Upper and Lower Nihotupu Dams and Pipelines

2024-2025 Annual Report

Final - November 2025

Watercare

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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	

APPROVED

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 Nihotupu 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 5,930,924 m^3 from the Upper Nihotupu Dam and 9,295,590 m^3 from the Lower Nihotupu Dam, measured accurately with Magflow meters
- Reservoir levels: Both dams were continuously monitored, showing average daily reservoir levels within the expected range. The Upper Nihotupu Dam ranged between 16.7 and 33.9 meters, while the Lower Nihotupu Dam ranged between 12.4 and 15.7 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 78 days at the Upper Nihotupu Dam and on 74 days at the Lower Nihotupu Dam. The required compensation flows were not met on two 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. Periphyton levels below recommended thresholds for benthic biodiversity protection. The macroinvertebrate community index showed stable results.
- Fisheries management: Six migrating eels were transferred downstream during the 2024-2025 season.
- Pipeline and free discharge valve operations: No scour valve operation occurred along the Nihotupu pipeline during this period. Regular free discharge valve operations and maintenance were performed at the dams, with turbidity levels monitored before and after discharges to ensure compliance with environmental standards when health and safety allowed.
- 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 monitoring results required annually by the following resource consents for the Upper Nihotupu Dam: 36644 (WAT60275196), 36645 (LUS60273056), 36646 (WAT60275184), 36647 (DIS60264202), 36648 (DIS60264758), and Lower Nihotupu Dam: 36649 (WAT60274754), 36650 (LUS60273034), 36651 (WAT60274764), 36652 (DIS60263575), and 36653 (DIS60264191).

This report also covers the annual reporting requirements of dam pipelines consents 25314 (DIS60263544), 25315 (DIS60263555), 25316 (LUS60273021).

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	Condition 2 (iii – iv) Condition 3

2 WATER USAGE

The daily quantity of water being taken from the Upper and Lower Nihotupu reservoirs are measured by Magflow meters. These meters are on the pipeline in the diversion tunnel chamber under Upper Nihotupu Dam and on the pipeline before the pump station at Lower Nihotupu Dam. The meters measure to an accuracy of ± 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 5,930,924 m^3 was abstracted from Upper Nihotupu Dam and 9,295,590 m^3 from Lower Nihotupu Dam.

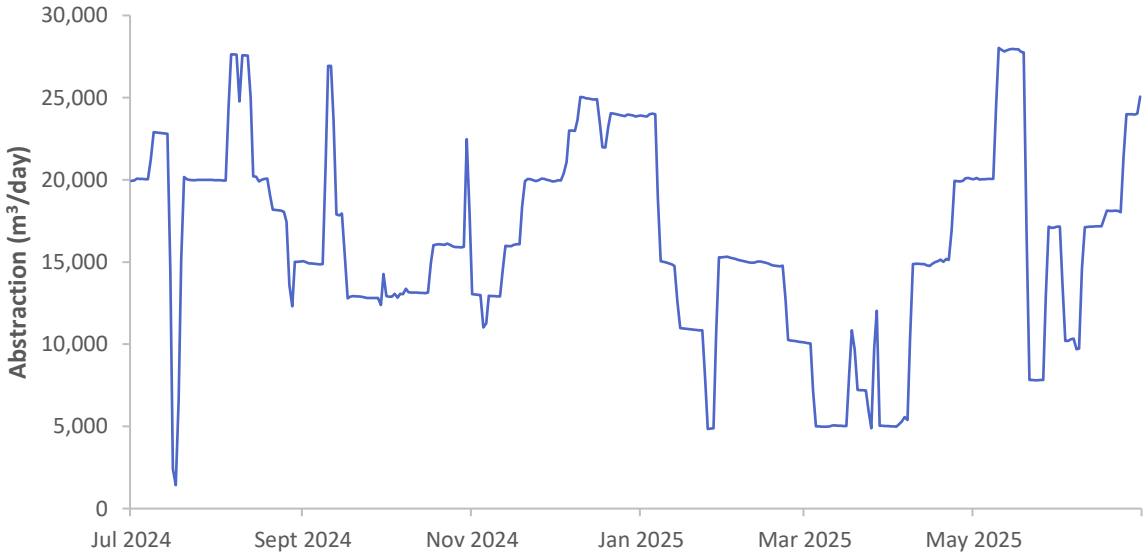

Figure 2-1: Total daily abstraction from Upper Nihotupu Dam for 2024-2025.

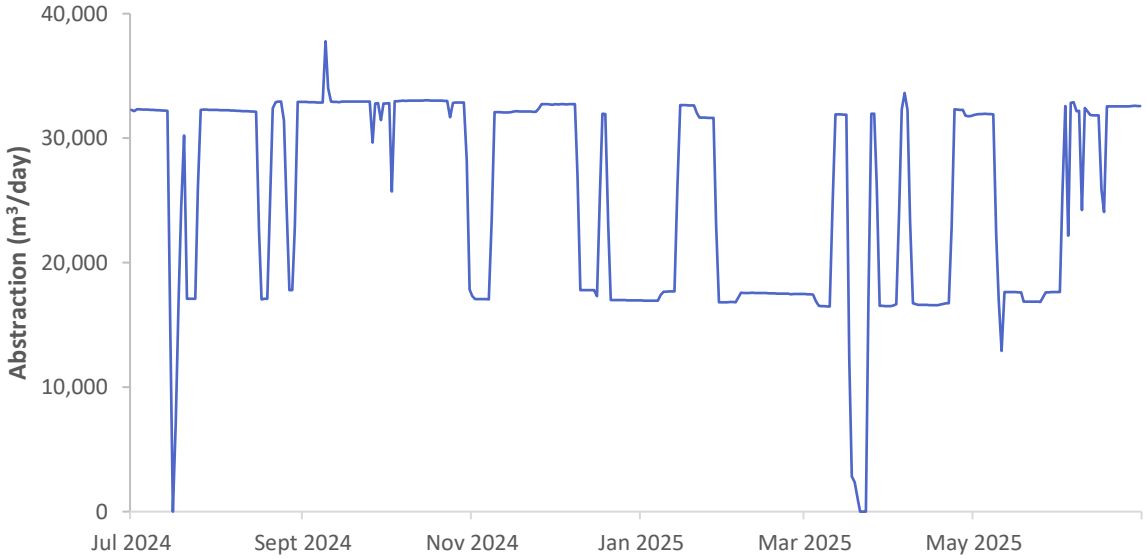

Figure 2-2: Total daily abstraction from Lower Nihotupu Dam for 2024-2025.

3 RESERVOIR LEVEL

The reservoir levels are monitored continuously on SCADA by level transmitters located in the towers of both Upper and Lower Nihotupu 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 Nihotupu Dam ranged between 16.7 – 33.9 m and Lower Nihotupu Dam was between 12.4 – 15.7 m.

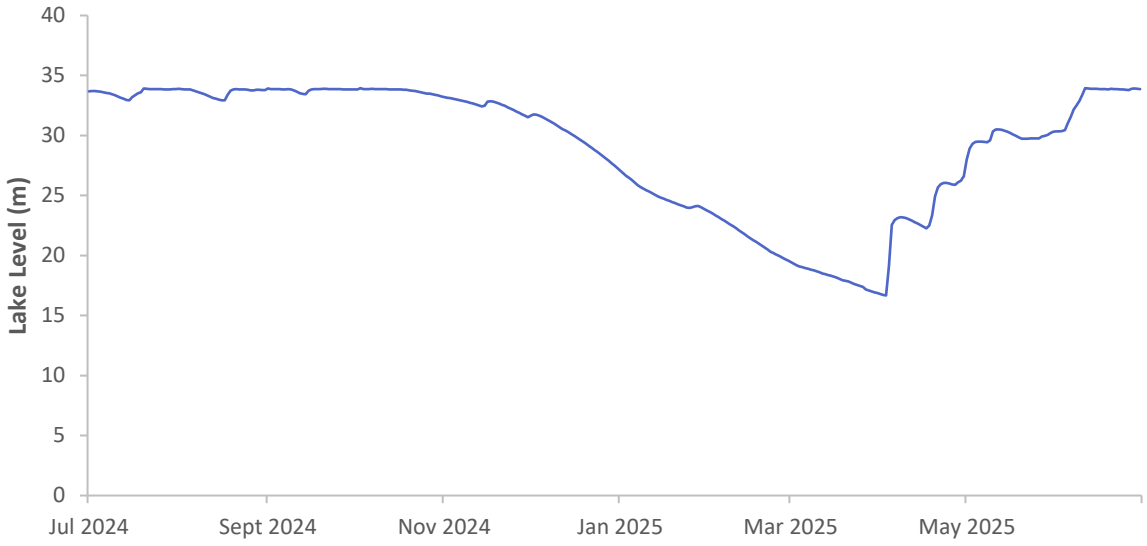

Figure 3-1: Reservoir daily average level for Upper Nihotupu Dam for 2024-2025.

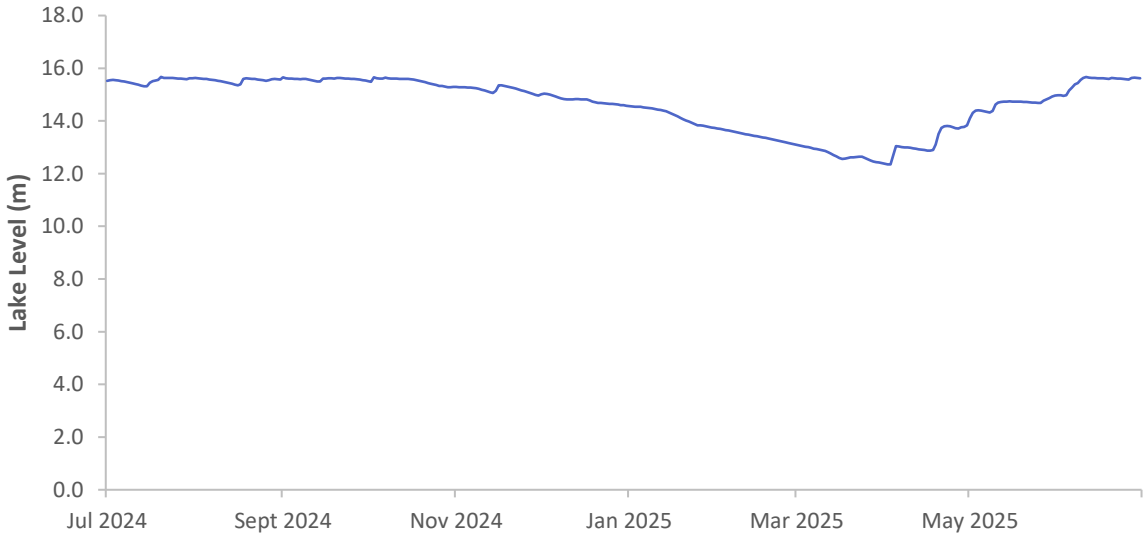

Figure 3-2: Reservoir daily average level for Lower Nihotupu Dam for 2024-2025.

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.

