

Hydrology of Marlborough Summary for November 2022



Report prepared by Charlotte Tomlinson, 2nd November 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

November rainfall has been average or slightly above for most of the Marlborough region, with river flows improving after a dry October. Monthly rainfall in 2022 has been extreme in both directions, with some very dry and some very wet months.

Soils throughout the region are at or slightly above normal moisture levels for this time of year. Soils in the Wairau and Awatere valleys are 0-10 mm wetter than normal as of the end of November.

Throughout November La Niña conditions continued, and a marine heatwave developed around the country with surface sea temperatures 1.1°C to 1.7°C above average. Rainfall, soil moisture and river flows are predicted to be about average through to February 2023.

Rainfall

November rainfall has been average or slightly above average in most parts of the region (see *Figure 1*). An exception is the Picton/Waikawa area with both locations recording lower than average rainfall this month.

Blenheim had 146% of average November rainfall last month, with a total of 72.6 mm (data from MRC). The mid Awatere Valley also had a particularly wet month, with the Awatere at Awapiri site recording more than double average November rainfall last month.

Looking at year-to-date rainfall totals in Table 1, all but 3 rainfall monitoring sites in Marlborough have surpassed average annual rainfall in the year to date. The Rai and Tunakino Valley sites have recorded 1.5 years of average rainfall over the last 11 months, and at the other end of the region the Te Rapa raingauge in the Waima Catchment has recorded 130% of average annual rainfall in the year to date.

Monthly rainfall in 2022 has been characterised by extremes, with several months of much lower-than-average rainfall (January, March, April, May, October), and several months with very high rainfall totals (February, July, August). This pattern of extremes was seen throughout the region in 2022.

