ROTORUA TE ARAWA LAKES PROGRAMME

Annual Report 2014-2015

Proud Partners

ROTORUA LAKES COUNCIL

BAY OF PLENTY REGIONAL COUNCIL TOI MOANA

TE ARAWA LAKES TRUST

With funding from

Ministry for the Environment
Manatū Mō Te Taiao

Contents

Purpose

The purpose of the annual report is to provide progress and achievements made by the Rotorua Te Arawa Lakes Programme to protect and restore the water quality of the Rotorua Te Arawa Lakes.

Progress is reported against the Annual Work Programme of the Funding Deed for the financial year ending June 2015. Water quality improvement outcomes are tracked by water quality monitoring results.

The over-arching goal of the Deed of Funding Agreement is to meet community aspirations for water quality in four lakes (Rotoiti, Rotorua, Ōkāreka and Rotoehu).

The report focusses on providing all operations, policy and support work undertaken for Deed Funded lakes. However, information on non-Deed Funded lakes is also included.

Key achievements

The table below sets out key achievements in each workstream across all lakes. The focus for the past year has been on interventions for Lake Rotorua, in-particular the Integrated Framework adopted by the Lake Rotorua Stakeholder Advisory Group and the Rotorua Te Arawa Lakes Strategy Group. Deed Funded activities are shown in bold.

Lake Operations as shown in 2014/2015 Annual Work Programme	Lake Operations Annual Progress
• **Continue in-lake treatments (weed harvesting/P locking).** • **Construct Tikitere Treatment Plant.** • Build phosphorus detainment bunds. • Implement Catchment Management Plan actions in Rerewhakaaitu. • Continue working with lake owners to develop Action Plan for Lake Rotokakahi. • Develop an Action Plan for Lake Rotomahana. • Conduct post implementation review of Action Plans for Lakes Ōkaro and Ōkāreka. • The University of Waikato Chair of Science and the Technical Advisory Group will continue to provide expert advice and scientific rigor for the programme. • Investigate weed management options in all lakes using weed harvester as an alternative to spraying.	• **A successful weed harvesting season was undertaken on Lake Rotoehu returning 3,458 kg of nitrogen and 461 kg of phosphorus.** • The weed harvester was hired out to Genesis Energy, returning funds to invest back into weed harvesting. • A small amount of weed harvesting was undertaken on Lake Rotoiti at Okawa Bay largely for amenity purposes, but also returning 145 kg of nitrogen and 31.16 kg of phosphorous. • **Alum dosing on lakes Rotorua and Rotoehu has continued in order to maintain these lakes at their target Tropic Level Index.** • **In December 2014 RTALSG decided to defer the construction of the Tikitere Zeolite Plant, which will enable better use of Deed Funds in the interim years.** • Draft Action Plans have been developed for Lakes Rotokakahi and Rotomahana. There are complicated information gaps for these lakes largely related to establishing nutrient sources and groundwater interactions which staff are working on. Post-implementation reviews for Lakes Ōkaro and Ōkāreka are planned to be undertaken following the completion of groundwater models for the whole area, in 2016. • The University of Waikato Chair of Science and the Lake Water Quality Technical Advisory Group have continued their role providing expert advice and scientific rigor for the Programme. • Alum modelling work undertaken by the University established that Lake Rotorua will be close to TLI if 435 tonne nitrogen target is achieved.

Policy and Planning as shown in 2014/2015 Annual Work Programme	Policy and Planning Annual Progress
• Understand regulatory requirements for all lakes and commence Rules development. • Rules for Lake Rotorua – finalise draft Rules design, undertake consultation, and commence formal notification. • **Finalise Incentives Policy for Lake Rotorua, put in place delivery structure and team.** • Progress tool development (databases) to support regulatory requirements for implementation. • Continue development of Transferable Development Rights (TDR) through the Proposed Rotorua District Plan RMA process. • Determine need for landscape plan.	• Draft nutrient rules for Lake Rotorua were notified in September along with public consultation on that draft. The submissions were analysed and presented to RTALSG and RD&D Council committees and substantial changes were made to the draft rules as a result. Staff have continued to work with stakeholders to develop the rules. • In March 2015 an options analysis considering nutrient management options for Lakes not covered by Rule 11 was presented to RTALSG and RD&D Council committees. The decision was to introduce a land use change rule as a start point for policy development for lakes not currently covered by Rule 11. This will be undertaken following the notification of the Lake Rotorua Rules. • **The Incentives Board was appointed in November 2014 and has been operational since then. In March 2015 a Director was appointed, Te Taru White. Te Taru has been working closely with parties interested in the scheme since his appointment and is confident of being able to sign up first agreements in 2015/2016.** • Work has been undertaken to define the requirements and scope options for a new database to manage nutrient allocations and trading. A business case is currently being developed and is due shortly. • Transferable Development Rights (TDR) have continued to be pursued through the Proposed Rotorua District Plan process. This part of the District Plan is currently in the appeals process and the programme has an active role in this. The programme's role in this is to ensure that District Plan provisions enable land uses which reduce nutrient input to lake catchments. • A significant variation was made to the Deed of Funding Agreement to clarify nutrient targets for each lake and enable multi-year appropriation. • StAG adopted a preferred allocation methodology for the Lake Rotorua Rules framework.

