



Surface Water Quality—Monitoring 2019

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, but a number of sites have water quality classed as marginal.
- Soluble Inorganic Nitrogen is the main cause for water quality deterioration at a number of sites
- Naturally high Turbidity causes poor water quality in some rivers, while recent high turbidity in the Waima River is likely the results of slips caused by recent earthquakes

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.

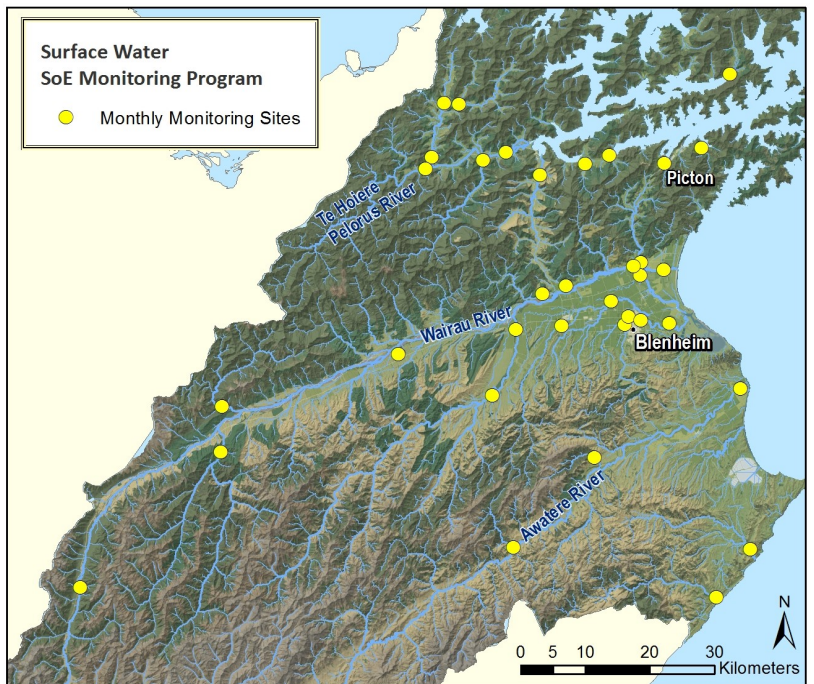


Figure 1: Map of sampling sites in Marlborough.

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 Ammoniacal Nitrogen**

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

- **Turbidity**

Turbidity is a measure for sediment in the water. Fine sediment affects the growth of aquatic insects and fish. When the sediment settles on the river bed, it smothers habitats and degrades food sources. Reduced water clarity also impacts on the recreational values of rivers.

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 number 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 waterways in the "marginal" and "poor" categories need to be improved where possible.

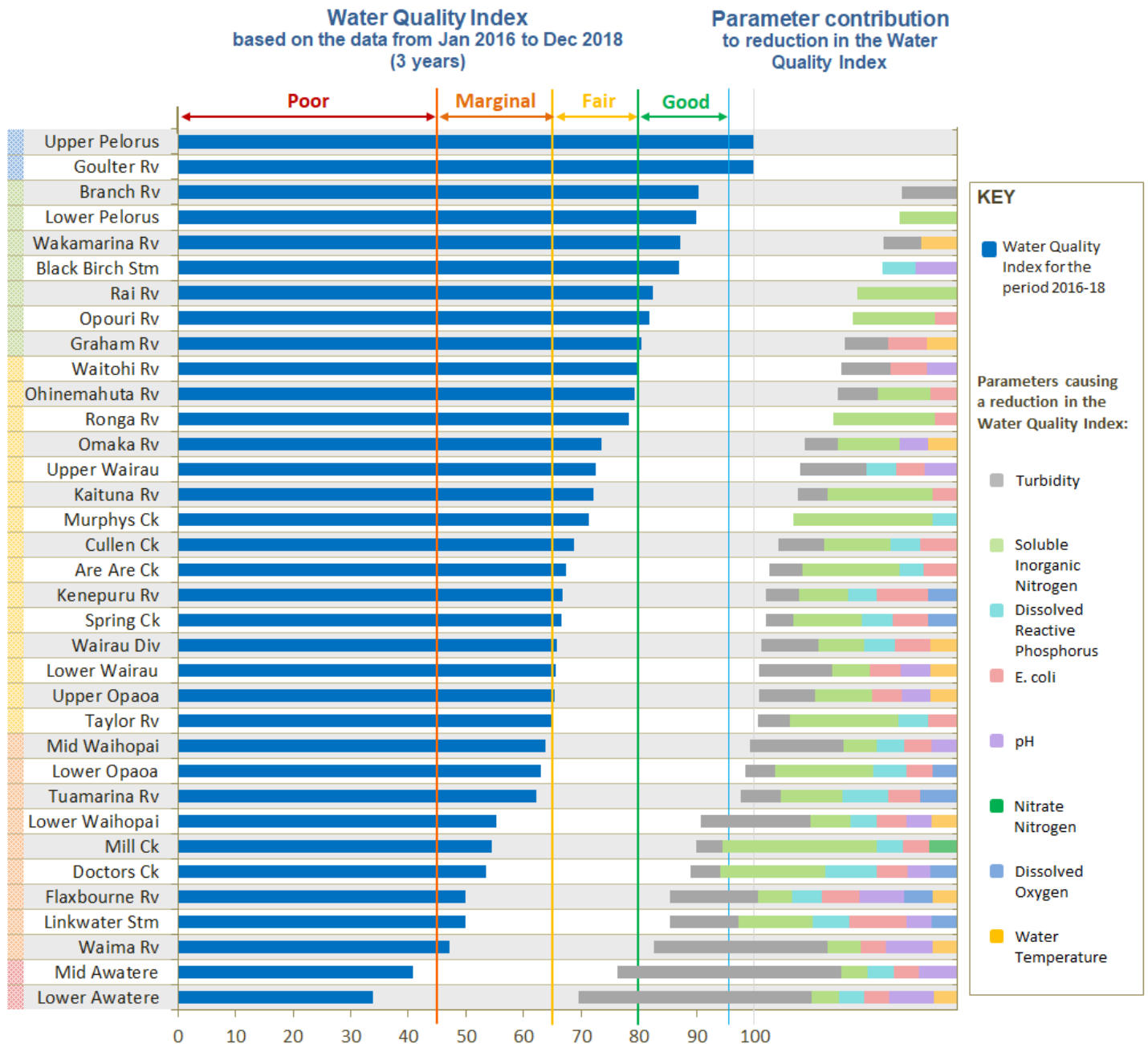


Figure 2: Water Quality Indices for the period 2016-2018 and the parameters contributions to the reduction in the indices.

Figure 2 shows the Water Quality Indices for the 35 rivers and streams monitored. Most rivers have good or fair water quality, but there are a number of waterways with water quality in the marginal category.

One of the main parameters causing water quality degradation is Soluble Inorganic Nitrogen, which enters waterways as a result of leaching from pastoral land use.

At a number of sites, Turbidity is the main parameter causing low water quality indices. In some catchments,

such as the Awatere and Waihopai, high Turbidity is mostly caused by highly erodible geology. High Turbidity in the Waima River is a new occurrence and is likely caused by slips from recent earthquakes.

Council has carried out catchment investigations to identify the causes of degraded water quality for a number of rivers within the marginal category. The next step will be involvement of the local community to improve water quality in these catchments. The Taylor River Improvement project is currently underway.