

SITUATION REPORT

Bay of Plenty Regional Council

Data Services Team



SitRep number:	SitRep # 3	SitRep effective as at:	1 December 2020
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Key points since last SitRep

- This is the third SitRep leading into the summer of 2020/2021.
- Rainfall over the month of November was 1 to 3 times average for the month. Long term calendar year totals however are still in deficit.
- There is an easing in short term dry condition pressure due to November's rain. Longer term SPI indicators that look at the last 6-12 months are showing we are still in deficit from long term normals.
- Forecasts suggest relatively dry conditions until the end of the December.
- There is currently little low flow pressure on the majority of monitored rivers in the BOP, the exception being the Ngongotaha River which is still low.
- Soil moisture levels are currently higher than normal.

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

1.1 NIWA seasonal forecast

NIWA forecasts December 2020 – February 2021 air pressure to be higher than normal pressure and drier conditions are expected to start summer with moist, sub-tropical disturbances are expected to reach the country occasionally, particularly the North Island and northern South Island. Moderate La Niña conditions continue. Air temperatures are very likely to be above average in all regions of New Zealand with high humidity possible.

Rainfall is equally likely to be near or above normal in the north (including the BOP).

An elevated risk for an ex-tropical cyclone to pass near the country exists due to La Nina's north-easterly air flow anomalies.

1.2 MetService 4 week forecast

The following forecast is provided by the MetService (Georgina Griffiths) and is developed from long-range (4 week) forecasts based on the ECMWF ensemble data and forecaster interpretation of local conditions.

- **30/11-6/12:** A cooler week, with a couple of minor northwest/southwest wind changes expected. A weak front on Thursday yields only brief and minor showers for BOP. Further showers are expected this weekend, but again, don't yield well for the bulk of BOP. A drier than normal week, overall.
- **7/12-13/12:** High pressure is signalled to move into the Tasman Sea, with settled westerly winds prevailing over the North Island. Another drier than normal week, overall, although some inland spots (such as Rotorua) look likely to catch a few more showers than coastal areas.
- **14/12-20/12:** High pressure looks to strongly intensify over the country (a Blocking High). Very dry and rather warm for BOP.
- **21/12-27/12:** Confidence is always rather low for week four predictions. However, for what it is worth, low pressures are signalled to the north of North Cape, with a wetter 'north-easterly' flavour showing up for BOP.

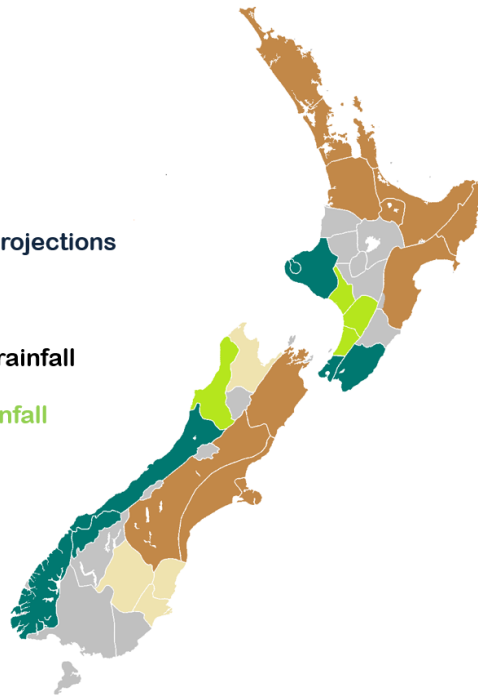
Summary: The lead up to Christmas is forecast to run drier than normal for BOP. Temperatures bounce back to above average, from the middle of next week.

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



December 2020 rainfall projections







- Below normal rainfall
- Normal-to-below normal rainfall
- Near normal rainfall
- Near-to-above normal rainfall
- Above normal rainfall



1.3 Short-term forecast (MetService)

Regional Forecast

Bay Of Plenty

	Today Tue 01	Cloud and any remaining showers clearing and becoming fine this afternoon. Gusty southerlies, gale about the eastern ranges until tonight. <small>Issued at 9:51am Tuesday 01 Dec 2020</small>
	Tomorrow Wed 02	Fine with afternoon sea breezes. Cloud increasing by evening as northwesterlies develop. <small>Issued at 10:22am Tuesday 01 Dec 2020</small>
	Thu 03	Partly cloudy to start. Scattered rain developing around midday, clearing to fine later in the afternoon as northwesterlies turn southwest. <small>Issued at 10:22am Tuesday 01 Dec 2020</small>
	Fri 04	Becoming fine. Winds tending westerly. <small>Issued at 10:34am Tuesday 01 Dec 2020</small>
	Sat 05	Cloudy periods. Isolated showers about the ranges from afternoon. Winds tending northwesterly. <small>Issued at 10:34am Tuesday 01 Dec 2020</small>
	Sun 06	Brief morning showers then mainly fine. A morning southerly change. <small>Issued at 10:34am Tuesday 01 Dec 2020</small>

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

2 Rainfall

November delivered welcome steady rainfall from multiple weather systems that passed over the region. Rainfall totals of 100% to 300% of long-term monthly normal were recorded, with the higher altitude rain gauges to the east of the region showing the lowest percentage.

Calendar year rainfall totals are still in deficit, being 70% to 90% of long term normal.



