

Risk

- Risk is fundamentally a function of probability and consequence;
- Probability is the chance of an event occurring at any given point in time;
- Commonly expressed as a Return Period or Recurrence Interval (the average interval between events commonly expressed in years);
- Also expressed as Annual Exceedance Probability or AEP (the likelihood of an event occurring in any given year).

Return Period or AEP

- **Relies on statistical analysis of what's gone before as a guide to what is likely to occur in the future;**
- Climatic events such as storms are inherently stochastic in nature and large flood events are not evenly distributed over time;
- *Stochastic - having a random probability distribution or pattern that may be analysed statistically but may not be predicted precisely.*
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Flood Risk



FLOOD RISK

BACKGROUND CONDITIONS

- flood history
- number of properties at risk

FLOOD PROTECTION

- type of defence
- design standard
- condition of defence

SOCIAL

- flood awareness
- social disruption
- nature of housing
- vulnerability of population

FLOOD PREDICTION

- source of flooding
- reliability of forecasting
- warning time

ECONOMIC

- infrastructure at risk
- commercial disruption
- services disruption
- potential agricultural losses

ENVIRONMENTAL

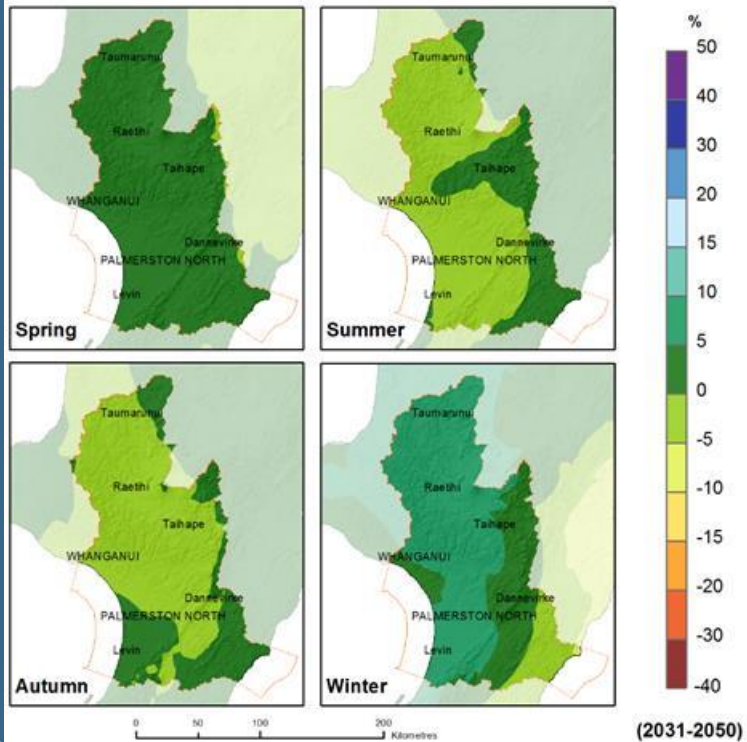
- climate change
- catchment conditions
- environmentally sensitive areas

FLOOD TYPE

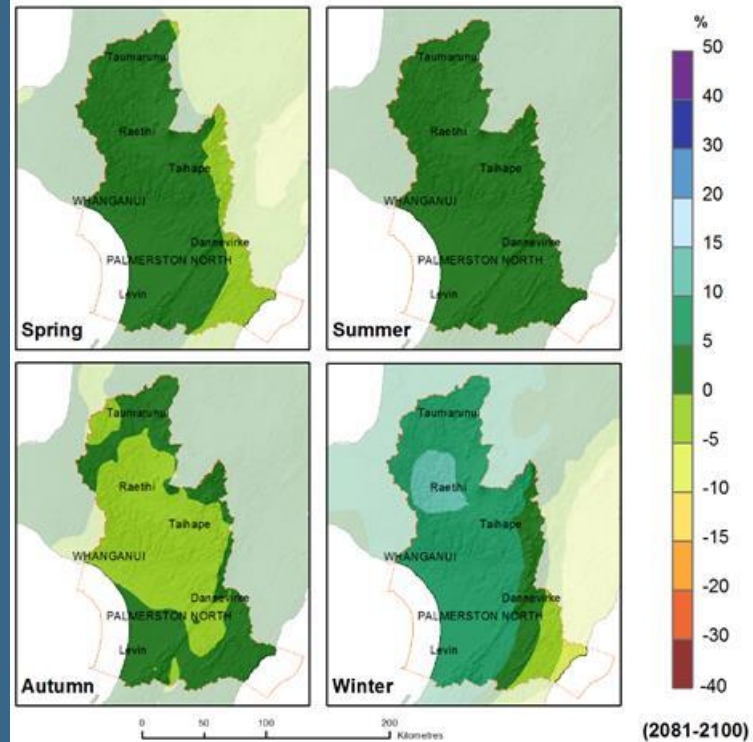
- wave action
- flood velocity
- rate of flood rise
- depth of flooding

