

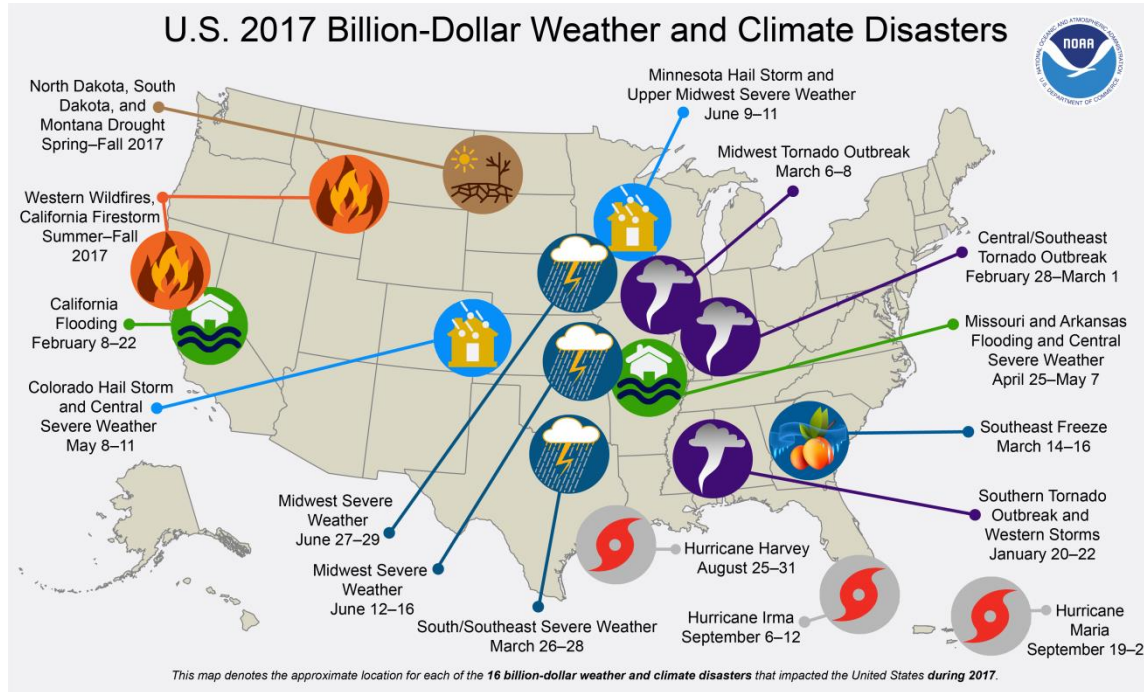


Catastrophe Modelling: 2017 Natural Disasters in Review

Desmond Carroll

ICMIF MORO, April 2018

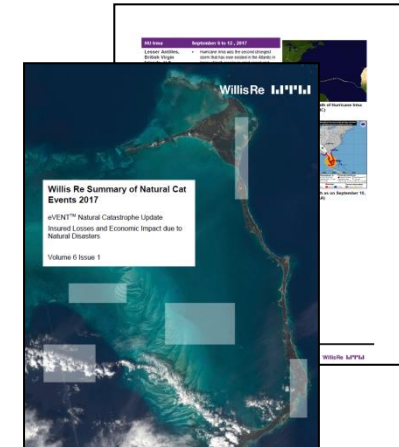
2017 natural catastrophes



\$87B property insurance loss

Peril	Total Loss
Hurricane	\$55,391.4
Wind and Thunderstorm Event	\$19,545.3
Wildland Fire	\$12,492.4

