

Water Resources Update

January 2024



Report prepared by Charlotte Tomlinson, 7th February 2024.

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

January marked the 8th consecutive month to record below average rainfall in Blenheim, with 6.6 mm recorded for the month. Total rainfall from June 2023 to the end of January 2024 is 194 mm, 45% of the long-term average of 436 mm. This is the lowest rainfall total for any June to January period over 94 years of record (1930-2024).

Rainfall was below average throughout the region, with Picton recording 26 mm of rainfall in January, about half of the average January rainfall. Awatere at Awapiri recorded 9 mm of rain for the month, compared to an average of 52 mm.

River flows were below average across the board in January, with a number of water restrictions now in place. In the Awatere River Class C water restrictions were in place at the beginning of the year, and Class B water takes were rationed from the 20th before full Class B restrictions began in the last week of January. In the Wairau River, Class C restrictions were in place from the 9th of January onwards. Rain in the upper catchment helped to maintain river flows in the second half of the month preventing further restrictions.

With minimal rainfall average shallow soil moisture at the Grovetown Park site in Blenheim remained low throughout January, with an average of 15.1%. This is well below the long-term average of 20.8%.

Textbook El Niño weather is expected in February with enhanced westerlies and persistent high pressure across northern New Zealand, and regular fronts moving through south of the high. Temperatures are very likely to be above average in Marlborough although varying throughout the month, while rainfall may be below average especially further to the east. The tropics remain active throughout February, but the current outlook sees tropical cyclones keeping well north of New Zealand.

As of the 5th of February the New Zealand Drought Index (NZDI) is showing both northern and southern Marlborough as 'extremely dry' with values of 1.3 and 1.4 respectively. An NZDI value of 1.5 or greater indicates climatic drought conditions.

It would be fair to say that localised meteorological drought is occurring in pockets of the region and may intensify throughout February. The NIWA drought forecast map shows there is a risk in the drier scenario of more widespread drought occurring in parts of the Wairau Plains, Awatere, and East Coast over the next 35 days. Stay up to date with the latest predictions at

<https://shiny.niwa.co.nz/drought-forecast>.

Rainfall

Low rainfall continued in January with Blenheim recording just 6.6 mm of rainfall, 16% of the long-term average. The total moisture deficit at the Marlborough Research Centre in January was -159 mm, 152% of the long-term average. Monthly rainfall and evapotranspiration for the 2023/24 hydrological year can be seen below in Figure 1.

