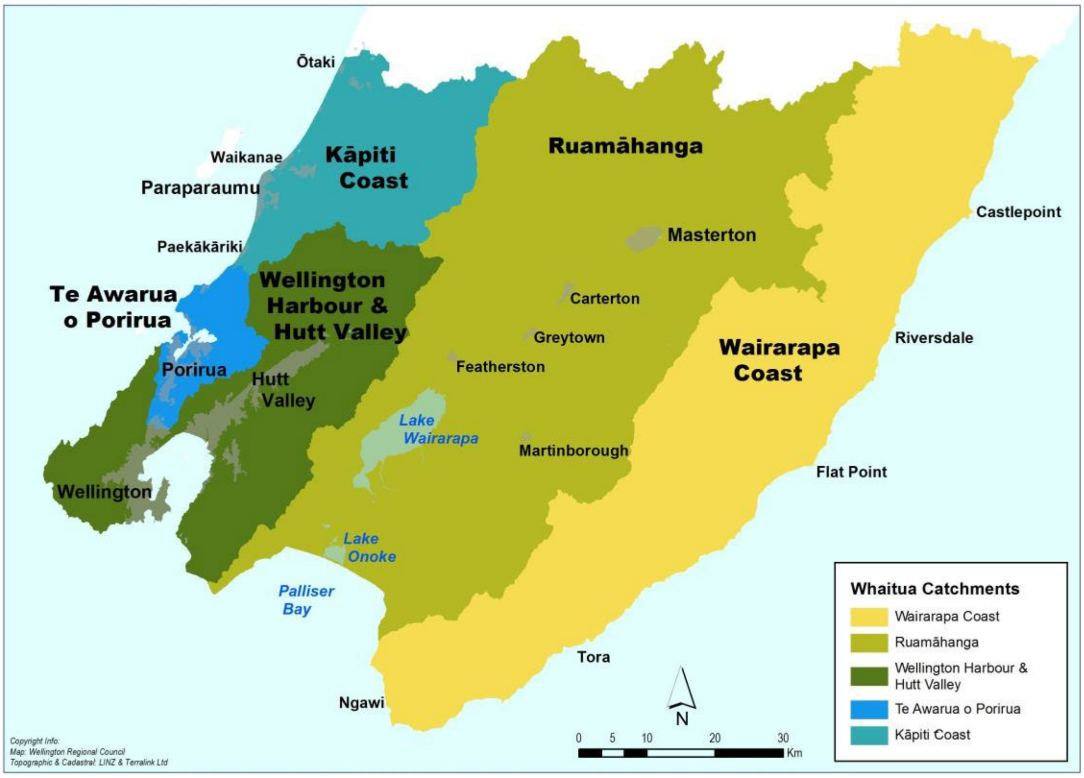
Whaitua Catchments Climate Change parameters (Updated April 2026)

Most parameters were extrapolated based on the most recent ESNZ regional climate change report (2025) using downscaled models of the sixth IPCC assessment. Previous AR5 reports were also used as a complementary source of information, whenever applicable.

Wellington Region whaitua

As pictured on the map below, the Wellington Region has been split into five whaitua (catchments) with a committee in each making decisions on the future of land and water management in that whaitua.



Changes that have already happened (verified by measurements): As of 2026, our region has already warmed by about 1.1 degrees in total, based on measured data for over a century in Wellington and Masterton. Nearly half of this warming (about 0.5 degrees) has happened since 1995, which is the reference baseline year representing the middle of the 1986-2005 period against which the IPCC models calculate their projections in our reports. This overall warming has been associated with several additional climatic changes, including increases in weather extremes and a significant disruption of weather patterns and displacement of the seasons (e.g. winters starting late). Insurance data confirms a marked increase of weather-related claims in New Zealand over the last decade.

Predicted changes (estimated by climate models): While it is impossible to predict exactly what the climate will be in the future, we offer below an estimate of the potential range for various climate variables per catchment area, based on the latest climate model assessment downscaled for our region. We note however that the models' resolutions are still too course (12x12 km) to adequately resolve smaller local scale details. As such, the projections below can act as an average range for each larger catchment area.

