A
National Risk Assessment Framework for Sudden Onset Natural Hazards

Draft prepared for the Australian Emergency Management Committee

9 August 2006

CONTENTS

1. INTRODUCTION

The 2002 report to the Council of Australian Governments (COAG) 'Natural disasters in Australia: Reforming mitigation, relief and recovery arrangements' advocated a 'fundamental shift in focus towards cost-effective, evidence-based disaster mitigation'. The report stated that in Australia there was a 'lack of independent and comprehensive systematic natural disaster risk assessments, and natural disaster data and analysis.' One key solution proposed to address this gap in our knowledge is outlined in Reform Commitment 1 in the report: 'Develop and implement a five-year national programme of systematic and rigorous disaster risk assessments'.

This framework is designed to improve our collective knowledge about natural hazard risk in Australia to support emergency risk management and natural hazard mitigation. The natural hazards covered are those defined in the report to COAG: bushfire, earthquake, flood, storm, cyclone, storm surge, landslide, tsunami, meteorite strike and tornado. Many events have demonstrated that the importance of natural hazards does not lie simply in the generation and passage of events such as severe storms or floods, but in the wide-reaching and profound impacts that these events can have on communities. *Risk*[1] is defined as:

> A concept to describe the likelihood of harmful consequences arising from the interaction of hazards, communities and the environment.

This framework focuses on *risk assessment* for sudden onset natural hazards to underpin natural hazard *risk management* and natural hazard *mitigation*. The framework does not focus on risk management or mitigation, although its outcomes support and benefit these.

The framework covers the following risks arising from natural hazards: *financial, socio-economic, casualty, political and environmental risk*. Each of these risks contributes to the overall impacts of natural hazards on communities.

This framework is aimed foremost at those who seek an improved evidence base for risk management of natural hazards, in all levels of government. The framework is also intended for risk assessment practitioners, researchers and information managers.

The primary driver of the framework is the need to develop an improved evidence base for effective risk management decisions on natural hazards. Developing this improved evidence base will also deliver on COAG Reform Commitment 1. Other key drivers include:

- Cooperative approaches across all levels of government to managing natural hazards;
- A consistent approach to natural hazard risk assessment;
- Risk management for cross-jurisdictional and catastrophic disasters;
- The potential impacts of climate change from possible changes in the frequency or severity of weather related natural hazards;
- Increasing exposure of populations to natural hazards through demographic change and increases in personal assets.

[1] Key terms (in italics) are defined in Annexe 5.3.

2. GOALS

The main goal for the National Risk Assessment Framework is:

- To support the development of an evidence base for effective risk management decisions, thereby delivering the outcomes sought in Reform Commitment 1 of the report to COAG 'Natural Disasters in Australia'.

Three other goals are linked to this main goal. These are:

- To improve outcomes by improving the value of the risk information that we produce. This can be achieved by improving methods, and employing minimum levels of acceptance for methods and deliverables;
- To support the objectives of risk management through development of tools, guidelines and databases that assists all stakeholders to conduct risk assessments; and
- To foster the development of systems for coordinating, sharing, aggregating, and making available consistent information on risk that is essential to support risk management decisions.

3. CURRENT STATE OF PLAY

Federal, State, Territory and Local Governments already have in place many risk assessment processes and knowledge bases that assist emergency managers to manage the risk posed by natural hazards. Examples of guidelines, policies, legislation, communication and sharing arrangements, databases and decision support tools are found in many jurisdictions. These risk assessment processes are the basis of current natural hazard risk management in Australia. Therefore, this framework builds on a significant and widespread base of risk assessment activity, utilising decision support tools and guidelines, already underway in all levels of government.

However, all levels of government also recognise that there has been no previous, singular approach and the many approaches taken have often seen risks assessed at local government level in different ways, so that it is difficult to compare risks from one local area to those in another, or from one hazard to another. It also becomes difficult to aggregate this information on risk to a regional, State/Territory or national scale in order to allocate resources more equitably. A gap analysis of the extensive current practice and knowledge is an initial step in the implementation of this framework (see Annexe 5.1).

The management of natural hazards by all levels of government in Australia will benefit from an improved, coordinated approach to risk assessment with a redefined context of shared principles, consistent government arrangements, systematic information and a forum for discussion. The approach is based on the broadly acceptable methodology in the Australian/New Zealand Risk Management Standard AS/NZS 4360: 2004. The framework is developed from this recognition and a shared commitment to addressing the COAG recommendations on natural hazards.

This framework will lead to a broader and more systematic approach to risk assessment that explicitly involves all levels of government (Australian, State, Territory and Local) and which has the aims of improving risk management outcomes. The steps to implement this process are described in Annexe 5.1.

