

**“Our science helps New Zealand build resilience to climate extremes and change”**

Dr David Wratt  
Chief Scientist – Climate

our science



# Helping New Zealand adapt to climate change

This year, NIWA released new projections of how climate change could affect New Zealand. Already, engineers, planners, and policymakers are using our work to help the country adapt to climate change.

“Some climate change is inevitable,” warns Dr David Wratt, NIWA's Chief Scientist – Climate. “But New Zealand should be better able to adapt than many countries.”

Our climate scientists looked at likely changes in New Zealand across six scenarios of future greenhouse gas emissions, using results from 12 global climate models run for the 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). For the first time, they also included results from NIWA's New Zealand regional climate model. The scenarios do not include future international reductions in greenhouse gas emissions driven by climate policies.

Key projections included:

- Temperature rise of about 1 °C by 2040 and 2 °C by 2090 for a mid-range scenario. (A 2 °C warming is about the difference in the annual median temperature between Wellington and Auckland.)
- Fewer frost days in the central North Island and in the South Island.
- Many more days above 25 °C, particularly at already warm northern sites.
- Less rain (averaged over a year) in most of the east coast and north of the North Island, coastal Canterbury, and coastal Marlborough, and more in the west and south of the South Island.
- Heavier and/or more frequent intense rainfall.
- More frequent flooding (from the sea) and drainage problems for vulnerable low-lying coastal areas, as a result of storms and high tides riding on the back of a higher sea level.

NIWA's approach to developing advice on sea-level rise is a good example of 'real world' science, balancing prudence with pragmatism.

The IPCC's basic range of projected sea-level rise, across all six scenarios, is 0.18–0.59 metres by 2090–2099 relative to the average sea level over 1980–1999. But it is possible that sea-level rise around New Zealand could be higher due to factors not included in current global climate models, such as the possibility of more rapid melting of Greenland ice. So our coastal engineers worked with other experts to develop planning guidance for the Ministry for the Environment.

The Ministry guidance suggests that, for planning and decision timeframes out to the 2090s, we should use a base value sea-level rise of 0.5 m along with an assessment of the potential consequences from a range of possible higher sea-level rises of at least 0.8 m. The higher values are particularly important where impacts

are likely to have high consequence or where additional future adaptation options are limited. Beyond 2100, where, as a result of the particular decision, future adaptation options will be limited, an allowance for sea-level rise of an additional 10 mm per year is recommended.

Full detail is contained in two Ministry for the Environment guidance manuals for local government.

#### FUNDERS:

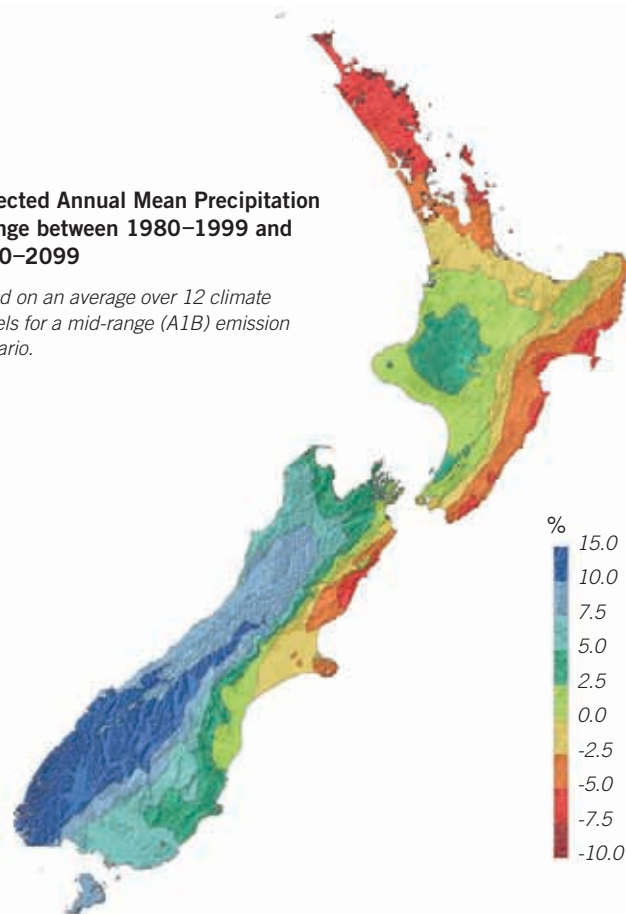
- Foundation for Research, Science and Technology
- Ministry for the Environment

#### COLLABORATORS:

- MWH New Zealand Ltd
- Earthwise Consulting Ltd

### Projected Annual Mean Precipitation Change between 1980–1999 and 2080–2099

*Based on an average over 12 climate models for a mid-range (A1B) emission scenario.*



James Slurman, Margaret Genet, Brett Mullian, NIWA

*Maps of NIWA's new climate change projections are being widely distributed to land-based sector representatives, local government, and other interested groups, with assistance from MAF and the Ministry for the Environment.*