

REGIONAL SUMMARY
Effects and impacts: Taranaki to Wellington

KEY EFFECTS

- Warmer winters, reduced frequency of frost inland and at higher elevations, and a longer growing season.
- Wetter average conditions, particularly in the west, which could manifest as more frequent and intense rainfall events.
- An increased risk of flooding and erosion with the potential for more frequent, intense, rainfall events. Erosion risk is high over significant areas of hill country and this will be exacerbated with any increase in rainfall frequency and intensity.
- A possibility of increased drought risk, particularly on lighter soils in coastal areas.
- Westerly winds are likely to increase in frequency and intensity.

KEY CHANGES

- The greatest gains are likely to come from increased pasture and plantation forestry productivity and increases in some arable and vegetable cropping. This is due to the warmer, wetter conditions and increase of carbon dioxide (CO_2) in the atmosphere.
- The greatest losses could result from an unreliable water supply. Increased flood and erosion risks over more of Wellington are also expected. Increased risk will come from extreme weather events with westerly winds increasing in frequency and possibly strength.

The southwest of the North Island will become generally wetter and warmer with climate change. However, while winter rainfall may increase, summer could become drier. Average annual temperatures are likely to increase by about 1.0°C by mid-century and 2.0°C or more by late century, with the largest temperature increases occurring in summer.

