SCIENCE IS CRITICAL, BUT IT IS NOT EVERYTHING

Our Findings

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Qualitative research into practitioner experiences of using science to make and defend bushfire & flood risk mitigation decisions

Methods:
1. Review of science diversity & uncertainty
2. Three case studies
3. Synthesis
BARWON-OTWAY, VIC

(map credit: Andrew Edwards)

GREATER DARWIN AREA

HAWKESBURY-NEPEAN VALLEY, NSW
<table>
<thead>
<tr>
<th>Location</th>
<th>Natural Hazard</th>
<th>Risk Landscape</th>
<th>Development influences</th>
<th>Visual risk cues in the landscape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Darwin Area</td>
<td>Gamba grass fuelled bushfire</td>
<td>Peri-urban &amp; rural tropical savannah</td>
<td>Frontier expansion</td>
<td>Low – new out of town Gamba grass growth, plus familiarity with cool dry season fires.</td>
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<tr>
<td>Barwon-Otway Region</td>
<td>Eucalypt forest, shrub and woodlands bushfire</td>
<td>Coastal temperate, rural &amp; coastal towns. Very limited exit routes.</td>
<td>Gentrification of coastal areas, rural decline, summer tourism</td>
<td>Moderate – regular local bushfire events, large events rare. Nil for tourists.</td>
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<tr>
<td>Hawkesbury-Nepean Valley</td>
<td>Low frequency high impact flood</td>
<td>Sandstone valleys, floodplains for multiple rivers, rural, peri-urban and urban edge. Very limited exit routes from many areas.</td>
<td>Intense residential housing pressure for Sydney</td>
<td>Low – confusing and often difficult to see. The last two serious floods were 1961 (15 metres above sea level) and 1867 (19 metres).</td>
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<tr>
<td></td>
<td>Ind’views</td>
<td>Group W/shop</td>
<td>Workshop professions</td>
<td>Fieldwork host</td>
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<tr>
<td>Greater Darwin Area</td>
<td>27</td>
<td>14</td>
<td>12 practitioners from State fire, planning &amp; land management departments</td>
<td>Bushfires NT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 scientists</td>
<td></td>
</tr>
<tr>
<td>Barwon-Otway Region</td>
<td>21</td>
<td>12</td>
<td>10 practitioners from State fire, planning &amp; land management departments</td>
<td>Department of Environment, Land, Water and Planning</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1 private industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 university scientist</td>
<td></td>
</tr>
<tr>
<td>Hawkesbury-Nepean Valley</td>
<td>22</td>
<td>17</td>
<td>15 Practitioner/researchers from State &amp; Federal flood, land, and meteorological agencies</td>
<td>Hawkesbury-Nepean Flood Management Taskforce</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 practitioners</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>All were members of the Taskforce.</td>
<td></td>
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<tr>
<td>Location</td>
<td>STEM</td>
<td>HASS</td>
<td>Transdisciplinary</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Greater Darwin Area</td>
<td>Focus on ecological Gamba grass science</td>
<td>Nil</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>Barwon-Otway Region, Victoria</td>
<td>Physical and natural sciences used to create a predictive fire risk computational tool</td>
<td>Minimal, and using largely ‘experimental’ quantitative methods</td>
<td>One quantitative-qualitative ‘experiment’</td>
<td></td>
</tr>
<tr>
<td>Hawkesbury-Nepean Valley, NSW</td>
<td>Majority members of the Taskforce are spanning disciplinary knowledge boundaries in terms of research and practice. The focus has been on meteorology, hydrology, agent based modelling, ecology, flood studies, social network analysis, demographic and population research.</td>
<td></td>
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</tbody>
</table>

STEM – Science, Technology, Engineering and Mathematics  
HASS – Humanities and Social Sciences
KNOWLEDGE & ASSUMPTION

Across the case studies the practitioners repeatedly spoke how the use of knowledge in their work related to two common assumptions in society:

• That scientific methods and results provide the certain and objective knowledge needed for risk mitigation; and,

• That there was a direct linear relationship between having scientific knowledge and being able to use it for risk mitigation.

