

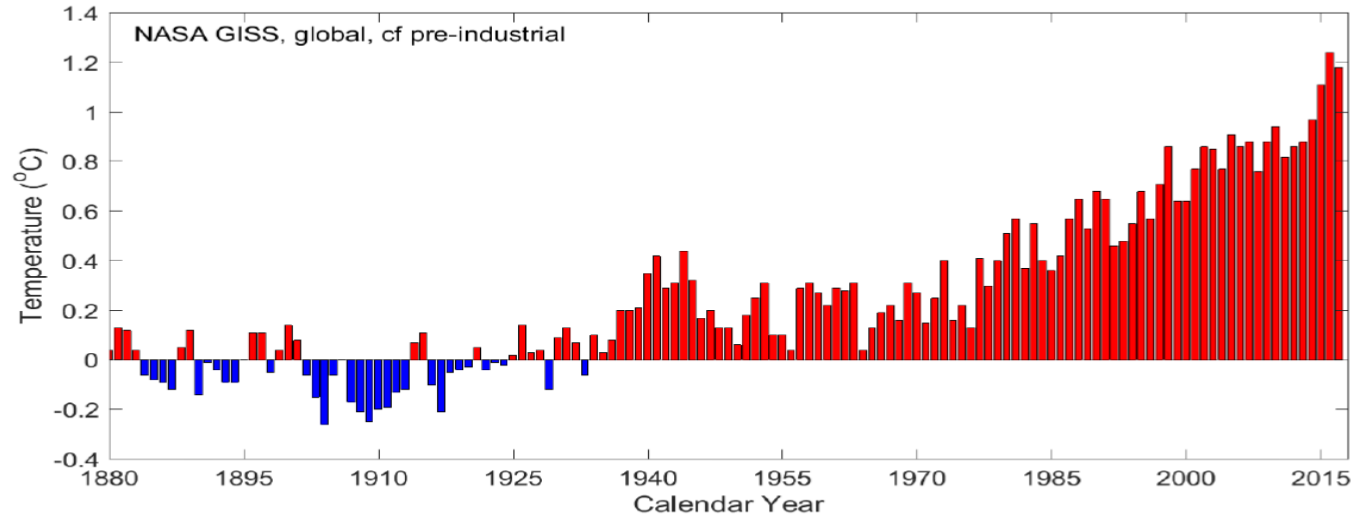
Responding to Climate Change challenges facing the water and wastewater industry

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19 September 2018

Temperatures are increasing

Global surface temperatures



Dry days are increasing in frequency

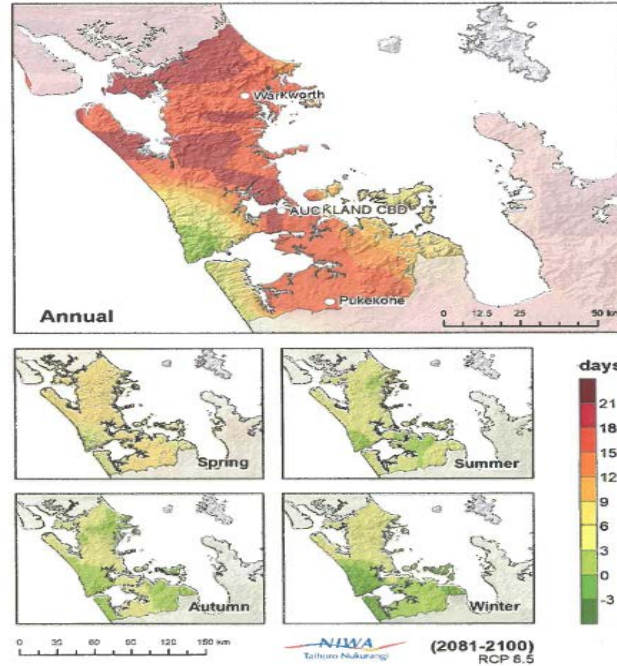
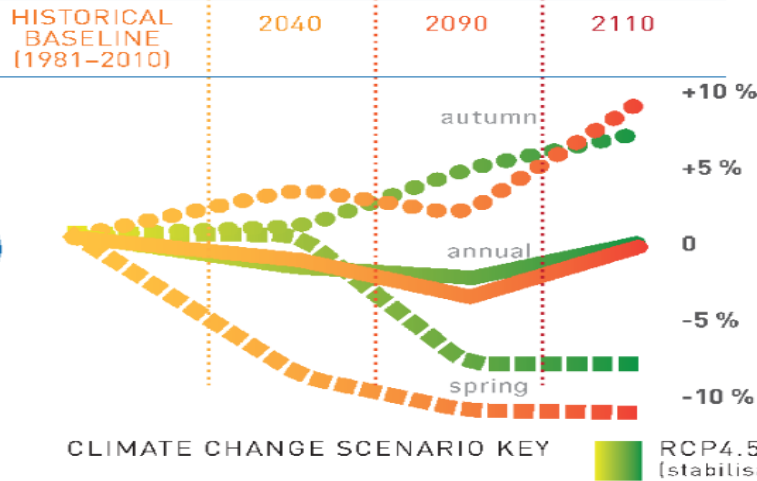


