Webinar:
Introduction to Flood Risk Management

Presenters:

Adam Berry | *Synergy Solutions*

Catherine Walker| *WMS Engineering*

Chair:

Krey Price | *International Water Training Institute*

Today's Experts

Presenters

Adam Berry
Synergy Solutions

Catherine Walker
WMS Engineering

Chair

Krey Price
International Water Training Institute

What is the basis of Flood Risk?

Risk = Consequence x Likelihood

AS/NZS ISO 31000:2009

Likelihood of consequence	AEP range %	Level of consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likely	>10	Low	Medium	High	Extreme	Extreme
Unlikely	>1 to 10	Low	Low	Medium	High	Extreme
Rare to very rare	0.01 to 1	Very low	Low	Medium	High	High
Extremely rare	<0.01	Very low	Very low	Low	Medium	High

Chrichton Risk Triangle

Sources:
https://www.kinanco.com/blog/the-three-pillars-of-risk-modeling-hazard-exposure-and-vulnerability
https://www.ilankelman.org/crichton/1999risktriangle.pdf

Social Vulnerability

Important to note before we even encounter a flood risk, we have already embedded social vulnerability:

- Physical Vulnerability
- Awareness Vulnerability
- Social and Economic Vulnerability
- Mobility Vulnerability

So, our flood risk is elevated before a flood arrives and then compounds.

Comparative Flood Risks

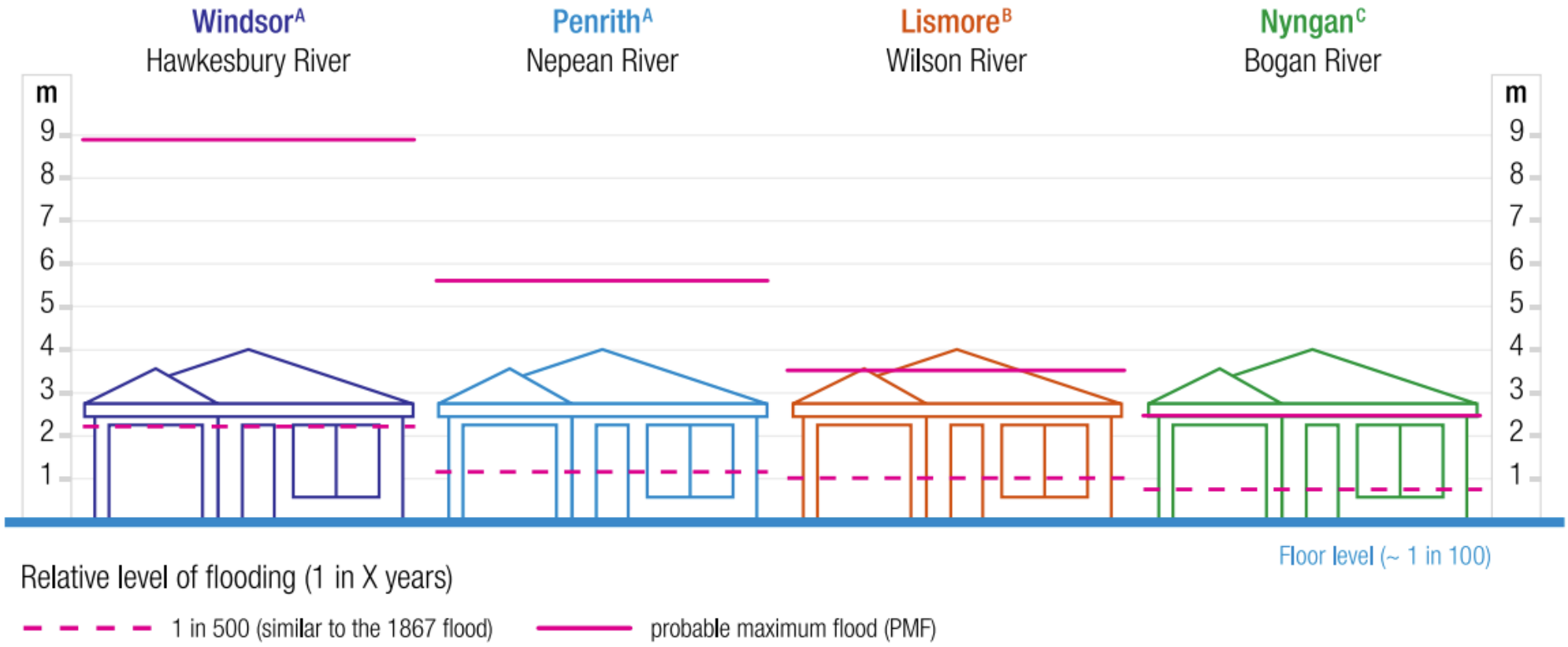


Figure 5 Comparison of the differences in flood levels and flood risk between the Hawkesbury-Nepean River at Windsor and other floodplains

Source: https://www.infrastructure.nsw.gov.au/media/zv2c5vzj/infrastructure-nsw-resilient-valley-resilient-communities-2017-jan.pdf

