



# Upper and Lower Huia Dams and Pipelines 2024-2025 Annual Report

Final - November 2025

Watercare 


## QUALITY INFORMATION

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## REVISION HISTORY

Rev	Revision Date	Name	Position	Signature
1	31/10/2025	Michiel Jonker	Environmental Care Manager	
2	29/10/2025	AJ Grobler	Operations Controller	
3	30/10/2025	James Talbot	Headworks Manager	

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Date	Name	Position	Signature
31/10/2025	Michiel Jonker	Environmental Care Manager	

## CONSENT CHANGE AND MONITORING HISTORY

Change type	Description	Effective date	Reference / condition	Reporting / monitoring implications
Annual report due date	Watercare requested all dam annual reports to be extended from 30 September to 31 October	19/05/2025	7	All reports to be submitted by 31 October of each year.

## EXECUTIVE SUMMARY

The 2024-2025 annual report for the Upper and Lower Huia Dams and pipelines provides an overview of compliance and monitoring activities conducted over the reporting period from 1 July 2024 to 30 June 2025. The report covers various aspects, including water abstraction, reservoir levels, spillway discharges, compensation flows, environmental monitoring, and pipeline operations, as required under the respective resource consents.

Key findings and highlights from the monitoring activities include:

- **Water usage:** The total volume of water abstracted during the reporting period was 4,862,578 m<sup>3</sup> from the Upper Huia Dam and 9,846,433 m<sup>3</sup> from the Lower Huia Dam, measured accurately with Magflow meters.
- **Reservoir levels:** Both dams were continuously monitored, showing average daily reservoir levels within the expected range. The Upper Huia Dam ranged between 16.5 and 28.9 meters, while the Lower Huia Dam ranged between 23.8 and 27.8 meters.
- **System storage:** The total system storage for water supply reservoirs ranged from 60% to 88% over the year.
- **Spillway and compensation flows:** Spillway discharges occurred on 11 days at the Upper Huia Dam and on 35 days at the Lower Huia Dam. The required compensation flows were not met on nine days due to delays in implementing the updated flow requirements. Throughout the remainder of the period, the required flows were met consistently.
- **Environmental stream monitoring:** Monitoring downstream of the dams highlighted stable water quality and nutrient levels. The macroinvertebrate community index showed some variation between sites.
- **Fisheries management:** No migrating eels were caught or transferred downstream during the 2024-2025 season.
- **Pipeline and free discharge valve operations:** One scour valve operation occurred along the Huia pipeline during this period. Regular free discharge valve operations and maintenance were performed at the dam, with turbidity levels monitored before and after discharges to ensure compliance with environmental standards.
- **Network Efficiency and Conservation:** Watercare continues its water efficiency efforts, identifying and repairing leaks across the region, reducing non-revenue water, and promoting residential and commercial water conservation initiatives.

In conclusion, compensation flow was non-compliant for nine days in the 2024-2025 monitoring period, all other resource consent conditions were compliant, and no equipment failures or maintenance activities resulted in adverse environmental effects.

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## 1 INTRODUCTION

This report contains the annual monitoring results for the following resource consents for the Upper Huia Dam: 35755 (WAT60274684), 36635 (LUS60273092), 36636 (WAT60273917), 36637 (DIS60264241), 36638 (DIS60264250), and Lower Huia Dam: 36639 (WAT60275209), 36640 (LUS60273072), 36641 (WAT60275221), 36642 (DIS60264215), and 36643 (DIS60264227). The conditions across all the Dam's consents are identical.

This report also covers the annual reporting requirements of dam pipelines consents 25311 (DIS60263520), 25312 (DIS60263532), and 25313 (LUS60273006). The conditions across each of the pipeline consents are identical.

The conditions of the consents requiring annual reports are listed in Table 1-1.

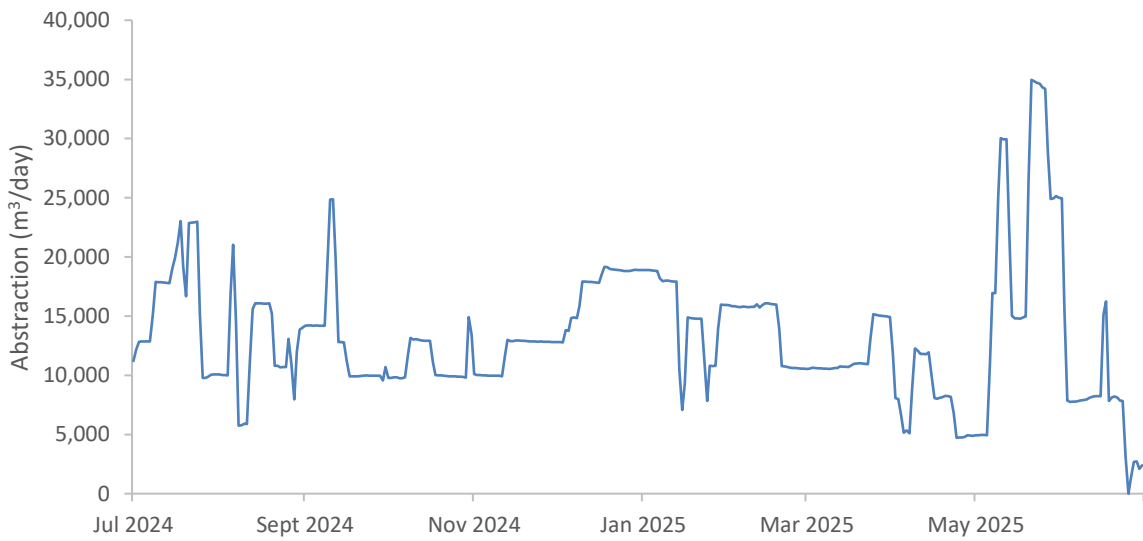
**Table 1-1: Resource consent conditions requiring annual reports.**

Reporting information	Consent conditions
Water use	Condition 1 Condition 7 (iii)
Reservoir level	Condition 2 (ii) Condition 7 (iii)
Environmental monitoring	Condition 5 Condition 7 (iii)
Free discharge valve monitoring	Condition 6 Condition 7 (iii)
Network efficiency and conservation	Condition 9 Condition 7 (iii)
Pipeline scour valve operations (pipeline consents)	Condition 2 (iii – iv) Condition 3

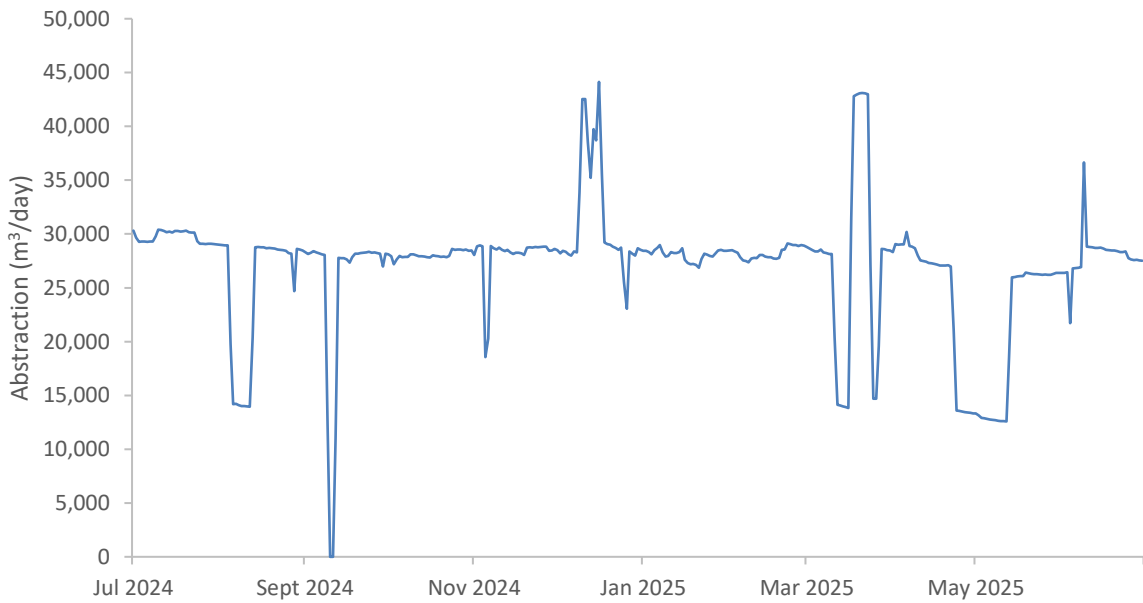
## 2 WATER USAGE

The daily quantity of water being taken from the Upper and Lower Huia reservoirs are measured by Magflow meters. These are located on the pipeline in the diversion tunnel within the dam at Upper Huia and on the pipeline before the pump-station at Lower Huia. The meters measure to an accuracy of  $\pm 5\%$ , are appropriately verified, and always maintained in working condition. Water usage monitoring excludes water removed from the dam for compensation flows.

Daily abstraction for the reporting period is shown in Figure 2-1 and Figure 2-2. The full dataset is in Appendix A. Over the 12 months 4,862,578 m<sup>3</sup> was abstracted from Upper Huia Dam and 9,846,433 m<sup>3</sup> from Lower Huia Dam.



**Figure 2-1: Total daily abstraction from Upper Huia Dam for 2024-2025.**

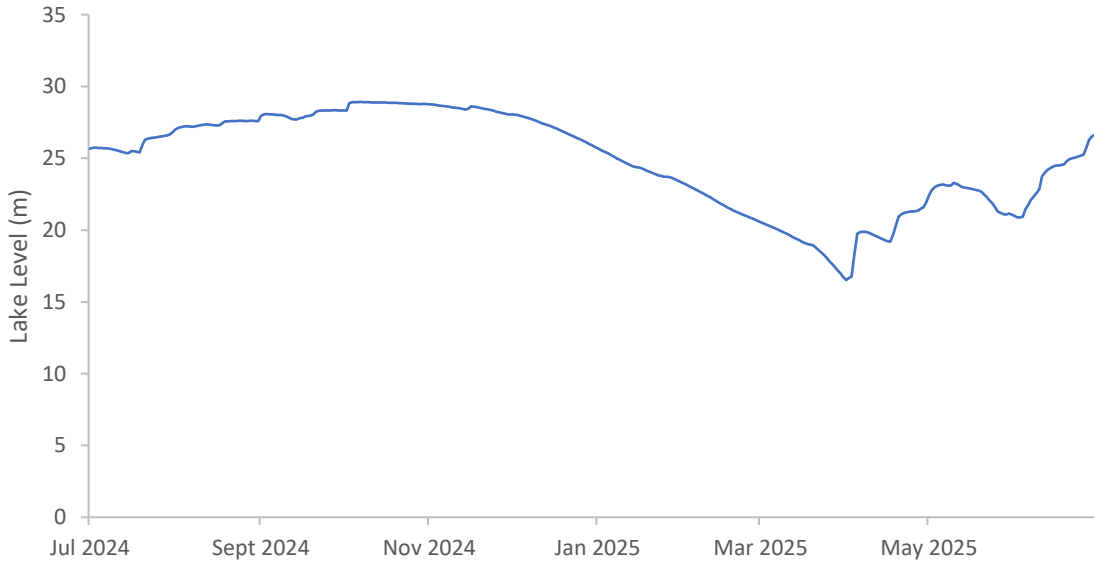


**Figure 2-2: Total daily abstraction from Lower Huia Dam for 2024-2025.**

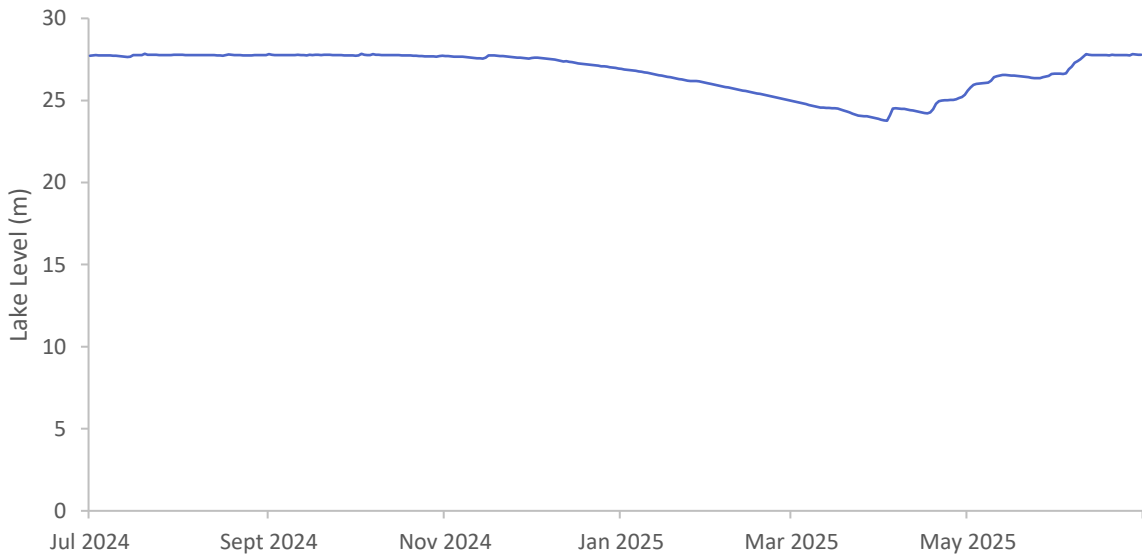
### 3 RESERVOIR LEVEL

The reservoir levels are monitored continuously on SCADA by level transmitters located in the towers of both Upper and Lower Huia Dams.

The daily average reservoir levels for the reporting period are shown in Figure 3-1 and Figure 3-2. The full dataset is in Appendix B. The average daily lake level for Upper Huia Dam ranged between 16.5 – 28.9 m and Lower Huia Dam was between 23.8 – 27.8 m.



**Figure 3-1: Reservoir daily average level for Upper Huia Dam for 2024-2025.**



**Figure 3-2: Reservoir daily average level for Lower Huia Dam for 2024-2025.**

## 4 TOTAL SYSTEM STORAGE

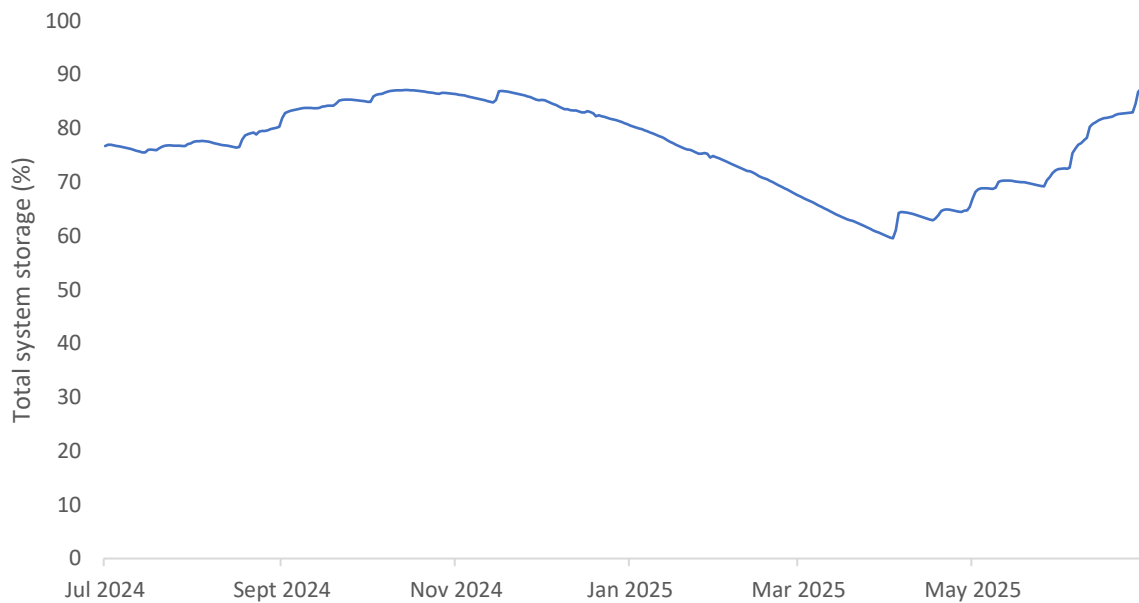
The resource consents require monitoring of the total system storage, defined by the following formula:

$$\frac{\text{Total system live storage volume}}{\text{Total system live storage volume capacity}} \times 100$$

Where:

- *Total system live storage volume* is the sum of water stored at any one time in all of the Watercare raw water reservoirs (whether within or outside the Auckland Region) above the level of the lowest supply intake in each respective reservoir
- *Total system live storage volume capacity* is the sum of the volume of water that can be stored at any one time in all of the Watercare raw water reservoirs (whether within or outside the Auckland Region) between the level of the lowest supply intake and the level of the spillway in each respective reservoir.

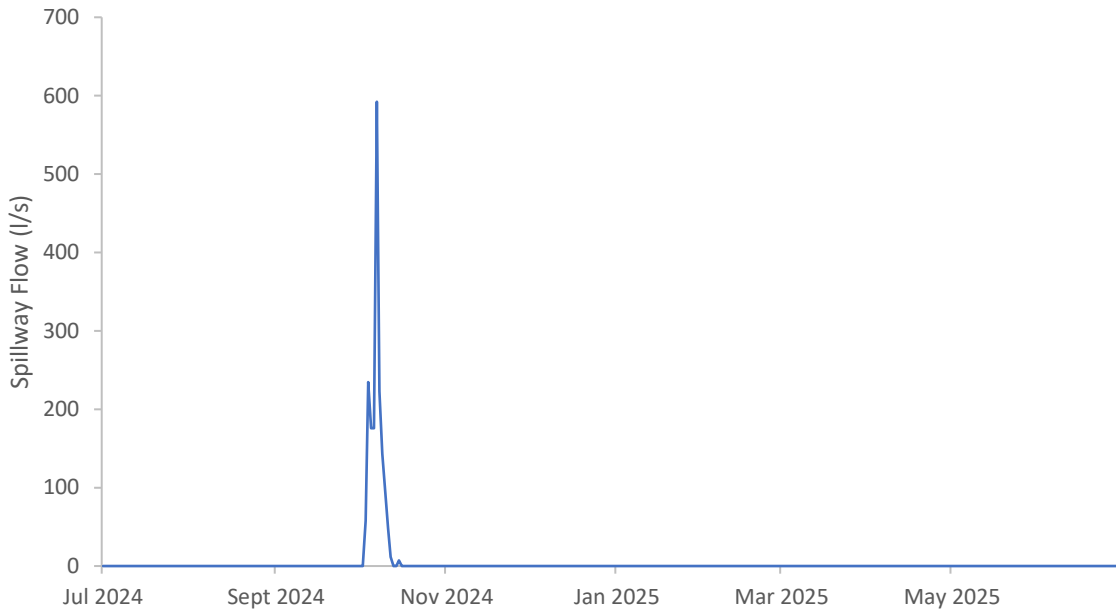
For the 2024-2025 monitoring period, total system storage for the raw water reservoirs ranged between 60% and 88%. The data is displayed in Figure 4-1 and the full dataset is in Appendix C.



