



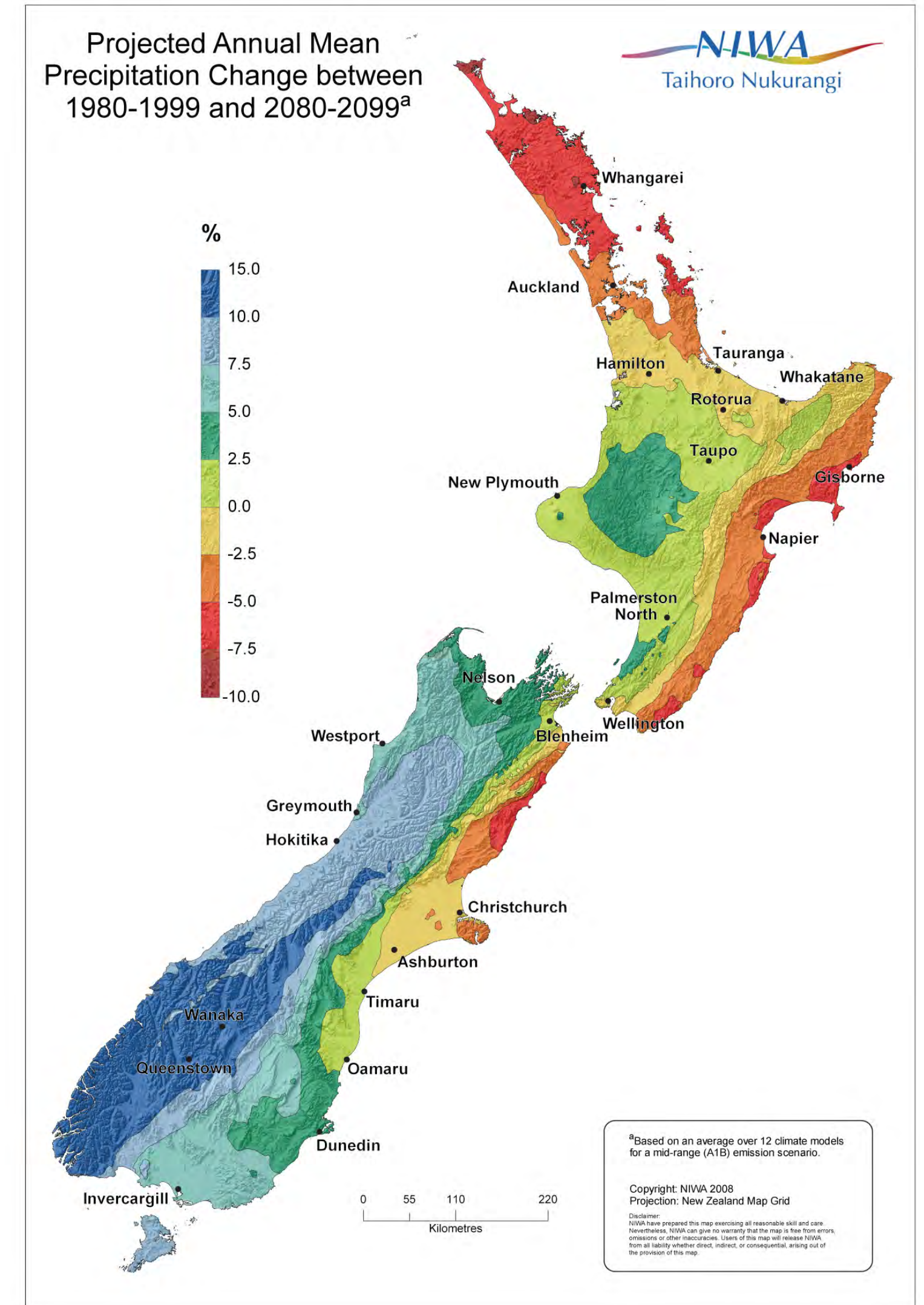
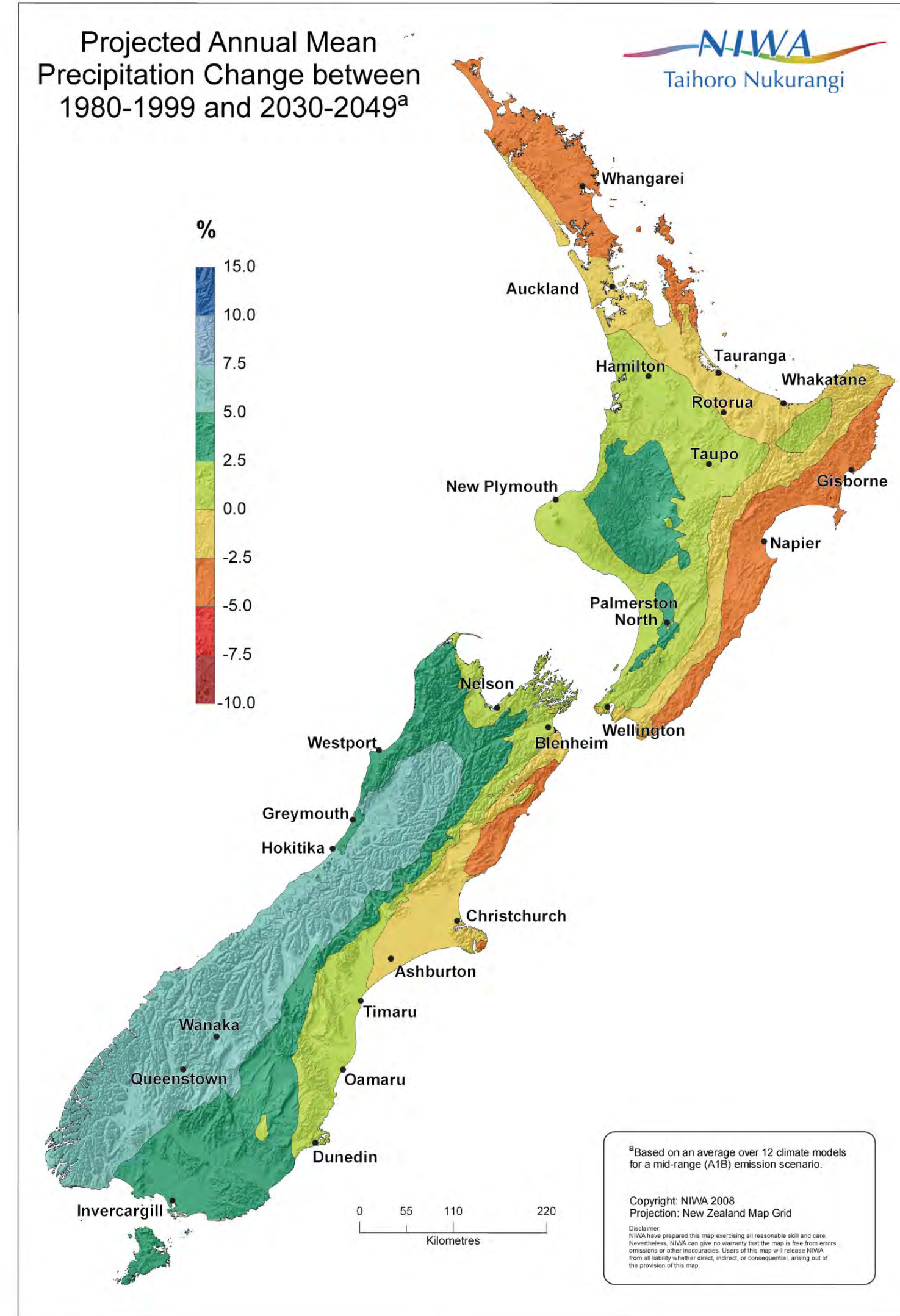
