

SITUATION REPORT

Bay of Plenty Regional Council

Data Services Team



SitRep number:	SitRep # 1	SitRep effective as at:	6 October 2020
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Key points since last SitRep

- This is the first SitRep leading into the summer of 2020/2021
- NIWA forecasts developing La Niña pattern which in the past has featured a gradual trend toward wetter conditions in northern New Zealand during late spring and early summer, with an increased chance for a moisture-rich tropical connection to develop.
Soil moisture levels and river flows are about equally likely to be near normal or below normal, with high air temperatures present.
- Rainfall deficits from last summer continue.
- Western parts of the region are already very dry compared to normal with flows at or approaching lowest ever recorded for this time of years present, however rivers are still well above management flow levels.

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

NIWA forecasts October – December 2020 air pressure to be higher than normal to the southeast and lower than normal to the north of New Zealand. This is expected to be associated with developing La Niña-like north-easterly air flow anomalies, although a westerly flow anomaly, which may be strong at times, is favoured to continue for much of October.

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 and east of the North Island, later in the three month period, north-easterly winds are expected to expose northern areas, such as Northland, the Coromandel Peninsula, and East Cape, to sub-tropical rainstorms while interior and western areas of the both islands remain sheltered from significant moisture.

Past La Niña events have featured a gradual trend toward wetter conditions in northern New Zealand during late spring and early summer, with an increased chance for a moisture-rich tropical connection to develop.

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.

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

1 Rainfall

Year to date rainfall across the region is largely 60-80% of normal for the calendar year, this is somewhat driven by the dry summer at the start of the year and only the month of June having significant rainfall above normal to somewhat balance the rainfall deficit.

September (being the first month of spring) rainfall provided 50% or less of long term monthly normal in central and western parts of the region.



Rainfall Summary

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Rainfall.Rainfall Summary Report

Period Selected: 2020-10-04 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	06/10/2020 09:00:00	0.0	0.0	0.0	0.5	0.5	70.5	35 %	1052.0	63 %
Te Puna at Odey Rd	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	1.0	69.6		1141.5	
Wairoa at Lower Kaimai	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	0.5	73.5	47 %	1161.5	81 %
Ngongotaha at Relph Rd	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	0.5	93.5	47 %	1041.4	71 %
Rotorua at Upper Oturoa Rd	06/10/2020 09:00:00	0.5	0.5	0.0	0.5	0.5	126.5	57 %	1303.1	73 %
Waimapu at Glue Pot Rd	06/10/2020 09:00:00	0.0	0.0	0.0	0.5	5.0	68.5	44 %	1125.5	74 %
Waimapu at McCarrolls	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	1.0	46.5	37 %	797.5	61 %
Rotorua at Whakarewarewa	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	0.0	63.0	56 %	723.3	70 %
Mangorewa at Kaharoa	06/10/2020 09:00:00	0.0	0.0	0.0	0.5	2.5	59.5	38 %	1028.3	70 %
Okaro at Okaro Rd	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	1.0	62.2	58 %	704.7	68 %
Lake Rotoiti at Okawa Bay	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	0.0	39.0	29 %	715.3	58 %
Tikitere at SH30	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	0.5	54.5		925.4	
Mangorewa at Upper Rangiuru	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	5.0	67.5	41 %	1167.4	73 %
Mangorewa at Mangorewa Lin	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	3.5	49.0	34 %	1045.0	75 %
Raparapahoe at Collins Lane	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	14.5	36.5	24 %	848.0	64 %
Kaituna at Marshalls Farm	06/10/2020 09:00:00	0.0	0.0	0.0	0.5	19.0	28.5	22 %	692.2	59 %
Kaituna at Te Matai	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	16.0	36.0	35 %	801.7	74 %
Rangitaiki at Kokomoka (Bore 1	06/10/2020 09:10:00	0.0	0.0	0.0	0.0	0.0	138.0	103 %	997.6	85 %
Pongakawa at Pongakawa Bush	06/10/2020 08:00:00	0.0	0.0	0.0	0.5	5.0	51.0	41 %	774.7	62 %
Outlet at Waitangi Soda Spring	06/10/2020 07:00:00		0.0	0.0	0.5	8.5	55.5		1175.1	
Te Whaiti at Minginui	06/10/2020 08:00:00	0.0	0.0	0.0	0.0	0.0	87.6		868.0	
Kawerau at Plunket St	06/10/2020 09:00:00	0.0	0.0	0.0	0.5	2.0	50.5		970.9	
Tarawera at Hogg Rd	06/10/2020 09:00:00	0.0	0.0	0.0	1.0	4.5	59.9		1003.2	
Ohinekoao at Harris Saddle	06/10/2020 09:00:00	0.0	0.0	0.0	2.5	6.0	73.5	52 %	911.3	60 %
Galatea Basin at Horomanga R	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	1.0	48.0	47 %	652.5	70 %
Waihua at Clearing	06/10/2020 08:00:00	0.0	0.0	0.0	1.0	3.5	62.0	45 %	952.5	70 %
Rangitaiki at Te Teko	06/10/2020 09:00:00	0.0	0.0	0.0	2.5	2.5	44.0	44 %	686.0	68 %
Edgecumbe at Edgecumbe	06/10/2020 09:00:00	0.0	0.0	0.0	1.5	1.5	49.0	42 %	748.6	69 %
Tarawera at Awakaponga	06/10/2020 09:10:00	0.0	0.0	0.0	2.5	3.5	60.0	59 %	787.4	73 %
Rangitaiki Plains at Flax Rd	05/10/2020 12:00:00		0.0	0.0	2.5	5.0	60.5	57 %	652.5	59 %

