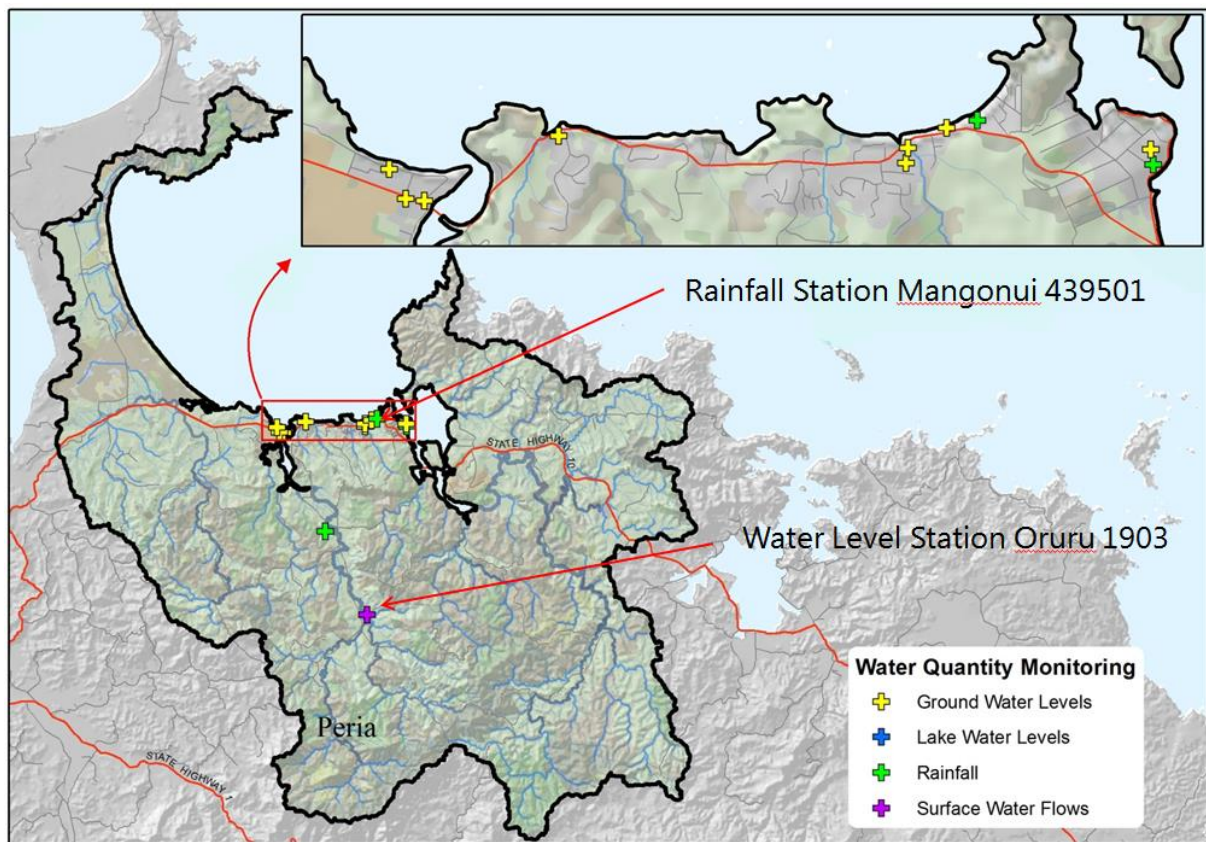


Doubtless Bay catchment water quantity update

This document is about rainfall, river flows and demand in the Doubtless Bay Catchment.

In Northland, rainfall is usually highest from autumn – spring and lowest from spring - autumn. Storm events also happen throughout the year. Rainfall affects river flows. Low river flows limit native fish habitat and recreational opportunities. High river flows are important for flushing out nuisance plant growth. High demand for river water may mean the water resource needs to be carefully managed.