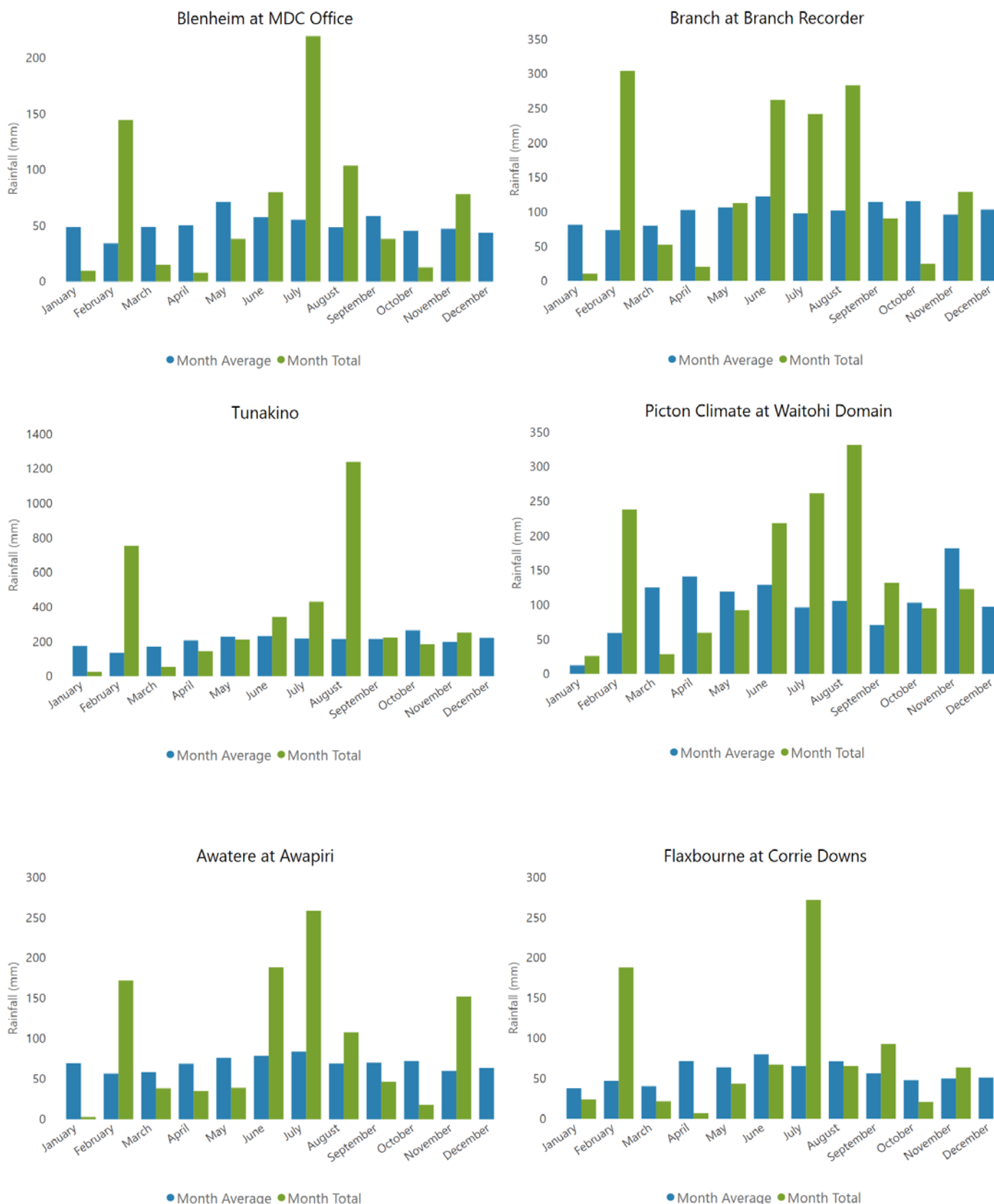


Figure 1. 2022 year-to-date monthly rainfall totals from 6 key sites around Marlborough, compared to average monthly rainfall totals.

Table 1. Monthly rainfall totals (mm) at rainfall monitoring sites in Marlborough, and 2022 year-to-date total rainfall.

Site	January	February	March	April	May	June	July	August	September	October	November	Total
Awatere at Awapiri	3	172	39	35	39	188	258	108	47	18	152	1058
Awatere Glenbrae NRFA	8	161	28	12	35	61	169	57	39	11	37	619
Beneagle at Farm Stream	10	157	21	13	76	86		94	78	21	92	648
Blenheim at MDC Office	10	145	15	8	38	80	220	104	38	13	78	746
Branch at Branch Recorder	11	304	53	20	113	262	242	283	90	25	129	1533
Flaxbourne at Corrie Downs	24	188	22	7	44	67	272	66	93	21	64	868
Kaituna Rainfall at Higgins Bridge	13	283	32	82	112	254	287	363	87	104		1615
Kenepuru Head NRFA	7	373	51	96	105	361	469	516	192	159	182	2513
Koromiko NRFA	30	301	44	45	99	244	337	287	186	130	126	1828
Lansdowne NRFA	14	263	43	42	71	161	298	239	88	25	130	1373
Malings	26	374	23	88	143	308	201	276	91	95	151	1772
Mid Awatere Valley NRFA	2	159	27	21	54	129	181	78	29	7	98	783
Molesworth NRFA	9	180	20	12	59	182	152	99	39	12	75	840
O Dwyers Road NRFA	13	211	29	19	56	122						450
Omaka at Ramshead Saddle	7	191	21	53	63	140	210	141	72	20	102	1022
Onamalutu at Bartletts Creek Saddle	13	331	47	86	119	326	459	450	130	124	147	2231
Onamalutu at Hilltop Road NRFA	19	356	47	85	106		462	448	135	169	167	1992
Picton Climate at Waitohi Domain	26	238	28	60	92	218	262	332	132	95	123	1605
Pudding Hill NRFA	11	211	17	16	76	144	98	124	49	23	90	859
Rai at Rai Falls	32	544	48	118	214	338	394	913	177	193	254	3226
Rai Valley NRFA	27	591	48	148	200	346	419	735	209	158	263	3144
Rarangi at Driving Range	9	251	35	18	64	160	324	186	64	53	111	1273

Table 1 (continued).

Site	January	February	March	April	May	June	July	August	September	October	November	Total
Red Hills	22	217	79	46	137	247	236	251	114	28	167	1541
St Arnaud NRFA	31	214	79	58	174	338	208	199	138	67	177	1685
Taylor at Taylor Pass Landfill	8	146	14	9	56	89	227	111	56	15	85	816
Taylor at Tinpot	9	216	22	38	75	142	310	138	105	47	107	1209
Te Rapa	52	251	47	31	71	72	378	86	133	32	65	1218
Top Valley at Staircase Ridge	17	357	59	115	116	320	388	410	114	57	165	2119
Tor Darroch NRFA	19	216	32	49	76	170	248	164	79	20	139	1213
Tunakino	25	755	54	145	210	344	431	1239	224	184	253	3862
Upper Clarence NRFA	12	180	19	5	42	91	93	34	28	14	68	587
Waihopai at Craiglochart	9	204	20	29	56	125	218	128	61	19	79	948
Waihopai at Spray Confluence	6	199	34	36	73	187	235	163	65	9	100	1108
Waikakaho	13	251	49	25	67	177	358	212	88	48	105	1392
Waikawa at Boons Valley	67	164	20	41	77	114	139	143	119	84	53	1020
Wairau at Narrows	8	216	26	37	84	157	292	246	79	51	103	1296
Wairau Valley at Southwold	10	245	35	42	77	185	310	273	77	35	89	1377
Wakamarina at Twin Falls	37	418	27	91	200	359	318	590	183	186	228	2636
Ward NRFA	29	192	40	23	66	77	294	65	87	24	80	977

River Flows

River flows recovered somewhat in November after a dry October. The Te Hoiere rivers (Pelorus, Rai, and Kaituna) all had a fresh on the 3rd of November, with mean monthly flows of about average.