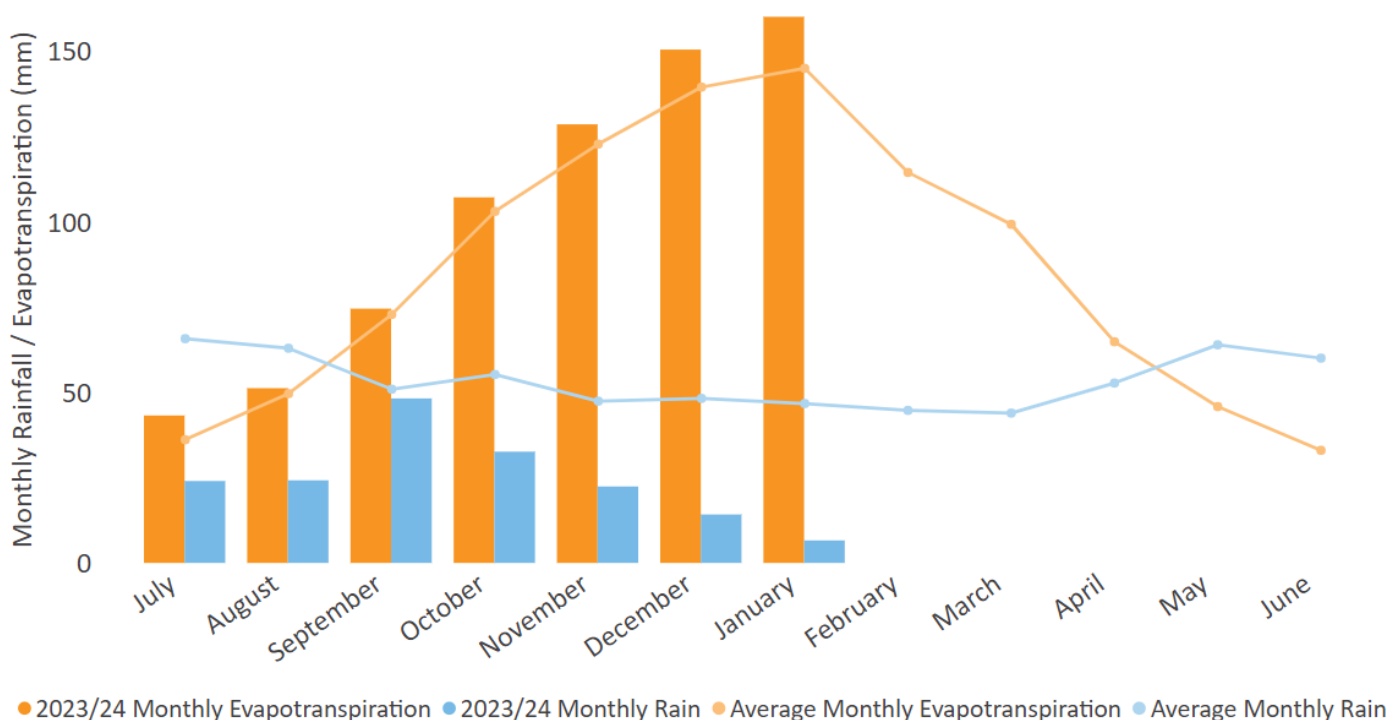


Figure 1. Monthly rainfall and evapotranspiration in Blenheim (Marlborough Research Centre) for the 2023-24 hydrological year, compared to average monthly totals.

In the 8 months from June 2023 to January 2024 Blenheim has recorded lower than average rainfall every month. Total rainfall was 194 mm, just 45% of the long-term average of 436 mm. This is the lowest rainfall total for this 8-month period over 94 years of rainfall record (1930-2024). The previous lowest total was 227 mm recorded over the same 8-month period in 1933/34.

Figure 2 shows rainfall from 6 key sites around the region. Picton received 26 mm of rain in January, about half of the average January rainfall. The Rai Valley area also recorded around 50% of average January rainfall, with 70 mm recorded at Rai Falls.

9 mm of rain was recorded at the Awatere at Awapiri site in January, which is 17% of average January rainfall. Wairau Valley at Southwold recorded 25% of average monthly rainfall, with 17 mm recorded in January.

A full list of monthly rainfall totals for the 2023/24 hydrological year at all sites can be seen in Table 1.



Figure 2. Monthly rainfall totals for the 2023-24 hydrological year from 6 key sites around Marlborough, compared to average monthly rainfall totals. Note the adjusted scale for the Tunakino and Top Valley sites.

Table 1. Monthly rainfall totals (mm) for the 2023-24 hydrological year at monitoring sites in Marlborough.

Site	July	August	September	October	November	December	January
Awatere at Awapiri	85	51	64	54	40	17	9
Awatere Glenbrae NRFA	44	18	53	48	20	24	16
Beneagle at Farm Stream	49		59	44	29	37	11
Blenheim at MDC Office	23	22	44	29	22	12	6
Branch at Branch Recorder	37		128	84	53	90	
Branch at Mt Morris	34	70	215	188	106	176	74
Flaxbourne at Corrie Downs	104	12	56	36	17	24	19
Kaituna Rainfall at Higgins Bridge	41	76	116	121	45	104	39
Kenepuru Head NRFA	62	130	135	142	68	128	36
Koromiko NRFA	46	79	117	103	53	76	47
Lake Elterwater Climate	97	12	59	39	20	30	17
Lansdowne NRFA	46	64	80	45	42	18	14
Malings	56	101	227	239	59	129	81
Mid Awatere Valley NRFA	39	38	50	37	28	21	5
Molesworth NRFA	41	38	72	62	35	15	18
Omaka at Ramshead Saddle	44	52	72	50	58	52	14
Onamalutu at Bartletts Creek Saddle	68	156	175	104	58	89	41
Onamalutu at Hilltop Road NRFA	48	96	175	119	53	126	53
Picton Climate at Waitohi Domain	46	65	86	82	44	61	26
Pudding Hill NRFA	54	39	77	81	47	16	27
Rai at Rai Falls	44	119	234	183	102	273	70
Rai Valley NRFA	50	128	180	163	101	312	67
Rarangi at Driving Range	31	52	63	71	24	18	26
Red Hills	36	49	161	113	79	90	62
St Arnaud NRFA	57	70	120	125	97	146	79
Taylor at Taylor Pass Landfill	40	27	47	39	22	13	8
Taylor at Tinpot	85	48	112	58	49	49	14
Te Rapa	174	19	84	55	53	52	43
Top Valley at Staircase Ridge	43	77	175	87	102	111	42
Tor Darroch NRFA	47	61	114	100	89	71	52
Tunakino	72	159	169	142	103	345	72
Upper Clarence NRFA	106	31	50	37	49	10	6
Waihopai at Craiglochart	26	55	60	38	56	13	12
Waihopai at Spray Confluence	38	65	101	58	75	35	28
Waikakaho	49	57	73	71	35	32	24
Waikawa at Boons Valley	61	69	124	109	82		
Wairau Valley at Southwold	51	75	80	48	42	27	17
Wakamarina at Twin Falls	44	104	176	198	95	205	78
Ward NRFA	136	18	55	41	26	31	24
Wye at Charlies Rest	35	68	113	83	68	53	24

River Flows

Below-average river flows continued across the board in the first month of 2024. The Wairau River at Tuamarina had a mean flow of just over 30 m³/s in January compared to the long-term mean of 70 m³/s. While flows were still below average in the north-west, they were the highest in the region relative to average, with the Rai River at 75% of average January flow and the Pelorus at 53%. With prolonged dry conditions rivers in the south-east were well below their average flows for January, with the Awatere River at Awapiri at just 33% of the mean January flow. A summary of river flows for January 2024 can be seen below in Table 2.