Land Management as shown in 2014/2015 Annual Work Programme	Land Management Annual Progress
• **Deliver land use change – gorse.** • Establish Land Technical Advisory Group. • **Establish decision-making support kit for land owners to help reduce nutrient loss.** • Identify methods for quantifying the benefits of actual changes happening on land.	• **As highlighted through the year, slow progress has been made with the Gorse programme. A flyover of flowering gorse has been completed and a plan is in place for improving progress for the 2015/2016 year.** • The Land Technical Advisory Group has been established and has held four meetings, in particular identifying research priorities. • Support continued for the Lake Rerewhakaiitu Farmer Group to implement their Nutrient Management Plans. Good progress is being made and the community has signaled an overwhelming commitment to continue their community solution to water quality. • The programme has prepared plans (x11) for helping farmers to implement detainment bunds in the Rerewhakaiitu Catchment. • **The Advice & Support Service was designed and established and over 40 landowners have signed up for the service at the time of writing**. • Acacia removal commenced in Lake Tarawera with 60 hectares removed in co-operation with DOC and local iwi.

Communication and Engagement as shown in 2014/2015 Annual Work Programme	Communication and Engagement Annual Progress
• Sip-monthly perception surveys of stakeholders and wider community. • Quarterly programme updates. • Specific activity to engage and receive feedback on the development of Lake Rotorua Catchment Land Use Rules and Incentives.	• A successful Opportunities Symposium was held in June to spark discussion about alternative low N land uses suitable for the Lake Rotorua Catchment. The Symposium was very well attended and generally positive feedback was received. • A quote for an independent perception survey was received at $30,000. In lieu of the six-monthly perception surveys at a total cost of $60,000 the data collected from the December 2013 surveys, the Rotorua media analysis, MOSAICs, BOPRC Māori Engagement Charter and feedback from advisory groups will be used to place targeted messaging across a variety of media. • The new Communications Plan for the programme considered the use of quarterly programme updates not as effective as sending relevant information to affected communities in newsletters, newspapers, online or other media where they seek information. • All activity to engage and receive feedback on the development of Lake Rotorua Catchment Land Use Rules and Incentives has been targeted and placed effectively within budget limits. For example the programme has ensured a presence at local events such as the Lakeside Concert and Home and Leisure Show to enable the wider community to become aware of an engaged in the work of the programme.
Sewerage as shown in 2014/2015 Annual Work Programme	**Sewerage Annual Progress**
• **Finalise design of Rotoiti and Rotomā Sewerage Schemes.** • **Complete Land Treatment System scoping and consultation.** • Review nitrogen and phosphorous tracking for all sewerage interventions	• **The preferred option for the Rotoiti-Rotomā Sewerage Scheme was adopted by Rotorua Lakes Council on 18 December 2014. This decision point followed consultation with the community and presentation of options to the Council as recommended by a Stakeholder Advisory Group and a Technical Advisory Group for the project. The scheme will be constructed in 2018/2019.** • **As with the Rotoiti-Rotomā Scheme, a Project Steering Committee has been established to consider possible alternative treatment and disposal options to Whakarewarewa Forest, this committee has continued its work through the year, including consultation with the community.** • Rotorua Lakes Council is able to estimate nutrient gains using standard values and multiply by the number of connections made to establish gains made by sewerage interventions. • An extension to the funding date was provided by the Ministry of Health for the Lake Rotoma Wastewater Scheme.