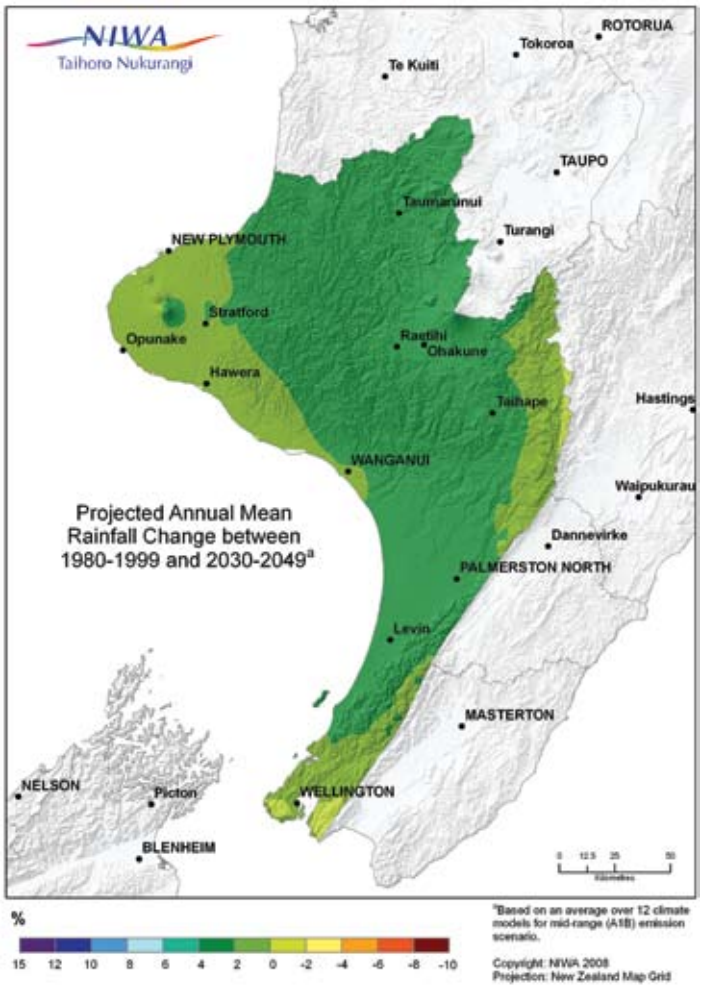
LIKELY IMPACTS AND OPPORTUNITIES

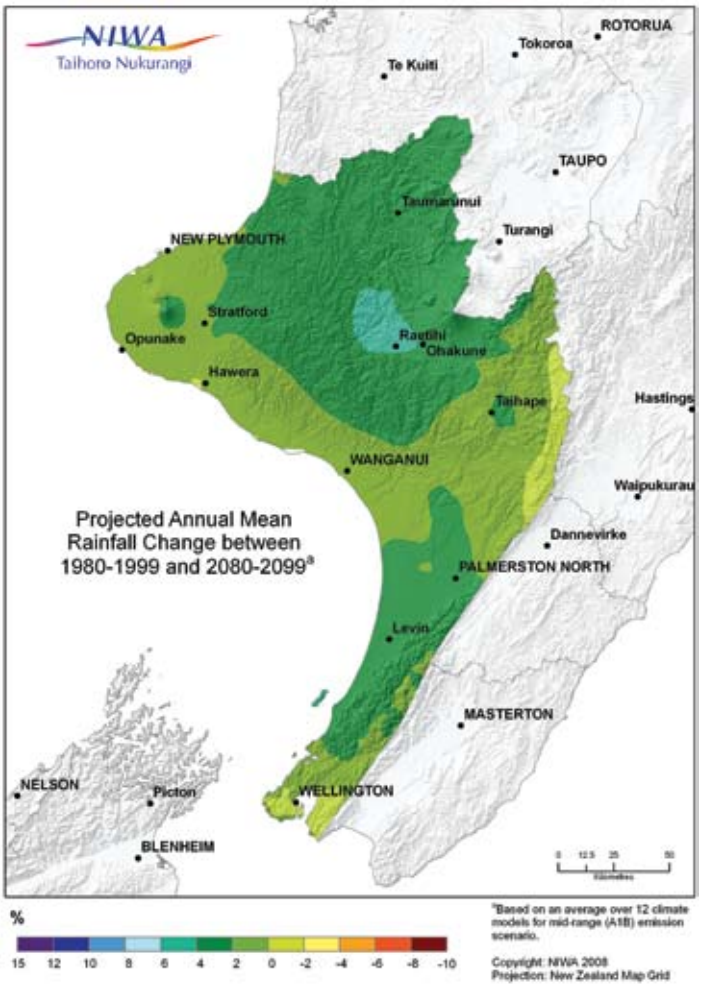
- With warmer, wetter conditions on average, western regions of the North Island could experience increases in temperate pasture yields.
- It is unlikely that there will be any dramatic changes in pasture composition in the short-term, with projected southward shifts in sub-tropical species such as paspalum unlikely to be significant in the region until the latter part of the 21st century.
- The abundance of insect pests such as the clover root weevil and clover flea could be accelerated with warmer average conditions.
- In general, stock will benefit from warmer winters, with less stress on animals (stock losses down), better reproduction rates and less calving losses. However, this will depend on the timing and intensity of winter rainfall.
- Warmer, wetter seasons will likely increase the incidence of fungal diseases. For example, facial eczema could emerge as a significant problem over time. Any potential effects on animal health are likely to be indicated by changes that occur in the Waikato and further north over the next one to two decades. Issues like heat stress on cows in summer could emerge as problems over time.
- Arable cropping in the western North Island ought to benefit from warmer average temperatures and higher average rainfall. Demand for water in the region is increasing and so the balance between future supply and demand will determine the extent to which arable cropping will increase.
- The west of the North Island is not a major fruit production area but there are localised industries throughout this part of New Zealand and the Horowhenua is a significant horticultural area. Over time, sub-tropical crops, such as avocados and citrus, will become increasingly viable further south but wind will continue to be a major limitation. A longer growing season may benefit horticultural production in areas like Horowhenua.
- Changes in pests and diseases in arable and horticultural crops are likely to occur over time but these will probably lag behind comparable changes further north.
- There are two main water resource issues in the western North Island that could result from climate change:
  - Increased risk of flooding and erosion throughout the region.
  - Security of water supply in parts of the region, in the face of increasing demand for irrigation and the possibility of increased drought severity in dry years.

- Changes in rainfall, with the possibility of more extremes of wet and dry, will have consequences for local and regional infrastructure including: land drainage; flood protection; community water schemes; culverts and bridges; erosion control; farm dams; water reticulation and irrigation.

ANNUAL AVERAGE RAINFALL

The maps below show the projected trend in annual-average rainfall that could be expected by 2050 and 2100, compared to the average for 1980–1999.





2050: Annual average rainfall in the southwest of the North Island may increase by about 1–3 percent.

2100: Annual average rainfalls are likely to be slightly higher than present, with indications of higher increases in inland Taranaki.

RANGES OF UNCERTAINTY IN TEMPERATURE AND RAINFALL PROJECTIONS

In the table below the first number in each case is a mid-range estimate of what the change will be, and the figures in brackets give the modelled range within which the change could lie. Mean, [lower, upper].

For example, the average summer temperature in Taranaki is likely to increase by 2.3 °C by 2090, but estimates of the expected temperature increase range between 0.9 and 6.1 °C.

CHANGE IN TEMPERATURE °C	SUMMER	AUTUMN	WINTER	SPRING	ANNUAL
TARANAKI					
2040	1.1 [0.2, 2.4]	1.0 [0.2, 2.6]	0.9 [0.1, 2.2]	0.8 [0.0, 2.0]	0.9 [0.2, 2.3]
2090	2.3 [0.9, 6.1]	2.2 [0.6, 5.3]	2.1 [0.5, 5.1]	1.8 [0.3, 4.9]	2.1 [0.6, 5.3]
MANAWATU–WANGANUI					
2040	1.1 [0.2, 2.3]	1.0 [0.2, 2.6]	0.9 [0.2, 2.2]	0.8 [0.0, 1.9]	0.9 [0.2, 2.2]
2090	2.3 [0.9, 6.0]	2.2 [0.6, 5.3]	2.1 [0.5, 5.0]	1.8 [0.3, 4.9]	2.1 [0.6, 5.3]
CHANGE IN RAINFALL %					
NEW PLYMOUTH					
2040	0 [–20, 18]	3 [–8, 13]	2 [–2, 9]	0 [–8, 16]	2 [–3, 9]
2090	–2 [–38, 15]	1 [–18, 15]	6 [–6, 20]	–1 [–17, 21]	1 [–10, 11]
TAUMARUNUI					
2040	0 [–19, 19]	2 [–10, 13]	7 [0, 17]	2 [–12, 19]	3 [0, 13]
2090	–1 [–36, 18]	–2 [–25, 12]	13 [1, 36]	1 [–16, 26]	3 [–7, 15]
WANGANUI					
2040	–1 [–21, 13]	3 [–8, 10]	5 [–3, 15]	1 [–10, 15]	2 [–3, 10]
2090	–3 [–42, 12]	–1 [–20, 12]	8 [–5, 25]	–0 [–16, 23]	1 [–11, 11]

