

# Natural Hazards

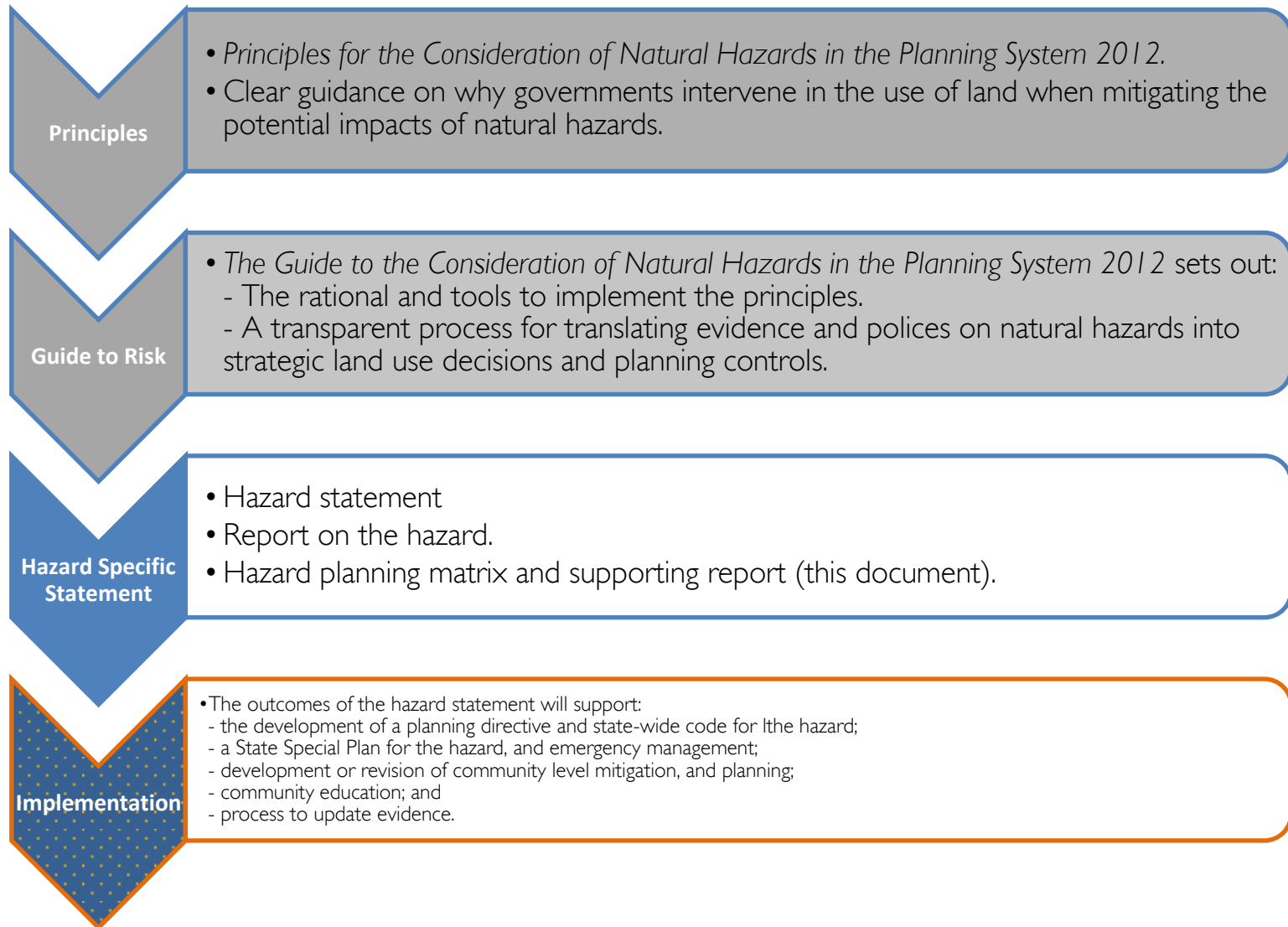
## Mitigating the Impact of Natural Hazards through Land Use Planning

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# Agenda

10 am – 11 am	Project overview
11 am – 12.30 pm	Landslide planning matrix
12.30 pm – 1 pm	Lunch
1pm – 1.30 pm	Minister for Climate Change announcement on the Sea Level Rise
1 pm – 3 pm	Coastal inundation

# Framework for the mitigation of natural hazards in the planning system



## WHY PLAN FOR NATURAL HAZARDS - PRINCIPLES

1. Private risks associated with natural hazards are the responsibility of individuals and business.
- 2. Governments should encourage public and private risks to be factored into investment decisions.**
3. Governments can support individuals to understand and manage private risks through the collection of evidence, provision of information, and facilitation of collective action.
- 4. Governments should ensure that private investment minimises unacceptable public risk.**
5. Governments should minimise investment, regulation, zoning, or policy that gives rise to unacceptable public or private risks.
- 6. Government should have regard to, and support individuals or business to consider how relevant risks may change in to the future, including through climate change.**

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## Risk based planning - An overview

Regulation of land through land use plans is about **future**; hazard events, land use and development – it does not address our existing exposure to the hazard.

