

SITUATION REPORT

Bay of Plenty Regional Council

Data Services Team



SitRep number:	SitRep # 2	SitRep effective as at:	2 November 2020
-----------------------	------------	--------------------------------	-----------------

Key points since last SitRep

- This is the second SitRep leading into the summer of 2020/2021
- NIWA confirms the arrival of La Niña.
- MetService predicts a continued dry signature for November with a change to a wetter signature being experienced in the early months of 2021.
- Rainfall deficits from last summer continue, with October rainfalls being 30-70% of long term averages.
- Western and central parts of the region are seeing low flows in the bottom 5 percentile compared to measured history.

Predicted event development (how is the situation expected to evolve?)

1 Long-term forecasts

NIWA forecasts November – January 2021¹ air pressure to be higher than normal to the southeast and lower than normal to the north of New Zealand and the arrival of La Niña is confirmed. Air temperatures are very likely to be above average in all regions of New Zealand.

Rainfall is likely to be near normal in the north (including the BOP) and equally likely to be near normal or below normal for all remaining regions. November could exhibit continued dryness for large parts of the country whereas the chance for sub-tropical or tropical disturbances will increase during December-January, consistent with recent La Niña events.

November could exhibit continued dryness (although there may be rainfall in the first week of the month) for large parts of the country whereas the chance for sub-tropical or tropical disturbances will increase during December-January, consistent with recent La Niña events.

For the tropical cyclone season (November 2020-April 2021) NIWA's Southwest Pacific Tropical Cyclone Outlook indicates that the risk for New Zealand is elevated. On average, one ex-tropical cyclone passes near the country each year. Significant rainfall, damaging winds, and coastal inundation can occur during these events.

Soil moisture levels and river flows are most likely to be below normal in the north of the North Island and the east of the South Island. For all other regions, soil moisture levels and river flows are about equally likely to be near normal or below normal.

MetService had been predicting a drier than normal September/October for many areas due to a strong signal for persistent highs in the NZ region and these predications have proved to be accurate.







¹ <https://niwa.co.nz/climate/seasonal-climate-outlook/seasonal-climate-outlook-november-january-2021>
Version 1, November 2020

2

MetService short-term regional forecast

Regional Forecast

Bay Of Plenty

	Today Tue 03	Cloudy with a few showers. Northeasterlies. Issued at 9:44am Tuesday 03 Nov 2020
	Tomorrow Wed 04	Mostly cloudy with a few showers about the coast, spreading inland in the evening. Northeasterlies. Issued at 11:09am Tuesday 03 Nov 2020
	Thu 05	Periods of rain, with heavy falls and possible thunderstorms. Northeasterlies strengthening and becoming gusty. Issued at 11:09am Tuesday 03 Nov 2020
	Fri 06	Morning rain with heavy falls and thunderstorms possible, easing to scattered showers later in the day. Strong northeasterlies turning westerly early morning. Issued at 10:51am Tuesday 03 Nov 2020
	Sat 07	A few showers easing. Northwesterlies developing. Issued at 10:51am Tuesday 03 Nov 2020
	Sun 08	A few showers becoming more frequent. Northwesterlies. Issued at 10:51am Tuesday 03 Nov 2020

Summary of event (summary of what has happened and any critical issues/decisions made)

3 Rainfall

October delivered continued rainfall deficits across the region with most gauges showing 30-70% of long term normal for the month. This has seen a slight worsening of year to date rainfall across the region, which is largely 60-80% of normal for the calendar year. These annual rainfall deficits are somewhat driven by the dry summer at the start of the year, with only the month of June having significant rainfall above normal to somewhat balance the rainfall deficit.



Bay of Plenty Regional Council
Thriving together. Mō te taiao, mō ngā tāngata

Rainfall Summary

Nov 2, 2020 | 1 of 2

Rainfall.Rainfall Summary Report

Period Selected: 2020-10-31 00:00 to End of Record

Location Name	Most Recent Sample	Intensity (mm/hr)	Today (mm)	Yesterday (mm)	Last 5 days (mm)	This Month (mm)	Last Month (mm)	Last Month % of Normal	Year To Date - Complete Months (mm)	Year To Date % of Normal
Tuapiro at Farm Bridge	02/11/2020 09:00:00	0.0	0.0	0.0	8.5	0.0	48.0	36 %	1100.0	61 %
Te Puna at Odley Rd	02/11/2020 08:00:00	0.0	0.0	0.5	14.5	0.5	85.0		1226.5	
Wairoa at Lower Kaimai	02/11/2020 09:00:00	0.0	0.0	1.0	15.0	1.0	88.5	53 %	1250.0	78 %
Ngongotaha at Relph Rd	02/11/2020 09:00:00	0.0	0.0	0.5	19.0	0.5	78.0	60 %	1119.4	70 %
Rotorua at Upper Oturoa Rd	02/11/2020 09:00:00	0.0	0.0	0.0	10.5	0.0	92.0	56 %	1395.1	72 %
Waimapu at Glue Pot Rd	02/11/2020 09:00:00	0.0	0.0	0.5	19.0	0.5	109.4	74 %	1229.0	74 %
Waimapu at McCarrolls	02/11/2020 09:00:00	0.0	0.0	0.5	17.0	0.5	57.5	57 %	855.0	61 %
Rotorua at Whakarewarewa	02/11/2020 09:00:00	0.0	0.0	0.5	8.5	0.5	61.5	50 %	780.8	67 %
Mangorewa at Kaharoa	02/11/2020 09:00:00	0.0	0.0	0.0	14.5	0.0	66.0	46 %	1094.3	68 %
Okaro at Okaro Rd	02/11/2020 09:00:00	0.0	0.0	0.0	7.5	0.0	59.0	70 %	763.7	69 %
Lake Rotoiti at Okawa Bay	02/11/2020 09:00:00	0.0	0.0	0.0	16.5	0.0	67.5	69 %	782.8	58 %
Tikitere at SH30	02/11/2020 09:00:00	0.0	0.0	0.5	21.5	0.5	114.0		1039.4	
Mangorewa at Upper Rangiuuru	02/11/2020 09:00:00	0.0	0.0	0.0	12.0	0.0	82.0	47 %	1249.4	71 %
Mangorewa at Mangorewa Lin	02/11/2020 09:00:00	0.0	0.0	0.0	10.5	0.0	50.5	38 %	1095.5	72 %
Raparapahoe at Collins Lane	02/11/2020 09:00:00	0.0	0.0	0.0	4.0	0.0	45.5	41 %	893.5	62 %
Kaituna at Marshalls Farm	02/11/2020 09:00:00	0.0	0.0	0.0	2.5	0.0	51.0	59 %	743.2	59 %
Kaituna at Te Matai	02/11/2020 09:00:00	0.0	0.0	0.0	6.5	0.0	46.5	48 %	848.2	72 %
Rangitaiki at Kokomoka (Bore 1	02/11/2020 09:05:00	0.0	0.0	0.0	12.0	0.0	140.5	114 %	1138.1	88 %
Pongakawa at Pongakawa Bush	02/11/2020 09:00:00	0.0	0.0	0.0	10.0	0.0	47.0	40 %	821.7	60 %
Outlet at Waitangi Soda Spring	02/11/2020 09:00:00	0.0	0.0	0.5	15.5	0.5	84.5		1259.6	
Te Whaiti at Minginui	02/11/2020 09:00:00	0.0	0.0	4.0	14.0	4.0	65.5		933.5	
Kawerau at Plunket St	02/11/2020 09:00:00	0.0	0.0	0.5	9.0	0.5	53.5		1024.4	
Tarawera at Hogg Rd	02/11/2020 09:00:00	0.0	0.0	0.0	8.5	0.0	53.0		1056.2	
Ohinekoao at Harris Saddle	02/11/2020 09:00:00	0.0	0.0	0.5	11.0	0.5	67.5	44 %	978.8	59 %
Galatea Basin at Horomanga R	02/11/2020 07:00:00		0.0	0.5	5.5	0.5	42.0	51 %	694.5	68 %
Waihua at Clearing	02/11/2020 08:00:00	0.0	0.0	1.0	18.0	1.0	87.0	68 %	1039.5	70 %
Rangitaiki at Te Teko	02/11/2020 09:00:00	0.0	0.0	0.0	6.5	0.0	32.0	35 %	718.0	65 %
Edgecumbe at Edgecumbe	02/11/2020 09:00:00	0.0	0.0	0.0	5.0	0.0	40.5	44 %	789.1	67 %
Tarawera at Awakaponga	02/11/2020 09:10:00	0.0	0.0	0.0	6.5	0.0	49.7	52 %	836.4	71 %
Rangitaiki Plains at Flax Rd	01/11/2020 12:00:00		0.0	0.0	6.0	0.0	36.0	38 %	688.5	57 %