Figure 4-51: Projected change in number of dry days per year and season (precipitation <1mm/day) at 2091 or RCP8.5, for the Auckland Region. Projected change in dry days is relative to 1986-2005. Results are based

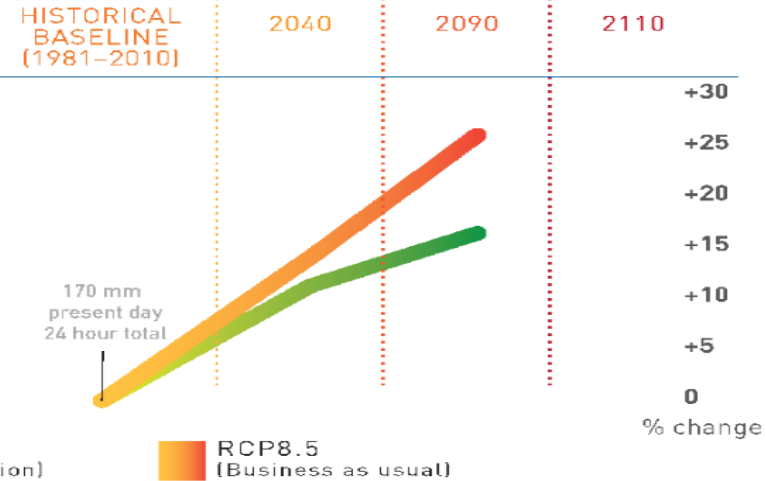
Storm events are increasing in intensity and frequency