Table 2. A summary of river flows in Marlborough for January 2024.

Site Name	January Mean Flow (m ³ /s)	January Long-Term Mean Flow (m ³ /s)	% of long-term mean	Flow Record Begins	Catchment Area (km ²)
Rai River at Rai Falls	5.40	7.25	75	1979	211
Pelorus River at Bryants	7.25	13.64	53	1977	375
Kaituna River at Higgins Bridge	0.99	1.63	61	1989	135
Branch River at Weir Intake	8.08	19.68	41	1958	551
Goulter River at Horseshoe Bend	2.87	5.15	56	2010	154
Waihopai River at Craiglochart	3.96	9.14	43	1960	745
Ohinemahuta River at Domain	0.08	0.39	21	2013	33
Are Are Creek at Kaituna Tuamarina Track	0.13	0.19	66	2007	32
Tuamarina River at Para Road	0.27	0.54	50	2004	100
Wairau River at Tuamarina	30.44	69.85	44	1960	3430
Omaka River at Gorge	0.20	0.54	37	1993	91
Taylor River at Borough Weir	0.03	0.21	15	1961	65
Flaxbourne River at Corrie Downs	0.01	0.07	21	2003	71
Awatere River at Awapiri	3.13	9.49	33	1977	983

The baseflow in the Awatere River at Awapiri has been in the lower quartile since early December and continued to decline throughout January, almost reaching the lowest level ever recorded at this time of year in the last week of the month (see Figure 3). In terms of water restrictions the month began with Class C water restrictions in place, and apart from a small fresh in the first week of the month continued to decline. Class B water users were rationed to a percentage of their total water take volume from January 20th before full Class B restrictions began in the last week of January.

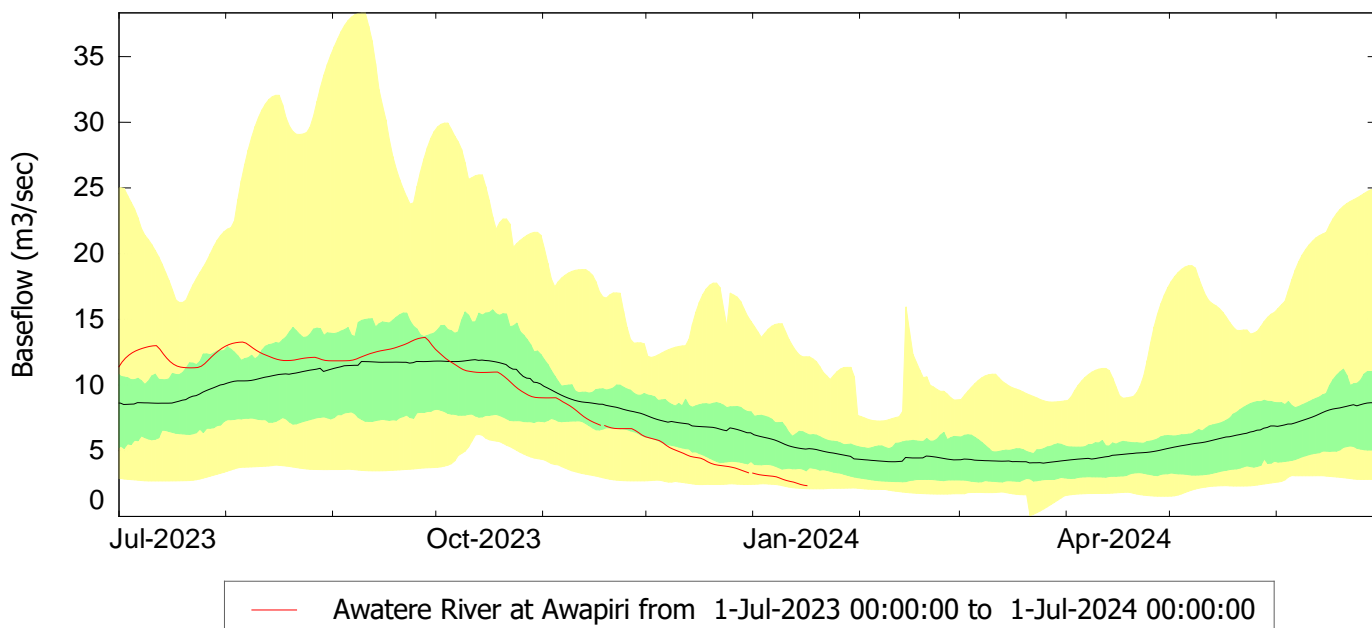


Figure 3. Awatere River at Awapiri baseflow, from 1 July 2023 to 30 June 2024. The black line is average baseflow and the red line is the 2023 baseflow. The green section is the middle 50% of data and the yellow sections show the upper and lower quartiles.

