



Purongo ā-tau

Annual Report 2020/21



**Rotorua
Te Arawa Lakes
Programme**



Rārangi Kaupapa

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Wai

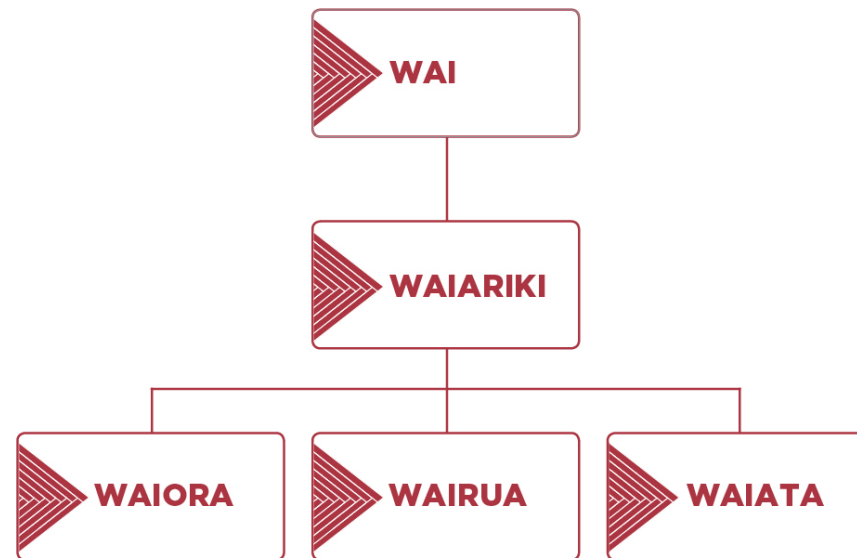
Purpose



Wai | Purpose

The purpose of this document is to report against the 2020/21 Annual Work Plan of the Rotorua Te Arawa Lakes Programme (the Programme). This report is prepared in order to fulfil Clause 5.3 and 5.4 of the Deed of Funding with the Crown for that Programme.

The report is structured around the guiding values of our work on the lakes, Te Whakapapa o te Wai, as set out in Te Tuapapa o ngā wai o Te Arawa; those values are as shown below, which is Figure 5 from the document.



Following an overview of achievement on the Deed Funded lakes (Waiariki), this report outlines the current status of the health of the Te Arawa Lakes (Wai Ora) and then a detailed breakdown of the Deed and Non-Deed funded interventions on each lake (Wai Rua). The financial status of the Deed funded interventions is also provided in Wai Ata.

This Annual Report outlines the on-the-ground work undertaken by the Partners to collectively work towards the aspirations for the Te Arawa Lakes, as set out in the Vision and Strategy for the Lakes of the Rotorua District.



Waiariki

Overview



Waiariki | Overview of Deed Funded Interventions

Te Rotorua-nui-ā-Kahumatamomoe - Lake Rotorua

TOTAL AWP Budget 2020/21 (Refer Column E Financials)	Actual year to date expenditure (Refer Column B Financials)	Crown Funding received to date (Refer Column F Financials)	Crown Funding applied to date (Refer Column G Financials)
\$5,715,000	\$2,531,000	\$554,000	\$1,265,000

Lake Rotorua continues to receive the biggest investment of funding from the Programme with the goal of achieving the sustainable nitrogen load for the lake of 435 tonnes, by 2032. The primary objective of this goal is to cease phosphorous locking (alum dosing) on the lake in the long term. To achieve the 435 tonne sustainable load to the lake (a reduction of 320 tonne) four tools are being implemented and are known as the Integrated Framework: nutrient rules (known as Plan Change 10), the Incentives Scheme, a gorse conversion project (now complete) and engineering solutions (constructed wetlands and sewerage reticulation). Implementation of the Integrated Framework is a challenging task, and requires large-scale land use change across the catchment in order for it to be realised – particularly in order to achieve the goals of the Incentives Scheme.

The **Lake Rotorua Nutrient Rules (previously known as Plan Change 10)**, achieved a significant milestone during the year, having all appeals resolved and receiving a consent order from the Environment Court. This is significant milestone following a 10 year process to develop them in collaboration with stakeholders and move through the processes prescribed by the Resource Management Act.

Staff working in the Programme have anecdotally noted a turning point in landowner appetite for the **Lake Rotorua Incentives Scheme** (the Scheme) this year, with a good pipeline of serious sellers now in place. This may be due to factors such as the appeals on Plan Change 10 now being resolved and implementation of the plan change well advanced (via the Advice and Support Service) which is enabling people to understand their position and opportunities for change. During this year the Scheme has supported the planting of approximately 193,000 trees in the Lake Rotorua catchment. The Scheme has secured 30 tonne of nitrogen reduction and over 4000 hectares of land use change.

A further ~10 tonne is either in the final stages of sign off, or in advanced negotiations. While the total cumulative target of 40 tonne this year has not been achieved, we know where it will come from and are advanced in securing it. We have also identified opportunities beyond that 40 tonne. Progress with the Scheme remains steady and staff believe that the 2032 target can be achieved. We note that taking up the Scheme is a significant decision for landowners and, in line with the scale of the decision, landowners need ample time to consider it and make the right decision for them and their whanau now and for generations to come.

The Independent Panel Review of Overseer, released by the Government just following the end of the financial year, has potentially provided a challenge to the Programme in terms of maintaining momentum in the implementation of the Lake Rotorua Nutrient Rules and the Incentives Scheme. The Partners have discussed the report and Government guidance and are resolute in continuing momentum to the 2032 target for Lake Rotorua and have agreed to follow the Government Guidance, i.e. the continued use of Overseer while the four options identified by the Government to respond to the Panel Report are worked through (see footnote¹).