Location Name	Most Recent Sample	Intensity (mm/hr)	Today (mm)	Yesterday (mm)	Last 5 days (mm)	This Month (mm)	Last Month (mm)	Last Month % of Normal	Year To Date - Complete Months (mm)	Year To Date % of Normal
Tarawera at ORC Pump Station	02/11/2020 09:00:00	0.0	0.0	0.0	2.0	0.0	26.5	32 %	520.5	57 %
Whakatane at Kopeopeo	02/11/2020 09:00:00	0.0	0.0	0.0	7.0	0.0	25.0	26 %	643.6	57 %
Rangitaiki at Thornton	02/11/2020 09:00:00	0.0	0.0	0.0	4.0	0.0	25.0	26 %	588.5	55 %
Whakatane at Huiarau Summit	02/11/2020 09:00:00	0.0	0.0	3.0	25.5	3.0	139.1	63 %	1691.4	83 %
Whakatane at Huitieke rain	02/11/2020 08:00:00	0.0	0.0	0.0	9.5	0.0	94.0	66 %	1115.0	89 %
Whakatane at Awahou Rd	02/11/2020 07:00:00		0.0	0.0	6.5	0.0	39.5		997.2	
Wainui-te-whara at Munro's	02/11/2020 09:00:00	0.0	0.0	0.0	10.0	0.0	38.4	38 %	809.0	63 %
Tauranga at Omahuru (Ogilvies	02/11/2020 09:10:00	0.0	0.0	0.5	23.5	0.5	126.5		1508.1	
Nukuhou at Nukuhou North	02/11/2020 09:00:00	0.0	0.0	0.0	9.0	0.0	37.0		875.7	
Ohope Spit at Ohope Golf	02/11/2020 09:00:00	0.0	0.0	0.0	8.0	0.0	34.2		758.0	
Waioeke at Koranga	02/11/2020 09:00:00	0.0	0.0	0.5	11.0	0.5	73.0	36 %	1161.0	64 %
Waioeke at Cableway	02/11/2020 08:15:00	0.0	0.0	0.5	20.0	0.5	161.9	74 %	1681.4	81 %
Waioeke at Mouth of Gorge	02/11/2020 08:15:00	0.0	0.0	0.0	11.5	0.0	55.1	39 %	958.8	66 %
Otara at Opotiki Wharf	02/11/2020 09:00:00	0.0	0.0	0.0	4.0	0.0	29.5	31 %	838.4	76 %
Otara at Tutaeotoko	02/11/2020 09:00:00	0.0	0.0	0.5	25.5	0.5	121.5	58 %	1546.8	76 %
Otara at Browns Bridge	02/11/2020 09:00:00	0.0	0.0	0.0	5.5	0.0	51.0	46 %	879.1	73 %
Pakihī at Pakihī Station	02/11/2020 09:05:00	0.0	0.0	0.0	10.0	0.0	132.5	63 %	1393.5	73 %
Pakihī at Rakanui	02/11/2020 09:00:00	0.0	0.0	0.5	13.0	0.5	97.0	52 %	1266.9	74 %
Haparapara at Haparapara	02/11/2020 09:00:00	0.0	0.0	1.0	35.5	1.0	263.5	67 %	2922.5	79 %

Table 1 Rainfall statistics for 2020.

3.1 Standardised Precipitation Index

The Standardised Precipitation² Index (SPI) is used for high level presence/absence definition of drought type conditions. SPI is a rainfall based index that provides information to identify the severity, location, duration, onset and cessation of drought conditions and is used worldwide. SPI indicates how extreme a recent totalised period rainfall has been when compared to historical data for that location. SPI values are updated on a monthly basis using historical data stretching back at least 30 years³.

The SPI can indicate both dry and wet conditions. The index is constructed in such a way that positive values indicate conditions that are wetter than normal and negative values indicate conditions that are drier than normal.

The SPI was designed to quantify rainfall deficit for drought analysis over multiple analysis periods, these analysis periods help reflect the impact of drought on different water resources and their use and are described in detail in Table 2.

Table 2. SPI rainfall analysis periods.

Analysis Period	Drought Type	Related Impact Examples
1 month	Meteorological	Meteorological drought happens when dry weather patterns affect a particular area and impact quick responding resources such as soil moisture.
3 month	Agricultural	Agricultural drought are those that impact major steps in a growing or production cycle. The impacted steps production are 1 - 6 months in duration.
12 month	Hydrological	Hydrological drought occurs when low water supply becomes evident, especially in streams, reservoirs, and groundwater levels. These develop over longer timeframes usually after many months of meteorological drought.