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

Rainfall Summary

Rainfall.Rainfall Summary Report

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Period Selected: 2020-11-29 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	01/12/2020 07:00:00	0.5	2.0	18.0	30.0	2.0	268.5	249 %	1368.5	71 %
Te Puna at Odey Rd	01/12/2020 07:00:00	0.5	3.0	16.0	27.5	3.0	281.5		1508.0	
Wairoa at Lower Kaimai	01/12/2020 07:00:00	0.5	3.5	15.0	26.0	3.5	288.0	201 %	1538.0	88 %
Ngongotaha at Relph Rd	01/12/2020 07:00:00	0.0	7.0	12.0	27.0	7.0	258.4	294 %	1373.4	82 %
Rotorua at Upper Oturoa Rd	01/12/2020 07:00:00	0.0	4.5	12.0	28.5	4.5	242.1	194 %	1650.6	80 %
Waimapu at Glue Pot Rd	01/12/2020 07:00:00	0.0	2.0	16.0	34.5	2.0	247.5	258 %	1476.5	84 %
Waimapu at McCarrolls	01/12/2020 07:00:00	0.5	1.5	7.0	12.5	1.5	199.5	293 %	1054.5	71 %
Rotorua at Whakarewarewa	01/12/2020 07:00:00	0.0	2.0	13.5	24.5	2.0	190.0	194 %	973.3	77 %
Paraiti (Mangorewa) at Kaharo	01/12/2020 07:00:00	0.5	9.0	10.5	27.5	9.0	254.1	229 %	1353.8	79 %
Okaro at Okaro Rd	01/12/2020 07:00:00	0.0	1.5	11.5	20.5	1.5	164.0	248 %	927.7	79 %
Lake Rotoiti at Okawa Bay	01/12/2020 07:00:00	0.0	7.0	10.0	22.0	7.0	213.6	329 %	997.3	71 %
Tikitere at SH30	01/12/2020 07:00:00	0.0	5.0	13.0	26.0	5.0	265.4		1297.4	
Paraiti (Mangorewa) at Upper	01/12/2020 07:00:00	0.0	4.0	14.0	24.0	4.0	330.0	239 %	1579.4	83 %
Paraiti (Mangorewa) at Link	01/12/2020 07:00:00	0.0	3.5	14.0	22.5	3.5	280.0	289 %	1375.5	85 %
Raparapahoe at Collins Lane	01/12/2020 07:00:00	1.0	2.0	8.0	14.5	2.0	194.0	206 %	1087.5	71 %
Kaituna at Marshalls Farm	01/12/2020 07:00:00	2.0	3.5	5.0	13.0	3.5	162.5	220 %	905.7	68 %
Kaituna at Te Matai	01/12/2020 07:00:00	0.5	2.5	7.5	17.5	2.5	256.7	362 %	1112.7	89 %
Rangitaiki at Kokomoka (Bore 1	01/12/2020 07:05:00	0.0	0.5	3.0	11.5	0.5	165.0	165 %	1303.1	94 %
Pongakawa at Pongakawa Bush	01/12/2020 06:00:00	0.5	6.0	11.5	24.5	6.0	214.5	279 %	1036.2	72 %
Outlet at Waitangi Soda Spring	30/11/2020 06:00:00		0.0	0.0	8.5	0.0	265.3		1528.6	
Te Whaiti at Minginui	01/12/2020 06:00:00	0.0	2.5	2.5	16.0	2.5	145.0		1078.5	
Kawerau at Plunket St	01/12/2020 07:00:00	0.0	1.5	9.0	17.0	1.5	331.0		1355.4	
Tarawera at Hogg Rd	01/12/2020 06:00:00	0.0	3.5	16.0	26.0	3.5	315.0		1371.2	
Ohinekoao at Harris Saddle	01/12/2020 06:00:00	1.0	5.0	17.0	31.5	5.0	283.0	333 %	1253.8	72 %
Galatea Basin at Horomanga R	01/12/2020 06:00:00	0.0	1.5	3.0	10.5	1.5	138.5	207 %	833.0	77 %
Waihua at Clearing	01/12/2020 06:00:00	0.0	1.0	4.5	11.0	1.0	208.5	248 %	1248.0	79 %
Rangitaiki at Te Teko	01/12/2020 07:00:00	0.0	0.5	6.0	11.0	0.5	206.5	318 %	977.5	83 %
Edgecumbe at Edgecumbe	01/12/2020 07:00:00	0.0	1.5	8.0	13.5	1.5	206.5	313 %	1001.0	80 %
Tarawera at Awakaponga	01/12/2020 07:10:00	0.0	4.5	12.5	23.5	4.5	230.5	303 %	1066.9	85 %
Rangitaiki Plains at Flax Rd	30/11/2020 12:00:00		0.0	0.0	8.5	0.0	231.0	330 %	880.5	69 %