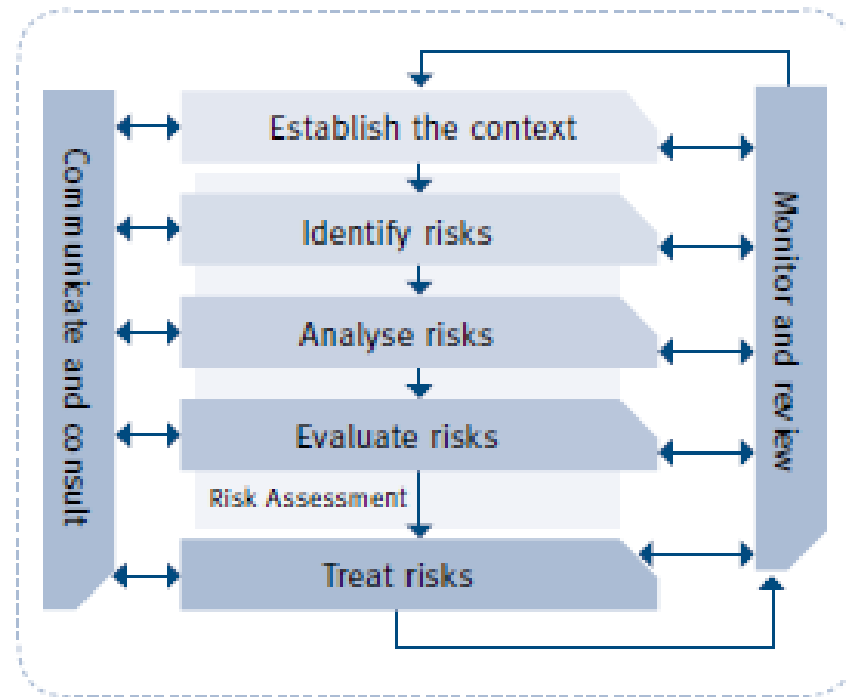
**Risk = Likelihood and Consequence**

**Likelihood = How often do hazard events occur?**

(Evidence or Proxy)

**Consequence = What will be the impact?**

(Evidence or 'Use and development importance by design working life')



# Implementing risk based planning?

Do we have enough information to calculate risk for each hazard - summary table of test below

"Risk" Approach	Available information	Examples of outcomes and tasks
Risk assessment	Written definition of the hazard Hazard susceptibility Event magnitude and likelihood Consequence identified for use and developments High level of certainty	Risk based zoning and banding within zones with a banding in a zone guiding different types of use. Risk based consents Use classes for different levels of risk
Precautionary	Written definition of the hazard Hazard susceptibility Lack of information to calculate risk Greater levels of uncertainty	As low as reasonably possible (ALARP) and emergency management Use classes for different levels of risk
<b>Hazard Treatment</b>	Mix of above – based on the best available information	Consultation, public participating in developing policy, conflict resolution, assumptions of likelihood and consequence
Emergency Response	Little or no knowledge of the hazard, high levels of uncertainty	Emergency response / recovery / insurance

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## Guide – The Context:

*“a legitimate role of governments is to protect public value by making judgements regarding risk, even in the absence of detailed risk information.”*

*“measures can be developed through active engagement with stakeholders to ensure that they reflect community attitudes towards risk and tolerance to risks” (Pge 4)*

# Likelihood:

## Three approaches to assessing likelihood:

- **Modelled Event** (eg. flood) – ARI or AEP
  - Trigger event is known and link to hazard is predictable
- **Areas of Hazard Susceptibility** (eg. landslide) - zones
  - Preconditions for a hazard event are reasonably well known but links between the trigger and event are difficult to generally predict.
- **Exposure to a reference event** (eg. fire) – dynamically defined hazard areas
  - Used when preconditions for a hazard event are either not known or dynamic.

# Consequence:

*“policy judgements regarding how to **assume consequence** for the purposes of assessing the appropriate use of land through the land use planning system”.*

- May be assumed for low level hazards
- Assessed on a site basis for areas of significant exposure to hazards of high magnitude
- Stepped application of the precautionary principle

## Risk Tolerance:

***Acceptable risk*** (or negligible risk), as defined by the Australian Geomechanics Society (AGS), is ...*a risk, for the purposes of life or work, society is prepared to accept as it is with no regards to its management. Society does not generally consider expenditure in further reducing such risks justifiable.*

## Risk Tolerance:

*Intolerable risks* are those risks that are considered unreasonable having regard to the likely costs to the public and to the individual. Theoretically, **everywhere outside of areas of acceptable risk are areas of intolerable risk.**

## Risk Tolerance:

**Tolerable risk** is *...a risk within a range that society can live with so as to secure certain net benefits. It is a range of risk regarded as non-negligible and needing to be kept under review and reduced further if possible (AGS: 2007)*