Implementation of the **Low Nitrogen Land Use Fund** (the Fund) has continued this year with the Objectives being the implementation of existing contracts and implementation of Phase 3.

A project for a Hedged Mānuka for Oil Pilot Trial was commenced during 2020/21. The rationale for this project is to potentially provide an alternative low nitrogen leaching option for owners of small land parcels, particularly multiple Māori-owned blocks. A number of these blocks are currently being cropped for maize, but this land use will not be able to continue due to the restrictions on nitrogen leaching imposed by the Lake Rotorua Nutrient rules. Furthermore height restrictions associated with the Rotorua Airport mean that forestry is not an alternative land use for many previously cropped properties.

¹ <https://environment.govt.nz/publications/government-response-to-the-findings-of-the-overseer-peer-review-report/>

Two sites have been secured for the trial; one near the Rotorua Airport and one at Waitetī. Plants have been ordered and site preparation has commenced, with planting planned for the 2021 planting season.

Of the Fund projects commenced in 2018/2019, only the Hazelnut Trial, Volcanic Creamery and Hemp Trial projects continued through 2020/2021. All projects commenced during 2019/2020 (Farm Forestry Report, High Rainfall Trial, Seedling Propagation Trial, dNITRO Update, Gorse Herbicide Trial and Hedged Mānuka for Oil Feasibility Study) have been completed.

During the year work was undertaken on the viability of constructed wetlands providing the remaining 42 tonne required to achieve the **50 Tonne Engineering Solutions** reduction of the Integrated Framework, confirming that constructed wetlands are a solid viable option. Eight tonne of 50 tonne target has been achieved through the reticulation of approximately 950 properties over the year staff and both Councils have continued to work on getting those who remain unconnected to reticulation online.

To achieve the remaining engineering target, Programme staff are now pursuing opportunities for constructed wetlands, including landowner interest for the identified priority sites. Staff have also commenced work on securing a rural drain restoration project with one landowner which we intend to use to measure the nutrient gains made by the restoration of these sites and create a model which can be repeated across the catchment.

Phosphorous locking on the lake is also Deed funded and it appears that temporary facilities that were established on the Puarenga while the permanent tank was replaced in 2020 managed to counter an algae bloom on the lake (and associated Public Health warning) during October/November 2020. Certainly we believe that alum dosing of the lake is what continues to maintain the water quality around its target TLI of 4.2, while those longer term interventions described above take effect.

Lake Rotoehu

TOTAL AWP Budget 2020/21 (Refer Column E Financials)	Actual year to date expenditure (Refer Column B Financials)	Crown Funding received to date (Refer Column F Financials)	Crown Funding applied to date (Refer Column G Financials)
\$408,000 (also refer Change Request 0069)	\$306,000	\$58,000	\$153,000

Lake Rotoehu still provides a challenge in terms of water quality management. More work and more investment is required on Lake Rotoehu.

However, the programme has made some very good gains in terms of land use change in this catchment which we believe will improve water quality in the long term. During the year staff completed an audit of all land use in the Lake Rotoehu Catchment in accordance with the Rule 11 benchmarks for all properties and in specific cases the land use change agreements which have been entered into, all are compliant.

Key points of change in land use between 2001-2004 (the Rule 11 Benchmarking period) and 2018-2019 (the year audited) are:

1. The pastoral area in the catchment has reduced from 1790 ha to 1175 ha (48% to 32% of the catchment).
2. The area in native bush (including riparian works) increased from 1152 ha to 1390 ha (31% to 38% of the catchment).
3. The area in plantation trees has increased from 737 ha to 1123 ha (20% to 30% of the catchment).

The above data demonstrates significant land use change achieved by the Programme in this catchment.

Weed harvesting and alum dosing continue on the lake now, after a hiatus due to high lake levels and algae dominance.

Weed growth on Rotoehu was sufficient during the year to allow harvesting in Autumn. During this harvest, 2500 tonne of Hornwort was removed from the lake and transported for composting to a site near Taupō.

Phosphorous locking (alum dosing) at Waitangi Soda Stream was turned back on in December 2020 to counter phosphorous coming from the catchment, in accordance with the now expired resource consent. Staff are currently working through a new resource consent application with mana whenua with the hope that a new consent will enable some refinements to the dosing regimen with the aim of improving water quality. Staff are working with mana whenua to get in place contracts for cultural assessment of the proposal and supporting mana whenua through a parallel technical review to ensure viability and safety.

Sewerage reticulation was never included in the original Action Plan for Lake Rotoehu (first adopted in 2007 and amended in 2011) and has not been considered until more recent years, there is currently no Deed funding available for it. However, during the year, a request was made by Strategy Group to the Minister for funding to enable the reticulation at Rotoehu to go ahead and at the time of writing we are awaiting a response from the Minister. Reticulation at Rotoehu already has resource consent, as part of the Rotomā-East Rotoiti scheme. Rotorua Lakes Council have now approved funding in their 2021 Long Term Plan and as a result of that detailed design of the Scheme is underway.

Lake Ōkāreka

TOTAL AWP Budget 2020/21 (Refer Column E Financials)	Actual year to date expenditure (Refer Column B Financials)	Crown Funding received to date (Refer Column F Financials)	Crown Funding applied to date (Refer Column G Financials)
\$447,000 (see Change Request 068)	\$418,000	\$49,000	\$209,000

With a \$9 million total expenditure on Lake Okareka under the Deed of Funding to date, significant benefit to the lake has been achieved. Sewerage reticulation of 260 lakeside dwellings has been completed as well as 230 hectares of land use change, i.e. from grazing and gorse to Manuka and natives. The Rule 11 benchmarks and land use change agreements in the Lake Ōkāreka are monitored by staff to ensure ongoing compliance. Over the year staff have worked with two large landowners in the catchment to implement their land use change agreements, i.e. conversion of gorse and pasture to mānuka.