The Wairau, Branch and Waihopai rivers all had a fresh on November 3rd, then more consistent rainfall from the 19th onwards elevated flows slightly through to the end of the month. The upper Wairau and Waihopai at Craiglochart had average to slightly above average mean flow, while the branch and Wairau at Barnetts Bank had 80% of average November flow.

The Awatere River had a small fresh on both the 3rd and 19th of November, with 73% of average November flow.

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

River	Site	November mean flow 2022 (m ³ /s)	November mean flow all records (m ³ /s)	% of monthly average	Records begin	Catchment area (km ²)
Pelorus	Bryants	21.05	20.05	105	1977	375
Rai	Rai Falls	12.51	12.68	99	1979	211
Kaituna	Higgins Bridge	3.91	3.67	107	2006	133
Branch	Intake Weir	21.67	27.10	80	1958	550
Wairau	Barnetts Bank	95.39	119.47	80	1960	3,430
Wairau	Dip Flat	44.01	42.14	104	1951	505
Ohinemahuta	Domain	0.81	1.01	80	1998	33
Waihopai	Craiglochart	18.232	14.75	124	1960	764
Awatere	Awapiri	10.66	14.54	73	1977	987
Omaka	Gorge	0.86	1.06	81	1994	90
Taylor	Borough Weir	0.26	0.42	62	1961	64
Flaxbourne	Corrie Downs	0.09	0.19	46	2003	70

Soil Moisture

Data from the Marlborough Research Centre shows that at the start of November, shallow soil moisture was lower than average at 21.5%, however by the end of the month following on from rainfall it had risen to 26.9%, which is well above the long-term average of 21.7%.

At the end of November, the spatial distribution of soil moisture deficit around Marlborough is similar to the historic average, as can be seen by comparing the right-hand (2022) and left-hand (historical average) maps in Figure 2 below. Soils are holding on to slightly more moisture than this time last year.

The soil moisture anomaly map (Figure 3) shows soils throughout the region are at or above normal moisture levels. Soils in the Wairau and Awatere Valleys are 0-10 mm wetter than normal for this time of year.