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	06/10/2020 09:00:00	0.0	0.0	0.0	2.0	9.0	28.5	35 %	494.0	59 %
Whakatane at Kopeopeo	06/10/2020 09:00:00	0.0	0.0	0.0	0.5	1.0	43.0	42 %	622.6	60 %
Rangitaiki at Thornton	06/10/2020 09:00:00	0.0	0.0	0.0	1.5	1.5	34.9	37 %	563.5	58 %
Whakatane at Huiarau Summit	06/10/2020 08:00:00	0.0	0.0	0.0	0.0	3.5	213.5	107 %	1527.9	84 %
Whakatane at Huitieke rain	06/10/2020 09:00:00	0.0	0.0	0.0	0.5	1.5	88.5	66 %	1021.0	92 %
Whakatane at Awahou Rd	06/10/2020 09:00:00	0.0	0.0	0.0	0.0	0.0	56.5		957.7	
Wainui-te-whara at Munro's	06/10/2020 09:00:00	0.0	0.0	0.0	1.5	2.5	52.5	40 %	778.0	66 %
Tauranga at Omahuru (Ogilvies	06/10/2020 08:10:00	0.0	0.0	0.0	0.5	1.0	121.5		692.6	
Nukuhou at Nukuhou North	06/10/2020 09:00:00	0.0	0.0	0.0	0.5	1.0	63.5		835.2	
Ohope Spit at Ohope Golf	06/10/2020 09:00:00	0.0	0.0	0.0	3.1	6.7	34.0		723.8	
Waioeka at Koranga	06/10/2020 09:00:00	0.0	0.0	0.0	1.0	2.5	103.0	52 %	1088.0	68 %
Waioeka at Cableway	06/10/2020 08:15:00	0.0	0.0	0.0	1.0	1.5	178.0	80 %	1523.3	82 %
Waioeka at Mouth of Gorge	06/10/2020 08:15:00	0.0	0.0	0.0	4.6	5.1	77.2	54 %	903.6	69 %
Otara at Opotiki Wharf	06/10/2020 09:00:00	0.0	0.0	0.0	1.0	2.5	42.6	42 %	808.9	80 %
Otara at Tutaeotoko	06/10/2020 09:00:00	0.0	0.0	0.0	2.5	3.5	163.0	77 %	1425.3	78 %
Otara at Browns Bridge	06/10/2020 09:00:00	0.0	0.0	0.0	5.0	5.5	58.4	48 %	828.1	76 %
Pakihi at Pakihi Station	06/10/2020 09:10:00	0.0	0.0	0.0	5.5	6.0	130.5	67 %	1261.0	75 %
Pakihi at Rakanui	06/10/2020 09:00:00	0.0	0.0	0.5	3.0	3.5	158.0	84 %	1169.9	77 %
Haparapara at Haparapara	06/10/2020 09:00:00	0.0	0.0	0.5	13.0	17.0	318.5	81 %	2659.0	80 %

Table 1 Rainfall statistics for 2020.

1.1 Standardised Precipitation Index

The Standardised Precipitation 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 years².

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 1.

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 2 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

Looking at 3 month (Figure 1) and 12 month (Figure 2) SPI results we can observe that it is the long term rainfall deficit of the 12 month SPI or that is showing a strong dry signature; looking at Figure 3, which shows the 12 month SPI values for the Waimapu catchment near Tauranga, we can see these have in fact been in some sort of dry state since late 2019 due to lack of rain.

¹ Precipitation being another name for rainfall.

² Where 30 years doesn't exist it is synthesised.