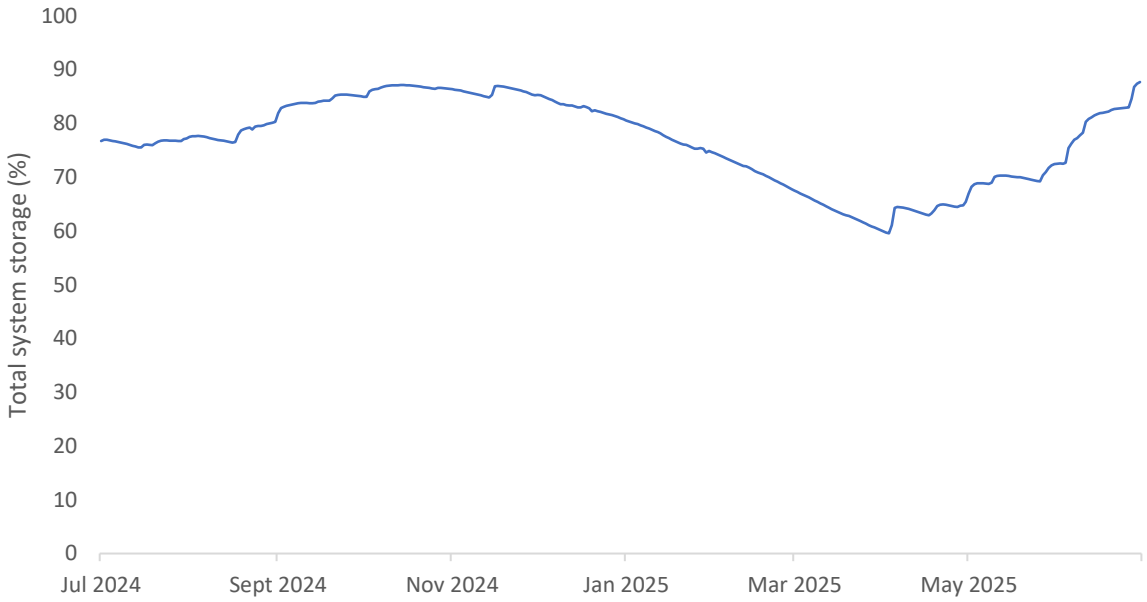

Figure 4-1: Total system storage for 2024-2025.

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 Nihotupu Dam spilled on 78 days during the reporting period, whereas Lower Nihotupu Dam spilled on 74 days.

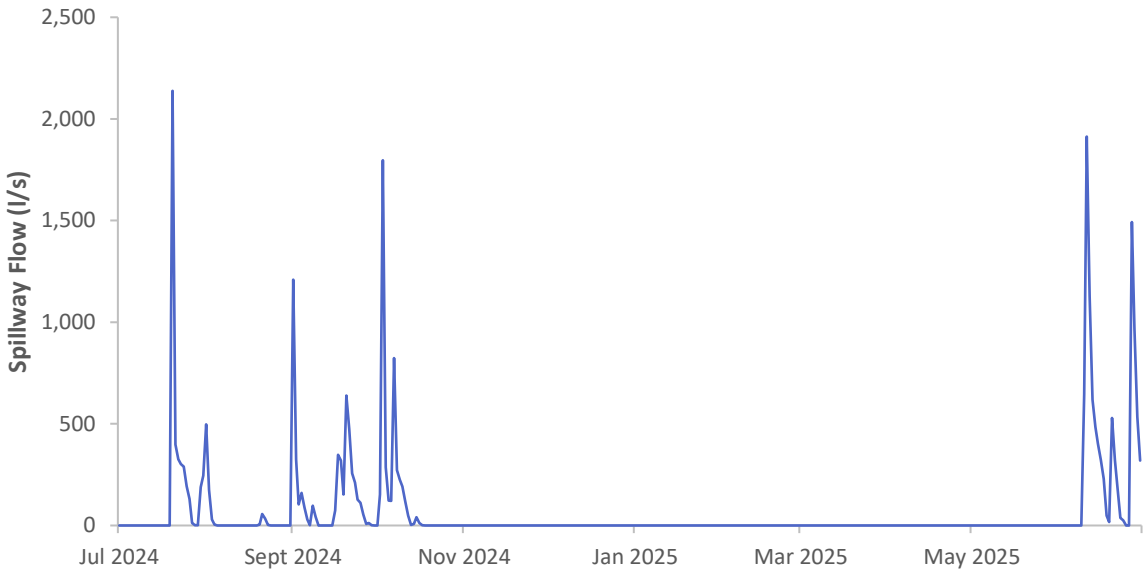

Figure 5-1: Spillway flows from Upper Nihotupu Dam for 2024-2025.

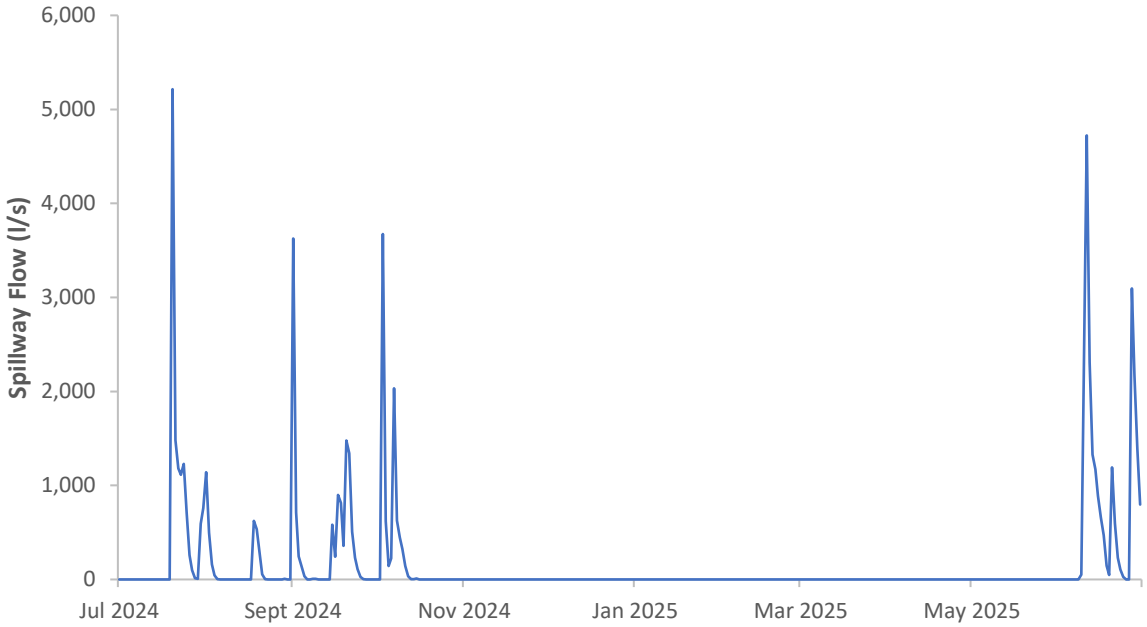

Figure 5-2: Spillway flows from Lower Nihotupu Dam for 2024-2025.

6 COMPENSATION FLOW

The Upper Nihotupu 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. The meters measure to an accuracy of at least ± 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. Flow changes are required within 24 hours of the daily calculation of total system storage.

Total system storage increased above 79% on 18 August 2025, but compensation flow and spillway flows combined were below 90 L/s on 23 and 24 August 2025 until control system changes were made on 25 August. On the 25 August, the daily total compensation flow was below the target, but higher than previous days, highlighting the change made to the system on this day. The delay to make control system changes reflects 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.

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

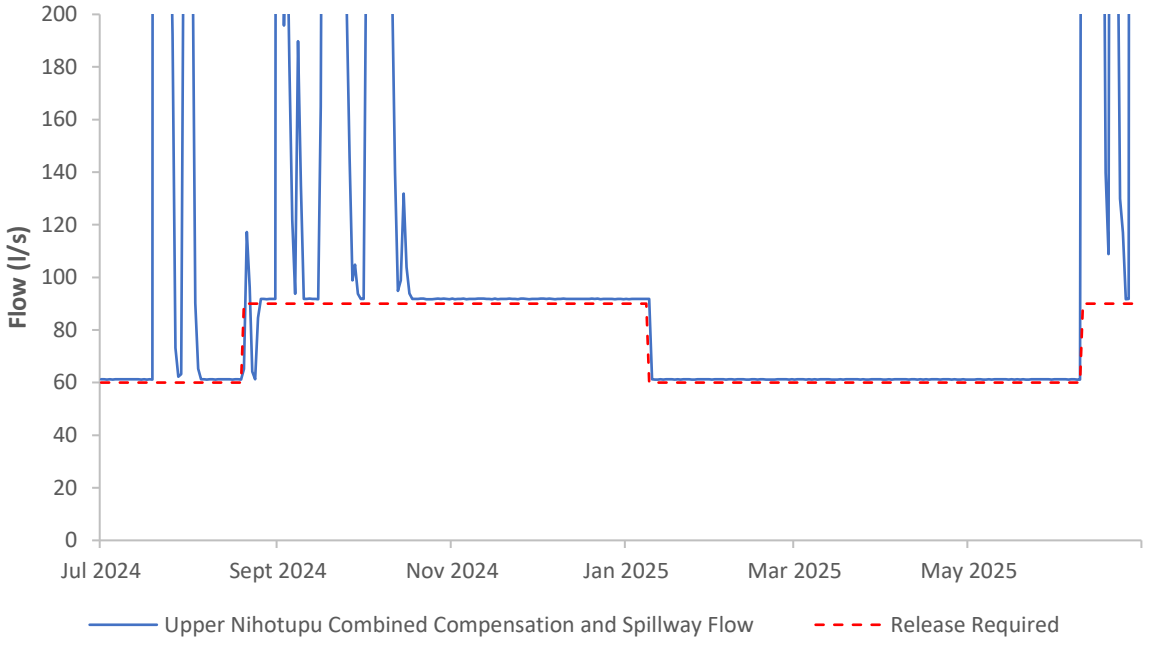

Figure 6-1: Upper Nihotupu Dam combined compensation and spillway flows for 2024-2025

7 FISHERIES MANAGEMENT

Fisheries management for the upstream and downstream transfer of native fish is ongoing at Lower Nihotupu Dam. Ministry of Primary Industries approval has been granted for this work under Special Permit 737. 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.

During upstream migration, 2,837 elvers and 89 galaxiids were transferred into Lower Nihotupu Dam. Six migrating eels were caught in the Lower Nihotupu Dam during the monitoring period.

8 FREE DISCHARGE VALVE OPERATIONS

The consent requires flushing flows to occur every month at Upper Nihotupu Dam from December to March to maintain the health of aquatic ecosystems and aesthetic values. Short discharges are also undertaken at both dams each year to open the discharge valve as part of routine maintenance. As per the conditions of the consent, turbidity was measured downstream of the discharge point for maintenance and safety discharges approximately 30 minutes before discharge commenced and between 60 and 120 minutes after the discharge valve has been opened. At Upper Nihotupu Dam, samples are only taken when it is safe to do.

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 Nihotupu Dams for the reporting period 2024-2025.

Location	Date	Duration of discharge	Turbidity before (NTU)	Turbidity during/after (NTU)
Upper Nihotupu	18 September 2024	14 minutes	4.11	4.35
Lower Nihotupu	25 September 2024	16 minutes	7.45	12.80
Upper Nihotupu	10 December 2024	3 hours	-	-
Upper Nihotupu	14 January 2025	3.5 hours	-	-
Upper Nihotupu	11 February 2025	3 hours	2.56	2.56
Upper Nihotupu	11 March 2025	3 hours	-	-
Lower Nihotupu	16 June 2025	2 minutes	7.65	7.40
		5 minutes		

9 NETWORK EFFICIENCY AND CONSERVATION

Watercare has published the Auckland Water Efficiency Plan 2021 to 2025[1], 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.

[1] 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 Nihotupu Dam Pipelines, then photos must be taken. Condition iv) states that these must be sent to Auckland Council annually.

No scour valve operations occurred along the Nihotupu raw watermain in the 2024-2025 reporting period.

11 ENVIRONMENTAL MONITORING

11.1 Overview

Condition 5 requires water quality, macroinvertebrate and habitat monitoring of three established sites in the Nihotupu catchment, two of these located along the Nihotupu River between the Upper and Lower Nihotupu Dams, and a control site above the Upper Nihotupu Dam. Monitoring is undertaken by Watercare Laboratory Services. Site B was not established due to lack of safe access.