The Waihopai River at Craiglochart had mean flow of 4 m³/s in January, which is just under half of the long-term mean flow for January. Baseflow is in the lower 50% of long-term data at the end of January, with Class C restrictions in place from the 11th of January through to the end of the month (with brief exceptions due to small flushes down the river, both rainfall derived as well as hydropeaking from the upstream dam). Waihopai baseflow can be seen below in Figure 4.

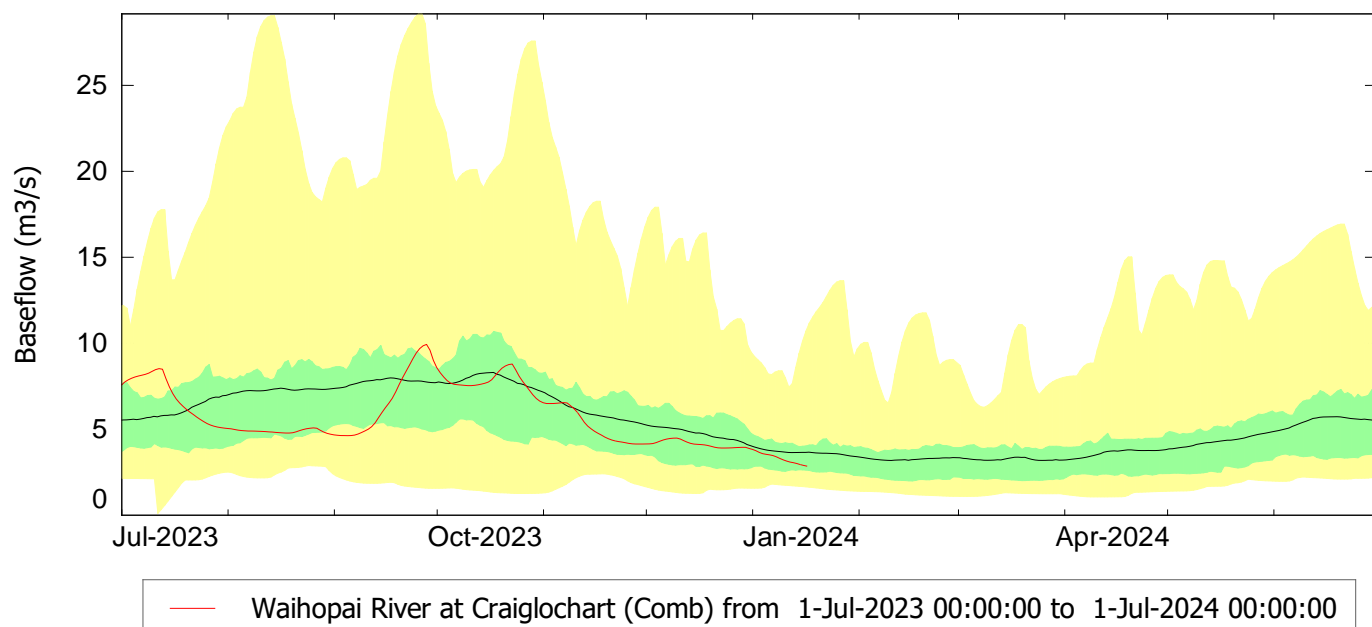


Figure 4. Waihopai River at Craiglochart baseflow, from 1 July 2023 to 30 June 2024. The black line is average baseflow and the red line is the 2023 baseflow. The green section is the middle 50% of data and the yellow sections show the upper and lower quartiles.

Baseflow in the Wairau River at Tuamarina declined in the first week of January, then remained steady throughout the rest of the month (See Figure 5 below). Class C restrictions were in place from the 9th of January onwards. In the second half of January, rain in the upper catchment maintained river flows, preventing further restrictions and briefly lifting Class C restrictions.

