

# Climate Doesn't Care – Do You?

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*Shailendra Kumar*

Energy and Environment Consulting,  
Round Rock, TX, United States

[skumar33@gmail.com](mailto:skumar33@gmail.com)



# Mountains Don't Care!

Colorado Weather Changes Rapidly

- Lightning
- Snowfall, even in Summer
- Heavy Rain
- Floods and Swollen Streams

Are **YOU** Prepared?



## **I**tems to Consider

- Water
- Extra Food
- Extra Clothing
- Map, Compass, GPS
- Sunglasses & Sunscreen
- Headlamp / Flashlight (spare batteries & bulb)
- First Aid Supplies
- Matches or Lighter
- Knife
- Whistle
- Cell Phone

## **Q**uestions to Ask Yourself *While You are in the Outdoors*

- Do we have the appropriate **Skills & Experience**?
- Are we **Eating and Drinking** enough?
- Are we using the right **Clothing & Equipment**?
- Should we **modify** our objectives in view of the **time, the weather, and the pace**?

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**The Rocky Mountain Rescue Group, Inc.**  
P.O. Box Y, Boulder, CO 80306

An all-volunteer team dedicated to  
saving lives through mountain rescue  
and safety education.

For more safety information, go to:  
[www.RockyMountainRescue.org](http://www.RockyMountainRescue.org)  
Serving the Community since 1967

