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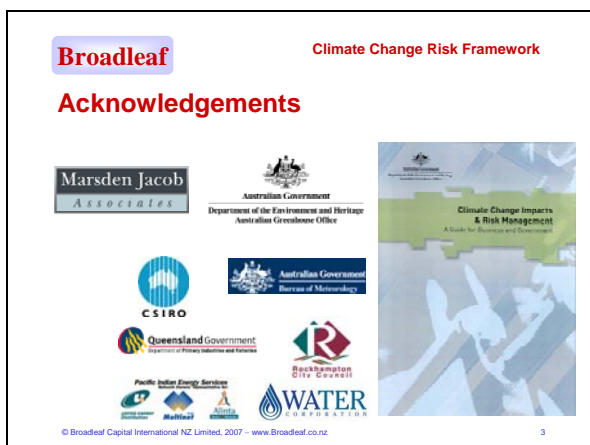
CLIMATE CHANGE IMPACTS AND RISK MANAGEMENT

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Director, Broadleaf Capital International

1 Introduction



This paper was presented to a seminar Climate Change: What Does It Mean? organized by the New Zealand Society for Risk Management at the Museum of New Zealand Te Papa Tongarewa, Wellington, on Tuesday 10 July 2007.



The majority of the material in this paper was prepared as part of the development of 'Climate Change Impacts and Risk Management: for Business and Government' for the Australian Greenhouse Office (AGO) in 2006. The work was undertaken jointly by Dr Dale Cooper and Dr Stephen Grey of Broadleaf, Dr John Marsden and Peter Kinrade of Marsden Jacob Associates, and Dr James Risbey of Monash University (now with CSIRO), working with Dr John Higgins of the AGO. The development also involved discussions and climate science input from the CSIRO and the Bureau of Meteorology, and case study input from the Department of Primary Industries & Fisheries Queensland, Rockhampton City Council, United Energy and the Water Corporation of Western Australia.

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2 Overview

Broadleaf Climate Change Risk Framework

What could be at risk?

- Infrastructure
- Agriculture
- Industry
- Services
- Business
- Human behaviour

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Broadleaf Climate Change Risk Framework

Overview

Infrastructure
Agriculture
Industry
Services
Business
Human behaviour

These are currently attuned to the historical climate
We know how they perform

They may perform differently in the climate of the future

THERE IS UNCERTAINTY ABOUT ...
Precisely how the climate will change
Precisely how we will be affected

... BUT WE ARE CERTAIN THAT
The climate will change
We will be affected

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We do not know precisely how the climate will change, and there is uncertainty in the detailed projections of the future.

However, we do know that the climate will change. Even if there were immediate reductions in the emissions of greenhouse gasses there will be long-term and continuing effects on our climate.

The changes that are anticipated will affect all of us, and our children, and they will be significant and pervasive. We are moving into uncharted territory, and a climate regime that is unprecedented in the current historical record.

Broadleaf Climate Change Risk Framework

The challenge

When thinking about how our activities might be affected by climate change ...

- Infrastructure
- Agriculture
- Industry
- Services
- Business
- Human behaviour

There are too many potential climate change risks to examine them all in detail

We need an efficient way to identify the top priorities

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There will be demands for resources for adaptation actions associated with the effects of climate change. Each organisation will have other demands on its resources, and there are likely to be conflicts over resources. Priority-setting is important, and it should ideally be linked closely to the priority-setting processes used across your organisation, to allow more coherent and strategic allocation of scarce resources.