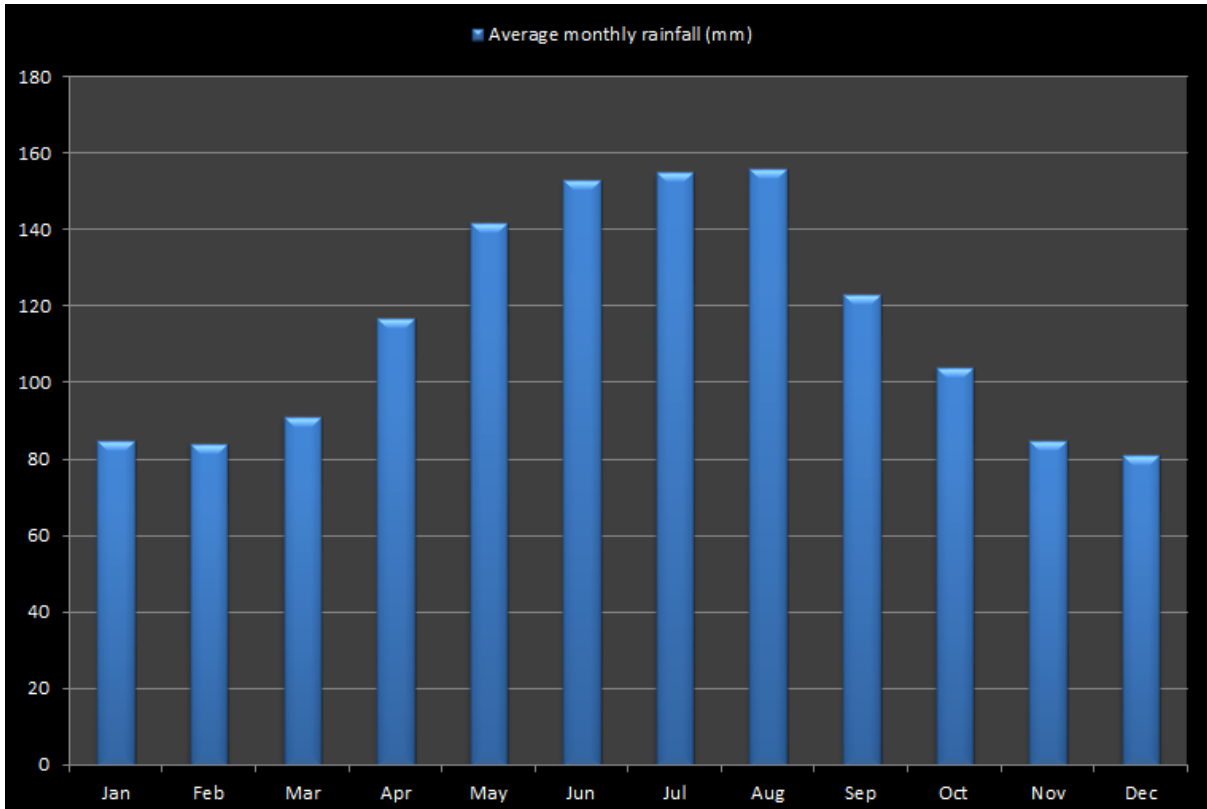
The Northland Regional Council (NRC) monitors rainfall, river flows and consented water permits at many Northland locations. Computer modelling is also used to predict water quantity, based on the monitoring information gathered.



Monitoring data

Rainfall

NRC operates rainfall monitoring stations in the Doubtless Bay catchment at Mangonui and Honeymoon Valley. The large difference in rainfall between stations is due to location and altitude. The rainfall station in Mangonui (439501) is situated on the coast at sea level and receives an annual rainfall of 1371mm. The Honeymoon Valley rainfall station in the upper catchment receives 1779mm annually. Average monthly rainfall for the - Mangonui station – with 95 years of rainfall records - is shown in the histogram below. Rainfall is generally lowest in late-spring/summer, peaks in winter with medians occurring in autumn and spring.