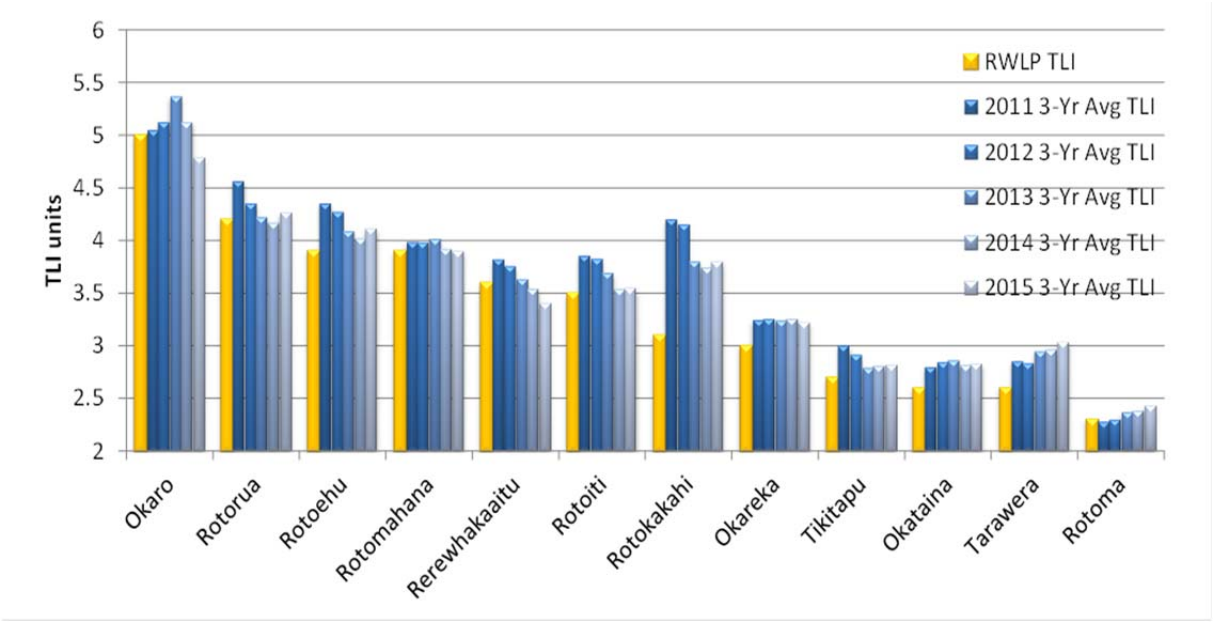
Rotorua Te Arawa Lakes annual water quality results

Lake water quality can fluctuate for a variety of reasons, including climatic conditions and rainfall. Trophic levels in the Te Arawa Rotorua Lakes were impacted in 2014-2015 by a warm settled summer resulting in prolonged stratification, especially in some polymictic lakes compared with previous years. The warm temperatures are also ideal for cyanobacterial growth and blooms. Cyanobacterial blooms occurred in Lakes Rotorua, Rotoiti, Tarawera, Rotokakahi and Rotoehu, and health warnings were issued at some times in some of these lakes. Many lakes also showed marked increases in phosphorus concentrations.

Of the 12 Rotorua lakes in the programme, tracking of the long-term water quality trend shows:

- Improving water quality in Lakes Rotorua and Rotoehu over recent years but vulnerability to climatic conditions and a possible decline in water quality in response to longer duration of stratification;
- Lake Rotoiti has shown a long-term improving trend since the installation of the Ōhau Channel Diversion Wall, however in 2014/2015 trophic status declined;
- Improved water quality in Lakes Ōkaro, Rerewhakaaitu and Tikitapu;
- Stable water quality in Lakes Ōkataina, Ōkareka, Rotomā and Rotomahana;
- Deteriorating water quality in Lakes Tarawera and Rotokakahi, which appears to be a consistent long-term trend.

Currently ten of the twelve Rotorua Te Arawa Lakes are above the Regional Water and Land Plan Trophic Level Index objective. Recent improvements in the TLI of Lakes Okaro and Rerewhakaaitu have resulted in these lakes meeting community objectives for lake water quality as stated in the Regional Water and Land Plan.



Note: Lake Rotokakahi TLI's are based on Te Wairoa Stream monitoring and a three-parameter TLI (no Secchi disc).

