Hydrology

Introduction

The Council monitors rainfall, river, groundwater, tidal and lake water levels through its hydrometric network, which consists of 211 monitoring stations spread across Northland. Of these stations, 81 are on a radio/cell phone telemetry network, which means the data is automatically sent to the Council for processing.

During 2008-09, three new stations were installed. These included two automatic rainfall stations and one automatic water level station.

The new telemetered rain gauge at Ōmāpere.

Data collected from this network is used to report on Northland's climate, improve flood warnings and guide water management, particularly during drought conditions.

The Council is also using information collected through its monitoring programme to develop a water allocation framework for the region, which will ensure the sustainable management of Northland's freshwater resources.

All telemetered rainfall and river information is available to view on the Council's website – **www.nrc.govt.nz/riversandrain**. Data is updated daily and the website allows everyone to view information on either a map or in table format.

The hydrometric network

Monitoring Northland's climate and water resources is an important function of the Regional Council. The information gathered allows the Council to make informed decisions about the Region's environmental resources, as well as providing valuable information during Civil Defence emergencies, such as severe storms.

Regional Council monitoring stations have been located to provide region-wide coverage. In 2008-09, the hydrometric network consisted of:

- 53 manual rainfall stations and 31 automatic rainfall stations;
- 14 manual lake level monitoring stations;
- 35 automatic water level monitoring stations;
- 7 automatic tidal water level monitoring stations; and
- 8 automatic and 63 manual groundwater level monitoring stations.

In addition, the National Institute of Water and Atmospheric Research (NIWA) and the MetService operate their own stations in the region.

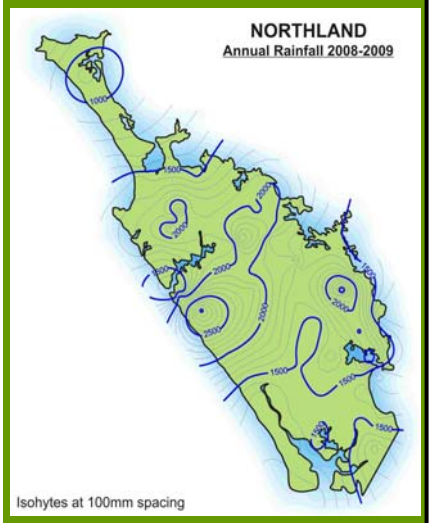
Hydrology performance targets

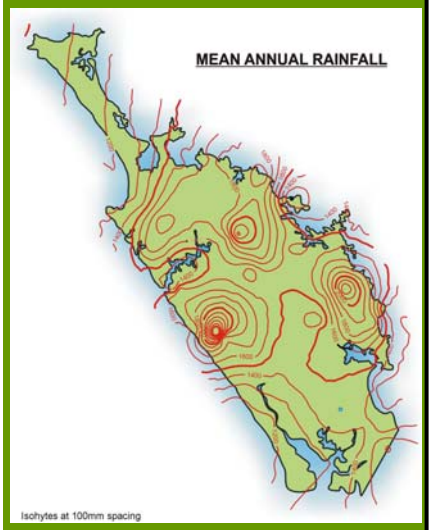
The Regional Council will continue to implement and improve a prioritised State of the Environment (SoE) monitoring programme and monitor compliance with, and the effects of, the exercise of resource consents and Regional Plans by:

- Operating a region-wide hydrometric network for the measurement, recording and reporting of rainfall, river flows, lake, groundwater and tide levels.
- Collecting water use records and measuring stream flows, groundwater and lake levels associated with significant water abstractions.
- Reporting to the Council annually on environmental monitoring activities within three months of the end of the financial year.
- Making the results from the annual SoE monitoring programmes available on the Council's website at **www.nrc.govt.nz/soe**

Northland Regional Council Monitoring staff measure high flows in the Whakapara River with an Acoustic Doppler Current Profiler (ADCP).

Regional Council staff installing a water level recorder.





The maps above give a comparison between the mean annual rainfall for Northland and the annual rainfall recorded across New Zealand in 2008-09.

The telemetry network

The Council operates a radio and cell phone telemetry network comprising 31 rainfall and 50 water level stations. These telemetered sites provide a 'real-time' picture of the state of Northland's water resources and are particularly important during periods of extreme rainfall, updating both the public and Civil Defence on the potential for flooding, and also during drought conditions.

To find out where the telemetry sites are for Northland go to **www.nrc.govt.nz/riversandrain**

Water allocation framework

This project aims to update the way water is currently allocated for use in Northland, to ensure that the region's water resources are managed more sustainably in the future and that over-allocation of our water resources is avoided.

The first step in this work is to do a 'stock take' of Northland's water resources, so we know exactly what we have. This will be followed by consultation with water users and the community to establish allocation limits for priority catchments. These limits will be set to protect the environment and to provide users with reasonable reliability of supply. The first stage of this programme will begin in 2010.

Thunderstorm activity over Bream Bay, on Northland's East coast.

Rainfall

In 2008-09, the annual rainfall for Northland varied from 70% to 140% of the mean annual rainfall for the region.

Northland's climate in 2008-09 was highly variable. Winter included heavy rain, severe winds, storm surges and flooding. Spring and summer were characterised by periods of settled weather broken by wet and stormy conditions. Autumn was more settled, however severe thunderstorm activity, lightning and flash flooding closed the season.

The MetService provides regional councils with frequent warnings of adverse weather systems. During 2008-09, 12 severe weather warnings were issued. Six of these severe weather warnings produced significant flooding in the region.

River flows

Northland has a large number of small river catchments and short, meandering streams. Climate and geology influence the flow within these rivers and the seasonal variation in rainfall is reflected in higher flows during winter and lower flows during summer.

During 2008-09, rivers in Northland had above average monthly flows for nine months of the year. The months of September and October 2008 and January 2009 recorded below average monthly river flows.