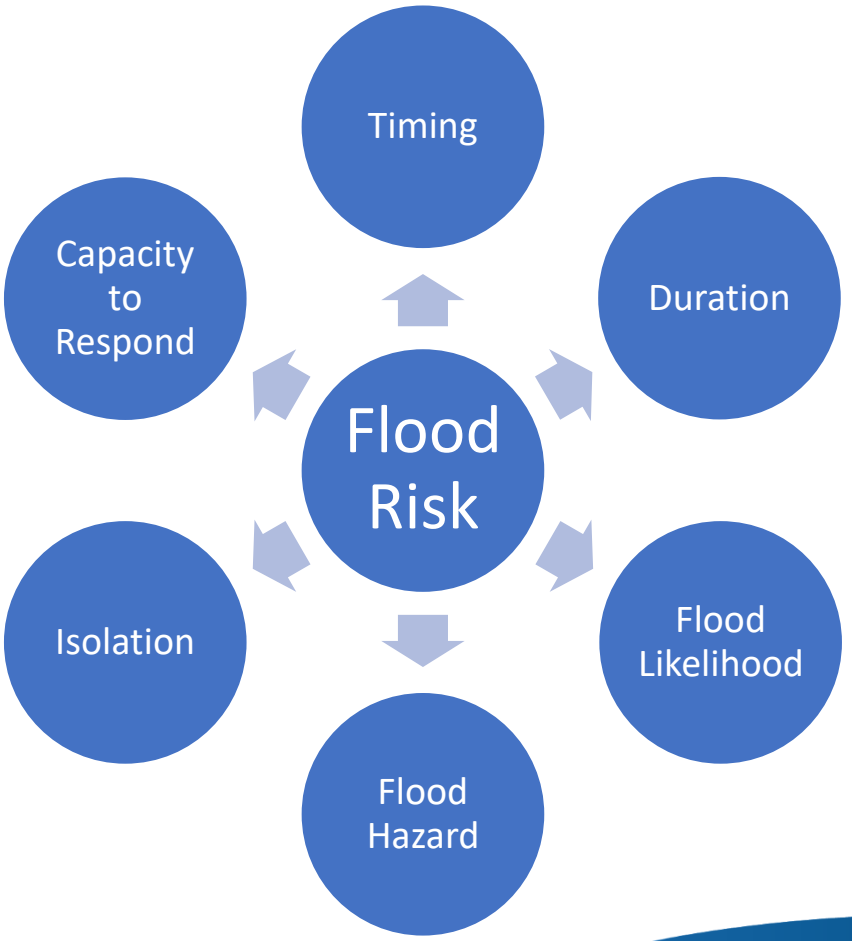
How do we express Flood Risk?

Past:

- Only frequency/likelihood
- Only recently introducing consequence/hazard

Present/Future:

- Type of flooding and speed
- Duration of flooding
- Infrastructure Immunity
- Isolation
- Capacity to respond*