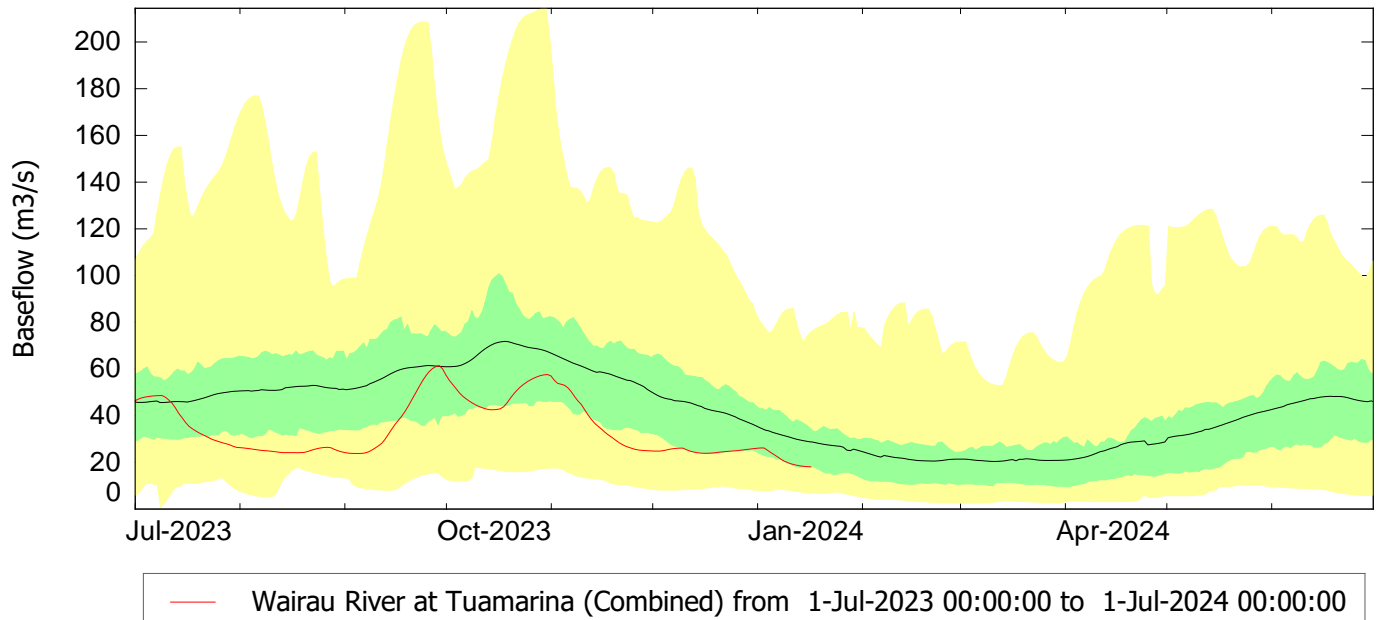


Figure 5. Wairau River at Tuamarina baseflow, from 1 July 2023 to 30 June 2024. The black line is average baseflow and the red line is the 2023 baseflow. The green section is the middle 50% of data and the yellow sections show the upper and lower quartiles.

Soil Moisture

Average shallow soil moisture at the Grovetown Park monitoring site was 15.1% for January which is well below the long-term average of 20.8%. Without any rainfall of note, shallow soil moisture remained low throughout the month.

