Hydrology Update Summer 2024/25

Report prepared by Charlotte Tomlinson, 11th of March 2025.

Data from the Marlborough District Council's Environmental Monitoring network was primarily used in preparing this report and supplemented with data from the Marlborough Research Centre, MetService, NIWA, and FENZ.

Executive Summary

Summer 2024/25 has been calm, with low rainfall and variable temperatures month to month. December 2024 was the warmest December on record (1930-2024), with an average temperature of 19.2°C, 2.3°C above the long-term average. January on the other hand was colder than average, with a mean temperature of 16.8°C, 1.4°C below the long-term average.

Summer rainfall in Blenheim totalled 75 mm, 55% of the long-term average and the 13th driest summer in 94 years of record. Evapotranspiration was normal over summer, but the low rainfall meant that the potential water deficit was higher than average, at -327 mm. 27 out of 29 rainfall monitoring sites in Marlborough recorded less than 80% of average summer rainfall. In the first week of March, drought conditions in many regions including Marlborough were declared as a medium-scale adverse event by the Minister of Agriculture.

Low rainfall has been ongoing for the past 20 months (since July 2023). In this time, 706 mm of rain has fallen in Blenheim, just 66% of the long-term average. The continuation of low rainfall has led to low river flows, soil moisture, and groundwater levels.

River flows have been below average across the region over summer, with most flow sites recording less than 50% of average summer flows. The Awatere River at Awapiri was an exception, with 79% of average summer flow recorded. This is due to frequent localised thunderstorms in the catchment providing regular rainfall inputs to the river.

In the Wairau River, baseflow has been in the lower quartile virtually all summer. Mean flow for February was 20 m^3/s, which is the 6th lowest February flow on record (1960-2025).

Soil moisture at the Marlborough Research Centre in Blenheim has been below average throughout the summer months. Average shallow soil moisture for February was 14.8%, compared to the long-term average of 18.7%. Soil moisture is lower than average in northern Marlborough, the Wairau Plains and along the east coast. Very dry soils seem to be less widespread than at the same time last year.

The Wairau Aquifer continues to show signs of stress due to prolonged low rainfall and reduced river flows. Insufficient recharge through the winter and spring months means the aquifer was not able to recover between last year and this year's dry summer conditions. Water level in the recharge reach of the aquifer (near Renwick) has been in the lower quartile throughout the summer months.

Through March, a large band of high pressure is due to continue to dominate New Zealand's weather, with dry conditions set to continue. The tropics are quiet as of early March, although tropical cyclone season continues through to the end of April.

Climate

Summer 2024/25 has been hot, cold, and somewhere in between, with large temperature variations from month to month. Consistent features were calm weather and low rainfall for all three months.

In Blenheim, December 2024 was the warmest December in 94 years, with an average temperature of 19.2°C - 2.3°C above the long-term average. In contrast, temperatures in January were noticeably colder than average. The mean temperature was 16.8°C, 1.4°C below the long-term average. February was slightly warmer than average with an average temperature of 18.4°C. The average summer temperature was 18.1°C, 0.4°C above the long-term average.

All three summer months recorded lower than average mean daily wind run in Blenheim. January 2025 was the 2nd calmest January since records began in 2010. Summer 2024/25 recorded 765.6 sunshine hours, which is 103% of the long-term average.

Rainfall

Summer rainfall totalled 75 mm in Blenheim, which is 55% of the long-term average and the 13th driest summer on record (1930-2025). Monthly rainfall totals along with monthly evapotranspiration from July 2024 onwards can be seen in Figure 1 below.

Total evapotranspiration for summer was 402 mm, 100% of the long-term average. Potential water deficit is the difference between rainfall received (gain) and potential evapotranspiration (loss). The potential water deficit this summer was -327 mm, higher than the average due to low rainfall. This is the 8th highest water deficit on record (1997-2025). The water deficit last summer was the largest on record at -423 mm.

In the first week of March, drought conditions in many regions including Marlborough were declared as a medium-scale adverse event by the Minister of Agriculture.

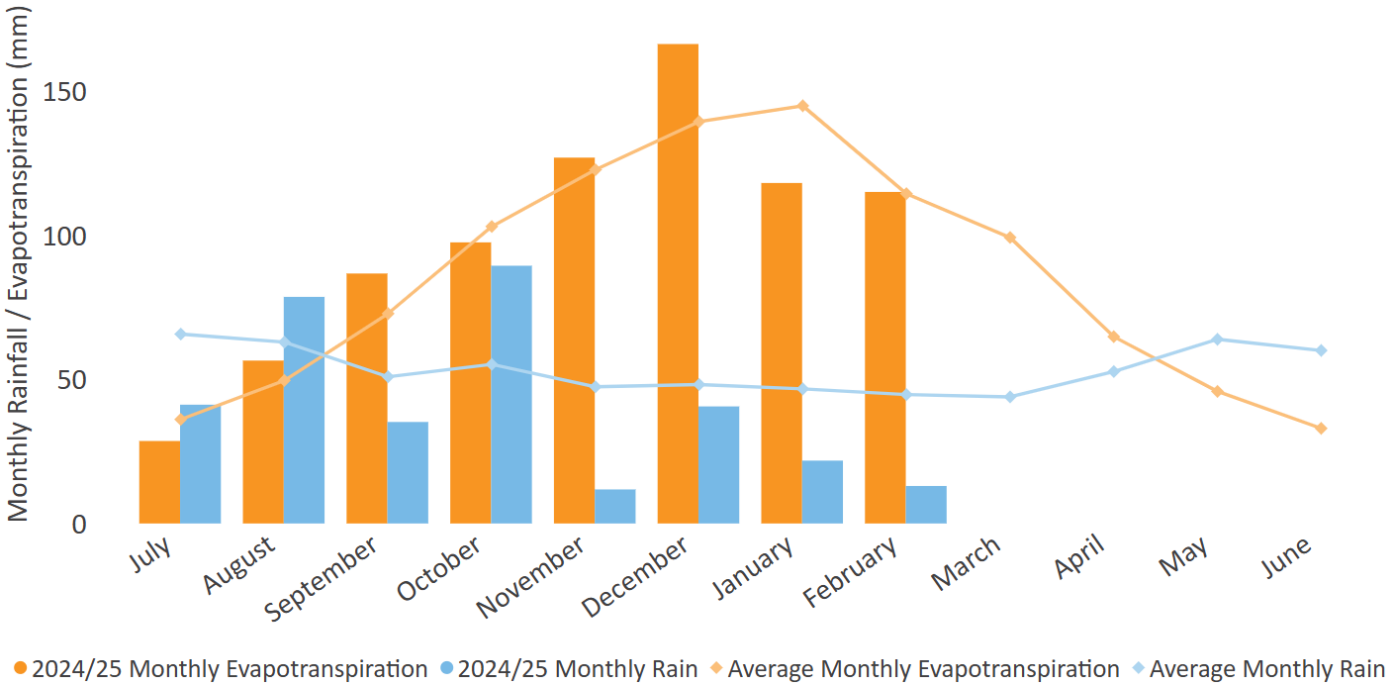

Figure 1. Monthly rainfall and evapotranspiration in Blenheim (Marlborough Research Centre) for the 2024-25 hydrological year, compared to average monthly totals.