Fish surveys are required on a five-yearly basis, at a site below the Upper Nihotupu Dam for the purpose of assessing instream values. The surveys are conducted by Tonkin + Taylor and was most recently completed in March 2021. The next survey is required in 2026.

11.2 Monitoring sites

The location of the monitoring sites is shown in Figure 11-4. All sites are located at riffle habitats.

11.2.1 Site A (Control)

36°56'27.9"S 174°33'26.1"E

The Site A (control Site) monitoring location shown in Figure 11-1 is located on the Nihotupu River, upstream of the Upper Nihotupu Dam.

Figure 11-1: Site A, looking downstream (March 2025).

11.2.2 Site C

36°57'22.6"S 174°35'09.6"E

The Site C monitoring site shown in Figure 11-2 is located on the Nihotupu River, 3.26 km below the toe of Upper Nihotupu Dam, and above the confluence with the David Stream.

Figure 11-2: Site C, looking upstream (March 2025).

11.2.3 Site D

36°57'15.0"S 174°35'55.7"E

The Site D monitoring site shown in Figure 11-3 is located on the Nihotupu Stream, approximately 2.29 km downstream of Site C and 5.55 km downstream of the Upper Nihotupu Dam. The site is located shortly upstream of the Lower Nihotupu Dam and raw watermain pipe bridge.

Figure 11-3: Site D, looking downstream (January 2025).

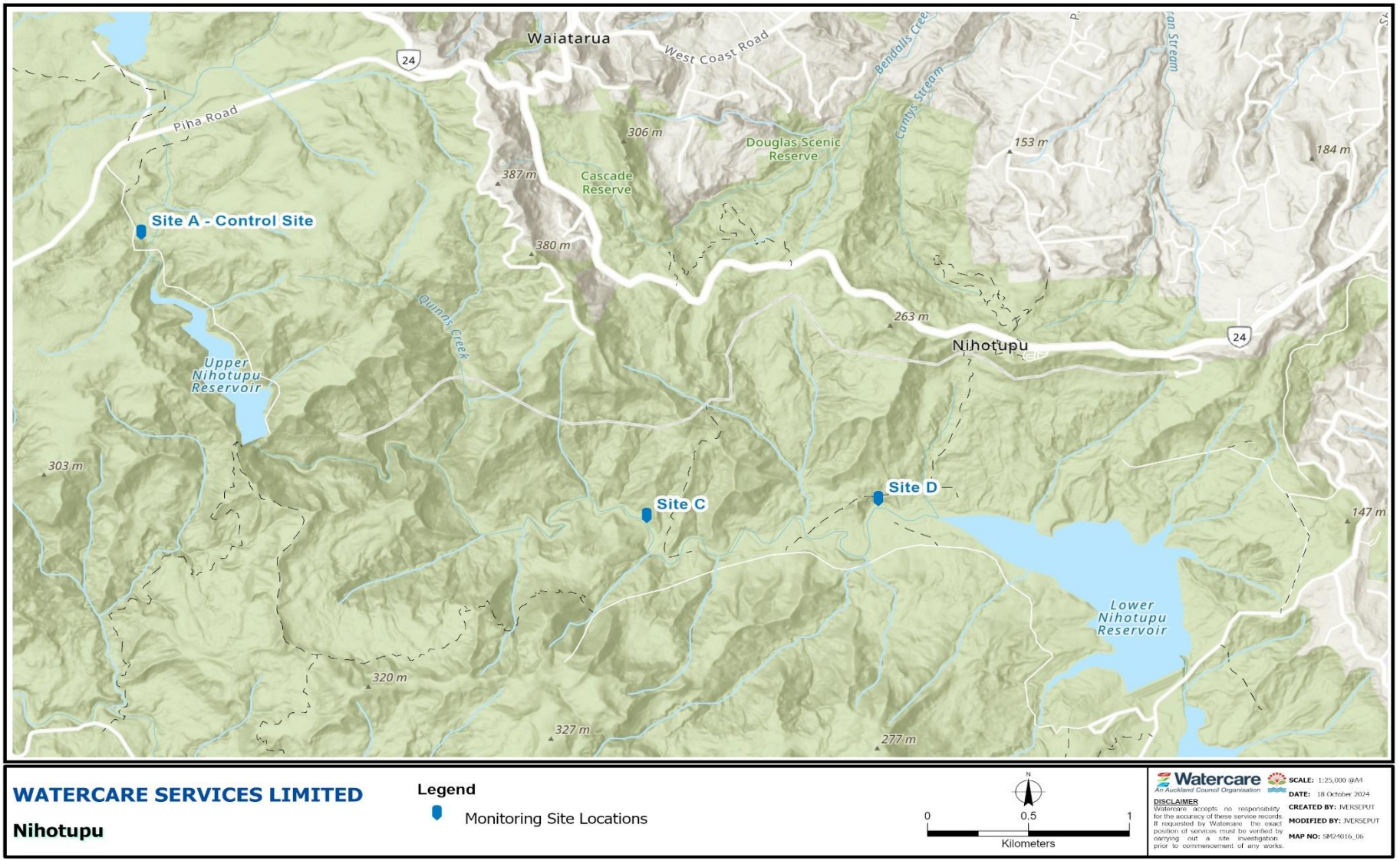

Figure 11-4: Nihotupu catchment monitoring locations.

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[2].

Table 11-1: Monthly water quality parameters.

Parameter	Units
Temperature*	˚C
Suspended solids	g/m³
pH	pH Unit
Conductivity (at 25 °C)*	µS/cm[1]
Turbidity	NTU
Black disc transparency (visual clarity)*	m
Dissolved oxygen (DO)*	g/m³
Dissolved reactive phosphorus (DRP)	gP/m³
Total phosphorous	gP/m³
Ammonia nitrogen (NH4–N)	gN/m³
Nitrate nitrogen (NO3–N)	gN/m³
Periphyton (*Chlorophyll a, b, & c*)**	mg/m²

*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

[2] 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 2020-2021. The next monitoring is required in 2025-2026.

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[3]. 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	-

[3] 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

The water quality results for the 2024-2025 monitoring period are summarised in Table 11-5. Water quality across Sites A (control), C, and D (downstream) was relatively consistent, suggesting minimal dam-related degradation. pH values were near-neutral and dissolved oxygen remained high (≈ 10 mg/L at all sites), indicating well-oxygenated conditions suitable for aquatic life. Turbidity and suspended solids were low, suggesting stable bank conditions and low sediment inputs.

Nutrient concentrations were low at all sites, and within the highest NPS-FM 2020 attribute bands for rivers (for example, Ammoniacal-N ≤ 0.24 mg/L = Band A). This indicates that nutrient enrichment is minimal and unlikely to stimulate excessive algal growth.

Chlorophyll a was highest on average at the control site A and lowest at Site C. Chlorophyll b and c followed similar patterns, confirming low periphyton productivity across the reach. All sites are below the recommended maximum chlorophyll *a* value (50 mg/m^2) for the protection of benthic biodiversity[4].

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

Parameter	Unit	Site A	Site C	Site D
Ammoniacal Nitrogen	mg/L	0.005 ± 0	0.005 ± 0	0.005 ± 0
Chlorophyll a	mg/L	3.7 ± 8.5	0.9 ± 1.1	1.6 ± 2.3
Chlorophyll b	mg/L	0.6 ± 1.2	0.3 ± 0.9	0.6 ± 1.4
Chlorophyll c	mg/L	0.3 ± 0.7	0 ± 0	0.1 ± 0.1
Conductivity	µS/cm	120 ± 12.4	120 ± 8.8	130 ± 8.8
DO	mg/L	9.9 ± 0.9	9.9 ± 1.3	10 ± 1.2
DRP	mg/L	0.009 ± 0.002	0.004 ± 0.001	0.005 ± 0.001
Nitrate	mg/L	0.005 ± 0.006	0.004 ± 0.004	0.002 ± 0.001
Suspended Solids	mg/L	2.3 ± 1.8	3.6 ± 5.2	2 ± 2.9
Temperature	°C	15.2 ± 2.3	16.7 ± 2.8	16.7 ± 2.9

[4] https://environment.govt.nz/assets/Publications/Files/nz-periphyton-guide-jun00.pdf

Parameter	Unit	Site A	Site C	Site D
Total Phosphorus	mg/L	0.016 ± 0.003	0.007 ± 0.005	0.008 ± 0.005
Turbidity	NTU	2.8 ± 0.7	1.8 ± 1	1.3 ± 1.1
Visual Clarity	m	1.2 ± 0.4	1.7 ± 0.4	1.6 ± 0.9
pH	pH unit	7.2 ± 0.2	7.1 ± 0.2	7.3 ± 0.2

11.6 Macroinvertebrate and habitat monitoring

Winter MCI scores were similar among sites, all within the "good" to "excellent" range under Stark & Maxted (2007). Summer MCI was lower at Site A ("fair") than at downstream Site D ("good"), suggesting seasonal variability rather than cumulative impact.

EPT taxa richness (pollution-sensitive groups) was highest at Site D (summer) and lowest at Site A (summer), indicating slightly improved habitat heterogeneity downstream. Total individuals were highest at Site A in summer (> 240 ind/m²), reflecting suitable riffle habitat and stable flows, though Site C data were incomplete.

Overall, macroinvertebrate assemblages indicate stable to improving ecological quality downstream, with no evidence of severe degradation attributable to dam operations.

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

Season	Metric	Site A	Site C	Site D
Winter	EPT taxa	3.8 ± 3.3	4.6 ± 1.4	4.4 ± 1.4
Summer	EPT taxa	2.6 ± 1.1	N/A	6.2 ± 3.3
Winter	Individuals	90.6 ± 113.5	37.8 ± 24.1	14.4 ± 12.2
Summer	Individuals	241.2 ± 428.9	N/A	165.4 ± 121.9
Winter	MCI	98 ± 22.4	98 ± 12.8	95 ± 8.8
Summer	MCI	76.4 ± 11.5	N/A	91.2 ± 13
Winter	QMCI	4.2 ± 1	4 ± 0.9	4.4 ± 0.7
Summer	QMCI	3.2 ± 1.4	N/A	3.6 ± 0.7
Winter	Taxa richness	7.4 ± 6.4	8 ± 2	6.6 ± 1.9
Summer	Taxa richness	8.6 ± 2.6	N/A	11.6 ± 6.2

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 Table 11-8 and displayed in Figure 11-5.

Long-term analysis (2013–2025) shows: decreasing chlorophyll a, b, and c at all sites — suggesting declining periphyton biomass over time, likely linked to the decreasing dissolved reactive phosphorus at all sites, notably at Site C. Total phosphorus decreased at Site D only, supporting evidence of improving nutrient condition downstream.

There is a slight increase in conductivity at the control site only, but not downstream, possibly reflecting natural mineral variation. pH decreased slightly at all sites, though remaining within

neutral range — a minor trend without ecological concern. Visual clarity decreased slightly at all sites, though values remain high (> 1 m), suggesting minor, non-significant variability.

For EPT taxa and Taxa richness, Sites C and D show significant increases, while the control (Site A) shows significant decreases. Additionally, both Sites C and D show significant increases in total individuals, whereas Site A does not. The control site (Site A) shows consistent declines in MCI, QMCI, EPT taxa, and richness, indicating natural variation or possible localised degradation unrelated to the operation of the Dam.

The macroinvertebrate results also show no evidence of declining water or habitat quality downstream; may even reflect improving conditions. Overall, stream condition is stable or improving, and trends are also consistent with natural variability rather than degradation.