Table 3 provides a definition of the SPI values and their ranking

Table 3. SPI value definition.

SPI Value	Definition
≥ 2.00	Extremely Wet
1.50 to 1.99	Very Wet
1.00 to 1.49	Moderately Wet
-0.99 to 0.99	Near Normal
-1.00 to -1.49	Moderately Dry
-1.50 to -1.99	Severely Dry
≤ -2.00	Extremely Dry

Both the 3 month (Figure 1) and 12 month (Figure 2) SPI results⁴ are now showing a strong dry signature; the 3 month SPI has worsened significantly since last month and this will have occurred due to the wetter June and July months no longer showing there effect.

Observing the 12 month SPI values for the Waimapu catchment near Tauranga (Figure 3) over time we can see these have in fact been in some sort of dry state since late 2019 due to lack of rain.

² Precipitation being another name for rainfall.

³ Where 30 years doesn't exist it is synthesised.

⁴ Results for the former TCC Waimapu at Gluepot Road site are under review and may change next month.

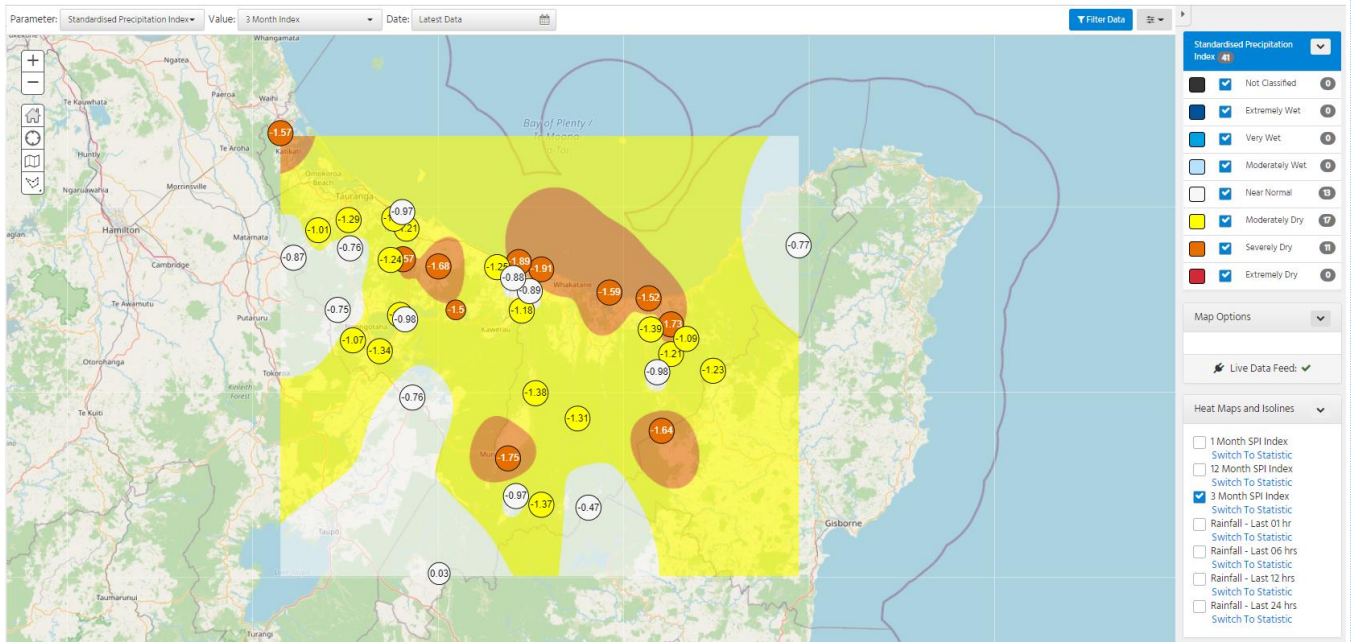


Figure 1 3 month SPI

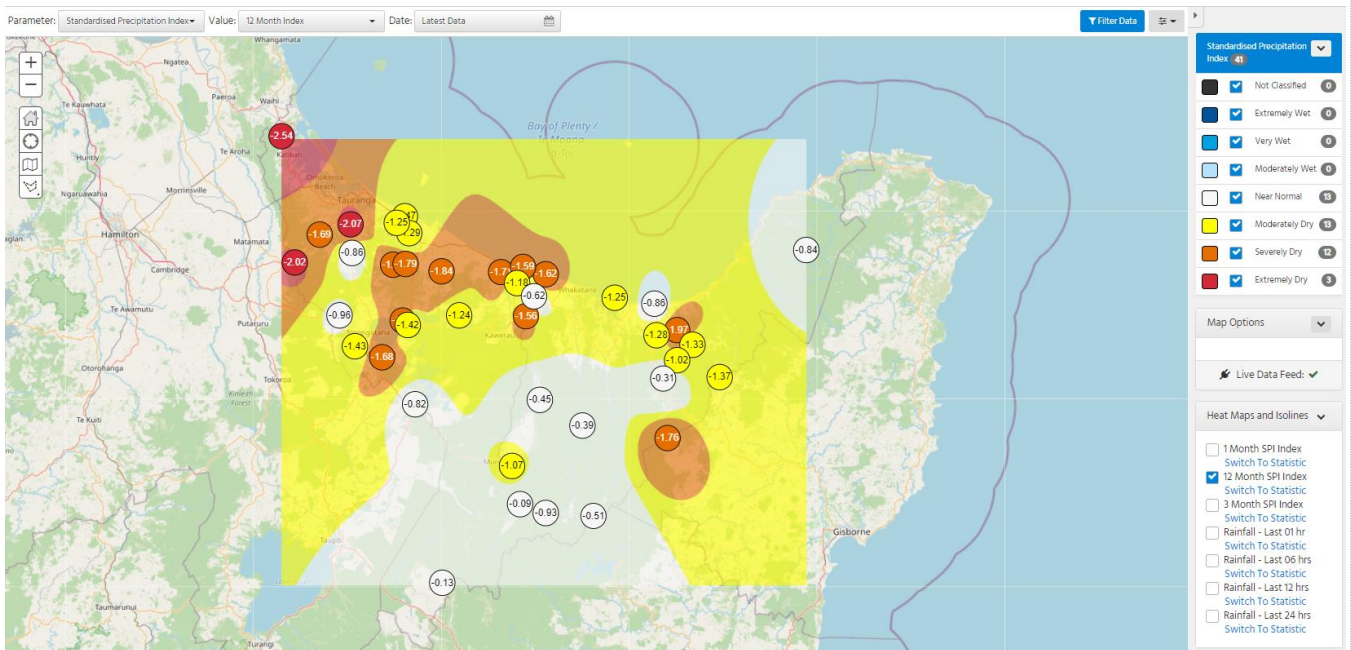


Figure 2 12 month SPI