Dollar values in millions



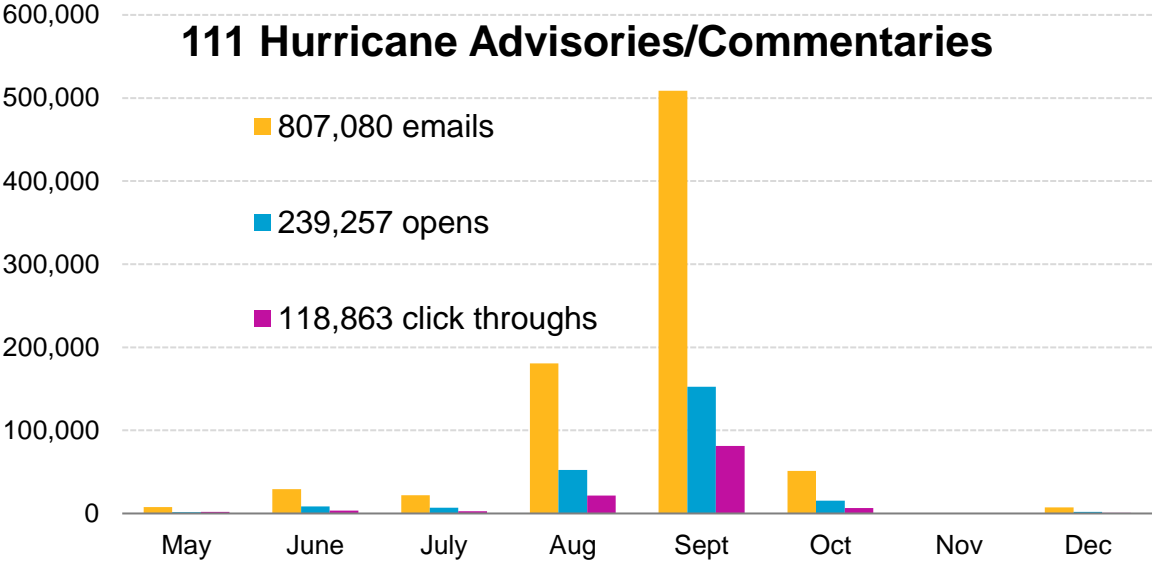
2017 hurricane season

- 17 Tropical Storms and Hurricanes Total
- 10 Hurricanes (in a row)
- 6 Major Hurricanes (highest since 2005)
- 4 Category 4 & 5 hurricanes
- Highest ACE (accumulated cyclone energy) in Atlantic since 2005
- 2 Category 5 hurricanes (and 2 Cat-5 landfalls; 2nd time only)
- 2 Category 4 US landfalls broke the US land falling major hurricane “drought” since 2005



Source: Miaminewtimes.com

2017 hurricane season



Recipients Include

- 2,000 reinsurance clients
- 3,600 retail clients
- 1,600 internal recipients

7,200 total recipients

Loss estimates

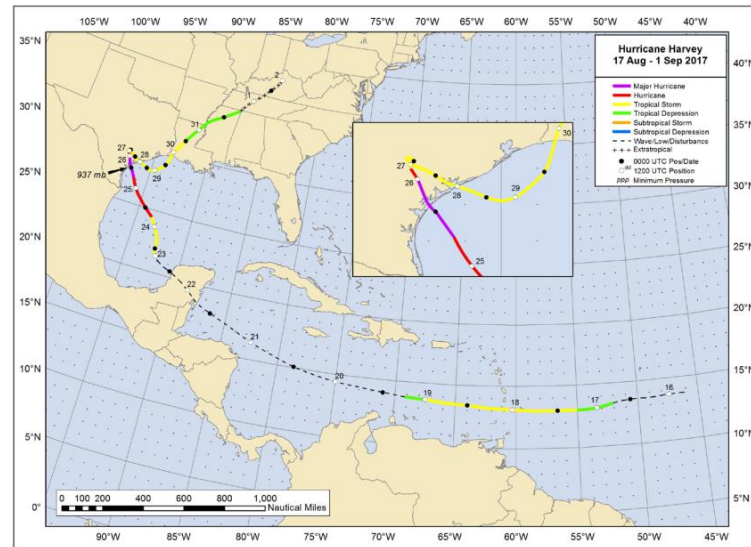
U.S. Industry Loss Estimates (excl. NFIP Loss Estimates)