Rainfall Summary

Rainfall.Rainfall Summary Report

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Period Selected: 2020-11-29 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
Tarawera at ORC Pump Station	01/12/2020 07:00:00	0.0	5.0	4.0	13.5	5.0	179.5	359 %	700.0	73 %
Whakatane at Kopeopeo	01/12/2020 07:00:00	0.5	0.5	4.5	10.0	0.5	194.5	354 %	838.1	71 %
Rangitaiki at Thornton	01/12/2020 06:00:00	0.5	2.0	4.0	9.5	2.0	193.5	302 %	782.0	69 %
Whakatane at Huiarau Summit	01/12/2020 06:09:00	0.5	9.5	4.5	31.0	9.5	293.2	162 %	1988.5	89 %
Whakatane at Huitieke rain	01/12/2020 06:00:00	0.0	1.5	5.5	17.0	1.5	289.0	247 %	1406.5	102 %
Whakatane at Awahou Rd	01/12/2020 07:00:00	0.0	1.5	6.0	17.5	1.5	234.1		1232.2	
Wainui-te-whara at Munro's	01/12/2020 07:00:00	0.0	0.5	6.0	17.5	0.5	220.5	294 %	1029.5	76 %
Tauranga at Omahuru (Ogilvies	01/12/2020 07:10:00	0.0	1.5	8.5	19.0	1.5	275.0		1783.1	
Nukuhou at Nukuhou North	01/12/2020 07:00:00	0.0	3.0	3.5	15.5	3.0	154.5		1030.2	
Ohope Spit at Ohope Golf	01/12/2020 07:00:00	0.0	4.0	3.0	19.5	4.0	159.5		917.5	
Waiouka at Koranga	01/12/2020 07:00:00	0.0	5.0	3.5	16.0	5.0	189.5	114 %	1324.7	67 %
Waiouka at Cableway	01/12/2020 06:25:00	0.0	2.0	6.0	15.0	2.0	341.0	201 %	2022.4	90 %
Waiouka at Mouth of Gorge	01/12/2020 06:20:00	0.0	1.5	2.5	15.5	1.5	158.0	142 %	1116.8	71 %
Otara at Opotiki Wharf	01/12/2020 07:00:00	0.0	1.0	2.0	14.5	1.0	186.0	295 %	1021.9	87 %
Otara at Tutaeotoko	01/12/2020 07:00:00	0.0	4.0	6.5	18.0	4.0	222.5	126 %	1790.8	81 %
Otara at Browns Bridge	01/12/2020 07:00:00	0.0	2.5	3.0	13.5	2.5	181.5	193 %	1060.6	82 %
Pakihī at Pakihī Station	01/12/2020 07:05:00	0.0	4.5	5.0	16.0	4.5	240.0	137 %	1633.5	79 %
Pakihī at Rakanui	01/12/2020 07:00:00	0.0	5.5	4.0	17.0	5.5	223.0	151 %	1455.4	78 %
Haparapara at Haparapara	01/12/2020 07:00:00	0.0	11.5	10.0	43.5	11.5	470.5	152 %	3393.0	84 %

Table 1 Rainfall statistics for 2020

2.1 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 results have responded positively to the rain over the last month, with the rainfall for the prior 3 months being now close to long term normal. 12 month SPI values, while showing some improvement, are still showing that long term rainfall deficits will take more than 1 month of good rainfall to take us back to long term normal.

² Precipitation being another name for rainfall.