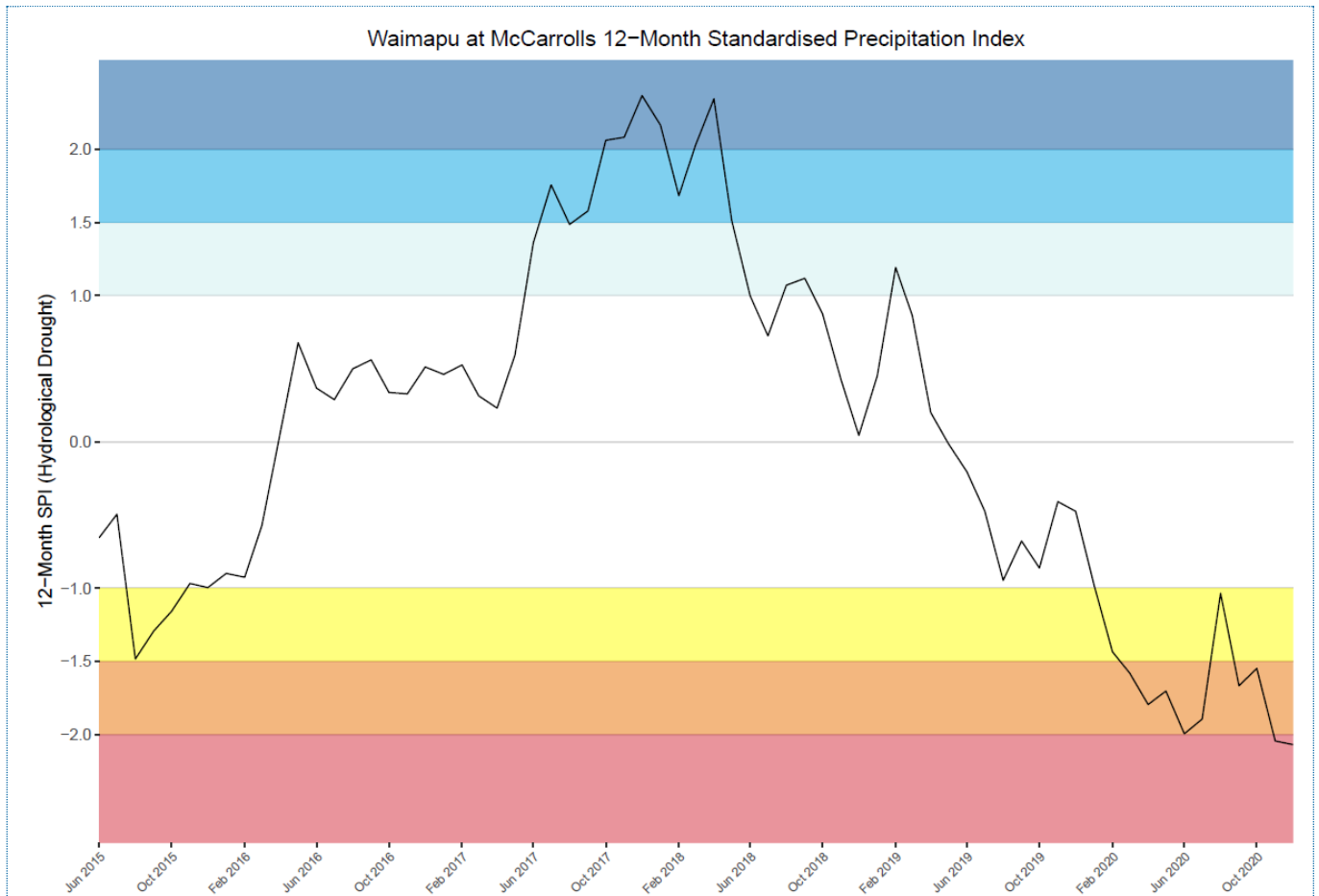


Figure 3 Waimapu at McCarrolls 12 month SPI history Sept. 2010 onwards

4 River Flows

Many rivers are showing a rise in flows towards the end of October being due to some rain occurring in the last few days of the month and this lift in flows is expected to be shortlived unless we get further sustained rainfall.

Flow in reference monitoring sites in the western BOP are reinforcing the severe/extremely dry 12 month SPI evident in Figure 2 with both the Tuapiro and Waimapu catchments in the lowest 5th percentile for this time of year.

Central areas of the region are now showing similar signals to the western BOP. We have added in the Puarenga Stream in Rotorua to this month's report as it is showing record low flows and there are low geothermal aquifer levels present in this area that are being investigated.

Eastern areas have experienced some rainfall providing reasonable flows, but are also still on the drier side of normal.

Although rivers are very low for the time of year, flows are still well above management levels.