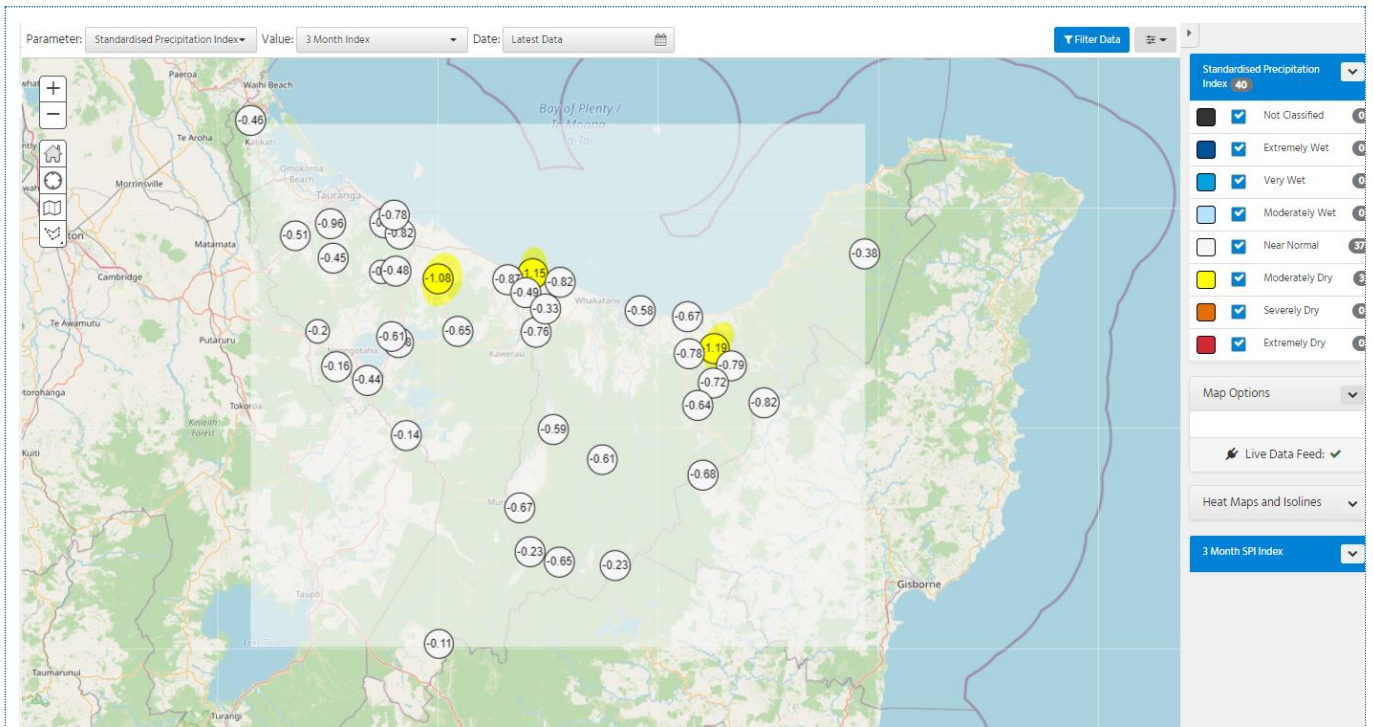


Figure 1 3 month SPI

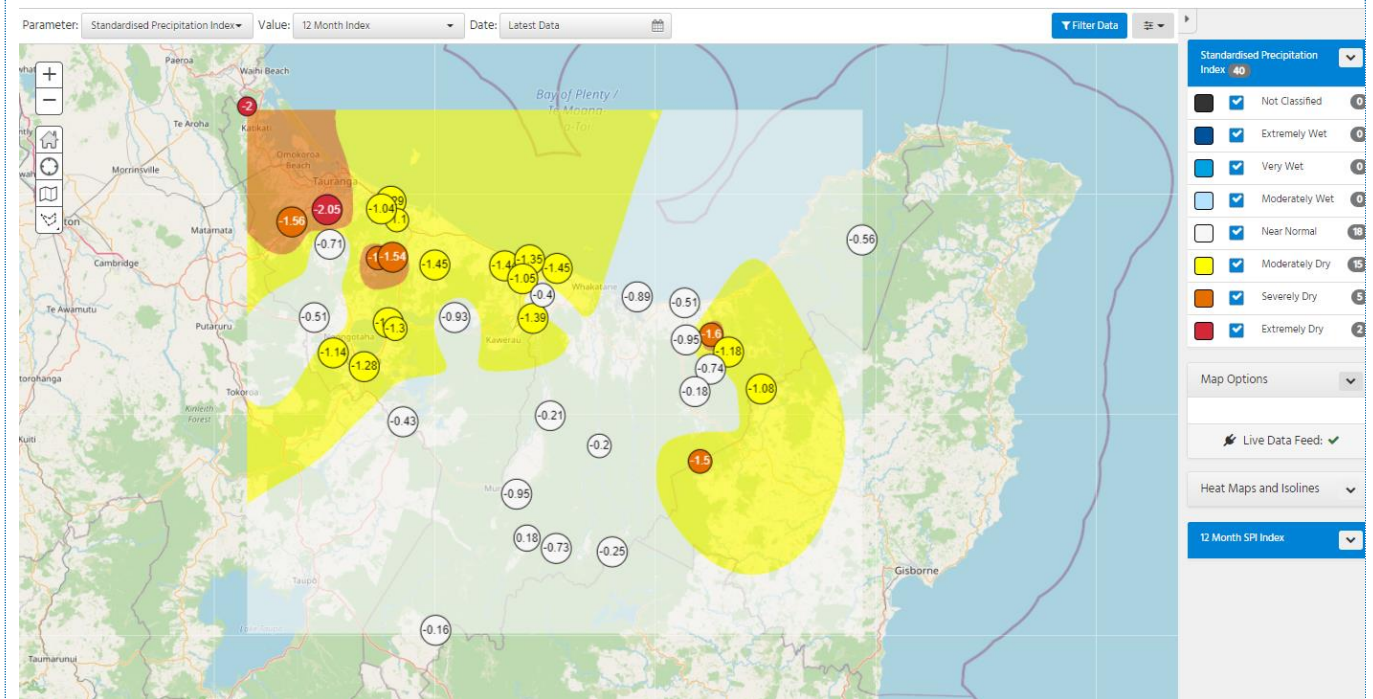


Figure 2 12 month SPI

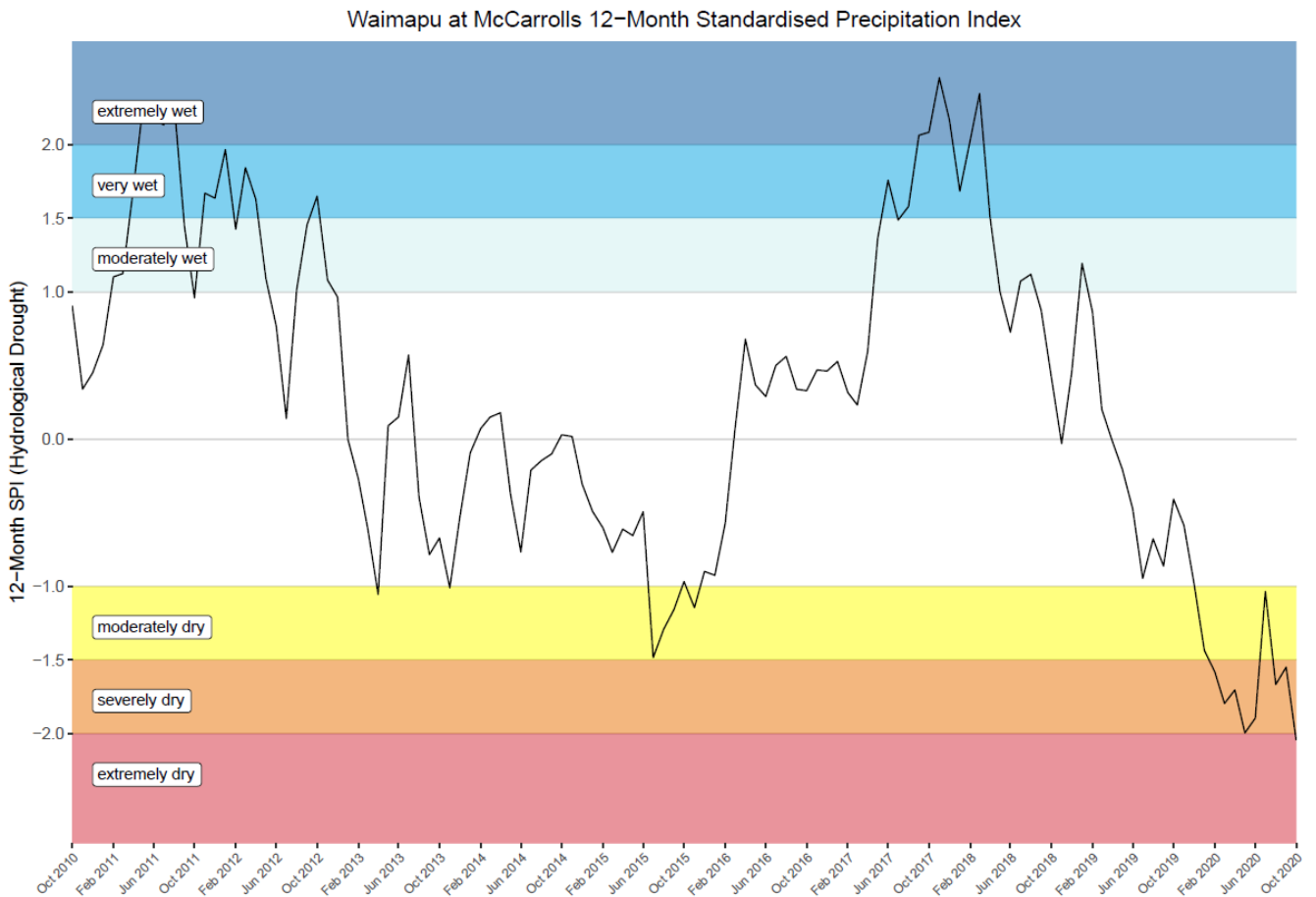


Figure 3 Waimapu at McCarrolls 12 month SPI history Sept. 2010 onwards

2 River Flows

Flow in reference monitoring sites in the western BOP are reinforcing the severe/extremely dry 12 month SPI signals evident in Figure 3. Both the Waimapu and Tuapiro catchments are in the lowest 5th percentile for this time of year, while the Raparapahoe is at record low flows for this time of the year over its 25 year history.

Central areas of the region are not as extreme, but are still on the dry side.

Eastern areas have experienced some significant rainfall in the Raukūmara ranges and catchments that have their headwaters at higher altitudes, such as the Otago, have reasonable flows. However those catchments with the top of their catchments at lower altitudes have not seen the same rainfall and thus we see that the Nukuhou river is nearing lowest ever flows for this time of the year.