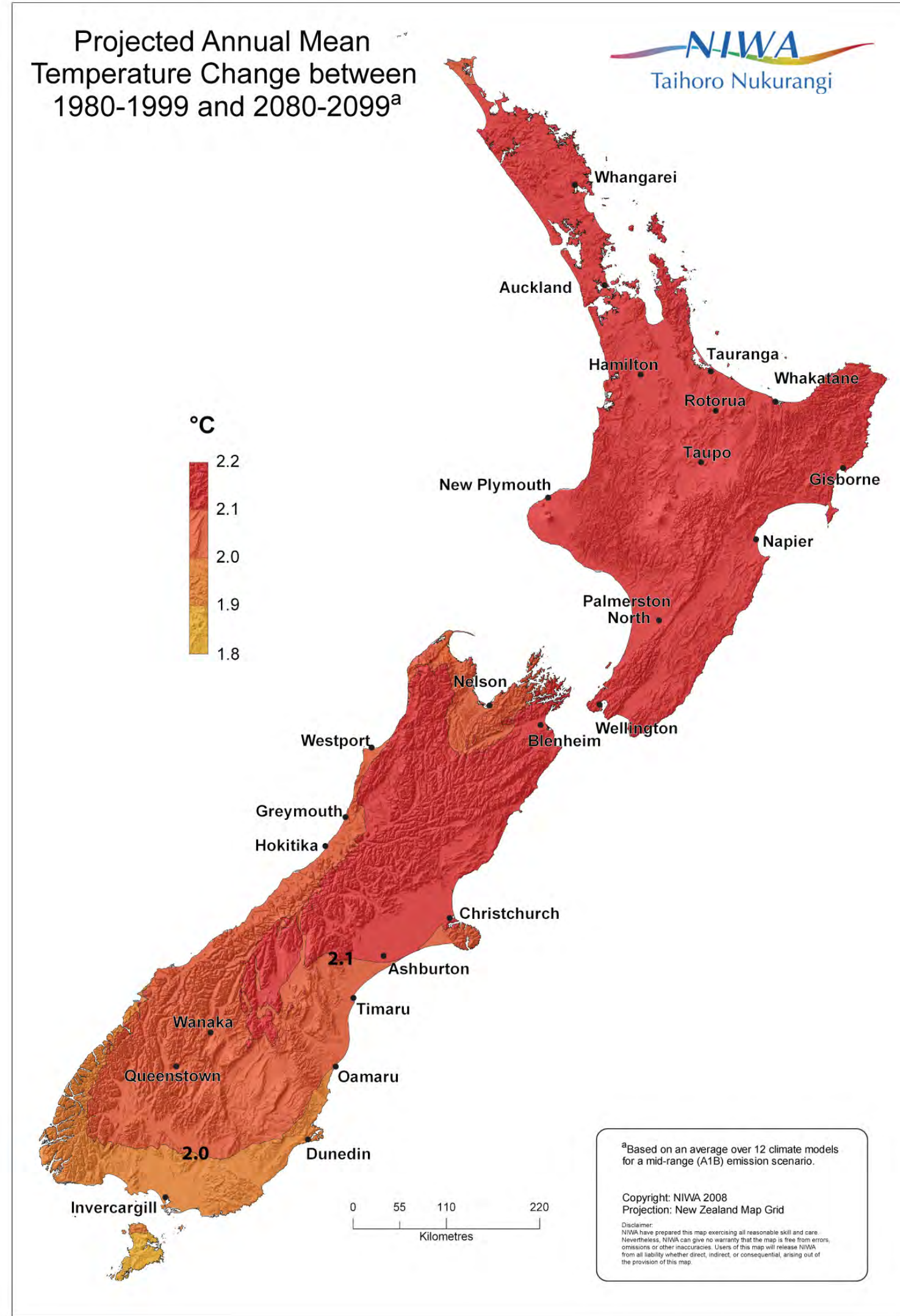
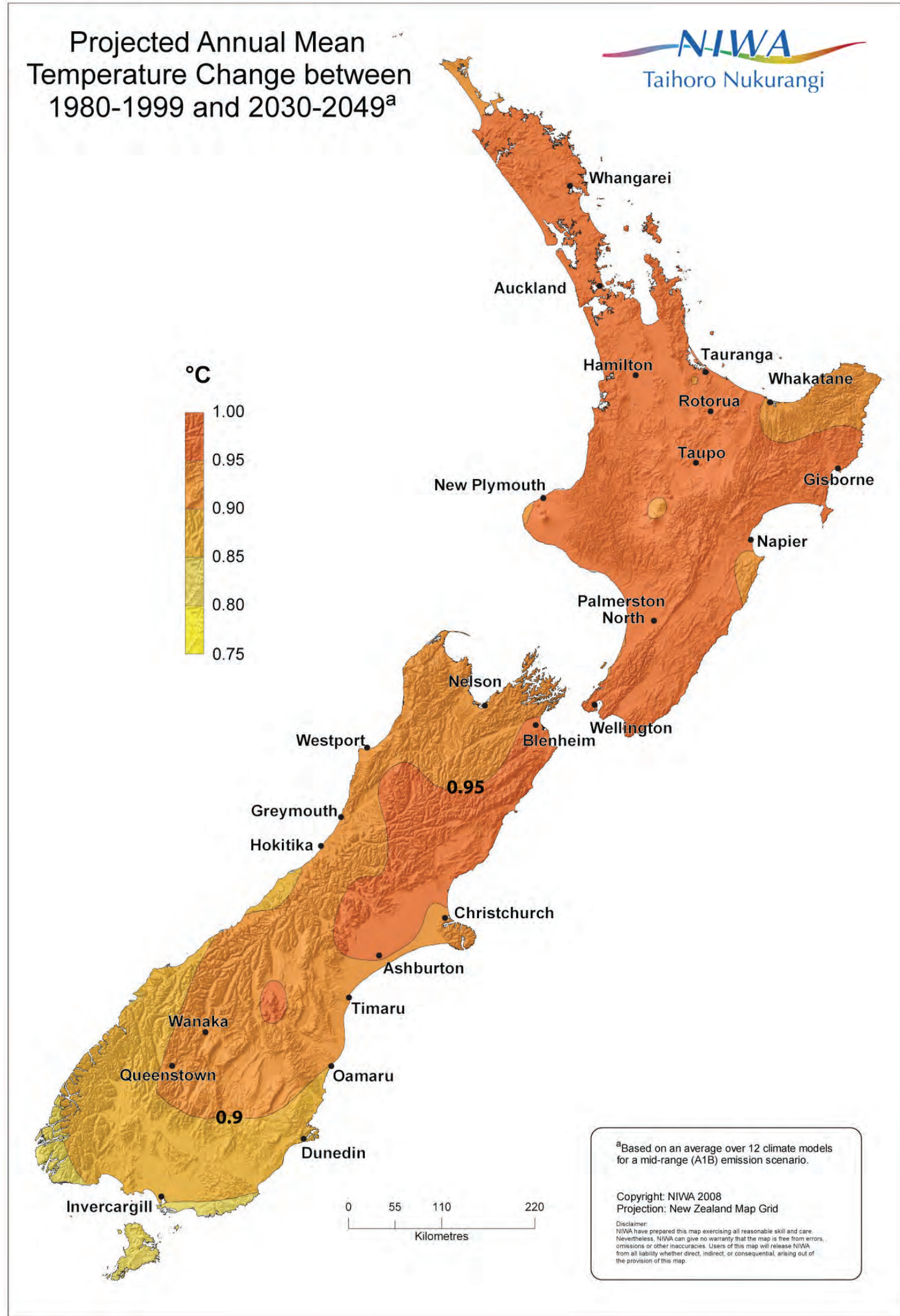
Climate change will affect planted forests in New Zealand