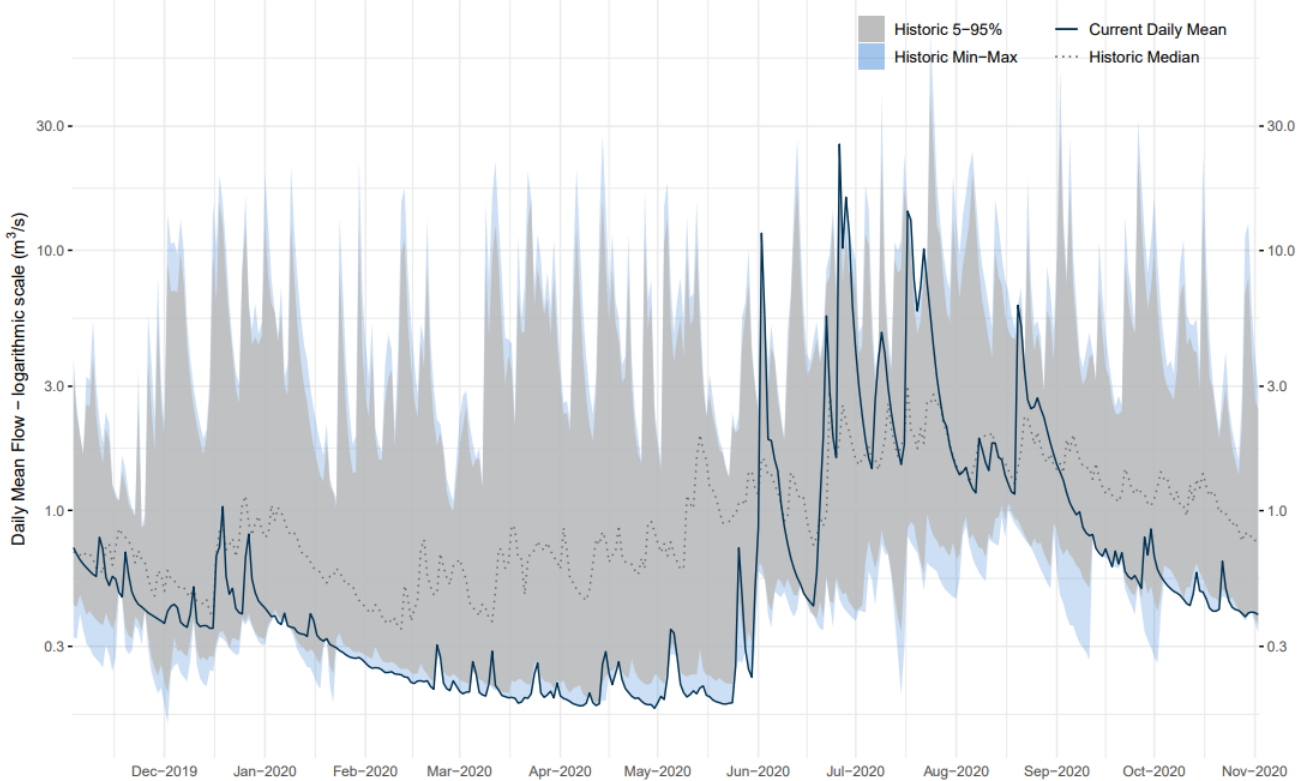
Note: The following graphs are based upon preliminary data and will undergo refinement as further information is collected throughout the event.

4.1 Western BOP flow monitoring sites



Tuapiro at Farm Bridge – Current vs Historic Daily Mean Flow

Flow Record Begins – 02 Dec 2010

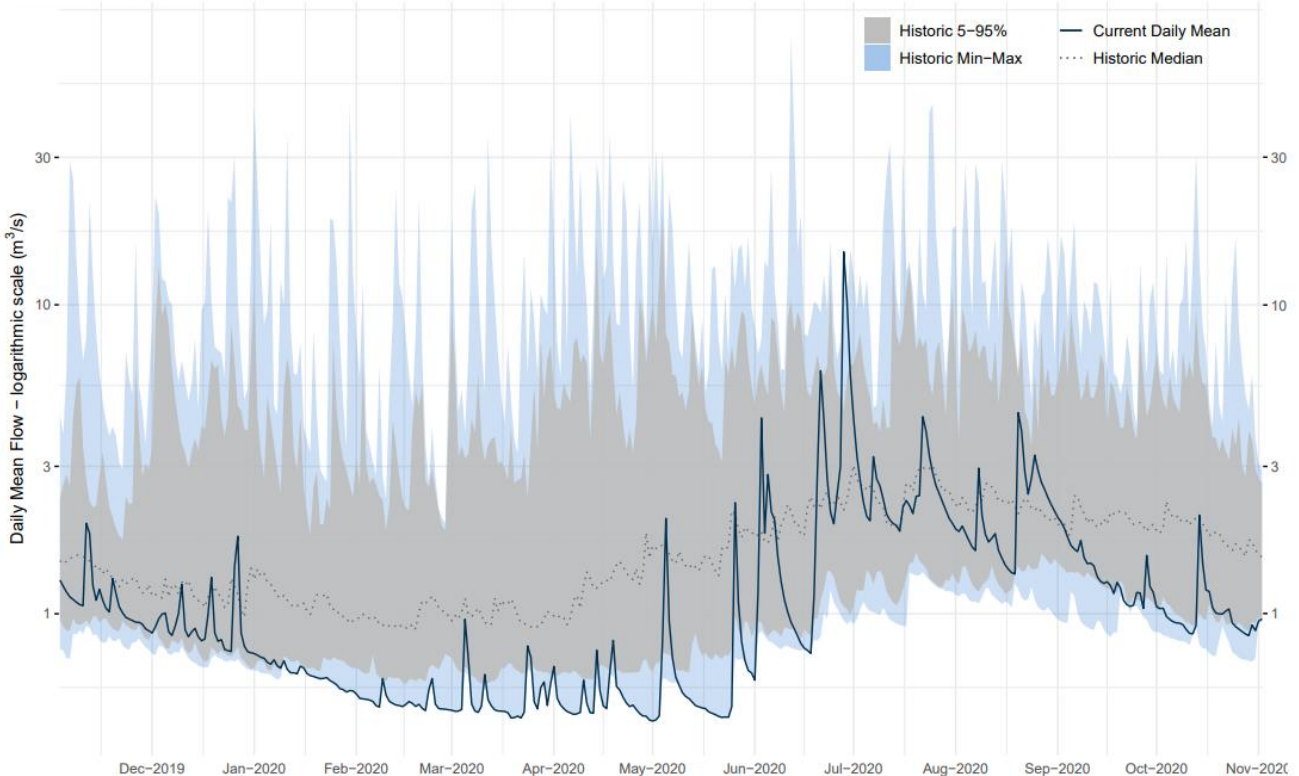


* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Council's telemetry system which has yet to go through quality assurance processes.



