Why Low Risk Doesn't Mean NO Risk

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Agenda

- What is meant by "Low Risk Doesn't Mean NO Risk"
  - How often are low risk areas expected to be impacted?

- Examples of perils where this has been observed
  - Flood
  - Wildfire

- How does the risk profile of damage change between high frequency and low frequency events?

Why the focus on "low" risk?

- Many residents in low risk areas decide the risk is too low, and choose to not purchase insurance (i.e. Flood)

- Recent natural catastrophe events have shown that low risk areas can be affected (Hurricanes Harvey & Florence, 2017 California Wildfires)
  - Significant (65-85%) uninsured losses in the hurricane flood events

- Higher risk areas ARE impacted at a higher frequency than low risk areas, but extreme events DO impact lower risk areas (actual and simulated events)
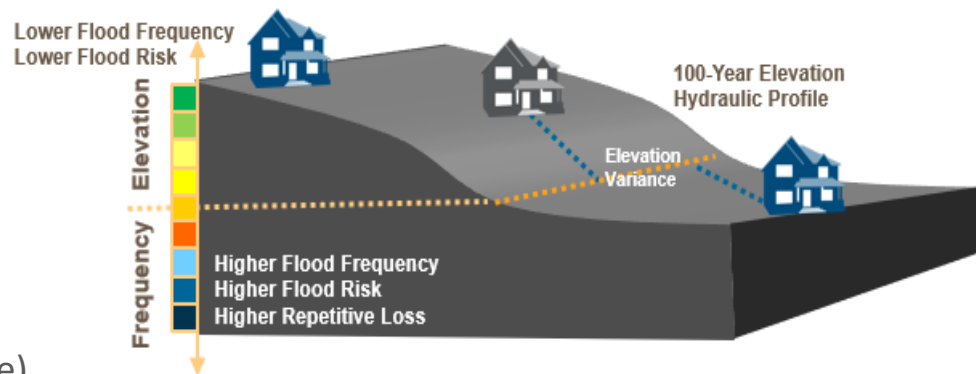
Why the focus on "low" risk?

- Many events are localized, and in many extreme events the majority of the affected properties are not classified as high risk
  - Return period classification (1 in 500 year) refers to the specific location, not that we would expect only 1 event over 500 years across the entire U.S.

- Uninsured damage can cause further financial issues
  - Mortgage default
  - Non-repaired structures are more susceptible to future loss

- Natural catastrophe models can certainly help quantify the risk differentials; the models are not necessarily wrong when low risk areas are actually impacted by an event
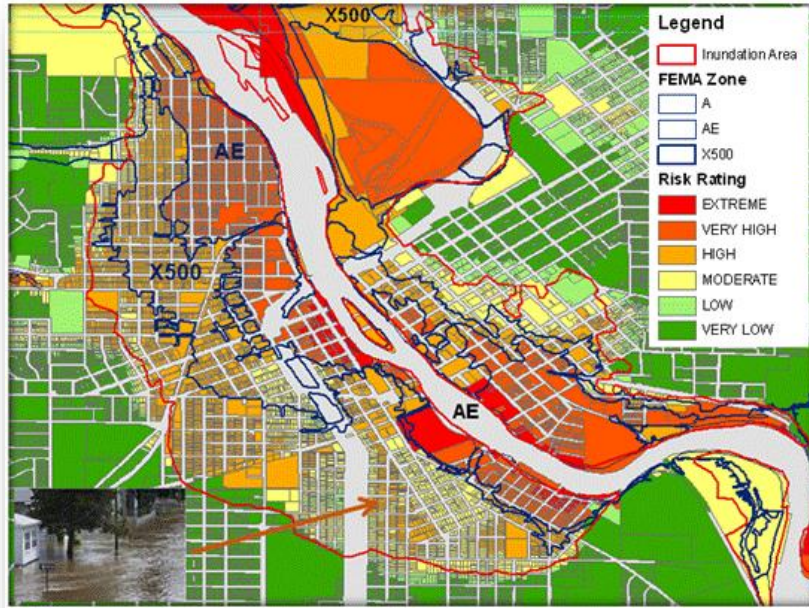 - Know the actual risk!