**IN CASE OF EMERGENCY, CALL 9-1-1**

# Climate Change: Societal Impact Areas

## Water

- Melting Ice
- Sea level rise
- Freshwater



## Agriculture

- Growing seasons
- Land use



## Energy

- Demand for A/C
- Water for cooling power plants
- Hydropower



## Public Health

- Heat waves – morbidity and mortality
- Vector-borne diseases

## Ecosystem

- Natural habitats, wetlands
- Species migration/ extinction



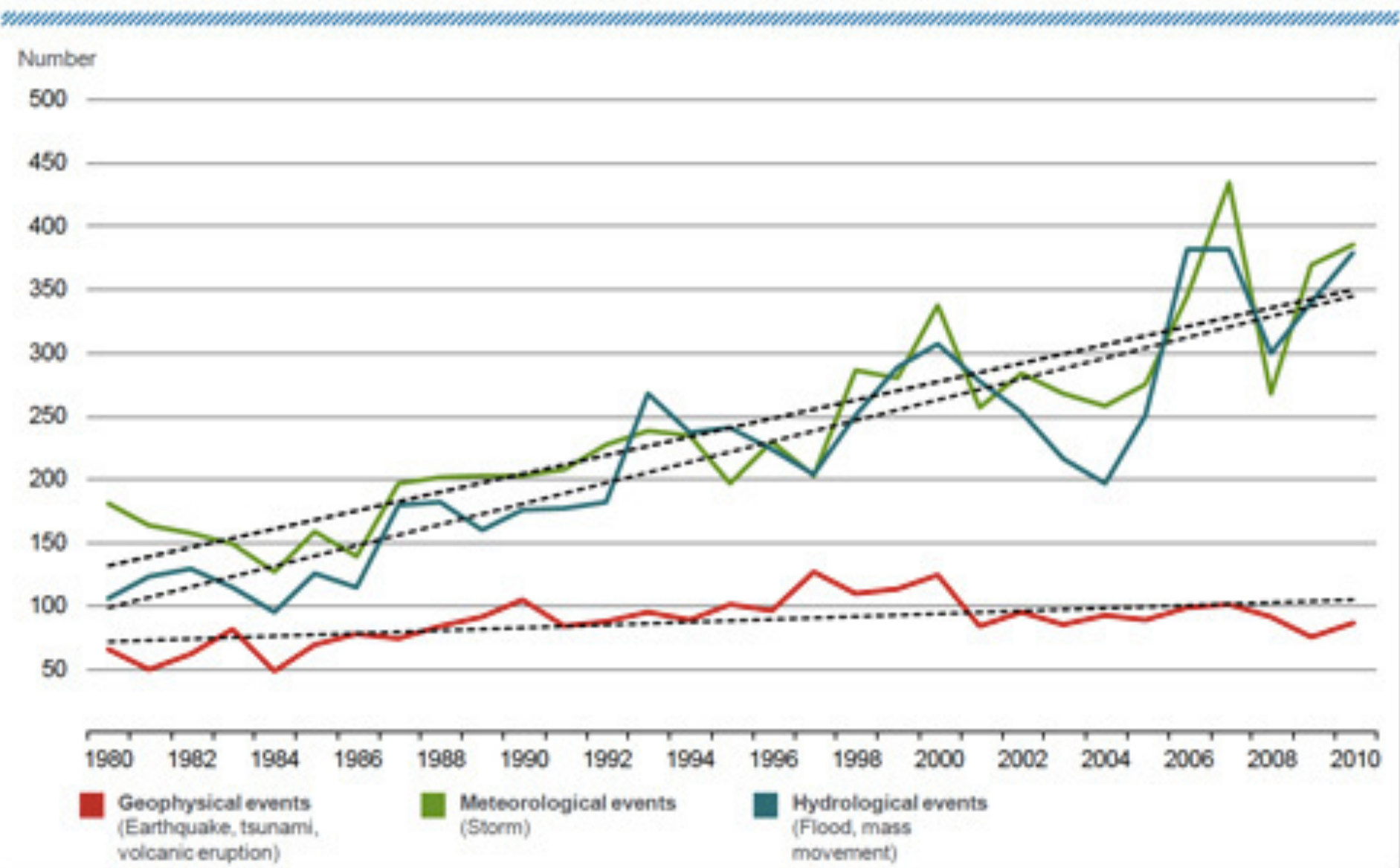
## Extreme Events

- Storms, hurricanes, floods, droughts, wildfires, tornadoes
- Increased frequency and intensity

