

Hydrology of Marlborough Summary for September 2022

Report prepared by Charlotte Tomlinson, 3rd October 2022.

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

Executive Summary

After an extremely wet winter, in which a significant flood event occurred in Northern Marlborough, September has been a more average month for rainfall across the region. The rivers have responded to this and are generally carrying 70-80% of their average September flows.

Soils are slightly wetter than usual for the time of year.

Climatically, more north-easterly winds are forecast through to December, with less westerly winds than normal.

Rainfall

After an extremely rainy winter, September had close to average rainfall throughout the region, as can be seen in the graphs below (*Figure 1*). The Blenheim, Branch, and Awatere rain gauges all recorded slightly lower than average rainfall this month, while Tunakino (Northern Marlborough), Picton, and the Flaxbourne all had slightly higher than average rainfall in September.

Looking at 2022 so far, many areas of the region have already exceeded average annual rainfall over the 9-month January-September period. Tunakino raingauge has recorded almost 1 metre more rain than an average year, with 3 months of rain still to fall. Contributing to this large year-to-date (YTD) total were large rainfall events in February and August. Similarly, the Rai Valley recorder has recorded about 600 mm more rain so far in 2022 than an average year.

The usually dry East Coast has had more rainfall than in an average year. The Flaxbourne raingauge has recorded almost 100 mm more rain so far in 2022 than in an average year, while Blenheim has had slightly more rainfall this year-to-date than an entire average year.