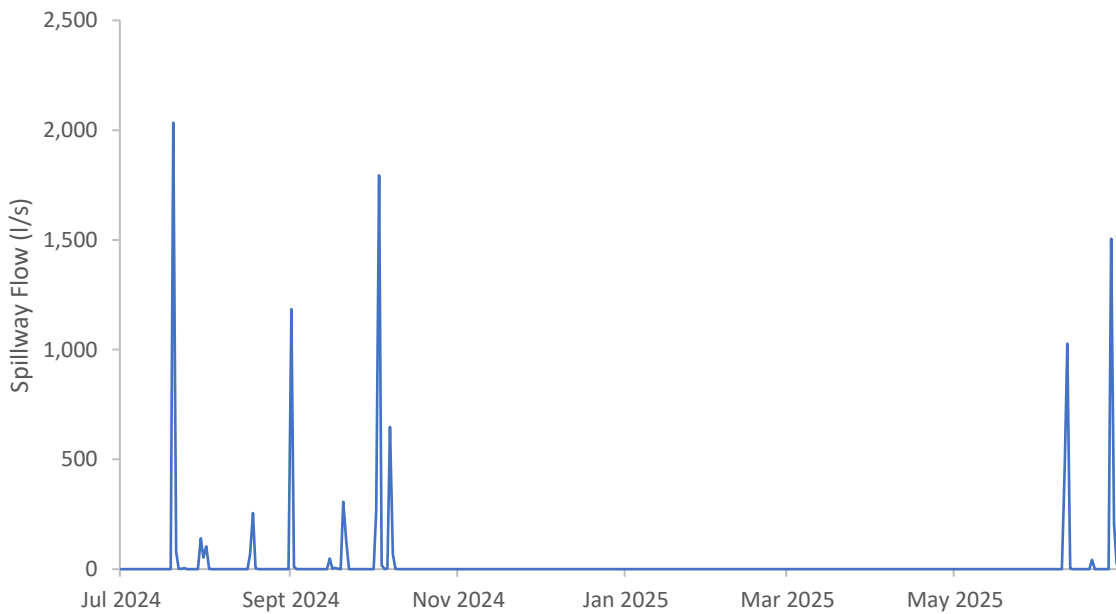
**Figure 4-1: Total system storage for 2024-2025.**

## 5 SPILLWAY DISCHARGE

The spillway flow is calculated by considering the water level over the spillway and the size and shape of the spillway, calculated at 1 mm levels. The spillway flow is presented in Figure 5-1 and Figure 5-2. The full dataset is in Appendix C. Upper Huia Dam spilled on 11 days during the reporting period, whereas Lower Huia Dam spilled on 35 days.



**Figure 5-1: Spillway flows from Upper Huia Dam for 2024-2025.**



**Figure 5-2: Spillway flows from Lower Huia Dam for 2024-2025.**

## 6 COMPENSATION FLOW

The Upper Huia Dam resource consents require a compensation flow to be maintained at the toe of the dam, in accordance with the requirements in Table 6-1. Compensation flow requirements are met by a combination of compensation flow releases and spillway flows and are shown in Figure 6-1. The full dataset is presented in Appendix C. The measuring devices are Magflow meters located on the downstream face of the dam within the tunnel. The meter measures to an accuracy of at least  $\pm 5\%$ , are appropriately calibrated, and always maintained in working condition.

Total system storage was below 79% between 1 July to 18 August 2024 and 9 January to 9 June 2025, with a minimum flow requirement of 60 L/s. For the remainder of the period, total system storage was more than 79%, with a minimum flow requirement of 90 L/s.

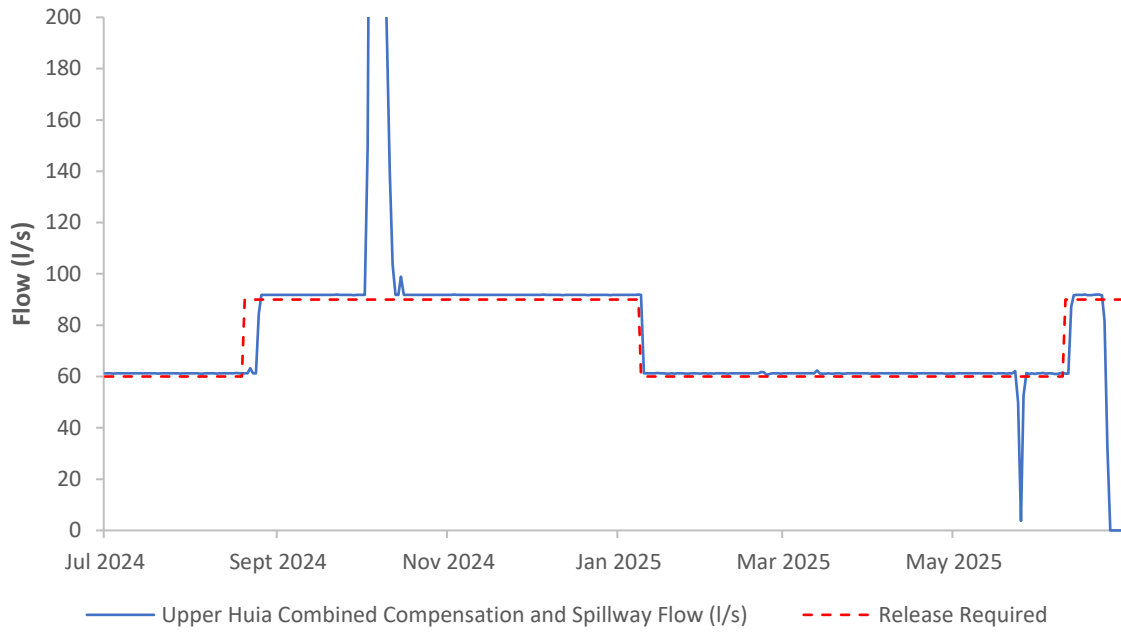
Total system storage increased above 79% on 18 August 2024, but compensation flow did not increase above 90 L/s until 25 August 2024. Similarly, storage exceeded 79% on 10 June 2025, with the flow increase occurring on 12 June 2025. These delays reflect the need for manual checks of system storage before adjusting compensation flow. On all other days of the reporting period, compensation flow during this period was fully compliant with the discharge requirements.

Between 24 to 26 May 2025, the compensation flowmeter failed resulting in an incomplete dataset. However, during the failure period, the valve opened to 100%. As such, the flow released was far more than the minimum requirement (~valve 43% open), but could not be recorded.

From 24 June to 8 July 2025 (beyond this reporting period), the Upper Huia Dam was out of service for maintenance and repair on the raw watermain. The compensation flow valve, located off the main intake pipework, could not be operated during this time. The scour valve with a separate intake was operated throughout the works to ensure the compensation flows to the downstream environment remain. The flows from the valve were more than 90 L/s, compliant with condition 4 of the consents. During this period, there is no data for compliance purposes, as a flowmeter is on the compensation flow valve, but not on the scour valve. Visual inspections with a stake confirmed the water levels in the downstream environment to be slightly higher when discharging from the scour valve compared to normal flows from the compensation flow valve, thus remaining above the minimum requirements.

**Table 6-1: Compensation regime**

Total System Storage (%)	Flow at the toe of the dam (L/s) (inclusive of water discharged via discharge valves and water discharged via spillway)
>79	90
59-79	60
<59	30



**Figure 6-1: Upper Huia Dam combined compensation and spillway flows for 2024-2025.**

## 7 FISHERIES MANAGEMENT

Fisheries management for downstream transfer of native fish is ongoing at Lower Huia Dam. Ministry of Primary Industries approval has been granted for this work under Special Permit 737. Upstream transfer of elvers or climbing *Galaxias sp.* is no longer undertaken at the Lower Huia Dam due to a lack of catch in previous migration seasons. The records from the 2024-2025 trap and haul season are detailed in the annual report to the Ministry of Primary Industries, which is included in Appendix E.

No eels, migrating or non-migrating, were caught in the Lower Huia Dam during the monitoring period.

## 8 FREE DISCHARGE VALVE OPERATIONS

The consent requires flushing flows to occur every month at Upper Huia Dam from December to March to maintain the health of aquatic ecosystems and aesthetic values. As per the conditions of the consent, turbidity was measured downstream of the discharge point approximately 30 minutes before discharge commenced and between 60 and 120 minutes after the discharge valve has been opened.

Short discharges are undertaken at both dams each year to open the discharge valve as part of routine maintenance. Discharges undertaken for maintenance are also sampled according to the flushing flow requirements.

The 2024-2025 discharges are detailed in Table 8-1. Auckland Council was notified more than 24 hours in advance for each release of flushing flows and maintenance discharge.

**Table 8-1: Free discharge valve monitoring for Upper and Lower Huia Dams for the reporting period 2024-2025**

Location	Date	Duration of discharge	Turbidity before (NTU)	Turbidity during/after (NTU)
Upper Huia	17 September 2024	12 minutes	5.27	5.93
		8 minutes		
Upper Huia	24 September 2024	35 minutes	5.69	6.29
Lower Huia	24 September 2024	17 minutes	4.80	5.40
Upper Huia	12 December 2024	3 hours, 3 minutes	1.91	2.29
Upper Huia	15 January 2025	3 hours, 1 minute	3.04	3.94
Upper Huia	24 January 2025	10 minutes	2.44	2.44
Upper Huia	12 February 2025	3 hours, 1 minute	2.61	2.81
Upper Huia	12 March 2025	3 hours	4.28	6.55

## 9 NETWORK EFFICIENCY AND CONSERVATION

Watercare has published the Auckland Water Efficiency Plan 2021 to 2025<sup>1</sup>, which includes a section detailing its water efficiency programmes and achievements. In summary, Watercare's water efficiency strategy has four main pillars:

- **Municipal water efficiency programme:** related to reducing water use by Watercare itself, mainly through reuse at its treatment plants, and by Auckland Council, through initiatives targeted at saving 30% of water use.
- **Residential water efficiency programme:** includes working with schools and sports clubs to raise awareness and water-saving campaigns, and a partnership with EcoMatters to give households the opportunity to have their water use audited and receive a report on the water and dollar savings they can achieve through simple changes.
- **Commercial water efficiency programme:** involves working with key costumers to reduce demand from our largest users, through initiatives such as the digital meter roll-out project across high-use industrial users, schools and sports clubs.
- **Non-revenue water reduction programme:** related to initiatives focused on reducing three aspects of non-revenue water: leakage, under-reading of meters, and unauthorised use.

Watercare continues with its proactive leakage detection programme, which is effectively targeting areas for leakage surveying using its district meter areas and its Leakage Management System. We continue to optimise our water networks performance through our pressure management programme, which is reducing the number of leaks and their recurrence of them.

The average consumption of Aucklanders is 257 l/p/d which is within our target for water consumption.

More details on water efficiency initiatives, performance, challenges, targets, and strategies for the future are available directly in the Auckland Water Efficiency Plan 2021 to 2025.

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<sup>1</sup> <https://waterefficiencyplan.watercare.co.nz/>

## 10 PIPELINE SCOUR VALVE OPERATIONS

Condition 2 (iii) of consents 25311 (DIS60263520), 25312 (DIS60263532), and 25313 (LUS60273006) states that if a scour valve discharge occurs along the Huia Dam Pipelines, then photos must be taken. Condition iv) states that these must be sent to Auckland Council annually.

The details of these discharges are in Table 10-1 and the discharge photos are in Figure 10-1. Visual observations did not observe any change in the sites following the discharges.

**Table 10-1: Raw watermain scour valve operations**

Date	Location	Duration
24 June 2025	SV 10046495	1 day, 22 hours



(a) Before discharge



(b) During discharge



(c) After discharge

**Figure 10-1: Huia raw watermain scour valve 10046495 discharge.**

## 11 ENVIRONMENTAL MONITORING

### 11.1 Overview

Condition 5 requires water quality, macroinvertebrate and habitat monitoring of four established sites in the Huia catchment, three of these located along the Huia Stream between the Upper and Lower Huia Dams, and a control site from an adjoining tributary, McQuillan Stream. Monitoring is undertaken by Watercare Laboratory Services.

Fish surveys are required on a five-yearly basis, at a site below the Upper Huia Dam for the purpose of assessing instream values. The surveys are conducted by Tonkin + Taylor and was most recently completed in February 2022. The next survey is required in 2027.

### 11.2 Monitoring sites

The location of the monitoring sites is shown in Figure 11-5. All sites are located at riffle habitats.

#### 11.2.1 Site A (Control)

36°57'54.1"S 174°33'23.5"E

The Site A (control Site) monitoring site shown in Figure 11-1 is located on McQuillan Stream, upstream of the confluence with Huia Stream and Site C. The confluence of the McQuillan Stream and Huia Stream is approximately 1.7 km downstream of the Upper Huia Dam, with the monitoring site approximately 15 m upstream of the confluence and 80 m upstream of the Telephone Track crossing.



*Figure 11-1: Site A, looking upstream (January 2025).*

#### 11.2.2 Site B

36°57'48.5"S 174°32'40.1"E

The Site B monitoring site shown in Figure 11-2 is located on the Huia Stream, above the confluence of the Māori Stream, approximately 0.88 km downstream of the Upper Huia Dam.



**Figure 11-2: Site B, looking upstream (January 2025).**

### 11.2.3 Site C

36°57'54.4"S 174°33'22.3"E

The Site C monitoring site shown in Figure 11-3 is located on the Huia Stream, 100 m below the confluence of the McQuillan Stream (control site). The site is approximately 1.8 km downstream of Site B, and 2.68 km downstream of the Upper Huia Dam. The Telephone Track crosses the Stream approximately 30 m upstream of the monitoring location.



**Figure 11-3: Site C, looking upstream (January 2025).**

### 11.2.4 Site D

36°58'11.3"S 174°33'40.8"E

The Site D monitoring site shown in Figure 11-4 is located on the Huia Stream, approximately 1.15 km downstream of Site C and 3.83 km downstream of the Upper Huia Dam. The site is located shortly upstream of the raw watermain pipe bridge along Crusher Pipe Track.



*Figure 11-4: Site D, looking upstream (January 2025).*

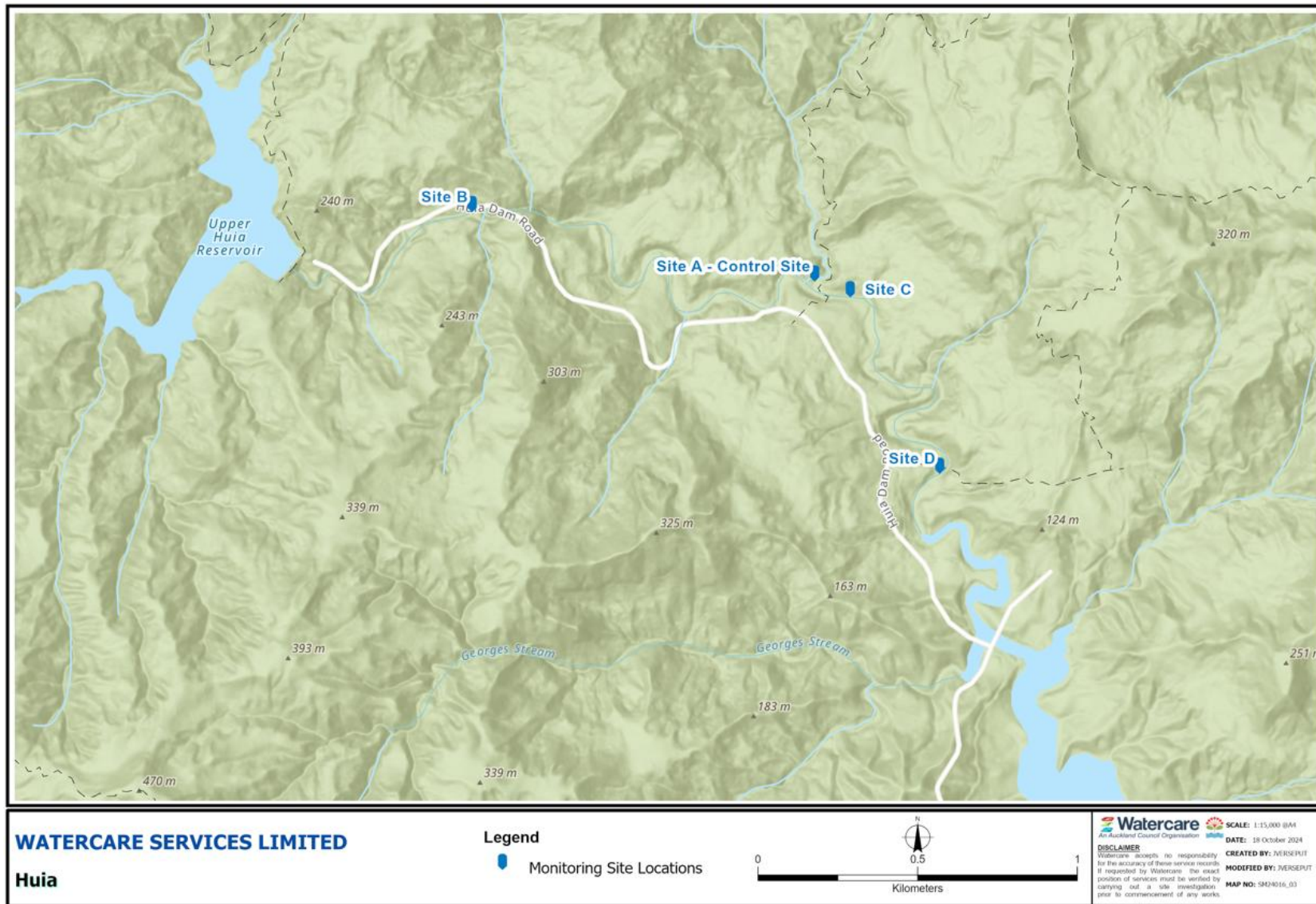


Figure 11-5: Huia catchment monitoring locations.