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

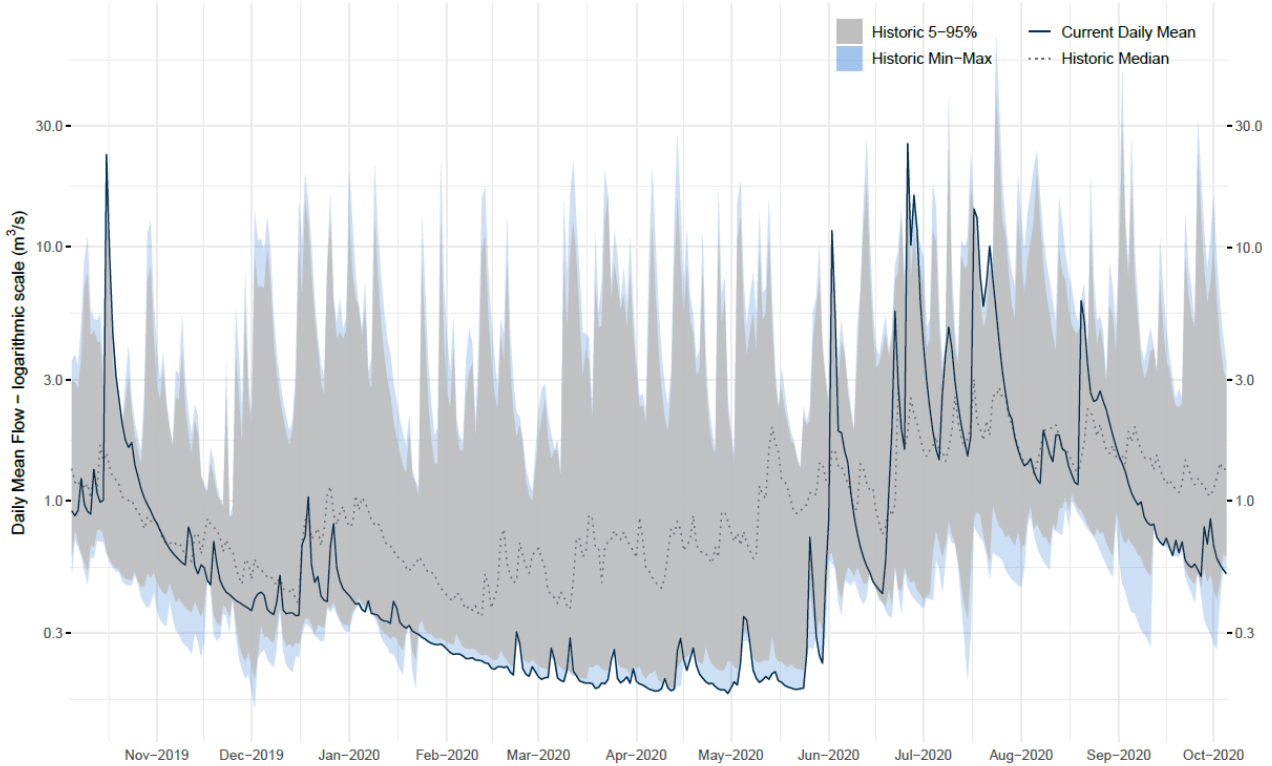
Note: The following graphs are based upon preliminary data and will undergo refinement as further information is collected throughout the event.