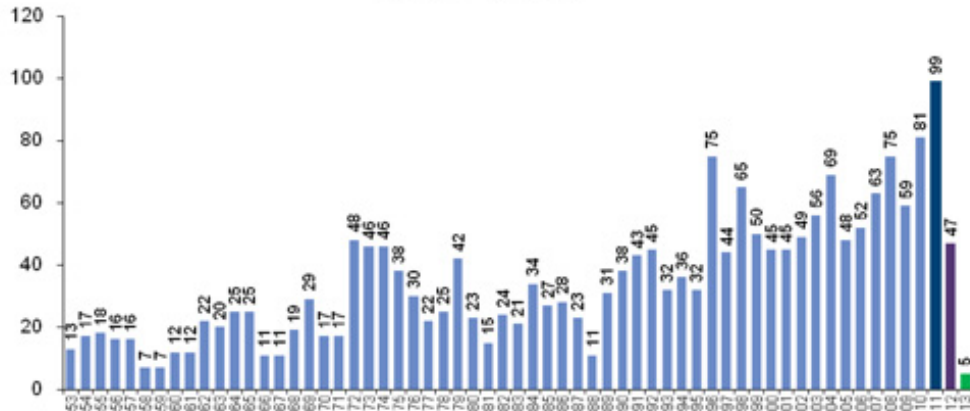


# Natural catastrophes worldwide, 1980 – 2010

## Number of events by peril with trend



# Number of Federal Disaster Declarations 1953-2013\*

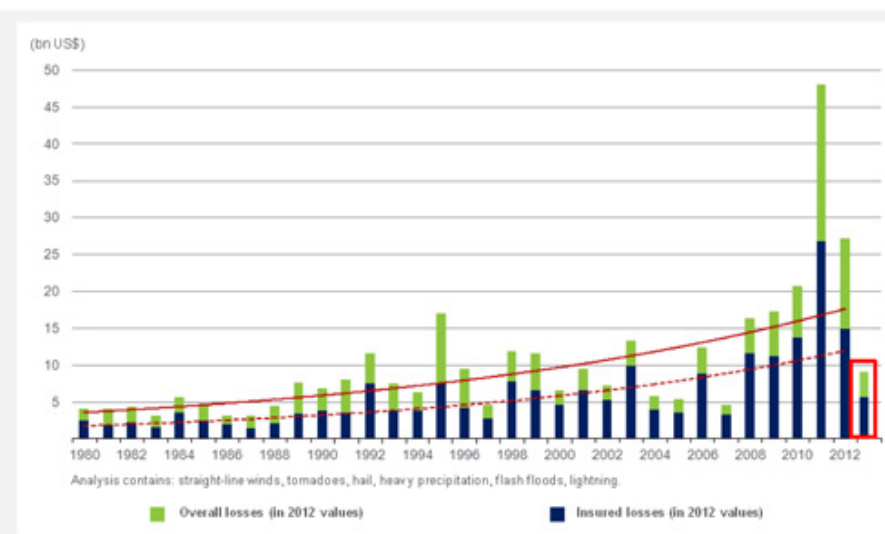


The Number of Federal Disaster Declarations Is Rising and Set New Records in 2010 and 2011. Hurricane Sandy Produced 13 Declarations in 2012/13.

\*Through Feb. 24, 2013  
Source: Federal Emergency Management Administration; <http://www.fema.gov>; <http://www.irs.gov>; Insurance Information Institute

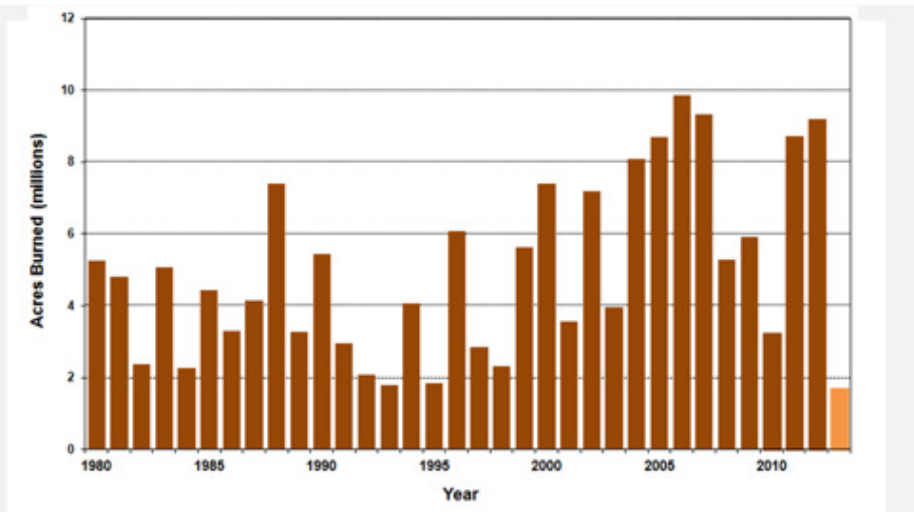
# Convective loss events in the U.S.

