

Quarterly Water Quality Report

eDNA Report – February 2024

Key Findings

- eDNA sampling was undertaken in the Opuha Scheme and wider catchment in December 2023 and January 2024, with ecological health ratings achieved from **Average** to **Pristine**.
- Upstream locations or locations higher in the catchment generally recorded better eDNA scores and higher ecological health ratings than locations downstream in the catchment.
- The **Lake Opuha tributaries** were rated from **Good** to **Pristine** with the **South Opuha River** achieving the highest rating of **Pristine**.
- The **Opuha River** was rated **Good**, and the **Te Ana Wai River** recorded ratings of **Excellent** and **Good**.
- The **Upper Opihi tributaries** were rated from **Average** to **Pristine**, with upstream locations scoring better than downstream locations.
- The ecological health ratings for the **Opihi River** ranged from **Average** (Burke's Pass) to **Excellent** (Fairlie). A decrease in the ecological health rating was observed between Fairlie (**Excellent**) and Raincliff (**Good**) – Raincliff is downstream of where the high nitrate tributaries of the Upper Opihi enter the Opihi River.

Introduction

Environmental DNA (eDNA) monitoring was undertaken in December 2023 and January 2024 to obtain an overview of the ecology, biodiversity and, indirectly, water quality, in the Opuha Scheme and wider catchment.

eDNA is material left behind by organisms (*e.g.* fish, insects, birds *etc.*) as they move through their environment – this material might be skin, hair, scales, mucus, faeces and other cells and tissue.

Monitoring eDNA can identify thousands of species of fish, insects, crustaceans, birds, mammals, amphibians, plants, fungi, bacteria and other organisms. The types of species identified allows us to attribute a score and describe the broad ecological health of a waterway in a similar way to how the Macroinvertebrate Community Index is used (<https://www.wilderlab.co.nz/tici>). Depending on the eDNA score achieved, the ecological health of a waterway can be rated from *Pristine* to *Very Poor*, with higher scores indicating better ecological health (Table 1).

eDNA is collected by pushing water through a small filter (Figure 1). The sample is preserved and sent for analysis to identify the organisms that left the eDNA behind. eDNA kits were obtained and analysed by Wilderlab (<https://www.wilderlab.co.nz/>).

eDNA sampling in the North Opuha, South Opuha and Opuha rivers was funded and carried out by OWL, with all other sampling undertaken by Living Landscapes South Canterbury and funded by the Ministry for Primary Industries via the Integrated Farm Plan Accelerator Fund.

This report gives a summary and highlights key findings for the eDNA results from December 2023 and January 2024, with a focus on the ecological health description. A summary of fish species identified is also given.

Table 1: eDNA scores and corresponding ecological health rating.

eDNA Score	Ecological Health Rating
>120	Pristine
110 – 120	Excellent
100 – 110	Good
90 – 100	Average
80 – 90	Poor
<80	Very Poor