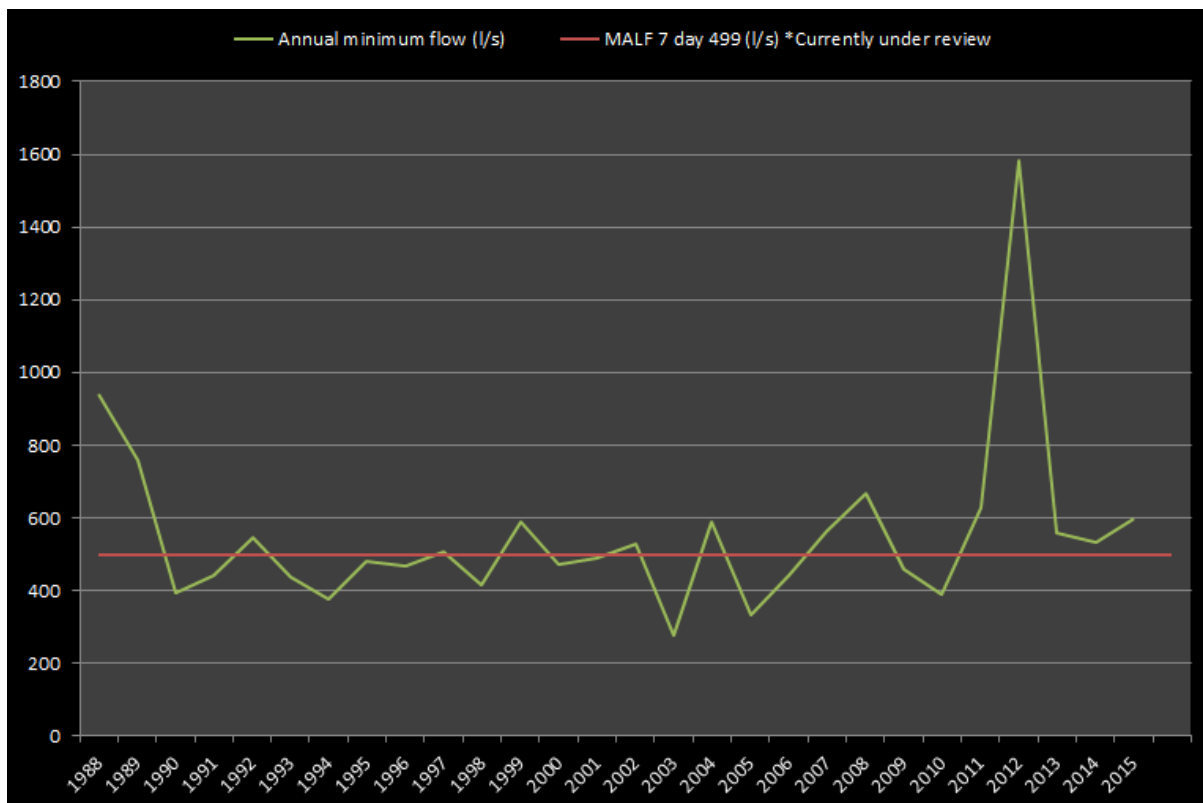


Statistics for the Mangonui Rainfall Station (439501):

- Minimum monthly total 54.4mm (May 1974)
- Minimum annual total 677mm 1914
- Maximum annual total 2286 mm 1956
- Average monthly total 1371mm

River flow – Low Flows

The graph below shows the variation in annual river low-flows at the Oruru recording station since 1988. The 7-day mean annual low flow (MALF) is approximately 499 l/s (litres per second). The lowest annual low-flow was 274 l/s in 2003.



Statistics for the Oruru at Sale yards Flow Station (#1903):

