

MfE CLIMATE CHANGE IMPACTS AND ADAPTATION REFERENCE LIST

LAST UPDATED: May 2006

Literature is cross referenced under the following headings:
(Hold down the ctrl key and click on the word to follow the link)

ADAPTATION

AGRICULTURE

AUSTRALIA

BIODIVERSITY

BUILT ENVIRONMENT

BUSINESS/INSURANCE

CLIMATE CHANGE & HAZARDS

COUNCIL STRATEGIES

HEALTH

IMPACTS

NZ REGIONS

PUBLIC/LOCAL COMMUNITIES

UK

WORKSHOPS

NB: references listed include documents listed on the Climate Change website
(www.climatechange.govt.nz).

ADAPTATION

[Climate Change Adaptation: Guidance on adapting New Zealand's built environment for the impacts of climate change \(PDF 1.0 MB\)](#)

October 2004

Published by BRANZ Ltd (Authors Michael O'Connell and Rachel Hargreaves).
BRANZ Study Report SR130

A best practice guidance document which provides information on the adaptation of the New Zealand built environment to the impacts of climate change. It is designed to help government agencies and the building and construction industry to understand the key impacts that climate change will have on the built environment, and begin planning and implementing integrated adaptation strategies to future-proof New Zealand's built assets and protect the communities of which they are a part.

[Adapting to Climate Change in Eastern New Zealand](#)

July 2005

A brochure outlining the impacts and opportunities for agriculture arising from climate change in Eastern New Zealand, and adaptation options at farm level and for rural communities.

[The view from the ground: A farmer perspective on climate change and adaptation](#)

July 2003

A farmer perspective on climate change and adaptation. Compiled by Gavin Kenny and Mark Fisher. Published by Earthwise Consulting Limited and the Hawke's Bay Climate Change Adaptation Group.

[Adapting to Climate Change in Eastern New Zealand: A Farmer Perspective](#)

September 2005

This report has been compiled to record workshop learnings from a project designed to engage with farmers and draw forward individual stories and collective thinking in relation to climate change. The project was funded by the Sustainable Farming Fund, with additional financial support from Environment Bay of Plenty, Hawke's Bay Regional Council, Environment Canterbury, the Climate Change Office of the Ministry for the Environment, AGMARDT, Merino NZ Inc.

[Climate Change: Risk and Vulnerability. Promoting an efficient adaptation response in Australia \(PDF 1.8 MB\)](#)

March 2005

"Climate Change: Risk and Vulnerability" is a report to the Australian Greenhouse Office, Department of the Environment and Heritage, by The Allen Consulting Group. The document provides a valuable insight into how early planning could help federal, state and local government, industries and communities plan for the effects of climate change, adapt to the impacts and exploit any opportunities. The report focuses on options for adaptation planning in key sectors and regions, and identifies some priority vulnerable systems and regions for further attention (eco-systems and biodiversity, agriculture, water supply, settlements and emergency services and

energy supply planning). It advocates for coordinated cross-sectoral reviews of vulnerable regions and centres, which will achieve better awareness of possible response options to a changing climate. The report concludes that an adaptation strategy, to be effective, must result in climate risk being considered as a normal part of decision-making, allowing governments, businesses and individuals to reflect their risk preferences just as they would for other risk assessments.

[Carbon constraints in the building and construction industry: challenges and opportunities](#)

December 2003

Published by the BRANZ Ltd), funded by the Building Research Levy.

This report examines the challenges faced by New Zealand's building and construction industry in both creating low-carbon buildings and in adapting to the effects of climate change on buildings. It discusses how climate change measures relate to the built environment, and how sustainability aspects may be factored into building regulations. Opportunities for low-carbon construction are also described in the report, with a focus on technical practicalities involved in constructing low-carbon buildings, health and air quality co-benefits, and relevant case studies.

[Preparing for Climate Change: A guide for local government in New Zealand](#)

July 2004

This is a guide to help councils across New Zealand assess the likely effects of projected climate change during the 21st century and plan appropriate responses where necessary. It is designed to summarise the main elements of a comprehensive technical report '[Climate Change Effects and Impacts Assessment](#)'.