Flood Examples

Flood Risk Modeling – Basic Concepts

- Beyond "In" or "Out"
  - Move beyond using only FEMA flood zones

- Incremental Risk Factors
  - Elevation variance
  - Distance to floodplain
  - Proximity to dams and levees
  - 10m granularity

- Intuitive Results (Flood Risk Score)
  - Risks are scored from 10 – 100
  - Categorized from Very Low to Extreme

Lower Flood Frequency
Lower Flood Risk

Elevation

Frequency

100-Year Elevation
Hydraulic Profile

Elevation Variance

Higher Flood Frequency
Higher Flood Risk
Higher Repetitive Loss

Performance of Models – Cedar Rapids Example

- Flooding went beyond 500 year flood zones

- However, flood models actually had very good correlation relative to high or greater risk ratings

- Isolated areas of low and moderate risk were impacted

Excerpts from the 2017 Hazard Report

Flood risk goes beyond the Special Flood Hazard Area

Table 1: Total Properties at Risk by Flood Risk Level

				Outside Special Flood Hazard Area			
	Total Properties	Extreme Risk	Very High Risk	High Risk	Moderate Risk	Low Risk	Very Low Risk
Austin-Round Rock-San Marcos	701,325	7,233	15,628	52,622	74,451	66,110	485,281
Bay City	23,459	722	5,727	7,374	5,904	1,104	2,628
Beaumont-Port Arthur	194,610	1,990	19,774	39,096	67,090	19,531	47,129
Bryan-College Station	91,106	836	2,983	6,865	13,070	13,496	53,856
Corpus Christi	34,330	186	4,199	5,924	6,175	3,379	14,467
Houston-Sugar Land-Baytown	2,340,343	57,077	211,851	494,983	715,202	287,098	574,132
Victoria	42,419	646	1,847	7,064	7,751	4,198	20,913