Climate Change mapping online: https://mapping1.gw.govt.nz/gw/ClimateChange/

Te Awarua-o-Porirua whaitua			
Variable/period	**2050**	**2100**	**Commentary**
Average annual Temperature	0.7C to 1.3C above the 1995 baseline	1.4C to 3.1C above the 1995 baseline	The range is an estimation based on lower range and upper range scenarios (SSP 2.6 and SSP7.0). Note that the more extreme SSP8.5 scenario has been excluded from this analysis For total warming in relation to pre-industrial levels, another half of a degree should be added
Average annual rainfall	0% to 5% increase	0% to 10% increase	There is large uncertainty in average annual rainfall with little agreement between models. Changes against emission scenarios are also not necessarily linear.
Amount of rain falling during heavy rainfall days (> 99th percentile of daily rainfall, equivalent to heavy rainfall days seen every year, i.e., not too extreme)	Up to 15% increase	Up to 25% increase	There is greater certainty for generalized increases in heavy rainfall
Extreme rainfall magnitude: 1-6 hour duration, 100 year Average Recurrence Interval (normally used as reference for flooding design, referring to very extreme, infrequent rainfall events)	7% to 18% increase	14% to 43% increase	Extreme rainfall increases for short and very short duration events can be more extreme and more certain, due to the increased amount of water vapour that the atmosphere can hold as it gets warmer (about 8% increase in saturation vapour per degree of warming), and the potential for severe thunderstorms and downpours embedded in atmospheric river events. The uncertainty range accounts for the total model variability used to inform the HIRDS system, which is the national reference for Flood Protection (https://hirds.niwa.co.nz/).
Sea level rise	0.2 to 0.6 metres above the 2005 baseline	0.5 to 1.5 metres above the 2005 baseline	The projected sea level rise variation is based on the total range between SSP2.6 and SSP8.5 including the impacts of vertical land movement. See the NZ Sea Rise project for more detailed information (https://searise.nz/maps/)
Number of hot days (above 25C) per year	Up to 10 days increase	Up to 30 days increase	
Number of frost nights (below 0C) per year	Up to 5 days reduction	Up to 15 days reduction	

Change in the intensity of wind during windy days (>99th percentile of daily mean)	Up to 4% increase	Up to 4% increase	
Change in annual number of windy days	Up to 10 days increase	Up to 10 days increase	
Change in annual growing degree days base 10	Increase between 200 and 600 GDD units	Increase between 300 and 1200 GDD units	Measures potential for crop and pasture growth
Change in annual potential evapotranspiration deficit (mm)	Increase between 60 and 100 mm	Increase between 60 and 120 mm	Measures drought intensity
Change in rivers mean annual low flow discharge (MAL)	Decrease up to 40%	Decrease up to 40%	Measures water shortage in the catchments
Change in rivers mean annual flood discharge (MAF)	Increase up to 40%	Increase up to 80%	Measures flood potential in the catchments
Changes in number of days of very high and extreme forest fire danger	50% to 100% increase	100% to 150% increase	These figures are given by IPCC model averages. Individual models can show much higher increases of up to 700%
Key environmental impacts	Increased flood intensity Increased coastal inundation (some areas to become permanently inundated) Increased erosion Reduced soil fertility Decreased water quality Groundwater quality and availability pressures Salt water intrusion Ground water intrusion Increased pressure on water storage Biodiversity losses Increased pests such as wasps and rodents Ocean acidification Decline in fish population Increased wildfire Increased allergies (e.g. pollen)		

Wellington Harbour & Hutt Valley whaitua			
Variable/period	**2050**	**2100**	**Commentary**
Average annual Temperature	0.7C to 1.3C above the 1995 baseline	1.4C to 2.9C above the 1995 baseline	The range is an estimation based on lower range and upper range scenarios (SSP 2.6 and SSP7.0). Note that the more extreme SSP8.5 scenario has been excluded from this analysis For total warming in relation to pre-industrial levels, another half of a degree should be added
Average annual rainfall	5% decrease to 10% increase	5% decrease to 10% increase	There is large uncertainty in average annual rainfall with little agreement between models. Changes against emission scenarios are also not necessarily linear.
Amount of rain falling during heavy rainfall days (> 99th percentile of daily rainfall, equivalent to heavy rainfall days seen every year, i.e., not too extreme)	Up to 15% increase	Up to 25% increase	There is greater certainty for generalized increases in heavy rainfall
Extreme rainfall magnitude: 1-6 hour duration, 100 year Average Recurrence Interval (normally used as reference for flooding design, referring to very extreme, infrequent rainfall events)	7% to 18% increase	14% to 43% increase	Extreme rainfall increases for short and very short duration events can be more extreme and more certain, due to the increased amount of water vapour that the atmosphere can hold as it gets warmer (about 8% increase in saturation vapour per degree of warming), and the potential for severe thunderstorms and downpours embedded in atmospheric river events. The uncertainty range accounts for the total model variability used to inform the HIRDS system, which is the national reference for Flood Protection (https://hirds.niwa.co.nz/).
Sea level rise	0.2 to 0.6 metres above the 2005 baseline	0.5 to 1.5 metres above the 2005 baseline	The projected sea level rise variation is based on the total range between SSP2.6 and SSP8.5 including the impacts of vertical land movement. See the NZ Sea Rise project for more detailed information (https://searise.nz/maps/)
Number of hot days (above 25C) per year	Up to 10 days increase	Up to 40 days increase	
Number of frost nights (below 0C) per year	Up to 5 days reduction	Up to 10 days reduction	