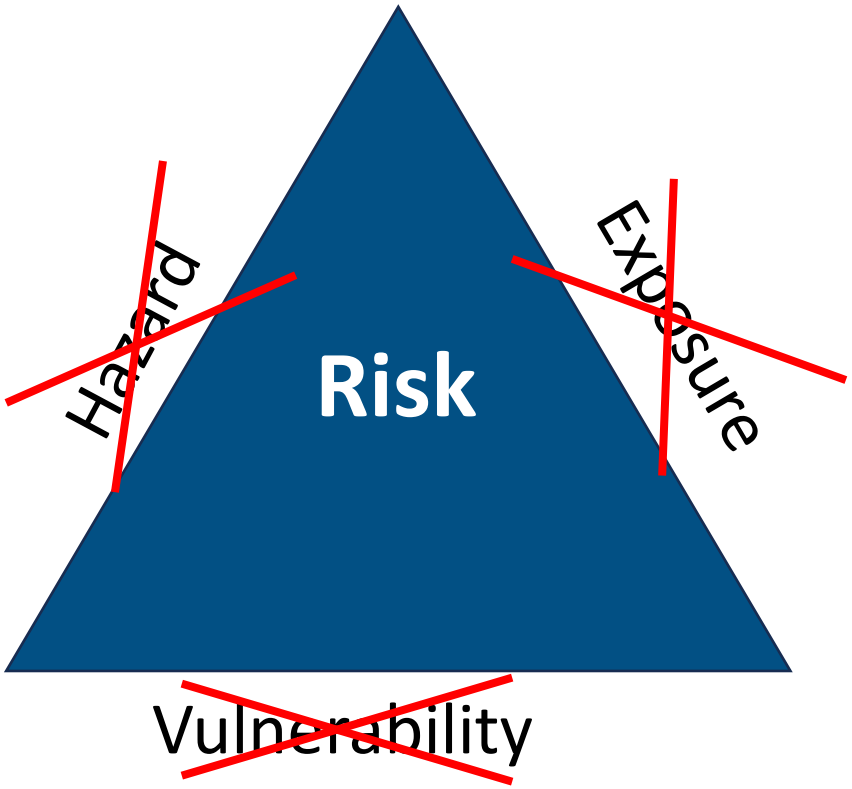


Graphical Display of Flood Risk

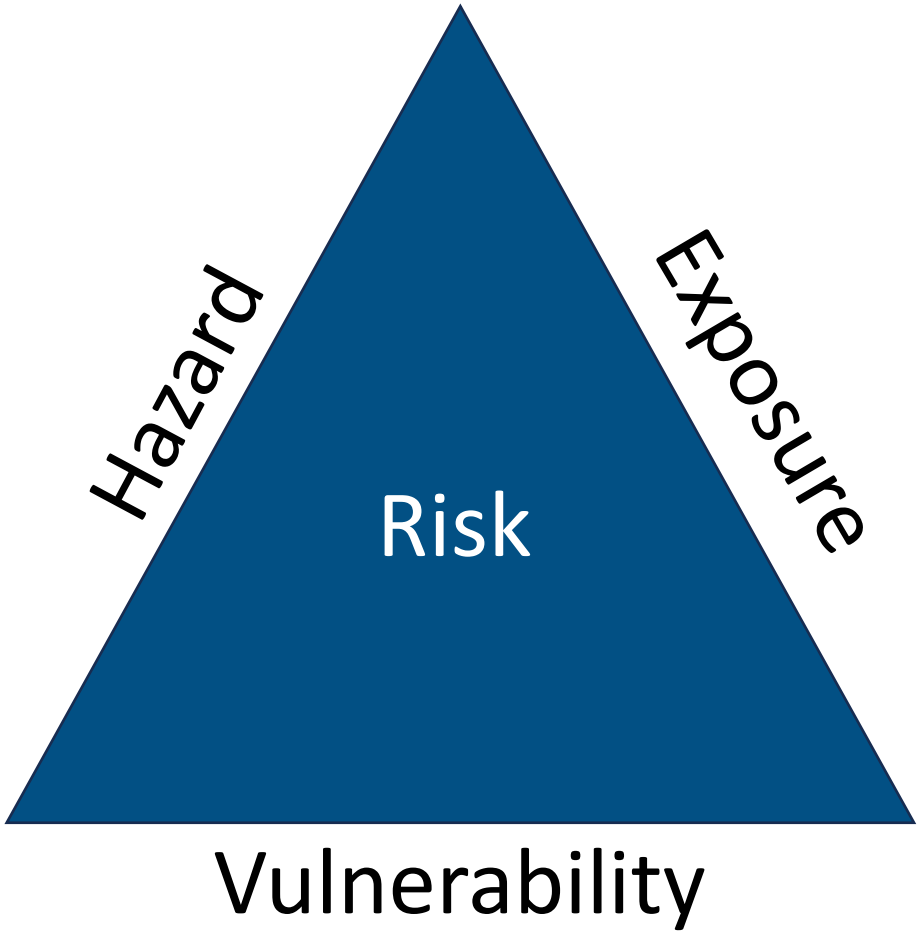
Floodplain Risk Management *is Not…*

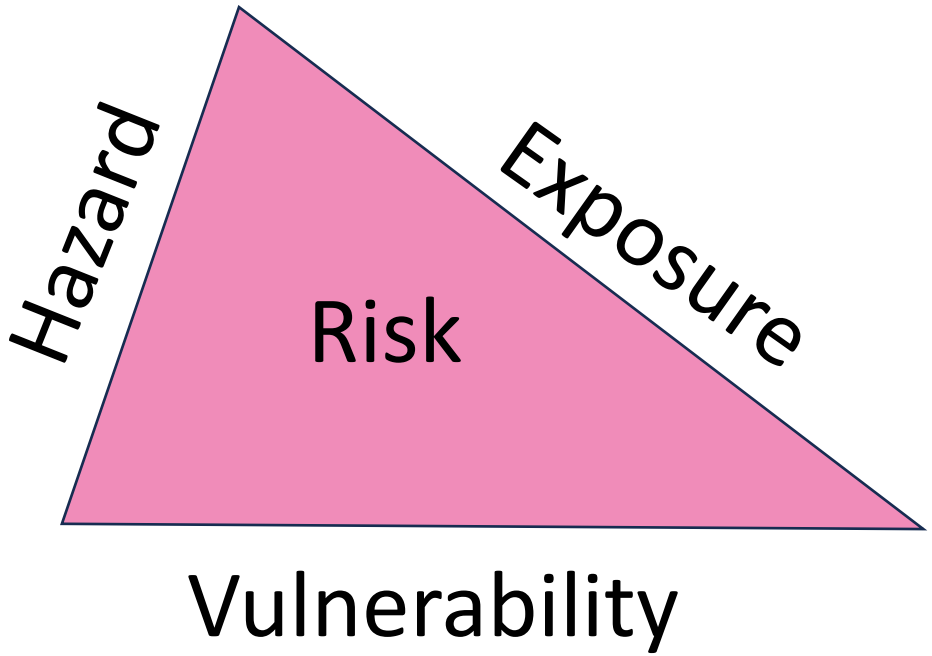
It is not:

- Removing the hazard by completely stopping floods from occurring
- Removing exposure by having zero development or usage of the floodplain
- Removing vulnerability altogether by protecting all people and buildings against the PMF everywhere
- Relying on stormwater infrastructure (eg OSD or rain gardens) to manage major overland flow.