Lake Ōkāreka water quality is considered stable around the target TLI and no further work is proposed in this catchment.

Lake Rotoiti

TOTAL AWP Budget 2020/21 (Refer Column E Financials)	Actual year to date expenditure (Refer Column B Financials)	Crown Funding received to date (Refer Column F Financials)	Crown Funding applied to date (Refer Column G Financials)
\$4,340,000	\$1,358,000	\$339,000	\$679,000

The installation of the Ohau Wall was completed in the early years of the Programme with Deed funds. In recent years reinforcing of the wall using steel walers has been required to maintain the integrity of the wall for its 50 year design life, this reinforcing project was completed during the year with a total of 364 walers now installed between the king piles. The algae bloom on Lake Rotorua in October/November 2020 was a test for the wall, ultimately the wall appeared to successfully do its job of preventing backflow of water from Lake Rotorua to Lake Rotoiti.

Wastewater reticulation is by far the biggest action on Rotoiti in terms of complexity and cost. Rotorua Lakes Council reticulated 409 properties at the western end of the lake back to the Rotorua Wastewater Treatment Plant in the earlier years of the Programme. Now work continues on the reticulation of approximately 450 properties at the eastern end of the lake, back to a newly completed, dedicated Membrane Bioreactor wastewater treatment plant which has been constructed and commissioned in the Rotoiti catchment and also receives wastewater from new reticulation at Lake Rotomā (now completed).

The total cost of reticulation at Lake Rotoiti, plus the forecast remaining expenditure (for both the eastern and western end of the lakes), is around \$52 million in total. This would take the total cost of lakeside reticulation under the Te Arawa Lakes Programme to around \$83 million in total for all wastewater reticulation committed to under the Deed (not including Rotoehu).

The Crown contribution to Rotorua Lakes Council under the Deed of Funding is less than half of the \$83 million. As a result, the Rotorua Te Arawa Lakes Strategy Group has requested another \$10 million of funding from the Minister so that the local and Crown contributions to lakeside reticulation under the Deed of Funding are equal. At the time of writing this report, the Minister is considering that request.

If this funding request to the Minister is not successful, Strategy Group resolved to revisit the remaining Deed funding allocation within the Programme, to give priority to completing the reticulation of Lake Rotoiti. If this does arise we will propose that the strategy group approaches the Minister for extra funding to support the Lakes Rotorua Incentives scheme.



Wai Ora

Annual Lake Water Quality Results



Wai Ora | Annual Lake Water Quality Results

The Water Quality Dashboard provided below summarises the work done by the Programme to monitor and measure the health of the Rotorua Te Arawa lakes during the year. Of particular note:

- The Dashboard shows that five of the lakes achieved their target Trophic Level Index (TLI) over for the year, that four lakes have a three year rolling average TLI which meets their target, and that four have a three year rolling TLI 0.2 or less points above their target TLI.
- While Lake Rotoehu did not again achieve its target TLI, this is the second year of significant improvement in the measured TLI.
- For Rotokākahi, while it also did not achieve its target TLI, this is the best TLI result for that lake since 2004.
- An elevated TLI for Tikitapu this year is a concern and staff will be monitoring this closely, the land use in the catchment is already very low intensity.
- Mātauranga Māori measures are an important measure of lake health and the Programme has an ongoing commitment to expand the range of these measures included in the Dashboard reporting as the work done by Te Arawa Lakes Trust and others to measure lake health using Mātauranga expands. The Dashboard shows that monitoring is showing juvenile koura are being impacted in lakes where catfish are present. Koura and Kakahi monitoring is now included in the annual Lake Health Reporting. Reports have recently been completed for Lakes Rotorua and Rotoiti.
- The TLI of Lake Rotorua is maintained at or close to its TLI through phosphorous locking (alum dosing) and as we saw during the year, if alum dosing ceases algal bloom will occur – until reductions to the nitrogen load to the lake can be achieved as is being pursued through the implementation of the Integrated Framework described above (noting a average age of groundwater in the catchment of 60 years). The algae bloom on Lake Rotorua during the year does impact its measured TLI.
- Overall these results for the Te Arawa Lakes remain positive, however close monitoring and management is required – particularly given that challenges such as climate change are likely to continue to impact on the ability of the Programme to maintain and improve water quality across the lakes.

Lake statistics (water quality attributes)

Lake	Trophic Level Index		National Policy Statement for Freshwater Management (NPS-FM) Lakes attributes				10 year trends				Contact recreational attributes		
	TLI 2020/21 (TLI Target)	TLI 3 year Avg	2021/21 Total max Nitrogen median	2020/21 Total Phosphorus median	2020/21 Chl-a-median	2020/21 Chl-a	Total clarity nitrogen	Total Phosphorus	Chl-a	Water	Blue green quality warning	Cyanobacteria biovolumes 2018-21	Swimming water quality - faecal ¹
Ōkāreka	3.1 (3.0)	3.1	B	A	B	A					N/A	N/A	Good
Ōkaro	4.4 (5.0)	4.7	C	C	C	B					Yes	B	Good
Ōkataina	2.6 (2.6)	2.6	A	A	A	A					N/A	N/A	N/A
Rerewhakaaitu	3.3 (3.6)	3.7	B	A	B	A					N/A	N/A	Good
Rotoehu	4.1 (3.9)	4.6	B	B	C	B					Yes	C/D	Excellent
Rotoiti	3.7 (3.5)	3.7	B/B	B/C	B/C	A/A					Yes	A	Excellent
Rotokāhahi	3.4 (3.1)	3.6	B	B	B	A				N/A	N/A	N/A	N/A
Rotomā	2.3 (2.3)	2.3	A	A	A	A					N/A	N/A	Excellent
Rotomahana	3.5 (3.9)	3.6	B	B	B	A					N/A	N/A	N/A
Rotorua	4.4 (4.2)	4.3	A/B	B/C	C/D	B/B					Yes	A	Poor
Tarawera	2.7 (2.6)	2.7	A	A	A	A					No	N/A	Excellent
Tikitapu	3.2 (2.7)	3.0	B	A	B	A					N/A	N/A	Good