A key message in the guide is that climate change effects can be broken down into manageable parts and dealt with as part of existing council planning and operational processes.

Although the guide will help councils identify, scope and respond to climate change in their areas, it does not provide standard solutions for specific situations. Each region, district and community will have its own climate-related vulnerabilities and priorities.

[Local Government Adaptation to Climate Change: Environment Bay of Plenty and Coastal Hazards: "Issues, Barriers and Solutions" \(PDF 106 KB\)](#)

December 2003

Because of Environment Bay of Plenty's (EBOP) history with the development of coastal hazard policy, MfE commissioned a case study project to identify the issues, barriers and solutions associated with such policy development and implementation. This report presents the issues found during the case study project, including a brief review of the development of coastal hazard policy by the case study councils over the last ten years in order to provide a context and background to the issues, barriers and solutions. The barriers and solutions are presented as a result of the case study, but do require further research, consultation and council debate because of the brief nature of the case study timeframe. The issues, barriers and solutions have been outlined as a starting point for further analysis by the relevant councils.

[Adapting to Climate Change in Eastern New Zealand: A Farmer Perspective](#)

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A web-based resource kit that documents the work and forward-thinking farmers in Eastern NZ

[Planning for climate change effects on coastal margins,](#)

September 2001

This report addresses the impacts of climate change and global warming on coastal margins. The report aims to assist resource managers and planners to understand the underlying impacts and issues in climate change and sea-level rise, and to provide guidance in planning and the development of mitigation or adaptation strategies for coastal communities.

[Workshop on adaptation practices in developed countries](#)

International workshop on adaptation practices & strategies in developed countries (Wellington 11-13 October, 2004)

This workshop took place from 11-13 October 2004, at the Intercontinental Hotel, Wellington, New Zealand. Links to the following:

- Scope outline of workshop goals and expectations
- Final workshop programme
- Workshop summary report
- Workshop presentations

[Local Government workshop: "Preparing for Climate Change"](#)

Preparing for climate change: Workshop on adaptation practices in developed countries (Wellington 12 October, 2004)

The NZ Climate Change Office hosted a workshop in Wellington for the local government sector on 'Preparing for Climate Change' (12 October 2004, Wellington). The workshop was a companion to the International Workshop on climate change adaptation practices & strategies in developed countries. The goals of the workshop were:

- To discuss and share adaptation strategies and practices relevant to the local government sector
- To identify and record barriers to preparing for climate change in the local government sector with a view to future work to address these

Available from this link are presentations and notes from the workshop.

AGRICULTURE

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A brochure outlining the impacts and opportunities for agriculture arising from climate change in Eastern New Zealand, and adaptation options at farm level and for rural communities.

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BIODIVERSITY

[Linkages between climate change and biodiversity in NZ \(PDF 289 KB\)](#)

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This report discusses the policy implications of scientific linkages between biodiversity and climate change in New Zealand. It highlights potential changes in vegetation cover and freshwater ecosystems. It also discusses potential synergies and areas of conflict for current national policies, and recommends key areas for future research and priorities for policy development.

BUILT ENVIRONMENT

[Climate Change Adaptation: Guidance on adapting New Zealand's built environment for the impacts of climate change \(PDF 1.0 MB\)](#)

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[Flood Resilient Homes](#)

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A factsheet which outlines steps home-owners living in flood risk areas can take to minimise damage if flooding occurs.
Authors: UK Building Research Establishment and the Association of British Insurers.

[Kapiti Coast District Council - Climate change work programme](#)

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Web-based information assessing the primary impacts of climate change for the Kapiti Coast District, outlining the climate change work programme undertaken by the Council, and linking to information on energy efficiency, low emissions vehicles and recycling in the district.

[Impacts of Climate Change in New Zealand and the Required Response \(PDF 167 KB\)](#)

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Authors J. D. N. Gluckman and C. A. Boyle.

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paper illustrates that engineers are likely to be involved in the completion of regional climate change hazard assessments, which are an important element of planning for a changing climate. The paper also proposed that the effective management of climate change effects will require an integrated and precautionary approach.