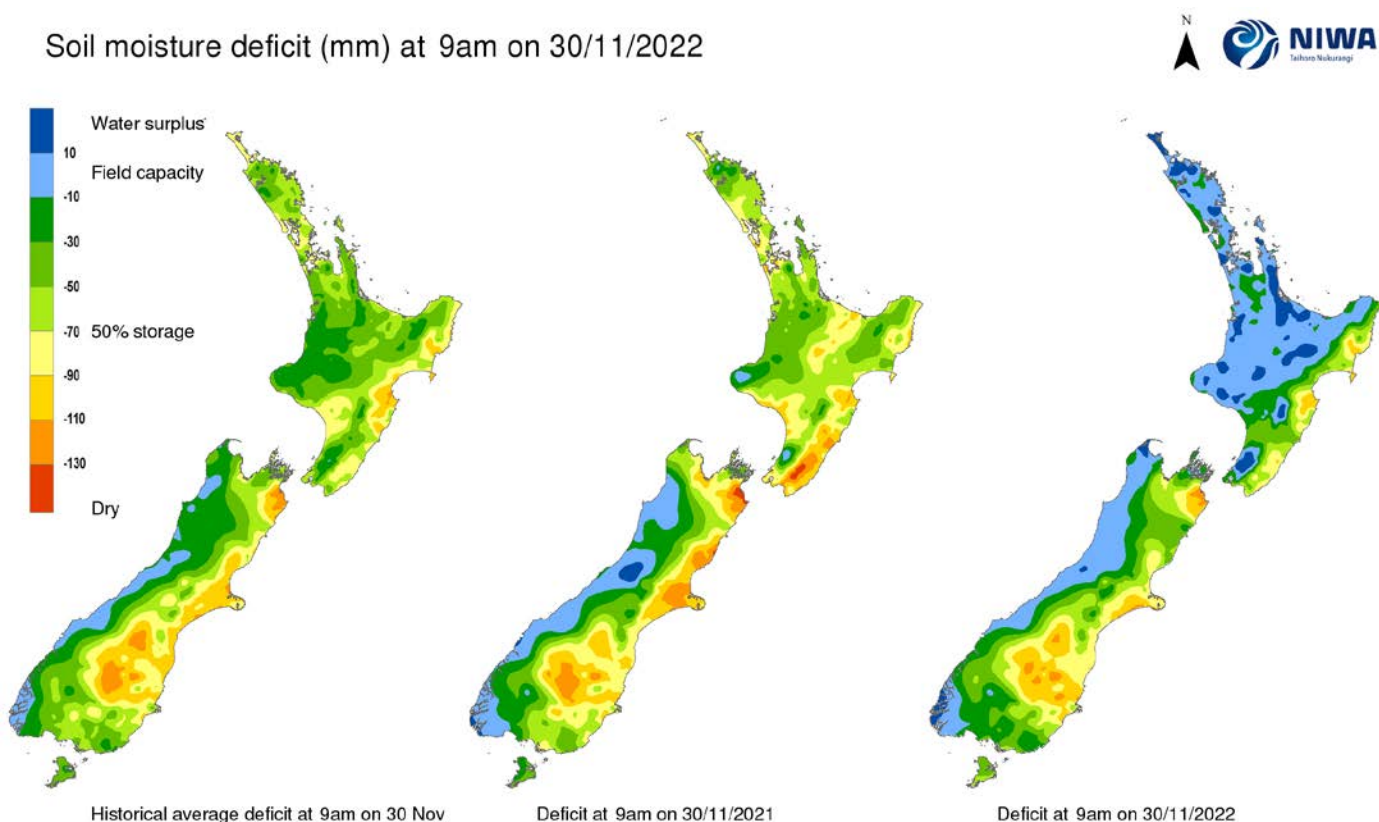


Figure 2. Soil moisture deficit maps of New Zealand, retrieved from NIWA on 30/11/2022.

Soil moisture anomaly (mm) at 9am on 30/11/2022

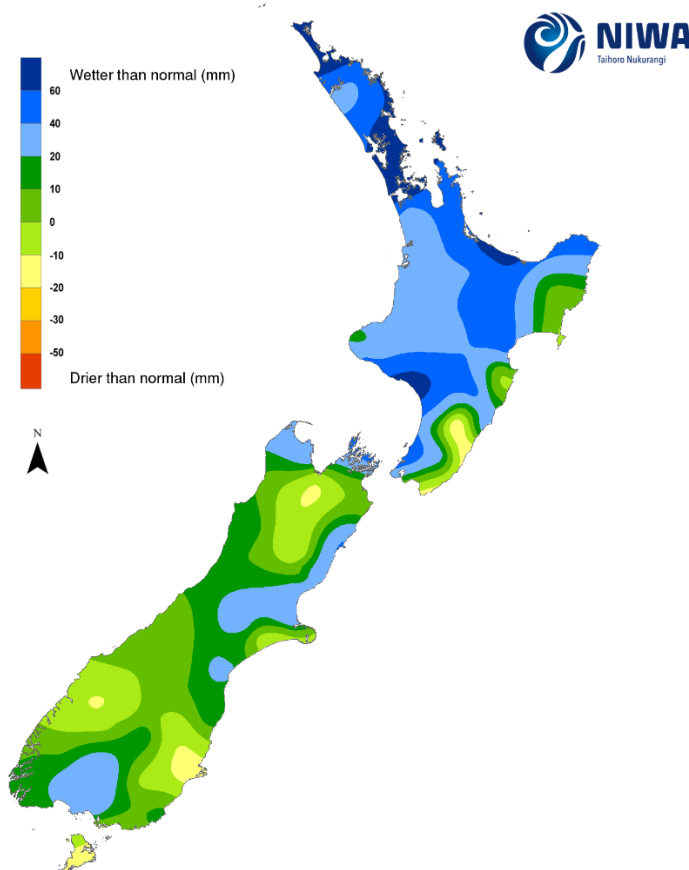


Figure 3. Soil moisture anomaly map of New Zealand, retrieved from NIWA 30/11/2022.

NIWA Seasonal Climate Outlook December 2022 – February 2023

La Niña continued throughout November, and a marine heatwave developed around the country with surface sea temperatures 1.1°C to 1.7°C above average. Air pressure over and to the south of the South Island is forecast to be higher than normal, likely resulting in an easterly air flow anomaly and fewer westerly winds over the next 3 months. The risk for ex-tropical cyclone activity is normal to elevated through to April. These systems can bring heavy rainfall, flooding, and strong winds.

The predictions for Marlborough/Tasman from November to January are:

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