Figure 2 shows summer rainfall for sites across Marlborough as a percentage of average summer rainfall, to show how wet or dry the season has been at different locations in the region.

Summer rainfall across the region has been below average. Less than 50% of average summer rainfall was recorded at sites near the coast, extending from Ward in the south to Rarangi, Kaituna, and to the Kenepuru Sound in the north. 50 to 80% of average rainfall was recorded across much of the region, from the Molesworth to Wairau Valley, Blenheim, and the Te Hoiere/Pelorus. Near-average summer rainfall (80-120%) was recorded at two sites, Red Hills and Rai Falls, in the west and north-west of the region respectively.

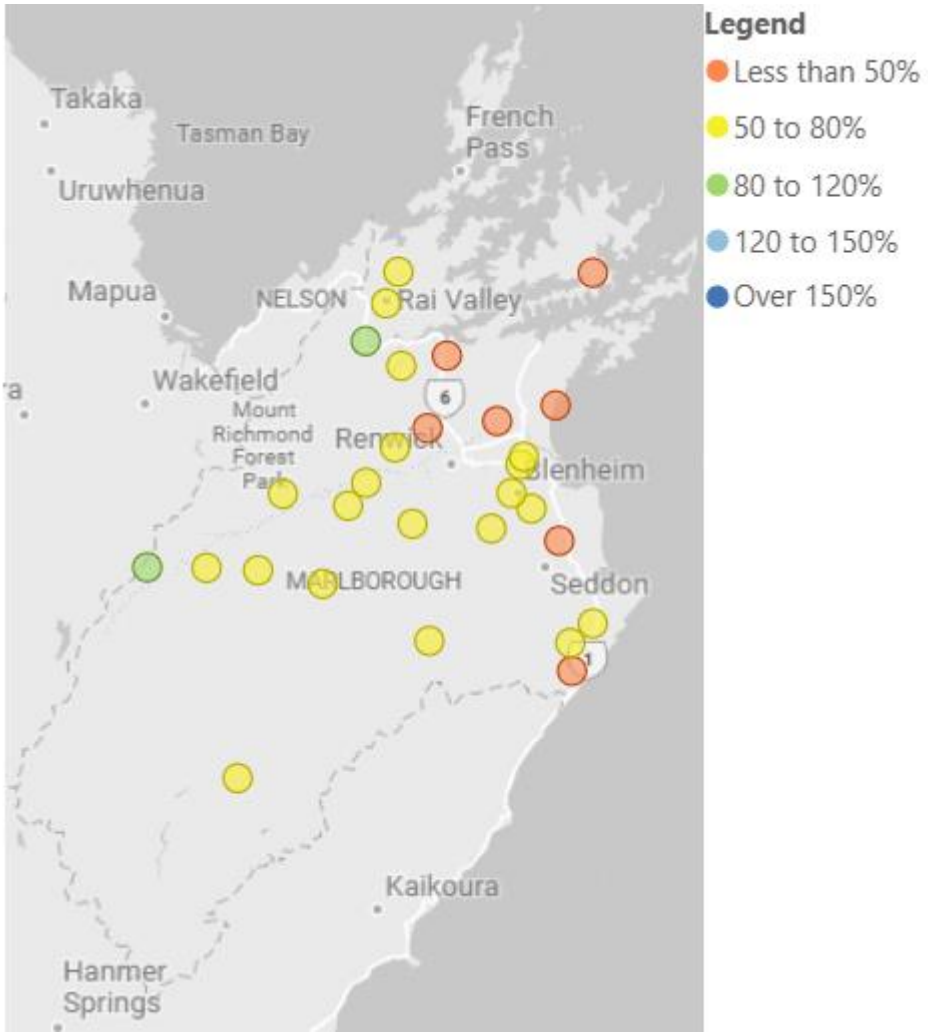

Figure 2. Summer 2024/25 rainfall at MDC monitoring sites, as a percentage of average summer rainfall.

Blenheim at the Marlborough Research Centre has recorded 332 mm of rainfall in the hydrological year to date (1 July to 28 February). This is 79% of the long-term average rainfall accumulation (see Figure 3 below).

Marlborough is currently in an extended dry period. Since July 2023 (20 months), 706 mm of rain has fallen, just 66% of the long-term average. The long duration of low rainfall has led to lower river flows, soil moisture, and groundwater levels.