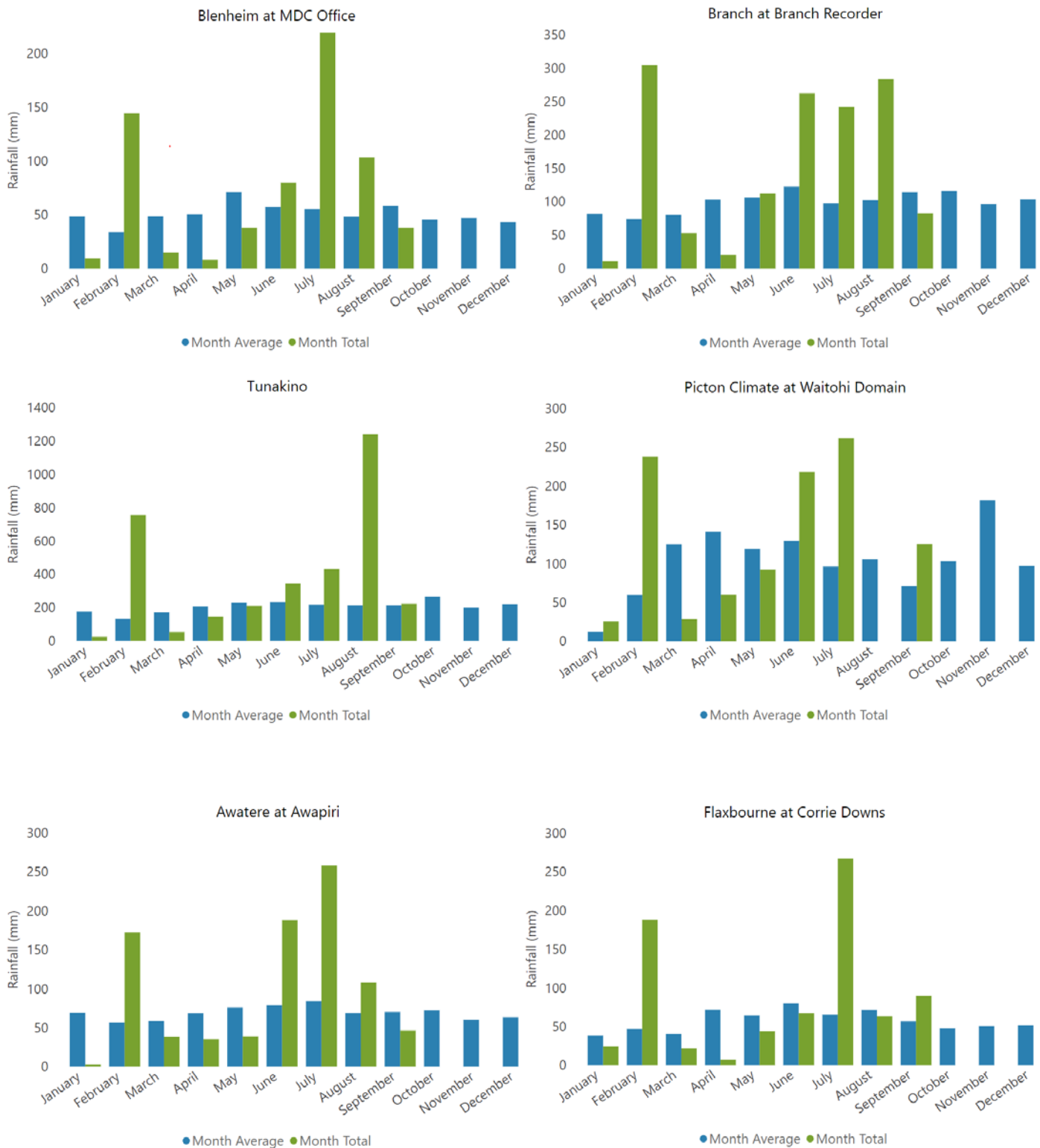


Figure 1. Year-to-date monthly rainfall totals from key sites around Marlborough, compared to average monthly rainfall totals.

Table 1. Monthly rainfall totals (mm) in Marlborough for Winter/Spring 2022, and Year-to-date Rainfall Totals (mm)

Site	Jun	Jul	Aug	Sept	Year-to-date Total
Tunakino	343.7	431.1	1238.8	223.5	3426.2
Rai at Rai Falls	338	394.2	912.5	170	2771.7
Rai Valley NRFA	346	418.8	735.2	208.6	2722.4
Wakamarina at Twin Falls	358.9	318.1	590.3	175	2214.9
Kaituna Rainfall at Higgins Bridge	254	287	365	87	1513.5
Kenepuru Head NRFA	360.6	469.2	516.2	192.2	2171
Koromiko NRFA	243.8	337	286.8	185.8	1571.8
Picton Climate at Waitohi Domain	218.2	261.6	315.8	125.2	1364.5
Waikawa at Boons Valley	114	138.5	143	119	883
Waikakaho	177.4	357.5	212.3	88	1239.7
Wairau at Narrows	156.6	291.5	246	79	1142.5
Rarangi at Driving Range	160.4	323.5	185.6	63.6	1109.6
Lansdowne NRFA	161.4	297.6	239	88	1218
Wairau Valley at Southwold	184.5	294.8	249.5	70.5	1208.4
Onamalutu at Hilltop Road NRFA		462	447.6	134.6	1657.2
Onamalutu at Bartletts Creek Saddle	326.2	458.6	450	130	1960.5
Top Valley at Staircase Ridge	320	388.4	430.1	120	1922.1
Red Hills	246.6	235.5	250.5	113.5	1346
St Arnaud NRFA	338.4	208.4	199.4	138.2	1440.4
Malings	307.5	200.5	275.5	90.5	1526
Branch at Branch Recorder	262.2	241.8	283.4	82.5	1370.7
Branch at Mount Morris	242.1	215.5	376.9	152.5	1802.8
Wye at Charlies Rest	194.7	215.2	197	89.5	1123.3
Waihopai at Spray Confluence	186.7	235.1	163.4	65.3	999.6
Tor Darroch NRFA	170.4	247.8	163.8	78.6	1054
Waihopai at Craiglochart	125	206.2	114	54	816.8
Omaka at Ramshead Saddle	140.2	210	148.7	75.5	910.9
Taylor at Tinpot	141.5	309.8	125.1	95	1031.7
Taylor at Taylor Pass Landfill	88.6	226.5	109	55	712.3
O Dwyers Road NRFA	121.8				450.2
Wither Hills NRFA			87.2	51.2	138.4
Blenheim at MDC Office	62.5	219.5	103.5	38	638.5
Beneagle at Farm Stream	86.4	251.2	87	71.5	773
Flaxbourne at Corrie Downs	67.4	267.4	63	89.5	772.1
Awatere at Awapiri	188.2	258.3	107.9	46.5	888.3
Awatere Glenbrae NRFA	60.8	168.6	57.4	38.6	570.8
Mid Awatere Valley NRFA	128.8	180.8	77.6	28.6	678.6
Molesworth NRFA	182.4	152.4	99.2	39	752.8
Lake Elterwater	61.3	288.5	63	98	792
Ward NRFA	77.2	294	65	87	873
Te Rapa	72.3	367.3	81	125	1097.3
Pudding Hill NRFA	144	98.2	124	48.8	745.8
Upper Clarence NRFA	91.2	92.6	34.2	28	504.6

River Flows

River flows in September have gradually declined throughout the month from the high flows seen in August, due to lower rainfall this month.