4. ESTABLISHING THE FRAMEWORK

Three priority areas that build on current stakeholder activities are identified for action to achieve the goals of this framework. These are (4.1) roles in the framework, with an emphasis on governance, reporting and review structures, (4.2) consistent and systematic production of baseline information on risk and improvement of risk assessment methods and tools, and (4.3) managing and accessing information on risk.

4.1 ROLES IN THE FRAMEWORK

The main roles and relationships of government agencies and committees in this framework are set out in Figure 1. A small number of national committees and Advisory Groups have key roles in overseeing the implementation of the framework and advising on national priorities. The Advisory Groups are responsible for consulting with their jurisdictions on priorities under the framework. Significant communication within jurisdictions, and between State/Territory and Local Governments, on setting priorities and reporting on outcomes, is an essential process in the framework. A single Advisory Group has the role of reporting progress and priorities to the Australian Emergency Management Committee (AEMC).

A new committee based on jurisdictional representation, the National Risk Assessment Advisory Group (NRAAG), will be responsible to oversee the implementation of the framework and the production of a new information base on risk, and reporting to AEMC. The jurisdictional base of this group enables many risk assessment priorities to be agreed by those who require the information. The Technical Risk Assessment Advisory Committee (TRAAC) will provide key technical support to NRAAG in implementing the framework. TRAAC will provide expert hazard-specific advice on addressing gaps in knowledge and method development. TRAAC will also provide advice on employing new information on risk to assist mitigation through land use planning, insurance and building codes.

The National Information Management Advisory Group (NIMAG) will play the leading role in advising and guiding NRAAG and TRAAC on managing and accessing information on risk.

NRAAG, supported by others, including TRAAC, NIMAG, the National Flood Risk Advisory Group (NFRAG) and the jurisdictions, will also play a pivotal role in the first year of the framework to identify knowledge and resource gaps and solutions to address those gaps.

Regular monitoring of the framework, review, evaluating performance and reporting progress are essential steps in maintaining and improving the framework. NRAAG, supported by TRAAC, will play the central role in reporting progress to AEMC.

Non-government organisations also play important roles in the framework. Their roles include:

Private sector (e.g., insurance industry, consultants)

- Sharing methods, information on risk and supporting data;
- Collaborating on projects;

Peak industry bodies (e.g., Australian Building Codes Board (ABCB), Planning Institute of Australia (PIA), Engineers Australia)

- Developing awareness in members;
- Fostering appropriate practice;

Other researchers (e.g., Bushfire Cooperative Research Centre, universities)

- Undertaking research compatible with the national risk assessment framework to progress framework goals.