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

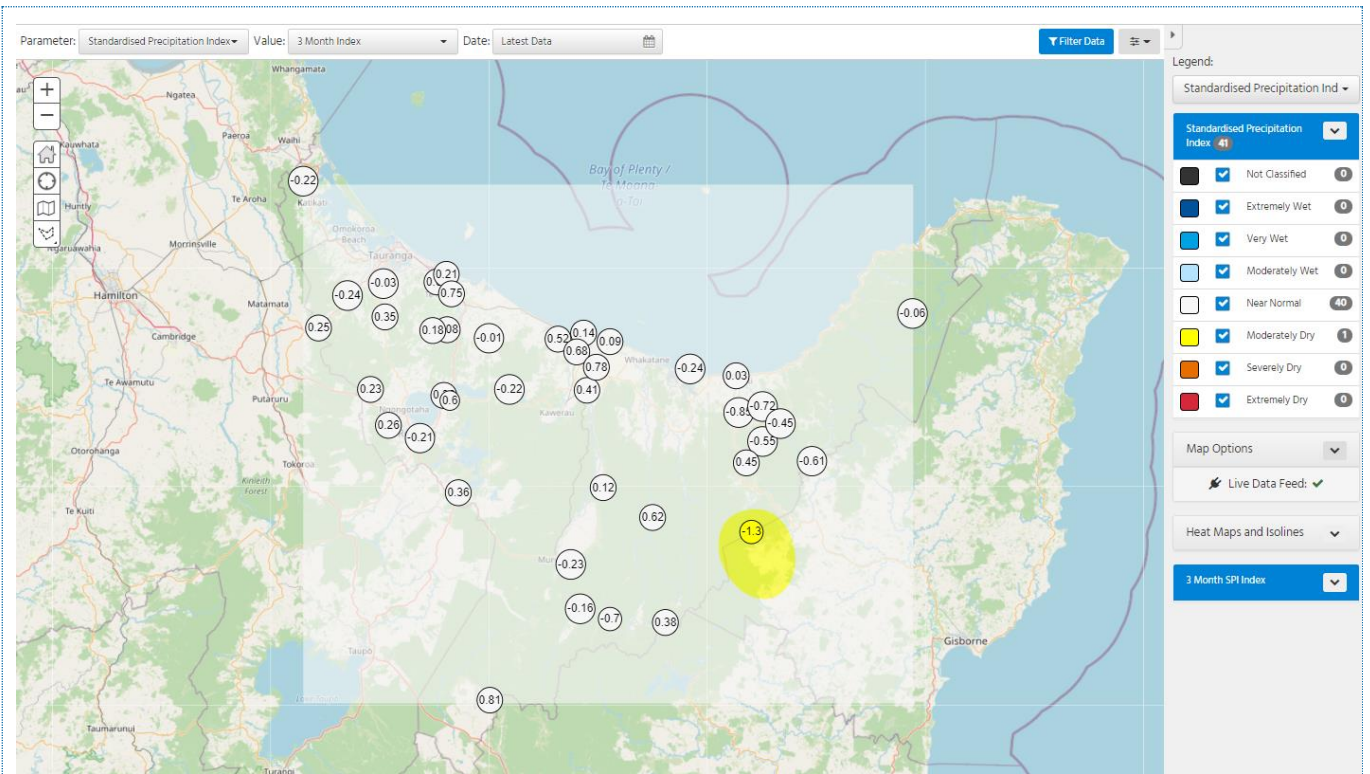


Figure 1 3 month SPI

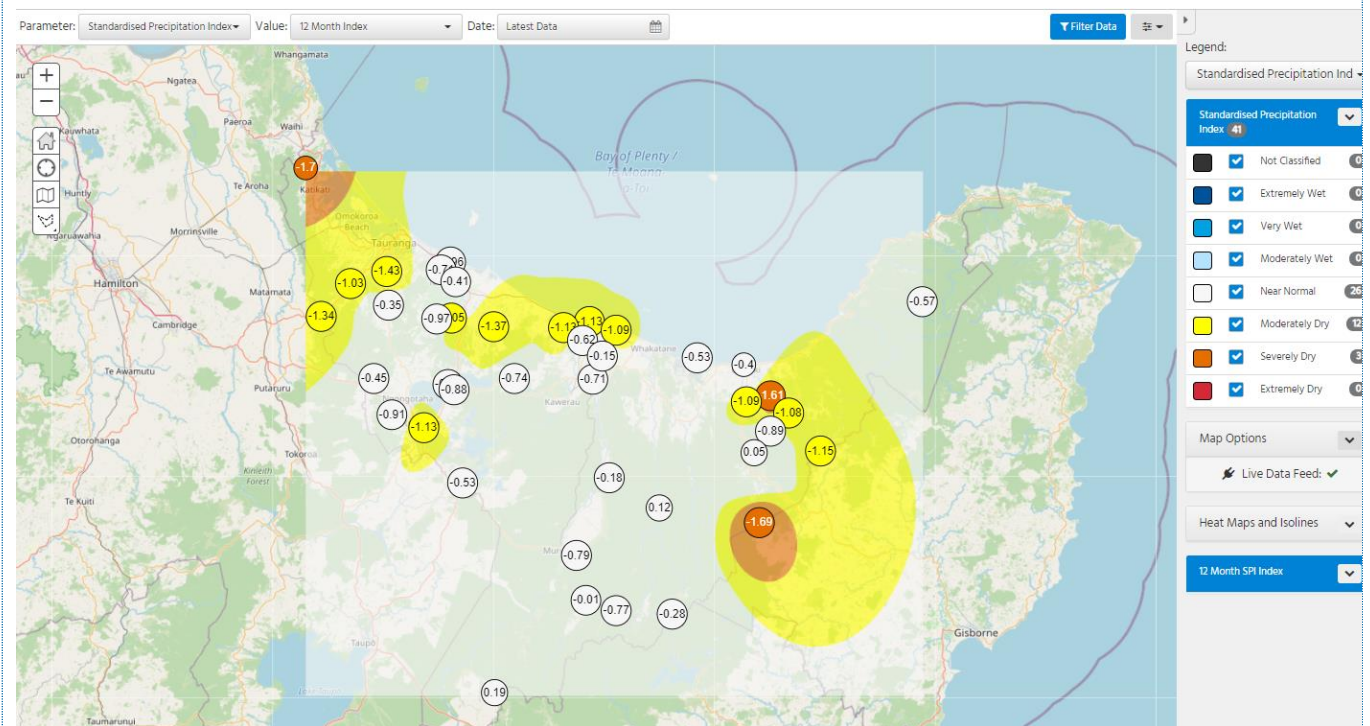


Figure 2 12 month SPI

3 River Flows

In general rivers have responded positively to the rainfall over the month and are currently not of any concern in terms of low flows, the exception to this is the Ngongotahā Stream which is still at low levels for this time of year.

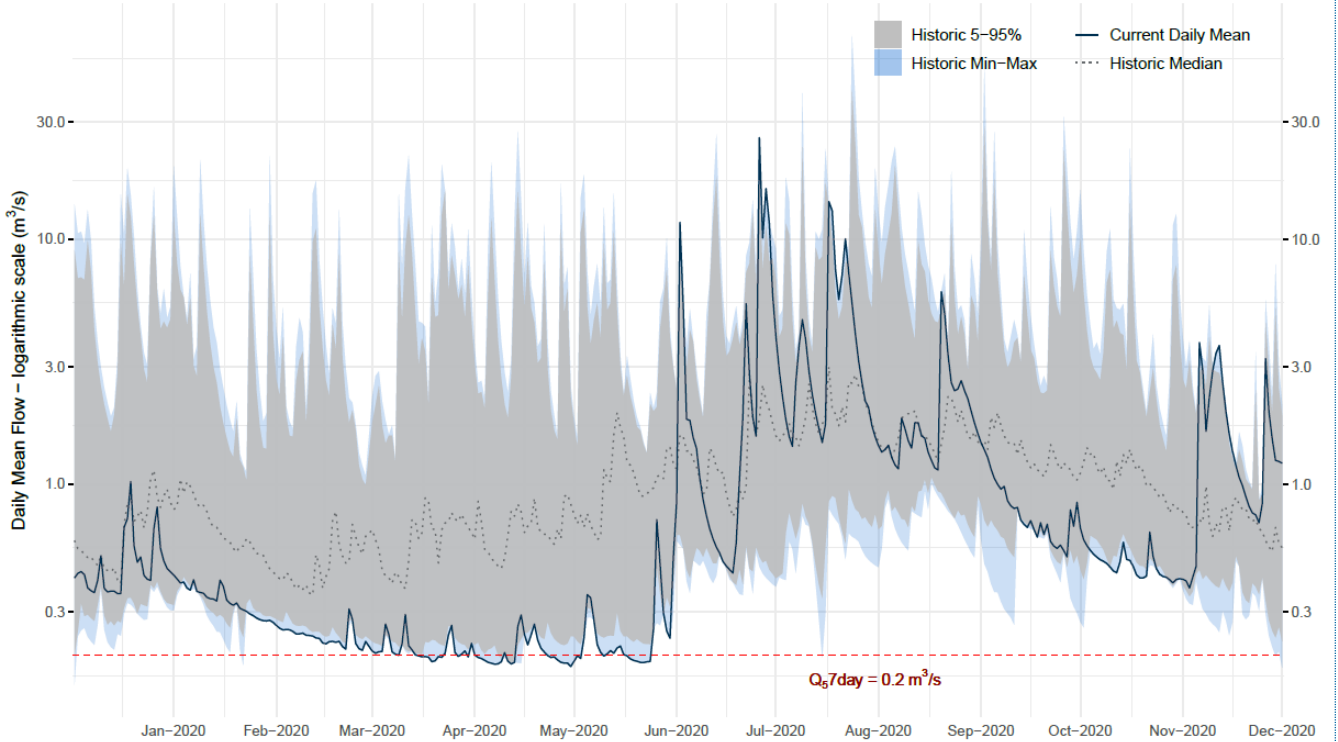
Note: The following graphs are based upon preliminary data and will undergo refinement as further information is collected throughout the event.

