTENSE, AND/OR SEVERE EXTREME WEATHER  
EVENTS

=

UNPRECEDENTED CURVE

# THE BOTTOM LINE

Disaster is a function of three things: exposure, vulnerability, and the hazard itself.

Today, all three are on the rise, and disaster risk is rising.

That's why it's so urgent that we mitigate risks and build resilience.  
An ounce of prevention is worth a pound of cure!