Projections of how climate will change:

Over the next two or three forestry rotations, NIWA projects the following likely trends in New Zealand's future climate:
 • **Warmer by about 2.0°C*** • **Wetter in the west and drier in the east** • **More extreme weather events.**

 Some of these changes will create opportunities.

 Others will require higher levels of risk management.



* Mid-range projection

Extreme weather events - higher variability and uncertainty

The effects of extreme weather events are already being felt. Intense storms are difficult to predict and their impact on forests can be huge.

More high intensity rain



Higher temperatures mean more rain and severe storms

For forest growers, heavier rain means:


-  Higher risk of erosion and downstream impacts from sediment and debris flows.

Photo supplied by BOP Regional Council

Higher winds

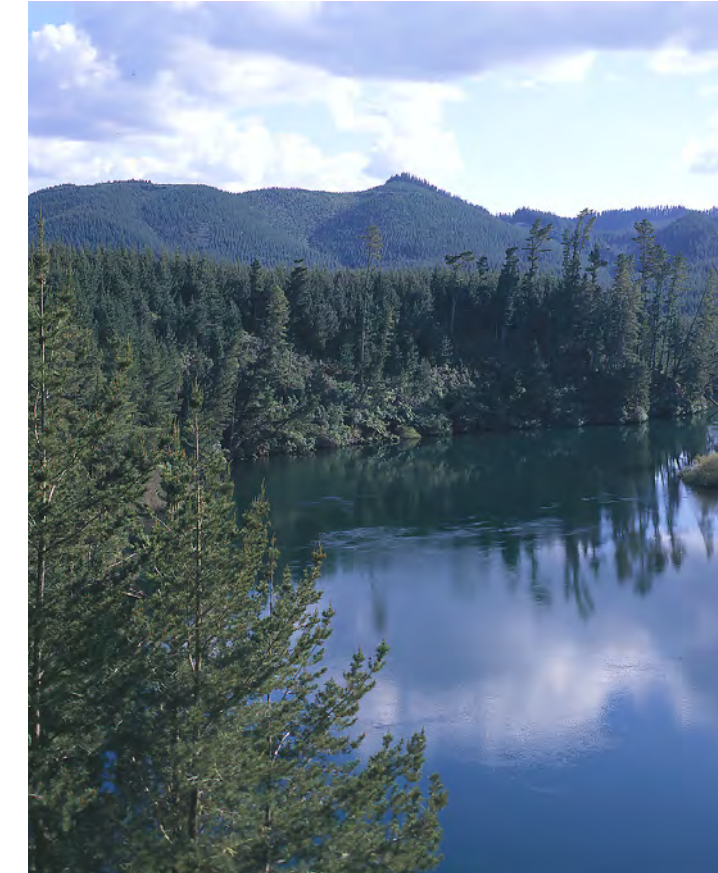


Winds may increase by up to 10%

For forest growers, higher winds mean:


-  More risk of toppling and breakage.