Change in the intensity of wind during windy days (>99th percentile of daily mean)	Up to 4% increase	Up to 4% increase	
Change in annual number of windy days	Up to 10 days increase	Up to 10 days increase	
Change in annual growing degree days base 10	Increase between 0 and 600 GDD units	Increase between 200 and 1200 GDD units	Measures potential for crop and pasture growth
Change in annual potential evapotranspiration deficit (mm)	Increase between 40 and 100 mm	Increase between 40 and 140 mm	Measures drought intensity
Change in rivers mean annual low flow discharge (MAL)	Decrease up to 40%	Decrease up to 40%	Measures water shortage in the catchments
Change in rivers mean annual flood discharge (MAF)	Increase up to 40%	Increase up to 100%	Measures flood potential in the catchments
Changes in number of days of very high and extreme forest fire danger	50% to 100% increase	100% to 150% increase	These figures are given by IPCC model averages. Individual models can show much higher increases of up to 700%
Key environmental impacts	Increased flood intensity Increased coastal inundation (some areas to become permanently inundated) Increased erosion Reduced soil fertility Decreased water quality Groundwater quality and availability pressures Saltwater intrusion Ground water intrusion Increased pressure on water storage Biodiversity losses Increased pests such as wasps and rodents Ocean acidification Decline in fish population Increased wildfire Increased allergies (e.g. pollen)		

Kāpiti Coast whaitua			
Variable/period	2050	2100	Commentary
Average annual Temperature	0.7C to 1.3C above the 1995 baseline	1.4C to +3.1C above the 1995 baseline	The range is an estimation based on lower range and upper range scenarios (SSP 2.6 and SSP7.0). Note that the more extreme SSP8.5 scenario has been excluded from this analysis For total warming in relation to pre-industrial levels, another half of a degree should be added
Average annual rainfall	0% to 10% increase	0% to 10% increase	There is large uncertainty in average annual rainfall with little agreement between models. Changes against emission scenarios are also not necessarily linear.
Amount of rain falling during heavy rainfall days (> 99th percentile of daily rainfall, equivalent to heavy rainfall days seen every year, i.e., not too extreme)	Up to 15% increase	Up to 25% increase	There is greater certainty for generalized increases in heavy rainfall
Extreme rainfall magnitude: 1-6 hour duration, 100 year Average Recurrence Interval (normally used as reference for flooding design, referring to very extreme, infrequent rainfall events)	7% to 18% increase	14% to 43% increase	Extreme rainfall increases for short and very short duration events can be more extreme and more certain, due to the increased amount of water vapour that the atmosphere can hold as it gets warmer (about 8% increase in saturation vapour per degree of warming), and the potential for severe thunderstorms and downpours embedded in atmospheric river events. The uncertainty range accounts for the total model variability used to inform the HIRDS system, which is the national reference for Flood Protection (https://hirds.niwa.co.nz/).
Sea level rise	0.1 to 0.4 metres above the 2005 baseline	0.2 to 1.3 metres above the 2005 baseline	The projected sea level rise variation is based on the total range between SSP2.6 and SSP8.5 including the impacts of vertical land movement. See the NZ Sea Rise project for more detailed information (https://searise.nz/maps/)
Number of hot days (above 25C) per year	Between 5 and 10 days increase	Between 5 and 50 days increase	
Number of frost nights (below 0C) per year	Up to 5 days reduction	Up to 15 days reduction	
Change in the intensity of wind during windy days (>99th percentile of daily mean)	Up to 4% increase	Up to 4% increase	