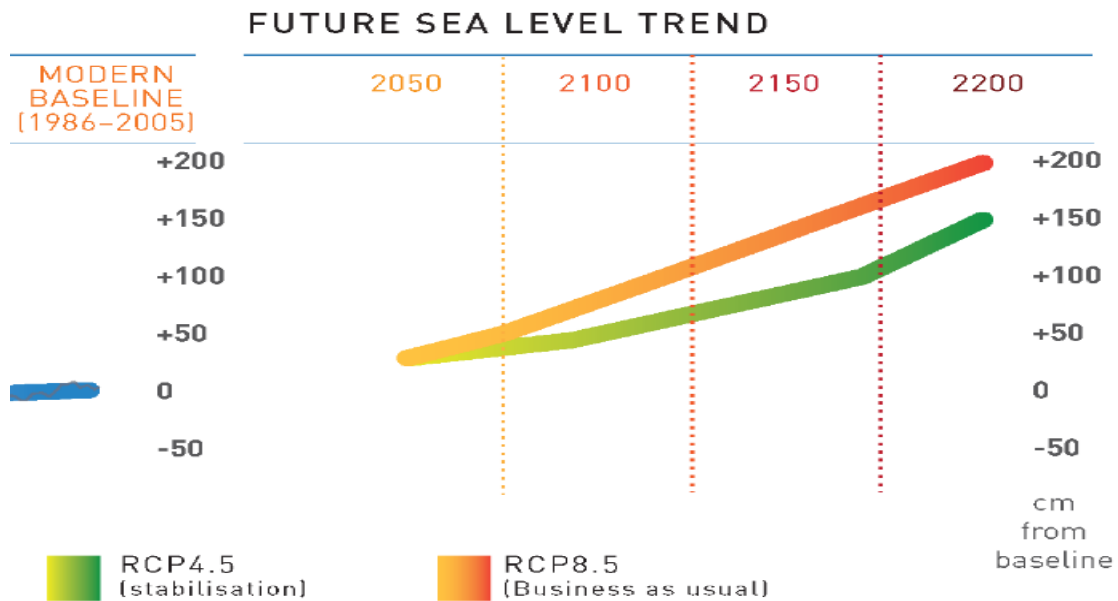
AVERAGE RAINFALL TRENDS



EXTREME RAIN INTENSITY (1 in 100 year storm)