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Mitigating the Impacts of Climate Change on the Built Environment (PDF 175 KB)

2003

A study report published by the BRANZ Ltd with funding from the Foundation for Research, Science and Technology.

Climate Change and Infrastructure Design: Wairau Catchment, North Shore City.

August 2004

This case study investigates the impacts of both climate change and different modelling approaches (design storm model vs time series/dynamic model) on stormwater infrastructure design within the Wairau Valley stormwater catchment in North Shore City. Four different climate data sets were produced - 'present', representing the present climate, and 'Future 1', 'Future 2', and 'Future 3', representing three different possible future climate change scenarios. In all, 8 different possibilities are examined: 'Present/Design Storm', 'Present/Dynamic', 'Future 1/Design Storm', 'Future 1/Dynamic', 'Future 2/Design Storm', 'Future 2/Dynamic', 'Future 3/Design Storm', 'Future 3/Dynamic'.

Although the case study may provide a blueprint to help other councils identify, scope and respond to climate change effects during their own stormwater upgrades, it is not intended to provide any standard solutions. Each region, district and community will have its own climate-related vulnerabilities and priorities relating to rainfall and stormwater infrastructure.

This case study was prepared by Helen Shaw, Senior Water Resources Engineer, URS Ltd.

Incorporating climate change into stormwater design - Why and how?

March 2005

A paper produced by H. Shaw, A. Reisinger, H. Larsen and C. Stumbles for the 4th South Pacific Conference on Stormwater And Aquatic Resource Protection (Auckland, May 2005). The paper outlines information on climate change impacts available to stormwater infrastructure designers, and discusses simple as well as more complex ways of incorporating climate change effects into stormwater design,

illustrating the process with a case study undertaken in North Shore City, and a number of different climate change scenarios.

BUSINESS/INSURANCE

[A changing climate for business - Business planning for the impacts of climate change \(PDF 1.1 MB\)](#)

June 2005

Published by the UK Climate Impacts Programme (UKCIP)

This report provides clear, practical advice help businesses begin to address the implications of a changing climate in their business planning. Based on the experience of a 2004 pilot project involving selected trade associations and professional bodies, the report provides key messages and suggested options for responding to a changing climate. Aimed at business decision-makers, the report provides detailed information on expected climate change and techniques for understanding and assessing likely threats and opportunities.

[A Changing Climate for Insurance \(PDF 254 KB\)](#)

August 2004

"A Changing Climate for Insurance" is a summary report designed for Chief Executives and policy makers within the insurance industry, central government and councils in the United Kingdom. Written for the Association of British Insurers, the report focuses on the relevance of climate change to the insurance industry, how the industry is responding to projected increases in extreme weather events in a changing climate, and the importance of engaging asset managers and other senior managers in understanding and reducing the risks rising from climate change in order to better protect communities and improve the resilience of business and industry. While the report is written for a UK audience, its learnings have high relevance to the New Zealand context.

CLIMATE CHANGE & HAZARDS

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A factsheet which outlines steps home-owners living in flood risk areas can take to minimise damage if flooding occurs.

Authors: UK Building Research Establishment and the Association of British Insurers.

[Flood Risk Management](#)

March 2004

Guidelines for reducing flood losses from the International Strategy for Disaster Reduction.

[Climate Change Hazards](#)

March 2003

A fact sheet from the Greater Wellington regional council on climate change hazards.

[Meteorological Hazards](#)

March 2003

A fact sheet from the Greater Wellington regional council on meteorological hazards.

[Weather Hazards: Climate Change](#)

A web-based fact sheet from Environment Waikato on how climate change could affect storms, rain, coastal flooding and erosion.

[Strategies for managing coastal erosion hazards on the Kapiti Coast](#)

May 2003

A report to the Kapiti Coast District Council.

[Coastal Hazards and Climate Change](#)

May 2004

This Guidance Manual is intended to help local authorities manage coastal hazards by:

- providing information on the effects of climate change on coastal hazards
- presenting a decision-making framework to assess the associated risks
- providing guidance on appropriate response options.