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

Monitoring site	Metric	Unit	Mean ± 95% CI	Tau	p-value	Trend
Site A	Ammoniacal Nitrogen	mg/L	0.006 ± 0.001	-0.08	0.42	No significant trend
Site C	Ammoniacal Nitrogen	mg/L	0.006 ± 0.001	-0.24	0.02	Decreasing
Site D	Ammoniacal Nitrogen	mg/L	0.006 ± 0.001	-0.11	0.27	No significant trend
Site A	Chlorophyll A	mg/L	9.6 ± 3.0	-0.19	0.03	Decreasing
Site C	Chlorophyll A	mg/L	5.1 ± 1.9	-0.39	0.00	Decreasing
Site D	Chlorophyll A	mg/L	6.0 ± 1.7	-0.40	0.00	Decreasing
Site A	Chlorophyll B	mg/L	2.1 ± 0.7	-0.21	0.01	Decreasing
Site C	Chlorophyll B	mg/L	0.3 ± 0.1	-0.40	0.00	Decreasing
Site D	Chlorophyll B	mg/L	1.5 ± 1.8	-0.37	0.00	Decreasing
Site A	Chlorophyll C	mg/L	0.6 ± 0.2	-0.19	0.03	Decreasing
Site C	Chlorophyll C	mg/L	0.5 ± 0.2	-0.47	0.00	Decreasing
Site D	Chlorophyll C	mg/L	1.0 ± 1.0	-0.49	0.00	Decreasing
Site A	Conductivity	µS/cm	109.9 ± 3.7	0.20	0.02	Increasing
Site C	Conductivity	µS/cm	115.0 ± 3.5	0.11	0.21	No significant trend
Site D	Conductivity	µS/cm	127.0 ± 6.2	0.15	0.09	No significant trend
Site A	DO	mg/L	10.1 ± 0.2	-0.06	0.46	No significant trend
Site C	DO	mg/L	9.9 ± 0.2	0.05	0.61	No significant trend
Site D	DO	mg/L	10.0 ± 0.2	0.03	0.76	No significant trend
Site A	DRP	mg/L	0.010 ± 0.001	-0.21	0.02	Decreasing
Site C	DRP	mg/L	0.006 ± 0.001	-0.38	0.00	Decreasing

Monitoring site	Metric	Unit	Mean ± 95% CI	Tau	p-value	Trend
Site D	DRP	mg/L	0.008 ± 0.001	-0.43	0.00	Decreasing
Site A	Nitrate	mg/L	0.006 ± 0.001	0.12	0.19	No significant trend
Site C	Nitrate	mg/L	0.006 ± 0.002	0.09	0.35	No significant trend
Site D	Nitrate	mg/L	0.005 ± 0.002	-0.01	0.96	No significant trend
Site A	pH	pH unit	7.4 ± 0.1	-0.40	0.00	Decreasing
Site C	pH	pH unit	7.4 ± 0.1	-0.42	0.00	Decreasing
Site D	pH	pH unit	7.5 ± 0.1	-0.38	0.00	Decreasing
Site A	Suspended Solids	mg/L	1.8 ± 0.3	-0.04	0.63	No significant trend
Site C	Suspended Solids	mg/L	2.3 ± 0.7	0.06	0.52	No significant trend
Site D	Suspended Solids	mg/L	1.8 ± 0.4	0.01	0.89	No significant trend
Site A	Temperature	°C	14.5 ± 0.6	0.03	0.76	No significant trend
Site C	Temperature	°C	16.4 ± 0.8	-0.01	0.92	No significant trend
Site D	Temperature	°C	16.0 ± 0.9	0.06	0.48	No significant trend
Site A	Total Phosphorus	mg/L	0.016 ± 0.002	-0.05	0.61	No significant trend
Site C	Total Phosphorus	mg/L	0.012 ± 0.002	-0.13	0.15	No significant trend
Site D	Total Phosphorus	mg/L	0.014 ± 0.002	-0.24	0.01	Decreasing
Site A	Turbidity	NTU	3.1 ± 0.3	-0.07	0.45	No significant trend
Site C	Turbidity	NTU	2.5 ± 0.5	0.15	0.08	No significant trend
Site D	Turbidity	NTU	2.4 ± 0.4	0.11	0.22	No significant trend
Site A	Visual Clarity	m	27.6 ± 52.3	-0.22	0.01	Decreasing
Site C	Visual Clarity	m	19.1 ± 34.8	-0.18	0.04	Decreasing
Site D	Visual Clarity	m	20.9 ± 38.0	-0.19	0.03	Decreasing

Table 11-8: Summary results (mean ± 95% confidence interval) and Mann-Kendall trend analysis results of macroinvertebrate community metrics for the Nihotupu monitoring sites 2013-2025.

Monitoring site	Metric	Mean ± 95% CI	Tau	p-value	Trend
Site A	EPT taxa	5.7 (± 0.5)	-0.2621	0.0001	Decreasing
Site C	EPT taxa	6.4 (± 0.7)	0.2847	0	Increasing
Site D	EPT taxa	7.2 (± 0.6)	0.2473	0.0002	Increasing
Site A	Individuals	95.8 (±19.8)	0.0522	0.4111	No significant trend
Site C	Individuals	102.6 (±21.4)	0.1724	0.0094	Increasing
Site D	Individuals	93.0 (±14.3)	0.1844	0.0038	Increasing
Site A	MCI	110.2 (± 3.7)	-0.3697	0	Decreasing

Monitoring site	Metric	Mean ± 95% CI	Tau	p-value	Trend
Site C	MCI	106.3 (± 2.9)	0.0013	0.9867	No significant trend
Site D	MCI	107.2 (± 3.0)	-0.054	0.3993	No significant trend
Site A	QMCI	5.4 (± 0.3)	-0.3924	0	Decreasing
Site C	QMCI	4.8 (± 0.2)	0.01	0.8948	No significant trend
Site D	QMCI	5.1 (± 0.2)	-0.2407	0.0007	Decreasing
Site A	Taxa richness	9.4 (± 0.7)	-0.1462	0.0253	Decreasing
Site C	Taxa richness	11.1 (± 0.9)	0.1844	0.0068	Increasing
Site D	Taxa richness	11.9 (± 0.8)	0.1615	0.0136	Increasing

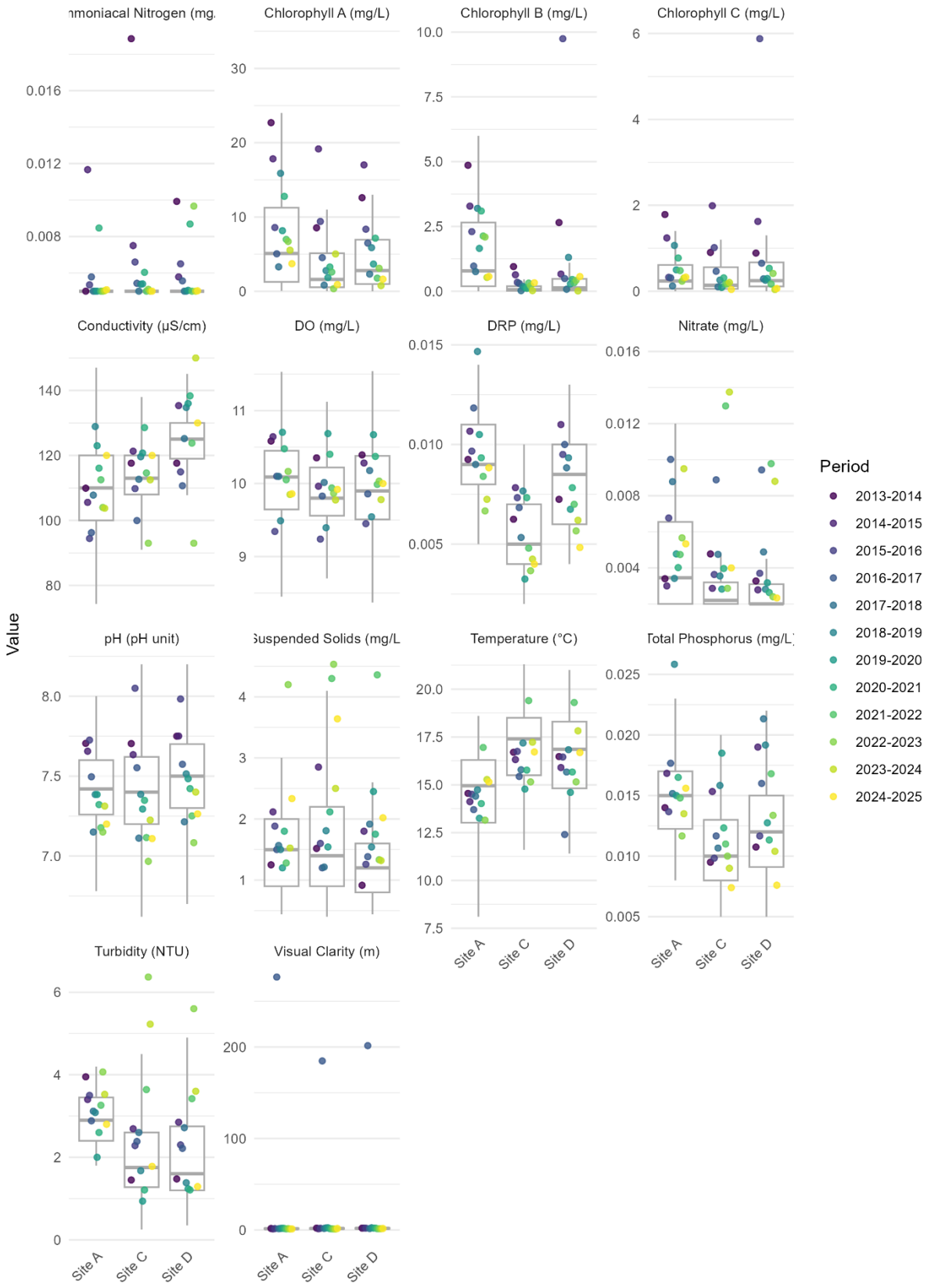

Figure 11-5: Seasonal averages (Dec-Apr) of the Nihotupu water quality monitoring results (2013-2025).

12 CONCLUSION

This report presents the required data for the period of 1 July 2024 to 30 June 2025 for Upper Nihotupu Dam, Lower Nihotupu Dam and the associated raw water pipelines. Compensation flow was below required flows on two 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, with macroinvertebrates communities highest at the sites downstream of the dam, compared to the control.