2.1 Western BOP flow monitoring sites



Tuapiro at Farm Bridge – Current vs Historic Daily Mean Flow

Flow Record Begins – 02 Dec 2010

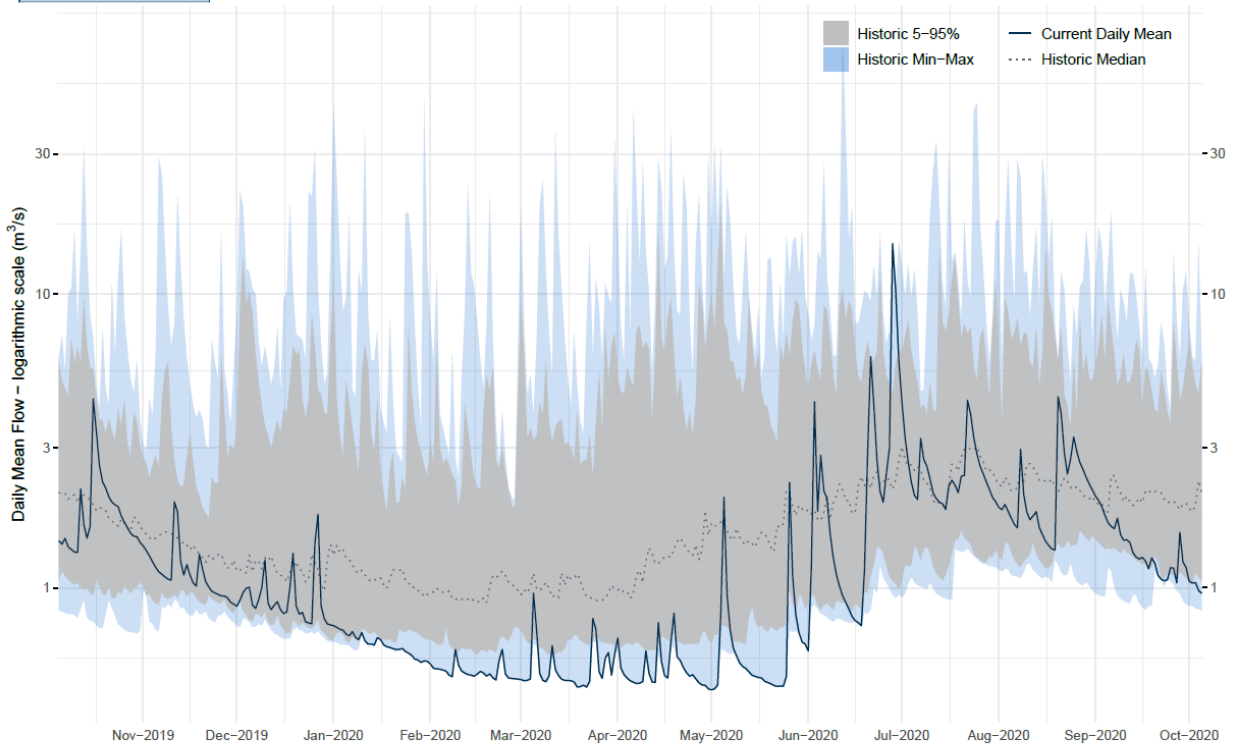


* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry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

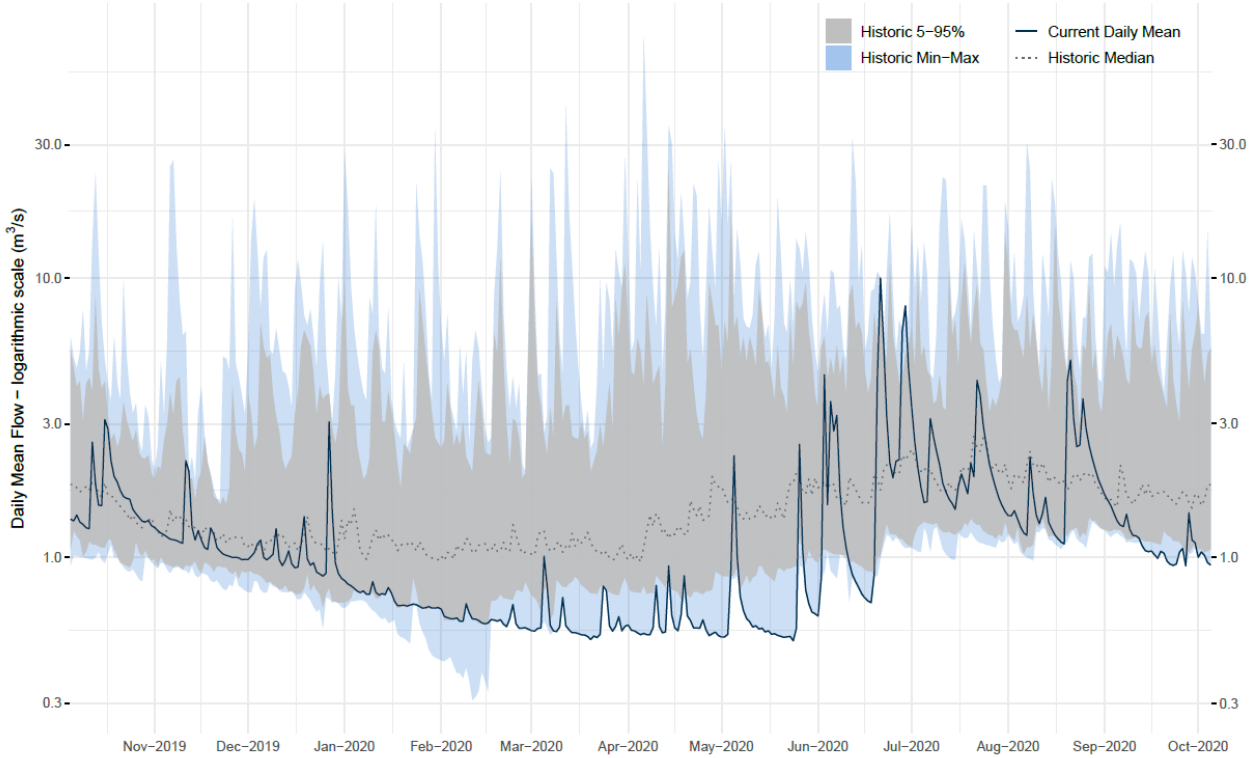


* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry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