Warmer temperatures, less frost



Fewer frost days in lower North and South Island

For forest growers, higher temperatures will mean:



-  Higher growth rates. Reduced risk of crop damage or loss from frost damage.

Increased drought



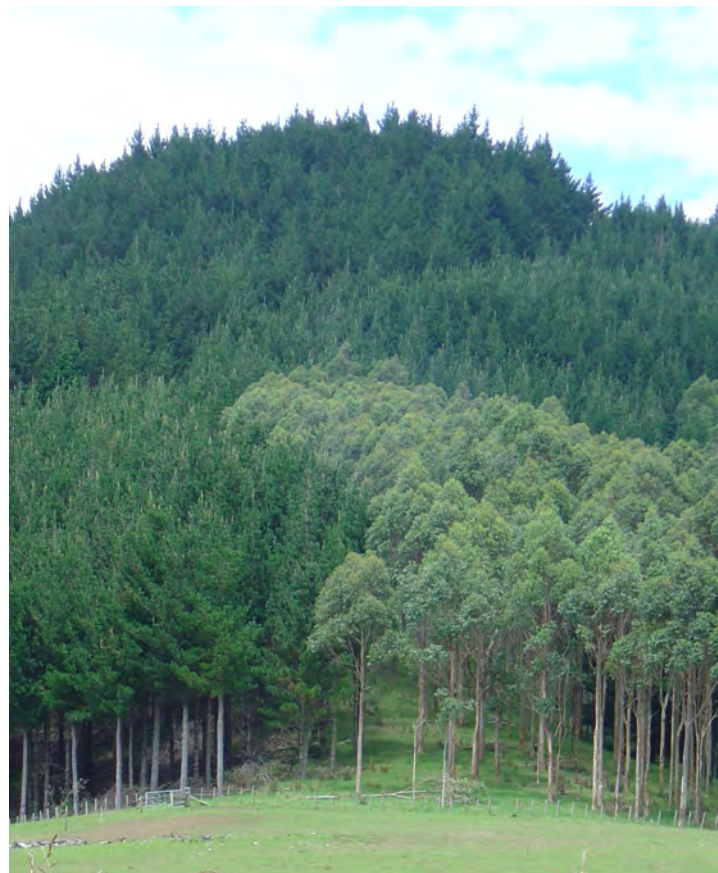
Severe droughts (1 in 20 years) may double or quadruple





For forest growers, more droughts will mean:

-  Less fungal diseases.
-  Slower growth rates. Increased fire danger.

Impacts on forestry

Forest productivity







-  More rainfall and higher temperatures mean higher growth rates.
-  Elevated CO₂ typically makes trees grow faster.
-  Wood density decreases with temperature change.
-  Increased risk of diseases, pests, weeds, wind and fire.

Forest productivity is expected to increase

Pests and diseases






-  Less fungal disease in dry areas.
-  Increased risk of new species from warm-temperate or subtropical regions.
-  Warmer temperatures mean more insects (due to better survival over winter).
-  Increased risk of Swiss needle cast in Douglas-fir.

Species composition may change in response to pest and disease trends

Weeds





-  Weeds adapt to change more quickly than trees. Faster growing trees mean even faster growing weeds.
-  Increased weed competition for water in dry regions.
-  Species composition and distribution will change. Risks of new weeds will increase.

Growth rates of weeds are expected to increase in most regions

Fire



-  Higher temperatures and more wind mean a longer fire season and bigger fires.
-  Highly stocked stands have higher risk profile and insurance rates.

Fire risk is likely to increase in many regions

Summary

-  Tree growth responds directly to changes in temperature, water availability and CO₂ concentration. In many regions, this could mean higher productivity and opportunities to establish faster-growing forests.
-  Climate change issues are driving policy to offset CO₂ emissions.
 - Carbon forestry offers increased revenue streams for growers
 - Demand for sustainable wood products is expected to increase
-  Climate change has highlighted the potential for using forests to protect soil and decrease risks of flooding.
-  The impact of pests and diseases, weeds, fire, intense rainfall and high wind cause significant economic losses in planted forests. These risks are expected to increase with climate change.