bushfire&natural HAZARDSCRC

SCIENCE IS CRITICAL, BUT IT IS NOT EVERYTHING

Our Findings

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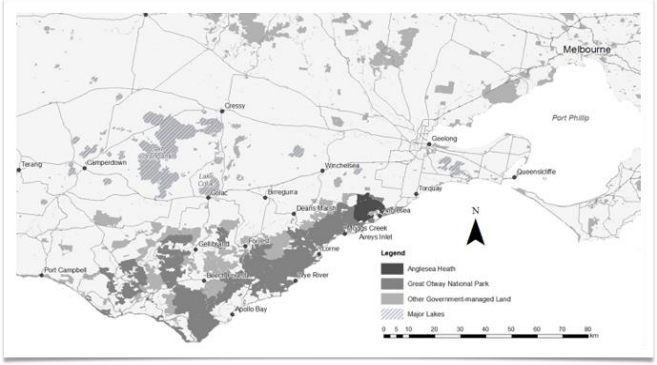
BNHCRC RESEARCH PROJECT: 2013-2017

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)

HAWKESBURY-NEPEAN VALLEY, NSW

GREATER DARWIN AREA

Location	Natural Hazard	Risk Landscape	Development influences	Visual risk cues in the landscape
Greater Darwin Area	Gamba grass fuelled bushfire	Peri-urban & rural tropical savannah	Frontier expansion	Low – new out of town Gamba grass growth, plus familiarity with cool dry season fires.
Barwon-Otway Region	Eucalypt forest, shrub and woodlands bushfire	Coastal temperate, rural & coastal towns. Very limited exit routes.	Gentrification of coastal areas, rural decline, summer tourism	Moderate – regular local bushfire events, large events rare. Nil for tourists.
Hawkesbury-Nepean Valley	Low frequency high impact flood	Sandstone valleys, floodplains for multiple rivers, rural, peri-urban and urban edge. Very limited exit routes from many areas.	Intense residential housing pressure for Sydney	Low – confusing and often difficult to see. The last two serious floods were 1961 (15 metres above sea level) and 1867 (19 metres).

	Ind i'views	Group W/shop	Workshop professions	Fieldwork host
Greater Darwin Area	27	14	12 practitioners from State fire, planning & land management departments 2 scientists	Bushfires NT
Barwon-Otway Region	21	12	10 practitioners from State fire, planning & land management departments 1 private industry 1 university scientist	Department of Environment, Land, Water and Planning
Hawkesbury-Nepean Valley	22	17	15 Practitioner/researchers from State & Federal flood, land, and meteorological agencies 2 practitioners All were members of the Taskforce.	Hawkesbury-Nepean Flood Management Taskforce

Location	STEM	HASS	Transdisciplinary
Greater Darwin Area	Focus on ecological Gamba grass science	Nil	Nil
Barwon-Otway Region, Victoria	Physical and natural sciences used to create a predictive fire risk computational tool	Minimal, and using largely 'experimental' quantitative methods	One quantitative-qualitative 'experiment'
Hawkesbury-Nepean Valley, New South Wales			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.

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 & ACTION

Knowledge is partial, provisional and plural, but decisions still need to be made.

So what do we do?