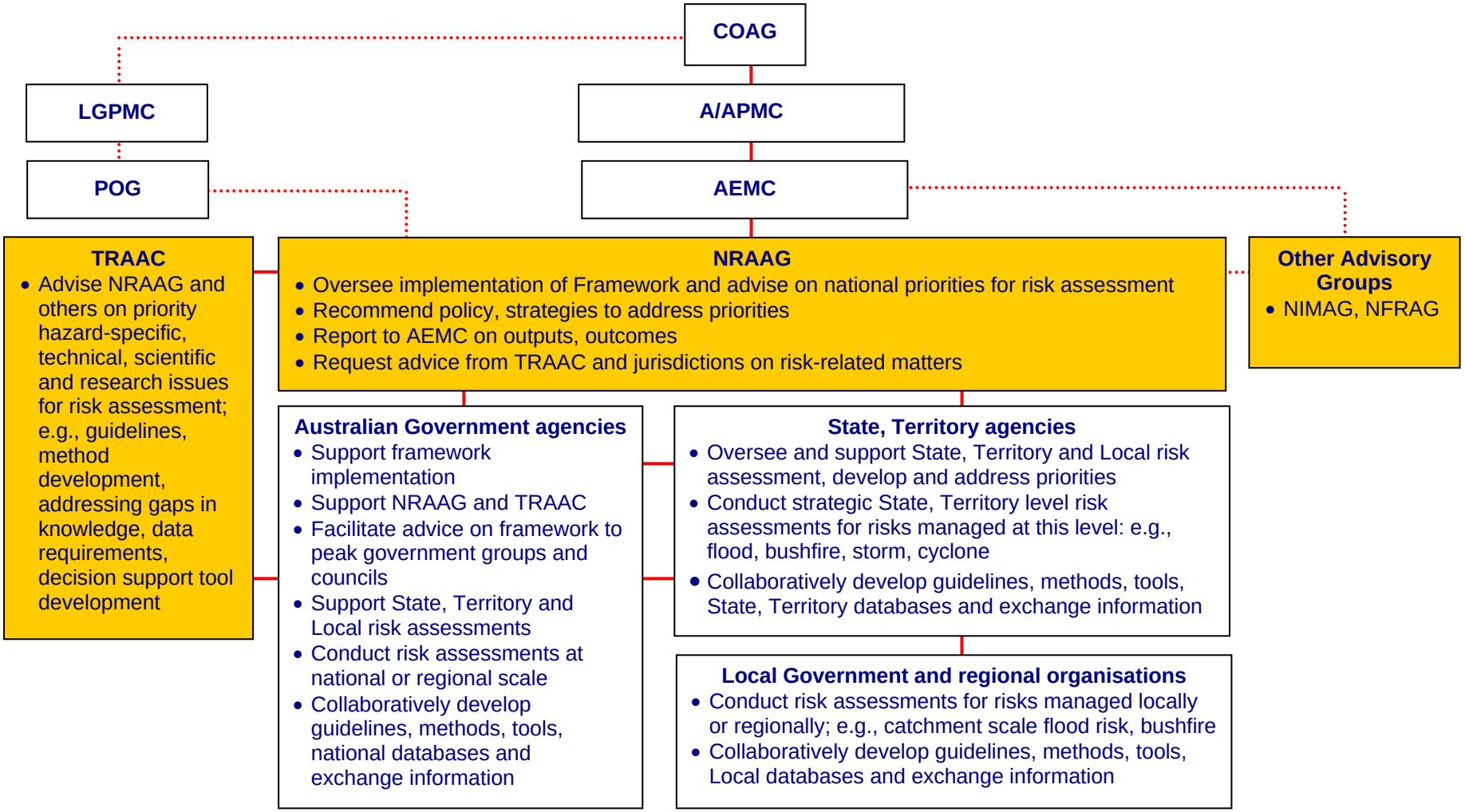

Figure 1: Main governance roles in National Risk Assessment Framework. Key advisory groups are shaded.

4.2 PRODUCING BASELINE INFORMATION AND IMPROVING RISK ASSESSMENT METHODS

Government, research and industry organisations undertake natural hazard risk assessments at different scales and for different purposes. Therefore, this framework is flexible in its application, and it accommodates the priorities of the jurisdictions and organisations involved, and differences in purpose, timelines, available capacity, scale of risk involved and the ability to treat the risk.

A consistency of approach underlies this flexibility to ensure an improved national evidence base of natural hazard risk in Australia is produced. Risk assessment methods are based on, and expanded from, the broadly acceptable methodology in AS/NZS 4360: 2004. The component steps of the risk management process in AS/NZS 4360 particularly relevant to this framework are:

- Establish the context;
- Identify risks;
- Analyse risks; and
- Evaluate risks.

Producing Baseline Information

The goals of this framework will be achieved through producing qualitative and quantitative information on risk and making this information accessible to all stakeholders. Essential supporting data will also be produced more systematically through this framework to assist risk assessments and improve risk assessment methods and tools. Examples of relevant supporting data could include hazard maps, community exposure databases and data on the costs of previous natural hazard events.

Some principles apply in producing baseline information on risk, centred on *best available and fit for purpose methods*. These principles include:

- Optimal results can be produced within time frames that are acceptable to decision and policy makers by employing, where appropriate, local knowledge and risk analysis methods that adopt, or expand on, best available methods; and
- Some risks, such as financial risks from direct damage to building stock, are at present easier to quantify than other risks, such as the risk of long-term trauma to individuals or communities, and so the best available methods may therefore employ techniques of differing levels of complexity.

The starting point for producing baseline information on risk in this framework is to explicitly define the required priority information. This requirement will be defined in the first year of implementing the framework. Performance indicators that measure success of the framework will also be developed at this stage.

The Emergency Management Information Development Plan (EMIDP) will assist in defining the baseline information required in this framework[2]. For example, some priority areas identified by EMIDP are relevant to the goals of the framework:

[2] EMIDP identified some of the high priority information needs of emergency managers. The Information Development Plan was prepared by a national working group in 2004-06, chaired by the Australian Bureau of Statistics (ABS).

- Understanding the full impact of costs (economic, social and environmental) of emergencies;
- Information on specific hazards ('Better understanding of the risks and vulnerabilities of Australian communities to specific hazards such as cyclones, storm tides/storm surges, severe winds and floods').

Other important steps to be taken in the first year of the framework are to assess knowledge gaps and prepare prioritised strategies to increase our knowledge. This assessment will also identify resources that are required to address the priorities. This process will be revisited annually to maintain focus on priority areas looking forward at least one year.

A report on natural hazards in Australia that will assist the gap analysis is being prepared, facilitated by Geoscience Australia (GA). This report is an overview of our current knowledge of hazards that are eligible under the Natural Disaster Relief Arrangements (NDRA). The report also provides summary reviews of current risk assessment practices, and roles and responsibilities for assessing and managing each hazard.

The production of consistent baseline information on risk will be assisted by risk assessment guidelines that will be prepared as a part of establishing the framework. The guidelines will focus on successful development of consistent information on risk, i.e., outcomes.