*Italicised figures are based on Te Wairoa Stream monitoring and a three-parameter TLI (no Secchi disk).

¹ NPS-FM Human contact attribute based on 95 percentile E.coli during the bathing season.

+ Lake Tarawera is not routinely monitored, however ad-hoc samples collected in response to public concern, has resulted in health warnings in past seasons.

What is the Trophic Level Index

The Trophic Level Index is a number used to indicate the health of lakes in New Zealand. As a general rule of thumb, the higher the number, the worse the water quality in the lake.

The number is calculated using four separate water quality measurements - total nitrogen, total phosphorous, water clarity and chlorophyll-a

National Policy Statement for Freshwater attributes

To protect ecosystem and human health, attributes are measured to help determine the extent to which specific values are provided for. There is a range of different physical, chemical, microbiological and ecological attributes, and one attribute may apply to more than one value.

Attributes are graded A-D (E), with the National Bottom Lines set for some attributes, 'A' indicated ecosystems are healthy and resilient, or low risk to human health; to 'D' aquatic communities are in persistent degraded state, or risk to human health from contact recreation is high.

Contact recreation

Bathing and contact recreation sites are monitored during Summer throughout the Rotorua Lakes, to inform the public when and where it is safe to interact with the water. Not all lakes or all bathing sites can be monitored so popular and culturally significant sites are prioritised. Sites can be graded from Poor to Excellent based on attribute statistics in the National Policy Statement for Freshwater (NPS-FM).

Cyanobacteria are monitored in lakes with a history of algal bloom activity. Health warnings are issued by Toi Te Ora based on the volume of potentially harmful cells in the water and sites are graded according to the NPS-FM.

A	Excellent
B	Good
C	Fair/Moderate
D	Poor

Lake statistics (Ecological attributes)

Lake	Lake submerged Plant Index ¹				Kōura		Kākahi		Catfish	
	LakeSPI	LakeSPI Native Index	LakeSPI Invasive Index	Invasive Submerged Plants Present	■ Improving ■ Stable ■ Worsening					
					Abundance	Trend	Abundance	Trend	Abundance	Trend
Ōkāreka	High	B	C	d	Moderate ³		Present ⁵	N/A	Absent ⁵	N/A
Ōkaro	High	C	C	c	Absent ³	N/A	Absent ⁵	N/A	Absent ⁵	N/A
Ōkataina	High	B	C	d	Abundant ⁴		Present ⁵	N/A	Absent ⁵	N/A
Rerewhakaaitu	Moderate	A	B	b, d	Present ⁴	N/A	Present ⁵	N/A	Absent ⁵	N/A
Rotoehu	Moderate	C	C	a, c, e	Moderate ²		Moderate ⁵	N/A	Absent ⁵	N/A
Rotoiti	Poor	C	B	a, b, c, d, e	Moderate ¹		Abundant ¹		Abundant ¹	
Rotokākahi				c	Moderate ⁴		Abundant ⁵	N/A	Absent ⁵	N/A
Rotomā	High	B	C	d	Abundant ³		Abundant ⁵	N/A	Absent ⁵	N/A
Rotomahana	High	B	C	a, b	Absent ⁴	N/A	Absent ⁵	N/A	Absent ⁵	N/A
Rotorua	Moderate	C	C	b, c, d	Moderate ¹		Abundant ¹		Present ¹	
Tarawera	Moderate	C	C	a, b, c, d, f	Moderate ³		Abundant ⁵	N/A	Absent ⁵	N/A
Tikitapu	Moderate	C	C	d	Moderate ⁴		Absent ⁵	N/A	Absent ⁵	N/A

¹based on 2020 and 2021 LakeSPI survey data.

Invasive Submerged Plants: a) Ceratophyllum; b) Egeria; c) Elodea; d) Lagarosiphon; e) *Potamogeton crispus*; f) *Ranunculus trichophyllus*

¹ Seasonal monitoring; ² Spring and Summer monitoring; ³ 5-10 yearly monitoring; ⁴ Baseline survey only; ⁵ Observational data only

* Anecdotal evidence suggests that hornwort has established in Lake Rotorua, although it has not been picked up in LakeSPI surveys.

Lake Submerged Plant Index (Lake SPI)

The Lake SPI programme monitors macrophytes (aquatic plants) which are used to classify the ecological condition of lakes. The ecological status of a lake can be characterised by the composition of native and invasive plants.

'Lake SPI' index is a synthesis of components from both the native and invasive impact conditions of a lake and provides an overall indication of lake condition. The higher the score, the better the condition.

Kōura and Kākahi monitoring

Kōura and Kākahi monitoring is carried out by Dr Ian Kusabs of Kusabs and Associates Ltd. Kōura monitoring is undertaken on all the Rotorua Te Arawa Lakes.

