Otago Regional Council

MEMORANDUM

To: Alexandra King, Manager Consents and Manager Environmental Delivery Data and Systems

From: Jason Augspurger, Principal Scientist

Date: 19/02/2026

Subject: Compliance of Kawarau and Shotover with Appendix 2A of the NPSFM 2020 (amended 2025)

Purpose

The purpose of this memo is to use assess state of the Kawarau and Shotover Rivers against the National Policy Statement for Freshwater Management appendix 2A attributes (MFE 2025) with consideration of the Water Services (Waste Water Environmental Performance Standards) Regulations (2025). This memo gives particular consideration to the S43 exceptions 43.1.i and 43.1.ii.

Context/Background

Under the Waste Water Environmental Performance Standards, the general exceptions for discharging treated waste water include exceptions 43.1.i and 43.1.ii. Under, 43.1.i a discharge is considered an exception to the standards if the river complies with the A band in all tables which apply to that location in Appendix 2A of NPSFM. Further clarification is provided under 43.1.ii that an exception may still apply if a river does not comply with the A band due to naturally occurring processes.

The current NPSFM (2020 amended 2025) contains 10 attributes in Appendix 2A. Of these 10 attributes, three apply only to lakes (phytoplankton, total nitrogen, total phosphorus), one applies to lakes and lake fed rivers (cyanobacteria), and the remaining attributes apply to rivers (periphyton, below point source dissolved oxygen) or both lakes and rivers (ammonia toxicity, nitrate toxicity, suspended fine sediment/clarity, and E.coli).

When assessing the Kawarau for compliance with Appendix 2A of the NPSFM 2020, this means there are up to seven relevant attributes as it is a lake-fed river. For the Shotover, up to six attributes may apply.

Of the seven attributes applying to the Kawarau assessment, ORC currently monitors ammonia toxicity, nitrate toxicity, suspended fine sediment/clarity, and E.coli at the Chard Road monitoring site located downstream of the confluence with the Shotover River and upstream of the confluence with the Arrow River (Figure 1). Periphyton and point source dissolved oxygen are not monitored. The Kawarau monitoring site is located downstream of a potential point source discharge (wastewater treatment) and thus the dissolved oxygen attribute may apply to

this site. Typically, dissolved oxygen would be monitored closer to the point source discharge than the location of this site. The lake-fed river attributes (cyanobacteria) are monitored upstream in Lake Whakatipu.

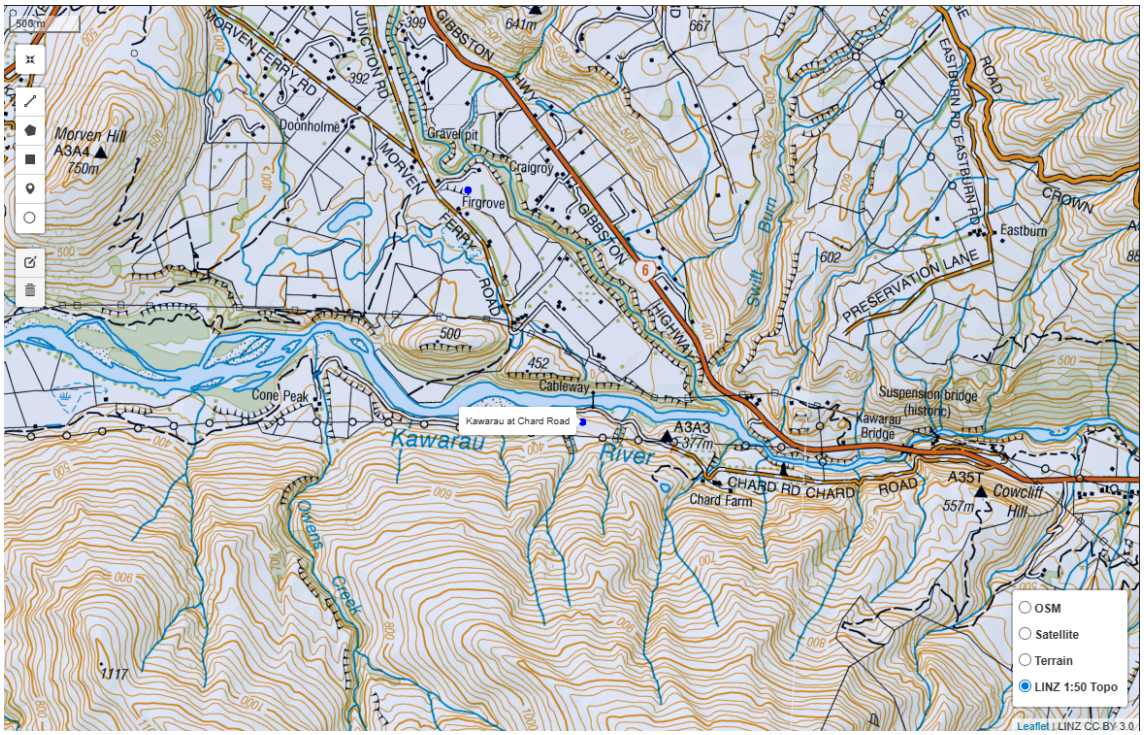

Figure 1: Location of the Kawarau at Chard Road monitoring site

The Shotover is monitored at the Bowens Peak site (Figure 2) and of the six parameters that may apply, four are monitored. Periphyton and dissolved oxygen below point source are not monitored at this site. However, dissolved oxygen does not apply to this site as it is not below a point source discharge. Thus, periphyton is the only unmonitored attribute which applies to this site in Appendix 2A.