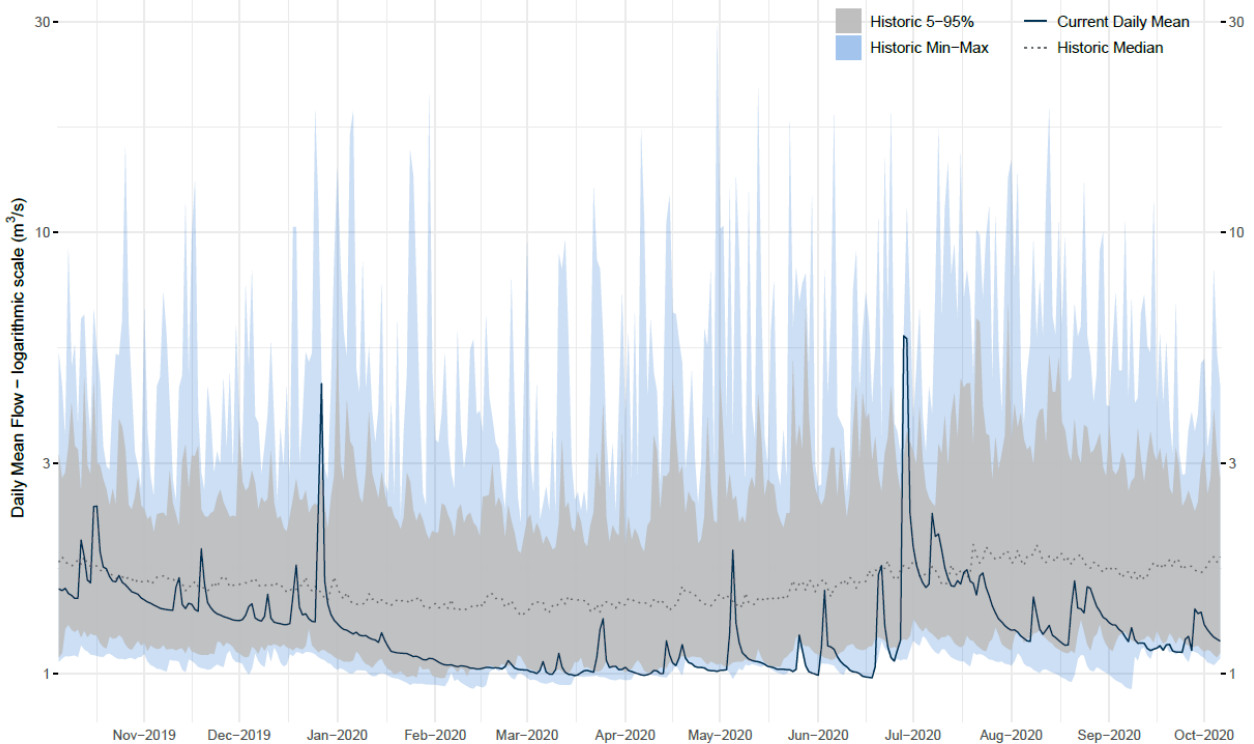
* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry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

2.2 Central BOP flow monitoring sites



Ngongotaha at SH5 – Current vs Historic Daily Mean Flow

Flow Record Begins – 03 Jun 1975



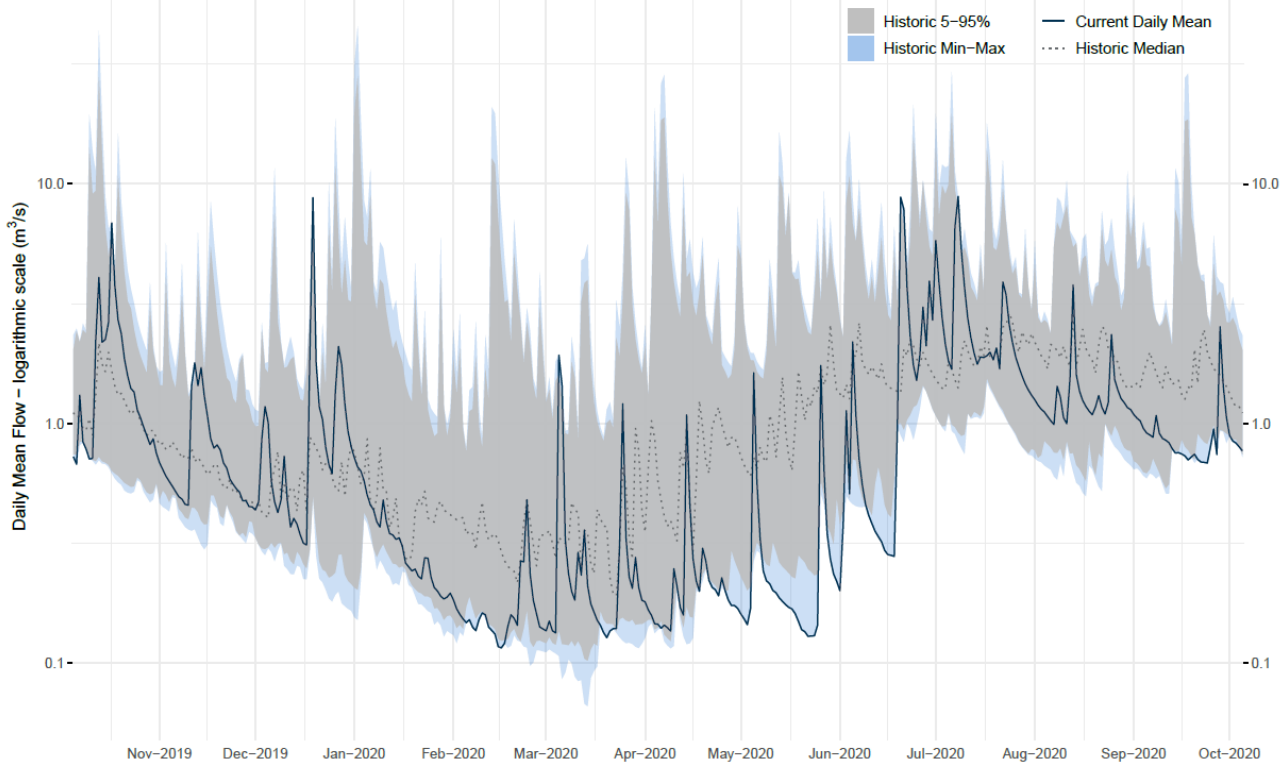
* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry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