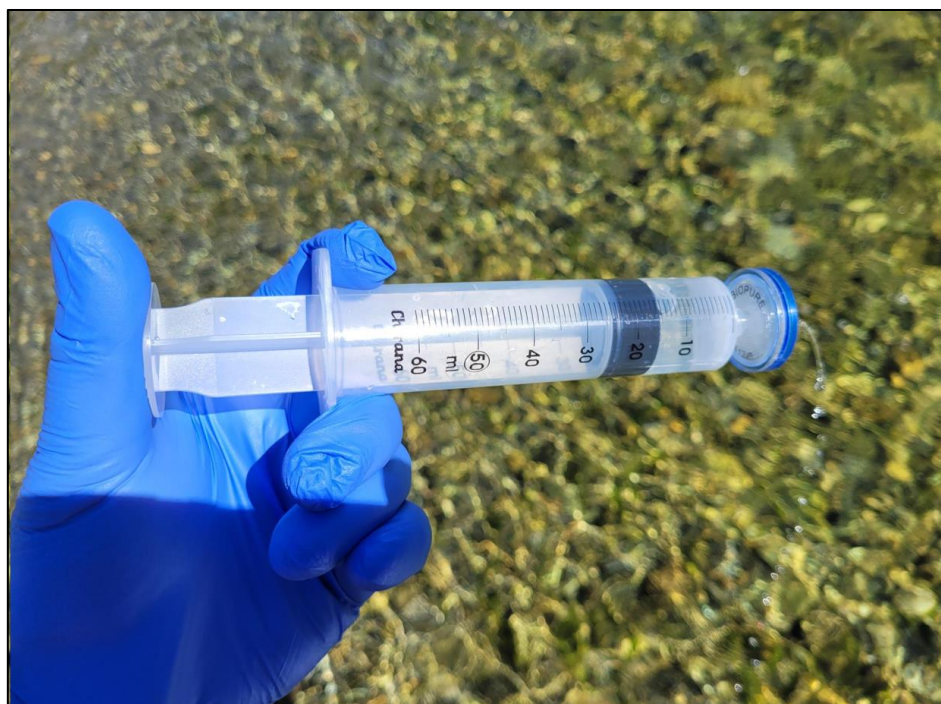


Figure 1: Syringe and filter used to collect eDNA samples.

North Opuha River and South Opuha River

eDNA was sampled at two locations on the **North Opuha River** (Clayton Rd and Clayton Settlement Rd). The eDNA scores for both sites were similar (118 and 115 respectively), with ecological health rated as **Excellent** (Figure 2).

eDNA for longfin eel was detected at both locations along with upland bully, Canterbury galaxias, alpine galaxias, and rainbow and brown trout.

The **South Opuha River** was sampled at Stoneleigh (upstream site) and Clayton Rd (downstream site). The eDNA scores were similar (124 and 121, respectively), and higher than the North Opuha River with both sites described as **Pristine** (Figure 2).

eDNA for longfin eel, Canterbury galaxias, alpine galaxias and common bully was detected at the Clayton Rd site but not at Stoneleigh. Both sampling sites detected eDNA for upland bully, brown trout and rainbow trout.

The higher eDNA scores for the South Opuha River, relative to the North Opuha River, is consistent with the better water quality generally observed in the South Opuha.

Ribbonwood Stream and Station Creek

eDNA was sampled in **Ribbonwood Stream** at Clayton Rd. The eDNA score was 110, an ecological health rating of **Excellent** (Figure 2).

eDNA was sampled in **Station Creek** at Clayton Rd. The eDNA score was 109, a rating of **Good**. Although Station Creek and Ribbonwood Stream have different ecological health ratings, their scores are very similar, indicating similar ecological health and water quality.

eDNA for longfin eel, Canterbury galaxias, upland bully, common bully and brown trout was detected in Ribbonwood Stream and Station Creek.