3.1 Western BOP flow monitoring sites



Tuapiro at Farm Bridge – Current vs Historic Daily Mean Flow

Flow Record Begins – 02 Dec 2010

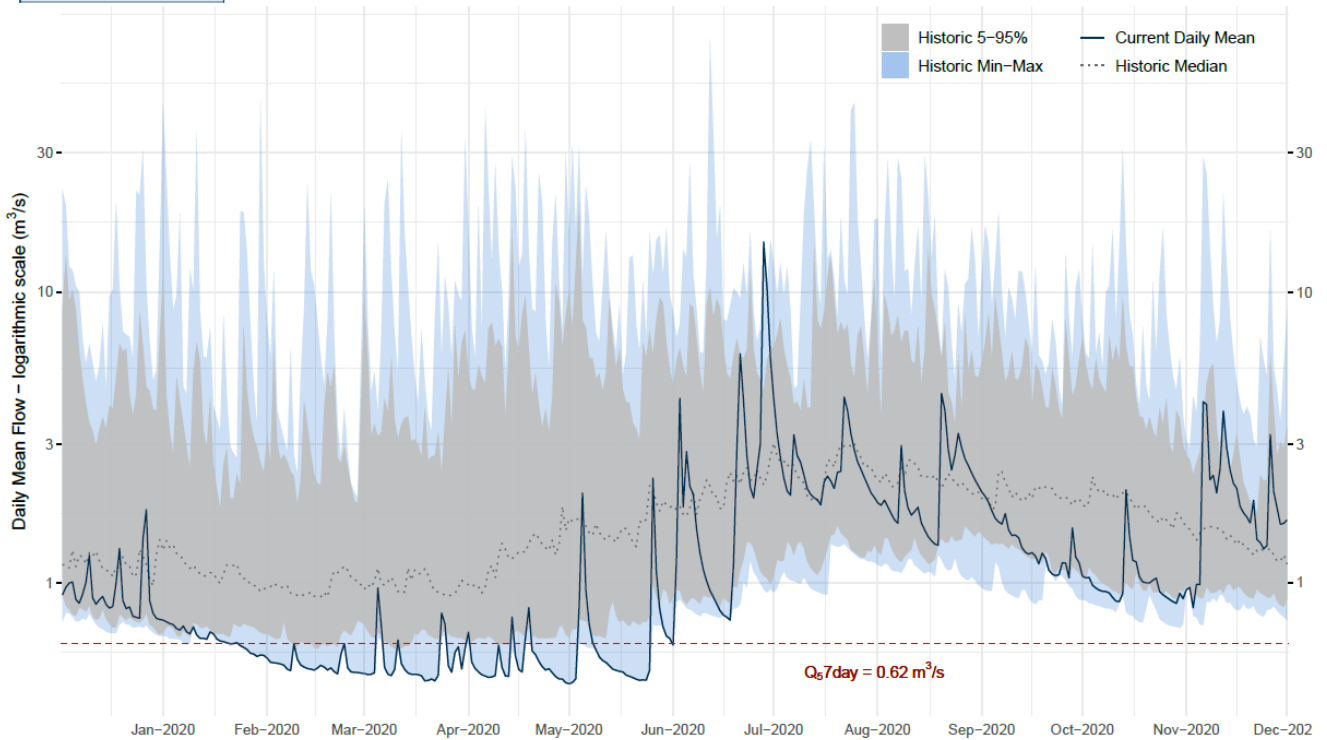


Site	Q5 7day	Latest Date	Latest Discharge	Latest Discharge (% of Q5)	Lowest Discharge	Lowest Discharge Date	Lowest Discharge (% of Q5)
Tuapiro at Farm Bridge	0.2	2020-11-30	1.215	608	0.376	2020-11-02	188