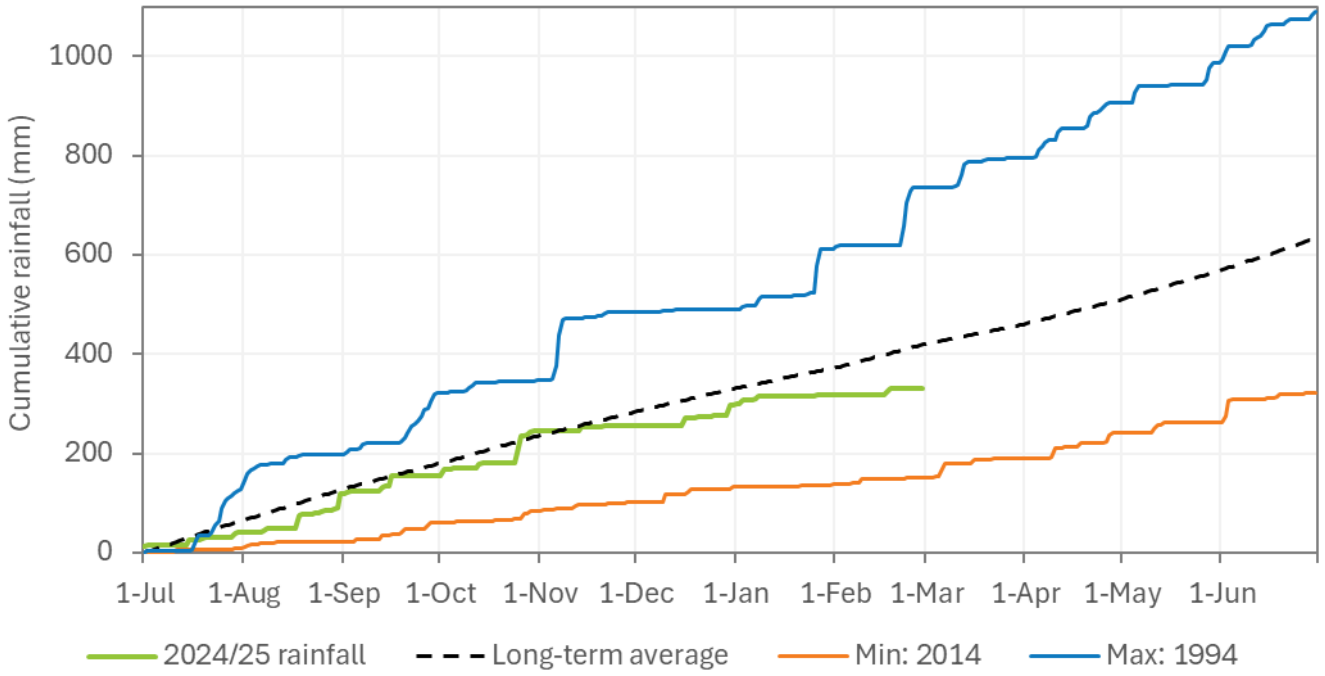

Figure 3. Cumulative rainfall (mm) for the 2024/25 hydrological year in Blenheim (Marlborough Research Centre), compared to the long-term average rainfall accumulation. Also shown are the minimum and maximum rainfall years.

A full list of monthly rainfall totals for the 2024/25 hydrological year at all rainfall monitoring sites can be found in the appendix, Table 1.

River Flows

River flows this summer have been below average across the region. Less than 50% of average summer river flow was recorded at 12 out of 14 sites, including sites on the Branch, Waihopai, Pelorus, and Wairau Rivers. 50 to 80% of the long-term average summer river flow was recorded at two sites in the region, Are Are Creek and Awatere River at Awapiri. Figure 4 shows average summer river flow for sites across Marlborough as a percentage of the long-term average summer flow.

Mean flow at Awapiri was 8.1 m^3/s over summer, which is 79% of the long-term mean summer flow. The upper Awatere catchment received inputs from convective thunderstorm systems throughout summer, which increased average flow at the site. Often the rainfall from these events was very localised and was not recorded at the rainfall monitoring sites in the catchment but could be seen on the rain radar and through the rise in river flow.

Are Are Creek recorded 55% of average summer flow, with a mean flow of 0.16 m^3/s. The creek gains flow from groundwater in the lower reaches, and baseflow may have been slightly higher than in neighbouring catchments.

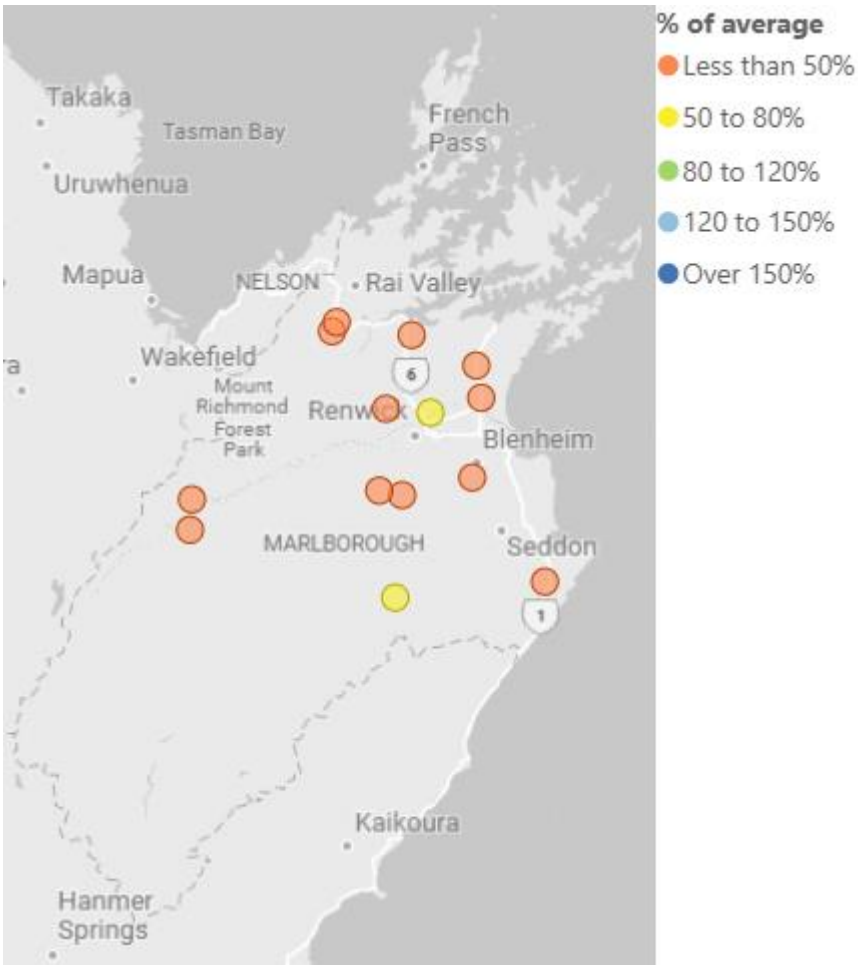

Figure 4. Average summer 2024/25 river flow at MDC monitoring sites, as a percentage of the long-term average summer flow.

Waihopai at Craiglochart baseflow has stayed below average since mid-November. Baseflow dipped into the lower quartile in mid-January, before two freshes in late February raised baseflow slightly. The mean summer flow at Craiglochart was 3.89 m^3/s, 42% of the long-term mean summer flow.