Vendor	Harvey	Irma	Maria (PR only)
AIR	\$10+ bn	\$32-50 bn	\$24-48 bn
RMS	\$25-35 bn *	\$35-55 bn	\$15-30 bn
KC&C	\$15.4 bn	\$25 bn	\$30 bn
PCS	\$15.7 bn	\$17.2 bn	\$24 bn

* includes NFIP Loss Estimates

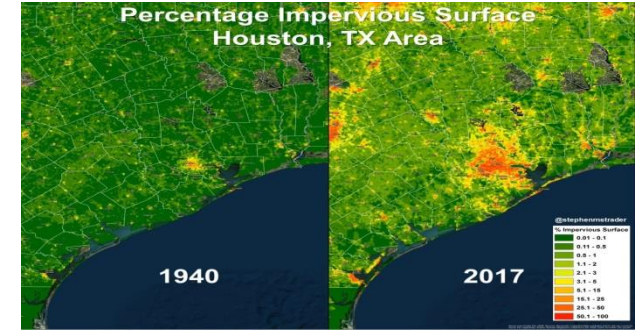
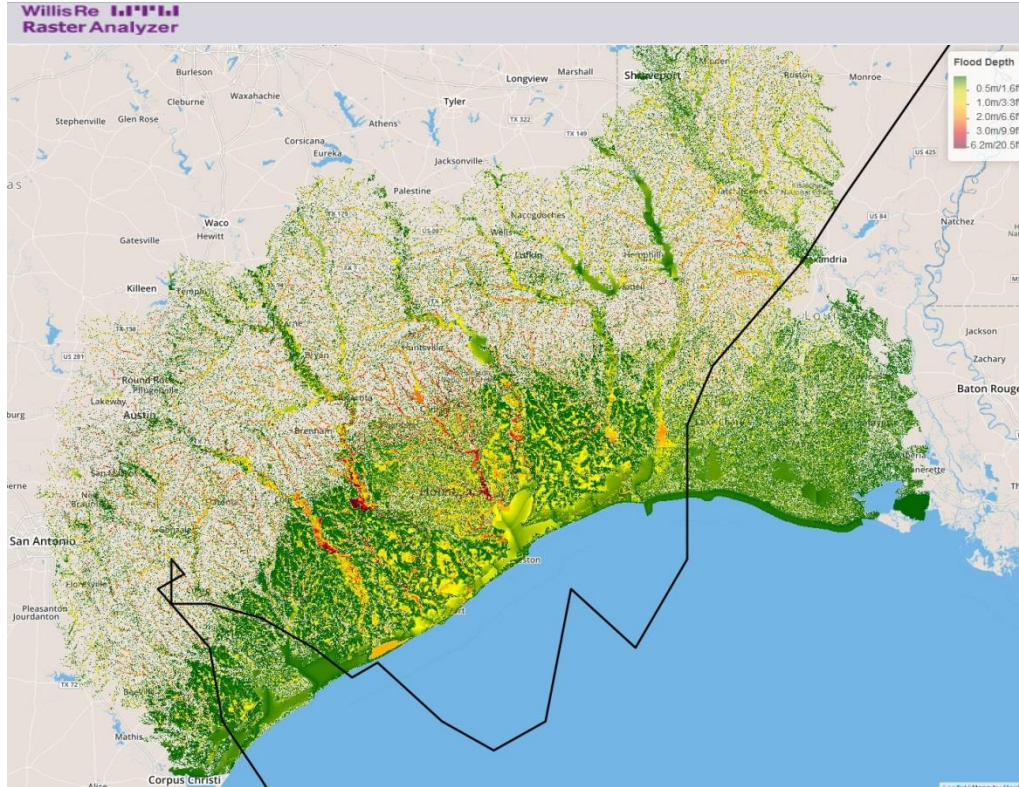
Hurricane Harvey – What made this event unique?