Waimapu at McCarrolls – Current vs Historic Daily Mean Flow

Flow Record Begins – 12 Mar 1991

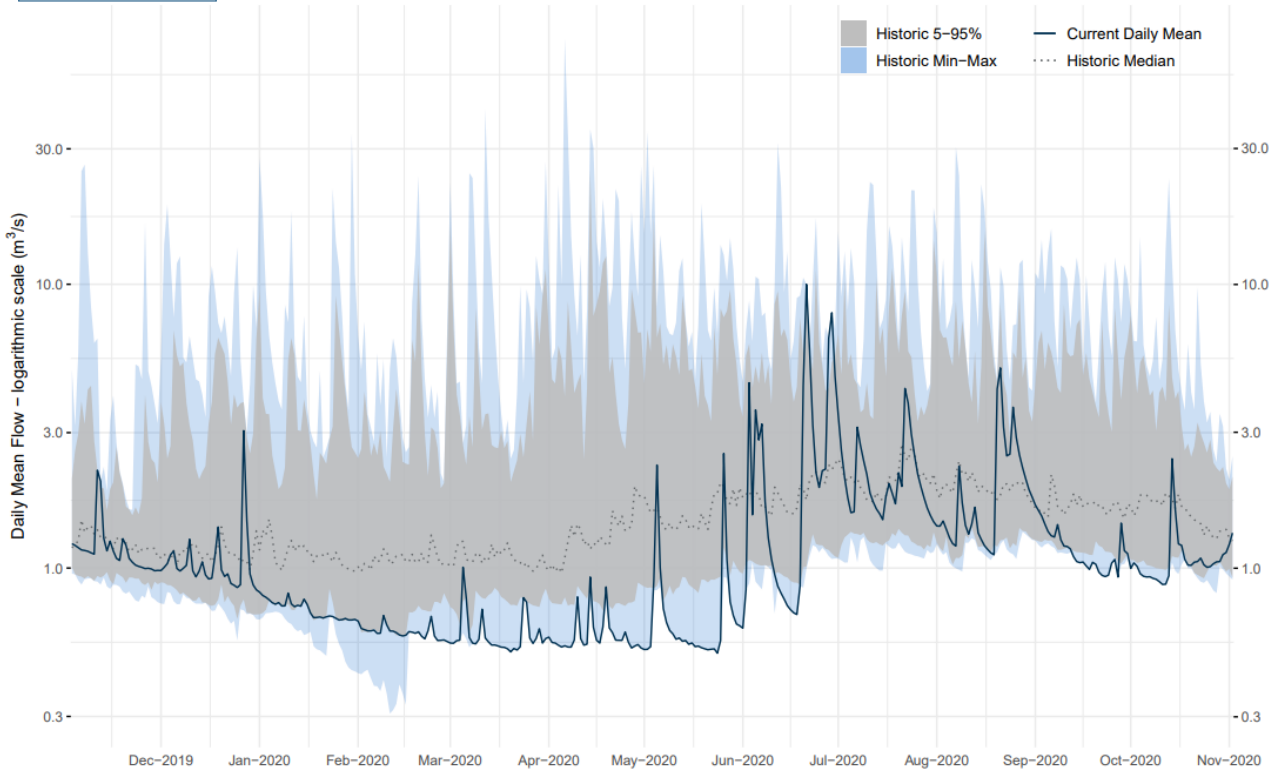


* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Council's telemetry system which has yet to go through quality assurance processes.



Raparapahoe at Above Drop Structure – Current vs Historic Daily Mean Flow

Flow Record Begins – 30 Aug 1995



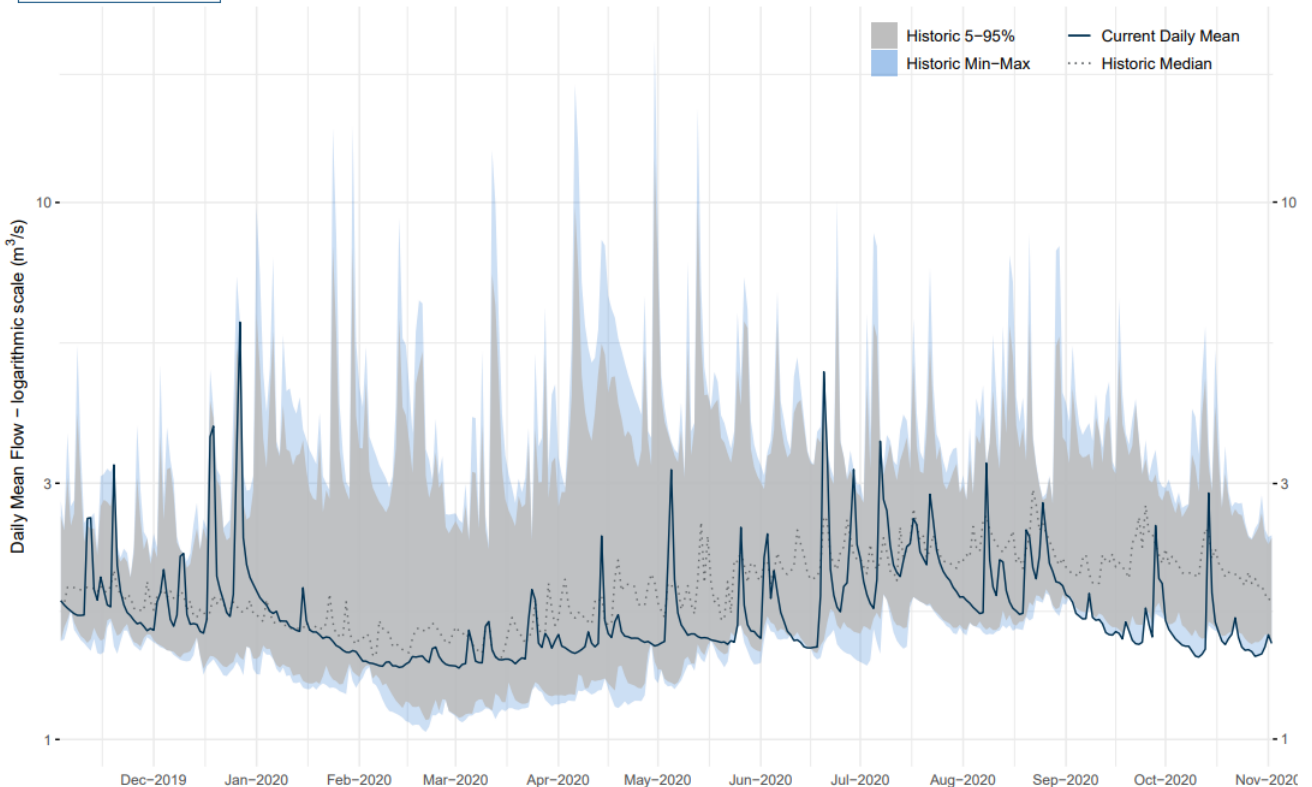
* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry system which has yet to go through quality assurance processes.