Appendix A. Daily Water Abstraction Volumes

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
1/07/2024	19948	32274
2/07/2024	19955	32170
3/07/2024	20066	32310
4/07/2024	20064	32312
5/07/2024	20056	32309
6/07/2024	20043	32305
7/07/2024	20037	32294
8/07/2024	21250	32272
9/07/2024	22891	32267
10/07/2024	22882	32246
11/07/2024	22861	32247
12/07/2024	22838	32226
13/07/2024	22819	32218
14/07/2024	22805	32197
15/07/2024	14531	14476
16/07/2024	2421	0
17/07/2024	1424	7178
18/07/2024	6582	17087
19/07/2024	15118	24446
20/07/2024	20175	30203
21/07/2024	20035	17103
22/07/2024	19996	17108
23/07/2024	19987	17108
24/07/2024	19987	17102
25/07/2024	20001	25906
26/07/2024	20001	32280
27/07/2024	20002	32288
28/07/2024	19993	32287
29/07/2024	19988	32274
30/07/2024	19988	32274
31/07/2024	19983	32269
1/08/2024	19978	32267
2/08/2024	19977	32254
3/08/2024	19964	32245
4/08/2024	19965	32243

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
5/08/2024	24430	32235
6/08/2024	27637	32225
7/08/2024	27640	32209
8/08/2024	27619	32203
9/08/2024	24777	32189
10/08/2024	27574	32181
11/08/2024	27571	32170
12/08/2024	27562	32157
13/08/2024	25013	32140
14/08/2024	20213	32139
15/08/2024	20194	32122
16/08/2024	19902	22655
17/08/2024	19989	17047
18/08/2024	20057	17089
19/08/2024	20080	17098
20/08/2024	19126	24313
21/08/2024	18178	32387
22/08/2024	18160	32898
23/08/2024	18142	32940
24/08/2024	18130	32931
25/08/2024	18050	31424
26/08/2024	17443	24682
27/08/2024	13588	17795
28/08/2024	12300	17798
29/08/2024	15015	22868
30/08/2024	15020	32913
31/08/2024	15023	32902
1/09/2024	15043	32915
2/09/2024	14988	32902
3/09/2024	14921	32889
4/09/2024	14906	32896
5/09/2024	14901	32880
6/09/2024	14873	32870
7/09/2024	14857	32854
8/09/2024	14870	32865

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
9/09/2024	20781	37784
10/09/2024	26939	34013
11/09/2024	26928	32935
12/09/2024	23600	32915
13/09/2024	17899	32903
14/09/2024	17844	32900
15/09/2024	17952	32949
16/09/2024	15419	32937
17/09/2024	12794	32943
18/09/2024	12888	32936
19/09/2024	12930	32929
20/09/2024	12917	32939
21/09/2024	12902	32943
22/09/2024	12889	32937
23/09/2024	12854	32938
24/09/2024	12819	32939
25/09/2024	12816	32950
26/09/2024	12815	29659
27/09/2024	12811	32795
28/09/2024	12813	32809
29/09/2024	12377	31439
30/09/2024	14282	32797
1/10/2024	12925	32789
2/10/2024	12891	32800
3/10/2024	12897	25715
4/10/2024	13061	32977
5/10/2024	12835	32974
6/10/2024	13055	32987
7/10/2024	13043	33012
8/10/2024	13369	32998
9/10/2024	13171	33011
10/10/2024	13143	33027
11/10/2024	13137	33025
12/10/2024	13140	33022
13/10/2024	13127	33020

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
14/10/2024	13122	33029
15/10/2024	13113	33037
16/10/2024	13145	33041
17/10/2024	14929	33027
18/10/2024	16030	33028
19/10/2024	16060	33028
20/10/2024	16086	33018
21/10/2024	16059	33016
22/10/2024	16040	33000
23/10/2024	16117	32998
24/10/2024	16037	31688
25/10/2024	15950	32848
26/10/2024	15914	32851
27/10/2024	15907	32852
28/10/2024	15898	32854
29/10/2024	15936	32850
30/10/2024	22466	28271
31/10/2024	17902	17841
1/11/2024	13046	17325
2/11/2024	13024	17072
3/11/2024	13009	17076
4/11/2024	12994	17072
5/11/2024	11028	17067
6/11/2024	11266	17068
7/11/2024	12947	17059
8/11/2024	12936	23428
9/11/2024	12926	32092
10/11/2024	12916	32088
11/11/2024	12900	32089
12/11/2024	14611	32073
13/11/2024	15985	32072
14/11/2024	15963	32073
15/11/2024	15959	32088
16/11/2024	16049	32151
17/11/2024	16086	32161

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
18/11/2024	16087	32143
19/11/2024	18359	32143
20/11/2024	19912	32140
21/11/2024	20065	32136
22/11/2024	20031	32132
23/11/2024	19979	32120
24/11/2024	19921	32110
25/11/2024	19981	32386
26/11/2024	20085	32735
27/11/2024	20047	32732
28/11/2024	19992	32726
29/11/2024	19951	32700
30/11/2024	19904	32691
1/12/2024	19925	32722
2/12/2024	19971	32698
3/12/2024	19951	32722
4/12/2024	20394	32729
5/12/2024	21084	32719
6/12/2024	22993	32734
7/12/2024	22998	32731
8/12/2024	22969	32725
9/12/2024	23639	27045
10/12/2024	25040	17792
11/12/2024	25014	17789
12/12/2024	24966	17783
13/12/2024	24944	17791
14/12/2024	24907	17800
15/12/2024	24878	17796
16/12/2024	24899	17314
17/12/2024	23435	25402
18/12/2024	21986	31969
19/12/2024	21956	31941
20/12/2024	23206	23058
21/12/2024	24056	17002
22/12/2024	24023	16991

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
23/12/2024	23982	16998
24/12/2024	23947	16992
25/12/2024	23903	16993
26/12/2024	23866	16992
27/12/2024	23968	16982
28/12/2024	23954	16981
29/12/2024	23905	16976
30/12/2024	23863	16980
31/12/2024	23902	16974
1/01/2025	23919	16969
2/01/2025	23875	16953
3/01/2025	23855	16955
4/01/2025	23999	16949
5/01/2025	24037	16944
6/01/2025	23983	16945
7/01/2025	18952	16935
8/01/2025	15059	17412
9/01/2025	15020	17677
10/01/2025	14964	17677
11/01/2025	14915	17681
12/01/2025	14853	17679
13/01/2025	14751	17686
14/01/2025	12616	25924
15/01/2025	10988	32659
16/01/2025	10964	32659
17/01/2025	10949	32646
18/01/2025	10929	32635
19/01/2025	10910	32626
20/01/2025	10891	32632
21/01/2025	10867	32003
22/01/2025	10850	31649
23/01/2025	10838	31665
24/01/2025	7847	31651
25/01/2025	4850	31640
26/01/2025	4866	31621

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
27/01/2025	4877	31633
28/01/2025	10540	23103
29/01/2025	15279	16824
30/01/2025	15292	16824
31/01/2025	15298	16826
1/02/2025	15314	16825
2/02/2025	15259	16831
3/02/2025	15223	16831
4/02/2025	15179	16827
5/02/2025	15130	17186
6/02/2025	15093	17576
7/02/2025	15045	17574
8/02/2025	15003	17571
9/02/2025	14966	17570
10/02/2025	14946	17574
11/02/2025	14972	17567
12/02/2025	15034	17572
13/02/2025	15022	17569
14/02/2025	14991	17556
15/02/2025	14947	17553
16/02/2025	14896	17543
17/02/2025	14826	17535
18/02/2025	14782	17530
19/02/2025	14758	17522
20/02/2025	14738	17517
21/02/2025	14782	17521
22/02/2025	12711	17517
23/02/2025	10254	17506
24/02/2025	10231	17461
25/02/2025	10207	17497
26/02/2025	10177	17490
27/02/2025	10151	17484
28/02/2025	10126	17478
1/03/2025	10102	17474
2/03/2025	10071	17463

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
3/03/2025	10044	17453
4/03/2025	7162	17444
5/03/2025	5009	16900
6/03/2025	4995	16525
7/03/2025	4990	16514
8/03/2025	4982	16498
9/03/2025	4975	16491
10/03/2025	5010	16490
11/03/2025	5059	24693
12/03/2025	5056	31903
13/03/2025	5047	31909
14/03/2025	5041	31902
15/03/2025	5030	31897
16/03/2025	5024	31883
17/03/2025	8242	12329
18/03/2025	10838	2828
19/03/2025	9673	2375
20/03/2025	7231	1070
21/03/2025	7209	0
22/03/2025	7193	0
23/03/2025	7174	0
24/03/2025	6003	17084
25/03/2025	4882	31971
26/03/2025	9746	31963
27/03/2025	12029	26158
28/03/2025	5048	16525
29/03/2025	5036	16520
30/03/2025	5027	16511
31/03/2025	5015	16510
1/04/2025	5004	16511
2/04/2025	4996	16550
3/04/2025	4987	16659
4/04/2025	5132	24243
5/04/2025	5289	32301
6/04/2025	5575	33643

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
7/04/2025	5387	32283
8/04/2025	10331	23380
9/04/2025	14882	16746
10/04/2025	14902	16674
11/04/2025	14894	16621
12/04/2025	14884	16613
13/04/2025	14868	16606
14/04/2025	14799	16603
15/04/2025	14767	16593
16/04/2025	14896	16591
17/04/2025	14983	16587
18/04/2025	15056	16585
19/04/2025	15155	16628
20/04/2025	15006	16699
21/04/2025	15197	16743
22/04/2025	15132	16744
23/04/2025	16952	22970
24/04/2025	19933	32312
25/04/2025	19916	32296
26/04/2025	19895	32281
27/04/2025	19948	32281
28/04/2025	20093	31813
29/04/2025	20118	31760
30/04/2025	20048	31779
1/05/2025	20042	31862
2/05/2025	20116	31918
3/05/2025	20009	31945
4/05/2025	20031	31948
5/05/2025	20038	31958
6/05/2025	20052	31940
7/05/2025	20065	31928
8/05/2025	20053	31911
9/05/2025	24596	22339
10/05/2025	28026	16982
11/05/2025	27910	12904

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
12/05/2025	27815	17635
13/05/2025	27894	17635
14/05/2025	27949	17635
15/05/2025	27962	17634
16/05/2025	27944	17631
17/05/2025	27941	17626
18/05/2025	27783	17618
19/05/2025	27756	16876
20/05/2025	16738	16869
21/05/2025	7819	16870
22/05/2025	7817	16866
23/05/2025	7816	16869
24/05/2025	7815	16858
25/05/2025	7817	16850
26/05/2025	7817	17242
27/05/2025	12885	17613
28/05/2025	17145	17621
29/05/2025	17079	17632
30/05/2025	17103	17642
31/05/2025	17151	17650
1/06/2025	17158	17649
2/06/2025	13704	25569
3/06/2025	10206	32577
4/06/2025	10211	22157
5/06/2025	10300	32839
6/06/2025	10340	32888
7/06/2025	9691	32157
8/06/2025	9730	32187
9/06/2025	14605	24226
10/06/2025	17109	32416
11/06/2025	17134	32173
12/06/2025	17163	31863
13/06/2025	17160	31841
14/06/2025	17172	31836
15/06/2025	17172	31822

Date	Upper Nihotupu Dam Daily Abstraction Volumes (m^3)	Lower Nihotupu Dam Daily Abstraction Volumes (m^3)
16/06/2025	17171	25874
17/06/2025	17627	24070
18/06/2025	18126	32541
19/06/2025	18111	32542
20/06/2025	18117	32558
21/06/2025	18120	32555
22/06/2025	18116	32553
23/06/2025	18026	32542
24/06/2025	21427	32551
25/06/2025	23991	32555
26/06/2025	23991	32545
27/06/2025	23995	32567
28/06/2025	23967	32593
29/06/2025	24023	32590
30/06/2025	25056	32590

Appendix B. Daily average reservoir level

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
1/07/2024	33.674	15.520
2/07/2024	33.703	15.545
3/07/2024	33.711	15.557
4/07/2024	33.687	15.549
5/07/2024	33.642	15.530
6/07/2024	33.598	15.511
7/07/2024	33.554	15.497
8/07/2024	33.508	15.479
9/07/2024	33.434	15.455
10/07/2024	33.348	15.428
11/07/2024	33.255	15.401
12/07/2024	33.158	15.373
13/07/2024	33.057	15.342
14/07/2024	32.956	15.311
15/07/2024	32.923	15.321
16/07/2024	33.192	15.452
17/07/2024	33.368	15.512
18/07/2024	33.518	15.539
19/07/2024	33.596	15.559
20/07/2024	33.920	15.671
21/07/2024	33.881	15.632
22/07/2024	33.877	15.628
23/07/2024	33.875	15.626
24/07/2024	33.874	15.628
25/07/2024	33.867	15.619
26/07/2024	33.862	15.609
27/07/2024	33.846	15.603
28/07/2024	33.840	15.596
29/07/2024	33.836	15.589
30/07/2024	33.866	15.616
31/07/2024	33.871	15.620
1/08/2024	33.887	15.627
2/08/2024	33.866	15.615
3/08/2024	33.850	15.606
4/08/2024	33.844	15.600