## 11.3 Methods

### 11.3.1 Water quality – discrete monitoring

Discrete water quality samples are collected monthly over summer, between December and May of each year. The parameters analysed at these sites are listed in Table 11-1. Sampling methodology and analysis techniques were carried out in accordance with APHA Standard Methods for the Examination of Water and Wastewater (2011), as per condition 5(vi).

Temperature and dissolved oxygen measurements are taken in situ using a calibrated YSI ProDSS meter. Periphyton composite samples are collected by scraping periphyton from 10 randomly selected rock surfaces<sup>2</sup>.

**Table 11-1: Monthly water quality parameters.**

Parameter	Units
Temperature*	°C
Suspended solids	g/m <sup>3</sup>
pH	pH Unit
Conductivity (at 25 °C)*	µS/cm <sup>1</sup>
Turbidity	NTU
Black disc transparency (visual clarity)*	m
Dissolved oxygen (DO)*	g/m <sup>3</sup>
Dissolved reactive phosphorus (DRP)	gP/m <sup>3</sup>
Total phosphorous	gP/m <sup>3</sup>
Ammonia nitrogen (NH <sub>4</sub> -N)	gN/m <sup>3</sup>
Nitrate nitrogen (NO <sub>3</sub> -N)	gN/m <sup>3</sup>
Periphyton ( <i>Chlorophyll a, b, &amp; c</i> )**	mg/m <sup>2</sup>

\*Parameters recorded in the field (all others analysed at the laboratory)

\*\*Chlorophyll d is not tested

Best endeavours are made to conduct sampling during periods of flow recession and when there had been rainfall of no greater than 2 mm over the previous 24 hours. When these conditions are unable to be met, sampling is completed before the end of the respective month. For the 2024-2025 monitoring period, the sampling dates and preceding rainfall totals are presented in Table 11-2.

**Table 11-2: Discrete water quality sampling dates and rainfall for 2024-2025.**

Date	Rainfall 24 hours prior (mm)
19 December 2024	0
29 January 2025	0

<sup>2</sup> Biggs BJF, Kilroy C, 2000: Stream Periphyton Monitoring Manual. Prepared for Ministry for the Environment, Wellington, New Zealand.

Date	Rainfall 24 hours prior (mm)
19 February 2025	1
19 March 2025	14
2 April 2025	0
25 May 2025	0.5

### 11.3.2 Water quality – continuous monitoring

Condition 5(v) requires that water temperature is continuously monitored at Site A (control) and Site B between December and May (inclusive) at 5-yearly intervals. Condition 5(iv) requires continuous measurement of dissolved oxygen, pH, temperature and conductivity over a 14-day period between 1 February and 15 April at 5-yearly intervals. Data logs at 10-minute intervals and is manually uploaded once monthly.

The most recent continuous monitoring was completed in 2021-2022. The next monitoring is required in 2026-2027.

### 11.3.3 Macroinvertebrate and habitat monitoring

Macroinvertebrate samples were collected once in winter (Jun-Jul) and in summer (Jan-Feb) each monitoring period. Five replicate samples were collected using kick-net sampling techniques<sup>3</sup>. Visual observations of substrate composition and embeddedness were recorded during each macroinvertebrate sampling event. Embeddedness measurements were based on a 50-100 m reach that includes the sampling site. Substrate composition was based on percentage coverage of different substrate sizes, as shown in Table 11-3. Embeddedness scoring criteria is in accordance with Barbour *et al.* (1999), shown in Table 11-4.

In the 2024-2025 reporting period, macroinvertebrate and habitat monitoring occurred on 13 July 2024 and 6 February 2025.

**Table 11-3: Substrate size classes**

Substratum Type	Size
Clay	<0.004 mm
Silt	0.004-0.06 mm
Sand	>0.06-2 mm
Gravel	>2-64 mm
Cobble	>64-256 mm
Boulder	>256 mm
Bedrock	-

<sup>3</sup> Stark et al. (2001). Protocols for sampling macroinvertebrates in wadeable streams

**Table 11-4: Embeddedness Scoring Criteria (Barbour et al., 1999)**

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
Embeddedness	Gravel, cobble, and boulder particles are 0–25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25–50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50–75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

## 11.4 Results

### 11.5 Water quality – discrete monitoring

A summary of the water quality monitoring results is presented in Table 11-5. Physicochemical parameters such as temperature, pH, dissolved oxygen, and turbidity were consistent across sites, indicating stable conditions downstream of the Upper Huia Dam.

Nutrients were low across all sites. Dissolved reactive phosphorus and nitrate are well below NPS-FM 2020 “A band” thresholds (DRP < 0.01 mg/L; NO<sub>3</sub>-N < 1 mg/L), classifying all sites as low-nutrient and indicating minimal enrichment from dam operations. Additionally, total phosphorus is also low, however there are no guidelines for this parameter in rivers in the NPS-FM 2020.

Chlorophyll *a* concentrations were highest on average at Site B and lowest on average at Site C. All values are generally well below the recommended maximum chlorophyll *a* value (50 mg/m<sup>2</sup>) for the protection of benthic biodiversity<sup>4</sup>.

**Table 11-5: Summary results (mean ± 95% confidence interval) for water quality parameters for the Huia monitoring sites 2024-2025.**

Parameter	Unit	Site A	Site B	Site C	Site D
Ammoniacal Nitrogen	mg/L	0.005 ± 0	0.014 ± 0.025	0.005 ± 0.001	0.005 ± 0
Chlorophyll a	mg/L	2.5 ± 25.6	4.2 ± 51.8	0.4 ± 4.6	0.8 ± 4.2
Chlorophyll b	mg/L	0.3 ± 3.5	0.2 ± 2.1	0 ± 0.5	0 ± 0.1
Chlorophyll c	mg/L	0.2 ± 2.1	0.4 ± 5.3	0 ± 0.3	0.1 ± 0.4
Conductivity	µS/cm	173.3 ± 14.3	140 ± 24.8	143.3 ± 28.7	146.7 ± 14.3
DO	mg/L	9.7 ± 0.5	8.8 ± 0.1	9.6 ± 0.6	9.9 ± 0.6
DRP	mg/L	0.021 ± 0.003	0.003 ± 0.002	0.006 ± 0.002	0.005 ± 0.002
Nitrate	mg/L	0.007 ± 0.002	0.023 ± 0.023	0.015 ± 0.017	0.002 ± 0.001
Suspended Solids	mg/L	1.6 ± 2.2	5.1 ± 17	3.3 ± 6.7	3.5 ± 3.4
Temperature	°C	16 ± 2.1	19.8 ± 2.1	18.1 ± 1.8	18.2 ± 2.3

<sup>4</sup> <https://environment.govt.nz/assets/Publications/Files/nz-periphyton-guide-jun00.pdf>

Parameter	Unit	Site A	Site B	Site C	Site D
Total Phosphorus	mg/L	0.025 ± 0.003	0.007 ± 0.007	0.034 ± 0.101	0.007 ± 0.004
Turbidity	NTU	1.3 ± 1.5	1.7 ± 2.5	1.4 ± 0.8	1.2 ± 0.9
Visual Clarity	m	1.4 ± 0.3	1.6 ± 0.5	1.5 ± 0.7	1.8 ± 0.9
pH	pH unit	7.3 ± 0.3	7 ± 0.4	7.3 ± 0.3	7.4 ± 0.3

## 11.6 Macroinvertebrate and habitat monitoring

MCI scores were highest at Site A (winter) and Site C (summer), and lowest at Site D (summer). QMCI (Quality-Weighted MCI) values mirrored this: high at Site A (winter) and lower downstream (3.0 at Site D winter). EPT taxa richness (sensitive Ephemeroptera, Plecoptera and Trichoptera species) was higher at Site C (5.4–8.8) and lowest at Site B (1.4–1.8).

Combining both seasons' results, both Site A and C are classed as Fair-Good in accordance with Stark & Maxted (2007). Site B is classed as fair-poor, and Site D consistently scored as Poor. Comparatively in 2023-2024, all sites were classed as Fair for MCI scores, Poor at the control site and Fair at all downstream sites

**Table 11-6: Summary results (mean ± 95% confidence interval) of macroinvertebrate community metrics for the Huia monitoring sites 2024-2025.**

Season	Metric	Site A	Site B	Site C	Site D
Winter	EPT taxa	2.8 ± 1	1.8 ± 1.6	2.6 ± 1.1	2.6 ± 2.3
Summer	EPT taxa	3.6 ± 2.7	1.4 ± 0.7	5.4 ± 2.4	1.2 ± 0.6
Winter	Individuals	33.2 ± 42	16.8 ± 21	26 ± 15.3	33.2 ± 29.3
Summer	Individuals	98.2 ± 41.8	50 ± 38.5	198.6 ± 182.1	48 ± 42.3
Winter	MCI	97.4 ± 15.5	87.6 ± 27.5	83.8 ± 9.6	64 ± 19.3
Summer	MCI	85 ± 11.6	60.8 ± 17.9	95.2 ± 9.3	60.2 ± 5.4
Winter	QMCI	5 ± 0	4.2 ± 1.6	4.4 ± 0.7	3 ± 0.9
Summer	QMCI	1.8 ± 1.6	2.4 ± 0.7	3.8 ± 0.6	2.8 ± 0.6
Winter	Taxa richness	4.4 ± 1.9	4.8 ± 4.4	5.4 ± 1.9	7.2 ± 4.3
Summer	Taxa richness	5.8 ± 4.2	3.6 ± 0.7	8.8 ± 3.3	4.4 ± 1.4

## 11.7 Trend analysis (2013-2025)

A summary of the historical results collected by the lab between December 2013 and May 2024 are presented in Table 11-7 and Figure 11-6 for water quality results and Table 11-8 for macroinvertebrates.

Dissolved reactive phosphorus shows a decreasing trend at Sites B–D, suggesting long-term nutrient reductions downstream of the Dam compared to the control site. Comparatively, Site C shows an increasing trend for nitrate, potentially indicating localised catchment inputs.

Chlorophyll are generally decreasing across most sites, suggesting reduced periphyton biomass over time.

Suspended solids and turbidity are increasing at Sites B and C while control Site A shows no trend, which may be the result of dam or channel-related effects rather than catchment-wide change. Visual clarity is also decreasing at Sites A–C, supporting the sediment trend.

pH shows a small but significant decrease at all sites, likely reflecting natural acidification from forest inputs.

For macroinvertebrate trends, EPT taxa increased at Sites A and C, indicating improving sensitive taxa presence despite some sediment pressures. MCI and QMCI are decreasing at Site D only, implying a localised decline in biological condition not reflected at the control. Taxa richness is decreasing at Site B, again not seen at the control site, suggesting potential habitat simplification closer to dam.

**Table 11-7: Summary results (mean  $\pm$  95% confidence interval) and Mann-Kendall trend analysis results of water quality parameters for the Huia monitoring sites 2013-2025.**

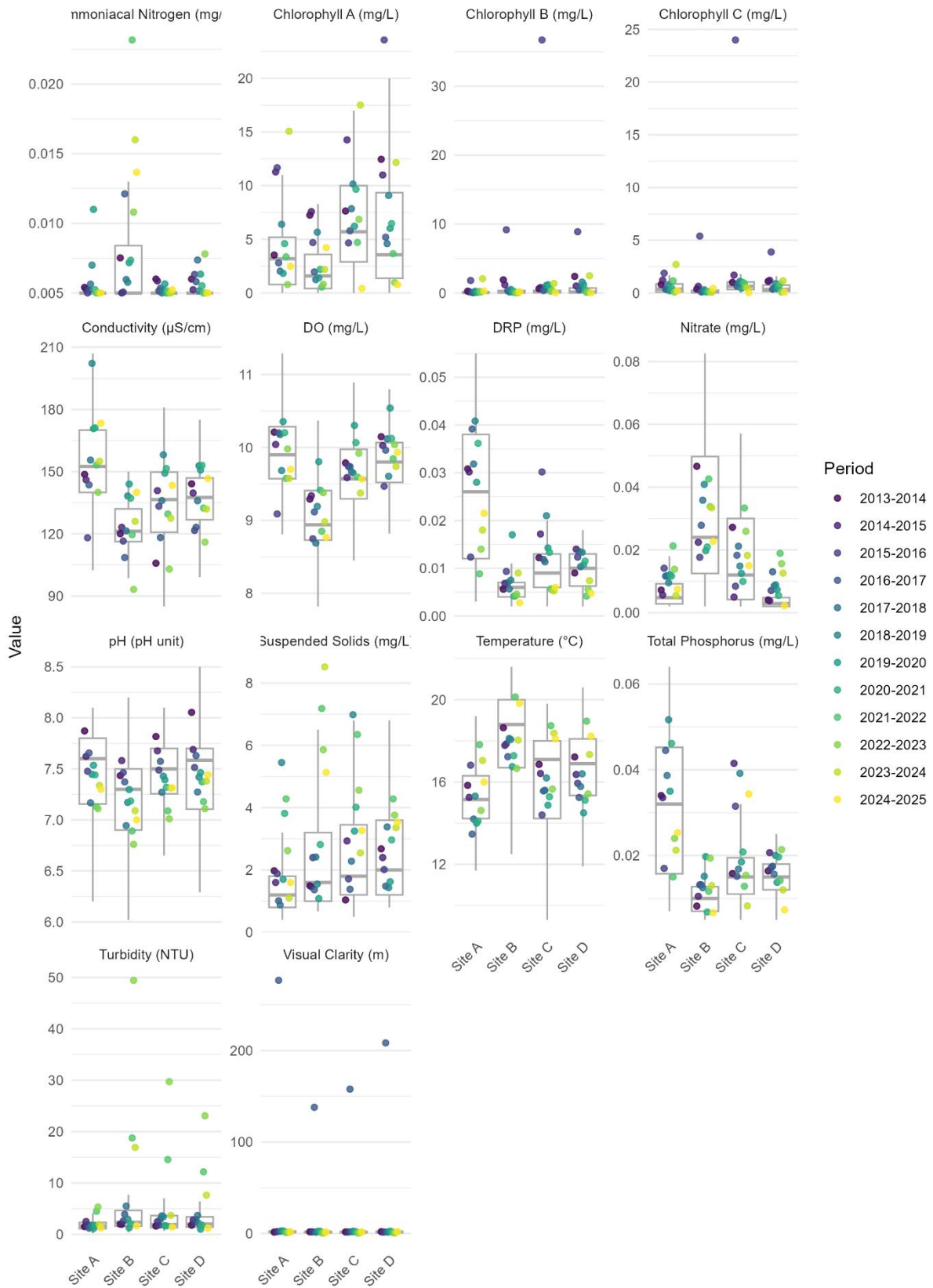
Monitoring site	Metric	Mean $\pm$ 95% CI	Tau	p-value	Trend
Site A	Ammoniacal Nitrogen	0.006 $\pm$ 0	-0.0912	0.3598	No significant trend
Site B	Ammoniacal Nitrogen	0.01 $\pm$ 0.002	0.2757	0.0024	Increasing
Site C	Ammoniacal Nitrogen	0.005 $\pm$ 0	-0.0945	0.3432	No significant trend
Site D	Ammoniacal Nitrogen	0.006 $\pm$ 0	-0.1155	0.2393	No significant trend
Site A	Chlorophyll A	5.515 $\pm$ 1.889	-0.1632	0.0581	No significant trend
Site B	Chlorophyll A	3.226 $\pm$ 0.966	-0.3448	0.0001	Decreasing
Site C	Chlorophyll A	8.082 $\pm$ 2.026	-0.1417	0.1009	No significant trend
Site D	Chlorophyll A	8.303 $\pm$ 3.606	-0.3197	0.0002	Decreasing
Site A	Chlorophyll B	0.432 $\pm$ 0.386	-0.1448	0.0987	No significant trend
Site B	Chlorophyll B	1.259 $\pm$ 1.531	-0.5878	0	Decreasing
Site C	Chlorophyll B	4.122 $\pm$ 6.965	-0.1378	0.1144	No significant trend
Site D	Chlorophyll B	1.706 $\pm$ 1.556	-0.3183	0.0002	Decreasing
Site A	Chlorophyll C	0.858 $\pm$ 0.353	-0.2061	0.0176	Decreasing
Site B	Chlorophyll C	0.703 $\pm$ 0.963	-0.3267	0.0001	Decreasing
Site C	Chlorophyll C	3.075 $\pm$ 4.419	-0.2318	0.0076	Decreasing
Site D	Chlorophyll C	0.993 $\pm$ 0.602	-0.3087	0.0003	Decreasing
Site A	Conductivity	156.149 $\pm$ 6.547	0.1678	0.0538	No significant trend
Site B	Conductivity	123.18 $\pm$ 4.654	0.0931	0.2834	No significant trend
Site C	Conductivity	133.227 $\pm$ 6.187	0.0366	0.6779	No significant trend
Site D	Conductivity	137.103 $\pm$ 3.984	0.006	0.9491	No significant trend
Site A	DO	9.919 $\pm$ 0.175	0.0309	0.7213	No significant trend
Site B	DO	9.141 $\pm$ 0.191	0.0815	0.3382	No significant trend