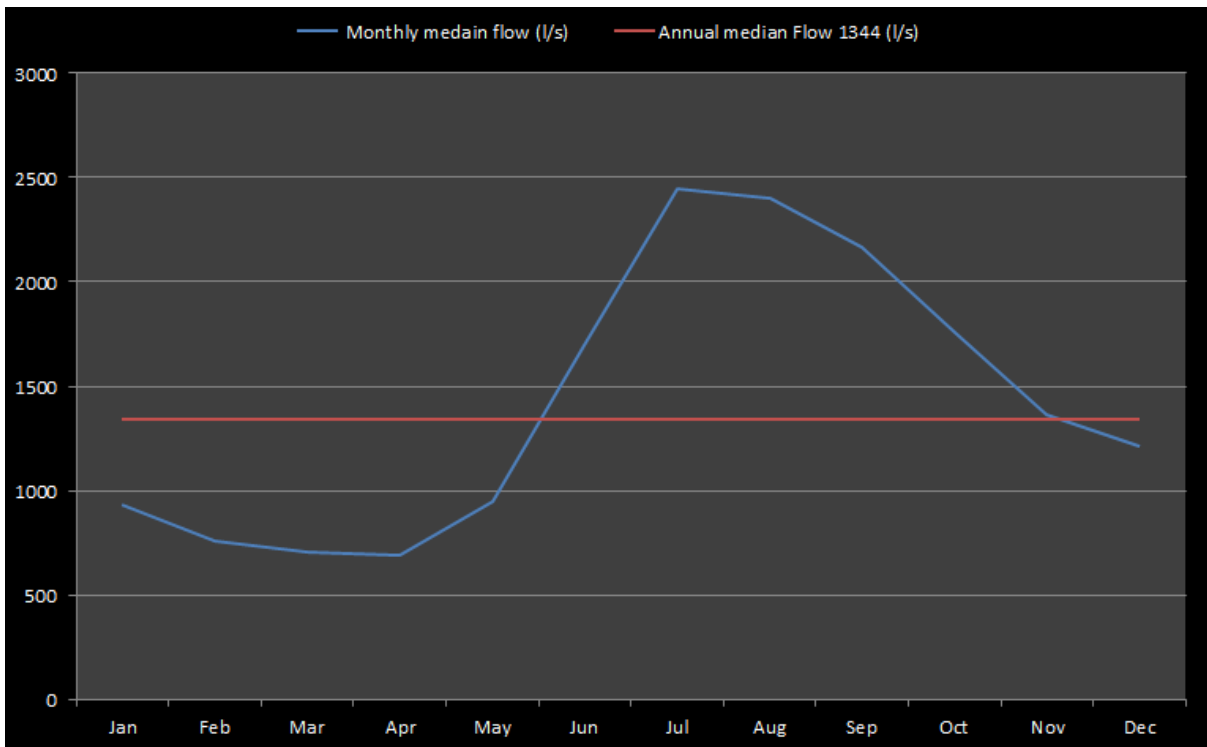
- Calculated Minimum 274 l/s on 25 Mar 2003
- Measured minimum flow is 408 l/s on 24 Mar 2010
- Maximum 35270 l/s
- 7 Day Mean Annual Flow 499 l/s

Demand for water from annual low-flows is relatively low in the catchment.

- Consented takes have a variety of cease-to-pump conditions to protect in-stream aquatic species. The lowest cease-to-pump conditions, in the Oruru Catchment are set at 390 l/s (or 78% of MALF).
- Non-consented water takes do not have cease-to-pump conditions. However, a Water Shortage Direction can issue a cease-to-pump requirement if deemed necessary.
- Volumetric demand - currently there is a demand of up to 46 l/s in the Oruru catchment from annual low flows (or 9% of MALF)
 - Consented water takes account for 42.9 l/s
 - Non-consented water takes (RMA or Regional Plan permitted takes) account for 3.1 l/s

River flow – Median Flow

The graph below shows the variation in median flow throughout the year. The annual river median-flow in the catchment is approximately 1344 l/s. Flows above median flow generally occur in autumn-spring. However, they can also occur during spring-autumn storm events.



Median flow statistics for the Oruru at Sale yards Flow Station (1903)

There is a low demand for the harvesting and storage of flows above the annual median flow:

- There are no in-stream dams to divert and store a proportion of water above median flows (winter or stormflows). In-stream dams may have conditions imposed on them requiring them to bypass during low-flows to protect in-stream values.
- There are no out-of-stream dams to store water taken (pumped) during above annual median-flows. The Council is working on a policy for 'supplementary' water permits which would enable the taking and storage/use of water when flows are above median flows (to enable storage and reduce demand from rivers during low flows).