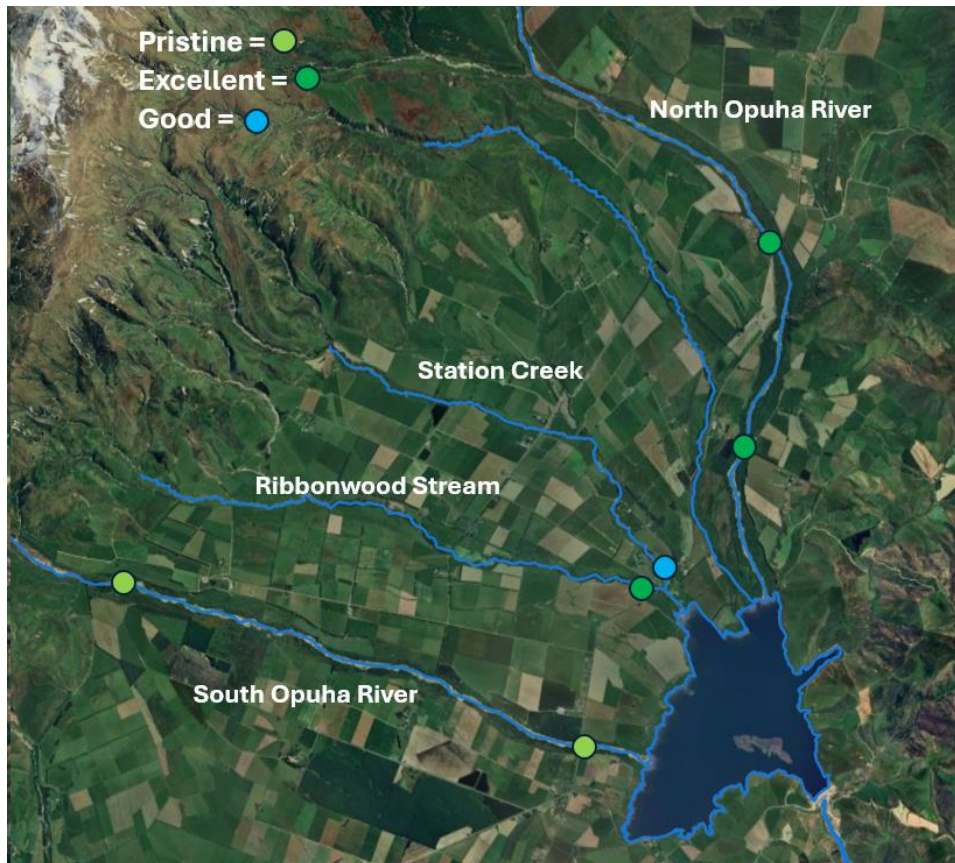


Figure 2: eDNA ecological health ratings for tributaries of Lake Opuha.

Opuha River

eDNA was sampled in the **Opuha River** at Skipton Bridge and Raincliff. The eDNA scores were similar with Raincliff (106) scoring slightly higher than Skipton Bridge (103). Both locations achieved an ecological health rating of **Good** (Figure 3).

eDNA for longfin eel, shortfin eel, Canterbury galaxias, upland bully, common bully, blue-gilled bully, torrentfish and brown trout were detected at both locations in the Opuha River.



Figure 3: eDNA ecological health ratings for the Opuha, Te Ana Wai and Opihi Rivers.

Te Ana Wai River

eDNA was sampled at three locations in the **Te Ana Wai River** – Limestone Valley, Cave and Tengawai Rd Bridge. The eDNA scores decreased from upstream to downstream with the upstream locations of Limestone Valley and Cave rated as **Excellent** and the downstream site of Tengawai Rd Bridge rated as **Good** (Figure 3).

eDNA for longfin eel, Canterbury galaxias and brown trout were detected at all locations, whereas blue-gilled bully and common bully was only detected at Tengawai Rd Bridge. Salmon was detected at Limestone Valley but not at the other sampling locations.

Upper Opihi River Tributaries

The ecological health ratings for the tributaries of the Upper Opihi River varied from **Average** to **Excellent**, with the rating dependent on the tributary and the sampling location within the tributary (Figure 4).

Wellshot Stream was sampled at two locations, with the upstream location recording a rating of **Excellent** (112) and downstream rated as **Good** (108). **Hall Stream** showed similar results with the upstream location rated as **Excellent** (119) and downstream rated as **Good** (100).

Allandale Stream and **Glenfield Stream** were sampled at two locations. Both Allandale locations were rated as **Average**, with the upstream location obtaining a higher eDNA score (98) than the downstream (94). Glenfield Stream recorded an ecological health rating of **Good** for the upstream location and **Average** for downstream. **Strathconan Creek** and **Coal Stream** were sampled at one location with Strathconan Creek recording a **Pristine** rating and Coal Stream a **Good** rating.

eDNA for longfin eel, upland bully and Canterbury galaxias were detected in all tributaries of the Upper Opihi, and eDNA for shortfin eel was detected in all tributaries except for Strathconan Creek. Trout was detected in all tributaries except for Wellshot and Strathconan Streams.

eDNA for freshwater mussels was detected for Glenfield stream but not detected at any other tributaries of the Upper Opihi.

