

Surface Water Quality - Monitoring 2017

Key Points

- A number of water quality parameters are measured at 35 river and stream sites across the region on a monthly basis
- Three years of monitoring data is combined to calculate Water Quality Indices, which allows reporting on the state of water quality using categories, ranging from excellent to poor
- The majority of sites have good or fair water quality
- Naturally high turbidity causes poor water quality in some rivers
- The majority of sites show improved water quality, but we do not yet have enough data to determine what caused these changes
- Soluble Inorganic Nitrogen is the main cause for water quality deterioration at a number of sites.

What is Marlborough District Council doing?

Every month, Council monitors water quality at 35 sites across the region. Land use activities, such as agriculture, horticulture and residential development have the greatest impact on water quality. Most monitoring sites are therefore located in lowland areas, where most of these activities occur.

A number of monitoring sites are also located in catchments with limited human influences to provide background information.

The monitoring data is used to improve management of Marlborough's streams and rivers by informing the development of regional rules. Additionally, the data allows Council to identify streams and rivers with significantly deteriorated water quality. Waterways with poor water quality are the focus of catchment-wide investigations to determine the sources of contamination. Council then works with landowners on eliminating or minimising contamination sources.

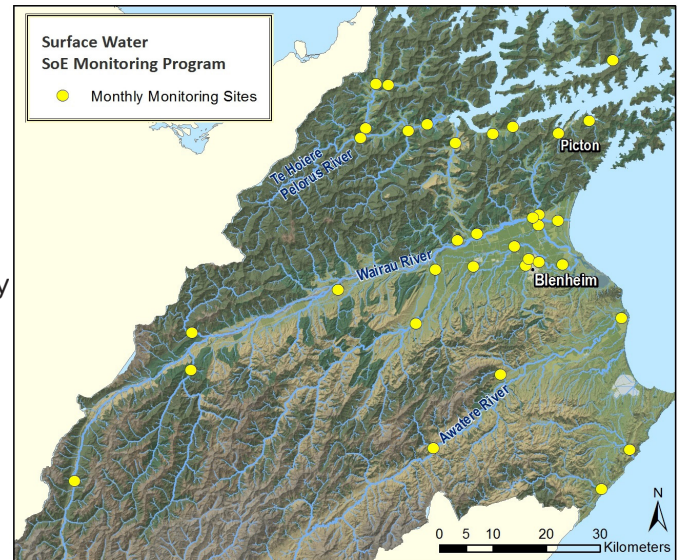


Figure 1: Map of sampling sites in Marlborough.

What we measure and why

At each site a number of parameters are monitored. Some parameters are measured in the field, while others are analysed from samples sent to an independent laboratory.

Nine of these parameters are used for the reporting on the state of water quality:

- **Water Temperature and Dissolved Oxygen**

High Water Temperatures and low Dissolved Oxygen levels effect the survival of aquatic insects and fish.

- **pH**

Deviations from natural pH values can impact the growth and reproduction of fish, and in extreme cases cause fish kills.

- **E. coli concentration**

E. coli are an indicator for faecal contamination, which has negative affects on aquatic ecosystems and presents a health risk to recreational users.

- **Soluble Inorganic Nitrogen and Dissolved Reactive Phosphorus**

These are the forms of Nitrogen and Phosphorus that are easily taken up by plants. High concentrations lead to excessive algae growth, which impacts aquatic habitat quality and oxygen levels.

- **Nitrate-Nitrogen and Ammonical Nitrogen**

High concentrations of these forms of Nitrogen are toxic to aquatic life.

- **Turbidity**

High Turbidity affects the growth of aquatic insects and fish and degrades their habitat. It also impacts on the recreational values of rivers.

Recently a number of heavy metals were also added to the parameter list. High concentrations of heavy metals are toxic to aquatic life.

The Water Quality Index

To report on the state of surface water quality, data from three consecutive years is used to calculate a Water Quality Index for each site. The index is a numbers between 0 and 100, with higher values representing better water quality. The index allows categorisation of water quality into five different classes. The classes “fair”, “good” and “excellent” represent acceptable water quality, while water ways in the “marginal” and “poor” categories need to be improved where possible.