Regular Kākahi monitoring surveys are undertaken in Lakes Rotorua and Rotoiti to monitor the long-term effects of lake restoration initiatives on Kākahi populations in the shallow littoral zone of these lakes.

Catfish monitoring

Catfish were first detected in Lake Rotoiti in March 2016 and in Lake Rotorua in December 2018. Surveys have been undertaken to detect their presence in the other lakes. So far they are limited to Lakes Rotorua and Rotoiti.

Lake SPI/Cultural/Catfish	
A	Excellent
B	Good
C	Fair/Moderate
D	Poor



Wai Rua




Deed Funded Interventions







Wai Rua | Deed Funded Interventions

Te Rotorua-nui-ā-Kahumatamomoe (Rotorua)

To meet community expectations for water quality in Lake Rotorua, nitrogen inputs to Lake Rotorua must not exceed 435 tonne annually. This limit is set in the Bay of Plenty Regional Policy Statement to be achieved by 2032. This table summarises the Deed Funded interventions that were worked on over the last 12 months, in accordance with the approved Annual Work Plan 2020-21.



Lead	Project	At lake target	Summary of Work This Year	Spend	Project status
SHARED	Brunswick / Rotokawa Sewerage Reticulation	N/A	Both Councils have continued a joint project to connect all properties that remain unconnected to sewerage reticulation in the Brunswick/Rotokawa. For various reasons a number of properties remain unconnected with landowner disagreement or affordability the main reasons. Engagement continues with all habitable properties who remain unconnected.	\$46,000	
TOI MOANA	Incentives	100 T N	The Incentives Scheme has secured 30 tonne of nitrogen reduction and approximately 10 tonne is either in the final stages of sign off or in advanced negotiations. While the total cumulative target of 40 tonne this year has not been achieved, we know where it will come from and are advanced in securing it. We have also identified opportunities beyond that 40 tonne.	\$1,016,000	
SHARED	Engineering Solutions	50 T N	The target this year was to complete detailed investigation of at least two wetland options with potential costing and pursue ongoing protection of existing wetland areas. Reticulation completed in earlier years of the Programme has achieved approximately 8 tonne nitrogen reduction. During the year work was done on the viability of constructed wetlands providing the remaining 42 tonne required to achieve the target and this work confirmed this as a solid viable option. That work also identified priority sites within the Catchment. Following this information, staff have	\$80,000	

Lead	Project	At lake target	Summary of Work This Year	Spend	Project status
			<p>worked on identifying landowner interest in wetland development on the priority sites and this is ongoing.</p> <p>Staff have also commenced work on securing a rural drain restoration project with one landowner which we intend to use to measure the nutrient gains made by the restoration of these sites and create a model which can be repeated across the catchment toward the engineering target.</p>		
TOI MOANA	Advice and Support Service	N/A	<p>The target for the year was for all properties over 40 hectares to be enrolled in Advice and Support, consented or in a compliance process. This target has been met.</p> <p>Key achievements of Service in relation to Over 40 hectare properties (consent required now):</p> <ul style="list-style-type: none"> • 217 properties have now registered with Advice and Support; 90 over 40 hectares in size and 127 under 40 hectares. • 49 Consents have been granted for over 40 hectare properties and 5 over 40 hectare properties have been assessed as being a low-intensity permitted activity. • 32 consented properties have had their conditions monitored. The remaining consents are not due to be monitored until next financial year. • There are eight over 40 hectare properties that still require resource consent for a variety of reasons, but these are all actively engaged in the Advice and Support Service. <p>Key achievements of the Service in relation to under 40 hectare properties (consent required mid-2022):</p> <ul style="list-style-type: none"> • Since March a general marketing campaign has been rolled out using: radio, bus backs, posters in vets, dairies and rural supply stores and a presence at the Home Show to inform landowners of the need to contact us in relation to the rules if they have not yet done so. 	\$237,000	

Lead	Project	At lake target	Summary of Work This Year	Spend	Project status
			<ul style="list-style-type: none"> Direct letters were sent in late March and early April to 65, 5-10 hectare and 86 10-40 hectare landowners. 55 responses were received and those parties are now engaged with the Service. A further letter in August 2021 has received 10 responses, all now enrolled in the Service. A total of 90 landowners in the under 40 hectare category have not yet engaged. 		
TOI MOANA	Low Nitrogen Land Use Fund	N/A	<p>The target for the year was to administer existing contracts, review work to date and implement phase three.</p> <p>A Hedged Mānuka for Oil Pilot Trial was commenced during 2020/21. Two sites have been secured for the trial; one near the Rotorua Airport and one at Waitetī.</p> <p>Of the Fund projects commenced in 2018/19, only the Hazelnut Trial, Volcanic Creamery and Hemp Trial projects continued through 2020/21 with staff continuing to work with the contracted parties to ensure delivery against those contracts.</p>	\$549,000	
TOI MOANA	Phosphorous Locking (Utuhina and Puarenga)	As required	<p>During the year resource consent was obtained for a further 10 year period to continue phosphorous locking/alum dosing on the Utuhina and Puarenga streams.</p> <p>The new Puarenga bulk storage tank has been installed and commissioned, so appropriate protocol dose rates have been reinstated. The algal bloom in October/November 2020 was short lived and it appears temporary dosing facilities established at Puarenga were successful in bringing that back under control.</p>	\$540,000	
TOI MOANA	Lake Rotorua Gorse Project	N/A	Now complete with 267 hectares of gorse conversion achieved, there were some minor ongoing commitments during the financial year in relation to the agreements entered into under this project.	\$63,000	
Total Deed Funded Expenditure Lake Rotorua 2020/21				\$2,531,000	



Rotoehu

Key measures required to meet water quality expectations at Rotoehu are considered to be: phosphorous locking (with some changes to the historical alum dosing regimen), weed harvesting, land use change and sewerage reticulation. Land use change agreements were completed in the Catchment some time ago and monitoring of these is ongoing, along with monitoring of the Rule 11 benchmarks for the Catchment set through regulation. The Lake Water Quality Technical Advisory Group has identified that sewerage reticulation is a project worth pursuing and during the year Strategy Group supported pursuing this, including making a request to the Minister for funding. Rotorua Lakes Council have allocated funding for reticulation at Rotoehu in there Long Term Plan and have commenced detailed design. Phosphorous locking and weed harvesting are ongoing projects on the Lake.