5 Central BOP flow monitoring sites



Puarenga at SH30 – Current vs Historic Daily Mean Flow

Flow Record Begins – 11 Nov 2009

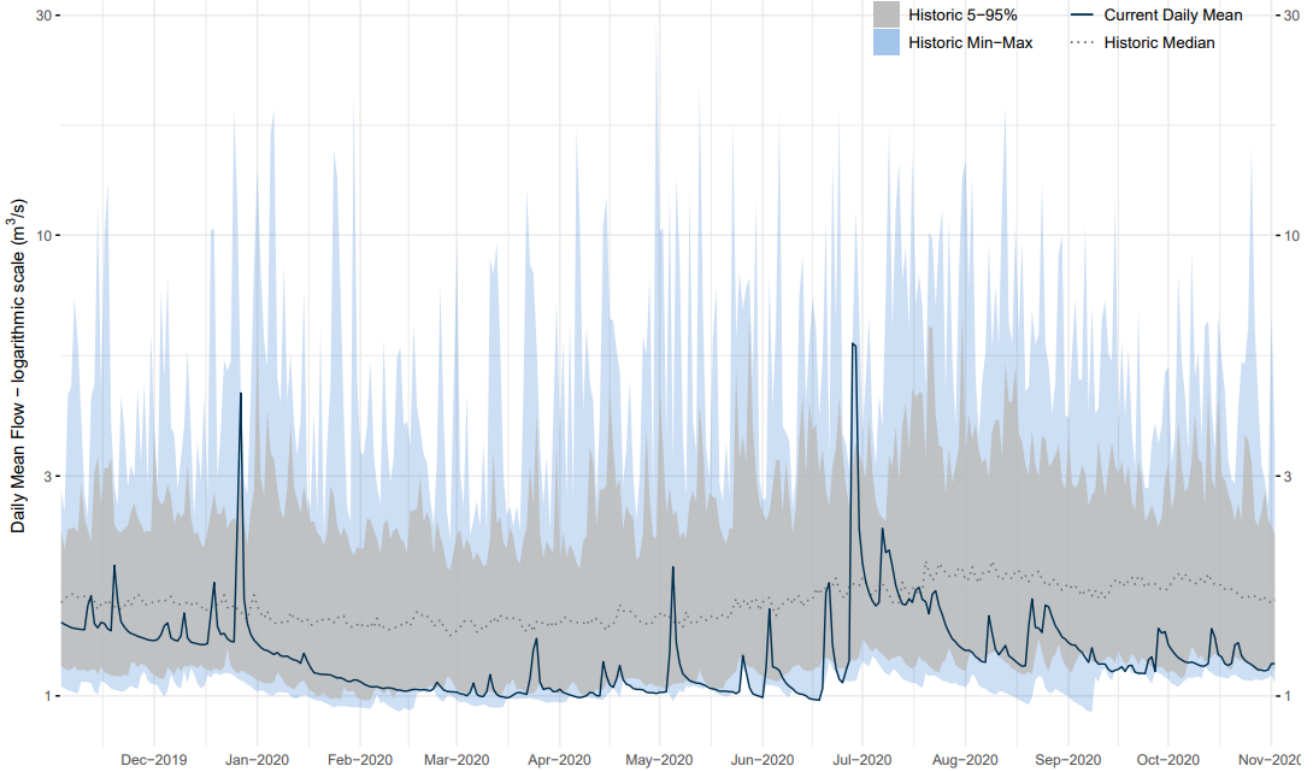


* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry system which has yet to go through quality assurance processes.



Ngongotaha at SH5 – Current vs Historic Daily Mean Flow

Flow Record Begins – 03 Jun 1975



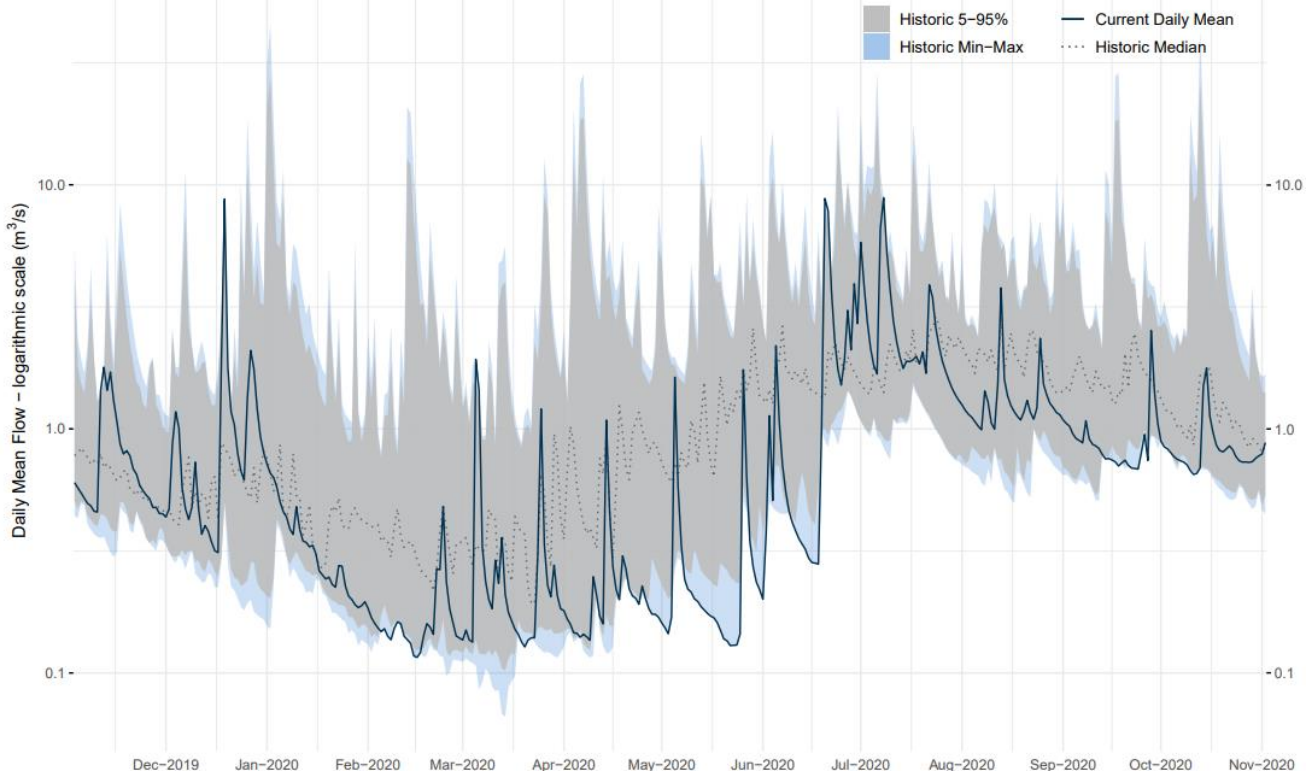
* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry system which has yet to go through quality assurance processes.