Overall and insured losses 1980 – 2012 and the half year 2013



Source: Geo Risks Research, NatCatSERVICE – As at July 2013 © 2013 Munich Re

# Number of Acres Burned in Wildfires, 1980 – 2013 YTD

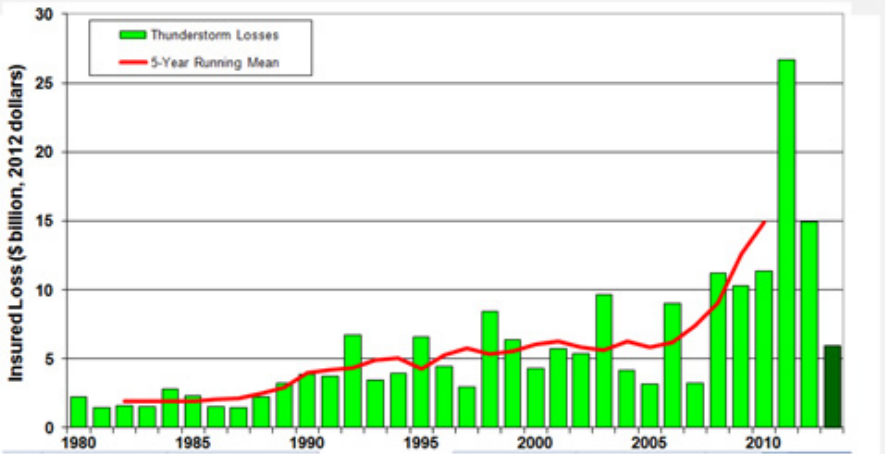


Source: National Interagency Fire Center © 2013 Munich Re

# US Thunderstorm Loss Trends

Annual Totals 1980 – 2013 YTD

Average thunderstorm losses have increased sevenfold since 1980.



Source: Property Claims Service, MR NatCatSERVICE © 2013 Munich Re

# Munich Re an Early Alerter to Global Warming MCII

Munich Climate Insurance Initiative

## Flood Inundation

### 2.1 Climatic Variations

Investigations into the overall trend of claims experience are indispensable, and here climatic variations become most significant. Such investigations involve a study of thermodynamic processes such as, for example, the rising temperature of the earth's atmosphere (as a result of which glaciers and the polar caps recede, surfaces of lakes are reduced and ocean temperatures rise); changes in the earth's atmosphere due to the large-scale increase in areas irrigated and cultivated and increases in humidity resulting therefrom; and lastly the pollution of the earth's atmosphere, e.g. rise of the CO<sub>2</sub> content of the air causing a change in the absorption of solar energy. We wish to enlarge on this complex of problems in greater detail, especially as—as far as we know—its conceivable impact on the long-range risk trend has hardly been examined to date.

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## Munich Re Publication Flood / Inundation (August 1973)

# Superstorm Sandy October 2012: Power, transportation, Communications...life interrupted

Residents angry, cold

NYC skyline blackout



Long lines for generator fuel



Subway stations flooded



Verizon replaces 3000 poles



Jersey shore devastation



# Colorado Fires July 2013





# Colorado Floods September 2013



# A difficult and tragic week in the Front Range, CO - destroyed over 1000 homes and changed the landscape



# Typhoon Haiyan in Philippines November 2013: One of the Strongest Storms in World History



More than 5600 people died...many orphans need help

# Urban Heat Island...Up to 16 degrees warmer than surrounding rural areas

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# Sea Level Rise, Storm Surge, and Shoreline Erosion

