



River Health - Update 2024

Key Points

- ◆ This Report Card is an update on the state of Marlborough's rivers. A more in-depth analysis of river health can be found in 3-yearly reports available on the website.
- ◆ Water quality of streams and rivers in the Marlborough region is monitored monthly using a number of different measures.
- ◆ Three years of monitoring data is combined to calculate water quality indices.
- ◆ The majority of river monitoring sites have good or fair water quality.
- ◆ The water quality index allows prioritisation of improvement actions. There are several programmes with the aim to improve river health.
- ◆ Sites with several NPS-FM states in the C or D/E band also have low water quality indices.
- ◆ The Marlborough Environment Plan includes measures to assess its effectiveness.

River Health Monitoring

Healthy rivers and streams are integral to the social and economic wellbeing of the region. In order to assess the health of Marlborough's waterways, council has a network of monitoring sites to provide information which assists in the management of that natural resource.

The map in Figure 1 shows the water quality at 35 long-term monitoring sites using a water quality index described later in this document. Also shown are sites that were added recently to ensure better regional coverage and representation. We do not yet have sufficient data to determine the water quality at these new sites.

Every three years, full reports provide in-depth analysis of river health and examination of changes over time. The last such report was published in 2023 and can be found on the council website. In the years between full reports, report cards, such as this one provide updated information.

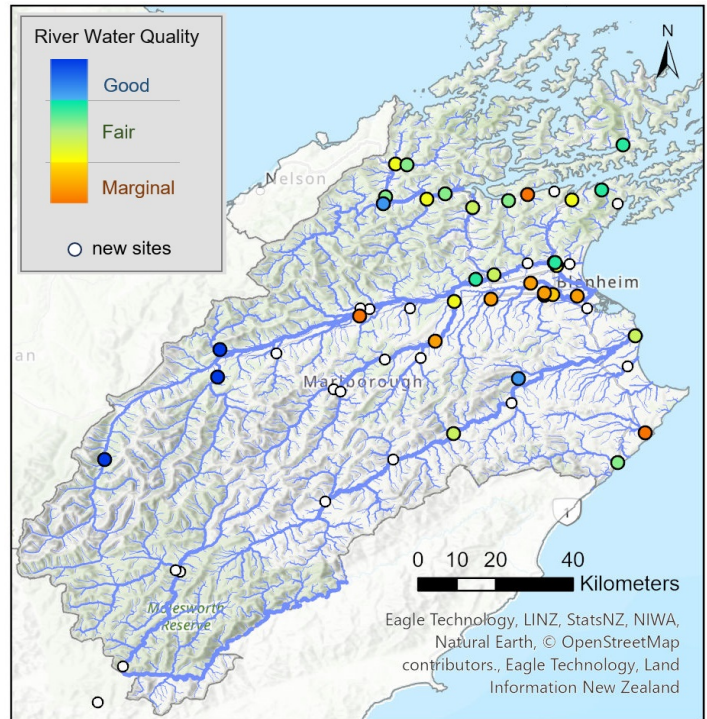


Figure 1: River water quality at long-term monitoring sites (coloured) and new monitoring sites (white).

What We Measure and Why

Monitoring sites are visited each month. During these visits field observations and samples are taken to collect measurements that allow river health to be assessed. Below are nine of the most important parameters measured:

- **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.
- **Dissolved 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 Ammonia 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 sediment settles on river beds, 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 river water quality, data from three consecutive years is combined and 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 value of the water quality index is based on how often and by how much limits for the different parameters (measures) are exceeded. The limits used for the calculation of the index are based on those in the National Policy Statement for Freshwater Management and associated documents.

The figure below shows the water quality index for the monitoring sites as blue bars on the left side of the graph. The right side of the graph shows the parameters that exceed limits and therefore cause a reduction in the index.