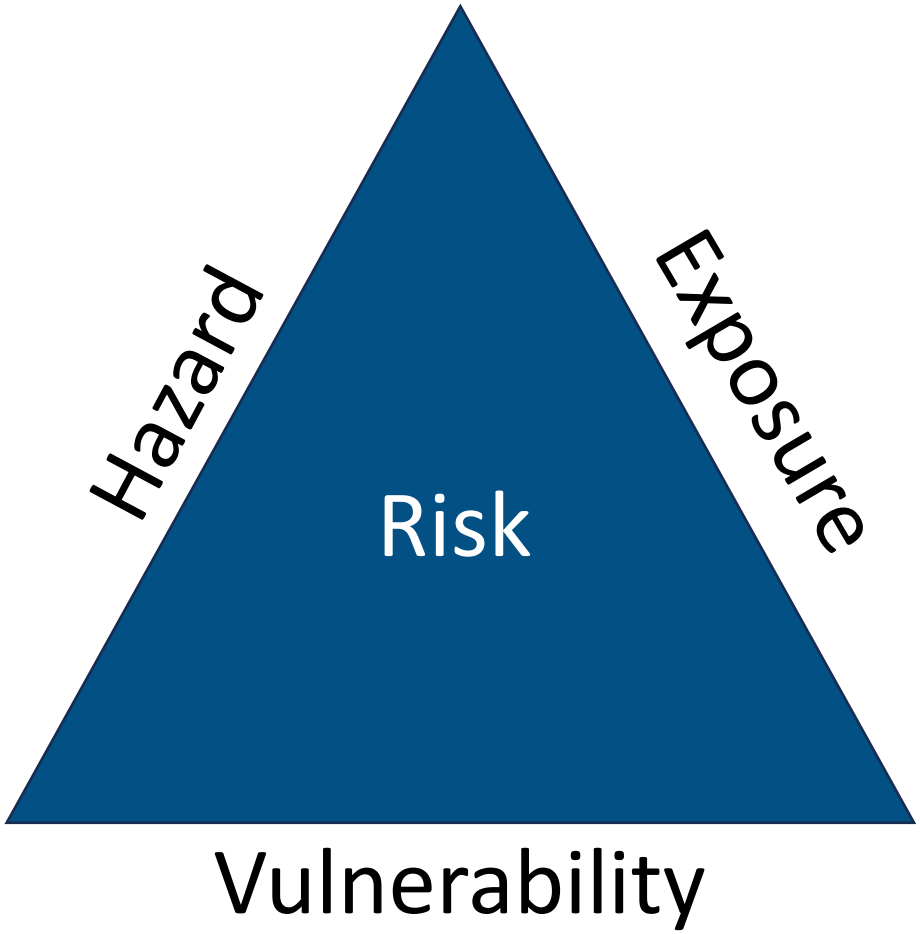


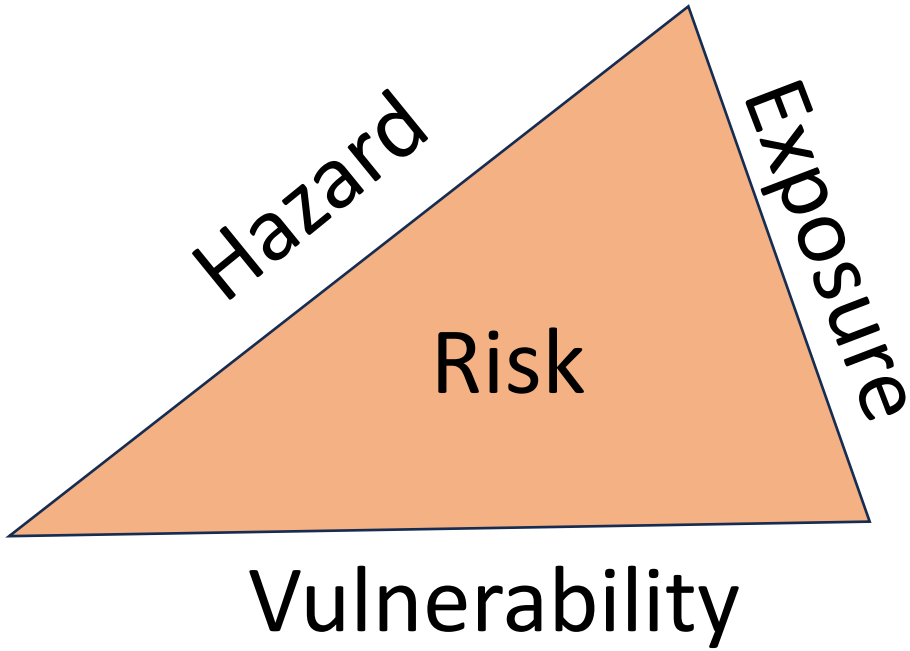
Floodplain Risk Management *Is…*



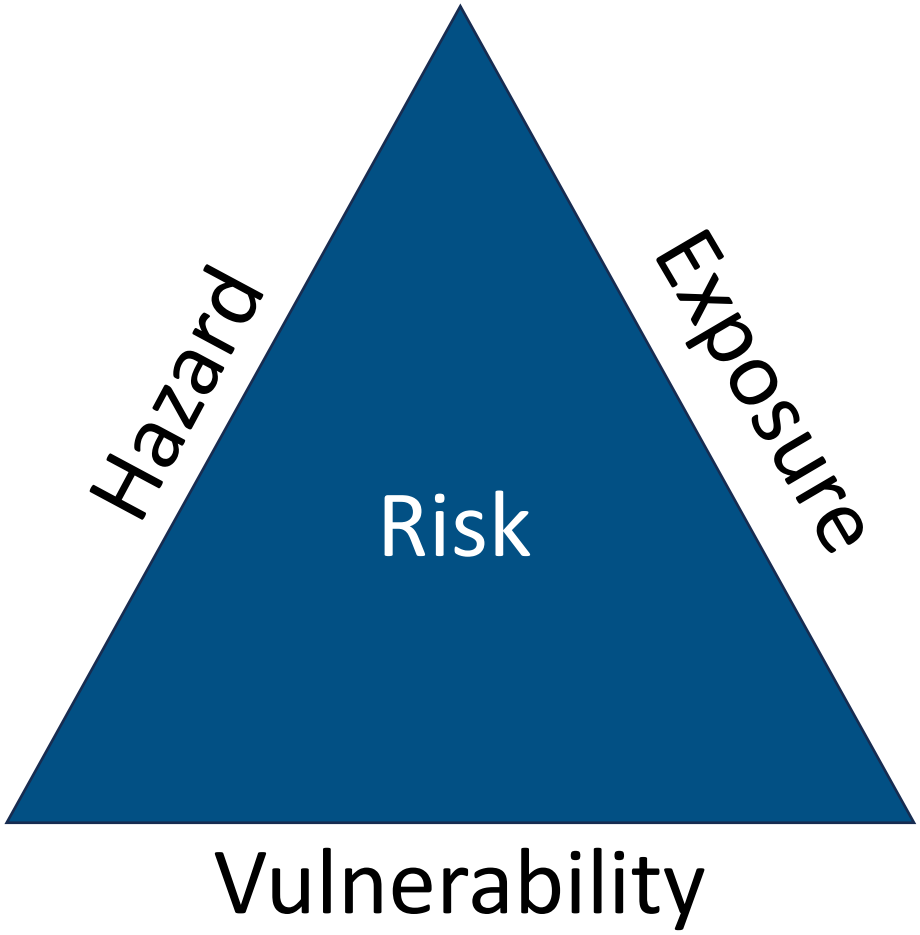


