INFO SHEET 06

TOITŪ TE HAKAPUPU
PLEASANT RIVER CATCHMENT RESTORATION PROJECT

Waka update

Five high-tech 'waka' are monitoring water quality every 15 minutes in Te Hakapupu / Pleasant River catchment's main tributaries. The data they collect shows how water quality can change over time and indicates when the health of freshwater organisms may be affected.

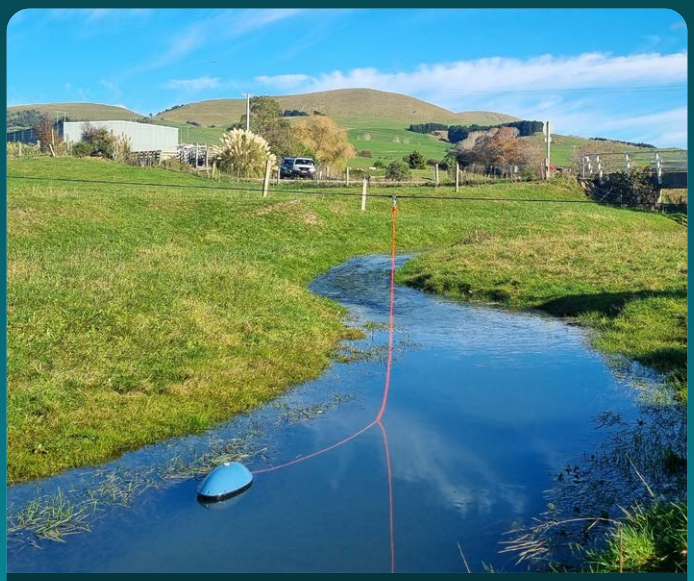

Figure 1. An Aquawatch waka in place on Te Hakapupu / Pleasant River. Image credit: Matt Dale, Waterscape Connections.

Water monitoring devices called 'waka' made by Aquawatch New Zealand are deployed in the three main tributaries in the catchment (**Figures 1 and 2**) as part of the Toitū Te Hakapupu / Pleasant River Catchment Restoration Project.

The waka are designed for maximum stability under different flow conditions. They are shown in **Figure 3** (next page); their outer casing is made from recycled milk bottles. They have five sensors and measure water quality at 15-minute intervals. The results are stored online.

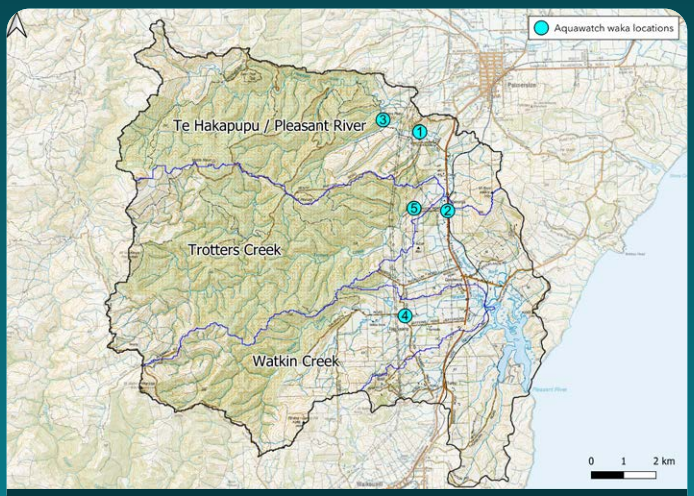

Figure 2. Locations of Aquawatch waka water monitoring sites in the upper Te Hakapupu / Pleasant River (1, 2 & 3), Watkin Creek (4) and Trotters Creek (5).

The sensors measure:

- **Turbidity** – water clarity, related to the amount of sediment and organic matter dispersed in the water.
- **Dissolved oxygen** – oxygen levels in the water, critical for the survival of fish and macroinvertebrates.
- **Temperature** – this affects dissolved oxygen levels and the speed of chemical and biological reactions like respiration.
- **Conductivity** – this affects the speed of chemical and biological reactions like respiration.
- **Acidity** – this affects the electrical conductivity of the water, which affects chemical reactions. Acidity is often better known/referred to as pH, which is the unit it is measured in.

In Te Hakapupu / Pleasant River catchment, the waka data shows both dissolved oxygen levels during low flow periods and sediment during heavy rainfall events are likely to be affecting water quality.