- Catastrophic inland flooding
- Stalled system intensifies as it moves over
- Rainfall centred over southeast Texas with Houston metro area.
- The Houston-Galveston and upper Texas areas experienced over 1270 mm of rain causing catastrophic and life-threatening flooding reaching up to 3.7 m



Source: NOAA

Hurricane Harvey – Willis Re Event Response



- Rainfall total: 60.58 inches (record for US Tropical cyclone)
- Stalling characteristic
- KatRisk flood footprint
 - Flood depths
 - Loss estimates

2017 California wildfire season

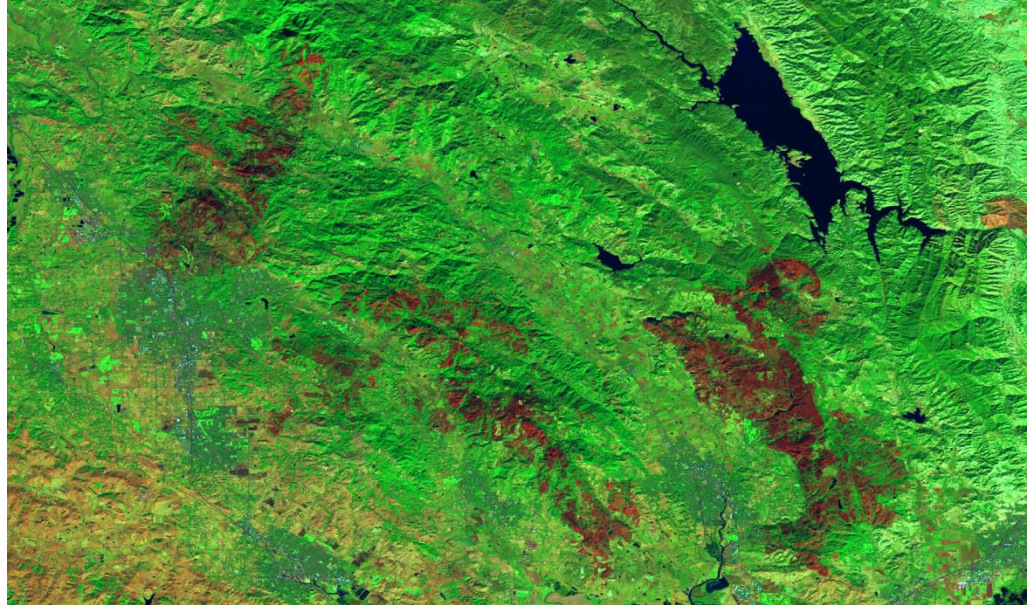
- Nearly 9,000 fires and 1.2 million acres burned
 - Size of Delaware
 - Thomas fire was largest ever recorded in CA - burned the equivalent of Dallas and Miami combined
- 10,800 structures and at least 46 people killed
- Costliest - \$9.4 billion (CA DOI)
- Air pollution