Figure 2: Location of the Shotover at Bowens monitoring site

Attributes, sites to which they apply, and whether they are monitored are outlined in the Table below (Table 1).

Table 1: Appendix 2A attributes, sites to which they apply, and monitoring status

Attribute	Site (monitoring status)
Periphyton	• Shotover at Bowens (not monitored) • Kawarau at Chard Road Bowens (not monitored)
Ammonia toxicity	• Shotover at Bowens (monitored) • Kawarau at Chard Road Bowens (monitored)
Nitrate toxicity	• Shotover at Bowens (monitored) • Kawarau at Chard Road (monitored)
Dissolved oxygen	• Kawarau at Chard Road (Not monitored)
Suspended fine sediment	• Shotover at Bowens (monitored via turbidity) • Kawarau at Chard Road Bowens (monitored via turbidity)
E.coli	• Shotover at Bowens (monitored) • Kawarau at Chard Road (monitored)
Cyanobacteria	• Lake Whakatipu (monitored)

State Assessment

Compliance with Appendix 2A was assessed in ORC's most recent water quality state of environment report (Ozanne et al. 2023). The assessment figure from this report is reproduced below (Figure 3). In addition to state of environment reporting, the July 1 2020 to June 30 2025

period was also assessed. No attributes have changed bands between the 2023 report and the 2020-2025 assessment. Thus, the Ozanne et al. 2023 report is indicative of current state.