5.1 Eastern BOP flow monitoring sites

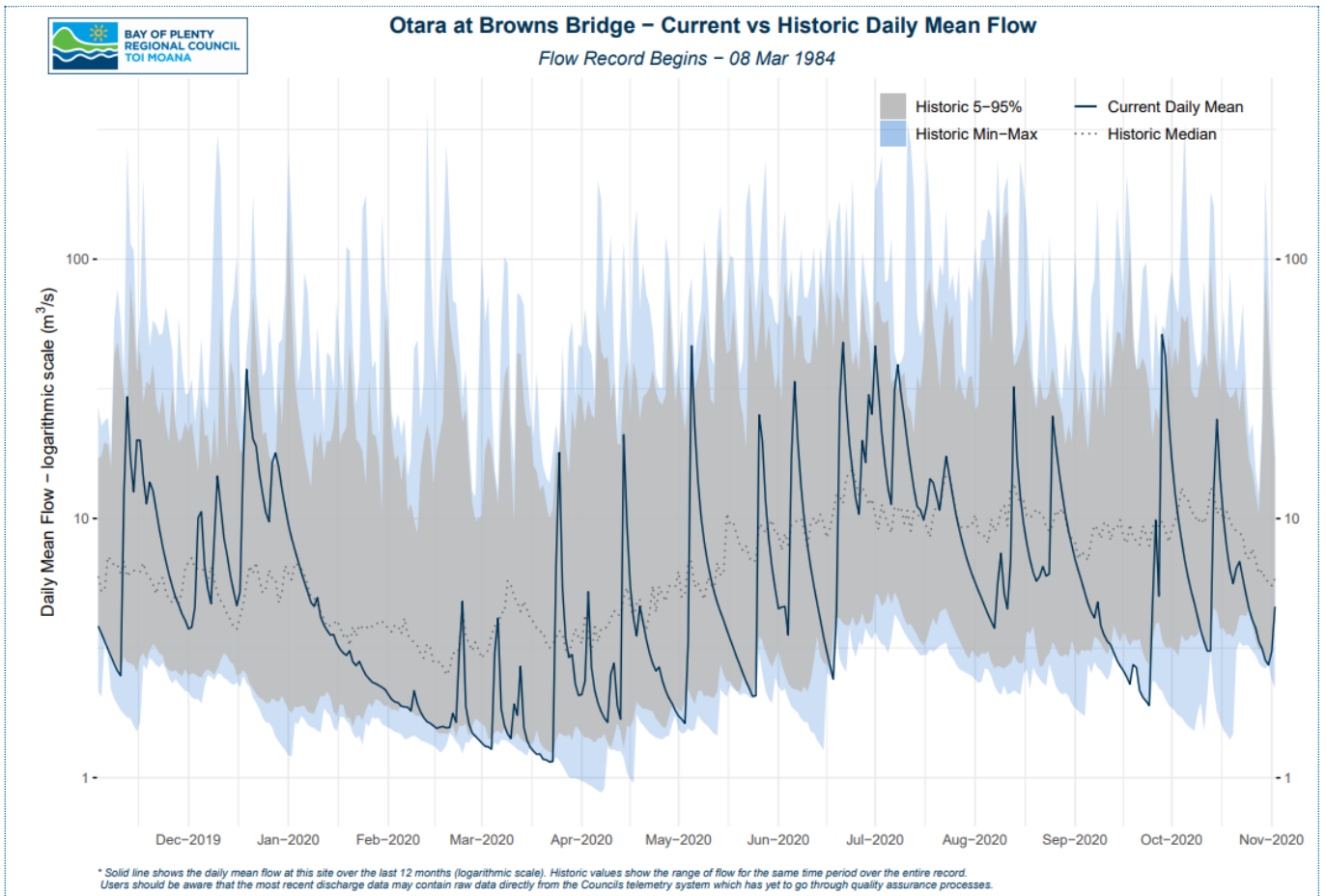


Nukuhou at Glenholme Rd – Current vs Historic Daily Mean Flow

Flow Record Begins – 07 Oct 2011



* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry system which has yet to go through quality assurance processes.



6 Soil Moisture

Soil moisture deficits continue across the Bay of Plenty as modelled by NIWA (Figure 4) and evidenced by our soil moisture reports (<https://envdata.boprc.govt.nz/Data/Report>).

Soil moisture anomaly (mm) at 9am on 28/10/2020

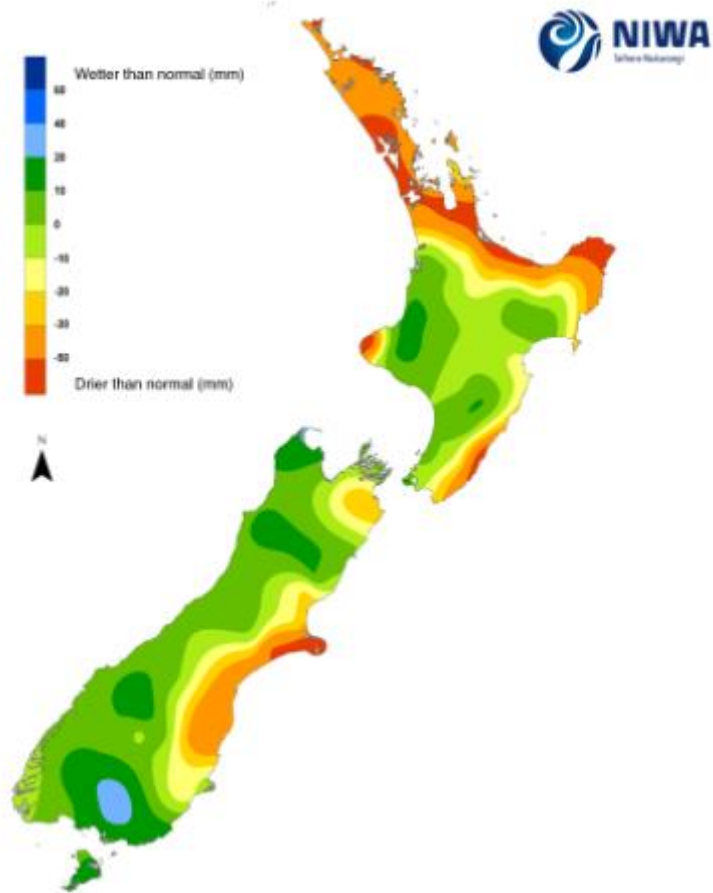


Figure 4 Soil Moisture Anomaly for the past two weeks relative to history for this time of year.

<p>Report prepared by: Glenn Ellery, Data Services Manager</p>	<p>Report authorised by: Glenn Ellery, Data Services Manager</p>
<p>Next Situation Report will be issued at: December 2020</p>	<p>Time, date of approval: 2 November 2020</p>