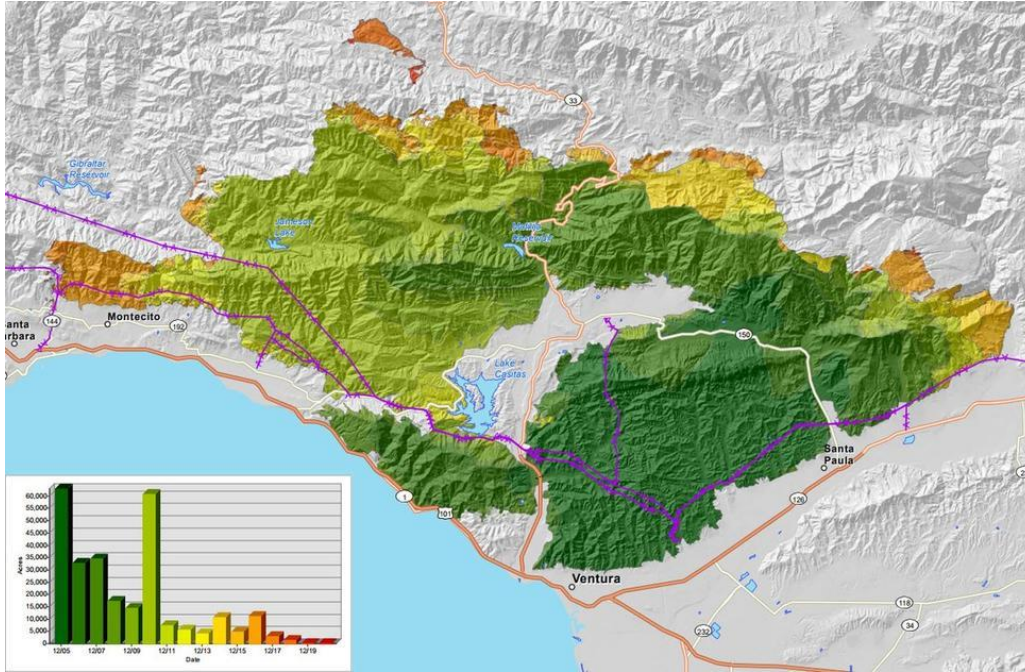
Source: https://www.washingtonpost.com/graphics/2017/national/california-wildfires-comparison/?utm_term=.ebca4b425343

Northern California Wildfires

- Complex of three fires burned over 245,000 acres
 - Tubbs – October 8th
 - Atlas – October 8th
 - Nuns – October 11th
- 44 fatalities
- 8,900 structures destroyed
- 100,000 people evacuated
- 8 – 10.5 billion insured losses