Source: CoreLogic, August 2017

Excerpts from the 2017 Hazard Report

Flood risk goes beyond the Special Flood Hazard Area

South Texas/Louisiana - Harvey Affected Areas
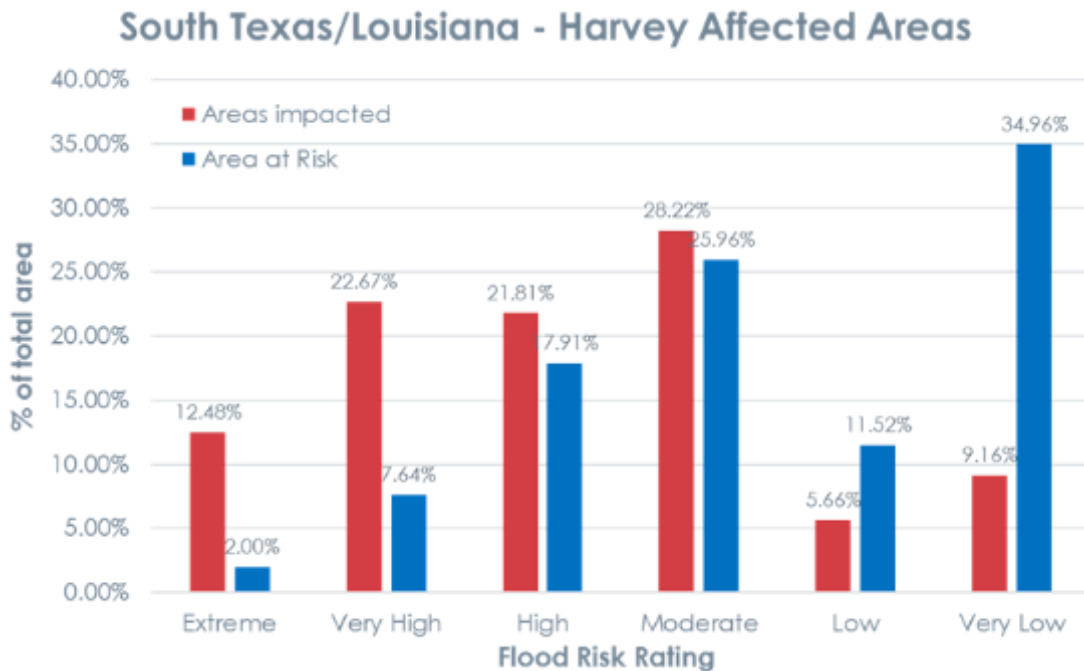
Estimates are that **65% of the areas** flooded from Hurricane Harvey were outside of a 100 year Special Flood Hazard Area
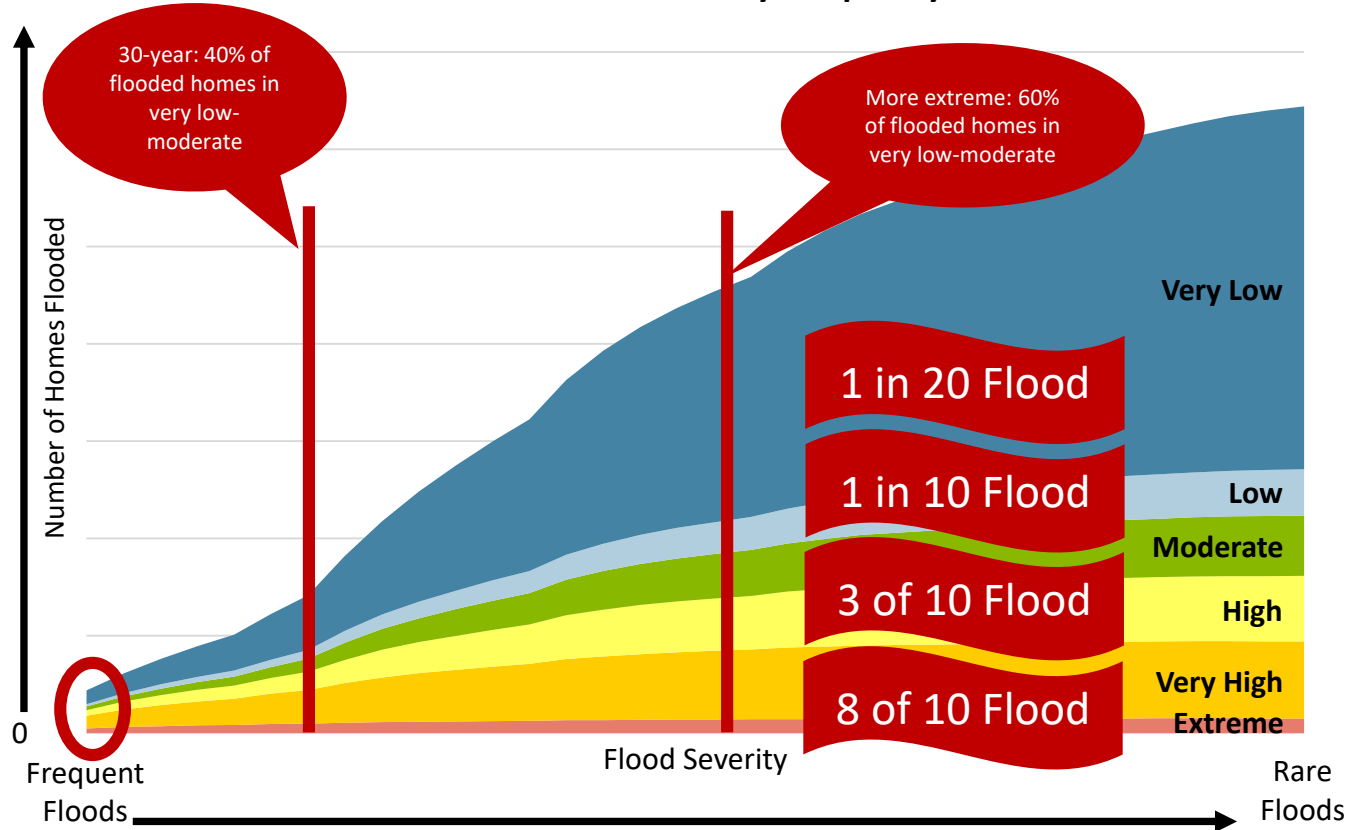
Nashville