Most rivers in the region are running at 70-80% of their average September flow (*Table 2*). Exceptions are the Waihopai River at Craiglochart and Taylor River at Borough Weir, which have 56% and 54% of average September flow respectively.

The Flaxbourne River is another outlier, with an average flow of 2.5 m³/s in September this year, compared to a 0.75 m³/s monthly average. High flows in the Flaxbourne have continued in September due to high winter rainfall and higher than average rainfall in the last month.

River	Site	September mean flow 2022 (m ³ /s)	September mean flow all records (m ³ /s)	% of monthly average	Records begin	Catchment area (km ²)
Pelorus	Bryants	20.39	24.61	83	1977	375
Rai	Rai Falls	10.94	13.31	82	1979	211
Kaituna	Higgins Bridge	4.32	5.78	75	2006	133
Branch	Intake Weir	22.19	27.57	80	1958	550
Wairau	Barnetts Bank	88.97	130.56	68	1960	3,430
Wairau	Dip Flat	39.26	28.64	137	1951	505
Onhinemahuta	Domain	0.80	1.06	75	1998	33
Waihopai	Craiglochart	11.30	20.02	56	1960	764
Awatere	Awapiri	12.80	18.30	70	1977	987
Omaka	Gorge	1.01	1.38	73	1994	90
Taylor	Borough Weir	0.50	0.93	54	1961	64
Flaxbourne	Corrie Downs	2.49	0.75	331	2003	70

Table 2. A summary of river flows in Marlborough for September 2022.

Soil Moisture

Data from the Marlborough Research Centre shows that shallow soil moisture reduced slightly throughout September but was restored by two days of rainfall at the end of the month. This meant that over the 30-day period, soil moisture increased from 36% at the start of the month to 38% at the end of the month.

As can be seen in the soil moisture deficit maps (*Figure 2*), soils around the region at the end of September have higher water content compared to 2021 and the historical average.

The soil moisture anomaly map (*Figure 3*) shows Marlborough soils are generally wetter than normal for this time of year, especially in the eastern coastal area.