Rotorua Te Arawa Lakes water quality trend

Bay of Plenty Regional Council, Rotorua Lakes Council and Te Arawa Lakes Trust.

Working as one to protect our lakes with funding assistance from the Ministry for the Environment.

ROTORUA TE ARAWA LAKES PROGRAMME

Lakes that require investigation

Lake Rotoiti

The University of Waikato are modelling the impact of the diversion wall on water quality and the potential nutrient release from sediment.

Lake Rotomā

The Rotorua Lakes Council is progressing sewerage reticulation. The level of phosphorus that will be removed by this is being evaluated and there is some science work required to determine whether some further marginal reduction in phosphorus will be required from land use.

Lake Rotomahana

Bay of Plenty Regional Council is planning on working with farmers to identify sources of nutrients and completion of the catchment ground water modelling is needed to assist in evaluating catchment water and nutrient flows.

Lake Rotokakahi

Bay of Plenty Regional Council is currently working with the lake owners on an Action Plan. This is involving research input from the University of Waikato.

Lake Rotorua

To meet community expectations for Lake Rotorua, nitrogen inputs to Lake Rotorua need to reduce to 435 tonnes of nitrogen and 30 tonnes of phosphorous annually. We also need to reduce the impact of nutrients already in the lake, i.e. phosphorous in lake sediments.

To achieve water quality targets for Lake Rotorua we are undertaking both short-term and long term interventions. Short-term interventions have resulted in the lake achieving its TLI target in the past. The solution to sustainable improvements is reducing the amount of nutrients entering the lake which is the aim of the Integrated Framework. The graphs below show total nutrient targets and planned versus achieved targets for the financial year ending 30 June 2014/2015.

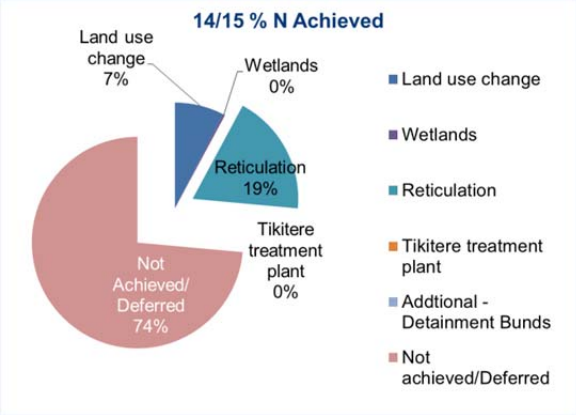
Water quality at a glance:

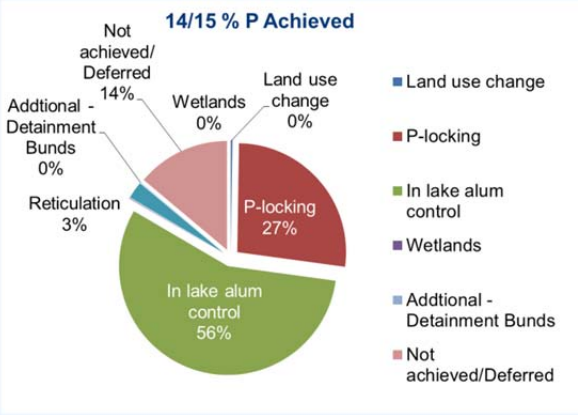
2015 TLI	**4.4**
2014 TLI	**4.2**
Target	**4.2**

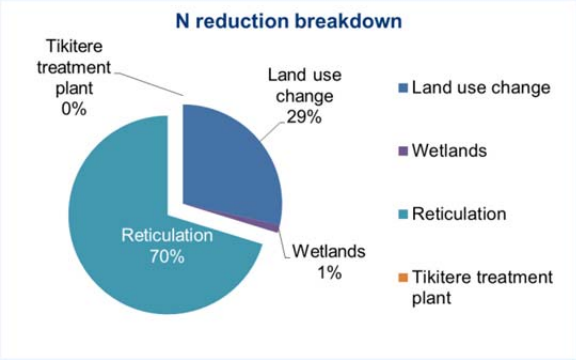
Water quality in Lake Rotorua has declined over the last 12 months due to stratification causing anoxia, which increases phosphorus levels particularly over the summer months.