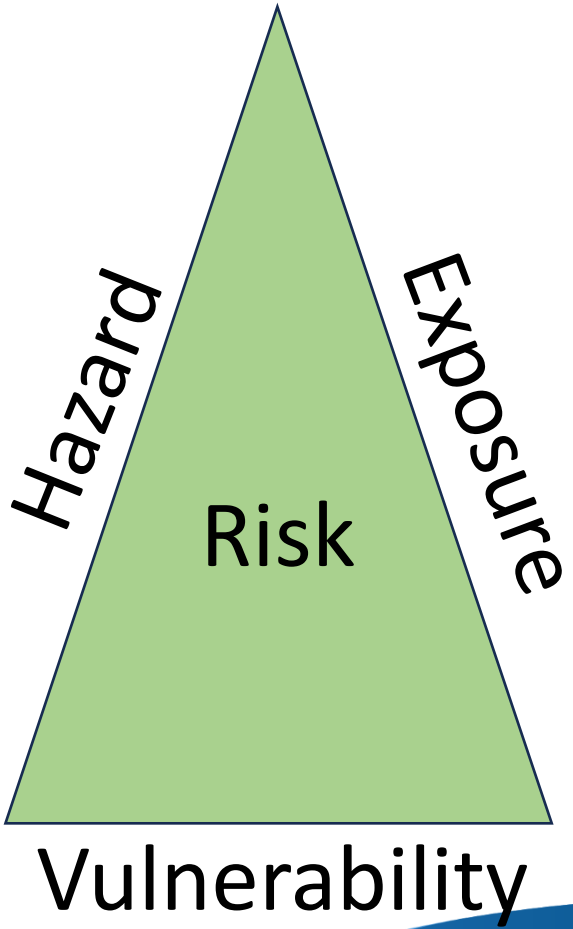
Floodplain Risk Management *Is…*





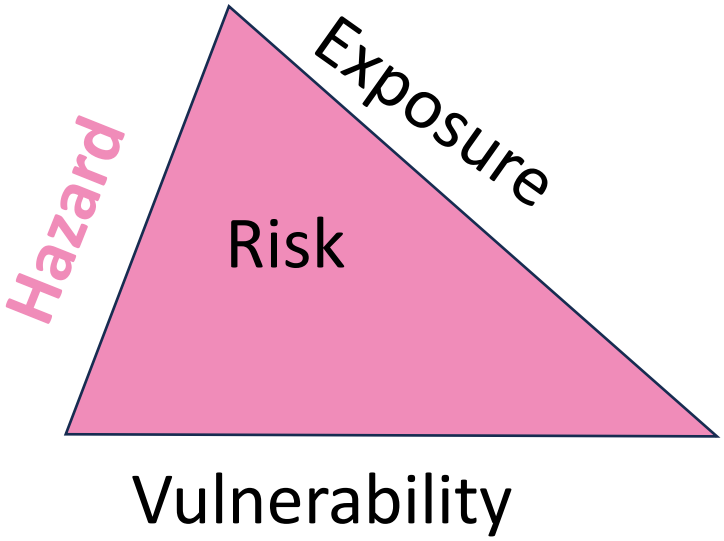
Floodplain Risk Management *Is…*





How do we Manage Flood Risk?

