

A new twist on risk based land use planning – beyond number crunching to understanding and engagement



Wendy Saunders, PhD, Natural Hazards Planner, GNS Science

James Beban, Cuttriss Consultants

Margaret Kilvington, PhD, Independent Social Research, Lyttleton



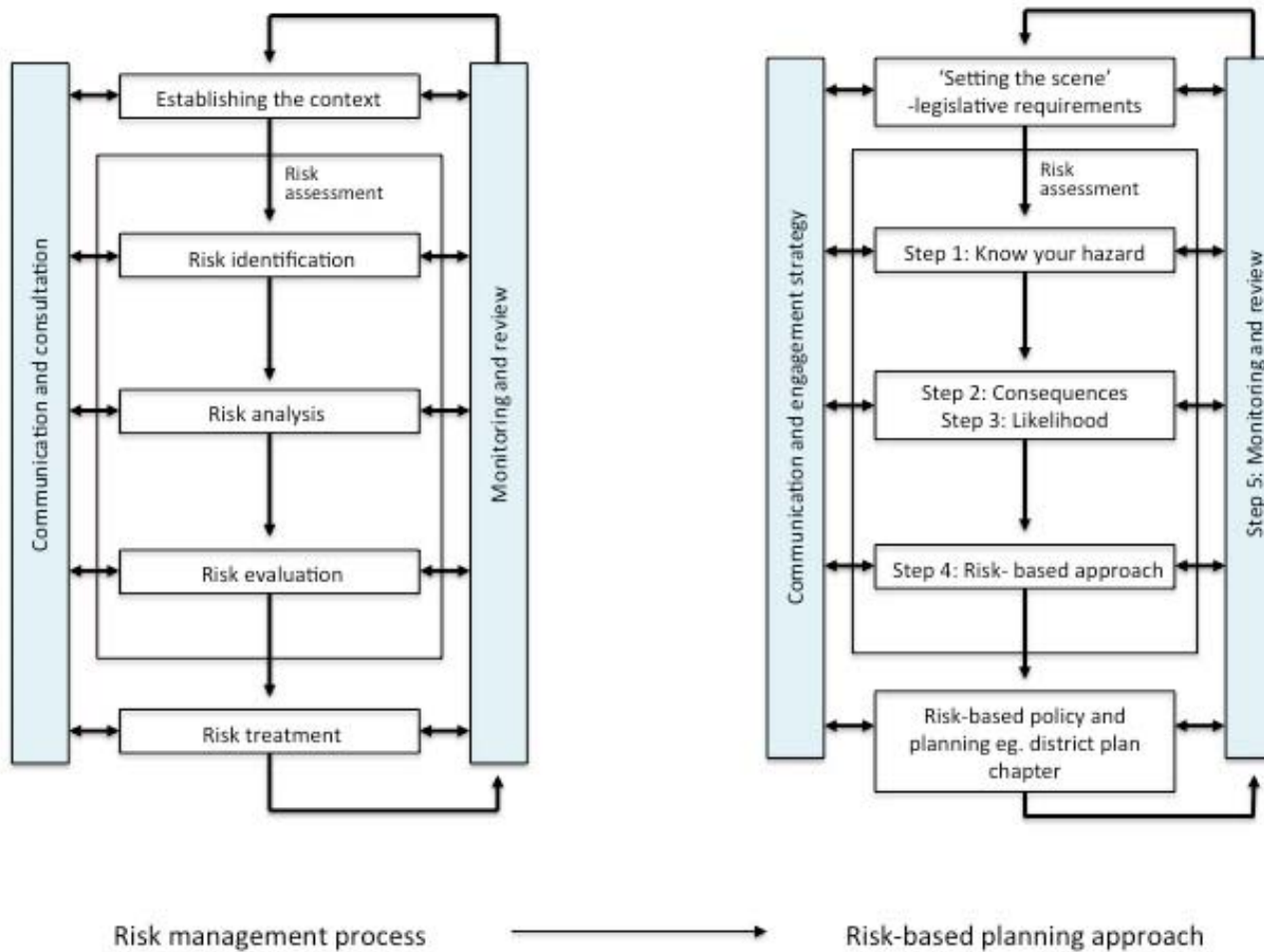
What is risk-based planning?