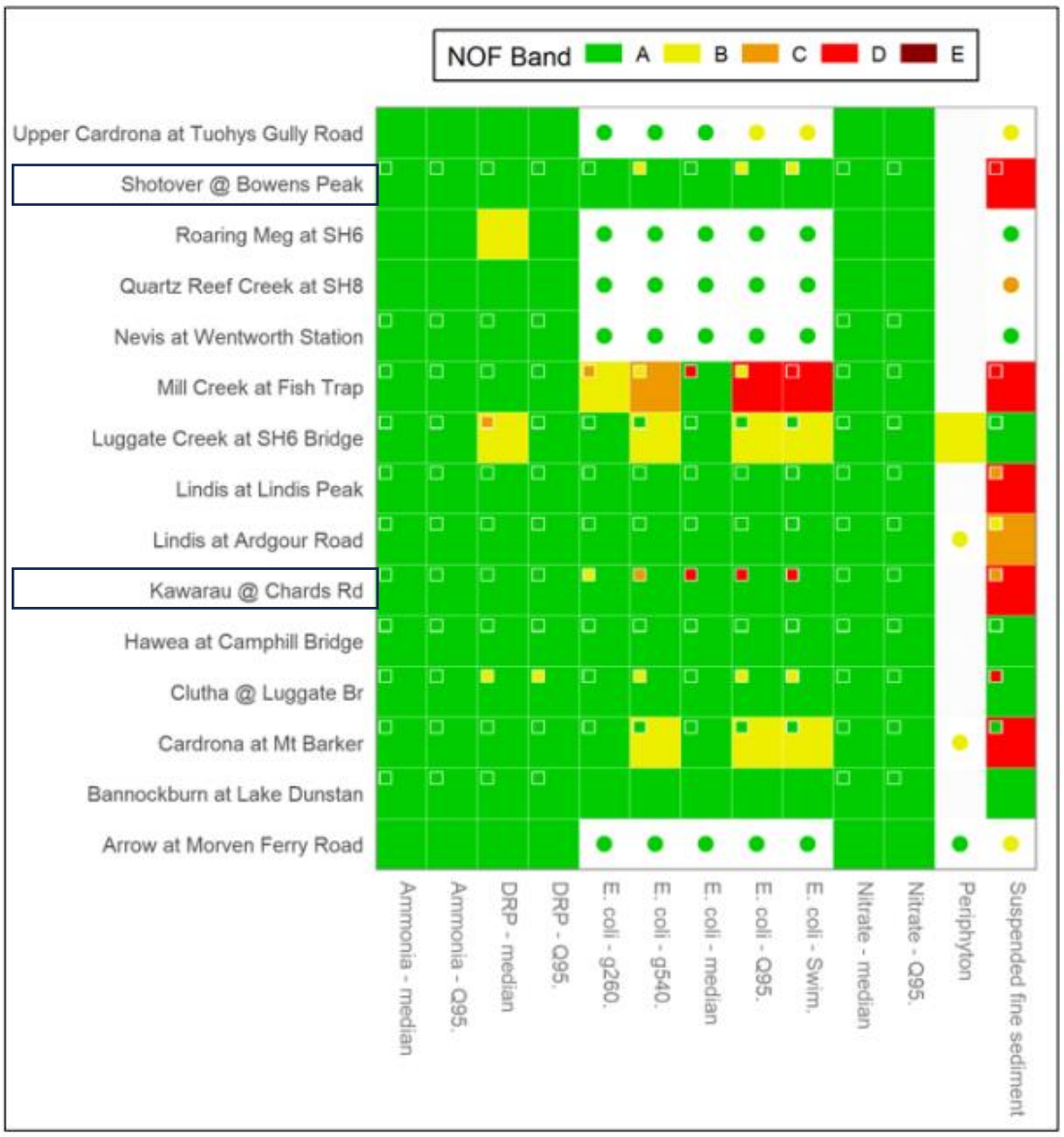

Figure 10 Grading of the river sites of the Dunstan Rohe based on the NOF criteria. Grades for sites that did not meet the sample number requirements in are shown as white cells with coloured circles. The white cells indicate sites for which the variable was not monitored. Small square in the upper left quadrant of the cells indicate the site grade for the baseline.

Figure 3: Appendix 2A attribute state reproduced from Ozanne et al., 2023

Ammonia toxicity, Nitrate toxicity, E.coli, and Suspended fine sediment

For both the Shotover at Bowens and Kawarau at Chard Road monitoring sites, all sites comply with the A band for Ammonia toxicity, Nitrate toxicity, and E.coli. Both sites fall in the D-band for suspended fine sediment/visual clarity. However, these sites are impacted by glacial melt water which is a naturally occurring process[1].

[1] Further work on naturally occurring processes will be completed this year.

Dissolved oxygen

While dissolved oxygen is not monitored continuously as per Appendix 2A, at the Kawarau site spot observations are made monthly during water quality sampling. The lowest recorded value is 9.6mg/l. This site is therefore expected to comply with the A-band for dissolved oxygen.

Periphyton

Periphyton is not monitored at either of the sites as depth makes monitoring difficult and/or impossible. Periphyton most readily blooms in environments with high light availability, stable beds, stable hydrology, and high nutrient levels (Snelder et al. 2019). Both sites have a high natural sediment load due to glacial processes which can scour periphyton and block light, can have frequent flushing flows due to heavy rainfall events in the upper catchments which contributes to scouring, and have low nutrient levels. Due to these characteristics, both sites are low risk for periphyton accrual.

Cyanobacteria

Cyanobacteria results were not presented in Ozanne et al., 2023 as it forms part of ORC's contact recreation programme. Recent monitoring indicates all lakes comply with the A band for Cyanobacteria including Lake Whakatipu which flows in the Kawarau (Trotter 2024).

Summary

Both the Kawarau and Shotover comply with the A band for all measured 2A attributes that apply to the sites, with the exception of suspended fine sediment. Suspended fine sediment fails to comply with the A band but is influenced by naturally occurring glacial processes and thus is an exemption under 43.1.ii.

Periphyton is not monitored at either site but is considered low risk due to inherent site characteristics. Dissolved oxygen is not monitored continuously, but spot samples indicate the Kawarau site is likely to comply with the A-band.

Table 2:Summary table of attributes and compliance with appendix 2A

Attribute	Status
Periphyton	No monitoring at either site but expected to be low risk due to site characteristics including frequent flushing flows, mobile bed, high sediment load, and low nutrient concentrations
Ammonia toxicity	A band
Nitrate toxicity	A band
Dissolved oxygen	Limited monitoring but expected to comply with A band.
Suspended fine sediment	D band due to naturally occurring processes and therefore an exception under 43.1.ii
E.coli	A band
Cyanobacteria	A band

References

MFE. 2025. National Policy Statement for Freshwater Management 2020 (amended 2025) [Internet]. [place unknown]. https://environment.govt.nz/assets/publications/npsfm-2020-amended-december-2025.pdf

Ozanne R, Levy A, Borges H. 2023. State and Trends of Rivers, Lakes, and Groundwater in Otago 2017 – 2022 [Internet]. Dunedin, NZ: ORC. https://www.orc.govt.nz/media/14523/orc-river-lake-groundwater-state-and-trends-2017-2022.pdf

Snelder TH, Moore C, Kilroy C. 2019. Nutrient Concentration Targets to Achieve Periphyton Biomass Objectives Incorporating Uncertainties. JAWRA J Am Water Resour Assoc. 55(6):1443–1463. https://doi.org/10.1111/1752-1688.12794

Trotter H. 2024. Water Quality and Ecosystem Health in Otago Rivers and Lakes [Internet]. [place unknown]. https://www.orc.govt.nz/media/zsfpbyuk/water-quality-soe-nps-fm-2019-2024.pdf

WEPS. 2025. Water Services (Waste Water Environmental Performance Standards) Regulations [Internet]. [place unknown]. https://www.legislation.govt.nz/regulation/public/2025/0258/latest/whole.html