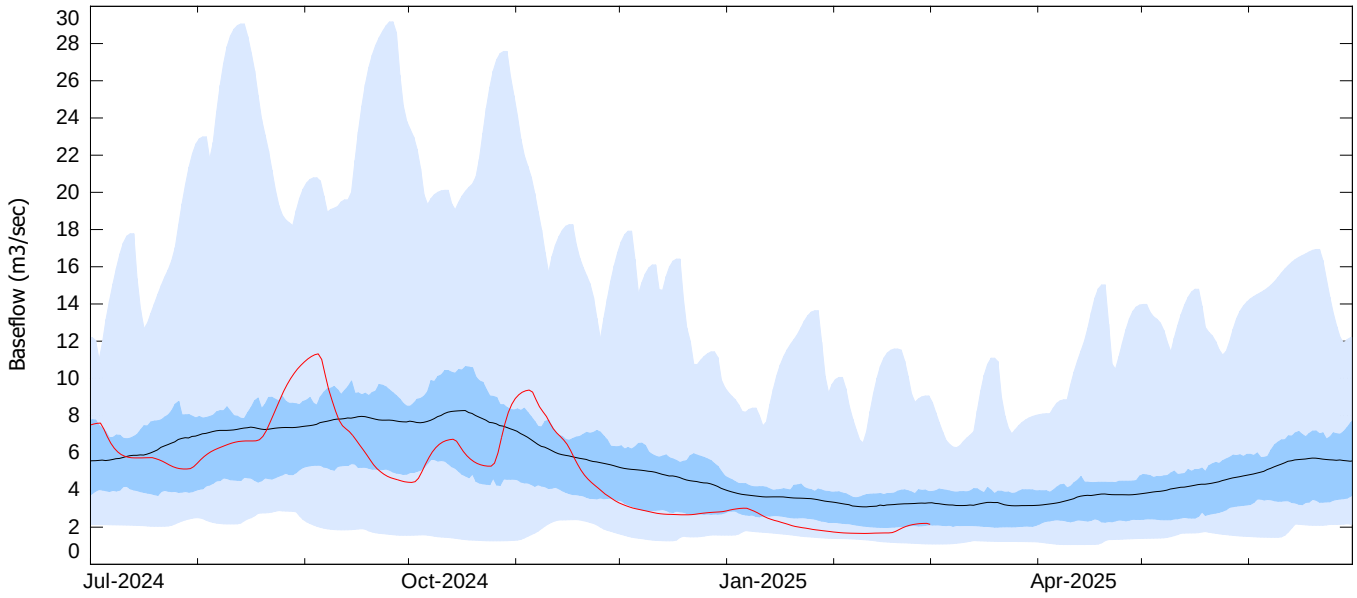

Figure 5. Waihopai River at Craiglochart baseflow, from 1 July 2024 to 30 June 2025. The black line is average baseflow and the red line is the 2024/25 baseflow. The dark blue shows the middle 50% of data and the light blue shows the upper and lower quartiles.

Baseflow in the Wairau River at Tuamarina has been in the lower quartile since early December, with minimal inputs to the river over summer. Flows have declined through summer, with mean flow in February of 20 m^3/s, 39% of the long-term mean February flow. This is the 6th lowest February flow on record (1960-2025).

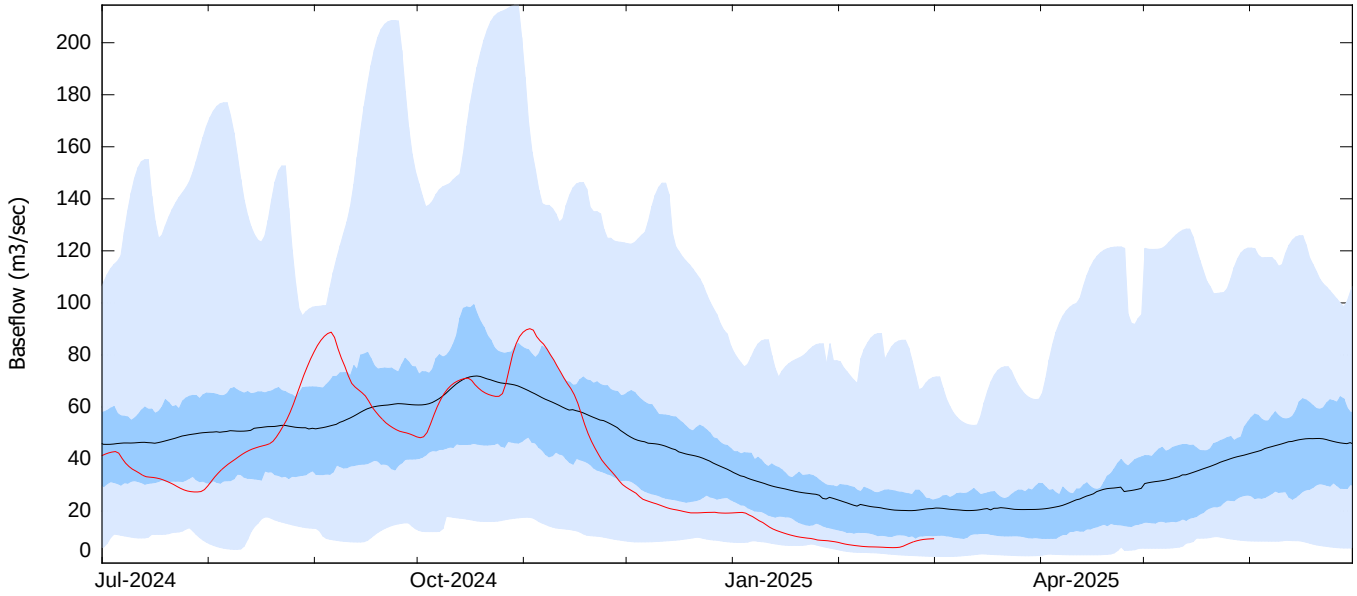

Figure 6. Wairau River at Tuamarina baseflow, from 1 July 2024 to 30 June 2025. The black line is average baseflow and the red line is the 2024/25 baseflow. The dark blue shows the middle 50% of data and the light blue shows the upper and lower quartiles.

Baseflow has been below average over summer in the Rai River. Mean flow in February was 1.8 m^3/s, 26% of the long-term mean for February. This is also the 6th lowest February flow on record (1989-2025).