Future Rainfall Projections

Low emissions scenario at 2040
RCP 4.5

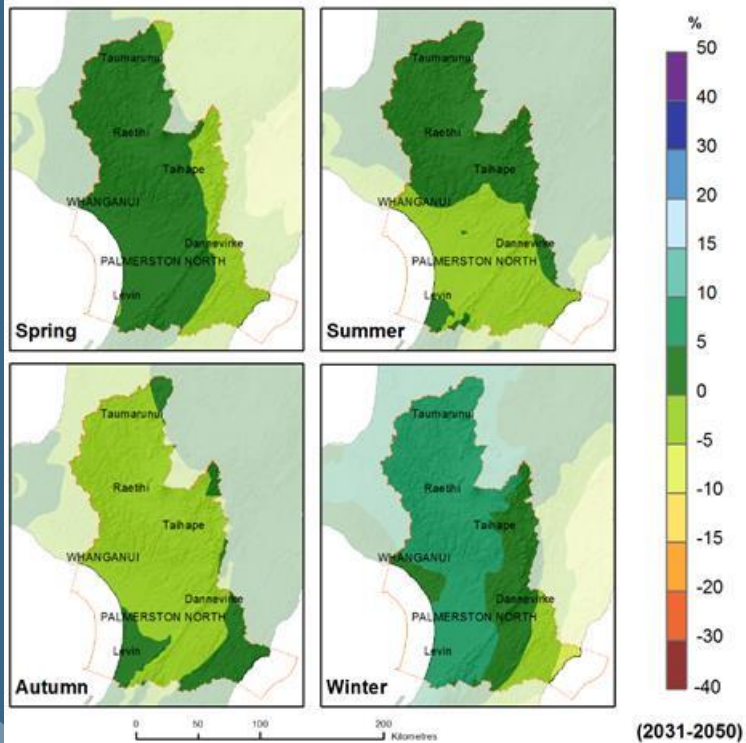


Low emissions scenario at 2090
RCP 4.5

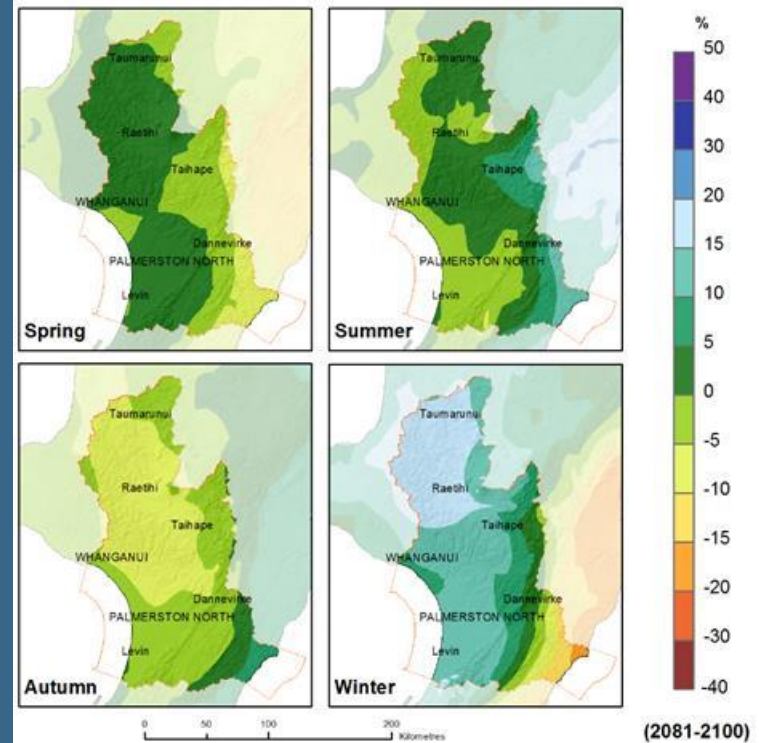


Future Rainfall Projections

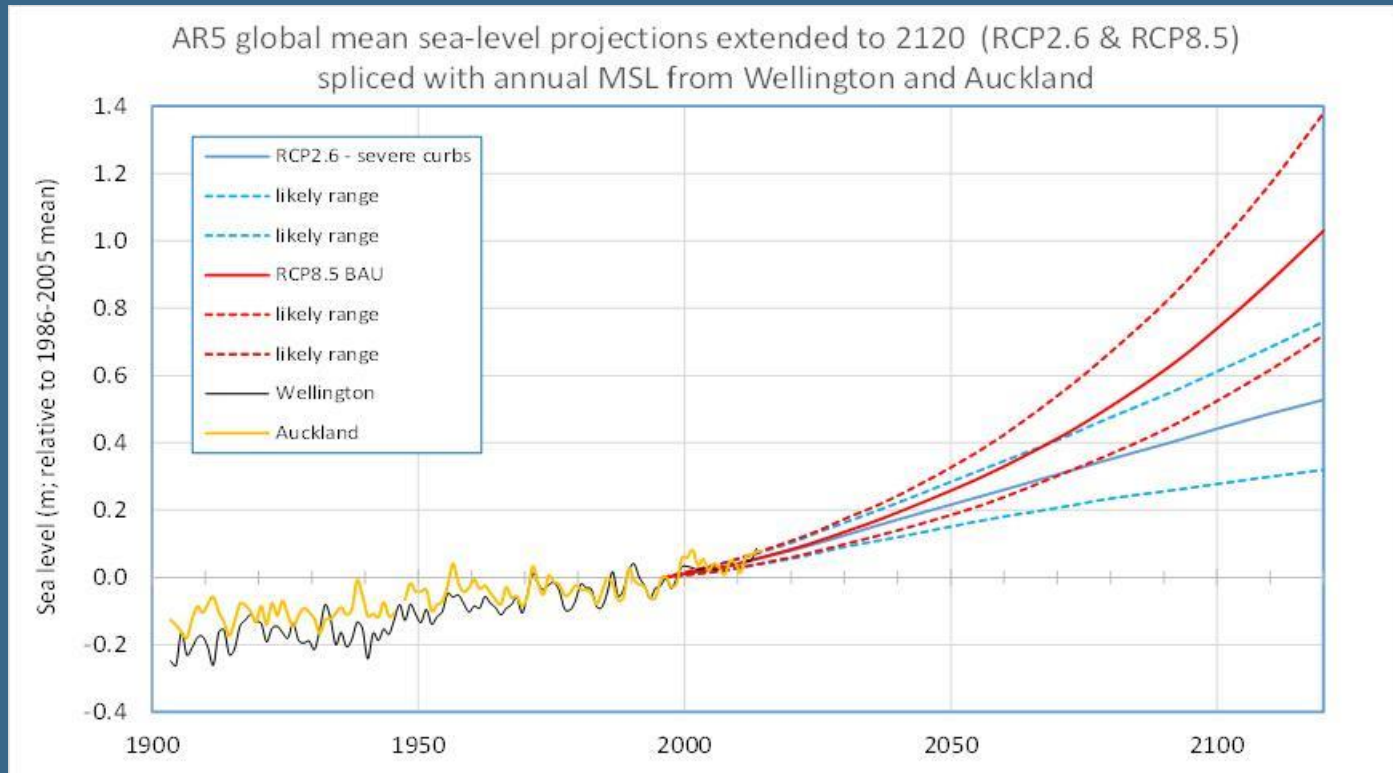
High emissions scenario at 2040
RCP 8.5



High emissions scenario at 2090
RCP 8.5



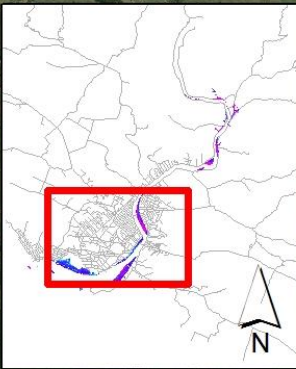
Climate Change



Flood Risk

- Inherently complex requiring value judgements around what level of risk is acceptable;