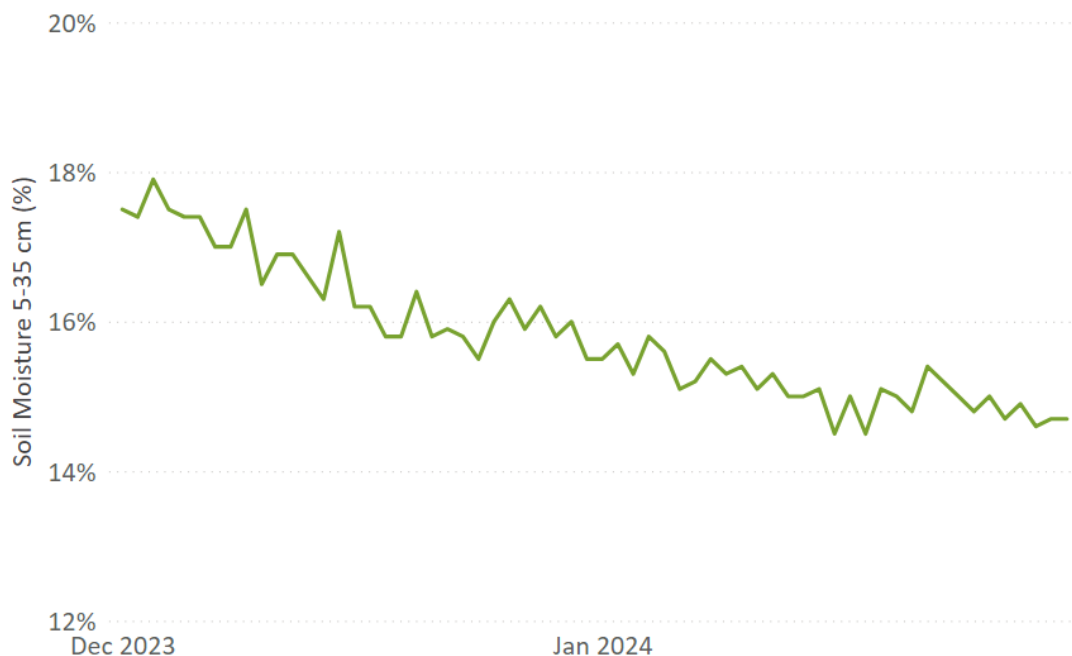


Figure 6. Shallow soil moisture from 1st December 2023 to 31st January 2024

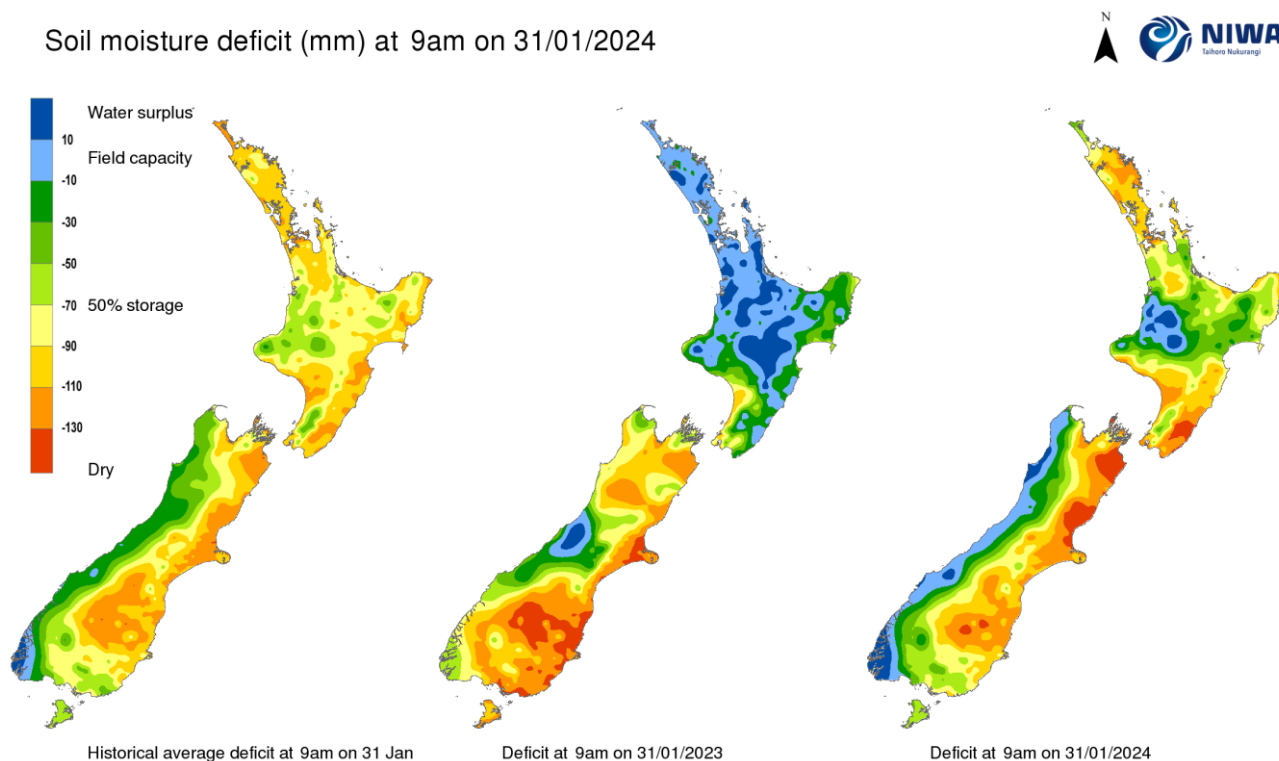


Figure 7. Soil moisture deficit maps of New Zealand, retrieved from NIWA on 31/01/2024

The soil moisture deficit map (right-hand map in Figure 7) shows soils are very dry on the Wairau Plains and to the south-east, as well as in the outer Marlborough Sounds. Soils are drier than the historical average and the same time last year (left and centre maps in Figure 7 respectively). The soil moisture anomaly map (Figure 8) shows soils are moderately drier than normal for this time of year.