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
5/08/2024	33.830	15.592
6/08/2024	33.766	15.577
7/08/2024	33.682	15.560
8/08/2024	33.593	15.541
9/08/2024	33.520	15.524
10/08/2024	33.436	15.506
11/08/2024	33.334	15.481
12/08/2024	33.228	15.458
13/08/2024	33.126	15.435
14/08/2024	33.060	15.408
15/08/2024	32.996	15.380
16/08/2024	32.935	15.357
17/08/2024	32.929	15.390
18/08/2024	33.397	15.600
19/08/2024	33.744	15.615
20/08/2024	33.834	15.609
21/08/2024	33.854	15.600
22/08/2024	33.851	15.592
23/08/2024	33.842	15.574
24/08/2024	33.832	15.558
25/08/2024	33.813	15.542
26/08/2024	33.770	15.527
27/08/2024	33.763	15.551
28/08/2024	33.805	15.585
29/08/2024	33.801	15.594
30/08/2024	33.789	15.581
31/08/2024	33.784	15.577
1/09/2024	33.909	15.653
2/09/2024	33.877	15.619
3/09/2024	33.858	15.608
4/09/2024	33.865	15.605
5/09/2024	33.858	15.599
6/09/2024	33.850	15.591
7/09/2024	33.836	15.580
8/09/2024	33.853	15.592

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
9/09/2024	33.842	15.592
10/09/2024	33.750	15.567
11/09/2024	33.639	15.547
12/09/2024	33.525	15.524
13/09/2024	33.456	15.502
14/09/2024	33.427	15.494
15/09/2024	33.730	15.612
16/09/2024	33.851	15.608
17/09/2024	33.878	15.623
18/09/2024	33.876	15.621
19/09/2024	33.863	15.611
20/09/2024	33.888	15.628
21/09/2024	33.886	15.630
22/09/2024	33.872	15.615
23/09/2024	33.869	15.608
24/09/2024	33.861	15.603
25/09/2024	33.860	15.598
26/09/2024	33.853	15.593
27/09/2024	33.844	15.582
28/09/2024	33.847	15.567
29/09/2024	33.842	15.551
30/09/2024	33.833	15.530
1/10/2024	33.826	15.506
2/10/2024	33.838	15.492
3/10/2024	33.939	15.656
4/10/2024	33.874	15.617
5/10/2024	33.860	15.605
6/10/2024	33.860	15.607
7/10/2024	33.904	15.640
8/10/2024	33.873	15.617
9/10/2024	33.870	15.613
10/10/2024	33.867	15.610
11/10/2024	33.861	15.605
12/10/2024	33.852	15.599
13/10/2024	33.843	15.593

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
14/10/2024	33.845	15.593
15/10/2024	33.851	15.596
16/10/2024	33.847	15.588
17/10/2024	33.840	15.570
18/10/2024	33.824	15.549
19/10/2024	33.800	15.524
20/10/2024	33.767	15.499
21/10/2024	33.733	15.472
22/10/2024	33.692	15.442
23/10/2024	33.650	15.415
24/10/2024	33.603	15.388
25/10/2024	33.553	15.360
26/10/2024	33.504	15.334
27/10/2024	33.484	15.325
28/10/2024	33.438	15.301
29/10/2024	33.388	15.280
30/10/2024	33.337	15.279
31/10/2024	33.245	15.287
1/11/2024	33.200	15.286
2/11/2024	33.157	15.284
3/11/2024	33.111	15.284
4/11/2024	33.059	15.276
5/11/2024	33.008	15.269
6/11/2024	32.970	15.263
7/11/2024	32.916	15.257
8/11/2024	32.856	15.249
9/11/2024	32.793	15.218
10/11/2024	32.728	15.184
11/11/2024	32.668	15.154
12/11/2024	32.597	15.121
13/11/2024	32.507	15.086
14/11/2024	32.421	15.057
15/11/2024	32.488	15.151
16/11/2024	32.821	15.352
17/11/2024	32.852	15.352

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
18/11/2024	32.819	15.331
19/11/2024	32.757	15.304
20/11/2024	32.665	15.276
21/11/2024	32.569	15.250
22/11/2024	32.468	15.226
23/11/2024	32.357	15.192
24/11/2024	32.246	15.162
25/11/2024	32.129	15.129
26/11/2024	32.009	15.094
27/11/2024	31.888	15.060
28/11/2024	31.765	15.026
29/11/2024	31.638	14.991
30/11/2024	31.526	14.965
1/12/2024	31.643	15.013
2/12/2024	31.759	15.042
3/12/2024	31.722	15.022
4/12/2024	31.640	14.994
5/12/2024	31.541	14.961
6/12/2024	31.421	14.928
7/12/2024	31.288	14.893
8/12/2024	31.148	14.858
9/12/2024	31.009	14.825
10/12/2024	30.853	14.821
11/12/2024	30.680	14.816
12/12/2024	30.526	14.817
13/12/2024	30.413	14.834
14/12/2024	30.278	14.831
15/12/2024	30.121	14.821
16/12/2024	29.961	14.817
17/12/2024	29.805	14.814
18/12/2024	29.649	14.777
19/12/2024	29.494	14.738
20/12/2024	29.330	14.704
21/12/2024	29.156	14.690
22/12/2024	28.980	14.679

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
23/12/2024	28.806	14.672
24/12/2024	28.628	14.664
25/12/2024	28.438	14.651
26/12/2024	28.267	14.650
27/12/2024	28.085	14.639
28/12/2024	27.888	14.621
29/12/2024	27.687	14.605
30/12/2024	27.484	14.593
31/12/2024	27.279	14.579
1/01/2025	27.069	14.563
2/01/2025	26.858	14.552
3/01/2025	26.648	14.540
4/01/2025	26.470	14.543
5/01/2025	26.282	14.533
6/01/2025	26.065	14.520
7/01/2025	25.859	14.504
8/01/2025	25.715	14.489
9/01/2025	25.578	14.475
10/01/2025	25.443	14.457
11/01/2025	25.326	14.434
12/01/2025	25.202	14.413
13/01/2025	25.075	14.389
14/01/2025	24.936	14.364
15/01/2025	24.829	14.320
16/01/2025	24.736	14.270
17/01/2025	24.644	14.220
18/01/2025	24.551	14.169
19/01/2025	24.457	14.118
20/01/2025	24.360	14.066
21/01/2025	24.270	14.019
22/01/2025	24.187	13.978
23/01/2025	24.095	13.928
24/01/2025	24.008	13.880
25/01/2025	23.966	13.834
26/01/2025	24.010	13.832

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
27/01/2025	24.115	13.827
28/01/2025	24.126	13.792
29/01/2025	24.022	13.772
30/01/2025	23.894	13.754
31/01/2025	23.761	13.734
1/02/2025	23.622	13.715
2/02/2025	23.481	13.694
3/02/2025	23.338	13.674
4/02/2025	23.193	13.654
5/02/2025	23.045	13.633
6/02/2025	22.895	13.610
7/02/2025	22.744	13.587
8/02/2025	22.592	13.563
9/02/2025	22.438	13.540
10/02/2025	22.282	13.516
11/02/2025	22.105	13.498
12/02/2025	21.933	13.484
13/02/2025	21.769	13.460
14/02/2025	21.608	13.436
15/02/2025	21.446	13.415
16/02/2025	21.284	13.393
17/02/2025	21.130	13.376
18/02/2025	20.985	13.360
19/02/2025	20.826	13.335
20/02/2025	20.665	13.312
21/02/2025	20.497	13.290
22/02/2025	20.328	13.265
23/02/2025	20.201	13.240
24/02/2025	20.080	13.215
25/02/2025	19.958	13.190
26/02/2025	19.833	13.167
27/02/2025	19.710	13.143
28/02/2025	19.583	13.119
1/03/2025	19.457	13.095
2/03/2025	19.329	13.070

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
3/03/2025	19.202	13.046
4/03/2025	19.087	13.023
5/03/2025	19.031	13.004
6/03/2025	18.965	12.978
7/03/2025	18.897	12.952
8/03/2025	18.830	12.929
9/03/2025	18.763	12.906
10/03/2025	18.696	12.883
11/03/2025	18.597	12.857
12/03/2025	18.510	12.811
13/03/2025	18.448	12.759
14/03/2025	18.378	12.704
15/03/2025	18.306	12.649
16/03/2025	18.234	12.594
17/03/2025	18.157	12.556
18/03/2025	18.047	12.571
19/03/2025	17.941	12.593
20/03/2025	17.895	12.615
21/03/2025	17.821	12.623
22/03/2025	17.730	12.634
23/03/2025	17.632	12.646
24/03/2025	17.537	12.647
25/03/2025	17.465	12.599
26/03/2025	17.377	12.544
27/03/2025	17.180	12.492
28/03/2025	17.078	12.465
29/03/2025	17.005	12.441
30/03/2025	16.937	12.420
31/03/2025	16.861	12.397
1/04/2025	16.784	12.375
2/04/2025	16.708	12.355
3/04/2025	16.674	12.351
4/04/2025	19.105	12.677
5/04/2025	22.549	13.038
6/04/2025	22.964	13.032

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
7/04/2025	23.115	13.009
8/04/2025	23.190	12.989
9/04/2025	23.179	12.990
10/04/2025	23.110	12.977
11/04/2025	23.013	12.962
12/04/2025	22.903	12.944
13/04/2025	22.782	12.928
14/04/2025	22.656	12.911
15/04/2025	22.524	12.894
16/04/2025	22.387	12.878
17/04/2025	22.264	12.868
18/04/2025	22.502	12.893
19/04/2025	23.349	13.104
20/04/2025	24.917	13.503
21/04/2025	25.669	13.739
22/04/2025	25.940	13.798
23/04/2025	26.051	13.814
24/04/2025	26.055	13.792
25/04/2025	25.998	13.758
26/04/2025	25.922	13.722
27/04/2025	25.877	13.709
28/04/2025	26.092	13.762
29/04/2025	26.224	13.775
30/04/2025	26.606	13.835
1/05/2025	27.984	14.102
2/05/2025	28.903	14.311
3/05/2025	29.315	14.393
4/05/2025	29.458	14.404
5/05/2025	29.500	14.393
6/05/2025	29.501	14.373
7/05/2025	29.474	14.347
8/05/2025	29.438	14.320
9/05/2025	29.590	14.382
10/05/2025	30.343	14.624
11/05/2025	30.504	14.691

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
12/05/2025	30.512	14.717
13/05/2025	30.467	14.729
14/05/2025	30.398	14.737
15/05/2025	30.307	14.740
16/05/2025	30.202	14.737
17/05/2025	30.083	14.732
18/05/2025	29.959	14.729
19/05/2025	29.840	14.733
20/05/2025	29.727	14.726
21/05/2025	29.723	14.719
22/05/2025	29.736	14.710
23/05/2025	29.746	14.702
24/05/2025	29.748	14.693
25/05/2025	29.748	14.684
26/05/2025	29.758	14.685
27/05/2025	29.905	14.774
28/05/2025	29.983	14.817
29/05/2025	30.039	14.862
30/05/2025	30.214	14.932
31/05/2025	30.320	14.966
1/06/2025	30.343	14.977
2/06/2025	30.344	14.977
3/06/2025	30.371	14.954
4/06/2025	30.441	14.971
5/06/2025	31.049	15.152
6/06/2025	31.555	15.266
7/06/2025	32.156	15.393
8/06/2025	32.497	15.439
9/06/2025	32.884	15.554
10/06/2025	33.393	15.635
11/06/2025	33.944	15.666
12/06/2025	33.917	15.643
13/06/2025	33.894	15.630
14/06/2025	33.887	15.627
15/06/2025	33.882	15.623