The guidelines will contain advice on choosing an appropriate level of risk assessment in a tiered system, based on the scale of the identified risk, timeliness, availability of resources, methods and supporting data, and capability to improve treatment of the risk. The guidelines will refer to existing best practice hazard-based guidelines where appropriate.

Improving Risk Assessment Methods

Some principles apply in improving risk assessment methods, based around *improving methods and sharing.* These include:

- All stakeholders will benefit from improved methods, and access to use these improved methods where this is appropriate and achievable;
- Sharing and validating methods is a key process in method improvement;
- Identifying *residual risk* under existing controls is important for evaluating risk, as is cost-benefit analysis or other analysis to evaluate risk treatment options. Developing and applying methods that can be used for these purposes is a priority.

Analysing gaps in risk assessment methods, and forming strategies to improve these methods through prioritised action, will be taken in the first year of the framework. The report on natural hazards in Australia will assist the gap analysis. This process will be revisited annually to maintain focus on priority areas looking forward at least one year.

The development and application of decision support tools by research, non-government and government organisations will benefit from this framework. Improved decision support tools can take years and significant resources to develop. The framework provides a focus for taking consistent approaches, producing comparable information on risk, and employing information systems for access to tools and data.

NRAAG will play a central role in advising on priorities for improving methods and decision support tools and considering associated resource implications. TRAAC will play a key role in supporting NRAAG in this task.

4.3 MANAGING AND ACCESSING INFORMATION ON RISK

Some principles apply in managing and accessing information on risk. These include:

- A broad-based national awareness and understanding of natural hazard risk will be enhanced by sharing information on risk and making it publicly available where possible;
- Stakeholders will benefit from effective information management through disseminating their own information and gaining access to the information and decision support tools of others; and
- Stronger collaboration between information managers and risk assessment researchers and practitioners will improve systems for coordinating, sharing, aggregating and making consistent information on risk available.

Achieving the goals of this framework requires successful information management. Relevant information management issues include those listed below. Here, the term 'data' refers to information on risk and supporting data:

- Priorities for data collection – purpose for data use, cost (collection, storage, access, analysis, quality control), benefit versus cost in terms of real impacts on risk management outcomes;
- Identifying and developing data sources;
- Custodianship of data - maintenance of data, authority, 'single point of truth', intellectual property;
- Access to data – metadata, 'discoverability' of data, licensing; and
- Interoperability - presentation of data, functionality of decision support tools, standards and sharing.

A strategy to manage information on risk and supporting data, and make them accessible, will be prepared in the first year of establishing the framework. NIMAG will play the leading role in advising and guiding NRAAG on preparing this strategy. NRAAG will prepare the strategy with input from TRAAC, NIMAG and NFRAG.

The strategy will consider information management issues such as those above and provide recommendations which, wherever possible, seek to employ existing infrastructure, institutions, programs, databases, standards and guidelines. The strategy will also contain recommendations on resource implications. It will be reviewed periodically.

5. ANNEXE

5.1 DRAFT IMPLEMENTATION PLAN

		1-year target (mid 2007)	2-year target (mid 2008)	5-year target (mid 2011)
PRIORITY AREA			**This date marks the end of DMAP**	**This date marks the end of the 3rd year of any program replacing DMAP**
Outcome: Roles in the Framework established				
	5.1.1 Agreement reached to implement National Risk Assessment Framework • This outcome triggers the implementation of the framework.	• National Risk Assessment Framework (scope, goals, draft implementation plan), Terms of Reference for NRAAG endorsed by AEMC. (Dec 2006). • Lead agency AEMC.		
	5.1.2 Advisory bodies established • National Risk Assessment Advisory Group (NRAAG) has been operating as a Working Group and will be formally established with endorsement from AEMC (Dec 2006). The Terms of Reference for NRAAG have been prepared. • Technical Risk Assessment Advisory Committee (TRAAC) was established in December 2004. The Terms of Reference for TRAAC will be modified to reflect key technical role supporting NRAAG.	• Roles will be formally established with endorsement from AEMC (Dec 2006). • Revised TRAAC TOR agreed (Jun 2007). • Lead agency AEMC, supported by NRAAG and TRAAC.	• NRAAG and TRAAC membership, Terms of Reference and work program reviewed annually, reported to AEMC and amended as required.	• NRAAG and TRAAC membership, Terms of Reference and work program reviewed annually, reported to AEMC and amended as required.