[Local Government Adaptation to Climate Change: Environment Bay of Plenty and Coastal Hazards: "Issues, Barriers and Solutions" \(PDF 106 KB\).](#)

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[A methodology to assess the impacts of climate change on flood risk - Full Report](#)

July 2005

This NIWA report provides guidelines for councils on how to handle the possible impact of climate change when assessing flood risk.

[A methodology to assess the impacts of climate change on flood risk - Summary of Report](#)

July 2005

This document is a summary of the NIWA Report titled: '[A methodology to assess the impacts of climate change on flood risk in New Zealand](#)'. The document outlines how councils can take steps to prepare for climate change by assessing their own flood risk.

Changes in drought risk with climate change

May 2005

A National Institute of Water and Atmospheric Research (NIWA) report commissioned by the Ministry for the Environment and the Ministry of Agriculture and Forestry to describe the likely changes in New Zealand drought risk over the 21st century, under low-medium and medium-high climate change scenarios.

Community-based Dune Management for the Mitigation of Coastal Hazards and Climate Change Effects - A guide for Local Authorities (PDF 796 KB)

September 2005

Prepared by Jim Dahm (Eco Nomos Ltd), Greg Jenks (Environment Bay of Plenty) and David Bergin (Forest Research).

This report brings together lessons from successful dune care/restoration programmes across New Zealand to provide guidelines for councils wanting to initiate dune restoration programmes, both to mitigate coastal hazards (including climate change effects such as projected sea level rise) and to restore the beneficial natural and human use values associated with coastal dunes.

COUNCIL STRATEGIES

Hawkes Bay Regional Council: Draft Regional Coastal Environment Plan

October 2005

The Hawkes Bay Regional Council is currently reviewing its draft Regional Coastal Environment Plan. The review includes consideration of the coastal environment, as well as the coastal marine area. One aspect presently under review is whether the draft Plan should be amended to include "inundation risk zones" - areas at risk of a one-in-50-years flood - within which building would be banned or restricted. A council report tabled for consideration proposes two zones: an extreme risk zone within the present erosion risk zone (already in the draft plan), and a moderate risk zone, covering areas on the landward side of the erosion zone. In both cases, predicted rises in sea levels would be taken into account when setting the boundaries of the zones in which combined tide and storm surge could cause a one-in-50-years flood.

Tackling Climate Change in Cambridgeshire: Cambridgeshire County Council Climate Change Strategy (PDF 2.9 MB)

March 2005

Published by Cambridgeshire County Council, UK

This council strategy to tackle climate change is based around 5 key themes: energy, transport, resource efficiency, adaptation (preparing for climate change) and public awareness. The strategy builds on Cambridgeshire County Council's existing environmental policies, which monitor wider environmental performance and awareness. It highlights work the council is carrying out to address both the causes

and the consequences of climate change. It is intended to guide all council activities. The council will report back on action under the strategy in 2009.

[Kapiti Coast District Council - Climate change work programme](#)

November 2005

Web-based information assessing the primary impacts of climate change for the Kapiti Coast District, outlining the climate change work programme undertaken by the Council, and linking to information on energy efficiency, low emissions vehicles and recycling in the district.

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This case study was prepared by Helen Shaw, Senior Water Resources Engineer, URS Ltd.

HEALTH

[Climate Change: Potential Effects on Human Health in New Zealand \(PDF 440 KB\),](#)

September 2001

This report looks at the impacts of climate change on human health in NZ and the research needs in this area.

IMPACTS

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Chatham Islands Climate Change

June 2005

"Chatham Islands Climate Change" is a report by the National Institute of Water and Atmospheric Research Ltd (NIWA) which provides information on climate change impacts in the Chatham Islands of New Zealand. It is designed to complement similar guidance produced by the Ministry for the Environment for other New Zealand regions. Authors: Brett Mullan, Jim Salinger, Craig Thompson, Doug Ramsay and Michelle Wild, National Institute of Water and Atmospheric Research Ltd (NIWA).

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The Effects of Climate Change under the Resource Management Act - A Quality Planning website note

The aim of this Guidance Note is to:

- Promote understanding about the effects of climate change; and
- Provide best practice information on how to assess the significance of, and respond where necessary to, the effects of climate change. A particular focus is how this can be done within local authorities' existing risk assessment, policy-making and decision-making processes.