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# Flooding from Storms

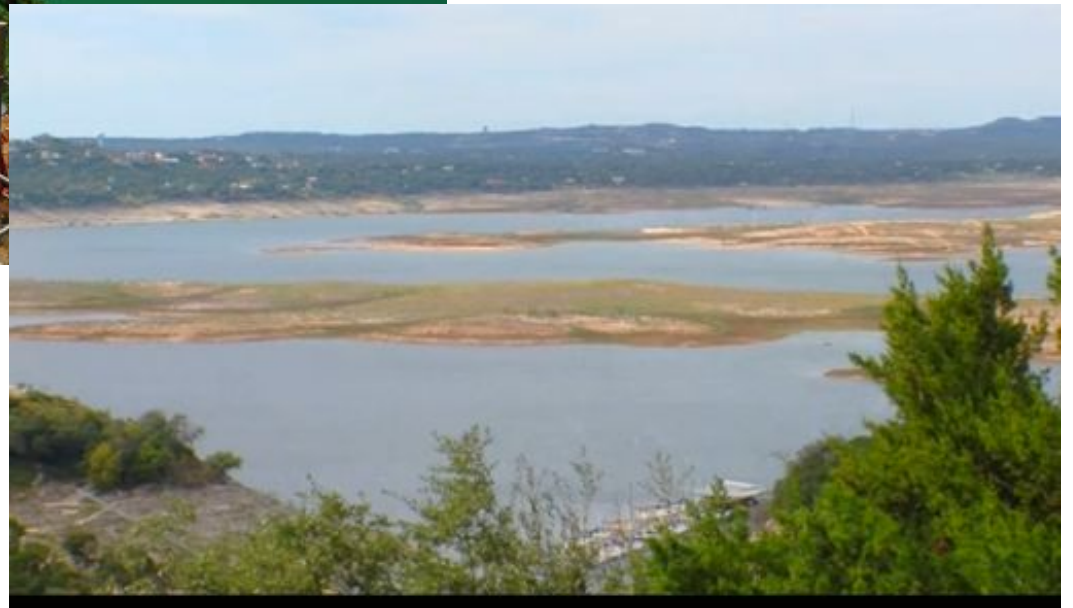


# Lake Travis in Austin, Texas

Then...



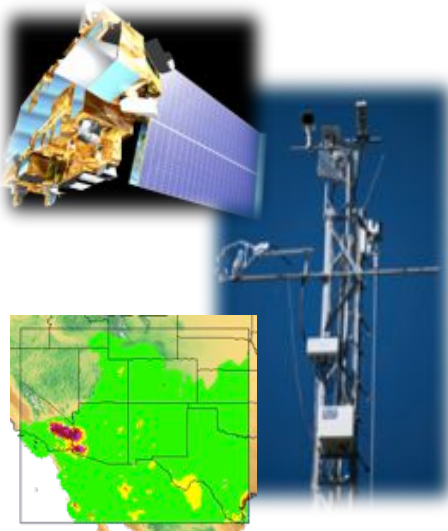
And now...



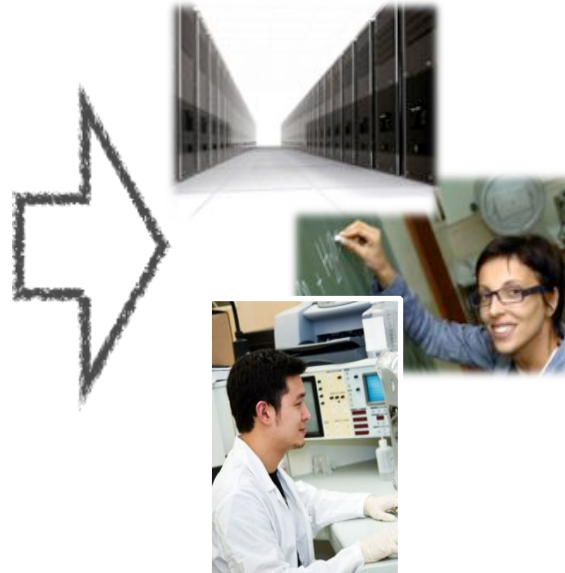
Water level dropped  
more than 30 feet!