Reducing Hazard



- Physically reducing flood depths, velocities, levels, extents
- Diverting flood flows away from development
- Permanent or Temporary Infrastructure
  - Levees
  - Flood Barriers
  - Dams or Basins
  - Channel Modifications
  - Sandbagging

Reducing Hazard

Flood Modifications

- Structural/Engineering Intervention
- Levees
- Bypass Channels
- Bed Dredging
- Dams and Detention Basins
- Pipe Upgrades
- Flood Gates/Backflow Prevention

Reducing Hazard

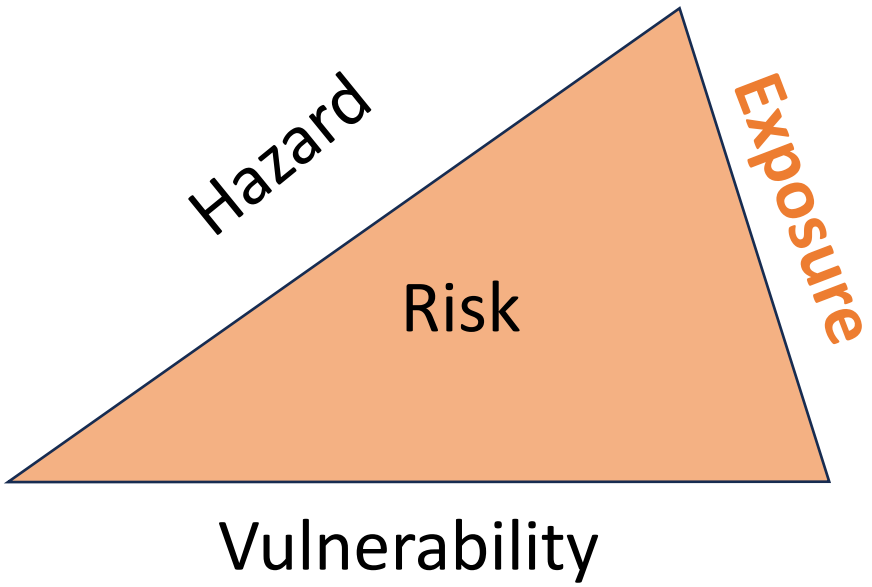
Without introducing new risks

- Tunnel vision – engineered solutions can also create big problems!
- We can't always ***fight*** our way out of flooding – we have to learn to manage and live with it
- Must consider all elements of flood risk
- Must consider residual risk left after intervention

Source: New York Times 2015

How do we Manage Flood Risk?

Reducing Exposure



- Managing *where* we develop
- Limiting *how many* properties are exposed to risk
- Being sensible about the types of properties or land uses that are exposed to flood risk

Reducing Exposure

Managing risk to existing development

- At property level specific measures
- *Note: We should avoid getting to this stage!*
- Voluntary buy backs.
- Land swaps
- House Raising