3 The Risk Management Standard AS/NZS 4360

Broadleaf Climate Change Risk Framework

Setting priorities

Mechanisms are already in place in many organisations
 Widely understood and embedded in business systems
 Risk management, using AS/NZS 4360 (the Standard), assists in:

- > Understanding priorities
- > Allocating resources to deal with them

For dealing with climate change impacts

- > Build on the Standard
- > Build on your existing risk management processes

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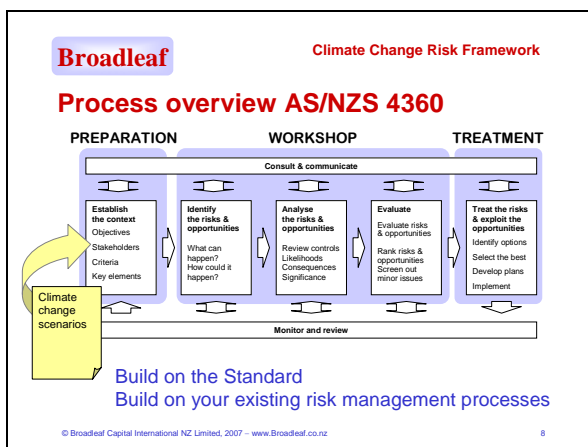
AS/NZS 4360 is a world-leading Standard, and the basis for the current work by the International Standards Organisation (ISO) on the development of an international risk management standard, ISO 31000. It is so successful because it is simple, it has wide applicability, it works for large and small organisations and it can be implemented across a range of sectors.

The Standard assists in understanding priorities and allocating resources.

Most organisations in Australia and New Zealand have risk management processes – we have been doing good risk management in Australasia for the past decade.

A key message when addressing the impacts of climate change is to build on your current risk management practices, using what you already do and extending the framework to include climate change impacts. This has several advantages:

- You will be building on a process that is already used and understood, so the outcomes from a risk assessment of the effects of climate change are likely to be interpreted and accepted more readily;
- The priorities that emerge from the process are likely to be more closely aligned with the priorities generated by your current approach, supporting more appropriate trade-offs between actions necessary to address climate change impacts and other actions that require scarce organisational resources.



This paper does not spend much time on the basics of the risk management process – it focuses on how it can be applied to the impacts of climate change.

One important point should be noted: the process identifies risks **and opportunities**. Although many of the impacts of climate change will be negative, some of them will be positive, and it is important to recognise such opportunities and understand how they might be exploited. (For example, the effects of warmer temperatures and higher concentrations of CO2 may be beneficial in some agricultural areas.)

4 Establishing the Context and Climate Change Scenarios

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Establish the context

As with any other risk management process, establishing the context is a critical first step

Incorporate climate change scenarios

- Use one or two scenarios
- Select them to suit your location(s) of interest
- Include climate features that matter to you

Seek specialist climate impact advice if necessary

- Use in-house advice if you have it
- Otherwise seek external resources

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Scenarios are not precise projections, but rather broad pictures that describe plausible or credible states of the world in the future. From the case exercise workshops we conducted in field-testing the approach described in the Guide, we recommend no more than two scenarios be used as the basis for risk assessment activities – tempting as it may be to have a wide range of scenarios available for discussion, more than two just confuses people and makes the workshop more difficult to run, without generating any significant improvements in the assessment outcomes.

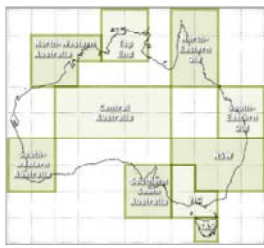
At least one of the scenarios should be a credible ‘unpleasant’ scenario, based on climate outcomes towards the extremes of projected ranges.

Scenarios work best with descriptive ‘word pictures’, as well as numerical indicators of climate measures such as temperature and rainfall.

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Climate change scenarios for Australia

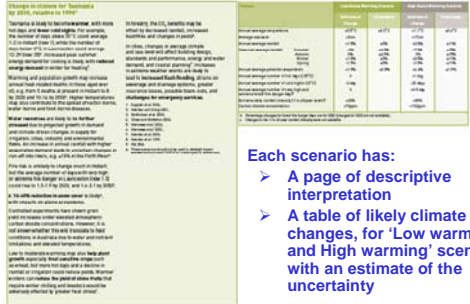
Detailed scenarios for 10 regions have been developed by the CSIRO for the Australian Greenhouse Office



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Example climate change scenario



Each scenario has:

- A page of descriptive interpretation
- A table of likely climate changes, for ‘Low warming’ and High warming’ scenarios, with an estimate of the uncertainty

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The CSIRO has developed climate change projections and scenarios for 10 regions in Australia, for the Australian Greenhouse Office. These scenarios are available from <http://www.greenhouse.gov.au/impacts/publications/risk-scenarios.html>.