# Ensuring Sustainability and Resilience: Scientists Connecting with Communities...

Data



Models & Uncertainty  
Quantification



Actionable  
Information

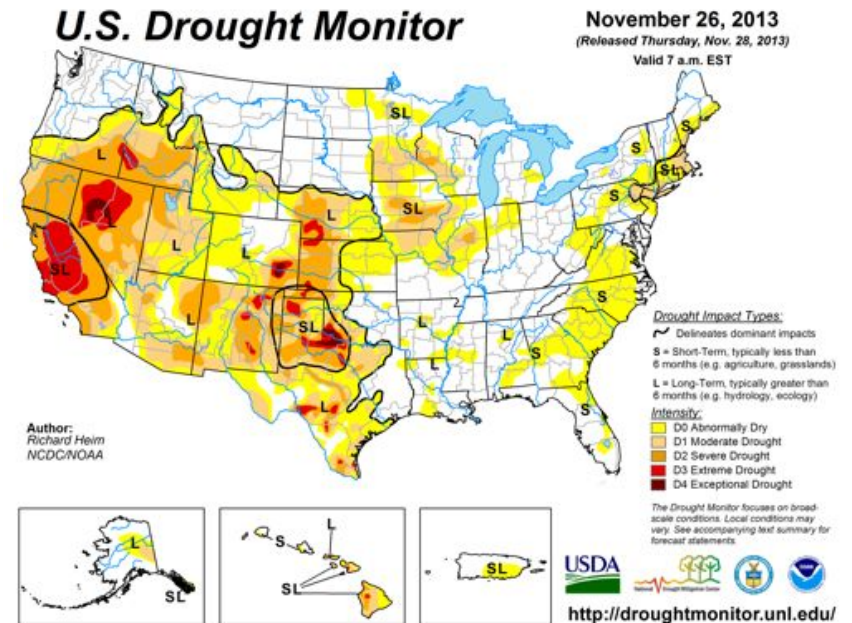
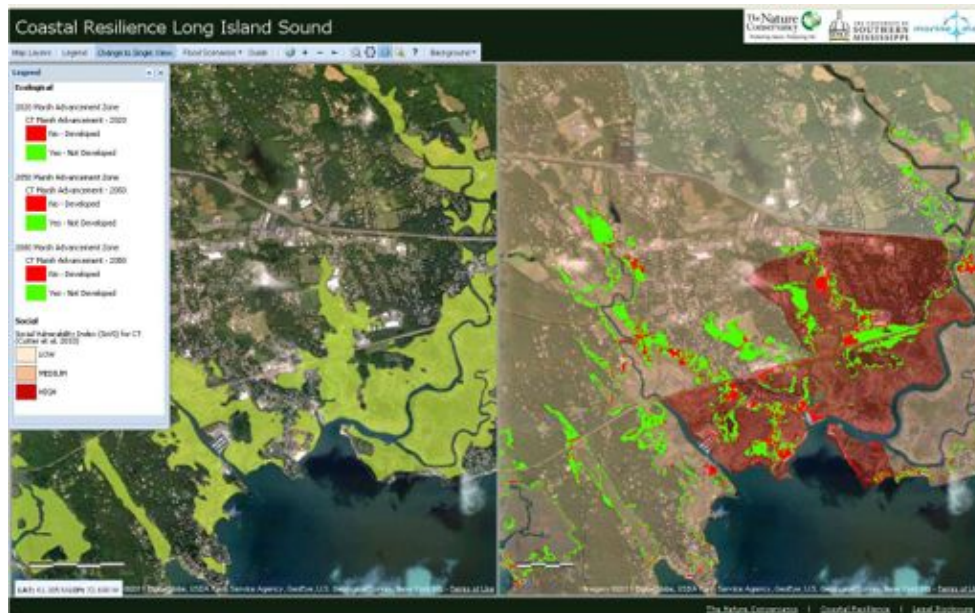


AGU 2013 Session GC-52A Friday morning 10:20 AM-12:00 PM:  
Kumar, Lowery, Whelchel paper focuses on Decision Tools in US Northeast