Site C	DO	9.762 ± 0.179	0.133	0.1206	No significant trend
Site D	DO	9.966 ± 0.191	0.1428	0.0924	No significant trend
Site A	DRP	0.026 ± 0.004	-0.1189	0.1669	No significant trend
Site B	DRP	0.007 ± 0.002	-0.2493	0.0049	Decreasing
Site C	DRP	0.013 ± 0.003	-0.2537	0.0035	Decreasing
Site D	DRP	0.01 ± 0.001	-0.4071	0	Decreasing
Site A	Nitrate	0.011 ± 0.003	0.1324	0.1264	No significant trend
Site B	Nitrate	0.031 ± 0.005	0.0895	0.2929	No significant trend
Site C	Nitrate	0.018 ± 0.004	0.1735	0.0431	Increasing
Site D	Nitrate	0.009 ± 0.003	0.002	0.9865	No significant trend
Site A	pH	7.424 ± 0.081	-0.3074	0	Decreasing
Site B	pH	7.186 ± 0.079	-0.3549	0	Decreasing
Site C	pH	7.394 ± 0.073	-0.3442	0	Decreasing
Site D	pH	7.455 ± 0.071	-0.3679	0	Decreasing
Site A	Suspended Solids	2.402 ± 0.742	0.0801	0.3616	No significant trend
Site B	Suspended Solids	3.309 ± 1.194	0.2997	0.0005	Increasing
Site C	Suspended Solids	3.547 ± 1.136	0.3632	0	Increasing
Site D	Suspended Solids	2.69 ± 0.478	0.1267	0.1434	No significant trend
Site A	Temperature	15.232 ± 0.605	0.0329	0.7086	No significant trend
Site B	Temperature	17.913 ± 0.721	-0.0185	0.8347	No significant trend
Site C	Temperature	16.19 ± 0.667	0.0999	0.2521	No significant trend
Site D	Temperature	16.23 ± 0.712	0.0103	0.9103	No significant trend
Site A	Total Phosphorus	0.033 ± 0.004	-0.0968	0.2655	No significant trend
Site B	Total Phosphorus	0.012 ± 0.002	-0.0503	0.5695	No significant trend
Site C	Total Phosphorus	0.023 ± 0.005	-0.1308	0.1342	No significant trend
Site D	Total Phosphorus	0.017 ± 0.002	-0.2453	0.0048	Decreasing
Site A	Turbidity	2.233 ± 0.426	0.2145	0.0133	Increasing
Site B	Turbidity	9.042 ± 4.294	0.2801	0.0011	Increasing
Site C	Turbidity	5.798 ± 2.434	0.2657	0.0021	Increasing
Site D	Turbidity	5.245 ± 1.988	0.2184	0.0108	Increasing
Site A	Visual Clarity	27.581 ± 51.463	-0.1941	0.0238	Decreasing
Site B	Visual Clarity	14.062 ± 25.158	-0.2498	0.0034	Decreasing
Site C	Visual Clarity	16.144 ± 29.305	-0.2207	0.0103	Decreasing

Site D	Visual Clarity	20.887 ± 38.67	-0.1641	0.0566	No significant trend
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**Table 11-8: Summary results (mean ± 95% confidence interval) and Mann-Kendall trend analysis results of macroinvertebrate community metrics for the Huia monitoring sites 2013-2025.**

Monitoring site	Metric	Mean ± 95% CI	Tau	p-value	Trend
Site A	EPT taxa	5.4 (± 0.5)	0.1532	0.0205	Increasing
Site B	EPT taxa	4.1 (± 0.4)	-0.0496	0.4686	No significant trend
Site C	EPT taxa	5.4 (± 0.4)	0.1397	0.0376	Increasing
Site D	EPT taxa	4.6 (± 0.5)	-0.0359	0.5925	No significant trend
Site A	Individuals	87.5 (±12.6)	0.1969	0.0019	Increasing
Site B	Individuals	68.3 (±10.4)	-0.2749	0	Decreasing
Site C	Individuals	116.9 (±15.5)	0.1909	0.0028	Increasing
Site D	Individuals	121.9 (±19.2)	-0.1165	0.0682	No significant trend
Site A	MCI	105.8 (± 3.1)	0.1045	0.1015	No significant trend
Site B	MCI	93.2 (± 3.0)	0.0325	0.619	No significant trend
Site C	MCI	99.7 (± 2.6)	0.0703	0.2757	No significant trend
Site D	MCI	94.3 (± 3.3)	-0.1667	0.0095	Decreasing
Site A	QMCI	4.8 (± 0.2)	-0.0241	0.7286	No significant trend
Site B	QMCI	4.2 (± 0.2)	0.0902	0.216	No significant trend
Site C	QMCI	4.3 (± 0.2)	0.0888	0.2156	No significant trend
Site D	QMCI	4.3 (± 0.2)	-0.2046	0.0045	Decreasing
Site A	Taxa richness	9.2 (± 0.7)	0.0005	0.9961	No significant trend
Site B	Taxa richness	8.6 (± 0.7)	-0.1638	0.0139	Decreasing
Site C	Taxa richness	10.2 (± 0.6)	0.0182	0.784	No significant trend
Site D	Taxa richness	9.3 (± 0.7)	-0.0938	0.1548	No significant trend



**Figure 11-6: Seasonal averages (Dec-Apr) of the Huia water quality monitoring results (2013-2025).**

## 12 CONCLUSION

This report presents the required data for the period of 1 July 2024 to 30 June 2025 for Upper Huia Dam, Lower Huia Dam and the associated raw water pipelines. Compensation flow was below required flows on nine days in the reporting period due to delays in implementing the updated flow requirements as total system storage changed.

All other consent conditions were fully compliant throughout the monitoring period.

There were no equipment failures or maintenance activities undertaken in the reporting period that resulted in a discharge that had an observed adverse environmental effect.

The environmental stream monitoring indicates some variability in water quality and macroinvertebrate communities, although this attributed to localised differences in the structure of substrate and cover rather than flow or water quality related changes.

## **Appendix A. Daily Water Abstraction Volumes**

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
1/07/2024	11225	30321
2/07/2024	12148	29649
3/07/2024	12822	29274
4/07/2024	12861	29289
5/07/2024	12871	29286
6/07/2024	12860	29277
7/07/2024	12853	29295
8/07/2024	15075	29312
9/07/2024	17881	29788
10/07/2024	17877	30390
11/07/2024	17855	30383
12/07/2024	17828	30285
13/07/2024	17809	30175
14/07/2024	17783	30222
15/07/2024	19038	30143
16/07/2024	19877	30270
17/07/2024	21194	30275
18/07/2024	23033	30228
19/07/2024	19171	30242
20/07/2024	16665	30309
21/07/2024	22883	30176
22/07/2024	22899	30141
23/07/2024	22936	30131
24/07/2024	22965	29337
25/07/2024	15239	29092
26/07/2024	9772	29102
27/07/2024	9772	29067
28/07/2024	9894	29084
29/07/2024	10057	29102
30/07/2024	10063	29073
31/07/2024	10068	29027
1/08/2024	10078	29002
2/08/2024	10025	28983
3/08/2024	10010	28955
4/08/2024	9997	28942

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
5/08/2024	16906	19741
6/08/2024	21042	14199
7/08/2024	14466	14224
8/08/2024	5759	14098
9/08/2024	5775	14010
10/08/2024	5906	14014
11/08/2024	5888	13982
12/08/2024	11034	13961
13/08/2024	15601	20391
14/08/2024	16091	28777
15/08/2024	16090	28779
16/08/2024	16081	28766
17/08/2024	16063	28764
18/08/2024	16067	28688
19/08/2024	16093	28694
20/08/2024	15228	28685
21/08/2024	10797	28636
22/08/2024	10808	28557
23/08/2024	10677	28536
24/08/2024	10685	28501
25/08/2024	10692	28447
26/08/2024	13091	28228
27/08/2024	10981	28183
28/08/2024	7966	24683
29/08/2024	12001	28615
30/08/2024	13870	28544
31/08/2024	14019	28466
1/09/2024	14184	28317
2/09/2024	14223	28133
3/09/2024	14202	28268
4/09/2024	14194	28402
5/09/2024	14202	28275
6/09/2024	14200	28199
7/09/2024	14179	28118
8/09/2024	14178	28062

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
9/09/2024	19692	12338
10/09/2024	24858	0
11/09/2024	24873	0
12/09/2024	19974	10974
13/09/2024	12796	27789
14/09/2024	12805	27742
15/09/2024	12785	27753
16/09/2024	11179	27642
17/09/2024	9901	27328
18/09/2024	9907	27844
19/09/2024	9903	28170
20/09/2024	9906	28170
21/09/2024	9952	28220
22/09/2024	9967	28270
23/09/2024	9982	28292
24/09/2024	9971	28355
25/09/2024	9967	28272
26/09/2024	9978	28288
27/09/2024	9962	28236
28/09/2024	9971	28181
29/09/2024	9557	26988
30/09/2024	10687	28165
1/10/2024	9792	28102
2/10/2024	9767	27934
3/10/2024	9824	27188
4/10/2024	9830	27632
5/10/2024	9748	27968
6/10/2024	9740	27831
7/10/2024	9821	27875
8/10/2024	11710	27882
9/10/2024	13157	28097
10/10/2024	13028	28120
11/10/2024	13047	28034
12/10/2024	12996	27936
13/10/2024	12936	27934

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
14/10/2024	12928	27894
15/10/2024	12929	27851
16/10/2024	12927	27817
17/10/2024	11127	28026
18/10/2024	10023	27957
19/10/2024	9996	27932
20/10/2024	9982	27886
21/10/2024	9966	27898
22/10/2024	9941	27845
23/10/2024	9927	27953
24/10/2024	9913	28625
25/10/2024	9906	28513
26/10/2024	9888	28550
27/10/2024	9876	28543
28/10/2024	9856	28490
29/10/2024	9818	28550
30/10/2024	14906	28425
31/10/2024	13441	28468
1/11/2024	10092	28058
2/11/2024	10029	28845
3/11/2024	10011	28932
4/11/2024	9998	28842
5/11/2024	9994	18574
6/11/2024	9977	20297
7/11/2024	9969	28892
8/11/2024	9958	28668
9/11/2024	9954	28567
10/11/2024	9955	28730
11/11/2024	9912	28521
12/11/2024	11625	28407
13/11/2024	13006	28524
14/11/2024	12900	28289
15/11/2024	12897	28141
16/11/2024	12937	28263
17/11/2024	12951	28247

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
18/11/2024	12927	28192
19/11/2024	12918	28050
20/11/2024	12888	28723
21/11/2024	12874	28750
22/11/2024	12864	28727
23/11/2024	12872	28792
24/11/2024	12846	28759
25/11/2024	12852	28790
26/11/2024	12833	28819
27/11/2024	12832	28809
28/11/2024	12839	28430
29/11/2024	12814	28464
30/11/2024	12810	28606
1/12/2024	12821	28509
2/12/2024	12813	28211
3/12/2024	12785	28448
4/12/2024	13817	28340
5/12/2024	13765	28107
6/12/2024	14845	27998
7/12/2024	14879	28384
8/12/2024	14835	28286
9/12/2024	15855	33819
10/12/2024	17924	42549
11/12/2024	17913	42551
12/12/2024	17886	38578
13/12/2024	17899	35231
14/12/2024	17868	39743
15/12/2024	17844	38696
16/12/2024	17817	44132
17/12/2024	18572	35579
18/12/2024	19171	29221
19/12/2024	19128	29074
20/12/2024	18964	29015
21/12/2024	18944	28837
22/12/2024	18908	28719

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
23/12/2024	18890	28534
24/12/2024	18862	28729
25/12/2024	18826	25517
26/12/2024	18804	23058
27/12/2024	18804	28386
28/12/2024	18869	28173
29/12/2024	18917	27995
30/12/2024	18900	28674
31/12/2024	18889	28529
1/01/2025	18893	28449
2/01/2025	18906	28426
3/01/2025	18881	28314
4/01/2025	18855	28105
5/01/2025	18829	28500
6/01/2025	18812	28691
7/01/2025	18185	28974
8/01/2025	17952	28299
9/01/2025	17989	27909
10/01/2025	17991	27950
11/01/2025	17947	28329
12/01/2025	17922	28227
13/01/2025	17910	28223
14/01/2025	10448	28318
15/01/2025	7061	28669
16/01/2025	9289	27613
17/01/2025	14889	27297
18/01/2025	14848	27177
19/01/2025	14819	27212
20/01/2025	14792	27115
21/01/2025	14785	26874
22/01/2025	14774	27661
23/01/2025	11307	28170
24/01/2025	7822	28068
25/01/2025	10802	27974
26/01/2025	10770	27892

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
27/01/2025	10806	28186
28/01/2025	13921	28457
29/01/2025	15985	28517
30/01/2025	15958	28437
31/01/2025	15935	28451
1/02/2025	15914	28466
2/02/2025	15846	28497
3/02/2025	15826	28391
4/02/2025	15779	28247
5/02/2025	15757	27843
6/02/2025	15803	27548
7/02/2025	15771	27497
8/02/2025	15749	27377
9/02/2025	15795	27718
10/02/2025	15780	27794
11/02/2025	15992	27754
12/02/2025	15724	28041
13/02/2025	15958	28038
14/02/2025	16094	27893
15/02/2025	16068	27831
16/02/2025	16039	27844
17/02/2025	16003	27710
18/02/2025	15981	27679
19/02/2025	13951	27781
20/02/2025	10769	28531
21/02/2025	10756	28570
22/02/2025	10705	29113
23/02/2025	10654	29073
24/02/2025	10620	28960
25/02/2025	10608	28969
26/02/2025	10580	28873
27/02/2025	10570	28964
28/02/2025	10558	28921
1/03/2025	10543	28795
2/03/2025	10576	28651

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
3/03/2025	10644	28483
4/03/2025	10624	28373
5/03/2025	10601	28374
6/03/2025	10594	28543
7/03/2025	10575	28297
8/03/2025	10562	28227
9/03/2025	10549	28131
10/03/2025	10556	28136
11/03/2025	10612	20375
12/03/2025	10620	14132
13/03/2025	10746	14057
14/03/2025	10736	13982
15/03/2025	10720	13923
16/03/2025	10704	13843
17/03/2025	10832	31433
18/03/2025	10970	42813
19/03/2025	10994	42938
20/03/2025	11018	43083
21/03/2025	11007	43096
22/03/2025	10978	43058
23/03/2025	10953	42988
24/03/2025	13101	27095
25/03/2025	15149	14708
26/03/2025	15113	14680
27/03/2025	15056	19573
28/03/2025	15017	28626
29/03/2025	14995	28584
30/03/2025	14968	28503
31/03/2025	14929	28461
1/04/2025	11858	28324
2/04/2025	8083	29049
3/04/2025	7999	29016
4/04/2025	6593	29031
5/04/2025	5144	29038
6/04/2025	5352	30178

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
7/04/2025	5104	28894
8/04/2025	8770	28811
9/04/2025	12267	28663
10/04/2025	12082	27998
11/04/2025	11813	27547
12/04/2025	11795	27487
13/04/2025	11775	27416
14/04/2025	11952	27312
15/04/2025	9980	27277
16/04/2025	8069	27227
17/04/2025	8016	27172
18/04/2025	8088	27069
19/04/2025	8156	27072
20/04/2025	8251	27069
21/04/2025	8236	27093
22/04/2025	8181	26968
23/04/2025	6829	21092
24/04/2025	4708	13594
25/04/2025	4755	13555
26/04/2025	4737	13509
27/04/2025	4793	13452
28/04/2025	4925	13410
29/04/2025	4913	13381
30/04/2025	4895	13336
1/05/2025	4924	13313
2/05/2025	4941	13143
3/05/2025	4955	12901
4/05/2025	4960	12866
5/05/2025	4923	12833
6/05/2025	10739	12769
7/05/2025	16948	12727
8/05/2025	16941	12688
9/05/2025	24965	12651
10/05/2025	30045	12617
11/05/2025	29935	12600

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
12/05/2025	29947	12585
13/05/2025	22690	18534
14/05/2025	15027	25954
15/05/2025	14805	26011
16/05/2025	14801	26056
17/05/2025	14776	26096
18/05/2025	14904	26101
19/05/2025	14960	26402
20/05/2025	26524	26364
21/05/2025	34968	26300
22/05/2025	34851	26264
23/05/2025	34729	26265
24/05/2025	34635	26238
25/05/2025	34342	26217
26/05/2025	34209	26247
27/05/2025	28977	26220
28/05/2025	24906	26205
29/05/2025	24947	26306
30/05/2025	25140	26374
31/05/2025	24997	26382
1/06/2025	24962	26370
2/06/2025	15546	26397
3/06/2025	7858	26435
4/06/2025	7755	21702
5/06/2025	7767	26804
6/06/2025	7779	26829
7/06/2025	7827	26858
8/06/2025	7872	26913
9/06/2025	7912	36637
10/06/2025	7971	28838
11/06/2025	8089	28797
12/06/2025	8180	28777
13/06/2025	8226	28697
14/06/2025	8244	28717
15/06/2025	8248	28727

Date	Upper Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )	Lower Huia Dam Daily Abstraction Volumes (m <sup>3</sup> )
16/06/2025	15128	28655
17/06/2025	16248	28514
18/06/2025	7818	28510
19/06/2025	8119	28472
20/06/2025	8222	28477
21/06/2025	8140	28415
22/06/2025	7850	28322
23/06/2025	7824	28305
24/06/2025	3114	28363
25/06/2025	0	27754
26/06/2025	1374	27645
27/06/2025	2704	27564
28/06/2025	2714	27594
29/06/2025	2107	27534
30/06/2025	2381	27502

## **Appendix B. Daily average reservoir level**

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
1/07/2024	25.667	27.718
2/07/2024	25.719	27.752
3/07/2024	25.731	27.756
4/07/2024	25.725	27.751
5/07/2024	25.713	27.743
6/07/2024	25.700	27.736
7/07/2024	25.688	27.736
8/07/2024	25.675	27.735
9/07/2024	25.633	27.728
10/07/2024	25.582	27.715
11/07/2024	25.530	27.700
12/07/2024	25.477	27.684
13/07/2024	25.422	27.666
14/07/2024	25.367	27.648
15/07/2024	25.373	27.674
16/07/2024	25.500	27.772
17/07/2024	25.490	27.763
18/07/2024	25.450	27.758
19/07/2024	25.401	27.755
20/07/2024	25.932	27.845
21/07/2024	26.307	27.787
22/07/2024	26.358	27.779
23/07/2024	26.401	27.776
24/07/2024	26.436	27.780
25/07/2024	26.455	27.773
26/07/2024	26.497	27.767
27/07/2024	26.532	27.762
28/07/2024	26.561	27.758
29/07/2024	26.589	27.756
30/07/2024	26.678	27.783
31/07/2024	26.821	27.786
1/08/2024	27.016	27.790
2/08/2024	27.120	27.776
3/08/2024	27.172	27.766
4/08/2024	27.211	27.762