SOURCE

Ministry for the Environment (2008). *Preparing for climate change: A guide for local government in New Zealand.*

THIS REGIONAL SUMMARY IS ONE OF EIGHT FROM THE RESOURCE PACK:
CLIMATE CHANGE: A GUIDE FOR LAND MANAGERS.
TO VIEW OTHER MATERIAL IN THIS RESOURCE PACK VISIT
WWW.MAF.GOVT.NZ/CLIMATECHANGE OR PHONE 0800 CLIMATE
TO REQUEST A HARD COPY.

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PO Box 2526, Wellington 6140.
Freephone: 0800 008 333
Web: www.maf.govt.nz

SOURCES

MINISTRY OF AGRICULTURE AND FORESTRY

WWW.MAF.GOVT.NZ

- *The EcoClimate report: Climate change and agricultural productions* (2008). Available on the Ministry of Agriculture and Forestry website www.maf.govt.nz/climatechange
- Kenny, G (2008) *Adapting to climate change in the kiwifruit industry*. Available from www.maf.govt.nz/climatechange

MINISTRY FOR THE ENVIRONMENT

WWW.MFE.GOVT.NZ

- *Preparing for Climate Change: A guide for local government* (2008). Available from www.mfe.govt.nz; Ref: ME534
- *Climate Change: Impacts on New Zealand* (2001). Available from www.mfe.govt.nz; Ref: ME396
- *Likely impacts on New Zealand agriculture* (2001). Available from www.mfe.govt.nz; Ref: ME412
- *Regional summaries of climate change;* Available from www.mfe.govt.nz/issues/climate/
- *Climate change effects and impacts assessment: A guidance manual for local government in New Zealand* (2008). Available from www.mfe.govt.nz; Ref: ME870

OTHER

- *The International Global Change Institute's CLIMPACTS programme: Examining the sensitivity of the New Zealand Environment to Climate Variability and Change*. Available on the University of Waikato website www.waikato.ac.nz
- *Adapting to climate change in eastern New Zealand* (2005). Published by Earth Limited.org on their website www.earthlimited.org

FOR MORE INFORMATION

- For general information on climate change for land-based sectors visit the Ministry of Agriculture and Forestry website **www.maf.govt.nz/climatechange**
- For more information on climate change in New Zealand visit **www.climatechange.govt.nz** or the Ministry for the Environment's website **www.mfe.govt.nz/issues/climate**
- For more information on animal health visit **www.biosecurity.govt.nz/regs/animal-welfare**
- For more information on insect and plant pests and diseases visit **www.biosecurity.govt.nz/pests/surv-mgmt**
- For a popular guide to the IPCC reports, visit the website of the United Nations Environment Programme **www.grida.no/publications/climate-in-peril**
- Information on droughts, floods and emergencies, land and water resources, irrigation practices and adverse events can be found in the Rural New Zealand section of the MAF website **www.maf.govt.nz**
- Information on projects under MAF's Sustainable Farming fund targeting climate related issues can be found in the Sustainable Farming section of the MAF website **www.maf.govt.nz**
- Your local council may also have information on climate change. Visit **www.localcouncils.govt.nz** for a list of council websites.

The following websites provide a range of resources and publications related to climate change adaptation.

INDUSTRY

- Dairy NZ **www.dairynz.co.nz**
- Fert Research **www.fertresearch.org.nz**
- Foundation for Arable Research **www.far.org.nz**
- Horticulture NZ **www.hortnz.co.nz**
- Meat and Wool New Zealand **www.meatnz.co.nz**
- NZ Kiwifruitgrowers Inc. **www.nzkgi.org.nz**
- NZ Forest Owners Association **www.nzfoa.org.nz**
- Organics Aotearoa NZ **www.oanz.org.nz**
- Sustainable Winegrowing New Zealand **www.nzwine.com**

CROWN RESEARCH INSTITUTES

- AgResearch **www.agresearch.co.nz**
- GNS **www.gns.cri.nz**
- Landcare Research **www.landcareresearch.co.nz**
- NIWA **www.niwa.co.nz**