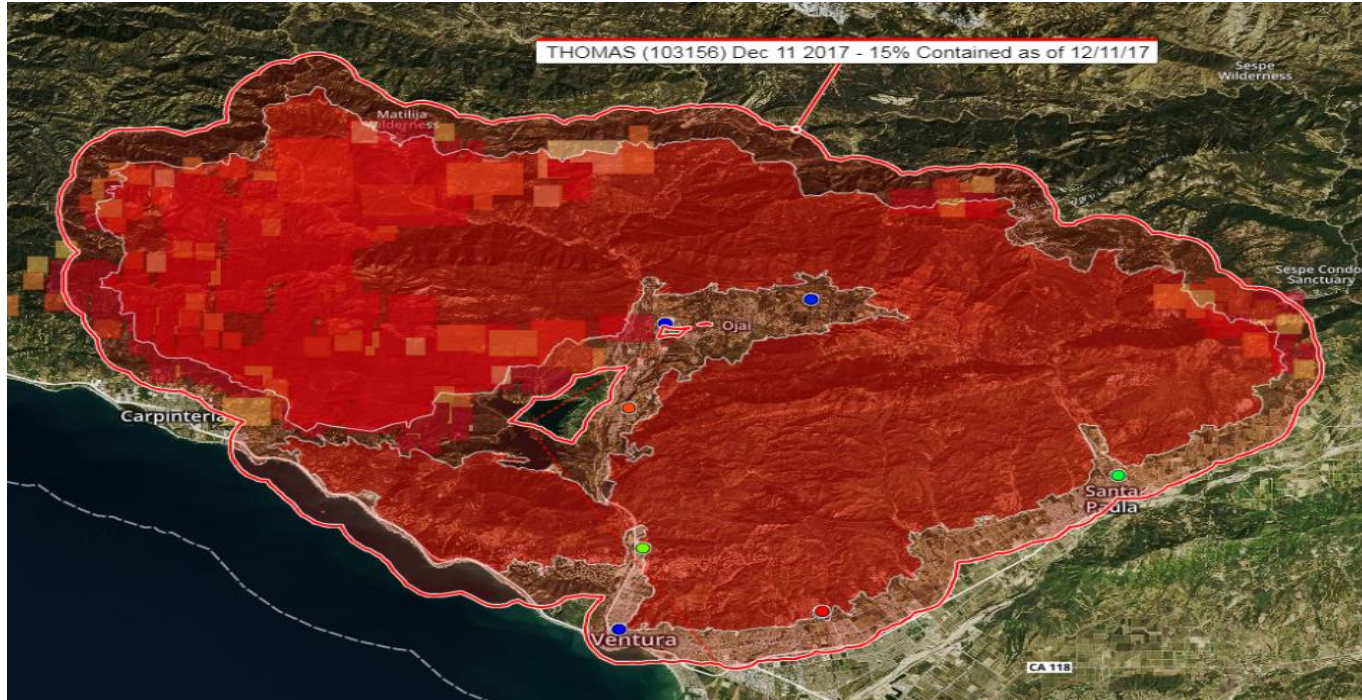
Southern California Wildfires



Source: California Department of Forestry and Fire Management

- Complex of six fires that burned over 307,000 acres
- Thomas fire became the largest in California history
- Driven by intense Santa Ana winds
- 1,329 structures destroyed
- 230,000 people evacuated
- 1 – 2.5 billion insured losses (RMS)