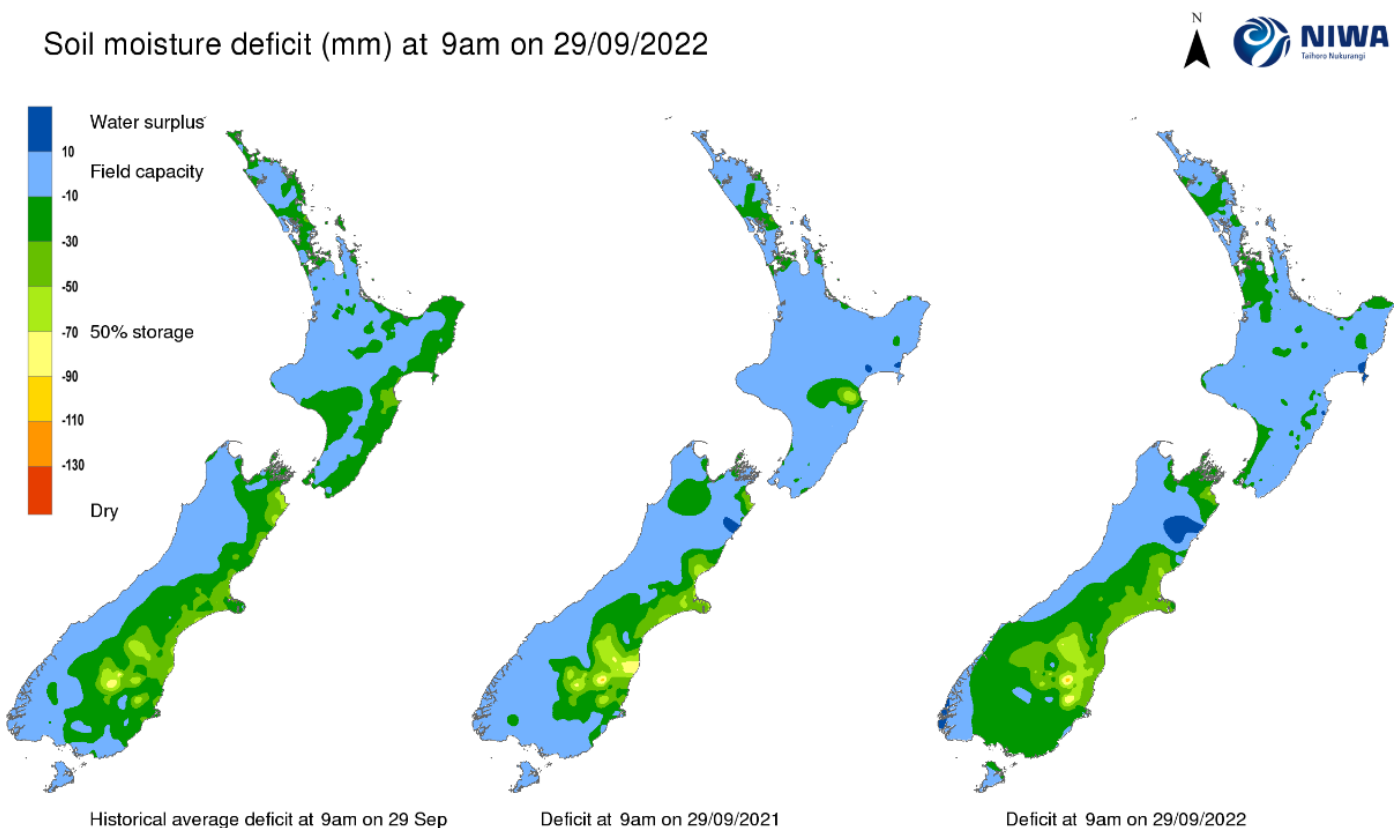


Figure 2. Soil moisture deficit maps of New Zealand, retrieved from NIWA on 29/09/2022.

Soil moisture anomaly (mm) at 9am on 29/09/2022

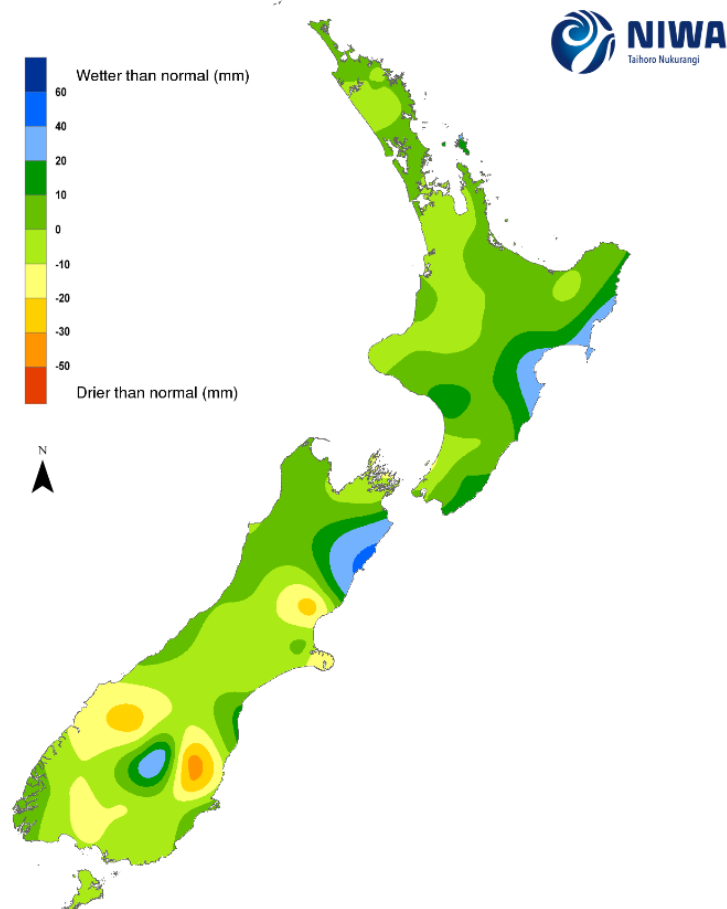


Figure 3. Soil moisture anomaly map of New Zealand, retrieved from NIWA 29/09/2022.

Seasonal Climate Outlook October-December 2022

The climate over the next 3 months will be influenced by the current marine heatwave and moderate La Niña conditions. Higher air pressure is forecast around the country, which could result in more north-easterly winds, less westerly winds, and the possibility of longer dry spells to the west. During November and December there is an increased risk for early tropical cyclone activity in the Southwest Pacific.

The predictions for Marlborough/Tasman from October to December are:

- 🌡️ Temperature – above average
- ☁️ Rainfall – near or below average
- 🌿 Soil Moisture – near or below average
- 🌊 River Flows – near or below average