Waimapu at McCarrolls – Current vs Historic Daily Mean Flow

Flow Record Begins – 12 Mar 1991



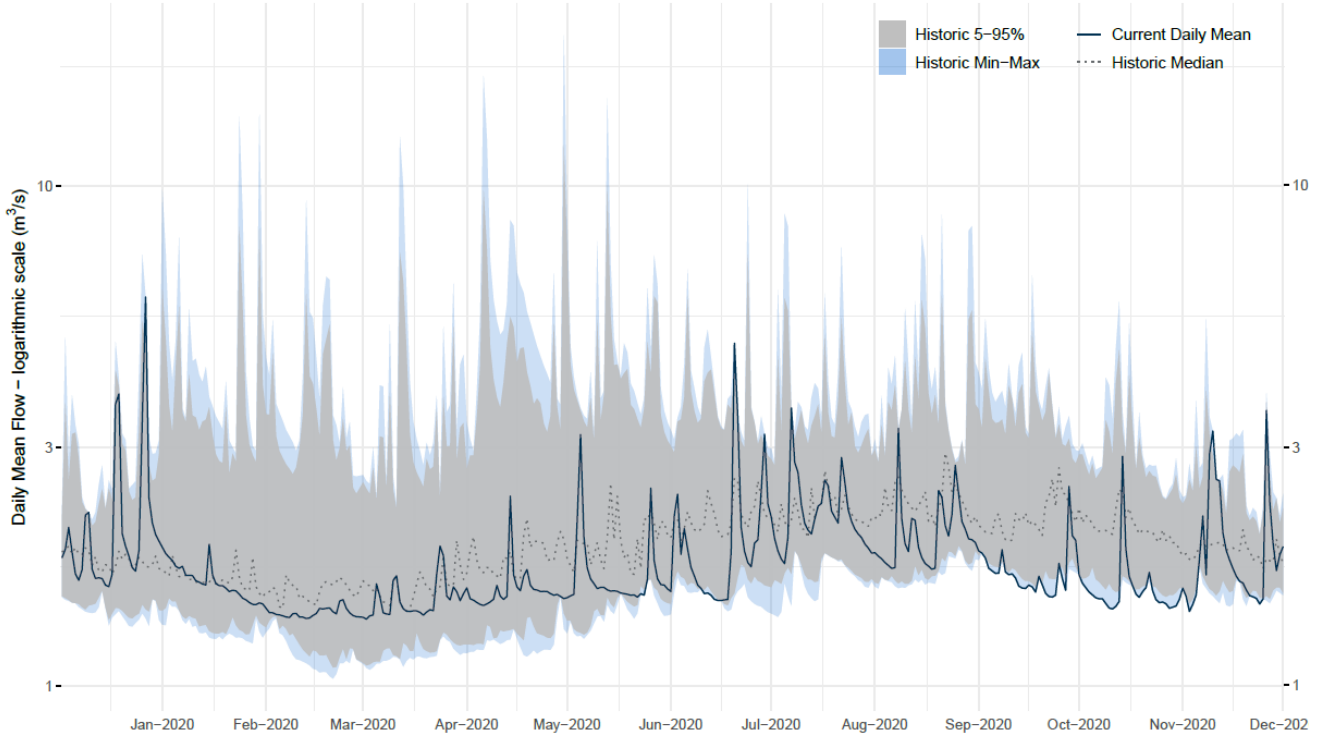
Site	Q5 7day	Latest Date	Latest Discharge	Latest Discharge (% of Q5)	Lowest Discharge	Lowest Discharge Date	Lowest Discharge (% of Q5)
Waimapu at McCarrolls	0.62	2020-11-30	1.644	265	0.821	2020-11-02	132

4 Central BOP flow monitoring sites



Puarenga at SH30 – Current vs Historic Daily Mean Flow

Flow Record Begins – 11 Nov 2009

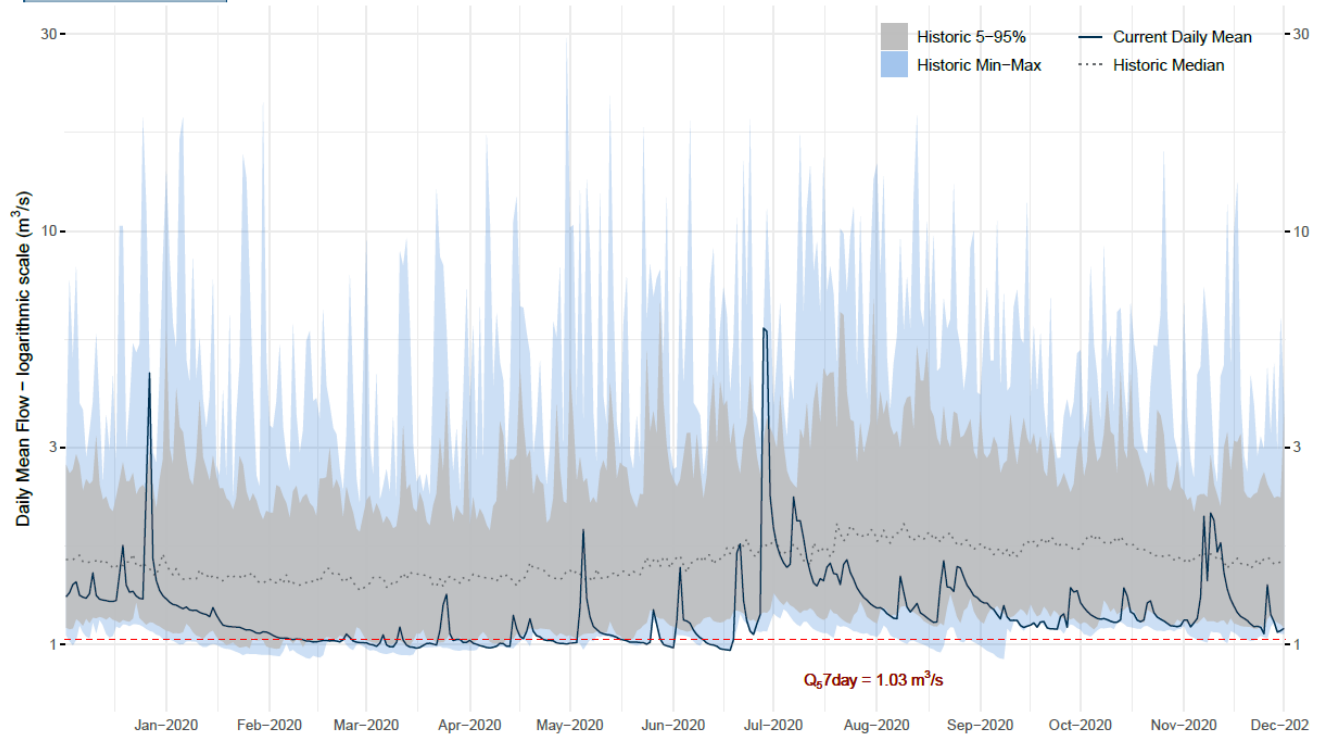


Site	Q5 7day	Latest Date	Latest Discharge	Latest Discharge (% of Q5)	Lowest Discharge	Lowest Discharge Date	Lowest Discharge (% of Q5)
Puarenga at SH30	NA	2020-11-30	1.898	NA	1.407	2020-11-02	NA