Safe or not?

- In May 2010 the Cumberland River flooded
- It was considered a "1,000-year" event that damaged or destroyed >11,000 homes

- 80% of homeowners uninsured
- What can we expect in the future?
- Our probabilistic model can simulate everything that could possibly happen

Nashville: Davidson County

Number of Homes Flooded by Frequency of Event

Wildfire Examples

Extreme conditions can lead to extreme events

Actuarial Reviews & Validation

Review of Historical Fires

- Prior wildfire events have been extensively reviewed relative to which locations were damaged and which ones were not
  - Validate that the models are working as expected
  - Determine the relative damageability for various score groups
    - Determination of the percentage of structures expected to be damaged, compared to others with higher or lower risk (# damaged compared to total available)
  - As expected, as risk score increases, the relative frequency of damage also increases
    - **But studies show that low risk locations can be affected**

Understanding Wildfire Risk

Value of Wildfire Risk Score

- 54% SFR in fire vicinity were low risk (91.7% CA statewide)

- 2.1% of the damaged SFR were low risk

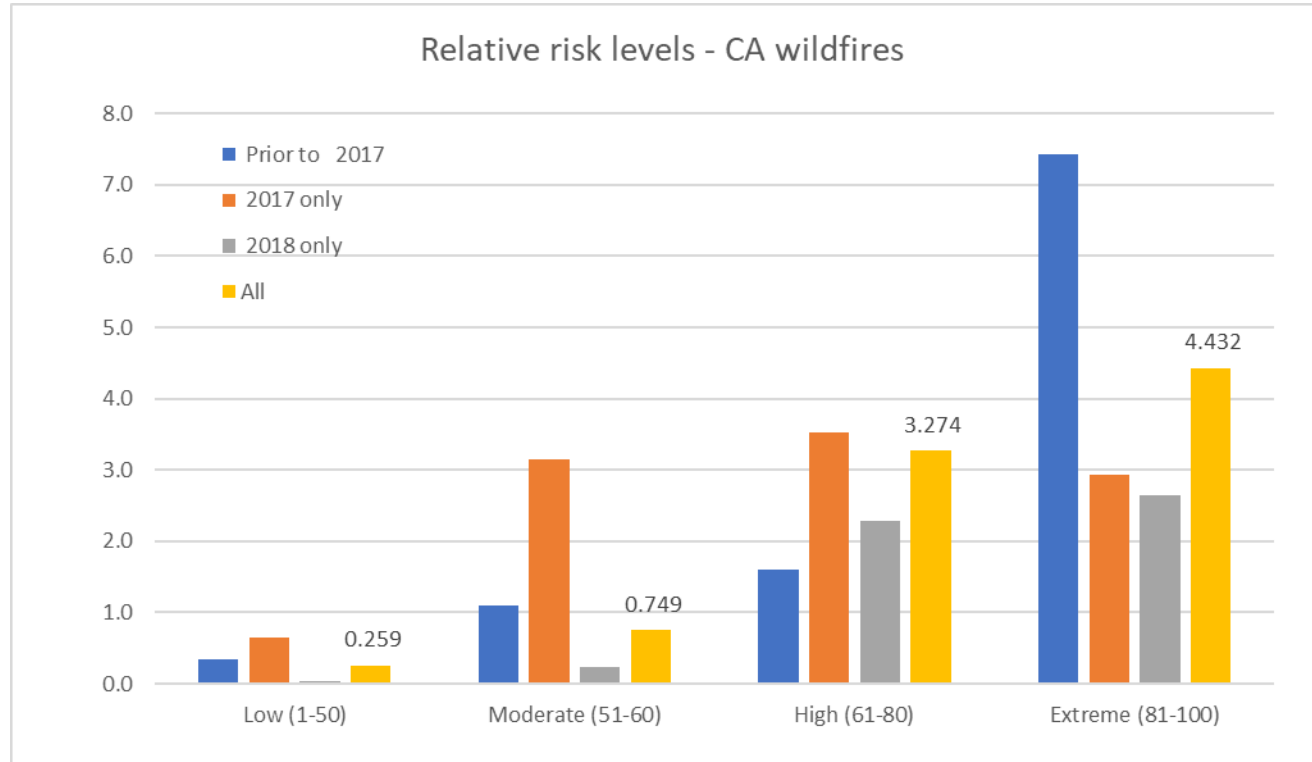- Damage rate (# damaged / # in vicinity) increases with risk