The AGO intends to update these from time to time.

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Climate change scenarios for New Zealand: summary


- Hotter, particularly in winter and in the north
- More very hot days
- Fewer frosts
- Wetter in the west, drier in the east
- More frequent heavy rain
- Increased sea level
- Increased westerly winds



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For more information about climate change scenarios for New Zealand ...



Climate Change Effects and Impacts Assessment
A guidance manual for Local Government in New Zealand

Coastal Hazards and Climate Change
A guidance manual for Local Government in New Zealand

Changes in drought risk with climate change
Drought Risk Assessment

NiWA Science
<http://www.niwascience.co.nz/ncc/clivar>

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Climate change scenarios for New Zealand are provided in:

D Wratt, B Mullan, J Salinger, S Allan, T Morgan and G Kenny, Climate Change Effects and Impacts Assessment: A Guidance Manual for Local Government in New Zealand, May 2004

<http://www.mfe.govt.nz/publications/climate/effects-impacts-may04/effects-impacts-may04.pdf>

A range of NZ Government publications is available from

<http://www.mfe.govt.nz/publications/climate/>.

See also

<http://www.mfe.govt.nz/publications/climate/preparing-for-adapting-climate-change-dec06/html/page4.html> (for the map appearing above)

<http://www.mfe.govt.nz/publications/climate/drought-risk-may05/drought-risk-climate-change-may05.pdf>

<http://www.niwascience.co.nz/ncc/clivar>

<http://www.niwascience.co.nz/ncc/clivar/scenarios>

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Establish the context

- Decide on the scope**
 - Geographical
 - System-wide, organisational, operational
 - Time horizon (25, 50, 75 years)
- Consider the relevant stakeholders**
 - Those with a formal role
 - Others that it is in your interest to consider
- Develop an evaluation framework**
 - Align with existing systems (if there are any)
 - Think about all relevant criteria, not just money

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Stakeholder analysis is important in all risk assessments, and particularly important when considering climate change and its impacts due to the pervasive effects it will have on the communities in which we live and with whom our organisations must interact.

At a minimum, you should think about stakeholders' objectives and aspirations, as these must be included in the evaluation framework you use for thinking about the consequences of the risks you identify. In some circumstances, you may want to include stakeholders in your risk assessment. In most circumstances, you will

need to communicate the outcomes from your risk assessments to stakeholders. See Section 4.4 of the Guide.

Criteria vary depending on the purpose of the assessment. The Guide (Tables 8, 9 and 10) contains examples for:

- A local authority;
- A public utility;
- A commercial business.

Broadleaf Climate Change Risk Framework

Establish the context

Develop a comprehensive set of key elements to

- Structure your workshop
- Manage your time
- Stimulate creative risk identification

Summary

- Establishing the context is the key to success
- Investing effort here is critical to making the process effective
- Document the context in a briefing paper for workshop participants

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Key elements provide a structure for the assessment, an agenda and a stimulus for creative thought during the brainstorming process. They should span the full scope of interest, to ensure nothing important is left out and provide more confidence that the risk identification process has been comprehensive.

Ways of structuring might include:

- Organisational functions or activities;
- Geographic areas or different land uses;
- Technology or assets of interest to the organisation;
- The services the organisation provides.

Table 13 of the Guide provides examples.

