Inundation Scenarios in Floodplain Risk Management

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I am a Risk Manager

- I’m not a Scientist
  - I don’t wait to know exactly how things work

- I use Engineering Principles
  - I will use empirical relationships that work, whether or not a scientist can explain how they work
What I try to achieve

Help a community avoid

- Death
- Injury
- Penury (bankruptcy)
How do I do it?

Help Councils & Communities to understand

- What gets how wet how often for how long
- What the consequences (of inaction) are
- What (if anything) can be done
- What the consequences (of action) are
- What Floodplain Risk Management Plan to implement
Risk Management Approach

- Risk is a product of both
  - Chance (or probability) and
  - Consequence (or damage)
## Risk analysis for structural damage to residential development in floodplains

Based on a traditional single storey, brick veneer, slab on ground house

<table>
<thead>
<tr>
<th>Floor level range</th>
<th>Likelihood of above floor flooding</th>
<th>Chance of experiencing in a life time</th>
<th>Structural damage consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:10,000 AEP to PMF</td>
<td>Improbable</td>
<td>0.7% - 0.07%</td>
<td>Insignificant $&lt; 1,000</td>
</tr>
<tr>
<td>1:1,000 to 1:10,000 AEP</td>
<td>Rare</td>
<td>7% - 0.7%</td>
<td>Minor $d &lt; 0.1m</td>
</tr>
<tr>
<td>Flood of record to 1:1,000 AEP</td>
<td>Unlikely</td>
<td>30% - 7%</td>
<td>Moderate $d &gt; 0.1 &amp; &lt; 0.5m</td>
</tr>
<tr>
<td>1:100 AEP to flood of record</td>
<td>Possible</td>
<td>50% - 30%</td>
<td>Major $d &gt; 0.5 &amp; &lt; 1.0m</td>
</tr>
<tr>
<td>1:50 to 1:100 AEP</td>
<td>Likely</td>
<td>75% - 50%</td>
<td>Catastrophic loss of house $&gt; 1.0m</td>
</tr>
<tr>
<td>Below 1:50 AEP</td>
<td>Almost Certain</td>
<td>100% - 75%</td>
<td>Insignificant $&lt; 1,000</td>
</tr>
</tbody>
</table>

### Structural damage consequences

- **Insignificant**: $< 1,000
- **Minor**: $1,000 - $5,000
- **Moderate**: $5,000 - $25,000
- **Major**: $25,000 - $60,000
- **Catastrophic**: $> 60,000

### Risk levels

- **Low Risk**
- **Medium Risk**
- **High Risk**
- **Extreme Risk**
The Flood Prone Land Policy Statement

The primary objective of the policy is to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses from floods utilising ecologically positive methods, where possible.
Risk Management Process

NSW Government Flood Prone Land Policy

Floodplain Development Manual
Floodplain Risk Management Process

Data Collection ➔ Flood Study ➔ Floodplain Risk Management Study ➔ Floodplain Risk Management Plan ➔ Plan Implementation

Floodplain Risk Management Committee
Data Collection & Flood Study

- **Documents**
  - Existing conditions across the catchment
  - Timing, depth, velocity, extent & duration of flooding across the floodplain & AEP range
  - High or Low Hazard areas across the floodplain & AEP range
  - Floodway, Storage & Fringe areas across the floodplain & AEP range
Inundation Scenarios

- Catchment and/or Local runoff
  - 1%AEP rainfall = 1%AEP Flood level

- Ocean storm surge
  - 1%AEP Ocean Level = 1%AEP Flood level

- Entrance state particularly for ICOLLs
  - How often, long & deep will areas flood behind an open, shoaled or closed entrance

- Tidal
  - How often, long & deep will tides like HHWSS flood areas now & into the future
Flood History at Nowra

Nowra Bridge Deck Level = 6.5 to 7m AHD
1% AEP Peak Flood Level = 6.3m AHD
Riverview Road Levee Crest Level = 6.4m AHD
Figure 8-1  Burrill Lake Longitudinal Profile of Design Flood Water Levels
Figure 8-4  Predicted Catchment Design Flood Water Level Hydrographs at the Causeway
Figure 8-6  Predicted Oceanic Design Flood Water Level Hydrographs at the Causeway
Tidal inundation over time

Now: (1992 to 2006 Average 2000-01)

MSL = 0.269m AHD 0.255m AHD
MHWS = 0.441m AHD 0.492m AHD
HHWSS = 0.572m AHD 0.651m AHD

0.5m SLR

MSL = 0.769m AHD 0.755m AHD
MHWS = 0.941m AHD 0.992m AHD
HHWSS = 1.072m AHD 1.151m AHD

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Thank you

Any Questions?

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