Change in annual number of windy days	Up to 10 days increase	Up to 10 days increase	
Change in annual growing degree days base 10	Increase between 0 and 600 GDD units	Increase between 200 and 1200 GDD units	Measures potential for crop and pasture growth
Change in annual potential evapotranspiration deficit (mm)	Increase between 40 and 80 mm	Increase between 40 and 120 mm	Measures drought intensity
Change in rivers mean annual low flow discharge (MAL)	Decrease up to 40%	Decrease up to 40%	Measures water shortage in the catchments
Change in rivers mean annual flood discharge (MAF)	Between 20% decrease and 60% increase depending on catchment	Increase up to 60%	Measures flood potential in the catchments
Changes in number of days of very high and extreme forest fire danger	50% to 100% increase	100% to 150% increase	These figures are given by IPCC model averages. Individual models can show much higher increases of up to 700%
Key environmental impacts	Increased flood intensity Increased coastal inundation (some areas to become permanently inundated) Increased erosion Reduced soil fertility Decreased water quality Groundwater quality and availability pressures Saltwater intrusion Ground water intrusion Increased pressure on water storage Biodiversity losses Increased pests such as wasps and rodents Ocean acidification Decline in fish population Increased wildfire Increased allergies (e.g. pollen)		

Ruamāhanga whaitua			
Variable/period	2050	2100	Commentary
Average annual Temperature	+0.9C to 1.3C above the 1995 baseline	+1.6C to +3.4C above the 1995 baseline	The range is an estimation based on lower range and upper range scenarios (SSP 2.6 and SSP7.0). Note that the more extreme SSP8.5 scenario has been excluded from this analysis For total warming in relation to pre-industrial levels, another half of a degree should be added
Average annual rainfall	5% decrease to 5% increase	0% to 15% decrease	There is large uncertainty in average annual rainfall with little agreement between models. Changes against emission scenarios are also not necessarily linear.
Amount of rain falling during heavy rainfall days (> 99th percentile of daily rainfall, equivalent to heavy rainfall days seen every year, i.e., not too extreme)	Up to 15% increase	Up to 25% increase	There is greater certainty for generalized increases in heavy rainfall
Extreme rainfall magnitude: 1-6 hour duration, 100 year Average Recurrence Interval (normally used as reference for flooding design, referring to very extreme, infrequent rainfall events)	7% to 18% increase	14% to 43% increase	Extreme rainfall increases for short and very short duration events can be more extreme and more certain, due to the increased amount of water vapour that the atmosphere can hold as it gets warmer (about 8% increase in saturation vapour per degree of warming), and the potential for severe thunderstorms and downpours embedded in atmospheric river events. The uncertainty range accounts for the total model variability used to inform the HIRDS system, which is the national reference for Flood Protection (https://hirds.niwa.co.nz/).
Sea level rise	0.4 to 0.8 metres above the 2005 baseline	0.9 to 2.0 metres above the 2005 baseline	The projected sea level rise variation is based on the total range between SSP2.6 and SSP8.5 including the impacts of vertical land movement. See the NZ Sea Rise project for more detailed information (https://searise.nz/maps/)
Number of hot days (above 25C) per year	Up to 30 days increase	Up to 80 days increase	
Number of frost nights (below 0C) per year	Up to 15 days reduction	Up to 40 days reduction	

Change in the intensity of wind during windy days (>99th percentile of daily mean)	Up to 4% increase	Up to 4% increase	
Change in annual number of windy days	Up to 10 days increase	Up to 10 days increase	
Change in annual growing degree days base 10	Increase between 0 and 600 GDD units	Increase between 200 and 1200 GDD units	Measures potential for crop and pasture growth
Change in annual potential evapotranspiration deficit (mm)	Increase between 20 and 120 mm	Increase between 0 and 200 mm	Measures drought intensity
Change in rivers mean annual low flow discharge (MAL)	Decrease up to 60%	Decrease up to 80%	Measures water shortage in the catchments
Change in rivers mean annual flood discharge (MAF)	Between 20% decrease and 40% increase depending on catchment	Between 20% decrease and 60% increase depending on catchment	Measures flood potential in the catchments
Changes in number of days of very high and extreme forest fire danger	100% to 150% increase	100% to 150% increase	These figures are given by IPCC model averages. Individual models can show much higher increases of up to 700%
Key environmental impacts	Increased flood intensity Increased coastal inundation (some areas to become permanently inundated) Increased erosion Reduced soil fertility Decreased water quality Groundwater quality and availability pressures Saltwater intrusion Increased in drought frequency and intensity Increased pressure on water storage Biodiversity losses Increased pests such as wasps and rodents High potential for fruit fly establishment Ocean acidification Decline in fish population Increased wildfire Increased allergies (e.g. pollen)		