		1-year target (mid 2007)	2-year target (mid 2008)	5-year target (mid 2011)
	5.1.3 Framework significance maintained through monitoring, performance evaluation and revision • This essential annual step is required to measure success against performance indicators. The framework can be adjusted to accommodate changes in drivers, for example from emerging needs.	• Key recommendations on future priorities and resource requirements prepared. • Criteria for success of framework established. • Performance Indicators to measure progress against these criteria developed. • 1-year progress reported to AEMC. Report includes definitions of criteria for success, performance indicators and required information on risk, and strategy for managing and accessing information. • Lead agency NRAAG supported by TRAAC, NFRAG, NIMAG, DOTARS, EMA, GA, BOM and jurisdictions.	• Annual evaluation reported to AEMC. • Key recommendations on future priorities and resource requirements included. • Framework modified as necessary to meet new developments.	• Annual evaluation reported to AEMC. • Key recommendations on future priorities and resource requirements included. • Framework modified as necessary to meet new developments.
PRIORITY AREA				
Outcome: Risk assessment methods developed and baseline information produced				
	5.1.4 Essential information on risk required for decision making defined • Defining the required information on risk establishes success criteria for the framework: e.g., 'what do we want to achieve in managing risk, and what do we need to know about risk to achieve this?'	• Essential information on likelihood, consequence, uncertainty defined for the types of risk addressed by the framework. The Risk Assessment Guidelines (see 5.1.6) will describe outcomes-based processes that develop information to meet these needs. • Lead agency NRAAG supported by TRAAC, NIMAG, NFRAG.	• Essential target information reviewed and modified as required.	• Essential target information reviewed and modified as required.

		1-year target (mid 2007)	2-year target (mid 2008)	5-year target (mid 2011)
	5.1.5 A picture of natural hazards across Australia developed • We need to take stock of what we already know about natural hazards across Australia to assist in defining current knowledge gaps on the risks from these hazards. • A multi-hazard document is being prepared that will meet this need and will bring together our understanding of natural hazards across Australia. The document will provide a new, central source of information on natural hazards across Australia for policy makers and risk management practitioners. • The document will assist priority setting for method development and information development. The document is a collaborative production, facilitated by GA.	• The first step in developing the document was to bring together knowledge for each of the natural hazards outlined in the COAG review. A draft of the report was completed in June 2006. • The second step is to consult with a wide stakeholder base, including AEMC member jurisdictions, in hazard and emergency management, planning, risk research and information management on content and conclusions prior to publication. • Document published May 2007. • Lead agency GA supported by BOM, Bushfire CRC, CSIRO, TRAAC, NRAAG, NFRAG.		
	5.1.6 Risk Assessment Guidelines developed • Risk assessment guidelines will assist practitioners at all levels of government to undertake risk assessments that support the National Risk Assessment Framework. The guidelines will be focussed on production of consistent and improved information on risk, i.e., outcomes. • The guidelines extend the relevant risk assessment components of the processes outlined in AS/NZS 4360:2004 and EMA's Emergency Risk Management Applications Guide.	• Risk Assessment Guidelines scoped and existing best practice hazard-specific guidelines identified. • Lead agency NRAAG supported by TRAAC, NFRAG, GA, EMA, peak industry and research organisations, NIMAG.	• Broad stakeholder comment sought and considered. • Draft guidelines produced (Jun 2008). • Guidelines published in 2008-09.	• Guidelines modified as required based on evaluation of their effectiveness and availability of new methods, data and decision support tools.

		1-year target (mid 2007)	2-year target (mid 2008)	5-year target (mid 2011)
	5.1.7 Knowledge gaps defined and priorities identified • This is an important, iterative process to improve our knowledge of risk by defining knowledge gaps, managing these gaps and consolidating the information gained. • This process will identify resource needs several years into the future and outline strategies to obtain those resources.	• Initial definition of knowledge gaps in 2006-07. The results from gap analysis at jurisdiction level will be brought to NRAAG by State and Territory delegates. • Lead agency NRAAG supported by TRAAC, NFRAG, NIMAG.	• Later iterations to define knowledge gaps performed in order to plan managing knowledge gaps for one or more years in advance.	• Later iterations to define knowledge gaps performed in order to plan managing knowledge gaps for one or more years in advance.
	5.1.8 Knowledge gaps managed • This will be achieved by developing and implementing annual workplans, with progress measured against performance indicators. • The accumulating evidence base contains information at a resolution or 'granularity' that serves all levels of government, as required.	• First annual work plan developed, based on current priorities. • Lead agency NRAAG supported by TRAAC, NFRAG, NIMAG.	• Workplans will be developed each year concurrent with an assessment of priorities (Mar 2007).	• Workplans will be developed each year concurrent with an assessment of priorities (Mar 2011).
	5.1.9 Decision support tools for risk assessment developed • This will occur incrementally according to the priorities set in the 'Define knowledge gaps' and 'Manage knowledge gaps' process of this framework.	• Lead agency NRAAG supported by TRAAC, NFRAG, NIMAG, GA, BOM, CSIRO, States, Territories, non government.	• Ongoing.	• Ongoing.