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
5/08/2024	27.233	27.761
6/08/2024	27.211	27.762
7/08/2024	27.184	27.762
8/08/2024	27.212	27.761
9/08/2024	27.260	27.764
10/08/2024	27.298	27.763
11/08/2024	27.331	27.762
12/08/2024	27.360	27.762
13/08/2024	27.353	27.762
14/08/2024	27.329	27.750
15/08/2024	27.302	27.740
16/08/2024	27.278	27.732
17/08/2024	27.298	27.755
18/08/2024	27.468	27.799
19/08/2024	27.561	27.777
20/08/2024	27.571	27.764
21/08/2024	27.584	27.761
22/08/2024	27.596	27.759
23/08/2024	27.602	27.750
24/08/2024	27.609	27.745
25/08/2024	27.610	27.745
26/08/2024	27.595	27.739
27/08/2024	27.591	27.755
28/08/2024	27.619	27.764
29/08/2024	27.616	27.757
30/08/2024	27.598	27.754
31/08/2024	27.581	27.761
1/09/2024	27.941	27.823
2/09/2024	28.069	27.779
3/09/2024	28.076	27.767
4/09/2024	28.071	27.763
5/09/2024	28.054	27.759
6/09/2024	28.036	27.757
7/09/2024	28.014	27.754
8/09/2024	28.012	27.764

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
9/09/2024	27.987	27.763
10/09/2024	27.915	27.773
11/09/2024	27.833	27.775
12/09/2024	27.752	27.772
13/09/2024	27.714	27.756
14/09/2024	27.697	27.753
15/09/2024	27.793	27.785
16/09/2024	27.822	27.771
17/09/2024	27.898	27.781
18/09/2024	27.945	27.775
19/09/2024	27.969	27.767
20/09/2024	28.056	27.789
21/09/2024	28.250	27.791
22/09/2024	28.297	27.774
23/09/2024	28.319	27.770
24/09/2024	28.333	27.766
25/09/2024	28.337	27.760
26/09/2024	28.338	27.756
27/09/2024	28.344	27.748
28/09/2024	28.343	27.746
29/09/2024	28.338	27.740
30/09/2024	28.328	27.736
1/10/2024	28.317	27.727
2/10/2024	28.334	27.739
3/10/2024	28.841	27.838
4/10/2024	28.910	27.781
5/10/2024	28.903	27.767
6/10/2024	28.902	27.767
7/10/2024	28.931	27.814
8/10/2024	28.908	27.785
9/10/2024	28.902	27.776
10/10/2024	28.900	27.771
11/10/2024	28.895	27.765
12/10/2024	28.887	27.759
13/10/2024	28.877	27.758

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
14/10/2024	28.881	27.758
15/10/2024	28.888	27.760
16/10/2024	28.879	27.758
17/10/2024	28.868	27.752
18/10/2024	28.865	27.746
19/10/2024	28.861	27.741
20/10/2024	28.854	27.736
21/10/2024	28.845	27.728
22/10/2024	28.836	27.718
23/10/2024	28.826	27.712
24/10/2024	28.814	27.702
25/10/2024	28.799	27.693
26/10/2024	28.789	27.686
27/10/2024	28.789	27.691
28/10/2024	28.777	27.681
29/10/2024	28.766	27.672
30/10/2024	28.794	27.699
31/10/2024	28.778	27.716
1/11/2024	28.759	27.710
2/11/2024	28.740	27.699
3/11/2024	28.719	27.687
4/11/2024	28.694	27.670
5/11/2024	28.667	27.658
6/11/2024	28.641	27.664
7/11/2024	28.615	27.657
8/11/2024	28.588	27.642
9/11/2024	28.559	27.626
10/11/2024	28.529	27.610
11/11/2024	28.507	27.595
12/11/2024	28.476	27.578
13/11/2024	28.431	27.560
14/11/2024	28.390	27.548
15/11/2024	28.446	27.614
16/11/2024	28.609	27.753
17/11/2024	28.601	27.749

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
18/11/2024	28.567	27.738
19/11/2024	28.528	27.727
20/11/2024	28.488	27.711
21/11/2024	28.448	27.698
22/11/2024	28.408	27.688
23/11/2024	28.362	27.669
24/11/2024	28.318	27.652
25/11/2024	28.271	27.633
26/11/2024	28.223	27.615
27/11/2024	28.177	27.598
28/11/2024	28.130	27.579
29/11/2024	28.079	27.559
30/11/2024	28.044	27.549
1/12/2024	28.059	27.584
2/12/2024	28.048	27.604
3/12/2024	28.007	27.600
4/12/2024	27.958	27.584
5/12/2024	27.904	27.565
6/12/2024	27.847	27.547
7/12/2024	27.784	27.528
8/12/2024	27.721	27.505
9/12/2024	27.660	27.486
10/12/2024	27.595	27.456
11/12/2024	27.500	27.411
12/12/2024	27.418	27.381
13/12/2024	27.378	27.386
14/12/2024	27.309	27.358
15/12/2024	27.229	27.327
16/12/2024	27.156	27.291
17/12/2024	27.083	27.265
18/12/2024	26.991	27.236
19/12/2024	26.898	27.215
20/12/2024	26.805	27.193
21/12/2024	26.722	27.175
22/12/2024	26.638	27.158

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
23/12/2024	26.553	27.138
24/12/2024	26.465	27.116
25/12/2024	26.369	27.090
26/12/2024	26.290	27.086
27/12/2024	26.197	27.063
28/12/2024	26.096	27.030
29/12/2024	25.995	27.003
30/12/2024	25.894	26.975
31/12/2024	25.794	26.946
1/01/2025	25.691	26.918
2/01/2025	25.591	26.891
3/01/2025	25.489	26.863
4/01/2025	25.408	26.848
5/01/2025	25.310	26.829
6/01/2025	25.202	26.799
7/01/2025	25.094	26.769
8/01/2025	24.990	26.740
9/01/2025	24.886	26.716
10/01/2025	24.785	26.685
11/01/2025	24.693	26.649
12/01/2025	24.598	26.614
13/01/2025	24.500	26.577
14/01/2025	24.418	26.541
15/01/2025	24.387	26.509
16/01/2025	24.355	26.477
17/01/2025	24.283	26.445
18/01/2025	24.203	26.410
19/01/2025	24.122	26.374
20/01/2025	24.038	26.337
21/01/2025	23.960	26.305
22/01/2025	23.887	26.281
23/01/2025	23.811	26.246
24/01/2025	23.773	26.210
25/01/2025	23.721	26.174
26/01/2025	23.705	26.178

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
27/01/2025	23.691	26.184
28/01/2025	23.633	26.156
29/01/2025	23.544	26.120
30/01/2025	23.451	26.084
31/01/2025	23.357	26.048
1/02/2025	23.262	26.011
2/02/2025	23.167	25.973
3/02/2025	23.071	25.936
4/02/2025	22.974	25.898
5/02/2025	22.875	25.859
6/02/2025	22.775	25.822
7/02/2025	22.674	25.785
8/02/2025	22.571	25.749
9/02/2025	22.468	25.712
10/02/2025	22.363	25.674
11/02/2025	22.257	25.638
12/02/2025	22.135	25.607
13/02/2025	22.016	25.574
14/02/2025	21.906	25.536
15/02/2025	21.794	25.497
16/02/2025	21.684	25.462
17/02/2025	21.577	25.432
18/02/2025	21.474	25.405
19/02/2025	21.365	25.368
20/02/2025	21.283	25.333
21/02/2025	21.207	25.295
22/02/2025	21.127	25.252
23/02/2025	21.048	25.211
24/02/2025	20.967	25.173
25/02/2025	20.886	25.132
26/02/2025	20.804	25.092
27/02/2025	20.722	25.052
28/02/2025	20.639	25.013
1/03/2025	20.556	24.975
2/03/2025	20.472	24.934

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
3/03/2025	20.387	24.894
4/03/2025	20.302	24.855
5/03/2025	20.232	24.819
6/03/2025	20.143	24.774
7/03/2025	20.052	24.729
8/03/2025	19.963	24.687
9/03/2025	19.874	24.644
10/03/2025	19.782	24.602
11/03/2025	19.689	24.565
12/03/2025	19.583	24.556
13/03/2025	19.482	24.553
14/03/2025	19.387	24.542
15/03/2025	19.290	24.530
16/03/2025	19.192	24.518
17/03/2025	19.104	24.497
18/03/2025	19.037	24.442
19/03/2025	18.985	24.390
20/03/2025	18.944	24.339
21/03/2025	18.788	24.271
22/03/2025	18.617	24.201
23/03/2025	18.446	24.130
24/03/2025	18.265	24.068
25/03/2025	18.052	24.054
26/03/2025	17.833	24.043
27/03/2025	17.627	24.029
28/03/2025	17.403	23.994
29/03/2025	17.184	23.954
30/03/2025	16.975	23.916
31/03/2025	16.736	23.875
1/04/2025	16.521	23.831
2/04/2025	16.677	23.790
3/04/2025	16.752	23.766
4/04/2025	18.315	24.096
5/04/2025	19.745	24.512
6/04/2025	19.849	24.526

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
7/04/2025	19.871	24.510
8/04/2025	19.877	24.495
9/04/2025	19.831	24.480
10/04/2025	19.750	24.448
11/04/2025	19.665	24.415
12/04/2025	19.576	24.380
13/04/2025	19.482	24.344
14/04/2025	19.387	24.309
15/04/2025	19.294	24.272
16/04/2025	19.229	24.235
17/04/2025	19.197	24.210
18/04/2025	19.682	24.278
19/04/2025	20.281	24.467
20/04/2025	20.923	24.797
21/04/2025	21.108	24.964
22/04/2025	21.190	24.997
23/04/2025	21.236	25.005
24/04/2025	21.276	25.021
25/04/2025	21.298	25.031
26/04/2025	21.312	25.041
27/04/2025	21.354	25.072
28/04/2025	21.493	25.159
29/04/2025	21.572	25.206
30/04/2025	21.898	25.346
1/05/2025	22.423	25.600
2/05/2025	22.757	25.803
3/05/2025	22.983	25.949
4/05/2025	23.080	26.004
5/05/2025	23.137	26.035
6/05/2025	23.170	26.055
7/05/2025	23.133	26.072
8/05/2025	23.083	26.092
9/05/2025	23.121	26.194
10/05/2025	23.279	26.414
11/05/2025	23.223	26.485

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
12/05/2025	23.117	26.521
13/05/2025	23.005	26.545
14/05/2025	22.965	26.548
15/05/2025	22.928	26.539
16/05/2025	22.885	26.524
17/05/2025	22.838	26.507
18/05/2025	22.792	26.490
19/05/2025	22.751	26.480
20/05/2025	22.673	26.456
21/05/2025	22.486	26.435
22/05/2025	22.282	26.410
23/05/2025	22.072	26.387
24/05/2025	21.853	26.365
25/05/2025	21.574	26.353
26/05/2025	21.282	26.360
27/05/2025	21.185	26.426
28/05/2025	21.100	26.449
29/05/2025	21.077	26.504
30/05/2025	21.147	26.607
31/05/2025	21.090	26.633
1/06/2025	20.985	26.636
2/06/2025	20.882	26.631
3/06/2025	20.874	26.619
4/06/2025	20.932	26.645
5/06/2025	21.441	26.908
6/06/2025	21.756	27.066
7/06/2025	22.135	27.289
8/06/2025	22.320	27.385
9/06/2025	22.568	27.508
10/06/2025	22.863	27.658
11/06/2025	23.726	27.818
12/06/2025	24.007	27.779
13/06/2025	24.182	27.772
14/06/2025	24.315	27.773
15/06/2025	24.424	27.768

Date	Upper Huia Dam Daily Average Level (m)	Lower Huia Dam Daily Average Level (m)
16/06/2025	24.504	27.764
17/06/2025	24.497	27.758
18/06/2025	24.535	27.755
19/06/2025	24.577	27.753
20/06/2025	24.800	27.783
21/06/2025	24.936	27.767
22/06/2025	25.005	27.758
23/06/2025	25.059	27.756
24/06/2025	25.111	27.755
25/06/2025	25.183	27.758
26/06/2025	25.245	27.753
27/06/2025	25.699	27.818
28/06/2025	26.282	27.796
29/06/2025	26.496	27.784
30/06/2025	26.625	27.775

## **Appendix C. Total system storage, spillway flows and compensation flows**

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
1/07/2024	0.000	0.000	61.243	60	76.73
2/07/2024	0.000	0.000	61.198	60	76.91
3/07/2024	0.000	0.000	61.242	60	76.93
4/07/2024	0.000	0.000	61.188	60	76.83
5/07/2024	0.000	0.000	61.210	60	76.72
6/07/2024	0.000	0.000	61.286	60	76.62
7/07/2024	0.000	0.000	61.226	60	76.53
8/07/2024	0.000	0.000	61.232	60	76.42
9/07/2024	0.000	0.000	61.205	60	76.29
10/07/2024	0.000	0.000	61.212	60	76.15
11/07/2024	0.000	0.000	61.236	60	75.99
12/07/2024	0.000	0.000	61.224	60	75.83
13/07/2024	0.000	0.000	61.244	60	75.67
14/07/2024	0.000	0.000	61.205	60	75.52
15/07/2024	0.000	0.000	61.220	60	75.53
16/07/2024	0.000	0.000	61.208	60	76.00
17/07/2024	0.000	0.000	61.227	60	76.02
18/07/2024	0.000	0.000	61.199	60	75.98
19/07/2024	0.000	0.000	61.229	60	75.94
20/07/2024	2.034	0.000	61.186	60	76.25
21/07/2024	0.079	0.000	61.235	60	76.60
22/07/2024	0.002	0.000	61.193	60	76.75
23/07/2024	0.001	0.000	61.227	60	76.79
24/07/2024	0.005	0.000	61.211	60	76.81
25/07/2024	0.000	0.000	61.238	60	76.78
26/07/2024	0.000	0.000	61.221	60	76.77
27/07/2024	0.000	0.000	61.227	60	76.73
28/07/2024	0.000	0.000	61.171	60	76.71
29/07/2024	0.000	0.000	61.264	60	76.72
30/07/2024	0.140	0.000	61.219	60	77.05
31/07/2024	0.053	0.000	61.201	60	77.20
1/08/2024	0.104	0.000	61.209	60	77.45
2/08/2024	0.002	0.000	61.201	60	77.58
3/08/2024	0.000	0.000	61.227	60	77.60
4/08/2024	0.000	0.000	61.168	60	77.63
5/08/2024	0.000	0.000	61.185	60	77.62
6/08/2024	0.000	0.000	61.220	60	77.51
7/08/2024	0.000	0.000	61.229	60	77.39
8/08/2024	0.000	0.000	61.239	60	77.24
9/08/2024	0.000	0.000	61.222	60	77.14
10/08/2024	0.000	0.000	61.181	60	77.02
11/08/2024	0.000	0.000	61.210	60	76.88
12/08/2024	0.000	0.000	61.282	60	76.80

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
13/08/2024	0.000	0.000	61.252	60	76.74
14/08/2024	0.000	0.000	61.244	60	76.61
15/08/2024	0.000	0.000	61.268	60	76.50
16/08/2024	0.000	0.000	61.256	60	76.39
17/08/2024	0.069	0.000	61.341	60	76.51
18/08/2024	0.255	0.000	61.252	60	77.92
19/08/2024	0.005	0.000	61.251	60	78.66
20/08/2024	0.000	0.000	61.255	90	78.93
21/08/2024	0.000	0.000	61.222	90	79.09
22/08/2024	0.000	0.000	63.229	90	79.19
23/08/2024	0.000	0.000	61.285	90	78.84
24/08/2024	0.000	0.000	61.239	90	79.38
25/08/2024	0.000	0.000	84.588	90	79.49
26/08/2024	0.000	0.000	91.776	90	79.52
27/08/2024	0.000	0.000	91.828	90	79.63
28/08/2024	0.000	0.000	91.822	90	79.85
29/08/2024	0.000	0.000	91.835	90	79.96
30/08/2024	0.000	0.000	91.829	90	80.08
31/08/2024	0.000	0.000	91.808	90	80.27
1/09/2024	1.185	0.000	91.777	90	81.88
2/09/2024	0.010	0.000	91.814	90	82.82
3/09/2024	0.000	0.000	91.832	90	83.06
4/09/2024	0.000	0.000	91.854	90	83.24
5/09/2024	0.000	0.000	91.820	90	83.37
6/09/2024	0.000	0.000	91.818	90	83.48
7/09/2024	0.000	0.000	91.799	90	83.58
8/09/2024	0.000	0.000	91.776	90	83.72
9/09/2024	0.000	0.000	91.826	90	83.80
10/09/2024	0.000	0.000	91.842	90	83.81
11/09/2024	0.000	0.000	91.864	90	83.80
12/09/2024	0.000	0.000	91.805	90	83.75
13/09/2024	0.000	0.000	91.825	90	83.73
14/09/2024	0.000	0.000	91.803	90	83.76
15/09/2024	0.048	0.000	91.859	90	84.03
16/09/2024	0.001	0.000	91.825	90	84.10
17/09/2024	0.006	0.000	91.826	90	84.18
18/09/2024	0.001	0.000	91.814	90	84.21
19/09/2024	0.000	0.000	91.876	90	84.22
20/09/2024	0.306	0.000	91.815	90	84.60
21/09/2024	0.135	0.000	91.878	90	85.13
22/09/2024	0.000	0.000	91.895	90	85.25
23/09/2024	0.000	0.000	91.856	90	85.31
24/09/2024	0.000	0.000	91.833	90	85.34