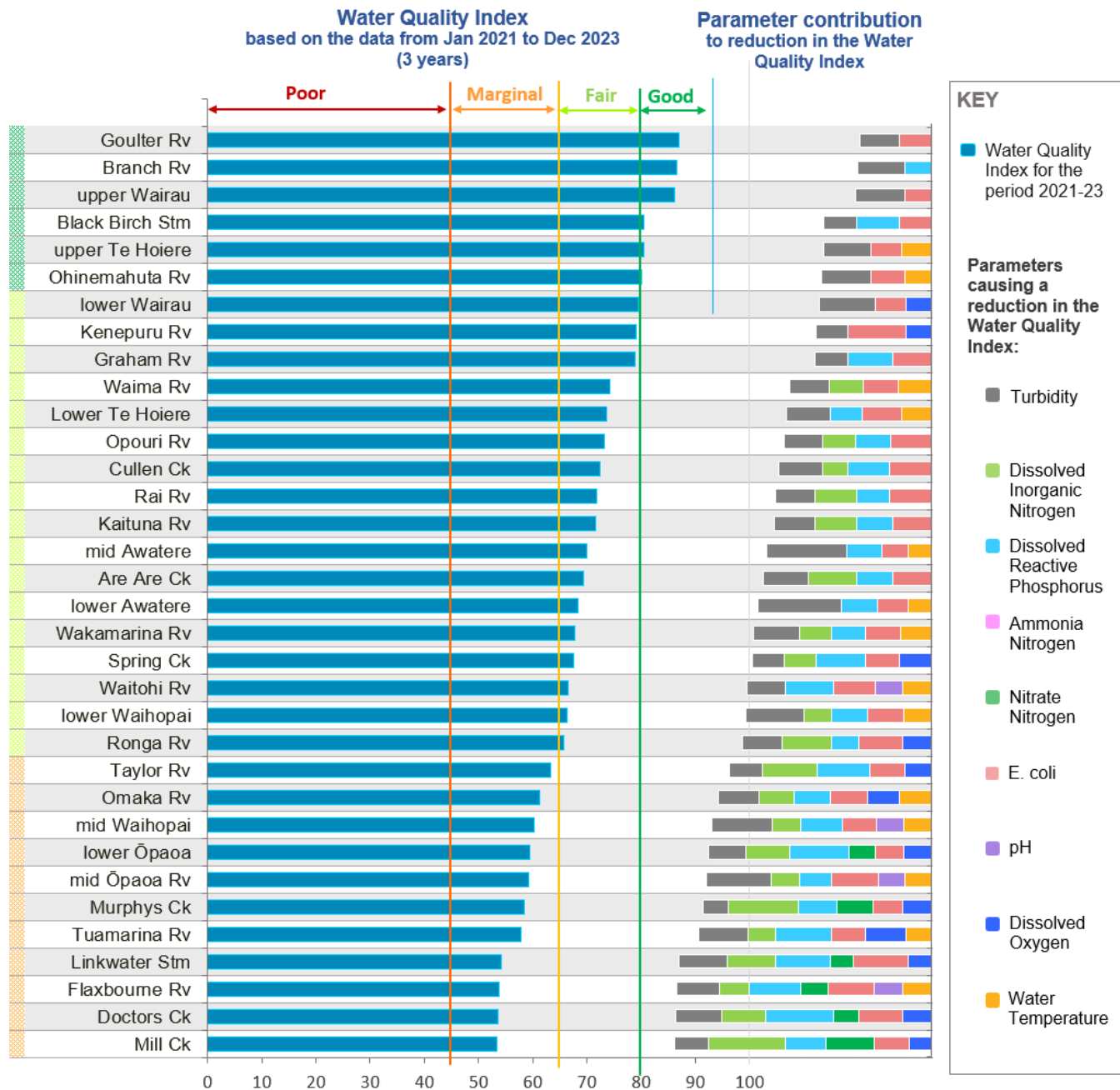


Figure 2: Water Quality Indices for the period 2021-2023 and the parameters contributions to the reduction in the indices.

One advantage of the index is the ability to rank sites based on their water quality. In Figure 2 sites are ranked from the best on top to the worst at the bottom of the graph. This allows management to be targeted to the waterways with the most degraded water quality. To further direct improvement actions, sites are divided into five classes. The classes “excellent”, “good” and “fair” represent acceptable water quality, while streams and rivers in the “marginal” and “poor” categories require improvements. Additionally, Figure 2 shows the parameters that need to be focused on. However, degraded sites usually show a wide range of parameters that exceed limits, demonstrating the interconnectedness of the different measures.

The majority of monitoring sites have water quality within the categories good or fair.

Sites and their associated catchments with low water quality indices (within or close to the marginal water quality category) are the centre of the Catchment Care programme and initiatives such as the Te Hoiere Project that aim to improve river health in collaboration with landowners.

The National Policy Statement for Freshwater Management (NPS-FM)

An important part of the National Policy Statement for Freshwater Management (NPS-FM) is the provision of limits for different parameters that are used to assess the health of rivers and lakes.

The NPS-FM limits define state bands, which range from A to D or E. States within the A band indicate low impacts on ecological health, while states within the D or E band are often considered “below the national bottom line”, which means that improvements need to be made unless the causes are natural.