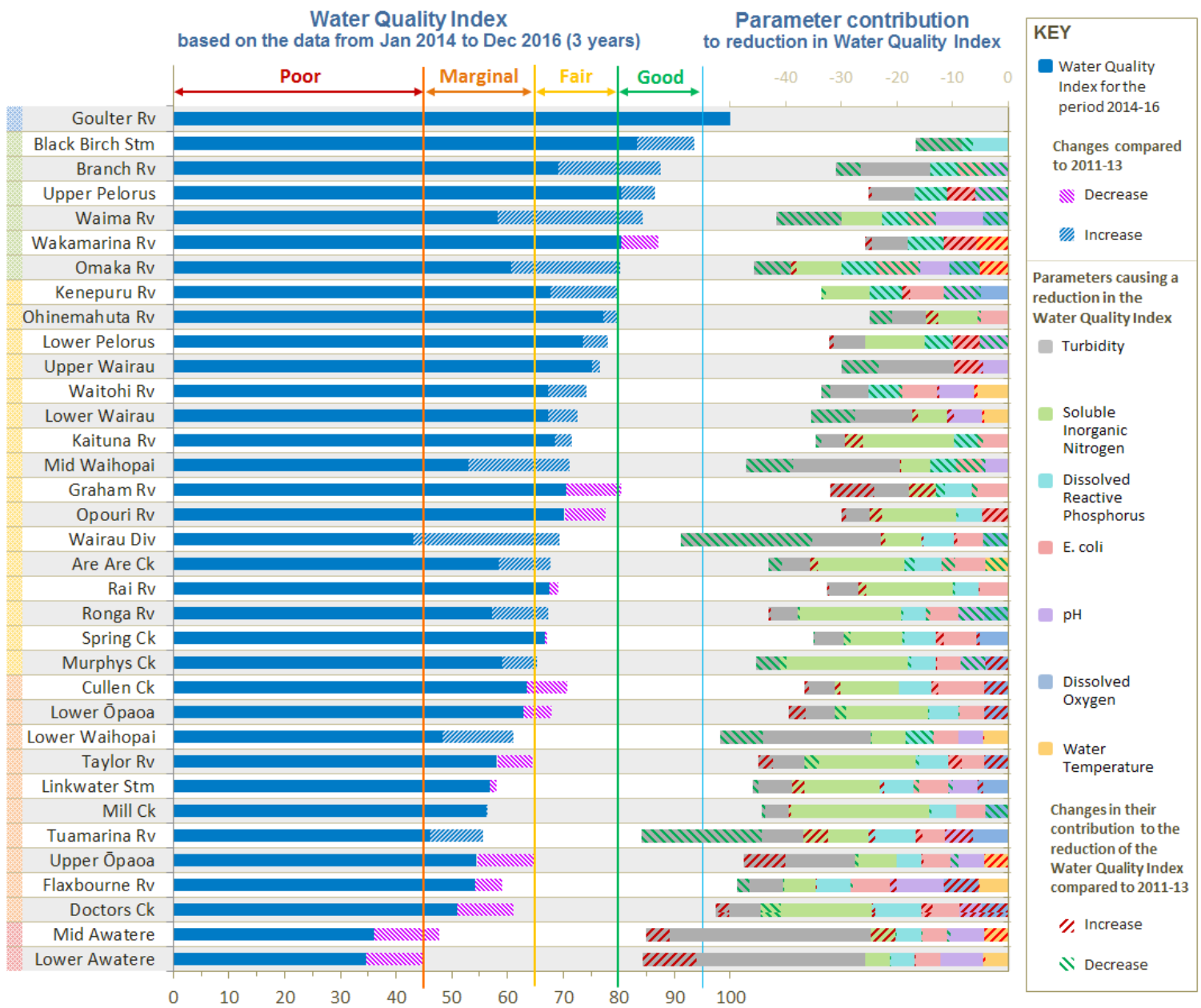


Figure 2: Water Quality Indices for the period 2014-16 and changes compared to the period 2011-13.

Although the majority of sites have good or fair water quality, some of the 35 sites monitored are in the marginal or poor water quality category. For some of these sites, however, the main cause for a low Water Quality Index is naturally high turbidity (Awatere and Waihopai River sites).

For most rivers water quality has improved in the last three years. The greatest increases in the Water Quality Index are seen for the Wairau Diversion, the Mid Waihopai, the Omaka River, Waima River and Branch River. The improvements are generally due to better results for a number of parameters. Unfortunately we do not yet have long enough monitoring records to determine if these improvements are due to

better management practices or if the changes are a result of natural variations in water quality. It is therefore essential to continue the monitoring of these sites and if possible add sites in areas of the region that are currently not well covered.

For the majority of sites high Soluble Inorganic Nitrogen concentrations are the main reasons for degraded water quality. The cause is nitrogen from animal faeces and/or fertiliser that leaches through the soil into subsurface and groundwater flows. Nitrogen concentrations are particularly high in spring-fed streams, such as Mill Creek, and waterways draining high intensity pastures and crops.