- Based on international risk management framework
- Consistency between governance, buildings, land use
- Decisions based on *risk* rather than hazard
- Risk = consequence x likelihood
- *Smarter* development NOT necessarily *no* development

The approach – a five step process

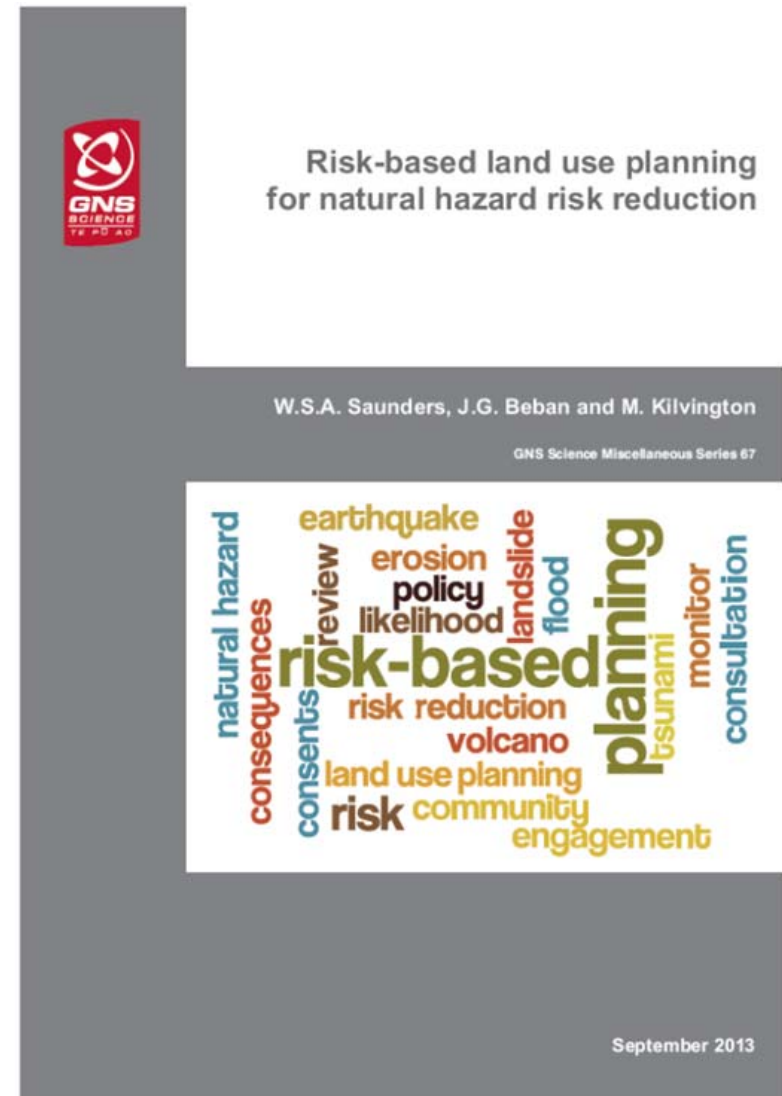
- 1. Know your hazard**
 - 2. Determine severity of consequences**
 - 3. Evaluate likelihood of event**
 - 4. Risk-based approach to policy and resource consents**
 - 5. Monitoring & Evaluation**
- Communication & engagement linked to each stage**