Wairarapa Coast whaitua			
Variable/period	2050	2100	Commentary
Average annual Temperature	+0.7C to 1.3C above the 1995 baseline	+1.4C to +3.4C above the 1995 baseline	The range is an estimation based on lower range and upper range scenarios (SSP 2.6 and SSP7.0). Note that the more extreme SSP8.5 scenario has been excluded from this analysis For total warming in relation to pre-industrial levels, another half of a degree should be added
Average annual rainfall	5% decrease to 5% increase	15% decrease to 5% increase	There is large uncertainty in average annual rainfall with little agreement between models. Changes against emission scenarios are also not necessarily linear.
Amount of rain falling during heavy rainfall days (> 99th percentile of daily rainfall, equivalent to heavy rainfall days seen every year, i.e., not too extreme)	Up to 15% increase	Up to 25% increase	There is greater certainty for generalized increases in heavy rainfall
Extreme rainfall magnitude: 1-6 hour duration, 100 year Average Recurrence Interval (normally used as reference for flooding design, referring to very extreme, infrequent rainfall events)	7% to 18% increase	14% to 43% increase	Extreme rainfall increases for short and very short duration events can be more extreme and more certain, due to the increased amount of water vapour that the atmosphere can hold as it gets warmer (about 8% increase in saturation vapour per degree of warming), and the potential for severe thunderstorms and downpours embedded in atmospheric river events. The uncertainty range accounts for the total model variability used to inform the HIRDS system, which is the national reference for Flood Protection (https://hirds.niwa.co.nz/).
Sea level rise	0.4 to 0.8 metres above the 2005 baseline	0.9 to 2.0 metres above the 2005 baseline	The projected sea level rise variation is based on the total range between SSP2.6 and SSP8.5 including the impacts of vertical land movement. See the NZ Sea Rise project for more detailed information (https://searise.nz/maps/)
Number of hot days (above 25C) per year	Between 5 and 30 days increase	Between 15 and 60 days increase	
Number of frost nights (below 0C) per year	Up to 5 days reduction	Up to 15 days reduction	

Change in the intensity of wind during windy days (>99th percentile of daily mean)	Up to 4% increase	Up to 4% increase	
Change in annual number of windy days	Up to 10 days increase	Up to 10 days increase	
Change in annual growing degree days base 10	Increase between 0 and 600 GDD units	Increase between 200 and 1200 GDD units	Measures potential for crop and pasture growth
Change in annual potential evapotranspiration deficit (mm)	Increase between 40 and 120 mm	Increase between 40 and 200 mm	Measures drought intensity
Change in rivers mean annual low flow discharge (MAL)	Decrease up to 60%	Decrease up to 80%	Measures water shortage in the catchments
Change in rivers mean annual flood discharge (MAF)	Between 20% decrease and 20% increase depending on catchment	Between 20% decrease and 60% increase depending on catchment	Measures flood potential in the catchments
Changes in number of days of very high and extreme forest fire danger	100% to 150% increase	100% to 150% increase	These figures are given by IPCC model averages. Individual models can show much higher increases of up to 700%
Key environmental impacts	Increased flood intensity Increased coastal inundation (some areas to become permanently inundated) Increased erosion Reduced soil fertility Decreased water quality Ground water quality and availability pressures Saltwater intrusion Increase in drought frequency and intensity Increased pressure on water storage Biodiversity losses Increased pests such as wasps and rodents High potential for fruit fly establishment Ocean acidification Decline in fish population Increased wildfire Increased allergies (e.g. pollen)		

Region-wide warming summary comparing the older RCPs (AR5) and the latest SSPs (AR6) scenarios

Total warming (region wide average) for the AR5 and AR6 scenarios used in our reports	Mid Century		Late Century	
Low emission scenarios	RCP 2.6	+0.6C	RCP 2.6	+0.6C
	SSP 2.6	+0.8C	SSP 2.6	+1.0C
Middle path scenarios	RCP 4.5	+0.8C	RCP 4.5	+1.3C
	RCP 6.0	+0.7C	RCP 6.0	+1.7C
	SSP 4.5	+1.0C	SSP 4.5	+2.1C
High emission scenarios	RCP 8.5	+0.9C	RCP 8.5	+2.6C
	SSP 7.0	+1.2C	SSP 7.0	+3.1C