Climate Change Effects and Impacts Assessment

May 2004

This document provides guidance on identifying and assessing likely future regional and local effects of climate change across New Zealand. It is designed to help local government identify and quantify opportunities and hazards which climate change poses for their functions, responsibilities and infrastructure.

Assessment of the impacts of sea level rise on floodplain management planning for the Avon river (PDF 857 KB),

December 2003

This report was commissioned as a case study on the impact of climate change on risk management planning for the Avon catchment and associated coastal areas. The study focuses primarily on an economic analysis of likely damages, and the response options available to local government to mitigate these. While this report is geographically specific in its scope, it is expected that many of the issues, challenges, and methodologies relating to coastal hazard planning within a climate

change framework presented here will also be applicable in other regions and catchments.

[Flood risk arising from future precipitation changes in Gleniti, Timaru \(PDF 449 KB\)](#)

December 2003

The purpose of this report is to assess flood risk arising from possible future precipitation changes in Gleniti, Timaru, due to climate change effects. This report describes the projected climate change effects, discusses the outcomes of a re-worked flood model which takes into account these effects, and assesses the implications for two of the catchments. While this report is geographically specific in its scope, it is expected that many of the issues, challenges, and methodologies relating to flood risk management within a climate change framework presented here will also be applicable in other regions and catchments.

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[Impact of climate change on long-term fire danger](#)

May 2005

A report produced by H. Grant Pearce, A. Brett Mullan and M. James Salinger of the National Institute of Water & Atmospheric Research Ltd (NIWA) and Todd W. Opperman, Darrin Woods and John R. Moore of Forest Research Ltd for the New Zealand Fire Service.

The report assesses that future fire activity is likely to increase as a result of global warming and associated climate change, and investigates how potential climate change effects are likely to change future fire danger through application of climate change scenarios to the long-term fire weather records. The report applies regional climate change scenarios for the 2080s to the long-term weather records for individual stations contained in the fire danger climatology database. An objective of the report is to enable New Zealand rural fire authorities to make more informed fire management decisions on fire prevention and preparedness activities now and in the future.

[The Waikato Weather Bomb: Understanding the impact](#)

March 2004

A survey and evaluation of the economic impact, social perceptions and preparedness relating to a heavy rainfall and flooding event that occurred on the Coromandel Peninsula in June 2002.

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[Climate change impacts on New Zealand,](#)

June 2002

An examination of the likely impacts of climate change and global warming in New Zealand.

[Local Government workshop: The impacts of climate change](#)

(Wellington 21 February 2002)

This report represents the proceedings of a workshop on the impacts of climate change on New Zealand, with a specific focus on the impacts and adaptation options for local government, and the relationship between local and central government to achieve a consistent yet flexible response across all regions and districts.

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[Adapting to Climate Change in Eastern New Zealand: A Farmer Perspective](#)

September 2005

This report has been compiled to record workshop learnings from a project designed to engage with farmers and draw forward individual stories and collective thinking in relation to climate change. The project was funded by the Sustainable Farming Fund, with additional financial support from Environment Bay of Plenty, Hawke's Bay Regional Council, Environment Canterbury, the Climate Change Office of the Ministry for the Environment, AGMARDT, Merino NZ Inc.

[Adapting to Climate Change in Eastern New Zealand: A Farmer Perspective](#)

July 2005

A web-based resource kit that documents the work and forward-thinking farmers in Eastern NZ

PUBLIC/LOCAL COMMUNITIES

[Easy Guide To Being a Climate-friendly Kiwi: At home and at the office](#)

June 2004

Published by BRANZ Ltd, funded by the Foundation for Research, Science and Technology from the Research for Industry Fund.

The 'Easy Guide to Being a Climate-Friendly Kiwi' provides easy-to-use, practical information on how to reduce your greenhouse gas emissions on a day-to-day basis, and includes a New Zealand-specific Climate Change calculator to work out your carbon footprint.