Relationship to risk management process



Step 1: Know your hazard

- Will inform policy, sets a baseline level of risk



Step 2: Determine consequences

Severity of Impact	Built				Economic	Health & Safety
	Social/Cultural	Buildings	Critical Buildings	Lifelines		
Catastrophic (V)	≥25% of buildings of social/cultural significance within hazard zone have functionality compromised	≥50% of affected buildings within hazard zone have functionality compromised	≥25% of critical facilities within hazard zone have functionality compromised	Out of service for > 1 month (affecting ≥20% of the town/city population) OR suburbs out of service for > 6 months (affecting < 20% of the town/city population)	> 10% of regional GDP	> 101 dead and/or > 1000 injured
Major (IV)	11-24% of buildings of social/cultural significance within hazard zone have functionality compromised	21-49% of buildings within hazard zone have functionality compromised	11-24% of buildings within hazard zone have functionality compromised	Out of service for 1 week – 1 month (affecting ≥20% of the town/city population) OR suburbs out of service for 6 weeks – 6 months (affecting < 20% of the town/city population people)	1-9.99% of regional GDP	11 – 100 dead and/or 101 – 1000 injured
Moderate (III)	6-10% of buildings of social/cultural significance within hazard zone have functionality compromised	11-20% of buildings within hazard zone have functionality compromised	6-10% of buildings within hazard zone have functionality compromised	Out of service for 1 day to 1 week (affecting ≥20% of the town/city population people) OR suburbs out of service for 1 week to 6 weeks (affecting < 20% of the town/city population)	0.1-0.99% of regional GDP	2 – 10 dead and/or 11 – 100 injured
Minor (II)	1-5% of buildings of social/cultural significance within hazard zone have functionality compromised	2-10% of buildings within hazard zone have functionality compromised	1-5% of buildings within hazard zone have functionality compromised	Out of service for 2 hours to 1 day (affecting ≥20% of the town/city population) OR suburbs out of service for 1 day to 1 week (affecting < 20% of the town/city population)	0.01-0.09% of regional GDP	<= 1 dead and/or 1 – 10 injured
Insignificant (I)	No buildings of social/cultural significance within hazard zone have functionality compromised	< 1% of affected buildings within hazard zone have functionality compromised	No damage within hazard zone, fully functional	Out of service for up to 2 hours (affecting ≥20% of the town/city population) OR suburbs out of service for up to 1 day (affecting < 20% of the town/city population)	<0.01% of regional GDP	No dead No injured

Step 3: Evaluate likelihood

Level	Descriptor	Description	Indicative frequency
5	Likely	The event may occur several times in your lifetime	Up to once every 50 years
4	Possible	The event might occur once in your lifetime	Once every 51 – 100 years
3	Unlikely	The event does occur somewhere from time to time	Once every 101 - 1000 years
2	Rare	Possible but not expected to occur except in exceptional circumstances	Once every 1001 – 2,500 years
1	Very rare	Conceivable but highly unlikely to occur	2,501 years plus

Step 4: Determining levels of risk

Likelihood	Consequences				
	1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

Risk	Level of risk	Consent
1-4	Acceptable	Permitted
5-9	Acceptable	Controlled
10-14	Tolerable	Restricted Discretionary
15-19	Tolerable	Discretionary
20-25	Intolerable	Non complying, prohibited

Step 5: Monitor & review

- Evaluate risk reduction effectiveness
 - Policies
 - Consents
- Evaluate acceptance of control options, residual risks & long term outcomes



Toolbox available



Home / RBP / Risk based planning / A toolbox

Risk based planning

A toolbox

- Project background
- Setting the Scene
- Risk-based planning approach and steps
- Examples
- Assumptions, limitations and uncertainties
- Site map
- Feedback

A toolbox for risk based land use planning for natural hazards

This toolbox aims to support risk-based land use policy and plan development in local government. It offers a new approach where consequences of natural hazard events are the focus. It presents techniques, practice steps and options for enabling local government to review multiple natural hazard risks, both within councils and with external stakeholders.

The toolbox is presented in three key themes:

- setting the scene for why this approach is important;
- the five step risk based approach for natural hazards and;
- examples of implementation.

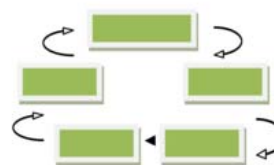
This toolbox is offered as a resource and guide, and is not intended as a prescription or as an off-the-shelf solution to successful management of natural hazards.

Setting the Scene



Why this approach is important, general information and principles of engagement

Risk based approach



Steps and actions of each phase of the approach

Examples



Implementation examples

- [Site Index](#) – a full index of the guide
- [What this toolbox does and does not do](#) – the limitations and assumptions of the approach
- Full report can be downloaded here - [MS67_Riskbased_planning_report.pdf](#) 3.32 MB
- [About the project](#) – background to the project and developers
- [Feedback](#) – this toolbox will continue to evolve, so let us know what you think, or your experience of using the toolbox

<http://www.gns.cri.nz/Home/RBP/Risk-based-planning/A-toolbox>

Bay of Plenty community engagement

- **Contributing to policy decision around ‘acceptable risk’**
- **Iwi, lifelines, community stakeholders, hazard experts**
- **Scenarios based on consequences and likelihood**
- **Deliberative decision making process to reconcile differences between levels of risk**

Summary

- Risk based approach is about SMART development, not NO development
- Based on international best practice
- Measureable outcomes
- Engagement process at each step
- Online toolbox
 - no silver bullet but best available knowledge based on expert opinion

Contact: w.saunders@gns.cri.nz