# **RIMU Hydrology** Situation Report

Research and Evaluation Unit

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# Rainfall | Soils | Rivers | Aquifers

# **Regional summary for November 2020**

Rainfall in November was at or above the normal range for all sites. The increase in rainfall since October is reflected most strongly in river flows, with almost all sites well above the mean annual low flow (MALF). Soil moisture is still lower than normal at some sites which shows the lasting impacts of the severe hydrological drought from last summer. Groundwater levels are within the normal range for many aquifers, but some deep sandstone Waitematā Group aquifers have groundwater levels below the normal range, resulting from past drought conditions and recent irrigation demand.

#### **Current drought index**

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The New Zealand Drought Index (NZDI) is used to determine the severity of drought conditions across the country. The latest NZDI value for Auckland is 0.56 (30 Nov 2020), which is below the first NZDI category of Dry (0.75-1.0). A chart of the NZDI for the Auckland Region is shown in Figure 1.



Figure 1: Auckland Region Drought Index 2018-2021 (data source: NIWA).

# Rainfall

All sites in the network recorded rainfall at or above normal monthly rainfall totals. Sites in the north and west generally recorded normal rainfall totals (between the 25th and 75th percentile). Sites in the central part of the region generally recorded higher than normal rainfall (above the 75th percentile). The locations of sites, monthly rainfall totals, and rainfall categories are shown in Figure 2.



Figure 2: Total rainfall (mm) at rain gauges for November with rainfall category.



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#### Soil moisture

Soil moisture sensors show that some areas remain at a deficit (less moisture than expected) compared to the normal range expected for this time of the year (end of November to beginning of December) based on long-term data (Figure 3). This highlights the lasting impacts of severe hydrological drought from last summer. Four sites in the north and central areas of the region had soil moisture levels well below the normal range. However, the high rainfall in November increased soil moisture at three sites in the central-west and north, leading to soil moisture levels above the typical range for this time of year. The remaining three sites had soil moisture in the normal range.



Figure 3: Current soil moisture (% volume) and category relative to long-term statistics for the end of November.

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## **River flows**

River flows responded to the increased rain in November and flows are currently well above the mean annual low flow (MALF). Only two sites in urban catchments on the North Shore have flows below MALF. No sites had flows below the minimum flow set in the Auckland Unitary Plan. The locations of sites and flow level relative to MALF are shown in Figure 4.



Figure 4: Stream flow relative to the mean annual low flow (MALF).



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#### **Aquifer water levels**

Groundwater levels in aquifers vary considerably across the region and relate to the geology of the aquifer and water use pressures. Most sites had groundwater levels in the normal range for this time of year (between the 25th and 75th percentiles). The sites with low groundwater levels were predominantly in sandstone Waitematā Group aquifers that respond slowly to changes in rainfall and have high irrigation demand. The aquifers with low groundwater levels are predominantly located in the southern part of the region and one site in the north, all in important agricultural production areas. These groundwater level deficits reflect the relatively slow recharge to these aquifers and lasting effects of hydrological drought. In contrast, volcanic aquifers that respond quickly to changes in rainfall were within the normal range. Groundwater monitoring sites and groundwater level category are shown in Figure 5.



Figure 5: Groundwater levels relative to long-term statistics for the end of November.

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