		1-year target (mid 2007)	2-year target (mid 2008)	5-year target (mid 2011)
PRIORITY AREA				
Outcome: Information on risk managed and accessible				
	5.1.10 Strategy developed for managing information on risk and making it accessible Criteria for success of this outcome include: • the capability for any government to contribute its own information on risk and supporting data, and gain access to the information and supporting data of others, • the capability for any government to consolidate information on risk from its own jurisdiction, for example from several assessments spanning locations and different hazards, and • the capability for any State or the Australian Government to consolidate information on risk from numerous smaller jurisdictions.	• Draft strategy prepared for managing information on risk and making it available. This will set out how this will be achieved, roles, resource implications, a timetable for implementation, Information Management solutions, IT requirements and specific skills required. • Lead agency NIMAG supported by NRAAG, TRAAC, NFRAG.		
	5.1.11 National evidence base developed through managing, sharing and consolidating information	• Status of current evidence base, systems and protocols assessed in strategy preparation. • Lead agency NRAAG supported by NIMAG, TRAAC, NFRAG.	• Strategy implemented. Effectiveness of strategy reviewed in evaluation process.	• Strategy implemented. Effectiveness of strategy reviewed in evaluation process.
	5.1.12 Risk management stakeholders engaged through communications strategy • Engagement of stakeholders improves the effectiveness of the framework by providing a dialogue on framework goals, progress and availability of baseline information, guides and methods.	• Communications strategy drafted and implementation begun. • Lead agency NRAAG supported by NIMAG, TRAAC, NFRAG, peak industry bodies.	• Strategy implemented and reviewed as required.	• Strategy implemented and reviewed as required.

5.2 LIST OF ACRONYMS

A/APMC	Augmented Australasian Police Ministers' Council
ABCB	Australian Building Codes Board
ABS	Australian Bureau of Statistics
AEMC	Australian Emergency Management Committee
AGD	Attorney-General's Department
ALGA	Australian Local Government Association
AS/NZS	Australian / New Zealand Standard
BOM	Bureau of Meteorology
COAG	Council of Australian Governments
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DMAP	Disaster Mitigation Australia Package
DOTARS	Department of Transport of Regional Services
EMA	Emergency Management Australia
EMIDP	Emergency Management Information Development Plan
ERM	Emergency Risk Management
FACS	Family and Community Services
GA	Geoscience Australia
ICA	Insurance Council of Australia
LGPMC	Local Government and Planning Ministers' Council
NCSWG	National Community Safety Working Group
NDRA	Natural Disaster Relief Arrangements
NFRAG	National Flood Risk Advisory Group
NIMAG	National Information Management Advisory Group
NRAAG	National Risk Assessment Advisory Group
PIA	Planning Institute of Australia
PM&C	Prime Minister and Cabinet
POG	Planning Officials Group
PPRR	Prevention, Preparedness, Response and Recovery
TRAAC	Technical Risk Assessment Advisory Committee

5.3 DEFINITIONS

Casualty risk: The likelihood of injury or death from a natural hazard

Emergency risk management: A systematic process that produces a range of measures that contributes to the wellbeing of communities and the environment

Environmental risk: The likelihood of impacts on the natural environment from a natural hazard

Financial risk: The likelihood of loss or gain to an individual or an entity affected by a natural hazard

Hazard: A source of potential harm or a situation with a potential to cause loss

Likelihood: A general description of probability or frequency

Mitigation: Sustained action taken to reduce or eliminate long-term risk to people, property and the environment from hazards and their effects

Political risk: The likelihood of loss or gain to a political individual or entity affected by a natural hazard

Residual risk: Risk remaining after implementation of risk treatment

Risk: A concept used to describe the likelihood of harmful consequences arising from the interaction of hazards, communities and the environment. Risk may be positive or negative but is usually considered adverse in the case of natural hazards

Risk assessment: The process used to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels or other criteria

Risk management: The culture, processes and structures that are directed towards realising potential opportunities whilst managing adverse effects

Risk treatment: The process of selection and implementation of measures to modify risk

Socio-economic risk: The likelihood of monetary and non-monetary loss or gain to society within a defined boundary affected by a natural hazard

Vulnerability: The degree of susceptibility and resilience of the community and environment to natural hazards

5.4 LIST OF CONTACTS

Australian Government

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5.5 BACKGROUND INFORMATION

The Cost of Natural Hazards

Natural hazards are a part of Australia's culture, history and landscape. Flood, cyclone, earthquake, bushfire, landslide and severe storms affect the lives and property of many Australians each year. In 2001, sudden onset natural hazards were estimated to cost the community more than $1.14 billion each year[3]. The risks from natural hazards have the potential to increase significantly in Australia as our population increases, ages and shifts to coastal communities, our reliance on infrastructure increases, and climate change brings a hotter drier climate, higher sea levels and possible changes to the frequency and severity of sudden onset weather events.

The report to the Council of Australian Governments (COAG) *Natural disasters in Australia: Reforming mitigation, relief and recovery arrangements* (High Level Group, 2002) identified a need to change aspects of natural disaster management arrangements at all levels of government. The recommendations cover the broad range of elements that comprise natural disaster management at operational, strategic and policy levels.