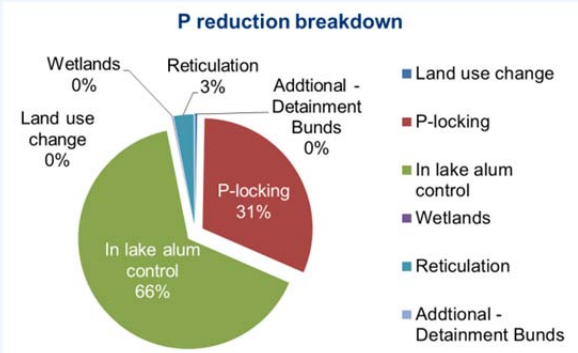
The increased TLI is a result of an increase in the average phosphorus of the lake compared to the previous five year. There is a resultant increase to the three-yearly averages from 4.2 to 4.3 TLI units.

There were at times orange alert level algae bloom warnings in place in late summer. For sustainable long-term water quality, nutrient reductions from land use are required and less reliance on alum dosing.









Programme update – Lake Rotorua						
Project	**Deed funded**	**Total target**	**Annual target**	**Annual result**	**Comments**	**Project status**
Land use change	Yes*	**270 T N** **10 T P**		3.94 T N 0.08 T P	Current result achieved in prior years.	
Rules		140 T N	0 T N	0 T N	The original notification decision for the rules was April 2015. This has been deferred.	
Incentives		100 T N	7.5 T N	0 T N	*No funding was approved by the Minister for incentives deals in 2014/2015. The Incentives Board is now established and the Board is confident the first deals will be struck in 2015/2016.	
Gorse		30 T N	8.44 T N	0 T N	Gorse conversion deals have been slow as described above. The first deals are now expected in 2015/2016, refer change request 26.	
Tikitere Treatment Plant	Yes*	30 T N	25 T N	0 T N	Deferred construction of the plant was deferred until 2018/2019, refer change request 16. *Originally funds related to the construction of the Tikitere plant were not approved in the 2014/2015 Annual Work Programme as a decision on full construction was deferred. Site maintenance costs and construction planning costs continued so Change Request 31 has been endorsed by PSG and RTALSG approval is sought to transfer funds approved in previous years to cover these costs.	

Programme update – Lake Rotorua						
Project	**Deed funded**	**Total target**	**Annual target**	**Annual result**	**Comments**	**Project status**
P-locking – alum dosing	Yes	4 T P	4 T P	8.48 T P	The Alum Dosing Programme has contributed to Lake Rotorua achieving its TLI in previous years due to P locking. It is estimated 17.74 T P has also been locked from releasing. Awahou is no longer an option so target reflects that change from 6 to 4.	
In lake alum control – no dosing		0 T P	25 T P	17.74 T P	Internal bottom sediment releases from Lake Rotorua can contribute up to 25 t p/a of nutrient. Alum dosing is able to control the nutrient release if total phosphorus stays below 0.027 g/m^3. Due to large stratification periods in March, some sediment releases occurred.	N/A
Detainment bunds	No	0 T P	0 T P	0.02 T P	Completed in prior years.	
Sewerage reticulation	Yes	11.3 T N 2.5 T P	11.3 T N 2.5 T P	9.74 T N 0.80 T P	Completed in prior years. This annual result differs from the 11.3 T N and 2.5 T P submitted prior years but is verified by RLC.	
Floating wetlands	No	0.18 T N 0.03 T P	0.18 T N 0.03 T P	0.18 T N 0.03 T P	Completed in prior years.	
Rotorua Wastewater Treatment Plant Alternative Disposal	Yes	N/A	N/A	N/A	Preferred option on track for selection December 2015.	
Total		**311.48 T N 16.53 T P**	**52.42 T N 31.53 T P**	**13.86 T N 27.15 T P**		

Project status: **Green** = on track, **Amber** = some delays, **Red** = major delays.

Lake Rotoehu

To meet community expectations for water quality Lake Rotoehu, nitrogen inputs to Rotoehu need to reduce by 44.5 tonnes of nitrogen and 1.7 tonnes of phosphorus. The main long-term intervention in Lake Rotoehu is land management change which was signed up in 2013/2014 but is due to be implemented in late 2015. This land use change is complemented by some short-term interventions. Sewerage reticulation at Lake Rotoehu is a possibility and is subject to community support.