Ngongotaha at SH5 – Current vs Historic Daily Mean Flow

Flow Record Begins – 03 Jun 1975



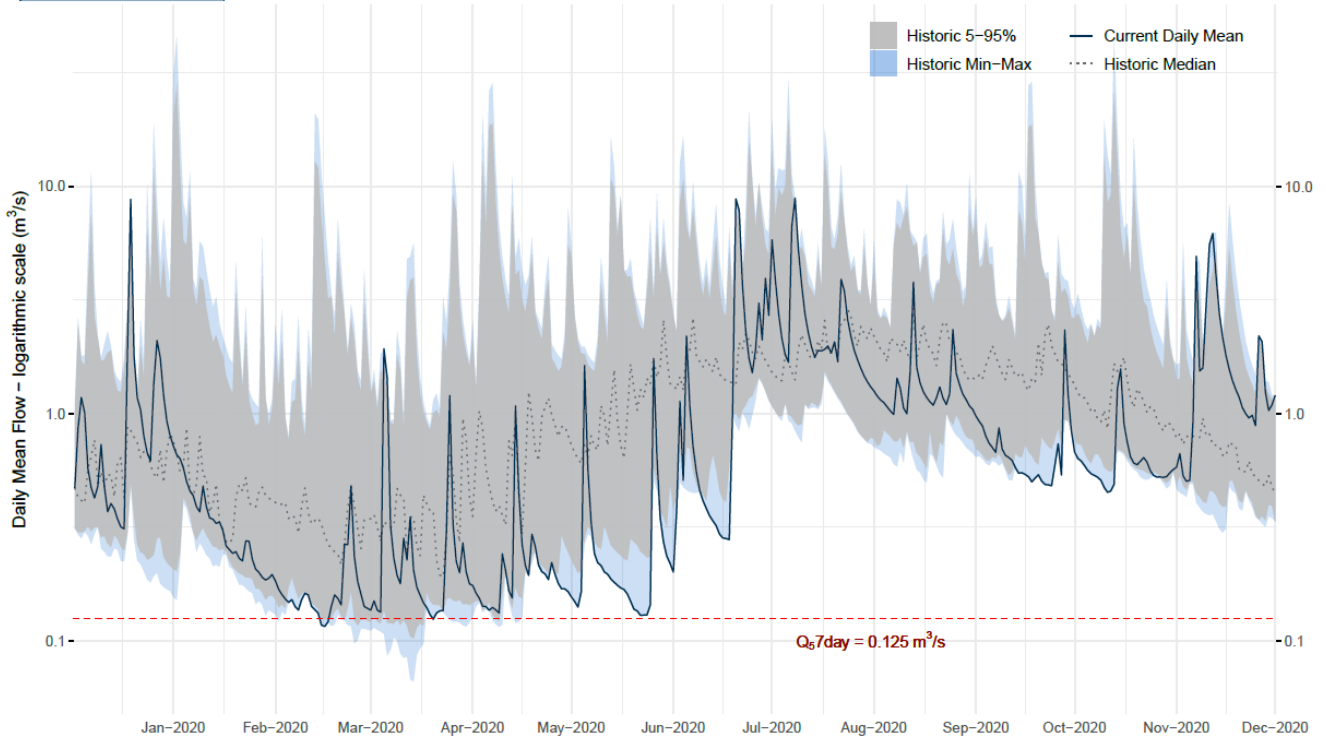
Site	Q5 7day	Latest Date	Latest Discharge	Latest Discharge (% of Q5)	Lowest Discharge	Lowest Discharge Date	Lowest Discharge (% of Q5)
Ngongotaha at SH5	1.03	2020-11-30	1.094	106	1.062	2020-11-24	103