Damage % by risk level	All Fires
Low (1-50)	0.5%
Moderate (51-60)	2.7%
High (61-80)	27.6%
Very High (81-100)	31.8%
All risks	12.0%

Wildfire Risk Distribution - 2018 CA Fires

Legend:
- California statewide
- Available Risk in fire vicinity
- % damaged
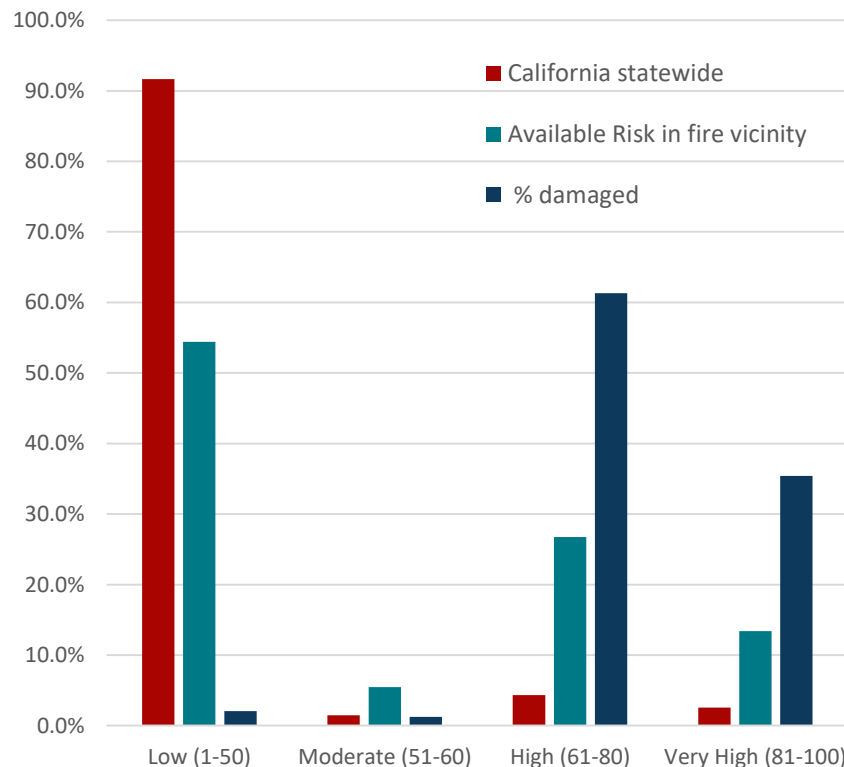
Actuarial Review & Validation