Figure 3 shows the river attributes states for monitoring sites in the Marlborough region. Poorer states attributable to natural causes are shown in a thinner font. An example are MCI and ASPM (Macroinvertebrate) states for spring fed streams, such as Spring Creek and Murphys Creek. States for Dissolved Inorganic Nitrogen (DIN) are also shown in a lighter font because the NPS-FM currently does not include limits for this attribute. However, dissolved nitrogen is an important driver for algae growth and limits were developed.

In general, sites with several states in the C and D bands also have lower water quality indices, which demonstrates that both approaches of presenting river health provide equivalent results.

| Periphyton | B | | B | | B | | B | | B | | B | | A | | B | | B | | B | | B | | B | | A | | | | | | | | | |
|---------------|----------|-----------|--------|---------------|---------------|---------------|------------|-----------|----------------|------------|-----------|-------------|--------------|-----------|---------|--------------|----------------|----------------|------------|--------------|--------------|-----------|----------|-----------|------------|------------|-----------|-------------|------------------|-------------|---------------|---------------|----------|---|
| MCI | B | B | C | B | B | C | C | C | B | C | C | B | B | B | C | C | D | C | D | C | D | D | D | | | B | B | C | D | C | | | | |
| ASPM | B | B | B | B | A | B | B | B | B | C | B | B | B | B | B | D | C | D | B | C | D | D | | | | B | B | B | D | B | | | | |
| E. coli | D | C | D | A | A | B | D | D | E | B | D | D | A | A | D | A | B | B | D | A | B | A | A | D | E | B | D | A | A | B | B | D | A | |
| Water Clarity | A | A | A | A | A | A | A | A | D | A | A | A | A | A | B | C | B | A | C | D | A | A | A | D | D | A | B | A | A | D | D | A | A | |
| Nitrate | A | A | A | A | A | A | A | A | A | A | A | A | A | A | B | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Ammonia | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| DIN | C | C | C | A | A | B | C | B | C | A | A | A | A | A | D | A | A | A | C | B | A | A | A | B | C | D | C | C | A | A | A | A | B | A |
| DRP | B | B | B | B | B | A | B | C | C | C | C | B | A | A | C | B | B | A | B | C | A | C | A | A | D | B | C | C | B | C | C | B | A | |
| | Ronga Rv | Opouri Rv | Rai Rv | Upper Pelorus | Wakamarina Rv | Lower Pelorus | Kaituna Rv | Cullen Ck | Linkwater Strm | Waitohi Rv | Graham Rv | Keneperu Rv | Upper Wairau | Branch Rv | Mill Ck | Mid Waihopai | Lower Waihopai | Ohinemahuta Rv | Are Are Ck | Tuamarina Rv | Lower Wairau | Spring Ck | Omaka Rv | Mid Opaoa | Doctors Ck | Murphys Ck | Taylor Rv | Lower Opaoa | Black Birch Strm | Mid Awatere | Lower Awatere | Flaxbourne Rv | Waima Rv | |

Figure 3: NPS-FM states for river monitoring sites for the year ending December 2023.

Plan Effectiveness

The Marlborough Environment Plan (MEP) includes regulatory and non-regulatory tools for sustainable management of rivers. These include regional rules and the requirement to work with landowner to improve river health in degraded catchments. To measure the effectiveness of these tools, the MEP includes “Anticipated Environmental Results” (AERs) and associated effectiveness measures. The table below summarises the effectiveness measures that relate to river health (15.AER.1 in the MEP):

| Monitoring effectiveness | Current progress |
|--|---|
| The quality of water in all surface waterbodies routinely monitored is classified as fair, good, or excellent | 68% of sites meet this target. |
| Nitrate concentrations in each FMU* have an annual median of <1 mgN/L and an annual 95th percentile of <1.5 mg N/L. | This target is met at all representative FMU monitoring sites. |
| Ammonia concentrations in each FMU* have an annual median of <0.03 mgN/L and an annual maximum of <0.05 mg N/L. | This target is met at all representative FMU monitoring sites. |
| The annual median E. coli level in each FMU* is <260 per 100 ml. | This target is met at all representative FMU monitoring sites |
| Water quality which was degraded is enhanced. Increase in the number of catchment enhancement plans developed and implemented for waterbodies deemed degraded. | There are a number of projects currently in progress. Preparation of catchment enhancement plans is planned for the coming years. |

* FMU = Freshwater Management Unit