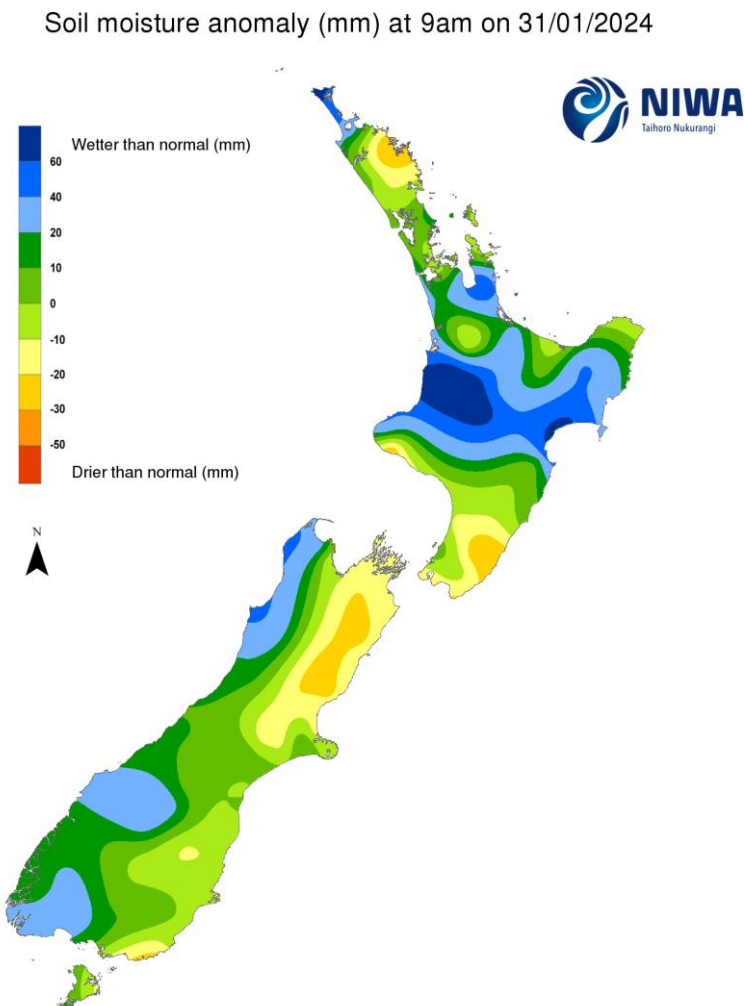


Figure 8. Soil moisture anomaly map of New Zealand, retrieved from NIWA 31/01/2024

Climate Outlook February to April 2024

The tropics remain active throughout February, but tropical cyclones should keep north of New Zealand as we saw with tropical cyclone Kiriilly in January. Textbook El Niño weather is expected in February, with enhanced westerlies and persistent high pressure across northern New Zealand, and regular fronts moving through south of the high.

For Marlborough temperatures are very likely to be above average (although varying throughout the month), while rainfall could be below average especially to the east. Localised meteorological drought is occurring in south-east parts of the region and may intensify throughout February.

The New Zealand Drought Index uses four common drought indicators to indicate how dry an area is: the Standardised Precipitation Index, the Soil Moisture Deficit, the Soil Moisture Deficit Anomaly, and the Potential Evapotranspiration Deficit. As of the 5th of February the NZDI values are 1.3 for Northern Marlborough, and 1.4 for Southern Marlborough, classifying both areas as 'Extremely Dry' (see Figure 9). An NZDI value of 1.5 or above is classified as meteorological drought. Stay up to date with current conditions at <https://niwa.co.nz/climate/information-and-resources/drought-monitor>.