[Flood Resilient Homes](#)

June 2004

A factsheet which outlines steps home-owners living in flood risk areas can take to minimise damage if flooding occurs.

Authors: UK Building Research Establishment and the Association of British Insurers.

[Local Communities: Planning for Climate Change](#)

May 2004

This document provides a general description of what causes climate change and identifies the likely impacts of climate change in New Zealand. It also briefly sets out the range of council functions and responsibilities which are likely to be affected by climate change, and describes the various legislative requirements for local authorities to manage the effects of climate change when making planning, infrastructure, and hazard management decisions. Lastly, the booklet identifies where further information on climate change effects and planning for climate change can be found.



[**A changing climate for business - Business planning for the impacts of climate change \(PDF 1.1 MB\)**](#)

June 2005

Published by the UK Climate Impacts Programme (UKCIP)

This report provides clear, practical advice help businesses begin to address the implications of a changing climate in their business planning. Based on the experience of a 2004 pilot project involving selected trade associations and professional bodies, the report provides key messages and suggested options for responding to a changing climate. Aimed at business decision-makers, the report provides detailed information on expected climate change and techniques for understanding and assessing likely threats and opportunities.

[**Tackling Climate Change in Cambridgeshire: Cambridgeshire County Council Climate Change Strategy \(PDF 2.9 MB\)**](#)

March 2005

Published by Cambridgeshire County Council, UK

This council strategy to tackle climate change is based around 5 key themes: energy, transport, resource efficiency, adaptation (preparing for climate change) and public awareness. The strategy builds on Cambridgeshire County Council's existing environmental policies, which monitor wider environmental performance and awareness. It highlights work the council is carrying out to address both the causes and the consequences of climate change. It is intended to guide all council activities. The council will report back on action under the strategy in 2009.

[**Flood Resilient Homes**](#)

June 2004

A factsheet which outlines steps home-owners living in flood risk areas can take to minimise damage if flooding occurs.

Authors: UK Building Research Establishment and the Association of British Insurers.

[**A Changing Climate for Insurance \(PDF 254 KB\)**](#)

August 2004

"A Changing Climate for Insurance" is a summary report designed for Chief Executives and policy makers within the insurance industry, central government and councils in the United Kingdom. Written for the Association of British Insurers, the report focuses on the relevance of climate change to the insurance industry, how the industry is responding to projected increases in extreme weather events in a changing climate, and the importance of engaging asset managers and other senior managers in understanding and reducing the risks rising from climate change in order to better protect communities and improve the resilience of business and industry. While the report is written for a UK audience, its learnings have high relevance to the New Zealand context.

WORKSHOPS

[LGNZ workshop on risk management and governance under the Resource Management Act \(Energy and Climate Change\) Amendment 2004](#)

(Wellington, 1 July 2005)

Link to a presentation by James Hassall of Phillips Fox, at the Climate Change Workshop July 2005 called "Risk Management, Governance and Climate Change: What Councils should be doing"

[Workshop on adaptation practices in developed countries](#)

(Wellington 11-13 October, 2004)

International workshop on adaptation practices & strategies in developed countries

Information available from this link:

- Scope outline of workshop goals and expectations
- Final workshop programme
- Workshop summary report
- Workshop presentations

[Local Government workshop: The impacts of climate change](#)

(Wellington 21 February 2002)

This report represents the proceedings of a workshop on the impacts of climate change on New Zealand, with a specific focus on the impacts and adaptation options for local government, and the relationship between local and central government to achieve a consistent yet flexible response across all regions and districts.

[Local Government workshop: "Preparing for Climate Change"](#)

(Wellington 12 October, 2004)

Preparing for climate change: Workshop on adaptation practices in developed countries

The NZ Climate Change Office hosted a workshop in Wellington for the local government sector on 'Preparing for Climate Change' (12 October 2004, Wellington). The workshop was a companion to the International Workshop on climate change adaptation practices & strategies in developed countries. The goals of the workshop were:

- To discuss and share adaptation strategies and practices relevant to the local government sector
- To identify and record barriers to preparing for climate change in the local government sector with a view to future work to address these

Available from this link are presentations and notes from the workshop.