Review of Historical Fires – California

Relative risk levels - CA wildfires

Actuarial Review & Validation

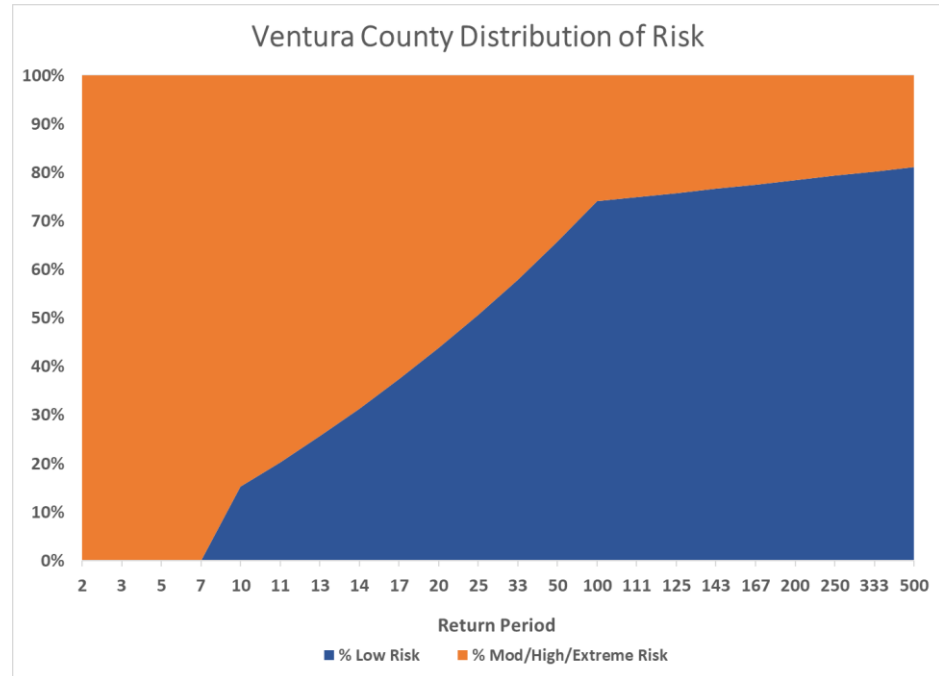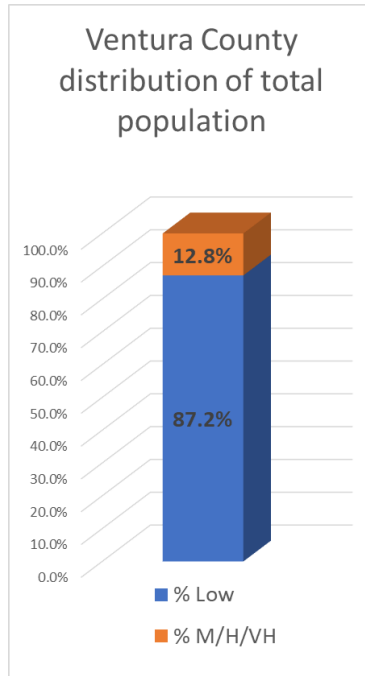## Risk Profiles – Actual and Simulated Events

- Similar to other natural catastrophe perils, more frequent (less severe) events mainly affect areas of elevated risk

  - Wildfires with the intensity needed to damage buildings normally start in areas with high risk vegetation (high or very high risk locations)

  - % of low risk locations affected is minimal in high frequency/low severity events

  - As events become more extreme, winds and other characteristics can spread the embers into areas of less risk

  - However, due to potentially higher density of structures in urban areas, once a single low risk structure is ignited it becomes fuel and could cause further nearby structures to burn (urban conflagration)

Actuarial Review & Validation

Event Simulation for Ventura County

- Low risk comprises a minimal amount of damaged locations in frequent events but as much as 80% of the more extreme events

Ventura County distribution of total population

12.8%

87.2%

- % Low
- % M/H/VH

Ventura County Distribution of Risk

Return Period

- % Low Risk
- % Mod/High/Extreme Risk

Thank You