The practitioners differed on the extent to which they accepted these assumptions or not.
UNCERTAINTIES, COMPLEXITIES & CONSTRAINTS

Socio-ecological risk landscape
• Environments and settlements
• Institutions, individuals & constituencies
• Resourcing, capacity, time

Scientific knowledge and its use
• Historical, instrumental & interventionist uncertainties
• Usability
• Diverse sciences
• Contested science
• Relationship to other knowledges
CONSEQUENCES OF THE MISMATCH

• Reduced range of access to evidenced based knowledge
• Reduced legitimacy of other knowledge sources, e.g. local, intuitive, expert
• Unrealistic expectations of certainty by others – communities, media, inquiries, etc

→

• Less efficient use of research monies
• Less effective risk mitigation
• More stressful work environments
WICKED PROBLEM

A complex issue for which there is no complete definition, nor any ultimate solution, where any solution creates further issues, and where solutions are not true or false or good or bad, but the best that can be done at the time.

(Clarke, 2016; Brown, 2010; Rittel & Weber, 1973)
Knowledge is partial, provisional and plural, but decisions still need to be made.

So what do we do?

Bring ‘knowers’ and their ‘knowledges’ together
EG: GAMBA GRASS

We need to simultaneously:

• Generate buy-in & commitment, and

• Co-produce knowledge about possible solutions
CO-PRODUCTION APPROACHES

e.g. Oxford University’s Competency Groups, led by Professor Sarah Whatmore

Ryedale Flood Research Group

Flood Research Groups - what we are trying to do in Ryedale and beyond?

Our way of working: some principles
1. To focus on practice – i.e. to produce knowledge about flooding by more than just talking or writing about it – by actually doing it – with all members of the group involved in it.
2. To focus on experiment – i.e. to produce innovation by working collectively, trying things out e.g. where to put upstream storage in a river catchment.
3. To generate more shared, or collective, understandings of a problem through doing flood research by trying things out.
4. To make new publics rather than representing pre-existing interest groups of stakeholders.

What have we done in Ryedale - some examples:

- Brought objects to meetings that ‘tell stories’ about flooding in Ryedale
- Discussed what needs to be in a good model of flooding for Pickering, Nunsmore and the Vale of Pickering
- Identified what could be tried out to reduce the flooding problems in Ryedale
- Developed models to try flood risk management strategies out and used these models and discussed what works with them and what doesn’t
- Developed the exhibition
- Used our materials to create a Making Space experiment.
- Looked at videos and photographs regarding river maintenance
- Collated press cuttings and historical photographs
- Discussed consultants’ reports
- Gathered local evidence, for example from local people?
BUT CAN’T WE JUST ADD SOCIAL SCIENCE TO THE MIX?

The two societal assumptions about knowledge privileges STEM:

- ‘hard’ and ‘soft’ sciences
- Linearity & ‘knowledge transfer’

  e.g. Barwon-Otway Region & Phoenix Rapidfire
INSTEAD...

We need to re-thread the science/society split

We do this with three key principles:

1) explicit acknowledgement of the meanings and values that inform one’s own perspective;

2) acceptance that how we perceive reality will differ, and that these differences need to be understood but not necessarily agreed upon; and,

3) commitment to making decisions together because decisions still need to be made.
PRACTICAL STEPS

• Focus on the problem, and not the academic discipline

• Embrace knowledge diversity

• Bring process into greater focus

• Be open to experimenting and adapting

• Be open to discussions about un-shared assumptions and goals
MORE INFORMATION

• Come to our Hawkesbury-Nepean case study talk at 10am on Wednesday – presented by Liz Clarke & Peter Cinque (NSW SES)

• Visit our BNHCRC project page ‘Scientific Diversity, Scientific Uncertainty, and Risk Mitigation Policy and Planning’

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PROJECT PUBLICATIONS

• Wodak, J. & Neale, T. 2015 A critical review of the application of environmental scenario exercises. Futures 73.
THANKS

Case study partners and participants

End user team:

Monique Blason (Department of Premier and Cabinet, South Australia); Don Cranwell (Metropolitan Fire Service, South Australia); Chris Irvine (State Emergency Service, Tasmania); Leigh Miller (Country Fire Service, South Australia); Ed Pikusa (Fire and Emergency Services Commission, South Australia); Dylan Rowe (Department of Environment, Land, Water and Planning, Victoria); John Schauble (Emergency Management Victoria, Victoria); Patrick Schell (Rural Fire Service, New South Wales)

The rest of the research project team:

Dr Christine Hansen (University of Gothenburg); Associate Professor Tara McGee (University of Alberta); Associate Professor Michael Eburn (ANU); Professor Stephen Dovers (ANU); Professor John Handmer (RMIT)