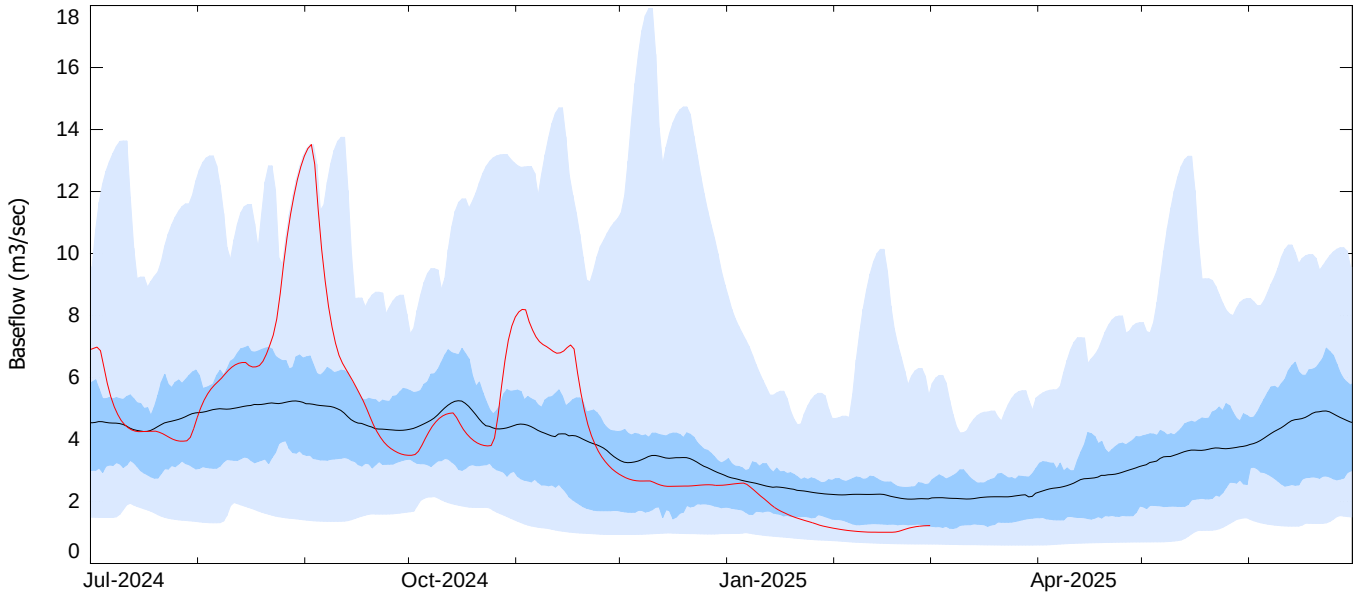

Figure 7. Rai River at Rai Falls baseflow, from 1 July 2024 to 30 June 2025. The black line is average baseflow and the red line is the 2024/25 baseflow. The dark blue shows the middle 50% of data and the light blue shows the upper and lower quartiles.

Soil Moisture

Soil moisture at the Marlborough Research Centre in Blenheim has been below average throughout the summer months. 15 mm of rain in mid-December saw soil moisture topped up slightly. Further rain in the last days of December and early January saw soil moisture rise to 23%. Soil moisture continued to decline through a dry January and February. Average shallow soil moisture for February was 14.8%, compared to the long-term average of 18.7%.

A graph of soil moisture for Blenheim over the 2024/25 hydrological year can be seen below in Figure 8.

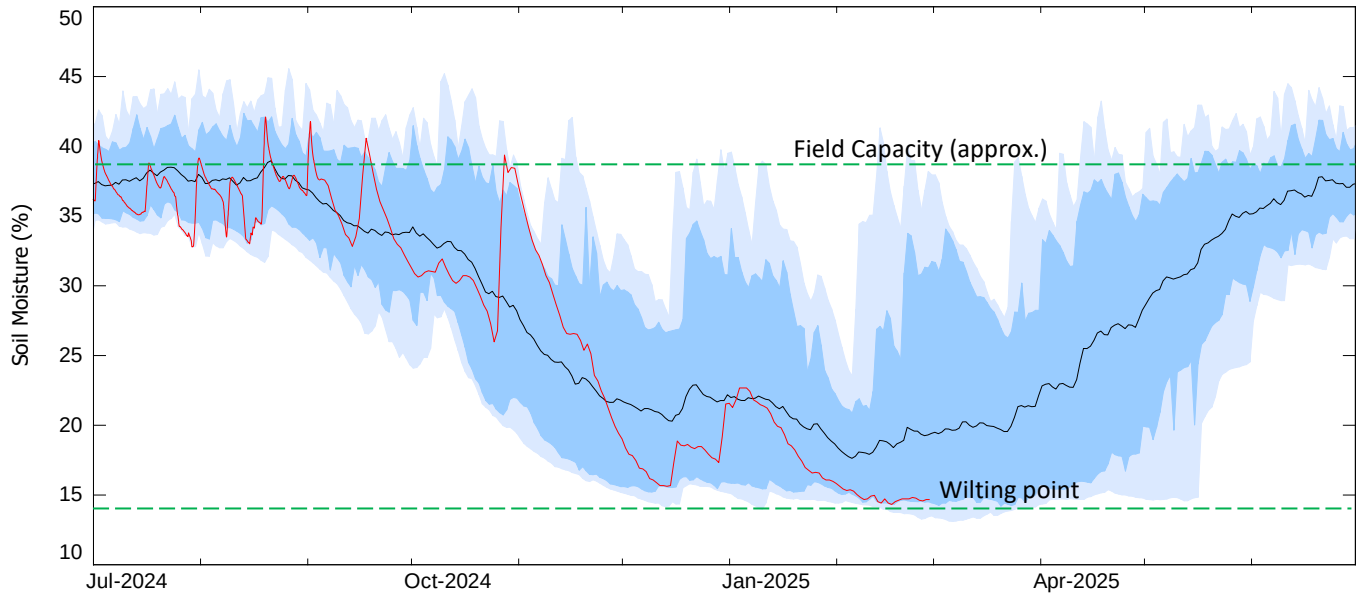

Figure 8. Shallow soil moisture at the Marlborough Research Centre (Blenheim) from the 1st of July 2024 to the 30th of June 2025. The red line shows this year's soil moisture, while the black line shows average soil moisture based on 19 years of data. The light blue shows the upper and lower 10% of the data and the dark blue shows the middle 80% of data.

The recent soil moisture deficit maps from NIWA (see Figure 9) show that soils are very dry, particularly on the Wairau Plains and lower Awatere. Very dry soils seem to be less widespread than at the same time last year.

The soil moisture anomaly map (Figure 10) shows how current soil moisture compares to the historical average. Soil moisture is slightly drier than average in northern Marlborough, the Wairau Plains and along the east coast. Further inland, soil moisture is about the same as the historic average.