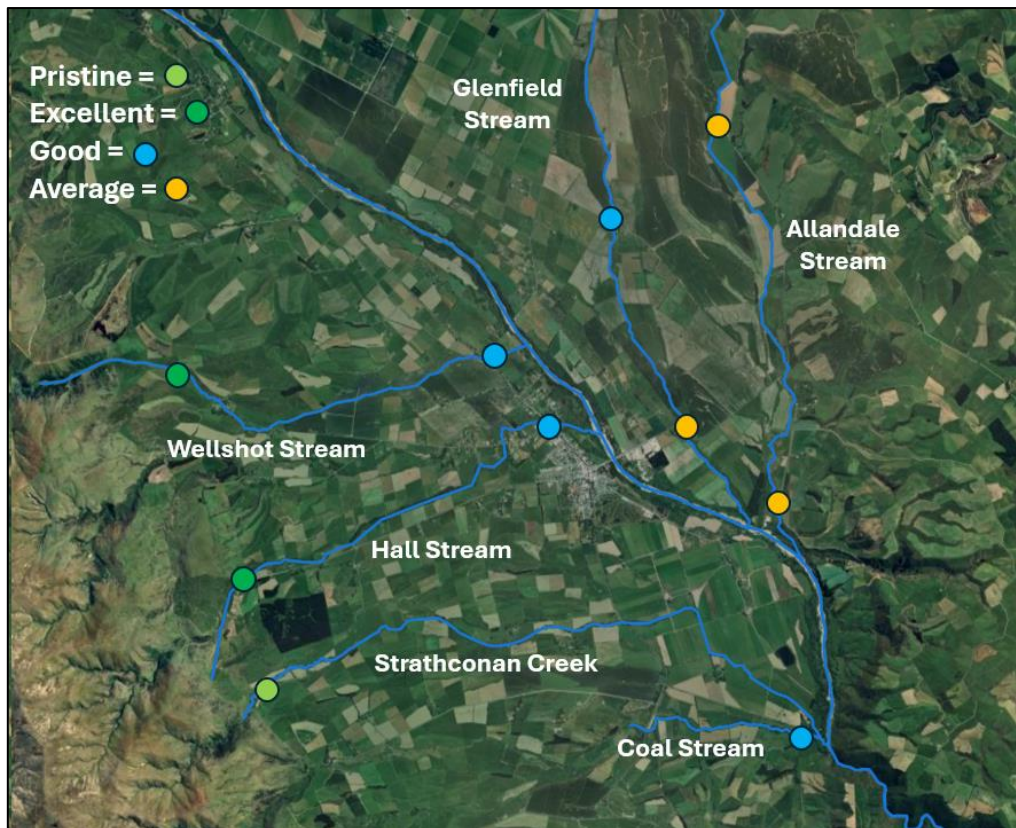


Figure 4: eDNA ecological health ratings for tributaries of the Upper Opihi River.

Opihi River

The **Opihi River** was sampled at six locations – Burke’s Pass, Fairlie, Raincliff Bridge, Hanging Rock Bridge, Pleasant Point, and State Highway 1. Interestingly, the most upstream location at **Burke’s Pass** recorded the lowest eDNA score (99) and an **Average** rating (Figure 3). The highest ecological health rating was achieved for **Fairlie** (**Excellent** – 113). The next downstream site of **Raincliff Bridge** achieved a rating of **Good** (107) – interestingly this location is downstream of where the high nitrate tributaries of Glenfield, Allandale, Strathconan and Coal enter the Opihi River. The remaining downstream locations of **Hanging Rock Bridge**, **Pleasant Point** and **State Highway 1** all scored similar scores to Raincliff Bridge (105, 105 and 103, respectively) with a rating of **Good**.

eDNA for longfin eel, upland bully, Canterbury galaxias and brown trout was detected at all sites. All sites detected shortfin eel except Burke’s Pass. All sites detected common bully and blue-gill bully except Burke’s Pass, Fairlie and Raincliff. Rainbow trout was detected in Fairlie and salmon was detected in Fairlie, Hanging Rock Bridge, Raincliff and Pleasant Point. Inanga was only detected at State Highway 1 and torrent fish detected at Raincliff, Hanging Rock Bridge, Pleasant Point and State Highway 1.

Any questions or feedback regarding the Quarterly Water Quality Report can be directed to Jared Panther (jared@opuha.co.nz; 021 223 7465) or Julia Crossman (julia@opuha.co.nz; 021 535 174).