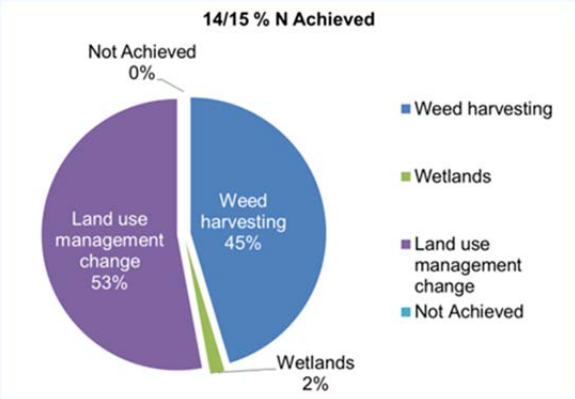
The graphs below show total nutrient targets and planned versus achieved for the financial year ending 30 June 2015.

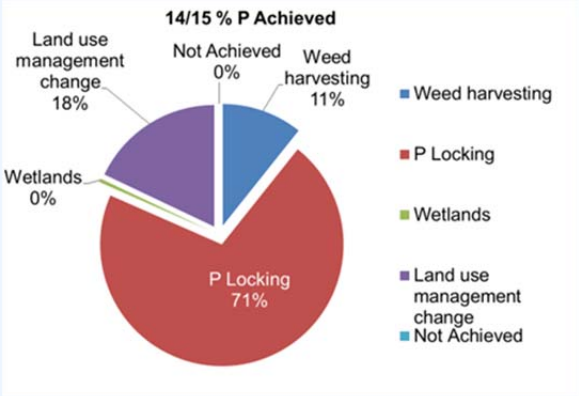
Water quality at a glance:

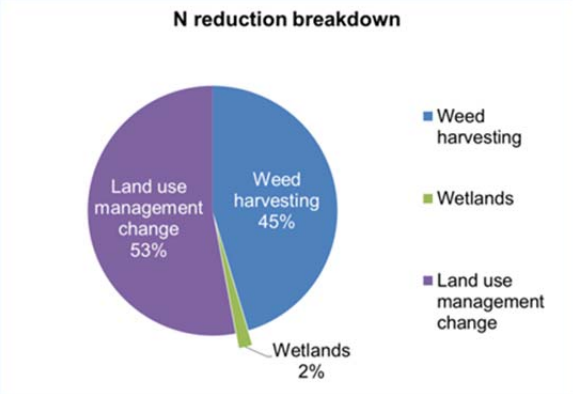
2015 TLI	**4.5**
2014 TLI	**4.0**
Target	**3.9**

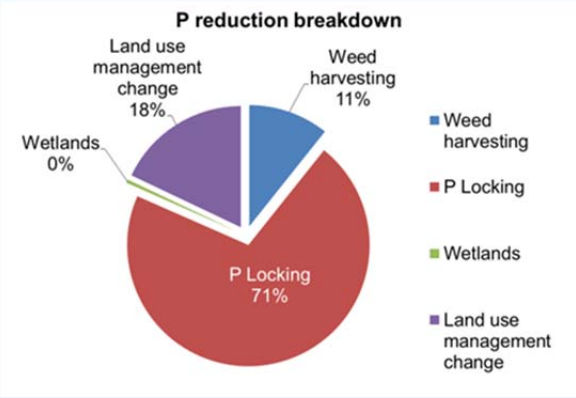
Much like Lake Rotorua, Rotoehu has had long periods of stratification that increased phosphorus, dissolved inorganic nitrogen and increased Cyanobacterial concentrations. The three-yearly average is now 4.12 TLI units, where the target is 3.9.

There were orange alert level algae bloom warnings in place till early April 2015.









Programme update – Lake Rotoehu							
Project	**Deed funded**	**Total target**	**Annual target**	**Annual result**	**Variance**	**Comments**	**Project status**
Land use and land management change	Yes	6.6 T N 0.46 T P	0 T N 0 T P	4.04 T N 0.77 T P		A further agreement complete, to be implemented late 2015.	
Weed harvesting	Yes	3.5 T N	3.5 T N 0 T P	3.46 T N 0.46 T P		Ongoing.	
Phosphorus locking	Yes	0.7 T P	0.7 T P	3.04 T P		Ongoing.	
Aeration trial	Yes					Trials complete, aerators to be removed 2015/2016.	
Floating wetland	Yes	0.132 T N 0.021 T P (Tanner *et al* 2010)	0.132 T N 0.021 T P	0.13 T N 0.02 T P		Completed in prior years.	
Total		**10.232 T N 1.181 P N**	**3.632 T N .721 T P**	**7.63 T N 4.29 T P**			

Project status: **Green** = on track, **Amber** = some delays, **Red** = major delays.