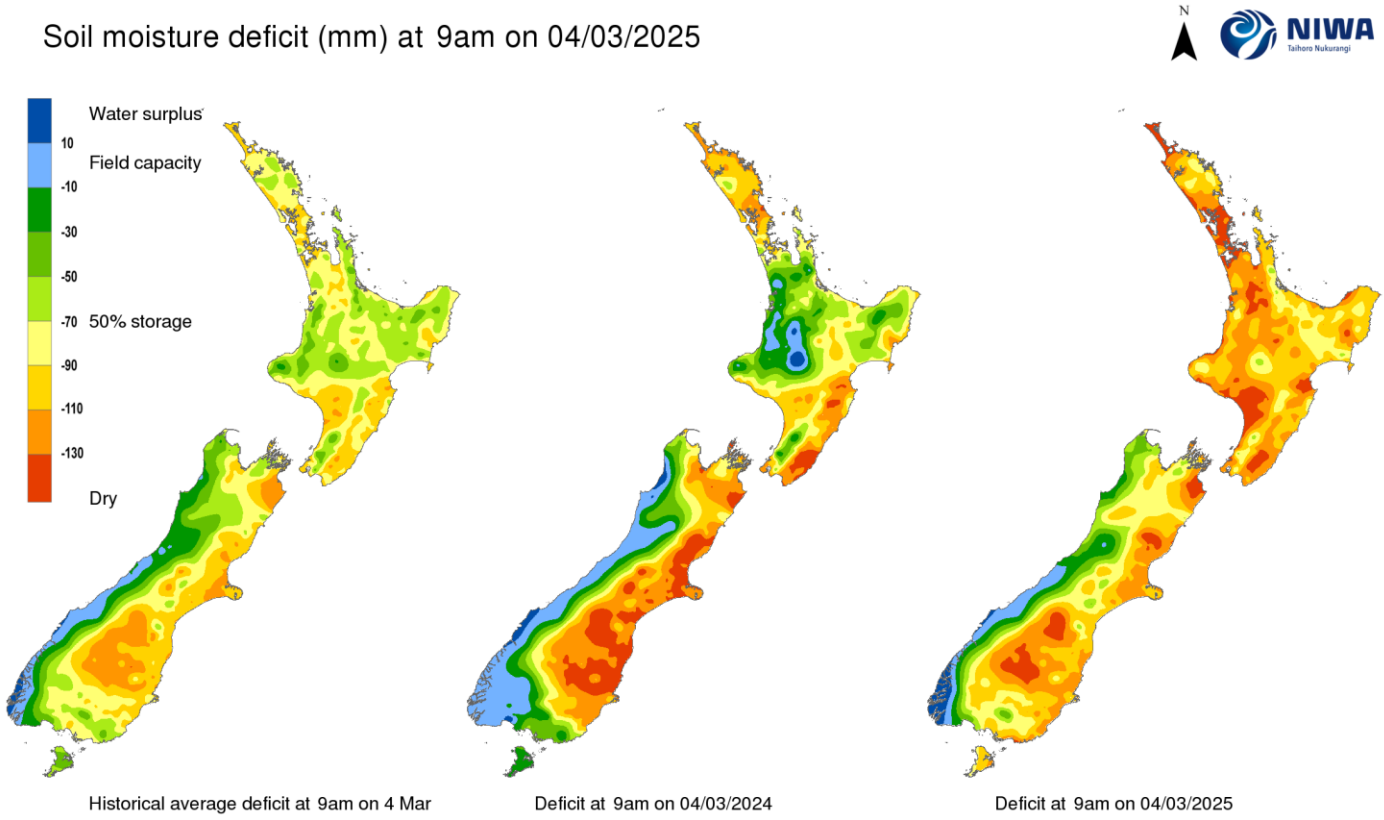

Figure 9. Soil moisture deficit map of New Zealand, retrieved from NIWA on the 4th of March 2025.

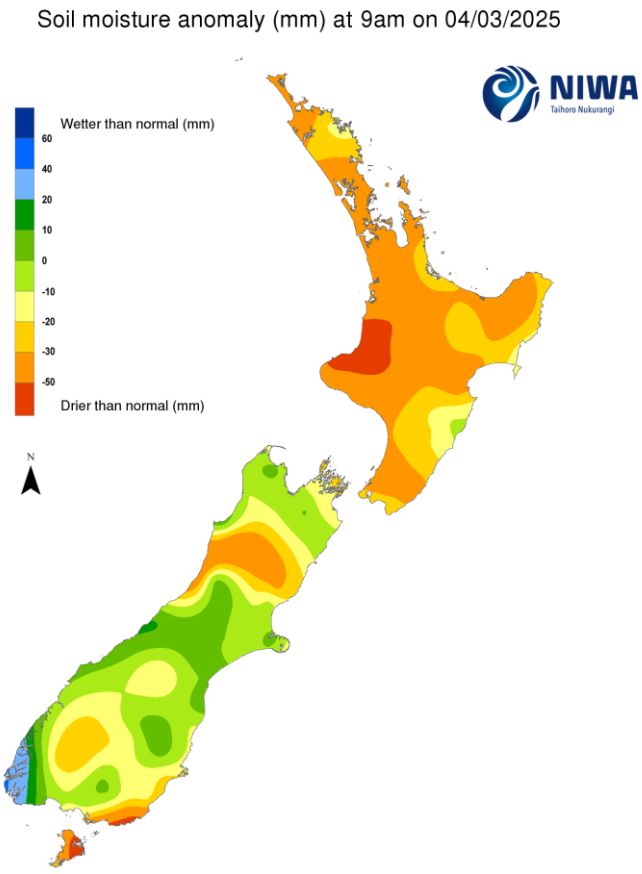

Figure 10. Soil moisture anomaly map of New Zealand, retrieved from NIWA on the 4th of March 2025.

Groundwater

Water level in the Wairau Aquifer recharge reach (Figure 11) declined into the lower quartile in early December and has stayed in the lower quartile throughout summer. The current low water level in the aquifer is primarily a product of the low rainfall and subsequent low river flows over the past two years. Insufficient recharge through the winter and spring months meant the aquifer was not able to recover between last year and this year's dry summer seasons.