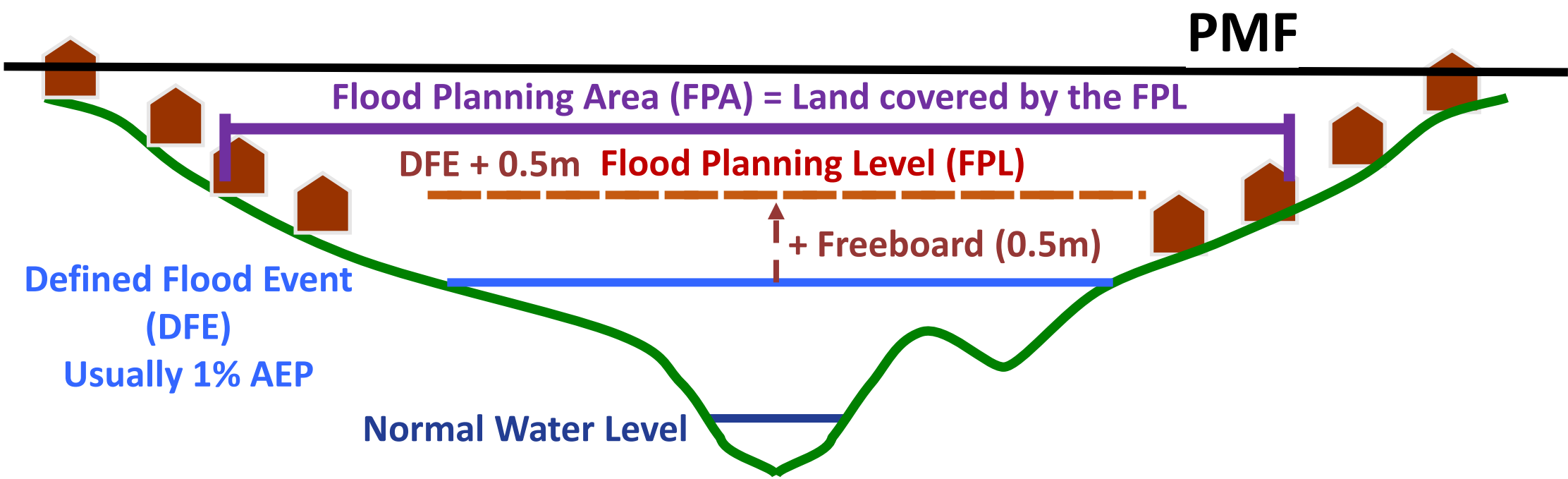
Source: ABC News, 2020

Reducing Exposure

Managing risk to future development

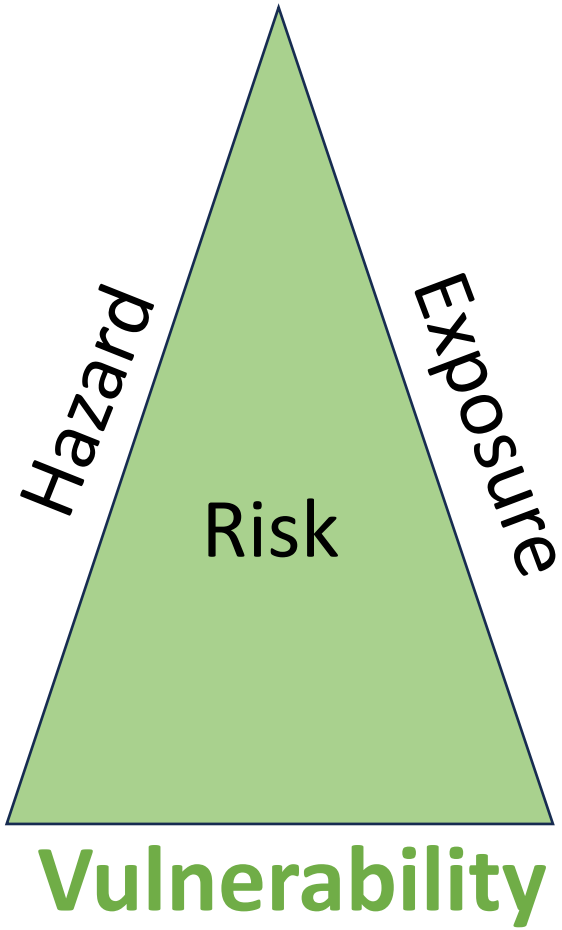
- Important to use all of our flood risk tools
- Understanding the elements of flood risk verse the type of use envisaged
- Managing where vulnerable, sensitive and critical facilities can be developed
- Defining what risk should be avoided, what risk is tolerable, and what is acceptable.
- Using our flood risk outputs to develop strategies

Deciding where to apply controls



How do we Manage Flood Risk?

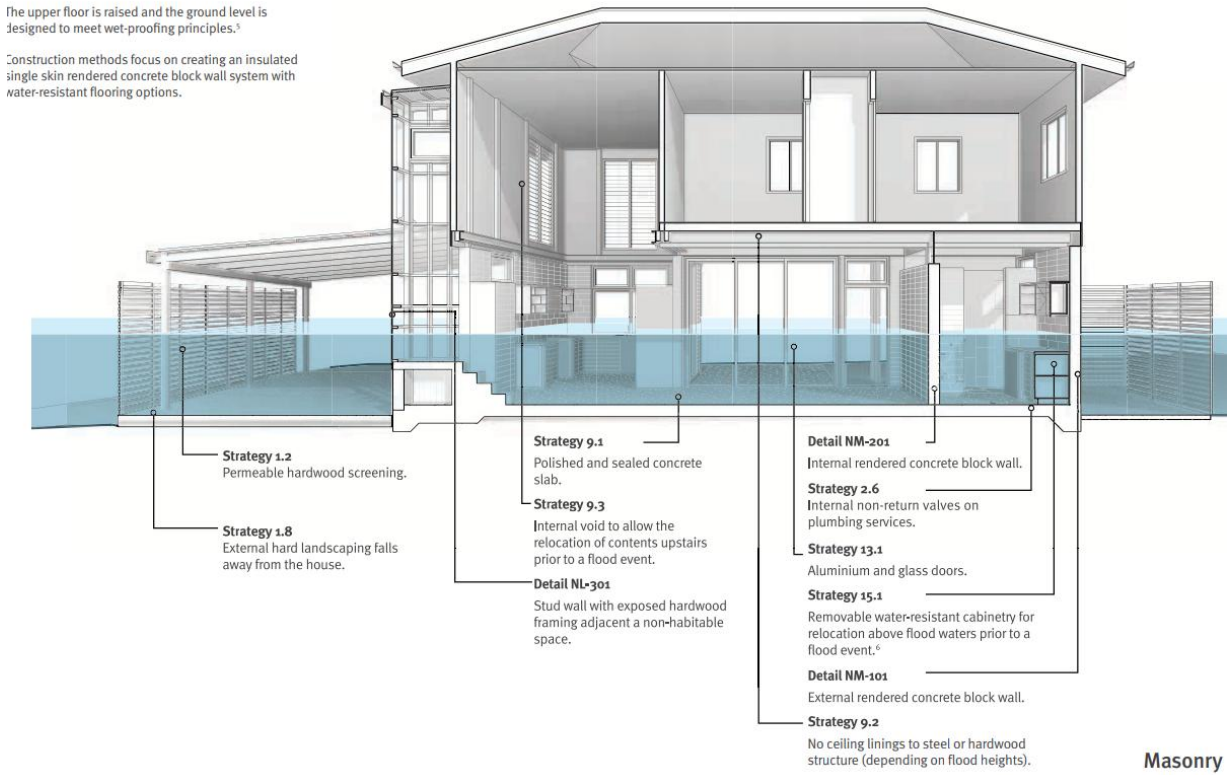
Reducing Vulnerability



- Improving community flood awareness and preparedness
- Managing where vulnerable, sensitive and critical facilities can be developed
- Improving ability to respond to flood risk (flood warnings, evacuations etc).