5 Risk Assessment

Broadleaf Climate Change Risk Framework

Risk assessment workshop

Manage the people

- Ensure a good mix of expertise
- Manage the numbers (5 to 15)
- Use an experienced facilitator

Identify, Analyse, Evaluate

- Generally these steps are similar to other risk assessment processes, but ...
- You may need to consider more than one scenario
- Evaluation may have to be adjusted for the relative likelihoods of multiple scenarios (use judgment)

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I do not intend to spend much time on this part of the process, as it is very familiar to most of you. I only want to reinforce a few points, and there is additional detail in the Guide.

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Initial & detailed assessment

```

graph TD
    IA[Initial assessment] --> R1[Risk you know you have to treat]
    IA --> R2[Risk you know you can set aside]
    IA --> R3[Risk you can't classify yet]
    R1 --- TN[Treat now]
    R2 --- PW[Put on watch]
    R3 --> DA[Detailed assessment]
    
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The outcome from the workshop is a triage of the risks and opportunities that have been identified: Risks that require action now.

- Those that can be set aside, either because they are genuinely low risks, or because action may not be needed immediately or urgently. Note that these risks are not discarded – they are set aside on a watch list to be reviewed regularly, to determine whether the priority has changed or whether the triggers for more immediate action have arisen.
- Those risks, generally not many of them, for which we need more information and

more detailed assessment before we can make a decision about the need for immediate action.

In practice, classification into the first two groups is relatively easy with the right workshop participants – there are usually only a few risks that require additional information and analysis.

6 Risk Treatment

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Treatment

Risks you agree need to be addressed

- Proceed immediately
- Plan and implement actions that will reduce the likelihood or consequences of the risks

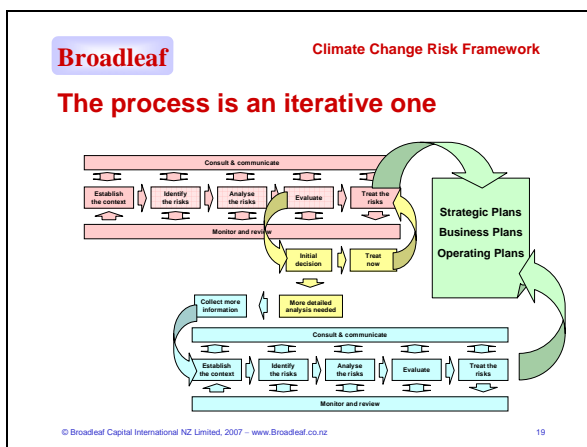
Risks that you are not sure can be set aside

- Mount further investigation
- You may require specialist technical and climate impact resources
- Decide whether to treat or set aside

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The additional information you need for more detailed analysis is not just concerned with climate science. You are more likely to need other kinds of models, such as:

- Economic models, e.g. for energy supply and demand;
- Demographics;
- Land use;
- Hydrographics;
- ...



7 Integration with Other Organisational Processes

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Integration

Climate change is a strategic issue

Integrate your risk assessment with the annual strategic planning cycle

Gather the outputs from other processes as inputs to risk assessment where relevant

Make risk assessment outputs available before plans and budgets are fixed

Link to the assessment to other processes

- Communication & Consultation in AS/NZS 4360

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Other processes and environmental scans from which you may derive useful inputs for your climate impact risk assessment may provide information about:

- Changes in population growth rates and demographics;
- Changes in land use;
- Changes in living standards and associated changes in community aspirations;
- Changes in the policy and regulatory environment, including policy related to sustainable development and emissions initiatives.

Communication and consultation is linked to your stakeholder analysis in the Context stage. You should develop a comprehensive communication plan that covers this aspect of the process.

8 Summary

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Summary

Build on existing processes and AS/NZS 4360

Integrate climate change risk assessment with other risk management and strategic planning activities

There is comprehensive advice in the AGO Guide

Use specialist expertise, as required, for

- Risk management facilitation
- Climate impacts
- Technical analysis for risks you can't classify easily in the initial assessment

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Additional information is provided in the Guide and on the Australian Greenhouse Office web site, www.Greenhouse.gov.au.

9 Contacts

For more information about the risk management aspects of the material discussed here, please contact:

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