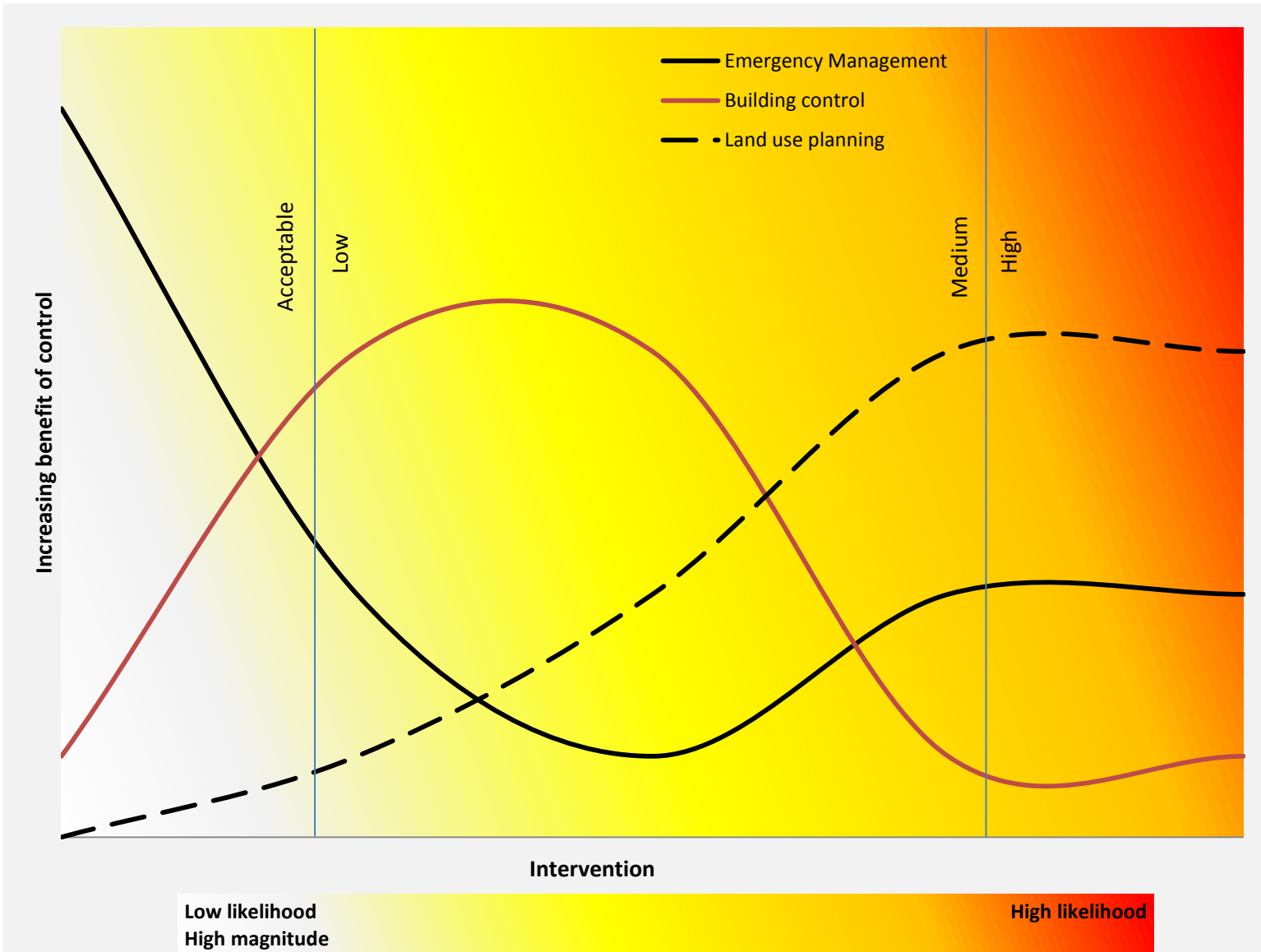
# Risk Tolerance: tolerable v intolerable

Defined through engagement with stakeholders.

Can be quantified only in some instances. Policy judgements in others.

Core role of Governments to make these judgements on behalf of the community

# Balancing the Private (principle 1) and Public (principle 4) Risk





# Hazard Bands (Likelihood)

## Acceptable

- hazard does not apply at all to the area, or with such low frequency as not to be considered as a matter that needs to be addressed.

## Low

- frequency is low enough, or the magnitude when it does occur is low enough, that it might be experienced by a significant portion of the community without concern.

# Hazard Bands (Likelihood)

## Medium

- likelihood is such that when it does occur the impact could be regarded as significant.

## High

- frequent or severe in that it creates the conditions not normally considered as being manageable or tolerable without exceptional measures.

# Hazard Bands (Likelihood) - Boundaries

- **Acceptable to low:** point at which risks can no longer be managed solely through non-planning measures.
- **Low to medium:** point at which development controls (e.g. siting and building controls) are not adequate to mitigate risks.
- **Medium to high:** point at which it can be presumed that use and development should not be located in the area.

# Using Hazard Bands to Guide Use and Development control – hazard

- **Control Level**
  - See example consequence statements, what is the balance between emergency management, land use planning, and building control
- **Strategic Planning Level**
  - Should the area be avoided through settlement planning, zoning or regional strategies
- **Use or Development Controls**
  - Direct guidance for acceptable solutions or performance criteria in a code
  - Life controls on use and developments?