Lead	Project	At lake target	Summary of Work This Year	Spend	Project status
TOI MOANA	Weed harvesting	As Required	<p>Weed growth on Rotoehu was sufficient to allow harvesting over the 2021 autumn season, following a lengthy hiatus in harvesting due to algae dominance on the lake.</p> <p>Locating a local site for disposal is proving difficult, and a more costly option, requiring transportation facility near Taupo was required.</p> <p>2500 tonne of Hornwort was removed from the Catchment.</p>	\$178,000	
TOI MOANA	Phosphorus locking	As Required	<p>Phosphorous locking on Lake Rotoehu recommenced this year following a hiatus due to high lake levels affecting the disbursement of the alum. The resource consent for the dosing has now expired and staff a working with mana whenua on a new application.</p> <p>Staff are working to get in place contracts for cultural assessment of the proposal. This includes supporting mana whenua through a parallel technical review.</p>	\$126,000	
Total Deed Funded Expenditure Lake Rotoehu				\$304,000	

Rotoiti

To meet community expectations for water quality the Ohau Diversion Wall and sewerage reticulation are key interventions, along with Rule 11 benchmarks set for landuse in the Catchment.

Led By	Project	At lake target	Summary of Work This Year	Spend	Project status
RLC	Sewerage Scheme Curtis Road to Hinehopu	4.9 T N 1.1 T P	<p>During the year construction of the main reticulation has been completed and a tender recommendation for the onsite pre-treatment systems has been approved.</p> <p>Individual property approvals to install the onsite pre-treatment systems are being sought.</p> <p>Rotorua Te Arawa Lakes Strategy Group has requested another \$10 million of funding from the Minister. At the time of writing this report, the Minister is considering that request.</p>	\$915,000	
TOI MOANA	Ohau Diversion Wall Maintenance	150 T N 15 T P	<p>During the year, reinforcing of the wall using steel walers has been completed in order to maintain the integrity of the wall for its 50 year design life, a total of 364 walers now installed between the king piles.</p>	\$443,000	
Total Deed Funded Expenditure Lake Rotoiti				\$1,358,000	

Ōkāreka

Led By	Project	At lake target	Summary of Work This Year	Spend	Project status
TOI MOANA	Land Use Change	N/A	This year Deed Funded work in this catchment was the continued implementation of contracts for land use change from pasture/gorse to mānuka. That land retirement has been completed during the year and the final payments for the work released.	\$418,000	
			Total Deed Funded Expenditure Lake Ōkāreka	\$418,000	



Wai Rua

Non-Deed Funded Interventions



Wai Rua | Non Deed Funded Interventions

The tables below summarises the work of all partners across the lakes that is not funded by the Funding Deed with the Crown.

All Te Arawa Lakes

Lead	Project	Update
RLC	Rotorua Wastewater Treatment Plant Alternative Disposal Site	Over the year Rotorua Lakes Council has continued work on a Sustainable Forest Approach (SFA) for the discharge of treated wastewater from the Lake Rotorua Wastewater Treatment Plant. A Reference Group of key stakeholder representatives has approved the investigation programme to confirm the viability of the proposed sites for the SFA. The first phase of the investigation programme into the SFA i.e. initial geotechnical investigation, is now underway. The resource consent applications to enable the upgrade of the Rotorua Wastewater Treatment Plan are being finalised.
SHARED	Te Tuapapa Implementation	Te Tuapapa – the Te Arawa Cultural Values Framework remains a key document for guiding work in the Programme. Te Arawa Lakes Trust have continued staff training with Rotorua Lakes Council and other professional bodies, e.g. NZ Planning Institute. The Trust also have workshops planned for Toi Moana Consents and Planning teams.
TALT	Te Arawa Fisheries Bylaw	Training of Pou Tiriao has been completed to assist in compliance monitoring work for the Bylaw. Three training workshops were held over the months of March & April. Six additional Pou Tiriao will join the current team of four, to make a total of 10 Pou Tiriao for this season. Rotorua Lakes Council have approved the installation of 20 Bylaw signs which will be installed in the coming months.
TALT	Te Papa Ahurewa – Te Arawa Hub (includes Iwi Engagement Forum)	In 2021 Bay of Plenty Regional Council provided funding to Te Arawa Lakes Trust to establish Te Papa Ahurewa an Environment Unit to support hapū and Iwi to engage in consents, policy and planning matters including the National Policy Statement for Freshwater Management. Work has continued during the year to establish the Hub and assist with engagement of Te Arawa on the National Policy Statement for Freshwater Management, geothermal resources and with resource consent applications related to the Te Arawa lakes.