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
25/09/2024	0.000	0.000	91.847	90	85.35
26/09/2024	0.000	0.000	91.823	90	85.29
27/09/2024	0.000	0.000	91.841	90	85.24
28/09/2024	0.000	0.000	91.761	90	85.18
29/09/2024	0.000	0.000	91.842	90	85.11
30/09/2024	0.000	0.000	91.877	90	85.03
1/10/2024	0.000	0.000	91.807	90	84.93
2/10/2024	0.269	0.000	91.813	90	84.89
3/10/2024	1.794	0.058	149.577	90	85.91
4/10/2024	0.018	0.234	326.238	90	86.24
5/10/2024	0.000	0.176	268.012	90	86.32
6/10/2024	0.003	0.176	268.087	90	86.38
7/10/2024	0.648	0.592	684.123	90	86.67
8/10/2024	0.068	0.223	314.714	90	86.83
9/10/2024	0.001	0.143	235.072	90	86.93
10/10/2024	0.000	0.096	187.737	90	86.98
11/10/2024	0.000	0.048	140.066	90	87.05
12/10/2024	0.000	0.012	103.637	90	87.08
13/10/2024	0.000	0.000	91.821	90	87.05
14/10/2024	0.000	0.000	91.780	90	87.11
15/10/2024	0.000	0.007	98.989	90	87.11
16/10/2024	0.000	0.000	91.828	90	87.08
17/10/2024	0.000	0.000	91.802	90	87.04
18/10/2024	0.000	0.000	91.867	90	86.99
19/10/2024	0.000	0.000	91.818	90	86.92
20/10/2024	0.000	0.000	91.800	90	86.86
21/10/2024	0.000	0.000	91.825	90	86.80
22/10/2024	0.000	0.000	91.835	90	86.72
23/10/2024	0.000	0.000	91.769	90	86.65
24/10/2024	0.000	0.000	91.824	90	86.57
25/10/2024	0.000	0.000	91.791	90	86.46
26/10/2024	0.000	0.000	91.771	90	86.40
27/10/2024	0.000	0.000	91.855	90	86.59
28/10/2024	0.000	0.000	91.815	90	86.57
29/10/2024	0.000	0.000	91.838	90	86.50
30/10/2024	0.000	0.000	91.843	90	86.49
31/10/2024	0.000	0.000	91.815	90	86.41
1/11/2024	0.000	0.000	91.764	90	86.32
2/11/2024	0.000	0.000	91.825	90	86.21
3/11/2024	0.000	0.000	91.894	90	86.19
4/11/2024	0.000	0.000	91.856	90	86.09
5/11/2024	0.000	0.000	91.802	90	85.95
6/11/2024	0.000	0.000	91.834	90	85.83

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
7/11/2024	0.000	0.000	91.838	90	85.71
8/11/2024	0.000	0.000	91.782	90	85.58
9/11/2024	0.000	0.000	91.870	90	85.44
10/11/2024	0.000	0.000	91.846	90	85.30
11/11/2024	0.000	0.000	91.778	90	85.20
12/11/2024	0.000	0.000	91.833	90	85.05
13/11/2024	0.000	0.000	91.819	90	84.90
14/11/2024	0.000	0.000	91.855	90	84.77
15/11/2024	0.000	0.000	91.790	90	85.26
16/11/2024	0.000	0.000	91.829	90	86.85
17/11/2024	0.000	0.000	91.852	90	86.92
18/11/2024	0.000	0.000	91.819	90	86.88
19/11/2024	0.000	0.000	91.822	90	86.80
20/11/2024	0.000	0.000	91.769	90	86.68
21/11/2024	0.000	0.000	91.840	90	86.58
22/11/2024	0.000	0.000	91.788	90	86.49
23/11/2024	0.000	0.000	91.818	90	86.36
24/11/2024	0.000	0.000	91.830	90	86.23
25/11/2024	0.000	0.000	91.861	90	86.11
26/11/2024	0.000	0.000	91.839	90	85.96
27/11/2024	0.000	0.000	91.795	90	85.78
28/11/2024	0.000	0.000	91.813	90	85.58
29/11/2024	0.000	0.000	91.816	90	85.36
30/11/2024	0.000	0.000	91.787	90	85.20
1/12/2024	0.000	0.000	91.816	90	85.25
2/12/2024	0.000	0.000	91.792	90	85.19
3/12/2024	0.000	0.000	91.826	90	85.00
4/12/2024	0.000	0.000	91.798	90	84.76
5/12/2024	0.000	0.000	91.908	90	84.51
6/12/2024	0.000	0.000	91.801	90	84.29
7/12/2024	0.000	0.000	91.789	90	84.04
8/12/2024	0.000	0.000	91.825	90	83.79
9/12/2024	0.000	0.000	91.780	90	83.57
10/12/2024	0.000	0.000	91.853	90	83.53
11/12/2024	0.000	0.000	91.786	90	83.34
12/12/2024	0.000	0.000	91.759	90	83.30
13/12/2024	0.000	0.000	91.806	90	83.28
14/12/2024	0.000	0.000	91.853	90	83.14
15/12/2024	0.000	0.000	91.824	90	82.96
16/12/2024	0.000	0.000	91.835	90	82.96
17/12/2024	0.000	0.000	91.881	90	83.19
18/12/2024	0.000	0.000	91.793	90	83.03
19/12/2024	0.000	0.000	91.829	90	82.80

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
20/12/2024	0.000	0.000	91.862	90	82.22
21/12/2024	0.000	0.000	91.762	90	82.41
22/12/2024	0.000	0.000	91.826	90	82.25
23/12/2024	0.000	0.000	91.775	90	82.10
24/12/2024	0.000	0.000	91.865	90	81.95
25/12/2024	0.000	0.000	91.853	90	81.73
26/12/2024	0.000	0.000	91.864	90	81.65
27/12/2024	0.000	0.000	91.803	90	81.55
28/12/2024	0.000	0.000	91.793	90	81.33
29/12/2024	0.000	0.000	91.703	90	81.14
30/12/2024	0.000	0.000	91.872	90	80.94
31/12/2024	0.000	0.000	91.865	90	80.73
1/01/2025	0.000	0.000	91.856	90	80.53
2/01/2025	0.000	0.000	91.806	90	80.33
3/01/2025	0.000	0.000	91.838	90	80.13
4/01/2025	0.000	0.000	91.790	90	79.99
5/01/2025	0.000	0.000	91.817	90	79.83
6/01/2025	0.000	0.000	91.771	90	79.63
7/01/2025	0.000	0.000	91.775	90	79.41
8/01/2025	0.000	0.000	91.900	90	79.18
9/01/2025	0.000	0.000	91.768	60	79.00
10/01/2025	0.000	0.000	61.219	60	78.79
11/01/2025	0.000	0.000	61.229	60	78.57
12/01/2025	0.000	0.000	61.218	60	78.37
13/01/2025	0.000	0.000	61.222	60	78.11
14/01/2025	0.000	0.000	61.253	60	77.77
15/01/2025	0.000	0.000	61.328	60	77.50
16/01/2025	0.000	0.000	61.216	60	77.24
17/01/2025	0.000	0.000	61.227	60	76.97
18/01/2025	0.000	0.000	61.189	60	76.72
19/01/2025	0.000	0.000	61.176	60	76.46
20/01/2025	0.000	0.000	61.240	60	76.23
21/01/2025	0.000	0.000	61.185	60	76.06
22/01/2025	0.000	0.000	61.194	60	75.96
23/01/2025	0.000	0.000	61.211	60	75.74
24/01/2025	0.000	0.000	61.205	60	75.50
25/01/2025	0.000	0.000	61.189	60	75.27
26/01/2025	0.000	0.000	61.187	60	75.29
27/01/2025	0.000	0.000	61.229	60	75.41
28/01/2025	0.000	0.000	61.253	60	75.26
29/01/2025	0.000	0.000	61.210	60	74.54
30/01/2025	0.000	0.000	61.173	60	74.84
31/01/2025	0.000	0.000	61.203	60	74.63

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
1/02/2025	0.000	0.000	61.234	60	74.43
2/02/2025	0.000	0.000	61.179	60	74.19
3/02/2025	0.000	0.000	61.208	60	73.96
4/02/2025	0.000	0.000	61.171	60	73.73
5/02/2025	0.000	0.000	61.229	60	73.46
6/02/2025	0.000	0.000	61.222	60	73.24
7/02/2025	0.000	0.000	61.219	60	72.99
8/02/2025	0.000	0.000	61.245	60	72.76
9/02/2025	0.000	0.000	61.162	60	72.55
10/02/2025	0.000	0.000	61.232	60	72.31
11/02/2025	0.000	0.000	61.231	60	72.07
12/02/2025	0.000	0.000	61.246	60	71.98
13/02/2025	0.000	0.000	61.210	60	71.75
14/02/2025	0.000	0.000	61.243	60	71.45
15/02/2025	0.000	0.000	61.223	60	71.10
16/02/2025	0.000	0.000	61.222	60	70.88
17/02/2025	0.000	0.000	61.201	60	70.67
18/02/2025	0.000	0.000	61.199	60	70.48
19/02/2025	0.000	0.000	61.195	60	70.23
20/02/2025	0.000	0.000	61.192	60	69.95
21/02/2025	0.000	0.000	61.752	60	69.68
22/02/2025	0.000	0.000	61.566	60	69.40
23/02/2025	0.000	0.000	60.643	60	69.13
24/02/2025	0.000	0.000	61.054	60	68.87
25/02/2025	0.000	0.000	61.247	60	68.59
26/02/2025	0.000	0.000	61.239	60	68.30
27/02/2025	0.000	0.000	61.223	60	68.01
28/02/2025	0.000	0.000	61.184	60	67.74
1/03/2025	0.000	0.000	61.256	60	67.47
2/03/2025	0.000	0.000	61.217	60	67.23
3/03/2025	0.000	0.000	61.252	60	66.96
4/03/2025	0.000	0.000	61.262	60	66.70
5/03/2025	0.000	0.000	61.253	60	66.49
6/03/2025	0.000	0.000	61.224	60	66.21
7/03/2025	0.000	0.000	61.214	60	65.92
8/03/2025	0.000	0.000	61.249	60	65.66
9/03/2025	0.000	0.000	61.225	60	65.41
10/03/2025	0.000	0.000	61.200	60	65.12
11/03/2025	0.000	0.000	61.239	60	64.83
12/03/2025	0.000	0.000	61.199	60	64.57
13/03/2025	0.000	0.000	62.351	60	64.32
14/03/2025	0.000	0.000	61.169	60	64.05
15/03/2025	0.000	0.000	61.173	60	63.78

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
16/03/2025	0.000	0.000	61.188	60	63.52
17/03/2025	0.000	0.000	61.310	60	63.28
18/03/2025	0.000	0.000	61.188	60	63.08
19/03/2025	0.000	0.000	61.184	60	62.90
20/03/2025	0.000	0.000	61.204	60	62.77
21/03/2025	0.000	0.000	61.243	60	62.55
22/03/2025	0.000	0.000	61.173	60	62.31
23/03/2025	0.000	0.000	61.182	60	62.08
24/03/2025	0.000	0.000	61.232	60	61.84
25/03/2025	0.000	0.000	61.202	60	61.57
26/03/2025	0.000	0.000	61.271	60	61.33
27/03/2025	0.000	0.000	61.193	60	61.06
28/03/2025	0.000	0.000	61.237	60	60.83
29/03/2025	0.000	0.000	61.228	60	60.62
30/03/2025	0.000	0.000	61.227	60	60.39
31/03/2025	0.000	0.000	61.221	60	60.15
1/04/2025	0.000	0.000	61.182	60	59.89
2/04/2025	0.000	0.000	61.193	60	59.69
3/04/2025	0.000	0.000	61.173	60	59.54
4/04/2025	0.000	0.000	61.222	60	61.06
5/04/2025	0.000	0.000	61.236	60	64.28
6/04/2025	0.000	0.000	61.258	60	64.41
7/04/2025	0.000	0.000	61.197	60	64.35
8/04/2025	0.000	0.000	61.224	60	64.29
9/04/2025	0.000	0.000	61.202	60	64.21
10/04/2025	0.000	0.000	61.257	60	64.06
11/04/2025	0.000	0.000	61.234	60	63.90
12/04/2025	0.000	0.000	61.278	60	63.73
13/04/2025	0.000	0.000	61.220	60	63.54
14/04/2025	0.000	0.000	61.242	60	63.37
15/04/2025	0.000	0.000	61.259	60	63.17
16/04/2025	0.000	0.000	61.240	60	62.99
17/04/2025	0.000	0.000	61.175	60	62.90
18/04/2025	0.000	0.000	61.253	60	63.24
19/04/2025	0.000	0.000	61.207	60	63.87
20/04/2025	0.000	0.000	61.205	60	64.61
21/04/2025	0.000	0.000	61.254	60	64.87
22/04/2025	0.000	0.000	61.271	60	64.89
23/04/2025	0.000	0.000	61.221	60	64.83
24/04/2025	0.000	0.000	61.245	60	64.73
25/04/2025	0.000	0.000	61.258	60	64.61
26/04/2025	0.000	0.000	61.274	60	64.49
27/04/2025	0.000	0.000	61.236	60	64.46

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
28/04/2025	0.000	0.000	61.181	60	64.67
29/04/2025	0.000	0.000	61.179	60	64.73
30/04/2025	0.000	0.000	61.193	60	65.37
1/05/2025	0.000	0.000	61.186	60	66.94
2/05/2025	0.000	0.000	61.271	60	68.21
3/05/2025	0.000	0.000	61.193	60	68.69
4/05/2025	0.000	0.000	61.245	60	68.82
5/05/2025	0.000	0.000	61.228	60	68.85
6/05/2025	0.000	0.000	61.225	60	68.82
7/05/2025	0.000	0.000	61.207	60	68.77
8/05/2025	0.000	0.000	61.256	60	68.72
9/05/2025	0.000	0.000	61.268	60	68.98
10/05/2025	0.000	0.000	61.206	60	70.03
11/05/2025	0.000	0.000	61.196	60	70.24
12/05/2025	0.000	0.000	61.229	60	70.28
13/05/2025	0.000	0.000	61.230	60	70.27
14/05/2025	0.000	0.000	61.197	60	70.24
15/05/2025	0.000	0.000	61.257	60	70.19
16/05/2025	0.000	0.000	61.148	60	70.12
17/05/2025	0.000	0.000	61.226	60	70.04
18/05/2025	0.000	0.000	61.253	60	69.98
19/05/2025	0.000	0.000	61.233	60	69.96
20/05/2025	0.000	0.000	61.176	60	69.87
21/05/2025	0.000	0.000	61.208	60	69.76
22/05/2025	0.000	0.000	61.200	60	69.64
23/05/2025	0.000	0.000	62.142	60	69.51
24/05/2025	0.000	0.000	49.926	60	69.39
25/05/2025	0.000	0.000	3.663	60	69.27
26/05/2025	0.000	0.000	52.532	60	69.22
27/05/2025	0.000	0.000	61.408	60	70.35
28/05/2025	0.000	0.000	61.063	60	70.91
29/05/2025	0.000	0.000	61.238	60	71.71
30/05/2025	0.000	0.000	61.001	60	72.20
31/05/2025	0.000	0.000	61.303	60	72.42
1/06/2025	0.000	0.000	61.198	60	72.49
2/06/2025	0.000	0.000	61.377	60	72.51
3/06/2025	0.000	0.000	61.175	60	72.48
4/06/2025	0.000	0.000	61.290	60	72.66
5/06/2025	0.000	0.000	61.220	60	75.39
6/06/2025	0.000	0.000	61.060	60	76.23
7/06/2025	0.000	0.000	60.972	60	76.91
8/06/2025	0.000	0.000	61.260	60	77.23
9/06/2025	0.000	0.000	61.474	60	77.79

Date	Lower Huia spillway flows (l/s)	Upper Huia spillway flows (l/s)	Upper Huia combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
10/06/2025	0.469	0.000	61.089	90	78.23
11/06/2025	1.027	0.000	61.081	90	80.25
12/06/2025	0.003	0.000	87.228	90	80.78
13/06/2025	0.000	0.000	91.729	90	81.12
14/06/2025	0.000	0.000	91.845	90	81.47
15/06/2025	0.000	0.000	91.766	90	81.73
16/06/2025	0.000	0.000	91.803	90	81.89
17/06/2025	0.000	0.000	91.953	90	81.96
18/06/2025	0.000	0.000	91.709	90	82.06
19/06/2025	0.000	0.000	91.698	90	82.16
20/06/2025	0.042	0.000	91.808	90	82.49
21/06/2025	0.000	0.000	91.958	90	82.65
22/06/2025	0.000	0.000	91.920	90	82.72
23/06/2025	0.000	0.000	91.681	90	82.77
24/06/2025	0.000	0.000	81.894	90	82.84
25/06/2025	0.000	0.000	32.311	90	82.91
26/06/2025	0.000	0.000	0.000	90	82.96
27/06/2025	1.505	0.000	0.000	90	84.57
28/06/2025	0.206	0.000	0.000	90	86.79
29/06/2025	0.025	0.000	0.000	90	87.33
30/06/2025	0.001	0.000	0.000	90	87.67

## **Appendix D. Native fisheries MPI report**



# Auckland Water Supply Dams 2024-2025 Native Fisheries Annual Report

Final - August 2025

Watercare 


## QUALITY INFORMATION

<b>Document</b>	Annual Report
<b>Date</b>	8 August 2025
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## REVISION HISTORY

Rev	Revision Date	Name	Position	Signature
1	24/07/2025	Michiel Jonker	Environmental Care Manager	
2	05/08/2025	AJ Grobler	Operations Controller	
3	08/08/2025	Brendon Dockary	Operations Controller	

## APPROVED

Date	Name	Position	Signature
08/08/2025	Michiel Jonker	Environmental Care Manager	

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## 1 INTRODUCTION

Watercare Services Limited (Watercare) currently undertakes a Native Fisheries Management Programme utilising ‘trap and haul’ methods at eight of the water supply dams. Ministry of Primary Industries approval has been granted for this work under Special Permit 737 (expires on 1 October 2025; Appendix A) and Fish Transfer Authorisation NFT325. The permit covers the upstream and downstream trap and haul activities for dams in the Auckland and Waikato regions:

- Hunua Ranges:
  - Hays Creek Dam
  - Cosseys Dam
  - Wairoa Dam
  - Upper Mangatawhiri Dam
  - Mangatangi Weir
- Waitākere Ranges:
  - Lower Nihotupu Dam
  - Lower Huia Dam
  - Waitākere Dam

New permits will be applied for to continue trap and haul from the 2025-2026 season onwards.

This report provides details of the programme for the period 1 July 2024 to 30 June 2025, in fulfilment of conditions 27, 28 and 29 of Special Permit 737.

## 2 UPSTREAM TRANSFER

Trapping for elver and other freshwater fish was conducted at the following sites for the purpose of upstream transfer:

- Lower Nihotupu Dam
- Waitākere Dam
- Hays Creek Dam
- Cosseys Dam
- Mangatangi weir

Trapping (upstream transfer) at Lower Huia Dam has proven unsuccessful in the past and is no longer undertaken.