Bring ‘knowers’ and their ‘knowledges’ together

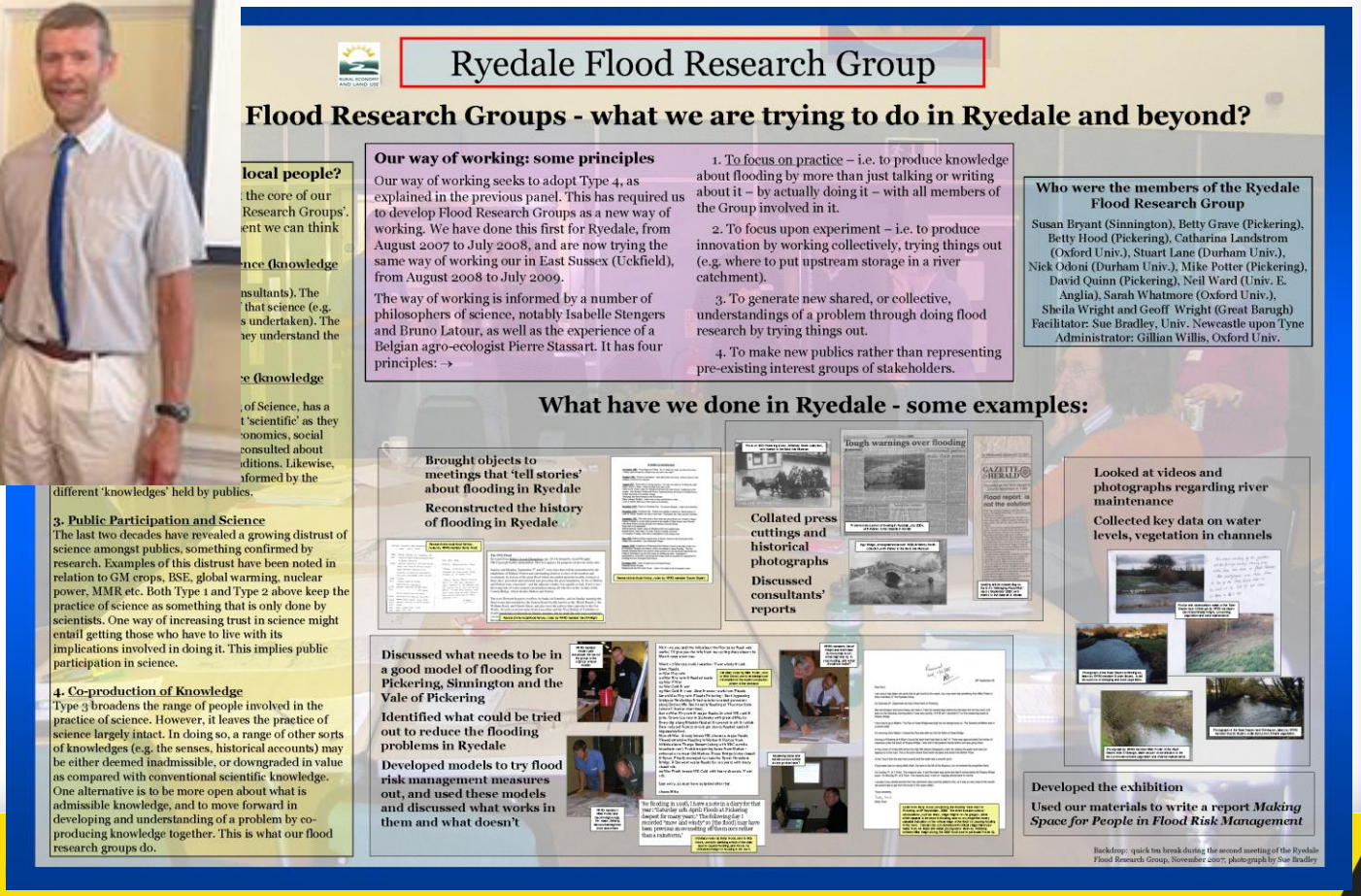
EG: GAMBA GRASS

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

Our way of working seeks to adopt Type 4, as explained in the previous panel. This has required us to develop Flood Research Groups as a new way of working. We have done this first for Ryedale, from August 2007 to July 2008, and are now trying the same way of working our in East Sussex (Uckfield), from August 2008 to July 2009.

The way of working is informed by a number of philosophers of science, notably Isabelle Stengers and Bruno Latour, as well as the experience of a Belgian agro-ecologist Pierre Stassart. It has four 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 upon 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 new 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.

Who were the members of the Ryedale Flood Research Group

Susan Bryant (Sinnington), Betty Grave (Pickering), Betty Hood (Pickering), Catharina Landstrom (Oxford Univ.), Stuart Lane (Durham Univ.), Nick Odoni (Durham Univ.), Mike Potter (Pickering), David Quinn (Pickering), Neil Ward (Univ. E. Anglia), Sarah Whatmore (Oxford Univ.), Sheila Wright and Geoff Wright (Great Barugh)
Facilitator: Sue Bradley, Univ. Newcastle upon Tyne
Administrator: Gillian Willis, Oxford Univ.

What have we done in Ryedale - some examples:

Brought objects to meetings that 'tell stories' about flooding in Ryedale

Reconstructed the history of flooding in Ryedale

Collated press cuttings and historical photographs

Discussed consultants' reports

Looked at videos and photographs regarding river maintenance

Collected key data on water levels, vegetation in channels

Discussed what needs to be in a good model of flooding for Pickering, Sinnington 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 measures out, and used these models and discussed what works in them and what doesn't

Developed the exhibition

Used our materials to write a report *Making Space for People in Flood Risk Management*

Backdrop: quick tea break during the second meeting of the Ryedale Flood Research Group, November 2007; photograph by Sue Bradley

local people?

the core of our Research Groups'. ent we can think

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of Science, has a 't 'scientific' as they conomics, social consulted about ditions. Likewise, nformed by the different 'knowledges' held by publics.

3. Public Participation and Science

The last two decades have revealed a growing distrust of science amongst publics, something confirmed by research. Examples of this distrust have been noted in relation to GM crops, BSE, global warming, nuclear power, MMR etc. Both Type 1 and Type 2 above keep the practice of science as something that is only done by scientists. One way of increasing trust in science might entail getting those who have to live with its implications involved in doing it. This implies public participation in science.

4. Co-production of Knowledge

Type 3 broadens the range of people involved in the practice of science. However, it leaves the practice of science largely intact. In doing so, a range of other sorts of knowledges (e.g. the senses, historical accounts) may be either deemed inadmissible, or downgraded in value as compared with conventional scientific knowledge. One alternative is to be more open about what is admissible knowledge, and to move forward in developing and understanding of a problem by co-producing knowledge together. This is what our flood research groups do.

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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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)