Date	Upper Nihotupu Dam Daily Average Level (m)	Lower Nihotupu Dam Daily Average Level (m)
16/06/2025	33.877	15.618
17/06/2025	33.870	15.614
18/06/2025	33.853	15.605
19/06/2025	33.847	15.600
20/06/2025	33.889	15.627
21/06/2025	33.877	15.617
22/06/2025	33.865	15.608
23/06/2025	33.851	15.603
24/06/2025	33.848	15.598
25/06/2025	33.817	15.587
26/06/2025	33.774	15.574
27/06/2025	33.880	15.634
28/06/2025	33.911	15.642
29/06/2025	33.889	15.631
30/06/2025	33.876	15.621

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

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
1/07/2024	0	0	61	60	76.73
2/07/2024	0	0	61	60	76.91
3/07/2024	0	0	61	60	76.93
4/07/2024	0	0	61	60	76.83
5/07/2024	0	0	61	60	76.72
6/07/2024	0	0	61	60	76.62
7/07/2024	0	0	61	60	76.53
8/07/2024	0	0	61	60	76.42
9/07/2024	0	0	61	60	76.29
10/07/2024	0	0	61	60	76.15
11/07/2024	0	0	61	60	75.99
12/07/2024	0	0	61	60	75.83
13/07/2024	0	0	61	60	75.67
14/07/2024	0	0	61	60	75.52
15/07/2024	0	0	61	60	75.53
16/07/2024	0	0	61	60	76.00
17/07/2024	0	0	61	60	76.02
18/07/2024	0	0	61	60	75.98
19/07/2024	0	0	61	60	75.94
20/07/2024	2138	5215	2,199	60	76.25
21/07/2024	398	1483	459	60	76.60
22/07/2024	325	1182	386	60	76.75
23/07/2024	302	1112	363	60	76.79
24/07/2024	289	1231	350	60	76.81
25/07/2024	194	711	255	60	76.78
26/07/2024	131	260	192	60	76.77
27/07/2024	12	100	73	60	76.73
28/07/2024	1	15	62	60	76.71
29/07/2024	2	8	63	60	76.72
30/07/2024	188	593	249	60	77.05
31/07/2024	246	761	307	60	77.20
1/08/2024	497	1140	558	60	77.45
2/08/2024	174	497	235	60	77.58
3/08/2024	29	160	90	60	77.60
4/08/2024	4	43	65	60	77.63
5/08/2024	0	2	61	60	77.62
6/08/2024	0	0	61	60	77.51
7/08/2024	0	0	61	60	77.39
8/08/2024	0	0	61	60	77.24
9/08/2024	0	0	61	60	77.14
10/08/2024	0	0	61	60	77.02
11/08/2024	0	0	61	60	76.88
12/08/2024	0	0	61	60	76.80

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
13/08/2024	0	0	61	60	76.74
14/08/2024	0	0	61	60	76.61
15/08/2024	0	0	61	60	76.50
16/08/2024	0	0	61	60	76.39
17/08/2024	0	0	61	60	76.51
18/08/2024	0	622	61	60	77.92
19/08/2024	0	536	61	60	78.66
20/08/2024	4	278	65	90	78.93
21/08/2024	56	53	117	90	79.09
22/08/2024	35	4	96	90	79.19
23/08/2024	3	0	64	90	-
24/08/2024	0	0	61	90	79.38
25/08/2024	0	0	85	90	79.49
26/08/2024	0	0	92	90	79.52
27/08/2024	0	0	92	90	79.63
28/08/2024	0	0	92	90	79.85
29/08/2024	0	7	92	90	79.96
30/08/2024	0	0	92	90	80.08
31/08/2024	0	0	92	90	80.27
1/09/2024	1209	3627	1,301	90	81.88
2/09/2024	324	713	416	90	82.82
3/09/2024	104	245	196	90	83.06
4/09/2024	161	141	253	90	83.24
5/09/2024	89	34	181	90	83.37
6/09/2024	30	0	122	90	83.48
7/09/2024	2	0	94	90	83.58
8/09/2024	98	8	190	90	83.72
9/09/2024	43	7	135	90	83.80
10/09/2024	0	0	92	90	83.81
11/09/2024	0	0	92	90	83.80
12/09/2024	0	0	92	90	83.75
13/09/2024	0	0	92	90	83.73
14/09/2024	0	0	92	90	83.76
15/09/2024	0	584	92	90	84.03
16/09/2024	73	241	165	90	84.10
17/09/2024	347	898	439	90	84.18
18/09/2024	320	815	412	90	84.21
19/09/2024	153	358	245	90	84.22
20/09/2024	639	1479	731	90	84.60
21/09/2024	474	1343	566	90	85.13
22/09/2024	256	509	348	90	85.25
23/09/2024	211	231	303	90	85.31
24/09/2024	128	110	220	90	85.34

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
25/09/2024	111	27	203	90	85.35
26/09/2024	54	4	146	90	85.29
27/09/2024	7	0	99	90	85.24
28/09/2024	13	0	105	90	85.18
29/09/2024	2	0	94	90	85.11
30/09/2024	0	0	92	90	85.03
1/10/2024	0	0	92	90	84.93
2/10/2024	153	0	245	90	84.89
3/10/2024	1797	3673	1,889	90	85.91
4/10/2024	287	619	379	90	86.24
5/10/2024	122	143	214	90	86.32
6/10/2024	121	224	213	90	86.38
7/10/2024	824	2032	916	90	86.67
8/10/2024	272	627	364	90	86.83
9/10/2024	225	446	317	90	86.93
10/10/2024	192	325	284	90	86.98
11/10/2024	118	144	210	90	87.05
12/10/2024	48	35	140	90	87.08
13/10/2024	3	2	95	90	87.05
14/10/2024	7	2	99	90	87.11
15/10/2024	40	10	132	90	87.11
16/10/2024	12	0	104	90	87.08
17/10/2024	2	0	94	90	87.04
18/10/2024	0	0	92	90	86.99
19/10/2024	0	0	92	90	86.92
20/10/2024	0	0	92	90	86.86
21/10/2024	0	0	92	90	86.80
22/10/2024	0	0	92	90	86.72
23/10/2024	0	0	92	90	86.65
24/10/2024	0	0	92	90	86.57
25/10/2024	0	0	92	90	86.46
26/10/2024	0	0	92	90	86.40
27/10/2024	0	0	92	90	86.59
28/10/2024	0	0	92	90	86.57
29/10/2024	0	0	92	90	86.50
30/10/2024	0	0	92	90	86.49
31/10/2024	0	0	92	90	86.41
1/11/2024	0	0	92	90	86.32
2/11/2024	0	0	92	90	86.21
3/11/2024	0	0	92	90	86.19
4/11/2024	0	0	92	90	86.09
5/11/2024	0	0	92	90	85.95
6/11/2024	0	0	92	90	85.83

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
7/11/2024	0	0	92	90	85.71
8/11/2024	0	0	92	90	85.58
9/11/2024	0	0	92	90	85.44
10/11/2024	0	0	92	90	85.30
11/11/2024	0	0	92	90	85.20
12/11/2024	0	0	92	90	85.05
13/11/2024	0	0	92	90	84.90
14/11/2024	0	0	92	90	84.77
15/11/2024	0	0	92	90	85.26
16/11/2024	0	0	92	90	86.85
17/11/2024	0	0	92	90	86.92
18/11/2024	0	0	92	90	86.88
19/11/2024	0	0	92	90	86.80
20/11/2024	0	0	92	90	86.68
21/11/2024	0	0	92	90	86.58
22/11/2024	0	0	92	90	86.49
23/11/2024	0	0	92	90	86.36
24/11/2024	0	0	92	90	86.23
25/11/2024	0	0	92	90	86.11
26/11/2024	0	0	92	90	85.96
27/11/2024	0	0	92	90	85.78
28/11/2024	0	0	92	90	85.58
29/11/2024	0	0	92	90	85.36
30/11/2024	0	0	92	90	85.20
1/12/2024	0	0	92	90	85.25
2/12/2024	0	0	92	90	85.19
3/12/2024	0	0	92	90	85.00
4/12/2024	0	0	92	90	84.76
5/12/2024	0	0	92	90	84.51
6/12/2024	0	0	92	90	84.29
7/12/2024	0	0	92	90	84.04
8/12/2024	0	0	92	90	83.79
9/12/2024	0	0	92	90	83.57
10/12/2024	0	0	92	90	83.53
11/12/2024	0	0	92	90	83.34
12/12/2024	0	0	92	90	83.30
13/12/2024	0	0	92	90	83.28
14/12/2024	0	0	92	90	83.14
15/12/2024	0	0	92	90	82.96
16/12/2024	0	0	92	90	82.96
17/12/2024	0	0	92	90	83.19
18/12/2024	0	0	92	90	83.03
19/12/2024	0	0	92	90	82.80

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
20/12/2024	0	0	92	90	82.22
21/12/2024	0	0	92	90	82.41
22/12/2024	0	0	92	90	82.25
23/12/2024	0	0	92	90	82.10
24/12/2024	0	0	92	90	81.95
25/12/2024	0	0	92	90	81.73
26/12/2024	0	0	92	90	81.65
27/12/2024	0	0	92	90	81.55
28/12/2024	0	0	92	90	81.33
29/12/2024	0	0	92	90	81.14
30/12/2024	0	0	92	90	80.94
31/12/2024	0	0	92	90	80.73
1/01/2025	0	0	92	90	80.53
2/01/2025	0	0	92	90	80.33
3/01/2025	0	0	92	90	80.13
4/01/2025	0	0	92	90	79.99
5/01/2025	0	0	92	90	79.83
6/01/2025	0	0	92	90	79.63
7/01/2025	0	0	92	90	79.41
8/01/2025	0	0	92	90	79.18
9/01/2025	0	0	92	60	79.00
10/01/2025	0	0	61	60	78.79
11/01/2025	0	0	61	60	78.57
12/01/2025	0	0	61	60	78.37
13/01/2025	0	0	61	60	78.11
14/01/2025	0	0	61	60	77.77
15/01/2025	0	0	61	60	77.50
16/01/2025	0	0	61	60	77.24
17/01/2025	0	0	61	60	76.97
18/01/2025	0	0	61	60	76.72
19/01/2025	0	0	61	60	76.46
20/01/2025	0	0	61	60	76.23
21/01/2025	0	0	61	60	76.06
22/01/2025	0	0	61	60	75.96
23/01/2025	0	0	61	60	75.74
24/01/2025	0	0	61	60	75.50
25/01/2025	0	0	61	60	75.27
26/01/2025	0	0	61	60	75.29
27/01/2025	0	0	61	60	75.41
28/01/2025	0	0	61	60	75.26
29/01/2025	0	0	61	60	74.54
30/01/2025	0	0	61	60	74.84
31/01/2025	0	0	61	60	74.63