Lead	Project	Update
TALT	Iwi Engagement Forums	Iwi Engagement Forums were held in September, October and November 2020 to share information and collect feedback on the work of Te Arawa Lakes Trust. Te Papa Ahurewa have also held forums through their work, related to the National Policy Statement for Freshwater Management.
RLC	Urban Stormwater	Rotorua Lakes Council are progressing their resource consent application for a comprehensive stormwater discharge consent for the Rotorua urban area and are being supported by Te Arawa Lakes Trust in preparing a Cultural Impact Assessment for this.
TOI MOANA	Lake Rotorua Nutrient Rules - P Mitigation Project	In accordance with the requirements of the Lake Rotorua Nutrient Rules (previously known as Plan Change 10) a Hauraki catchment group has been formed. Staff have worked with the group to identify opportunities for mitigation of phosphorous loss to the lake. A field day took place in April to show how phosphorous Critical Source Areas can be identified and potential mitigation methods.
	Jobs for Nature - TALT Wetland Restoration Team Mauri tū, Mauri ora	TALT secured funding through the Government's Mauri Tū Māori Ora - Jobs For Nature funding. 22 individuals have been employed in various roles, 14 working directly in wetlands and waterways throughout the rohe, including the Te Arawa Lakes in a 'wetland team'. The team are working on a total of 15 wetland sites, 2 within the Rotorua catchment, including supporting Regional Council Environmental Programmes with various landowners and are now on the Regional Council's contractor supply panel which will help provide future work for the team in pest weed control, monitoring, fencing and some pest animal control around the Te Arawa rohe. As part of this programme, in partnership with the Ministry of Social Development and the Department of Conservation, a nine week pilot training programme was completed and four of the participants have joined the wetland team.

SHARED	<p>Catfish Incursion Management (Lakes Rotorua and Rotoiti)</p>	<ul style="list-style-type: none"> • The Te Arawa Lakes Trust catfish coordinator role has completed three years and has commenced another three year term. • 31 schools and around 2,500 volunteers are involved in the Catfish volunteer programme and new volunteers are joining the kaupapa weekly. • 1,895 nets set throughout the year with 25,075 catfish caught this is a significant reduction (60%) in number of catfish caught compared to 2019/20 despite more nets being set. • Netting also undertaken in Lake Okareka, Lake Okataina and Lake Okaro, with no catfish detected. • New rules adopted in Regional Pest Management Plan to support preventing the spread of freshwater pests, including catfish (see Lakes Biosecurity below). <p>Biocontrol</p> <p>In late 2020, 60 mature catfish were transported to NIWA's Northland Marine Research Centre to begin research into developing sterile male catfish that can be used as a biocontrol tool. To date the research has shown that catfish are highly amenable to captive rearing and breeding in captivity. During the year, egg incubation and larvae rearing techniques have been developed. Once hatched and feeding, the larvae are robust with a survival rate of approximately 90%. Despite this, a number of challenges, including being unable to source critical compounds to induce masculinisation, were identified and further research is required to develop an effective method of producing reproductively sterile male catfish.</p> <p>Environmental DNA (eDNA)</p> <p>eDNA is a process whereby water samples are collected and analysed to determine what species may be present. This technology is relatively new and there is still some uncertainty about how sensitive it is, that is how good is it at finding pest species including pest fish. During the year, the Biosecurity team took samples from 302 sites across the region to trial the use of the technology, including samples from all of the Te Arawa Rotorua Lakes. It included sites where catfish are known to be present, and sites where they should not be present and this knowledge of what is present is important to determine how effective eDNA is at finding pests. Results are due on early 2021-22.</p>
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Lead	Project	Update
	Lake Biosecurity	<p>Together, Te Arawa Lakes Trust and the Regional Council trained 17 individuals from across Rotorua as Biosecurity Officers. This team were rostered on at boat ramps across the Te Arawa Lakes between October 2020 and April 2021. Their role was to ensure check, clean, dry processes and new self-certification processes were followed and educate the public about biosecurity threats to the lakes.</p> <p>The checks undertaken showed a very low compliance with the new self-certification rule (only 23%) but a high compliance overall (98%) in terms of the suitability of the vessel for launching.</p>
TALT	Te Arawa Climate Change Strategy - Te Ara ki Kopū strategy	<p>Te Urunga o Kea are finalising details for their Te Ara ki Kopū Strategy Launch - Te Arawa Climate Change Strategy. Te Urunga o Kea are working with on a Risk assessment pilot project that ensures the values, world view and approach of Te Arawa inform the context, assessment and adaptation response to Climate Change.</p> <p>Te Ara ki Kopū identifies Food and Water Security and sovereignty and Biodiversity as priority kaupapa, relating directly to the Programme.</p>
TOI MOANA	Detainment Bund Construction - Upper Ngongotahā	<p>During the year ten detainment bunds across three properties have been constructed in the Ngongotahā catchment utilising Crown funding allocated as part of the Covid recovery package.</p> <p>The bunds are designed to hold back peak flows in smaller storm events and also prevent phosphorous and sediment from entering the lake.</p>
RLC	Rotoehu Sewerage Reticulation	<p>As above, this is currently not a Deed funded project but Strategy Group has requested funding form the Minister to proceed with the project. Detailed design has commenced.</p>
TOI MOANA	Toihuarewa Waimāori - Chair of Lake and Freshwater Science	<p>During the year staff have secured support from the Regional Council for funding of this science leadership role for a further ten years. Following that approval staff have worked with the University on the recruitment process for the position which is currently underway.</p>
TOI MOANA	Installation of monitoring buoys	<p>A new buoy has been installed on Lake Ōkāreka. Replacement of the buoy on Rotoiti is still required in order to update the technology.</p>

Lead	Project	Update
TOI MOANA	Tree Removal	Problem trees, including Japanese Walnuts, poplars, eucalypts and large pine trees, have been removed from around 10 km of the Ngongotahā Stream between Relph Road and the Ngongotahā Village. These trees were in danger of falling into the stream and potentially creating debris dams.
TOI MOANA	Lake Ōkāreka Outlet Upgrade	During the year an upgrade of the pipeline of the outlet was successfully completed and will enable larger flows and management of levels of Lake Ōkāreka, in accordance with the new resource consent for the discharge. Final works are planned to be completed in September 2021, to improve the outlet from the lake to the canal and pipeline as well as complete the armoured pipeline outlet into the Waitangi Stream.