Lake Rotoiti

To meet community expectations for water quality, Lake Rotoiti needs to reduce to 230 tonnes of nitrogen annually and 13.3 tonnes of phosphorous annually.

The Ohau Diversion Wall is established and protecting the lakes water quality while nutrient reductions to Lake Rotorua are achieved. However, corrosion was discovered in the wall in December 2014 and now staff are working to prepare detailed costs and specifications for protection of the wall in 2015/2016.

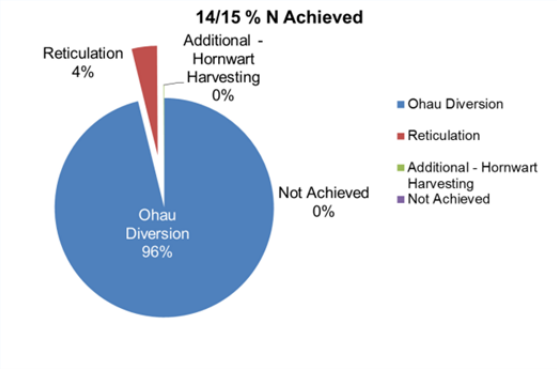
The graphs below show total nutrient targets and planned versus achieved for the financial year ending 30 June 2015.

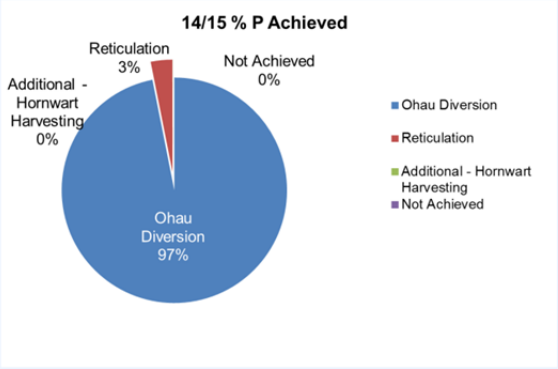
Water quality at a glance:

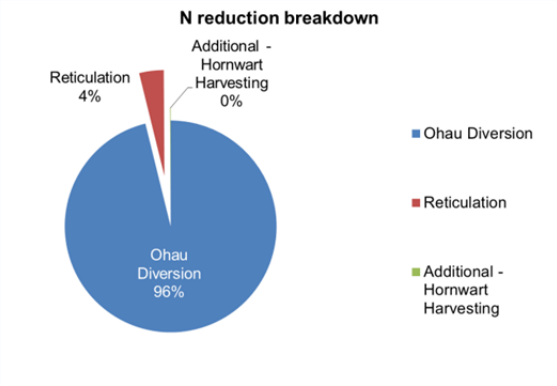
2015 TLI	**3.8**
2014 TLI	**3.4**
Target	**3.5**

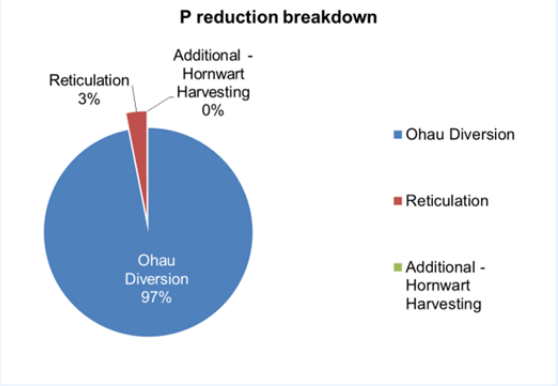
Lake Rotoiti had increases in nitrogen and phosphorus levels, with the increased concentrations of dissolved reactive phosphorus during stratification. Water clarity was only marginally affected by elevated chlorophyll-a concentrations.

There were also orange alert level algae blooms over the late summer early autumn.