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
1/02/2025	0	0	61	60	74.43
2/02/2025	0	0	61	60	74.19
3/02/2025	0	0	61	60	73.96
4/02/2025	0	0	61	60	73.73
5/02/2025	0	0	61	60	73.46
6/02/2025	0	0	61	60	73.24
7/02/2025	0	0	61	60	72.99
8/02/2025	0	0	61	60	72.76
9/02/2025	0	0	61	60	72.55
10/02/2025	0	0	61	60	72.31
11/02/2025	0	0	61	60	72.07
12/02/2025	0	0	61	60	71.98
13/02/2025	0	0	61	60	71.75
14/02/2025	0	0	61	60	71.45
15/02/2025	0	0	61	60	71.10
16/02/2025	0	0	61	60	70.88
17/02/2025	0	0	61	60	70.67
18/02/2025	0	0	61	60	70.48
19/02/2025	0	0	61	60	70.23
20/02/2025	0	0	61	60	69.95
21/02/2025	0	0	61	60	69.68
22/02/2025	0	0	61	60	69.40
23/02/2025	0	0	61	60	69.13
24/02/2025	0	0	61	60	68.87
25/02/2025	0	0	61	60	68.59
26/02/2025	0	0	61	60	68.30
27/02/2025	0	0	61	60	68.01
28/02/2025	0	0	61	60	67.74
1/03/2025	0	0	61	60	67.47
2/03/2025	0	0	61	60	67.23
3/03/2025	0	0	61	60	66.96
4/03/2025	0	0	61	60	66.70
5/03/2025	0	0	61	60	66.49
6/03/2025	0	0	61	60	66.21
7/03/2025	0	0	61	60	65.92
8/03/2025	0	0	61	60	65.66
9/03/2025	0	0	61	60	65.41
10/03/2025	0	0	61	60	65.12
11/03/2025	0	0	61	60	64.83
12/03/2025	0	0	61	60	64.57
13/03/2025	0	0	61	60	64.32
14/03/2025	0	0	61	60	64.05
15/03/2025	0	0	61	60	63.78

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
16/03/2025	0	0	61	60	63.52
17/03/2025	0	0	61	60	63.28
18/03/2025	0	0	61	60	63.08
19/03/2025	0	0	61	60	62.90
20/03/2025	0	0	61	60	62.77
21/03/2025	0	0	61	60	62.55
22/03/2025	0	0	61	60	62.31
23/03/2025	0	0	61	60	62.08
24/03/2025	0	0	61	60	61.84
25/03/2025	0	0	61	60	61.57
26/03/2025	0	0	61	60	61.33
27/03/2025	0	0	61	60	61.06
28/03/2025	0	0	61	60	60.83
29/03/2025	0	0	61	60	60.62
30/03/2025	0	0	61	60	60.39
31/03/2025	0	0	61	60	60.15
1/04/2025	0	0	61	60	59.89
2/04/2025	0	0	61	60	59.69
3/04/2025	0	0	61	60	59.54
4/04/2025	0	0	61	60	61.06
5/04/2025	0	0	61	60	64.28
6/04/2025	0	0	61	60	64.41
7/04/2025	0	0	61	60	64.35
8/04/2025	0	0	61	60	64.29
9/04/2025	0	0	61	60	64.21
10/04/2025	0	0	61	60	64.06
11/04/2025	0	0	61	60	63.90
12/04/2025	0	0	61	60	63.73
13/04/2025	0	0	61	60	63.54
14/04/2025	0	0	61	60	63.37
15/04/2025	0	0	61	60	63.17
16/04/2025	0	0	61	60	62.99
17/04/2025	0	0	61	60	62.90
18/04/2025	0	0	61	60	63.24
19/04/2025	0	0	61	60	63.87
20/04/2025	0	0	61	60	64.61
21/04/2025	0	0	61	60	64.87
22/04/2025	0	0	61	60	64.89
23/04/2025	0	0	61	60	64.83
24/04/2025	0	0	61	60	64.73
25/04/2025	0	0	61	60	64.61
26/04/2025	0	0	61	60	64.49
27/04/2025	0	0	61	60	64.46

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
28/04/2025	0	0	61	60	64.67
29/04/2025	0	0	61	60	64.73
30/04/2025	0	0	61	60	65.37
1/05/2025	0	0	61	60	66.94
2/05/2025	0	0	61	60	68.21
3/05/2025	0	0	61	60	68.69
4/05/2025	0	0	61	60	68.82
5/05/2025	0	0	61	60	68.85
6/05/2025	0	0	61	60	68.82
7/05/2025	0	0	61	60	68.77
8/05/2025	0	0	61	60	68.72
9/05/2025	0	0	61	60	68.98
10/05/2025	0	0	61	60	70.03
11/05/2025	0	0	61	60	70.24
12/05/2025	0	0	61	60	70.28
13/05/2025	0	0	61	60	70.27
14/05/2025	0	0	61	60	70.24
15/05/2025	0	0	61	60	70.19
16/05/2025	0	0	61	60	70.12
17/05/2025	0	0	61	60	70.04
18/05/2025	0	0	61	60	69.98
19/05/2025	0	0	61	60	69.96
20/05/2025	0	0	61	60	69.87
21/05/2025	0	0	61	60	69.76
22/05/2025	0	0	61	60	69.64
23/05/2025	0	0	61	60	69.51
24/05/2025	0	0	61	60	69.39
25/05/2025	0	0	61	60	69.27
26/05/2025	0	0	61	60	69.22
27/05/2025	0	0	61	60	70.35
28/05/2025	0	0	61	60	70.91
29/05/2025	0	0	61	60	71.71
30/05/2025	0	0	61	60	72.20
31/05/2025	0	0	61	60	72.42
1/06/2025	0	0	61	60	72.49
2/06/2025	0	0	61	60	72.51
3/06/2025	0	0	61	60	72.48
4/06/2025	0	0	61	60	72.66
5/06/2025	0	0	61	60	75.39
6/06/2025	0	0	61	60	76.23
7/06/2025	0	0	61	60	76.91
8/06/2025	0	0	61	60	77.23
9/06/2025	0	52	61	60	77.79

Date	Lower Nihotupu spillway flows (l/s)	Upper Nihotupu spillway flows (l/s)	Upper Nihotupu combined compensation and spillway flow (l/s)	Release required (l/s)	Total system storage (%)
10/06/2025	645	2523	706	90	78.23
11/06/2025	1913	4724	1,974	90	80.25
12/06/2025	1128	2308	1,215	90	80.78
13/06/2025	618	1327	710	90	81.12
14/06/2025	484	1173	576	90	81.47
15/06/2025	401	890	493	90	81.73
16/06/2025	322	660	414	90	81.89
17/06/2025	230	471	322	90	81.96
18/06/2025	48	146	140	90	82.06
19/06/2025	17	48	109	90	82.16
20/06/2025	529	1192	621	90	82.49
21/06/2025	321	597	413	90	82.65
22/06/2025	170	232	262	90	82.72
23/06/2025	38	105	130	90	82.77
24/06/2025	25	27	117	90	82.84
25/06/2025	0	0	92	90	82.91
26/06/2025	0	0	92	90	82.96
27/06/2025	1492	3097	1,584	90	84.57
28/06/2025	966	2169	1,058	90	86.79
29/06/2025	534	1393	626	90	87.33
30/06/2025	319	796	411	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

Document	Annual Report
Date	8 August 2025
Name and position of originator	Emma Baker, Environmental Scientist
Report directory	\\water.internal\ORG\Ops\Water Supply\Headworks\SDGEN\00 - Site General\Compliance\Trap and Haul\Ministry of Fisheries Reports

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	-
Total	**2,837**	**178.0**

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	-
Total	**2,330**	**14.0**

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	-
Total	**614**	**10.0**

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	-
Total	**323**	**0.0**

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	-
Total	**459**	**10**

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
Total			**1,767.5**

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 Eels	Species		Weight (g)		Length (mm)		Migrators	
			Longfin	Shortfin	Average	Largest	Average	Largest	Count	(%)
	22/05/2025	0	0	0	0	0	0	0	0	0
	27/06/2025	0	0	0	0	0	0	0	0	0
Waitākere	20/03/2025	1	0	1	750	750	700	700	0	0
	5/06/2025	0	0	0	0	0	0	0	0	0
Hays Creek	19/03/2025	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 erythrophthalamus*) 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:

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 mātaitai 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 mātaitai 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[1]. 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.

[1] 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 31st of August of each year. A nil return shall be made if no collection activities are undertaken by the 31st 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 of 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 9th 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 cc. Christine.Bowden@mpi.govt.nz

Fisheries Compliance Regional Manager can be contacted by the following:

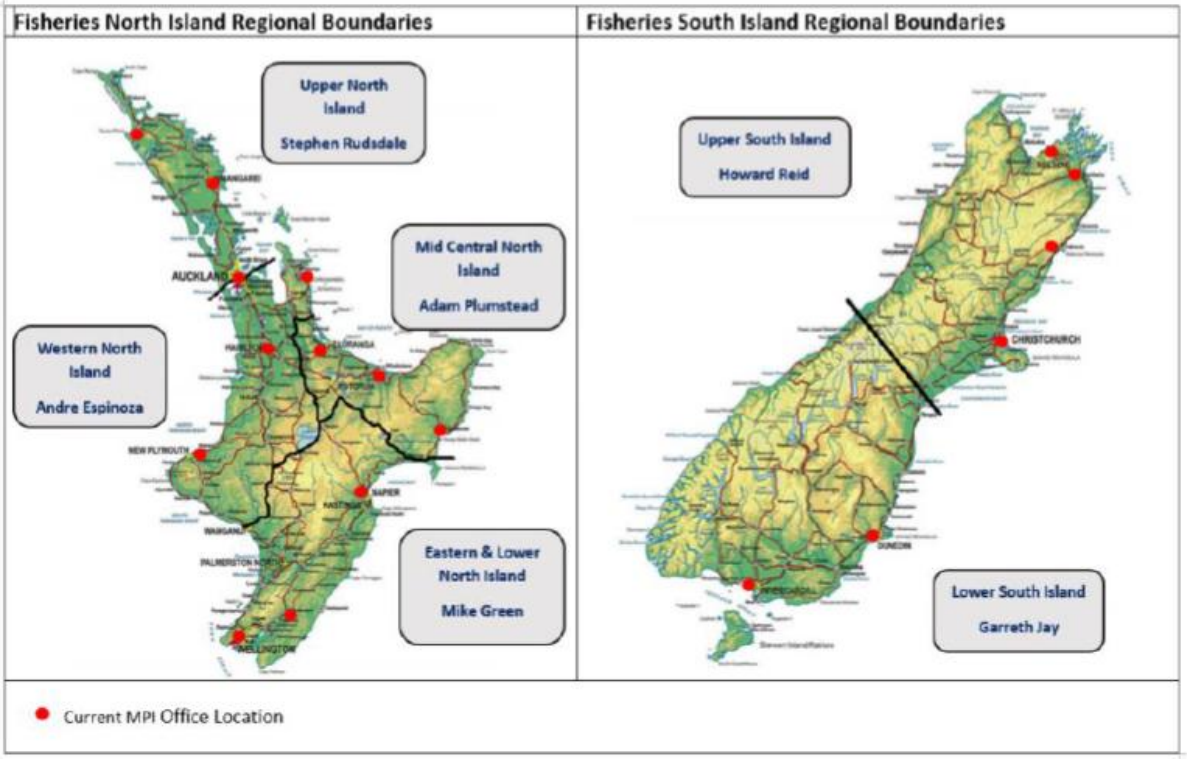
Upper North Island	Stephen Rudsdale Tel (09) 470 0580 Email Stephen.Rudsdale@mpi.govt.nz cc. Charlene.Sutton@mpi.govt.nz
Western North Island	Andre Espinoza Tel (09) 820 7742 Email: Andre.Espinoza@mpi.govt.nz cc. Louise.Kay@mpi.govt.nz

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

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


Fisheries North Island Regional Boundaries
Upper North Island
Stephen Rudsdale
Mid Central North Island
Adam Plumstead
Western North Island
Andre Espinoza
Eastern & Lower North Island
Mike Green
AUCKLAND
Fisheries South Island Regional Boundaries
Upper South Island
Howard Reid
Lower South Island
Garreth Jay
CHRISTCHURCH
Current MPI Office Location

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