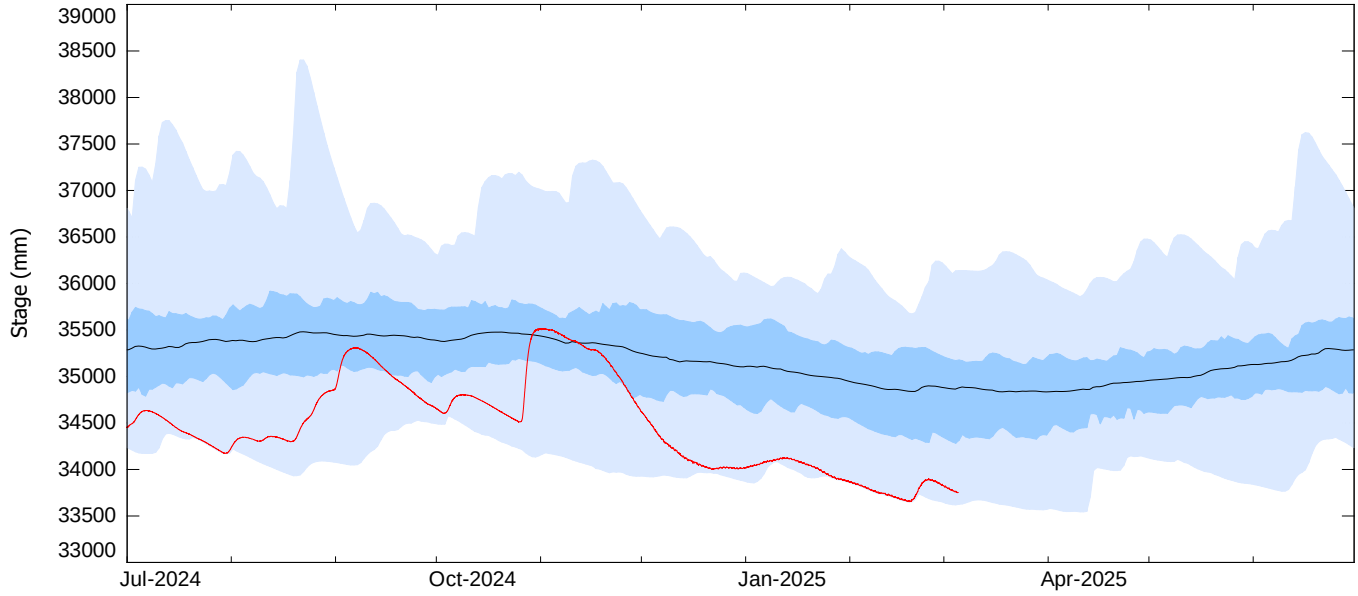

Figure 11. Wairau Aquifer at Conders well water level, from 1 July 2024 to 30 June 2025. The black line is the long-term average groundwater level, and the red line is the 2024/25 groundwater level. The dark blue shows the middle 50% of data and the light blue shows the upper and lower quartiles.

Rarangi Shallow Aquifer water level steadily declined throughout the summer months with low rainfall unable to provide recharge to the aquifer. Restrictions were met at the site in mid-March.

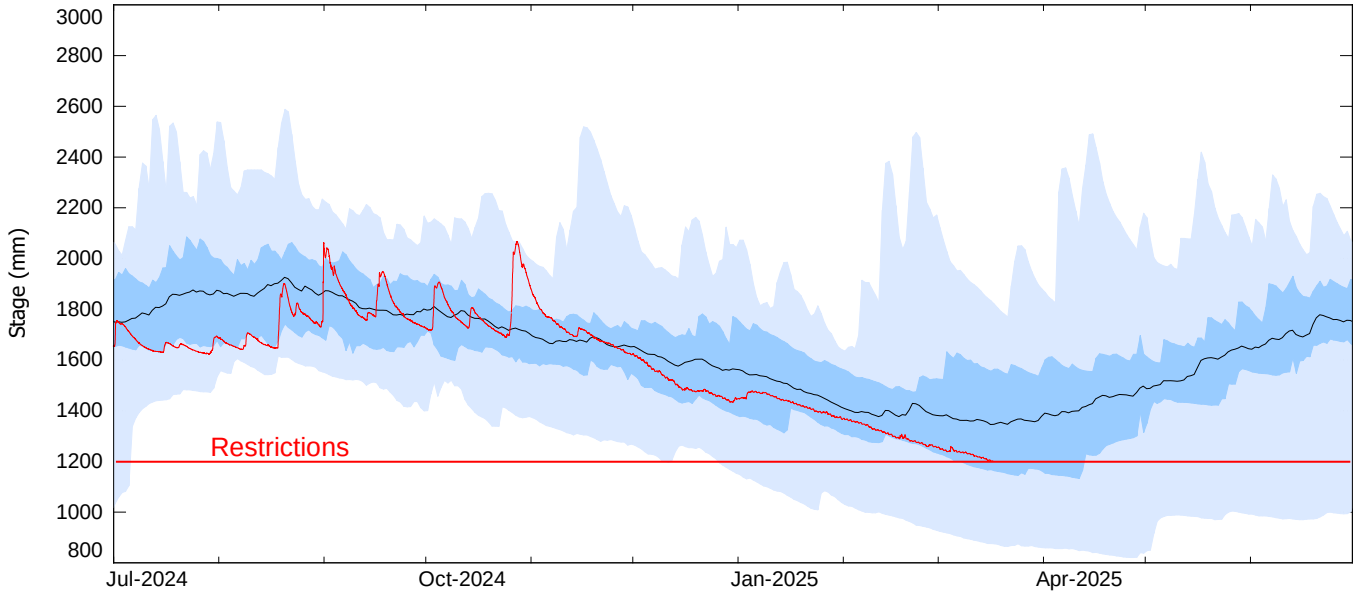

Figure 12. Rarangi Shallow Aquifer (Pipitea Wetland) water level, from 1 July 2024 to 30 June 2025. The black line is the long-term average groundwater level, and the red line is the 2024/25 groundwater level. The dark blue shows the middle 50% of data and the light blue shows the upper and lower quartiles.

Climate Outlook March to May:

High pressure looks to continue as the dominant force in Aotearoa's weather through much of March. A large band of high pressure is currently extending north of New Zealand to the tropics and well south of the country, blocking most of the typical autumn westerlies from bringing significant rain. The tropics are quiet as of early March, with no tropical cyclones in the Coral Sea or South Pacific at present, although tropical cyclone season continues through to the end of April.