- In reality the level of flood risk a community is prepared to accept varies considerably over time and is substantially influenced by how recently a large flood may have occurred;
- Conventional wisdom with **Risk Aversion** (*the reluctance of a person to accept a bargain with an uncertain payoff rather than another bargain with a more certain, but possibly lower, expected payoff*) because of the long timescales.

Whanganui River - Maximum Flood Depth - 200 year ARI Flood



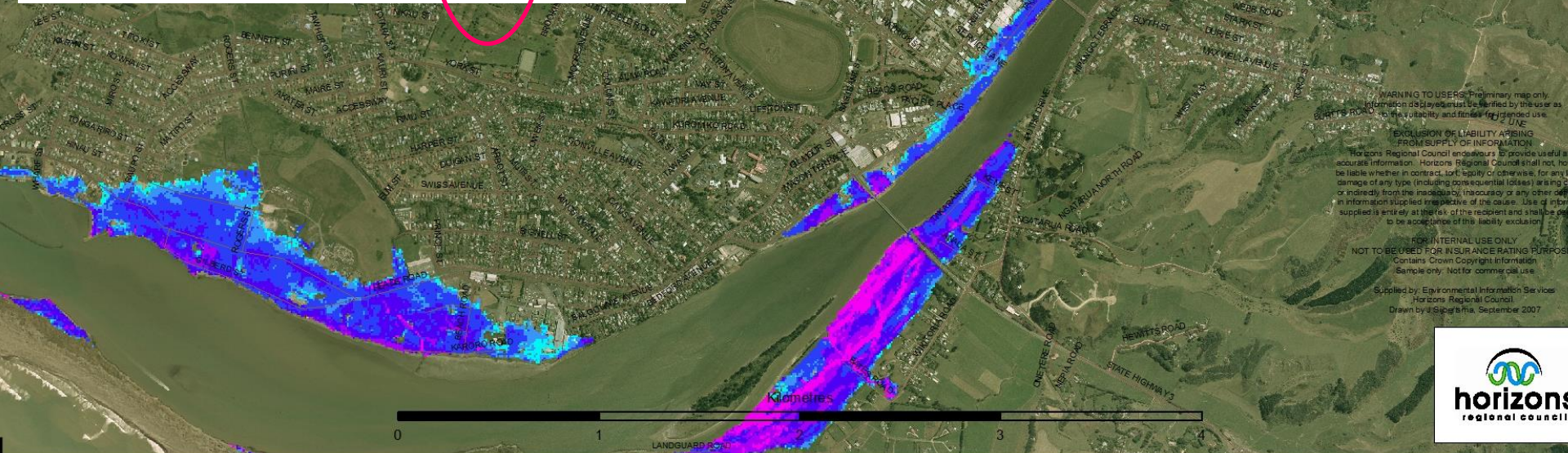
Key

— Road

Maximum Flood Depth (m)

- Below 0.20
- 0.20 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- Above 2.00

	Change in modelled flood levels (m)			
	2% AEP	1% AEP	0.5% AEP	1% AEP + CC
Railway bridge	0.45	0.42	0.39	0.34
Dublin Street bridge	0.41	0.42	0.40	0.37
City bridge	0.36	0.37	0.37	0.35
Cobham bridge	0.32	0.37	0.40	0.44
Yacht Club	0.10	0.12	0.15	0.17



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