### 2.1 Collection methods

During the 2024-2025 trap and haul season, two traps were deployed in the Waitākere Ranges and three in the Hunua Ranges. The design and methodology of each trap followed those outlined in Watercare's Native Fisheries Program – Operations Manual for Undertaking Trap and Haul.

During rainfall events, traps were taken out of service as part of standard operations. Additionally, over the Christmas holiday period, the Hunua dams' traps were not in service due to low staff availability.

### 2.2 Fish species, elvers and approximate total weight

The estimated weight of each catch is based on the number of individuals caught, the expected weight for each species (1 g per elver and 0.5 g per juvenile galaxiid) and the measured size of the individuals. The data provided in Table 2-1 to Table 2-5 fulfil conditions 28a, 28b and 28f.

All elvers and galaxiids were released directly into the respective dams upstream of the trapping sites or above the Mangatangi weir.

**Table 2-1: Approximate total weight of each species collected at Lower Nihotupu Dam during the 2024-2025 upstream trap and haul season.**

Date	Elver (g)	Galaxiids (g)
20/10/2024	5	100.0
24/10/2024	-	10.0
30/10/2024	6	3.5
3/11/2024	40	1.0
7/11/2024	38	-
13/11/2024	12	-
18/11/2024	14	9.0
25/11/2024	80	30.0
28/11/2024	50	2.0
3/12/2024	200	-
6/12/2024	250	6.0
9/12/2024	300	2.5
10/12/2024	50	0.5

Date	Elver (g)	Galaxiids (g)
15/12/2024	40	1.5
22/12/2024	100	-
22/12/2024	50	-
2/01/2025	480	-
5/01/2025	107	3.0
9/01/2025	100	-
14/01/2025	60	-
16/01/2025	100	0.5
23/01/2025	120	2.0
28/01/2025	230	-
3/02/2025	200	16.0
6/02/2025	85	-
11/02/2025	48	-
17/02/2025	30	-
7/03/2025	28	-
10/04/2025	14	-
<b>Total</b>	<b>2,837</b>	<b>178.0</b>

**Table 2-2: Approximate total weight of each species collected at Waitākere Dam during the 2024-2025 upstream trap and haul season.**

Date	Elver (g)	Galaxiids (g)
10/11/2024	5	-
18/11/2024	7	-
2/12/2024	23	1.0
11/12/2024	22	2.0
19/12/2024	12	1.0
27/12/2024	3	1.5
29/12/2024	3	1.0
29/12/2024	35	-
3/01/2025	170	-
6/01/2025	12	-
7/01/2025	100	-
9/01/2025	50	-
13/01/2025	110	-
14/01/2025	5	7.5
16/01/2025	200	-
20/01/2025	24	-
21/01/2025	104	-

Date	Elver (g)	Galaxiids (g)
2/02/2025	35	-
7/02/2025	300	-
10/02/2025	140	-
17/02/2025	350	-
27/02/2025	200	-
4/03/2025	64	-
10/03/2025	184	-
12/03/2025	11	-
18/03/2025	64	-
26/03/2025	38	-
30/03/2025	44	-
16/04/2025	15	-
<b>Total</b>	<b>2,330</b>	<b>14.0</b>

**Table 2-3: Approximate total weight of each species collected at Hays Creek Dam during the 2024-2025 upstream trap and haul season.**

Date	Elver (g)	Galaxiids (g)
21/10/2024	-	1.0
28/10/2024	-	1.5
31/10/2024	-	0.5
1/11/2024	-	1.0
2/11/2024	-	2.0
4/11/2024	-	1.0
4/11/2024	-	0.5
5/11/2024	-	2
22/12/2024	52	-
27/12/2024	49	-
30/12/2024	69	-
31/12/2024	16	-
7/01/2025	17	-
13/01/2025	15	-
13/01/2025	200	0.5
15/01/2025	14	-
6/02/2025	84	-
19/02/2025	46	-
20/02/2025	25	-
24/02/2025	12	-
3/03/2025	3	-

Date	Elver (g)	Galaxiids (g)
4/03/2025	6	-
9/03/2025	6	-
<b>Total</b>	<b>614</b>	<b>10.0</b>

**Table 2-4: Approximate total weight of each species collected at Cosseys Dam during the 2024-2025 upstream trap and haul season.**

Date	Elver (g)	Galaxiids (g)
29/10/2024	3	-
7/11/2024	2	-
14/11/2024	2	-
2/12/2024	16	-
3/12/2024	5	-
3/12/2024	16	-
16/12/2024	12	-
26/12/2024	10	-
29/12/2024	26	-
31/12/2024	18	-
5/01/2025	16	-
7/01/2025	12	-
14/01/2025	12	-
27/01/2025	66	-
4/02/2025	24	-
12/02/2025	5	-
18/02/2025	11	-
19/02/2025	11	-
21/02/2025	15	-
10/03/2025	34	-
14/03/2025	3	-
18/03/2025	4	-
<b>Total</b>	<b>323</b>	<b>0.0</b>

**Table 2-5: Approximate total weight of each species collected at Mangatangi weir during the 2024-2025 upstream trap and haul season.**

Date	Elver (g)	Galaxiids (g)
8/10/2024	1	-
30/10/2024	1	-
13/11/2024	1	-
17/11/2024	2	-
20/11/2024	4	-

Date	Elver (g)	Galaxiids (g)
25/11/2024	4	-
26/11/2024	4	-
29/11/2024	6	-
1/12/2024	50	-
9/12/2024	1	-
11/12/2024	23	0.5
13/12/2024	24	-
16/12/2024	19	-
23/12/2024	3	-
24/12/2024	4	-
30/12/2024	11	1.0
31/12/2024	13	-
2/01/2025	7	-
3/01/2025	11	-
5/01/2025	13	0.5
8/01/2025	14	-
10/01/2025	5	-
20/01/2025	55	5.5
27/01/2025	78	1.5
28/01/2025	13	-
29/01/2025	35	-
30/01/2025	3	-
3/02/2025	15	0.5
7/02/2025	24	-
16/02/2025	4	-
21/02/2025	7	0.5
28/02/2025	3	-
10/03/2025	1	-
<b>Total</b>	<b>459</b>	<b>10</b>

### 2.3 Juvenile eel length

Condition 28c requires the weight of juvenile eels (i.e., greater than 20 g in weight) collected for transfer to be measured. The length was measured instead of weight, consistent with previous years' practices. The data is provided in Table 2-6.

**Table 2-6: Length of juvenile eels reported during the 2024-2025 upstream trap and haul season**

Location	Date	Length of juvenile eel (mm)
Waitākere	23/10/2024	250

## 2.4 Bycatch species and weight

The most caught bycatch species were the Kōura (*Paranephrops planifrons*) and bullies (*Gobiomorphus spp*). All bycatch species were caught in the permanent fish trap structures located at the base of the dams. On average, the bullies are estimated to weigh 2.5 g, and smelt (*Retropinna retropinna*) approximately 0.5 g, though no smelt were caught during this trap and haul season. When the bully species could not be identified, they were assumed to be common bullies. The results of the bycatch are presented in Table 2-7.

**Table 2-7: Approximate total weight of bycatch reported during the 2024-2025 upstream trap and haul season.**

Location	Date	Species (number if weight unknown)	Weight (g)
Lower Nihotupu	20/10/2024	Common bully	2.5
	24/10/2024	Common bully	2.5
	3/11/2024	Common bully	65.0
	7/11/2024	Common bully	17.5
	13/11/2024	Common bully	12.5
	25/11/2024	Common bully	27.5
	3/12/2024	Common bully	7.5
	3/12/2024	Common bully	15
	9/12/2024	Common bully	7.5
	10/12/2024	Common bully	17.5
	15/12/2024	Common bully	2.5
	22/12/2024	Common bully	2.5
	22/12/2024	Common bully	12.5
	14/01/2025	Common bully	2.5
	16/01/2025	Common bully	2.5
	7/03/2025	Common bully	2.5
10/04/2025	Common bully	25.0	
Waitākere	18/11/2024	Common bully	2.5
	29/12/2024	Common bully	10.0
	3/01/2025	Common bully	5.0
	10/02/2025	Common bully	7.5
Hays Creek	1/12/2024	Common bully	2.5
	7/01/2025	Common bully	2.5
Mangatangi	8/10/2025	Common bully	15.0
		Kōura (1)	n/a
	11/10/2025	Common bully	5.0
	14/10/2025	Common bully	2.5
	18/10/2024	Common bully	2.5
	22/10/2024	Kōura (1)	n/a

Location	Date	Species (number if weight unknown)	Weight (g)
	22/10/2024	Common bully	2.5
	22/10/2024	Redfin bully (1)	2.5
	24/10/2024	Kōura (1)	n/a
	29/10/2024	Kōura (1)	n/a
	29/10/2024	Common bully	7.5
	1/11/2024	Redfin bully	2.5
	4/11/2024	Common bully	2.5
	6/11/2024	Common bully	2.5
	8/11/2024	Common bully	5.0
	11/11/2024	Common bully	15.0
	13/11/2024	Common bully	15.0
	18/11/2024	Common bully	7.5
	20/11/2024	Common bully	7.5
	21/11/2024	Kōura (1)	n/a
	25/11/2024	Common bully	7.5
	26/11/2024	Kōura (1)	n/a
	26/11/2024	Common bully	17.5
	1/12/2024	Kōura (10)	n/a
	1/12/2024	Common bully	30.0
	1/12/2024	Common bully	22.5
	6/12/2024	Kōura (1)	n/a
	9/12/2024	Common bully	37.5
	11/12/2024	Common bully	42.5
	13/12/2024	Kōura (2)	n/a
	13/12/2024	Common bully	32.5
	16/12/2024	Common bully	40.0
	18/12/2024	Common bully	15.0
	23/12/2024	Common bully	12.5
	24/12/2024	Kōura (1)	n/a
	24/12/2024	Common bully	105.0
	27/12/2024	Common bully	117.5
	30/12/2024	Common bully	170.0
	31/12/2024	Common bully	27.5
	3/01/2025	Common bully	45.0
	6/01/2025	Common bully	75.0
	8/01/2025	Common bully	32.5
	10/01/2025	Common bully	12.5
	21/01/2025	Common bully	27.5

Location	Date	Species (number if weight unknown)	Weight (g)
	27/01/2025	Kōura (1)	n/a
	27/01/2025	Common bully	45.0
	29/01/2025	Common bully	37.5
	3/02/2025	Common bully	12.5
	7/02/2025	Common bully	120.0
	10/02/2025	Common bully	25.0
	16/02/2025	Common bully	42.5
	18/02/2025	Common bully	25.0
	21/02/2025	Common bully	175.0
	24/02/2025	Common bully	20.0
	28/02/2025	Kōura (1)	n/a
	28/02/2025	Common bully	10.0
	3/03/2025	Common bully	12.5
	6/03/2025	Kōura (1)	n/a
	10/03/2025	Kōura (1)	n/a
	10/03/2025	Common bully	7.5
	21/03/2025	Kōura (2)	n/a
	24/03/2025	Common bully	15.0
	24/03/2025	Kōura (2)	n/a
	26/03/2025	Kōura (4)	n/a
	31/03/2025	Kōura (3)	n/a
<b>Total</b>			<b>1,767.5</b>

## 2.5 Fish deaths

Fish deaths were observed on a number of occasions during the upstream trapping season, detailed in Table 2-8. When the bully species could not be identified, they were assumed to be common bullies. Fish deaths primarily occurred inside the permanent fish trap structures, however, deceased juvenile brown trout (*Salmo trutta*) were located on the netted ramp leading to the tank at the Mangatangi weir, and some elvers were found in the trap's outlet structure at Waitākere Dam.

**Table 2-8: Fish deaths during the 2024-2025 upstream trap and haul.**

Location	Date	Species	Number
Lower Nihotupu	30/10/2024	Galaxiid	5
	3/11/2024	Common bully	5
Waitākere	7/01/2025	Elver	1
	7/02/2025	Elver	2
	10/03/2025	Elver	12
	16/04/2025	Elver	4
Hays Creek	29/10/2024	Galaxiids	3
	31/10/2024	Galaxiids	1

Location	Date	Species	Number
	2/11/2024	Galaxiids	1
Cosseys	30/12/2024	Elver	1
Mangatangi	20/11/2024	Brown trout	1
	21/11/2024	Brown trout	6
	25/11/2024	Brown trout	1
	26/11/2024	Brown trout	10
	29/11/2024	Brown trout	9
	2/12/2024	Brown trout	4
	2/12/2024	Elver	3

## 3 DOWNSTREAM TRANSFER

### 3.1 Collection methods

Net setting for eels was conducted at the following eight sites for the purpose of downstream transfer:

- Lower Nihotupu Dam
- Lower Huia Dam
- Waitākere Dam
- Hays Creek Dam
- Cosseys Dam
- Wairoa Dam
- Upper Mangatāwhiri Dam
- Mangatangi Dam

Fyke nets are used as the downstream eel trapping method. They are long cylindrical netting bags with netting cones, designed for easy entry but a difficult exit. Two fyke nets were deployed near the dam face in all permitted water supply dams overnight, collected on the dates listed in Table 3-1 during the eel migration season. Migrating eels exhibit distinctive morphological features and can therefore be identified from non-migrating eels during the trapping process.

### 3.2 Migrating eel

Condition 28h requires reporting on several aspects of the downstream eel transfer process, including the total weight, approximate number, and species of adult migrating eels collected for transfer. It also requires the date of collection, comments on the prevailing flow conditions (e.g., normal, flood), the site of release, and the percentage of eels caught that were successfully transferred and released.

Table 3-1 provides most of the data required by this condition. There were 19 migrating eels caught in the 2024-2025 trap and haul season, this is an increase compared to the 11 eels caught in 2023-2024. Any migrant eels caught were transferred downstream on the day of capture and the remainder of the catch was released back into dams. Flow conditions were normal on the days trapping occurred.

**Table 3-1: Total weight per day, eel species and approximate numbers caught for transfer, and the number and percentage of adult migrating eels transferred.**

Location	Date	Total	Species		Weight (g)		Length (mm)		Migrators	
		Eels	Longfin	Shortfin	Average	Largest	Average	Largest	Count	(%)
Lower Nihotupu	4/03/2025	3	0	3	340	510	550	600	0	0
	25/03/2025	6	3	3	400	600	550	750	2	33.3
	15/04/2025	0	0	0	0	0	0	0	0	0
	6/05/2025	4	1	3	1162.5	2,900	712.5	950	2	50
	27/05/2025	3	2	1	4066.7	7,700	1000	1,400	2	66.7
Lower Huia	2/04/2025	0	0	0	0	0	0	0	0	0
	23/04/2025	0	0	0	0	0	0	0	0	0
	13/05/2025	0	0	0	0	0	0	0	0	0

Location	Date	Total	Species			Weight (g)		Length (mm)		Migrators	
			Eels	Longfin	Shortfin	Average	Largest	Average	Largest	Count	(%)
	22/05/2025	0	0	0	0	0	0	0	0	0	0
	27/06/2025	0	0	0	0	0	0	0	0	0	0
Waitākere	20/03/2025	1	0	1	750	750	700	700	0	0	0
	5/06/2025	0	0	0	0	0	0	0	0	0	0
Hays Creek	19/03/2025	0	0	0	0	0	0	0	0	0	0
	24/04/2025	7	4	3	1000	2,900	671.4	1,100	1	14.3	
	28/05/2025	4	4	0	1,780	3,555	1,000	1,500	0	0	
	30/05/2025	4	4	0	3,650	6,850	912.5	1,300	1	25	
Cosseys	12/03/2025	2	2	0	2,025	3,000	750	900	0	-	
	14/03/2025	5	5	0	3,253	9,000	780	950	1	20	
	15/04/2025	0	0	0	0	0	0	0	0	-	
	18/04/2025	1	1	0	1,634	1,634	800	800	0	-	
	20/05/2025	1	1	0	400	400	400	400	0	-	
	21/05/2025	2	2	0	1142.5	1,600	825	900	0	-	
	26/06/2025	3	3	0	569.7	956	500	800	0	-	
Wairoa	5/03/2025	1	1	0	5,900	5,900	1,270	1,270	1	100	
	7/03/2025	1	1	0	1,525	1,525	570	570	1	100	
	9/04/2025	4	4	0	4,050.5	6,702	1,026.25	1,205	0	-	
	11/04/2025	0	0	0	0	0	0	0	0	-	
	14/05/2025	1	1	0	3,000	3,000	950	950	0	-	
	16/05/2025	1	1	0	3,674	3,674	1,200	1,200	1	100	
Mangatāwhiri	7/05/2025	3	3	0	2,803	5,675	916.7	1,200	1	33.3	
	9/05/2025	6	6	0	617	985	520	600	0	-	
	11/06/2025	0	0	0	0	0	0	0	0	-	
	13/06/2025	0	0	0	0	0	0	0	0	-	
Mangatangi	26/03/2025	1	1	0	1,950	1,950	960	960	0	-	
	27/03/2025	0	0	0	0	0	0	0	0	-	
	2/05/2025	7	7	0	1,205	2,390	714.3	900	6	85.7	

### 3.3 Bycatch species and weight

Perch (*Perca fluviatilis*), rudd (*Scardinius erythrophthalmus*) and carp (*Cyprinus rubrofuscus*) were caught in the dams as part of the downstream transfer and weighed onsite.

**Table 3-2: Approximate total weight of the bycatch reported during the 2024-2025 downstream trap and haul season.**

Location	Date	Species	Weight (g)
Lower Nihotupu	25/03/2025	Perch	50
		Rudd	100
Hays Creek	30/05/2025	Carp	150
Cosseys	26/06/2025	Perch	300

Location	Date	Species	Weight (g)
Upper Mangatāwhiri	2/04/2025	Common bully	34

### 3.4 Fish deaths

Fish deaths occurred on two occasions as part of the downstream transfer operations. One deceased rudd was found at Cosseys Dam on 21 May 2025, and two carp were found on 30 May 2025 at Hays Creek Dam.

## 4 SUMMARY

Upstream transfer of migrating species occurred at five Watercare dams for the 2024-2025 season: Lower Nihotupu Dam, Waitākere Dam, Hays Creek Dam, Cosseys Dam and at the Mangatangi weir. All transferred both galaxiids and elvers, with Lower Nihotupu having the greatest catch rates, consistent with previous years. Notably, a significant number of bullies were also caught at the Mangatangi weir.