A continuation of dry weather is good news as the grape harvest gets underway in Marlborough, but rain would be welcome across the country, particularly in the western areas of the North Island where pasture farmers are feeling the pressure of drought conditions. Town supply water restrictions are also in place in several regions, including Taranaki and Northland.

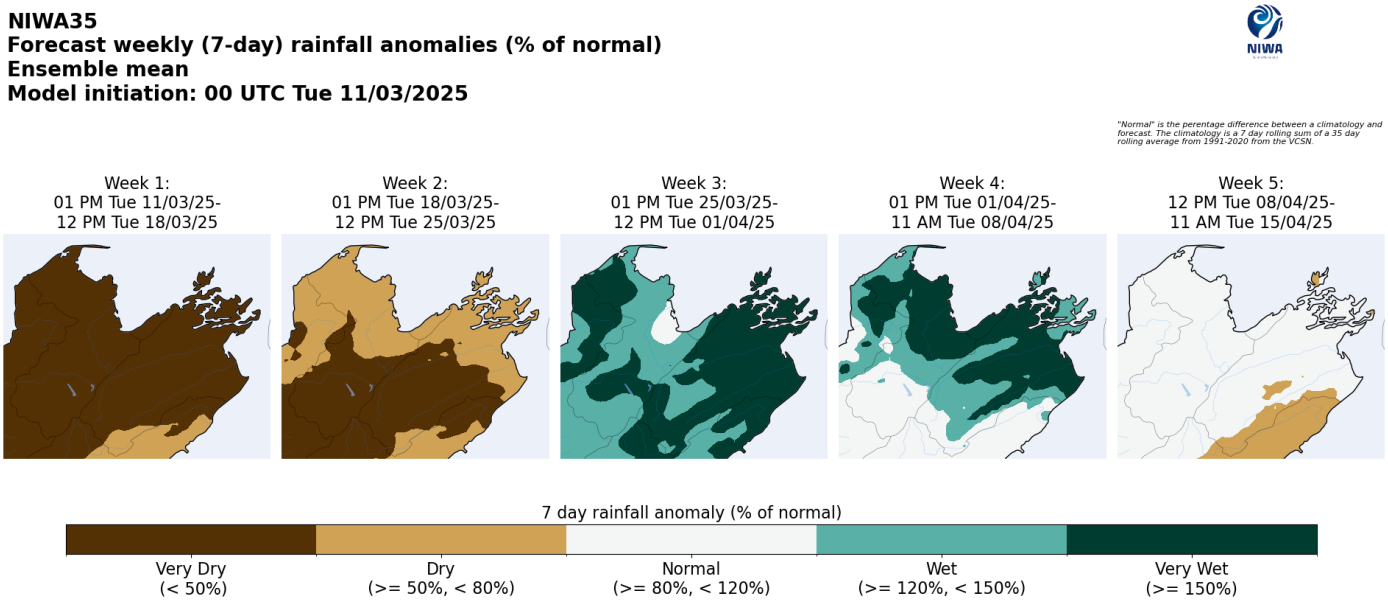

Figure 13. Weekly forecasted rainfall anomalies for Marlborough/Nelson/Tasman, from the 11th of March to the 15th of April. Retrieved from NIWA on the 11th of March 2025.

The predictions for Marlborough/Tasman from March to May are:

- Temperature: above average
- Rainfall: near average
- Soil Moisture: near average or below average
- River Flows: near average or below average

Appendix

Table 1. Monthly rainfall totals (mm) for the 2024-25 hydrological year at monitoring sites in Marlborough. Note: rainfall totals December to February are preliminary.

Site	July	August	September	October	November	December	January	February
Awatere at Awapiri	69	101	28	187	19	60	11	43
Awatere Glenbrae NRFA	41	70	40	122	17	21	25	18
Beneagle at Farm Stream	54	80	44	129	21	46	46	16
Blenheim at MDC Office	38	67	58	85	9	39	18	12
Branch at Branch Recorder	99	146	61	300	66	78	49	58
Branch at Mt Morris	100	181	83	380	107	102	81	74
Flaxbourne at Corrie Downs	63	72	52	125	12	42	29	17
Kaituna Rainfall at Higgins Bridge	116	196	67	257	63	54	43	39
Kenepuru Head NRFA	188	295	100	299	116	67	40	38
Koromiko NRFA	132	214	74	292	68	53	35	31
Lake Elterwater Climate	71	69	49	124	32	35	26	13
Lansdowne NRFA	67	89	35	137	34	44	43	43
Malings	100	209	156	291	73	59	39	41
Mid Awatere Valley NRFA	55	64	29	147	18	86	11	40
Molesworth NRFA	34	86	27	150	20	50	33	34
Omaka at Ramshead Saddle	72	119	37	163	42	59		
Onamalutu at Bartletts Creek Saddle	177	260	82	339	86	82	64	68
Onamalutu at Hilltop Road NRFA	154	273	101	320	100	63	54	57
Picton Climate at Waitohi Domain	117	179	70	242	65	47	29	24
Pudding Hill NRFA	36	85	32	141	13	87	33	24

Table 1. (continued).

Site	July	August	September	October	November	December	January	February
Rai at Rai Falls	222	463	96	448	159	128	66	92
Rai Valley NRFA	253	410	101	447	155	112	61	88
Rarangi at Driving Range	61	149	69	163	20	45	27	26
Red Hills	87	131	104	309	76	79	141	91
St Arnaud NRFA	62	184	137	245	66	90	98	66
Taylor at Taylor Pass Landfill	48	85	51	108	19	43	26	12
Taylor at Tinpot	82	126	57	179	48	48	46	27
Te Rapa	66	78	64	129	25	52	23	28
Top Valley at Staircase Ridge	136	155	60	344	96	57	77	83
Tor Darroch NRFA	82	91	45	197	45	84	64	79
Tunakino	274	451	145	515	214	113	71	92
Upper Clarence NRFA	41	58	20	141	7	69	25	25
Waihopai at Craiglochart	53	97	28	150	26	60	42	22
Waihopai at Spray Confluence	80	94	29	187	23	66	40	45
Waikakaho	80	154	63	227	33	49	36	18
Waikawa at Boons Valley	102	179	86	291	76	57	45	24
Wairau Valley at Southwold	97	126	44	212	46	54	47	44
Wakamarina at Twin Falls	170	381	101	393	138	114	71	74
Ward NRFA	64	66	49	109	24	55	41	26
Wye at Charlies Rest	68	112	50	170	65	46	49	47