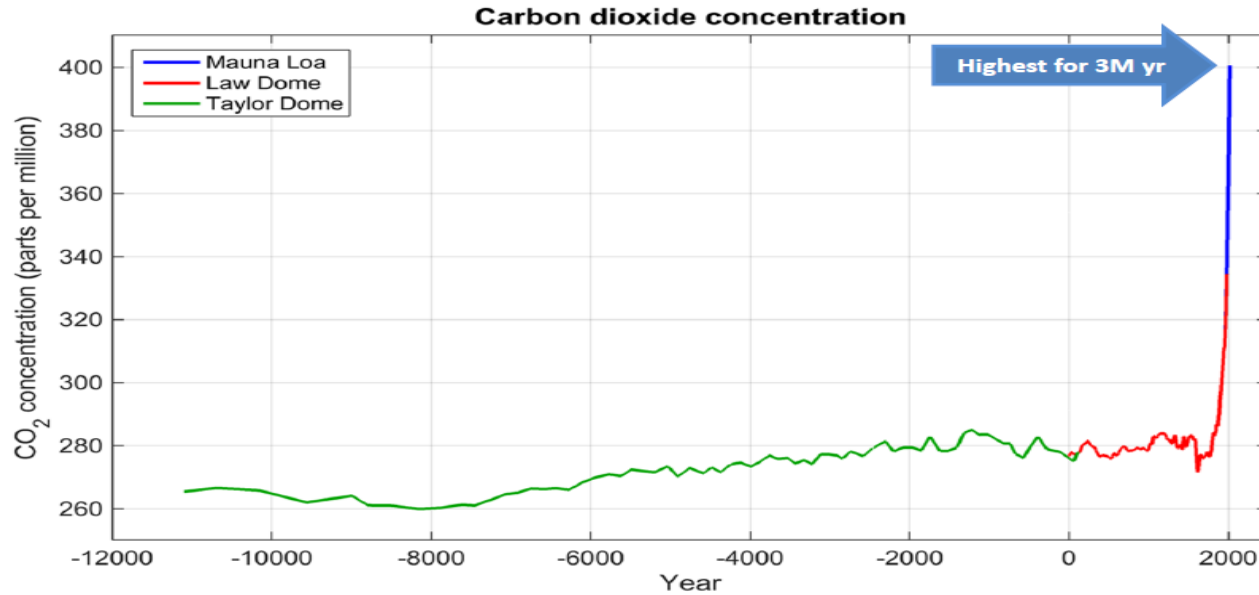
Sea levels are rising



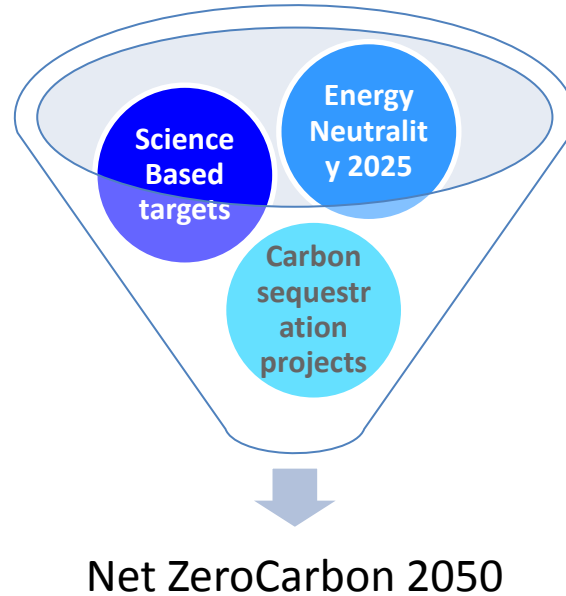
Mitigation and Adaptation

- Mitigation
 - Reduce emissions to result in a less than +2°C world
 - Paris 2015 agreement – New Zealand was a signatory
 - Climate leaders coalition
- Adaptation
 - Build resilience in infrastructure and process to be ready for a different climate
 - Case-by-case basis

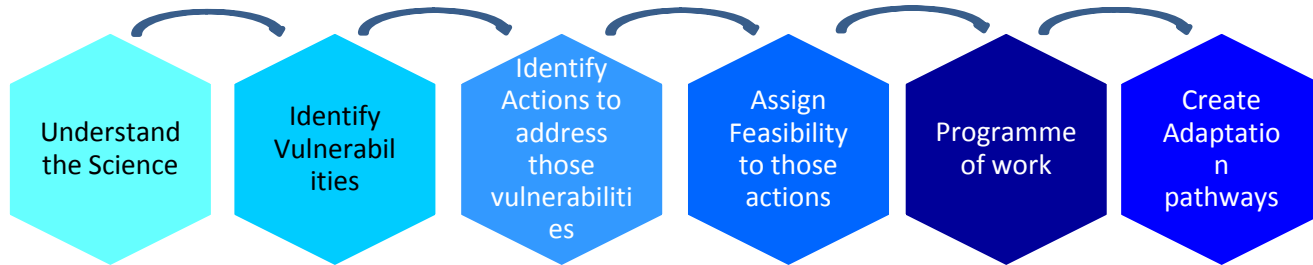
Mitigation - Greenhouse Gases in the atmosphere are increasing



Mitigation at Watercare



Adaptation process development



Vulnerability examples

Decreased land stability following rainfall

Loss of native vegetation in catchments due to fire

Buoyancy forces on dam base

Fluctuating supply patterns dependant on rainfall events

Increased microbiological activity in raw water sources

Saline intrusion

Dependency on third party suppliers (roading, power, telecommunications, chemical supply)

Potential for ash in the raw water sources

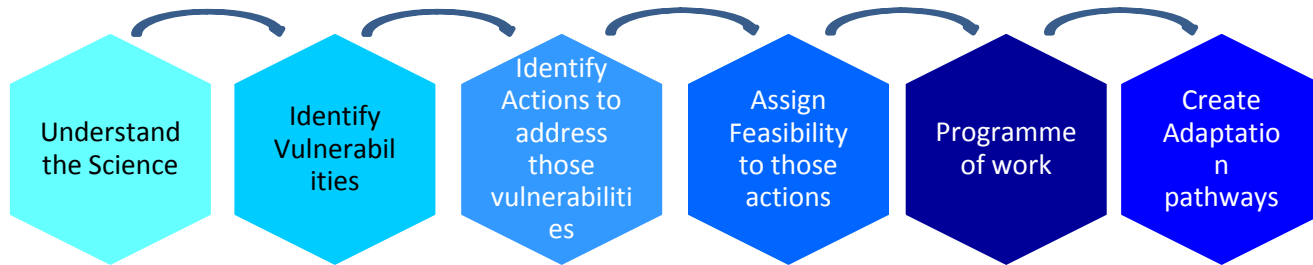
Pipe breakages due to dry ground conditions and slips

Potential loss of gravity supply

Land use change could result in increased pesticides

Pipe corrosion from salt water

Adaptation process development



Key steps

- Discuss with CE and Senior Management
- Geographic study
- Create a climate change team
- Mitigate or adapt (or both)
- Develop process to become resilient

Thank you – Feel free to reach out

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