The downstream transfer of migrating species was undertaken at eight Watercare dams for the season: Lower Nihotupu Dam, Lower Huia Dam and Waitākere Dam in the Waitākere Ranges and Hays Creek dam, Cosseys Dam, Wairoa Dam, Upper Mangatawhiri Dam and at the Mangatangi weir in the Hunua Ranges. Eels (migratory and non-migratory) were caught on at least one occasion at most dams, with the exception of Lower Huia Dam. Migrating eels were caught at all five Hunua Ranges dams, and only at Lower Nihotupu Dam in the Waitākere Ranges.

**Appendix A. Ministry of Primary Industries Special Permit  
737**

**Fisheries New Zealand**

Tini a Tangaroa

**SPECIAL PERMIT  
(737)**

The Director-General of the Ministry for Primary Industries (MPI) acting through his delegated officer (Director-General) and pursuant to section 97(1) of the *Fisheries Act 1996* (the Act), hereby issues a special permit to:

**Watercare Services Limited  
Private Bag 92521  
Wellesley Street  
Auckland 1141**

**Client Number: 9720100**

and agents, representatives and employees of, as part of their association with Watercare Services Limited (the permit holder), subject to the following conditions specified below.

**Purpose**

1. This special permit is issued for the following purpose specified in section 97(1)(c) of the Act:
  - a) to allow persons or agencies to take aquatic life and relocate it to a suitable habitat where this is necessary or required to mitigate adverse effects of habitat modification on the aquatic life.
2. The permit holder is permitted to take, transfer, and release native fish of the following species: shortfin and longfin eels (*Anguilla* spp.), *Galaxias* spp., *Gobiomorphus* spp., and torrentfish (*Cheimarrichthys fosteri*), irrespective of size for the above purpose.

**Term of Permit**

3. This special permit revokes and replaces special permit 610 and any previous amendments.
4. This special permit is valid from the date of signature until 1 October 2025, unless sooner varied or revoked.

**Permitted Activities**

5. This special permit allows the taking (as defined in section 2 of the Act) of aquatic life, for the purposes of relocating aquatic life, to mitigate adverse effects of habitat modification, carried out by the permit holder.
6. Fishing under the authority of this special permit for upstream migration may only be taken from the following waterways:
  - a) Hūnua area:

Page 1 of 10

- i) Cosseys Stream or its tributaries downstream of the Cosseys Dam;
      - ii) Hays Creek or its tributaries downstream of the Hays Creek Dam;
      - iii) Mangatangi stream or its tributaries downstream of the Mangatangi Weir.
    - b) Waitākere area:
      - i) Huia Stream, downstream of the lower Huia Dam;
      - ii) Nihotupu Stream, downstream of the lower Nihotupu Dam, near the spillway;
      - iii) Waitākere River, downstream of the Waitākere Dam.
7. Fishing under the authority of this special permit may be undertaken for downstream migrant eels from the following waterways:
- a) Hūnua area:
    - i) Cosseys Reservoir upstream of the Cosseys Dam;
    - ii) Hays Creek Reservoir upstream of the Hays Creek Dam;
    - iii) Wairoa Reservoir upstream of the Wairoa Dam;
    - iv) Mangatangi Reservoir upstream of the Mangatangi Dam;
    - v) Mangatawhiri Reservoir upstream of the Upper Mangatawhiri Dam.
  - b) Waitakere area:
    - i) Lower Huia Reservoir, upstream of the Huia Dam;
    - ii) Lower Nihotupu Reservoir, upstream of the Nihotupu Dam;
    - iii) Waitākere Reservoir, upstream of the Waitakere Dam.
8. New sites or species may only be added under the authority of this special permit through an amendment to the special permit. An application for inclusion of new site or species must be lodged with the Customary Fisheries and Spatial Allocations Manager (see Schedule One for contact details).
9. The permit holder is to obtain written approval from the taiāpure management committee or Tangata Kaitiaki/Tiaki prior to fishing in any taiāpure–local fisheries or mātaītai area. The permit holder should contact the relevant Fisheries Compliance Team Manager (see contact details in Schedule One) for current details of taiāpure–local fisheries or mātaītai reserves in the area where collection is proposed.
10. The permit holder is to consult with Waikato-Tainui before fishing in Waikato Tainui’s rohe (illustrated as area A on the Iwi map attached in Schedule Two). The permit holder should avoid fishing in wāhi tapu areas within area A. To determine areas of significance to Iwi, the permit holder is advised to contact local marae in areas where fishing is to take place. Local marae details can be obtained from Waikato Raupatu River Trust [ph. (07) 858 0400].
11. Any transfer of native fish may only be undertaken with an appropriate approval pursuant to section 26ZM(2) of the *Conservation Act 1987*, or any statutory re-enactment or amendment of that provision.

**Fishing Conditions**

12. No fish, aquatic life, or seaweed may be taken for personal use or collection, to provide for broodstock for commercial production, or for sale, bait or berley, while fishing under the authority of this special permit.
13. For the purpose of fishing pursuant to this special permit, the permit holder is authorised to use:
  - a) Fyke nets irrespective of mesh size (escapement tubes blocked if required);
  - b) A floating pontoon set trap with wings and holding pen;
  - c) Dip nets irrespective of mesh size;
  - d) Mesh liners may be used on fyke nets to meet the desired net mesh size;
  - e) A fish trap with a ramp, shaded holding tank and using a fish attractant;
  - f) Any other catching device as approved by the Customary Fisheries and Spatial Allocations Manager;
  - g) Any suitable vessel.
14. Any fishing equipment left unattended must be clearly labelled with the permit holder's name and the words: "Fisheries New Zealand Special Permit No. 737".
15. Explosive or toxic gas, or toxic, poisonous, or narcotic substance must not be used to take native fish under the authority of this special permit unless prior written approval is obtained from the Customary Fisheries and Spatial Allocations Manager, Fisheries New Zealand.
16. Any vessel(s) nominated to fish under the authority of this special permit must not engage in commercial fishing for any species under the authority of a fishing permit, issued under section 91 of the Act, while fishing under the authority of this special permit. Unless written approval is obtained from a Regional Fisheries Compliance Team Manager prior to fishing. For the purposes of interpretation, 'commercial fishing' is defined as the taking of fish, aquatic life, or seaweed within New Zealand fisheries waters for the purpose of sale.

**Disposal Conditions**

17. Any bycatch species caught while fishing under the authority of this special permit shall be released at the point of capture with the exception of dead, diseased or unwanted aquatic life<sup>1</sup>. The permit holder shall take measures as appropriate to minimise the capture of non-target species (eg. trout). These may include appropriate placement of fishing gear and using grills or coarse mesh.
18. The permit holder must not use any fish or aquatic life taken under this permit for personal use or collection, to stock a fish farm or use as food on a fish farm, for consumption, or for bait.
19. Native fish that cannot be returned alive to the environment (including dead, diseased or contaminated eels), must be humanely killed and disposed of in a biosecure manner, after relevant data has been collected, as per appendices.

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<sup>1</sup> Unwanted aquatic life as defined in section 2 of the *Fisheries Act 1996*.

*Upstream migrants*

20. Fish taken under this special permit may be held in a 'holding pen' at the point of capture for a period of no more than 7 days. Fishing equipment should be inspected more frequently during peak migration or following floods. Releases of fish may not be made beyond any natural barrier (as natural recruitment processes should determine passage beyond these points).

*Downstream migrants*

21. Eels taken under this special permit as adult downstream migrants may be held at the specific capture sites for a maximum of 72 hours from the time of capture and are to be released as follows:
- a) Eels taken from the lower Nihotupu Reservoir: either below the Nihotupu Dam or in the Huia Stream below the lower Huia Dam;
  - b) Eels taken from all other reservoirs: at a point in the river catchment from which they were taken where their subsequent migration is unhindered by any manmade barrier.
22. All non-migrant eels collected shall be released upstream of the collection point.

**Biosecurity Conditions**

23. In order to eliminate the risk of transferring species declared as noxious or unwanted organisms within the aquatic environment, the permit holder must screen catch for signs of disease or morbidity and any unwanted aquatic life before transportation.
24. During the collection fish, aquatic life, or seaweed the permit holder shall ensure that no aquatic plant, noxious fish, or unwanted organism, including eggs and larvae of noxious fish or unwanted organisms, is introduced into any other waterway, either from the water holding the collected fish, aquatic life, or seaweed, or enmeshed in fishing gear.
25. To prevent the spread of unwanted aquatic plants and animals, all equipment used in the collection and removal of fish, aquatic life or seaweed must be thoroughly checked, cleaned and dried before and after being used for fishing under this special permit:
- a) all equipment used in the transport, holding and release of aquatic life should be treated, as outlined below, before being used again:
    - i. all non-fibrous (metal and plastic) smooth surfaced equipment is to be thoroughly cleaned using freshwater (chlorinated town supply water, bore water or collected rain water); and
    - ii. any non-fibrous smooth surfaced equipment that can retain water such as under seals and hollows within handles etc. must be dismantled in such a way that all surfaces can be thoroughly cleaned using freshwater (chlorinated town supply water, bore water or collected rain water); and
  - b) all other equipment must be:
    - i. immersed for a minimum of 30 seconds, in a water bath heated to at least 50° C; or

- ii. immersed in water, for a minimum of 5 minutes containing at least 35 g of sodium chloride per litre.
26. The permit holder must notify Biosecurity New Zealand's emergency hotline (0800 809 966) as soon as practicable should it observe unwanted or unusual organisms, including any distressed, diseased, or moribund aquatic life during any of its operations. None of the above organisms or contaminated water, should be released into any waterway and samples should be kept for Biosecurity New Zealand investigation. Samples should be chilled not frozen, or as advised after contacting Biosecurity New Zealand.

### Reporting Requirements

27. The permit holder shall supply an annual report of all work undertaken under the authority of this special permit to the Customary Fisheries and Spatial Allocations Manager, Fisheries New Zealand (see contact details in Schedule One). This report shall be supplied no later than the 31<sup>st</sup> of August of each year. A nil return shall be made if no collection activities are undertaken by the 31<sup>st</sup> August of each year.
28. The report should contain the following information:

#### *Upstream transfers*

- a) the species and approximate total weight of each species collected for transfer, and the date of collection;
- b) the total weight of elvers (ie, less than 20 g in weight) collected for transfer, and the date of collection;
- c) the total weight of juvenile eels (ie, greater than 20 g in weight) collected for transfer, and the date of collection;
- d) the species and total weight of each bycatch species caught, and which method or specific trap resulted in their capture;
- e) numbers of each species that die before release of the fish can occur;
- f) the total weight of each species released at each respective release site, the location of the site, and date of respective releases;
- g) the number and type of collection mechanisms employed, and any factors that reduced collection efficiency.

#### *Downstream transfers*

- h) the total weight, approximate number and species of adult migrating eels collected for transfer, and the date of collection, including comment on the flow conditions that prevailed on that date (eg, normal, flood), the site of release, and the percentage caught that were transferred and released;
- i) the species and total weight of each bycatch species caught, and which method or specific trap resulted in their capture;

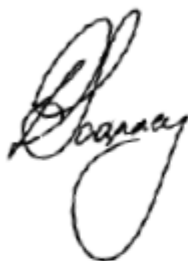
- j) numbers of each species that die before release of the fish can occur;
  - k) the number and type of collection mechanisms employed, and a brief description of how they work.
29. To obtain useful data for the management of native eel fisheries, the permit holder is also required to:
- a) record the number and total weight of shortfin and longfin elvers in a representative sample of the catch (100 elvers) at 15 day intervals, when catch allows. For the purpose of this data collection elvers are those up to 20 g in weight;
  - b) supply electronic records (in Excel or txt format) on fish caught for entry into the New Zealand Freshwater Fish or eel recruitment database (currently maintained by NIWA) to Fisheries New Zealand with the annual report required by condition 27.
30. For any projects, or part projects that are carried out in Waikato-Tainui's rohe (area A in Schedule Two) a summary report of those projects must be submitted to Waikato Raupatu River Trust annually (see contact details in Schedule One).
31. For the purpose of this permit, the permit holder is not required to meet the requirements of the *Fisheries (Reporting) Regulations 2017* and the *Fisheries (Geospatial Position Reporting) Regulations 2017*.

#### General Conditions

32. Except as otherwise expressly provided, the provisions of the Act or any regulation, notice, direction, restriction, requirement, or condition under the Act will apply to any fishing, or any person engaged in fishing, under this special permit.
33. The permit holder must ensure that all personnel, read, understand and are fully conversant with the conditions of the special permit before the taking aquatic life commences under this special permit.
34. This special permit must be held at the permit holder's premises. The permit holder or their employees or agents at the location, must have a copy of this special permit in their possession while collecting aquatic life under the authority of this special permit. In all cases, copies of this special permit must be produced for sighting on request by a Fishery Officer.
35. The Director-General (or his delegate) may amend, add or revoke any conditions to this special permit, or revoke this special permit by notice in writing to the permit holder.
36. This special permit does not preclude the permit holder from complying with any other statutory requirement from any other governing agency.
37. No fishing undertaken, or catch taken or otherwise possessed under this special permit shall give rise to any right, privilege, or expectation or preference in regard to the granting of any future permit, license, authorisation, quota, catch history, individual catch entitlement or other right whatsoever under the Act.

38. Failure to comply with the conditions of this special permit can, at the discretion of the delegated officer, result in the revocation of the permit. Every person commits an offence who contravenes any term or condition placed on this special permit and is liable to a fine not exceeding \$100 000.

DATED at Nelson on the 9<sup>th</sup> of June 2020.



**David Scranney**

Manager Customary Fisheries and Spatial Allocations

Acting pursuant to a delegation issued under Section 41 of the State Sector Act 1988.

**SCHEDULE ONE:  
Contact Details**

**Fisheries New Zealand Manager Customary Fisheries and Spatial Allocations can be contacted by the following:**

Nelson David Scranney  
Tel (03) 548 1069  
Email: [David.Scranney@mpi.govt.nz](mailto:David.Scranney@mpi.govt.nz)  
cc. [Christine.Bowden@mpi.govt.nz](mailto:Christine.Bowden@mpi.govt.nz)

**Fisheries Compliance Regional Manager can be contacted by the following:**

Upper North Island Stephen Rudsdale  
Tel (09) 470 0580  
Email [Stephen.Rudsdale@mpi.govt.nz](mailto:Stephen.Rudsdale@mpi.govt.nz)  
cc. [Charlene.Sutton@mpi.govt.nz](mailto:Charlene.Sutton@mpi.govt.nz)

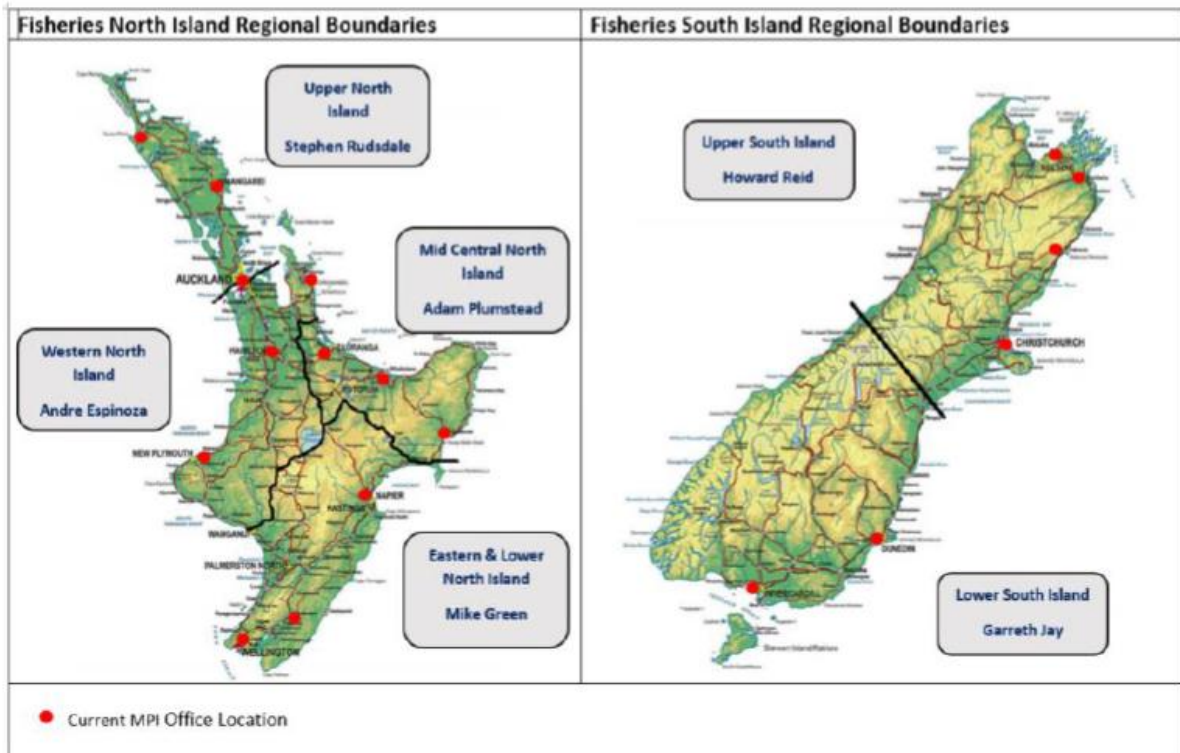
Western North Island Andre Espinoza  
Tel (09) 820 7742  
Email: [Andre.Espinoza@mpi.govt.nz](mailto:Andre.Espinoza@mpi.govt.nz)  
cc. [Louise.Kay@mpi.govt.nz](mailto:Louise.Kay@mpi.govt.nz)

**Waikato-Tainui River Iwi can be contacted on the following:**

Hamilton Taroi Rawiri  
Waikato-Tainui Environmental Manager  
Waikato Raupatu River Trust  
Private Bag 3344 Hamilton  
Tel: (07) 858 0400  
Email: [taroi.rawiri@tainui.co.nz](mailto:taroi.rawiri@tainui.co.nz)

**NIWA agent for otolith submissions can be contacted by the following:**

Christchurch Dr Shannan Crow  
NIWA  
10 Kyle Street  
Riccarton  
Tel: 027 291 9119  
Email: [shannan.crow@niwa.co.nz](mailto:shannan.crow@niwa.co.nz)



**SCHEDULE TWO**  
**Map of Waikato co-governance areas;**  
**Waikato-Tainui's rohe is area A**