Tarawera Restoration Plan

Led by	Project	Update
SHARED	Farm Environment Plans for the inner and outer Tarawera Catchment	<p>The development of Farm Environment Plans for all farms within the Inner and Outer Catchments of Tarawera was completed around 2019.</p> <p>The Rotorua Catchments team continues to support landowners with those plans to implement actions in them through Environmental Programmes. This year two new Programme which include retirement and restoration of six ephemeral flow paths have been undertaken.</p>
RLC	Sewerage Reticulation	<p>During the year the Lake Tarawera Sewerage Scheme has been included in the newly adopted Long Term Plan of Rotorua Lakes Council. Implementation is proposed from 2021 to 2024.</p> <p>Preparation for the procurement of a design and build contract is underway. The design and build contract will provide a more evidenced based scheme cost that will confirm capital cost contribution from benefitting properties.</p>
TALT	Collective Impact Framework	<p>The project has been designed and presented to key stakeholders and has their support and eagerness to proceed. Te Arawa Lakes Trust are now seeking funding to provide a Community Connector to support the implementation of the project.</p>
TOI MOANA	Nutrient Modelling	<p>Modelling work has been completed confirming the original targets set in the Restoration Plan.</p>
TOI MOANA	Acacia Control	<p>This control occurs on the whenua of Te Arika Lands Trust (Rangitihi and Tūhourangi) and Te Arika 6Q2B (Tūhourangi), treasured land of these iwi with a rich history at the base of Mount Tarawera.</p> <p>Control completed for the 2020 winter control period was approximately 19 hectares of dense acacia in very steep land. Work commenced on the project for the 2021 winter control period on the 21 June 2021. Approximately 33 hectares of bush with varying density of acacia will be targeted this year.</p>



Wai Ata

Financials



Wai Ata | Financials

This section provides financial information as per the Deed of Funding with the Ministry for the Environment and approved by the Chief Financial Officers forum which oversees that work.

Rotorua Te Arawa Lakes Programme - Report B (Financial Progress Statement)

CFO Forum Financial Reports for the year ending 30 June 2021

For the 12 months to 30 June 2021

Interventions	Funding deed clause 5.4.1				5.4.2 (a) Note 1	5.4.2 (b) / 5.2.2 (d)			5.4.2 (c)	5.4.2 (d) Note 2
	(A) Council Approved Annual Plan	(A) Final Annual Plan (with budget rephasing)	(B) Actual year to date expenditure	(B - A) Variance to date over/(under) spend	(D) Council funding excluding Crown grants (50% of B)	(E) Approved Crown funding 2020/21	(F) Crown funding received to date	(G) = (B - D) 50% Crown funding applied to date	(H) Reserve interest accrued	(I) Other funding sources
Lake Rotoehu	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000
Weed Harvesting	69	69	178	109	89	200	7	89	0	0
Phosphorus Locking Soda Springs	463	463	126	(336)	63	208	51	63	0	0
Total Lake Rotoehu	532	532	306	(226)	153	408	58	153	0	0
Lake Ōkāreka										
Land Management Change	262	262	418	156	209	447	49	209	0	0
Total Lake Ōkāreka	262	262	418	156	209	447	49	209	0	0
Lake Rotorua										
Advice and Support	372	372	237	(135)	119	274	37	119	0	0
Phosphorus Locking	982	982	540	(442)	270	824	52	270	0	0
Gorse	24	24	63	39	32	0	8	32	0	0
Land Incentive Payments	6,000	6,000	829	(5,171)	415	3,500	338	415	0	0
Land Incentive Board Administration	802	802	187	(615)	94	0	50	94	0	0
Low Nitrogen Land Use Fund	794	794	549	(245)	274	652	54	274	0	0
Lakes Engineering Solutions	7,312	504	79	(424)	40	170	16	40	0	0
Sewerage Reticulation	175	175	46	(129)	23	295	0	23	0	0
Total Lake Rotorua	16,463	9,654	2,531	(7,123)	1,265	5,715	554	1,265	0	0
Lake Rotoiti										
Ohau Wall	0	398	443	45	222	340	0	222	0	0
Sewerage Reticulation	4,000	4,000	915	(3,085)	458	4,000	339	458	0	0
Total Lake Rotoiti	4,000	4,398	1,358	(3,040)	679	4,340	339	679	0	0
Total Programme Expenditure	21,256	14,845	4,613	(10,232)	2,307	10,910	1,000	2,307	0	0

Total Programme by Council										
Rotorua Lakes Council	4,175	4,175	961	(3,214)	481	4,295	339	481	(1)	0
Bay of Plenty Regional Council	17,081	10,670	3,652	(7,018)	1,826	6,615	661	1,826	62	0
Total Programme by Council	21,256	14,845	4,613	(10,232)	2,307	10,910	1,000	2,307	61	0

Programme reserve account interest accrued

5.4.2 (a) Note 1: Funding detail - Council

RLC general funding	481
RLC reserve	481
BOPRC reserves	1,826
BOPRC targeted rates	913
BOPRC general funding	913
Total funding detail - Council	4,613

5.4.2 (b) Note 2: Funding detail - any other source

Miscellaneous income	0
Total funding from any other source	0



**Rotorua
Te Arawa Lakes
Programme**

www.rotorualakes.co.nz