Reducing Vulnerability - Property

- Minimising damages through better building design, flood compatible materials, flood proofing.
- More appropriate materials on doors, walls and floors
- Lifting electrical outlets and appliances
- Removable cabinetry and other items
- Use of hardwood



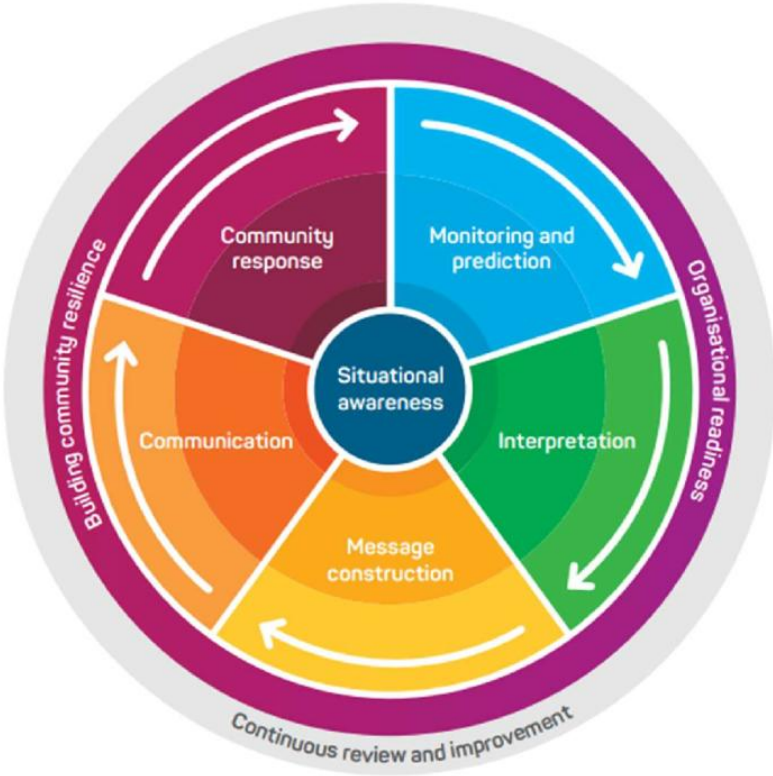
Source: Flood Resilient Building Guidance for Queensland Homes, 2019. Queensland Reconstruction Authority

Reducing Vulnerability - People

- Empowering residents to become more flood aware through education
- Greater flood awareness leads to improved mental and emotional recovery after a flood (and property losses are generally also lower where people have been able to prepare their homes beforehand)
- Driver safety training
- Flood Warning Systems

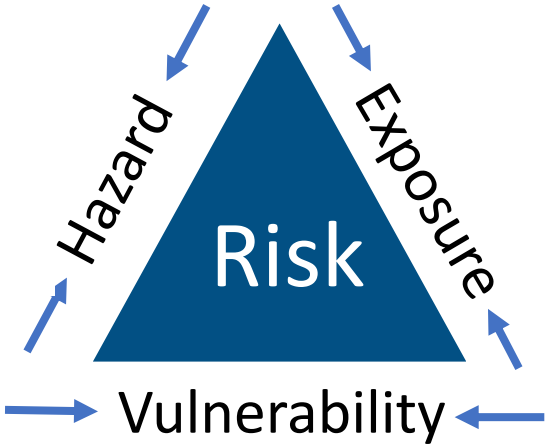
Total Flood Warning Systems

- Upcoming course
- Requires multiple professions
- Similar to flood risk – requires multiple elements
- Often last “defence” in flooding
- Should be the first thing we think about not the last!!
- Significant advancements recently



Bringing it all together

Floodplain Risk Management



Upcoming Training Courses

Handed Over, Far From Over: The Client's Journey with Your Flood Model

I.e. Everything your client wishes flood modellers knew

Thurs 11th Sept - Flood modelling for urban and regional mitigation infrastructure design – with *#AlastairXeros (Xeros Piccolo)*

Thurs 18th Sept - Joining the dots between flood models and community resilience – *with #Flilippo Dall'Osso (WaterTech)*

Thurs 25th Sept - The link between flood modelling, development and planning – with *#Emma Maratea (Rhelm)* and *#Paul Grech (GLN Planning)*.

Supported by #Floodplain Management Australia

Upcoming Training Courses

Total Flood Warning Systems

Thurs 6th November - Part 1 Total Flood Warning System Overview and Understanding.

Part 2 Monitoring and Prediction

Thurs 13th November - Part 3. Messaging and Communication

Part 4. Real World Examples of Systems

**Further guest speakers to be announced*