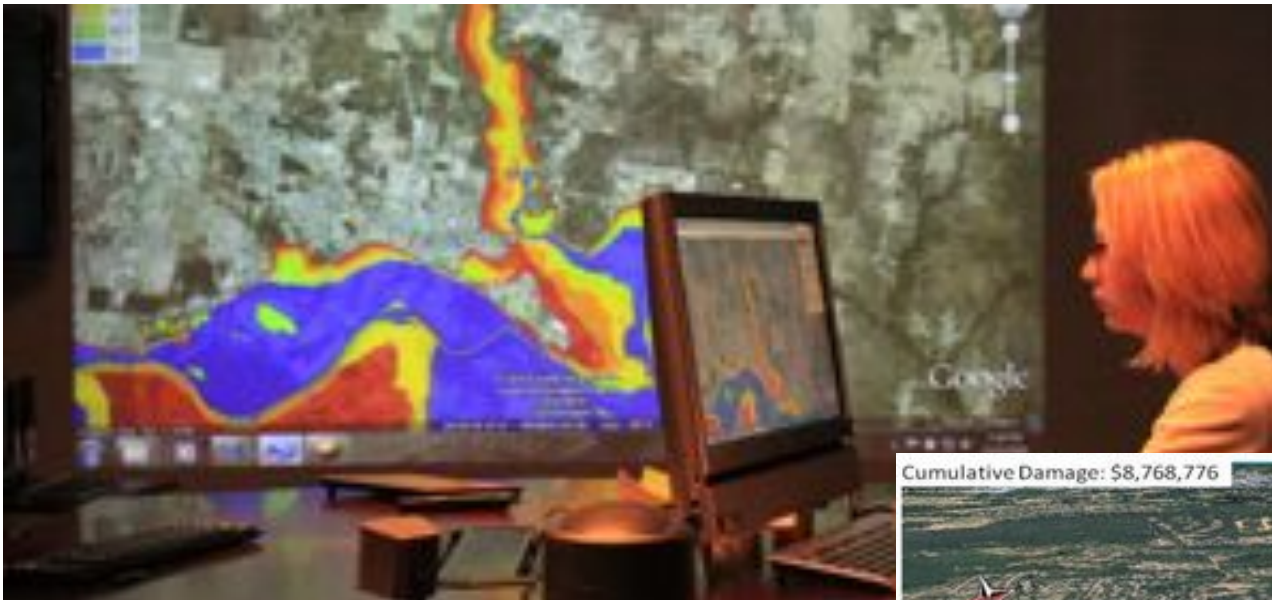
# The federal, state, and local governments are doing their part...

## Coastal Resilience

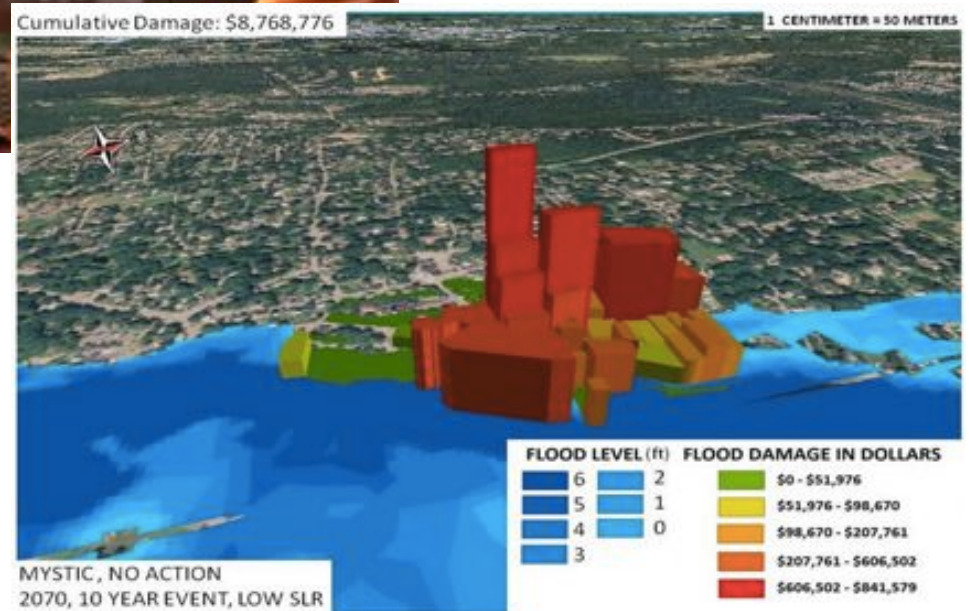


# Private sector, NGOs, and academia have a significant role to play...

*StormCenter Communications Partnering with NASA, FEMA, NOAA*



*Catalysis Adaptation Partners & NOAA COAST*



# Scientists are needed by our heroes...

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From the movie...  
"Back to the Future"

Marty Mcfly needed Doc Brown,  
the guy who drives the DeLorean...



# Coming To Rescue...



Well...Katniss still needs Beetee,  
the electromagnetic force field blah, blah...expert!