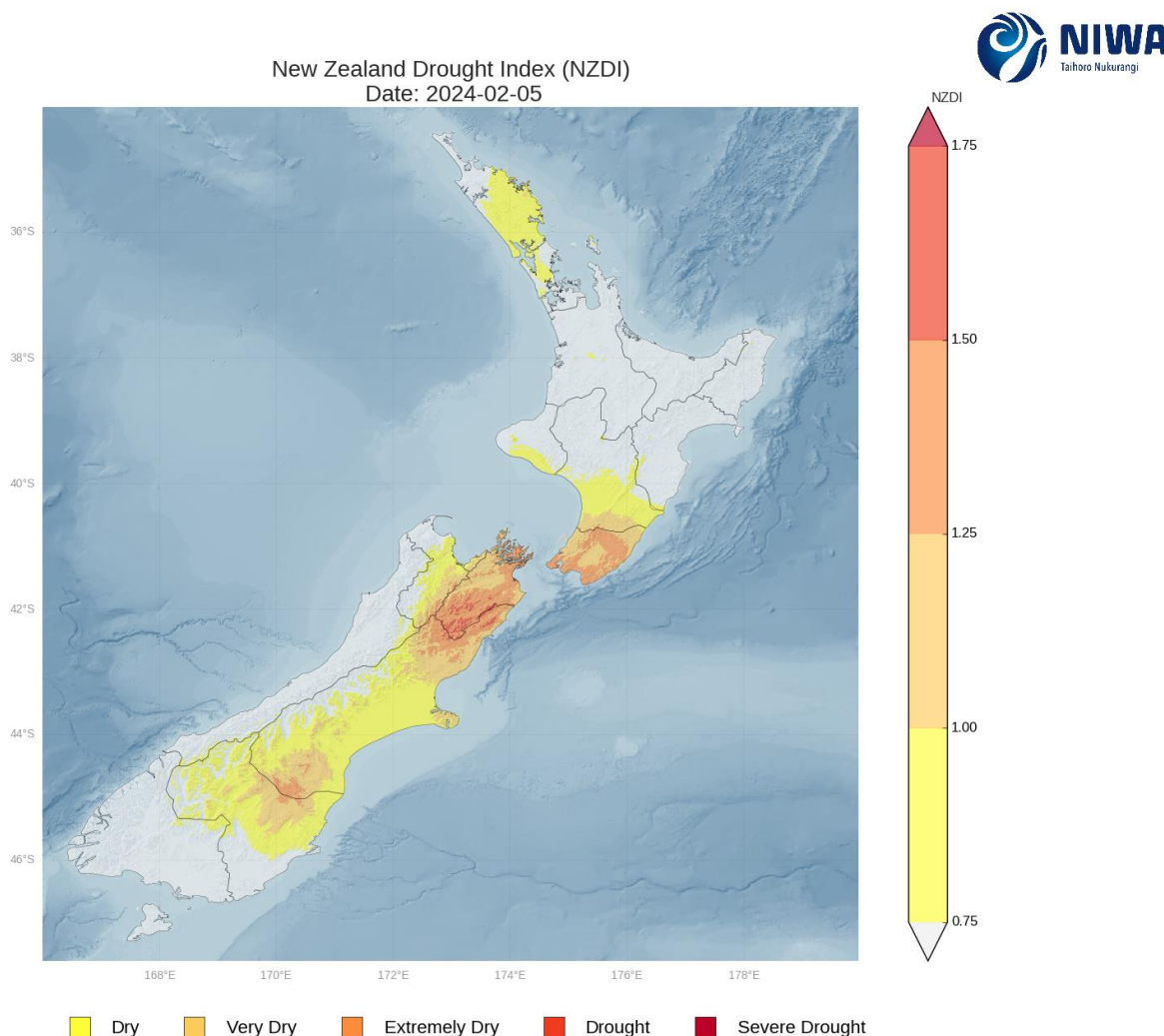


Figure 9. The New Zealand Drought Index (NZDI) retrieved from NIWA on the 5th of February 2024.

The NIWA35 map shows that in the drier scenario (right-hand map in Figure 10 below) there is a risk of drought occurring in areas of the Wairau Plains, Awatere, and further south over the next 35 days. Stay up to date with the latest predictions at <https://shiny.niwa.co.nz/drought-forecast>.

NIWA35
Risk of areas experiencing dryness or drought within 35 days
Model initiation: 00 UTC Mon 05/02/2024
Valid: 01 PM Mon 05/02/24 - 01 PM Sun 10/03/24 NZDT



"Dryness" refers to the categories of "Very Dry" and "Extremely Dry" in the NZDI categorisation. "Drought" refers to the categories of "Drought" and "Severe Drought" in the NZDI categorisation.

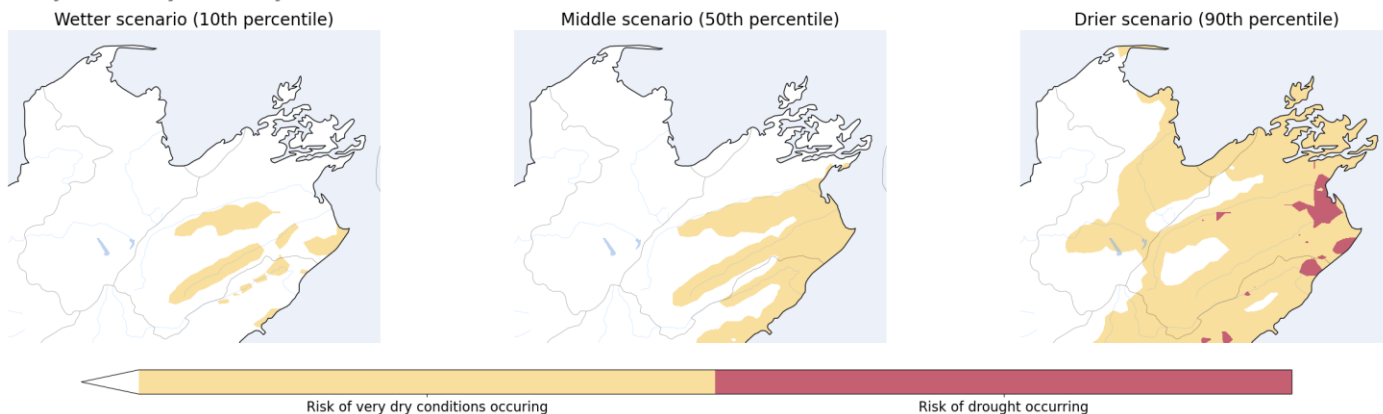


Figure 10. Marlborough/Nelson/Tasman risk of areas experiencing dryness or drought within 35 days, from the 5th of February to the 10th of March 2024. Retrieved from NIWA on 7th of February 2024.

The predictions for Marlborough/Tasman from February to April are:

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