2.3 Eastern BOP flow monitoring sites



Nukuhou at Glenholme Rd – Current vs Historic Daily Mean Flow

Flow Record Begins – 07 Oct 2011

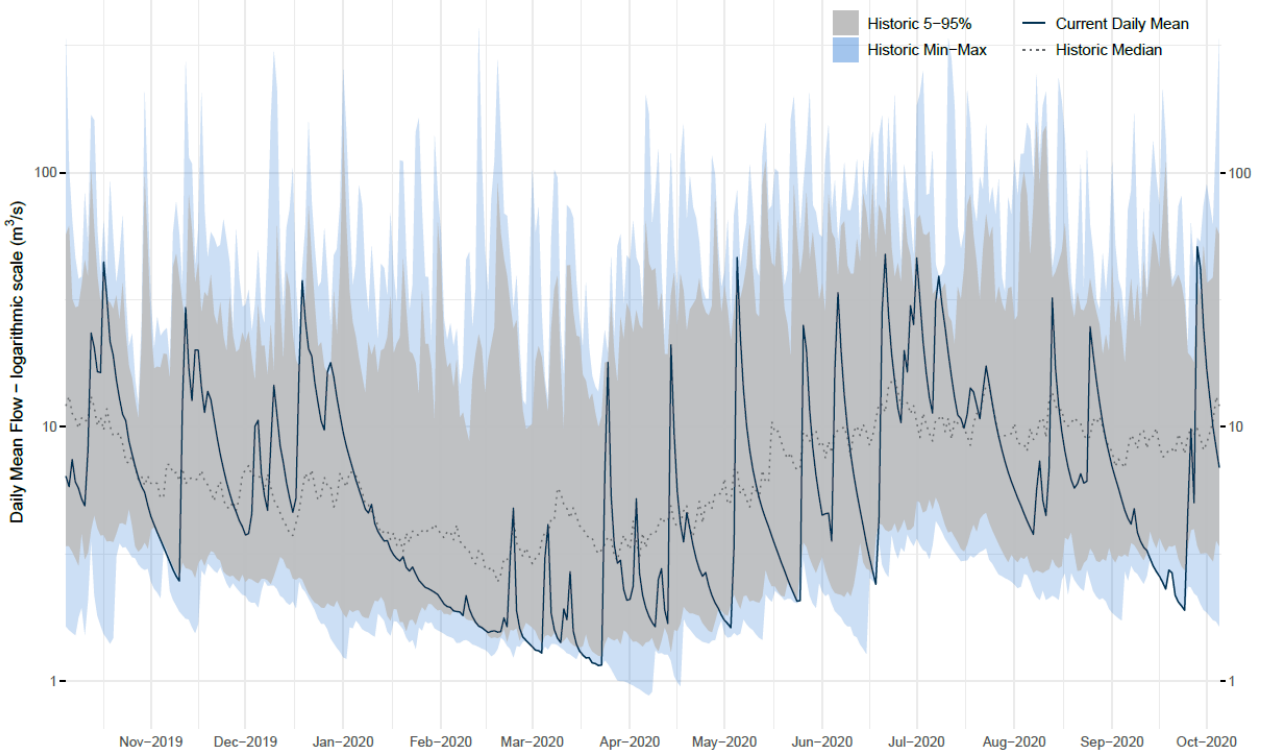


* Solid line shows the daily mean flow at this site over the last 12 months (logarithmic scale). Historic values show the range of flow for the same time period over the entire record. Users should be aware that the most recent discharge data may contain raw data directly from the Councils telemetry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



Otara at Browns Bridge – Current vs Historic Daily Mean Flow

Flow Record Begins – 08 Mar 1984



* 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.

Report prepared by: Glenn Ellery, Data Services Manager	Report authorised by: Glenn Ellery, Data Services Manager
Next Situation Report will be issued at: November 2020	Time, date of approval: 6 October 2020