4.1 Eastern BOP flow monitoring sites



Nukuhou at Glenholme Rd – Current vs Historic Daily Mean Flow

Flow Record Begins – 07 Oct 2011

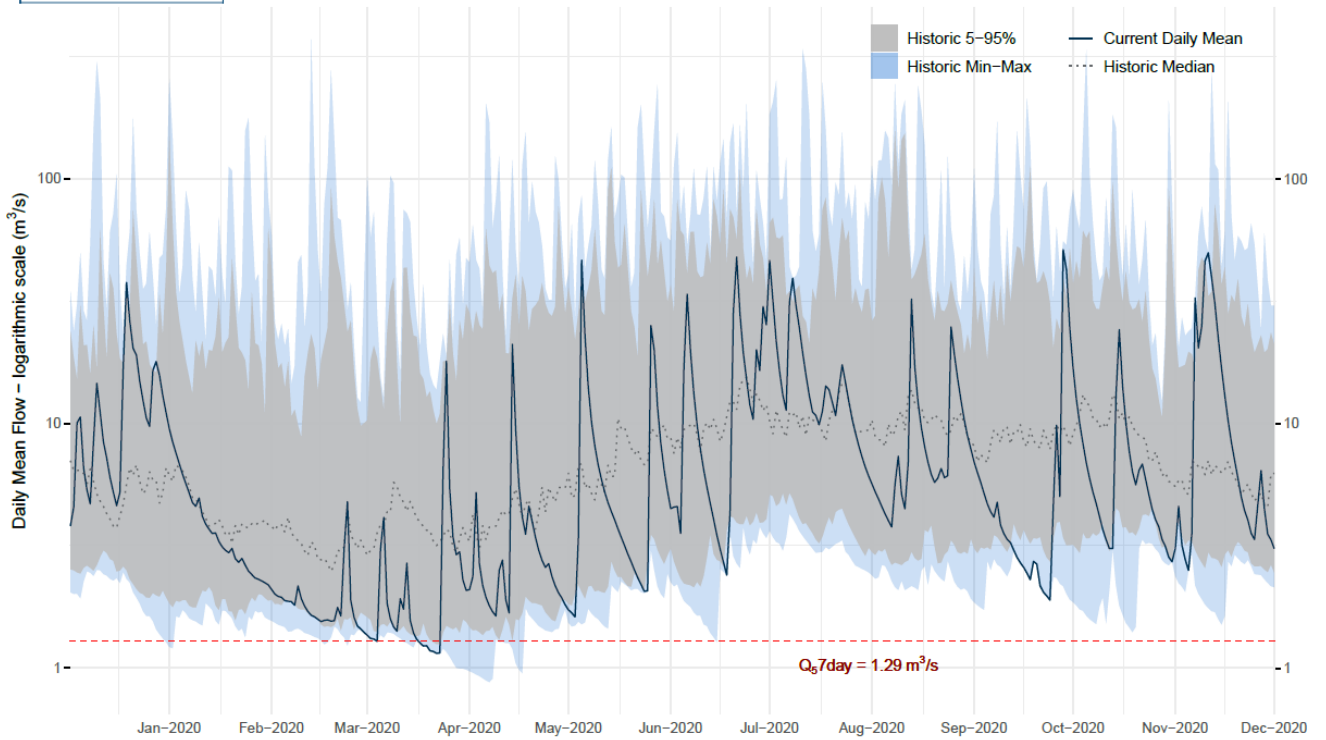


Site	Q5 7day	Latest Date	Latest Discharge	Latest Discharge (% of Q5)	Lowest Discharge	Lowest Discharge Date	Lowest Discharge (% of Q5)
Nukuhou at Glenholme Rd	0.125	2020-11-30	1.203	962	0.45	2020-10-10	360



Otara at Browns Bridge – Current vs Historic Daily Mean Flow

Flow Record Begins – 08 Mar 1984



Site	Q5 7day	Latest Date	Latest Discharge	Latest Discharge (% of Q5)	Lowest Discharge	Lowest Discharge Date	Lowest Discharge (% of Q5)
Otara at Browns Bridge	1.29	2020-11-30	3.076	238	2.508	2020-11-04	194

5 Soil Moisture

Soil moisture levels for the Bay of Plenty as modelled by NIWA (Figure 4) are now wetter than normal due to the significant rainfall that has occurred this month. The increase in soil moisture over the last month is evidenced by our monitoring sites (<https://envdata.boprc.govt.nz/Data/Report>).

Soil moisture anomaly (mm) at 9am on 30/11/2020

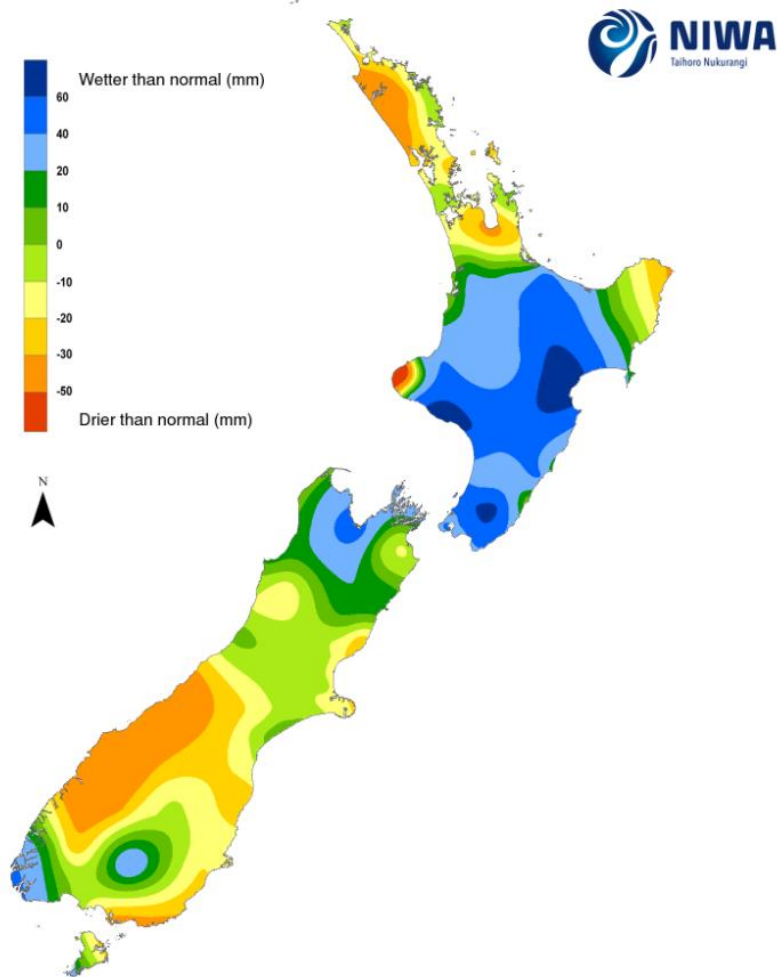


Figure 3 Soil Moisture Anomaly

<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: January 2021</p>	<p>Time, date of approval: 1 December 2020</p>