In the 5-year period 2000-01 to 2004-05, during and since the years since the report to COAG was prepared, Australian Government expenditure alone on NDRA averaged $72 million per year, and insured costs of disasters averaged around $266 million (Figure 2). These figures are the only robust estimates of economic costs available since 2001. These costs do not include the many additional direct and indirect economic costs to our society which are significant but are largely unknown. Although the insurance costs are punctuated by large-scale disasters, these recent figures indicate that we have not yet contained the impacts of natural hazard events. Our way of life will be improved if we can reduce the impact of natural hazards on the community.

Origins of the National Risk Assessment Framework

The concept of a national approach to risk assessments originated from the 2002 report to COAG on natural disaster reforms.

The Department of Prime Minister and Cabinet (PM&C) informed DOTARS on Christmas Eve 2003 that all states and territories and the Australian Local Government Association had agreed in principle to the Reform Commitments, the 66 Recommendations in the Review and to the proposed machinery for implementation.

PM&C also advised that the Attorney-General's Department (AGD), in consultation with DOTARS, should put into effect arrangements for an augmented Australasian Police Ministers' Council (A/APMC) supported by a reconstituted Australian Emergency Management Committee, to implement the reform commitments and recommendations.

[3] Bureau of Transport Economics, 2001. Economic Costs of Natural Disasters in Australia, Report 103, Commonwealth of Australia.

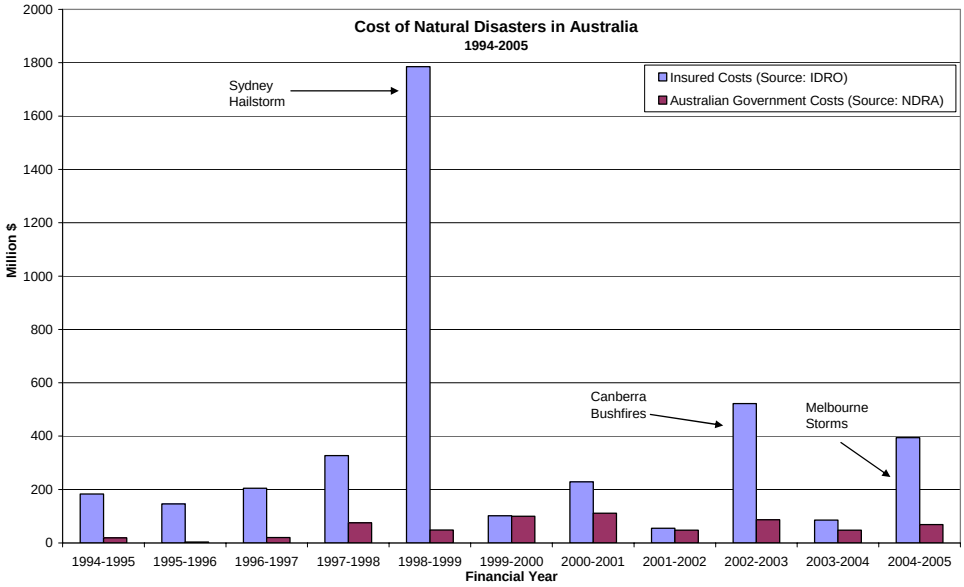

Figure 2: Insured costs of natural disasters, and Australian Government expenditure on Natural Disaster Relief Arrangements, in the 10-year period 1994-95 to 2004-05.

The authors of the report to COAG stated that in Australia there was a:

> 'lack of independent and comprehensive systematic natural disaster risk assessments, and natural disaster data and analysis.'

The solution proposed to this gap in our national knowledge is outlined in Reform Commitment 1 in the report to COAG:

> 'Develop and implement a five-year national programme of systematic and rigorous disaster risk assessments'.

A second national commitment is closely linked to Reform Commitment One and relates to data collection. Reform Commitment Two states:

> 'Establish a nationally consistent system of data collection, research and analysis to ensure a sound knowledge base on natural disasters and disaster mitigation.'

The High Level Group stated that:

> 'Natural disaster management activities should be driven by an active and coordinated national approach to research and development, data collection and analysis, and systematic, widespread risk assessments. The intention is to shift national management arrangements further towards proactivity, from the more reactive approach of the past'

and,

> 'most importantly, a fundamental shift in focus towards cost-effective, evidence-based disaster mitigation. This represents an historic move beyond disaster response and reaction, towards anticipation and mitigation.'

All levels of government allocate resources to disaster mitigation, as a part of their total expenditure on emergency management and planning for natural hazards. It is a goal of this framework to develop an evidence base to demonstrate the effectiveness of expenditure on disaster mitigation. This evidence base can only be built around effective risk assessments that estimate the likelihood and impacts of future events on the community.