Figure 3. Aquawatch waka.
Image credit: Aquawatchsolutions.com

Dissolved oxygen levels can drop below the level recommended for healthy fish habitat (5mg/ml) during dry summer and autumn periods when there can be low flows in Te Hakapupu / Pleasant River. During these periods, the tributaries shrink from a constant flow to become a series of isolated pools. This low oxygen environment was present at the Patterson Road monitoring site for the entire month of April in 2024 and probably present in other parts of the catchment's waterways.

To help minimise stress on freshwater organisms during periods of low flow with low levels of dissolved oxygen, the refuge pools where they will be residing could be enhanced. This could be achieved with riparian plantings to provide shade, as well as ensuring stock are excluded from these areas and upstream.

Turbidity levels increase dramatically during periods of heavy rainfall. This suggests sediment levels will be increasing in the same way. In Watkin Creek, turbidity in the absence of rainfall averaged 14 NTU (Nephelometric Turbidity Units). During the flood in early October 2024, it rose 28 times higher to peak at 402 NTU (**Figure 4**). A similar spike was observed at the other two waka sites.

Creating sediment traps to help remove sediment from waterways, as well as reducing the initial mobilisation of sediment at its source, through planting for example, are important ways to help conserve the health of the freshwater environment in Te Hakapupu / Pleasant River catchment. The waka will continue to collect data in the catchment for the remainder of the project.

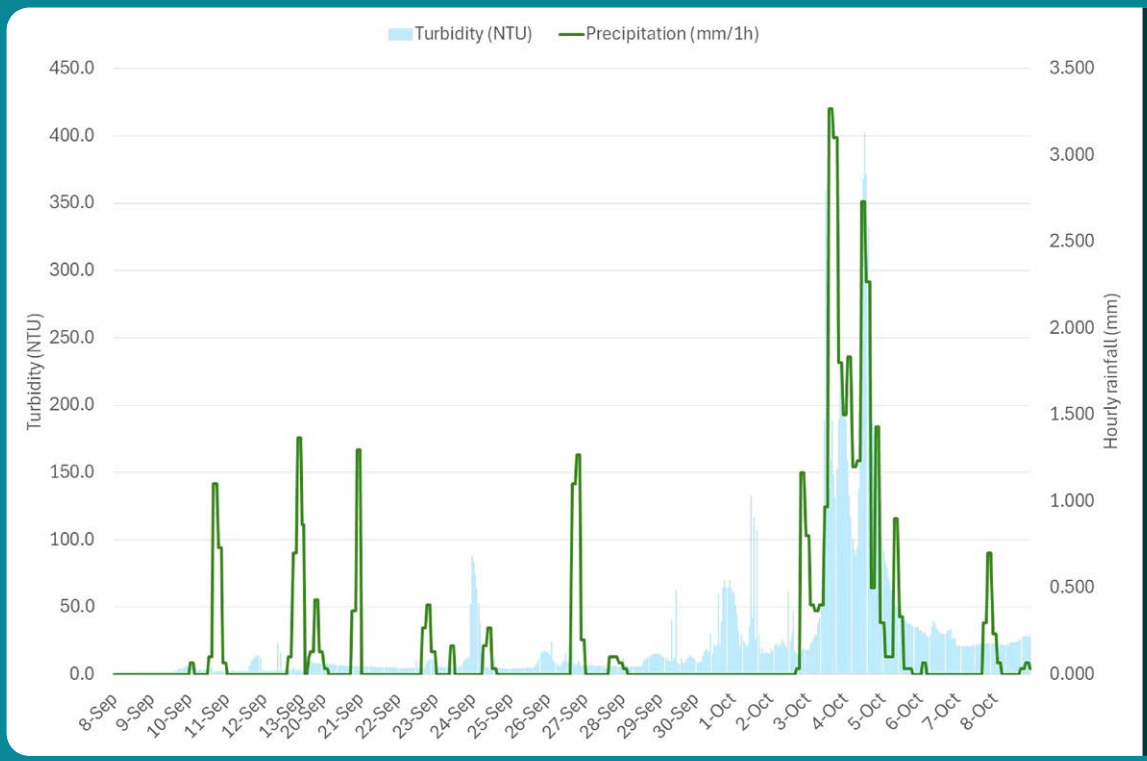

Figure 4. Turbidity (blue bars) and rainfall (green line) from the Watkin Creek waka highlighting the increase in turbidity associated with the flood in early October 2024.

A partnership project by:

Otago Regional Council

Kāti Huirapa Runaka ki Puketeraki

In collaboration with:

Ministry for the Environment
Manatū Mō Te Taiao
Essential Freshwater Fund
A JOBS FOR NATURE PROJECT

East Otago Catchment Group

Find out more at www.orc.govt.nz/toitutehakapupu