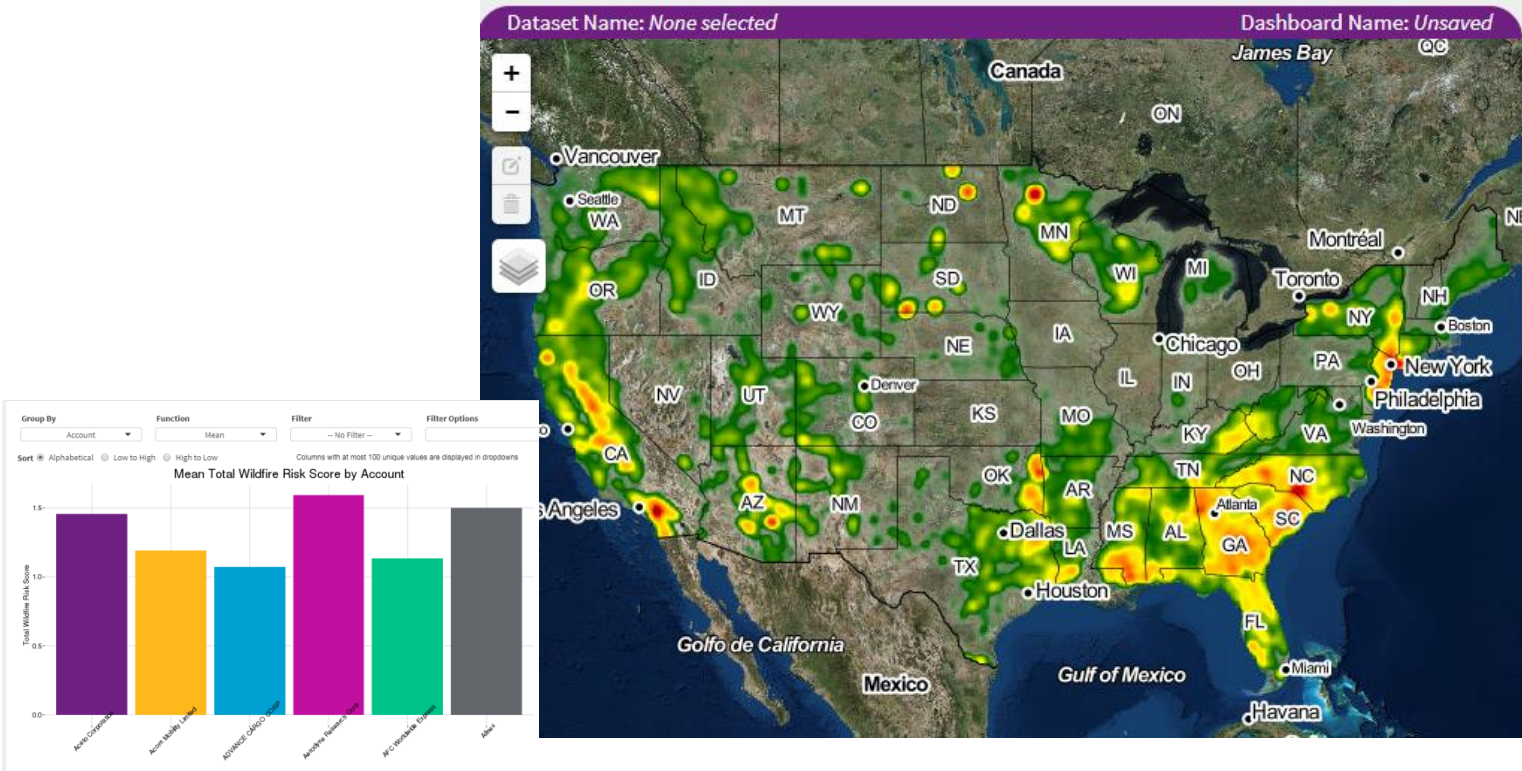
Southern California Wildfires



Wildfire

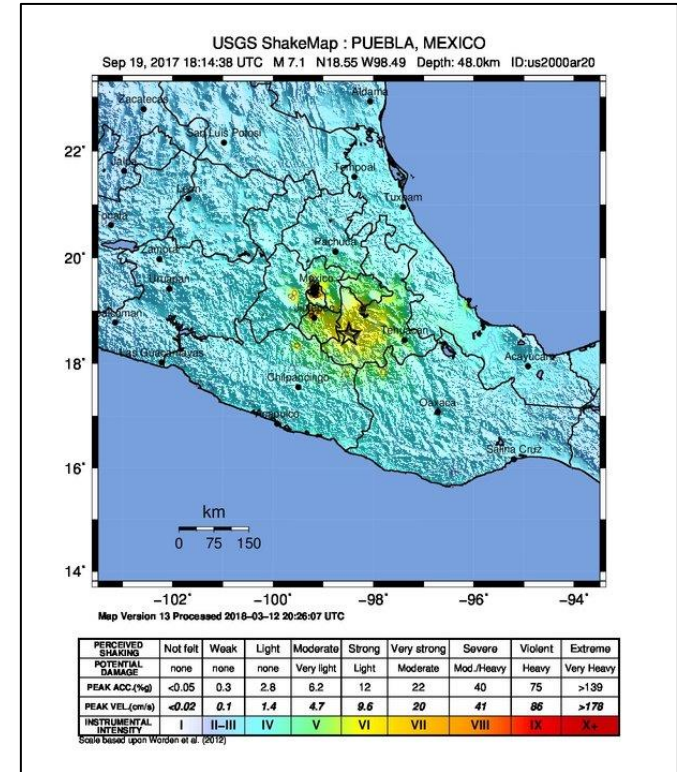


Willis Re US Wildfire



Puebla Earthquake

- Mw 7.1 Earthquake on Sept. 19th, 2017
- Epicenter 55km south of Puebla
 - 120km from Mexico City
- Preceded by an Mw 8.1 Earthquake
- Over 10,000 buildings damaged (RMS)
- Insured loss estimates vary by 3.6 billion
 - AIR – 2.1 billion
 - RMS – 1.2 billion
 - ERN – 4.8 billion
- 369 Fatalities (more than half in Mexico City)



Puebla Earthquake



- A majority of buildings were reinforced, confined or unreinforced masonry
- Corner buildings were particularly susceptible to damage
- Building code changes in 1987 mitigated total loss
- Pounding damage was significant due to the close proximity of buildings to one another



Recap