In 2004 and 2005, multi-level government workshops were held in all capital cities to address COAG Reform Commitment One and discuss the development of a National Risk Assessment Framework. There was significant consultation over the purpose, content and structure of such a framework, with many different views as to how such an approach should be undertaken. This initial consultation identified the main contacts in each State and Territory who then formed an informal working group to progress COAG Reform Commitment One. TRAAC also provided valuable advice on the framework in 2005-06 and 2006-07.

This framework has evolved out of all of those discussions and is intended to include the aims of all stakeholders. The informal working group proposed a more formal process under AEMC through the establishment of the National Risk Assessment Advisory Group (NRAAG). Implementing a National Risk Assessment Framework will require ongoing discussion among all levels of government, and other stakeholders, and hence this document should be viewed as one step in this evolving process.

Natural hazard risk assessment and the risk management process

Risk assessments form a core part of the risk management process and are a key part of emergency risk management in Australia. Risk assessment fits into the broader risk management process shown in Figure 3. The Australian and New Zealand Standard on Risk Management (AS/NZS 4360:2004) outlines three key aspects of the risk assessment process:

> ***'Identify risk*** – Identify where, when, why and how events could prevent, degrade, delay or enhance the achievement of the objectives.
>
> ***Analyse risk*** – Identify and evaluate existing controls. Determine consequences and likelihood and hence the level of risk. This analysis should consider the range of potential consequences and how these could occur.
>
> ***Evaluate risk*** – Compare estimated levels of risk against the pre-established criteria and consider the balance between potential benefits and adverse outcomes. This enables decisions to be made about the extent and nature of treatments required and about priorities.'[4]

[4] AS/NZS 4360:2004 pp. 7-8

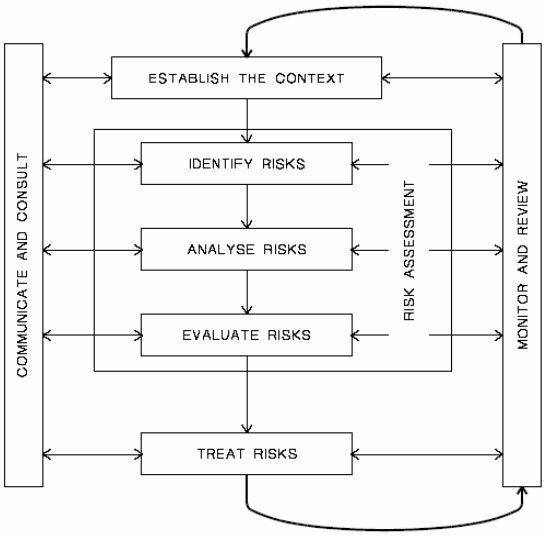

Figure 3: Risk Management Process (reproduced from Figure 2.1, AS/NZS 4360:2004).

This process is commonly used by Australia's emergency management community as the main approach to assessing and managing the risks posed by natural hazards.

In Australia the 'PPRR' paradigm is widely referred to by practitioners, scientists and academics involved in emergency management. PPRR outlines the broader elements and activities involved in managing natural disasters and refer to[5]:

- ***Prevention*** Measures to eliminate or reduce the likelihood or consequences of an event. This also includes reducing the severity or intensity of an event so that it does not become an emergency;
- ***Preparation*** Measures to ensure that communities and organisations are capable of coping with the effects of emergencies;
- ***Response*** Measures taken in anticipation of, during and immediately after, emergencies to ensure the adverse consequences are minimised; and
- ***Recovery*** The coordinated process of supporting disaster affected persons in the reconstruction of the physical infrastructure and restoration of emotional, social, economic, and physical well-being.

The risk assessment process can be successfully employed in all facets of emergency management, across PPRR.

The main focus of this framework, however, is the strategic assessment of long-term natural hazard risk in Australia, and the use of mitigation measures to reduce this risk.

Emergency risk management

Emergency risk management (ERM) has special mention in this framework because ERM is aimed primarily at the local government level, and local government is a key stakeholder in this framework.

[5] EMA, 2004. *Critical Infrastructure Emergency Risk Management and Assurance*, Handbook, 2nd Ed., Australian Government, Canberra.

> 'Emergency risk management (ERM) is a process which involves dealing with risks to the community arising from emergency events. It is a systematic method for identifying, analysing, evaluating and treating emergency risks. Risk treatments include prevention and preparedness as well as provision for response and recovery should an emergency event occur …
>
> The model that underpins the process … is based on the Australian/New Zealand Standard AS/NZS 4360:1995 Risk management.'[6]

Local government is a key stakeholder in the ERM process because it has a highly developed understanding of local communities and a unique role in managing community assets. Local government also is usually the first level of support for communities in emergencies.

[6] EMA, 2004. Emergency Risk Management Applications Guide, Manual 5, Australian Emergency Management Series, Australian Government, Canberra, p.9. http://www.ema.gov.au/.