Programme update – Lake Rotoiti							
Project	**Deed funded**	**Total target**	**Annual target**	**Annual result**	**Variance**	**Comments**	**Project status**
Sewerage Scheme – Curtis Road to Hinehopu	Yes	4.9 T N 1.1 T P	0 T N 0 T P	0 T N 0 T P		A solution was adopted for the Rotomā-Rotoiti Sewerage Scheme in December 2014. As a result of a funding extension granted by the Ministry of Health, construction will occur in 2018/2019 in accordance with a new approved project plan. The project is now on track.	
Hornwart harvesting	No	0 T N 0 T P	0 T N 0 T P	0.15 T N 0.003 T P		A small amount of weed harvesting was undertaken in Okawa Bay largely for amenity reasons but provided a nutrient benefit.	
Ohau Diversion Wall	Yes	130 T N 15 T P	150 T N 15 T P	150 T N 15 T P		Wall has shown signs of deterioration, this deterioration and cost of protection is being investigated and it is proposed to seek pricing shortly.	
Sewerage Schemes Okere/Otatamarae/ Whangamarino/Mourea/ Okawa Bay	Yes	5.9 T N 0.21 T P	5.9 T N 0.21 T P	5.84 T N 0.48 T P		62% completed for Rotoiti in prior years. This annual result differs from the 8.5 T N and 1.9 T P submitted prior years but is verified by RLC.	
Total		**140.80 T N 16.31 T P**	**155.90 T N 15.21 T P**	**155.99 T N 15.483 T P**			

Project status: **Green** = on track, **Amber** = some delays, **Red** = major delays.

Lake Ōkareka

To meet community expectations for water quality Lake Ōkareka, nitrogen input to the lake needs to reduce to 8.4 tonnes and phosphorous input needs to reduce to .33 tonnes.

No actions were planned for Lake Ōkareka this financial year. On-going monitoring of existing interventions will inform if further actions are required in later years of the programme.

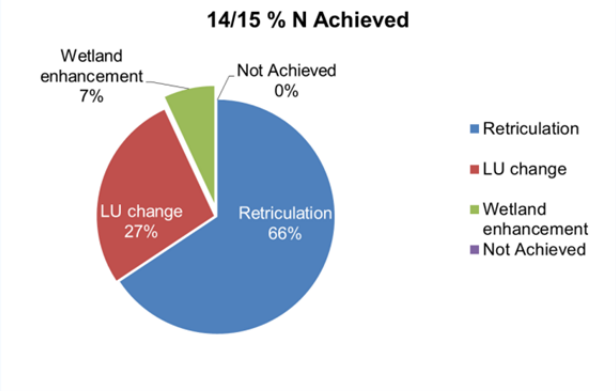
Water quality at a glance:

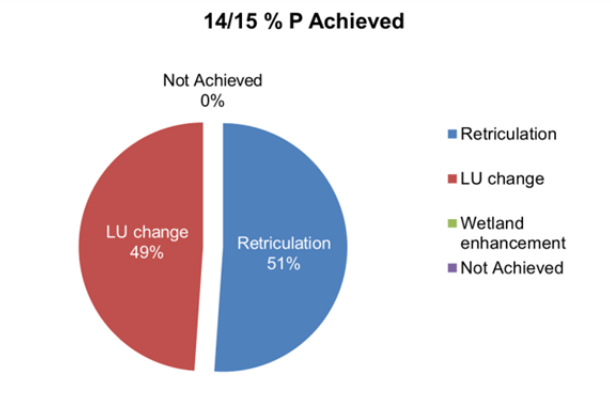
2015 TLI	**3.3**
2014 TLI	**3.3**
Target	**3.0**

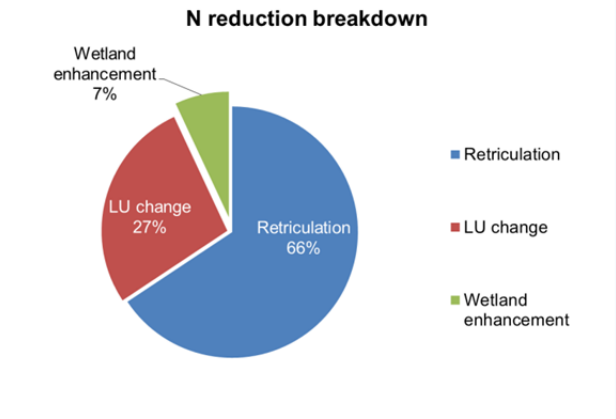
Annual monitoring results saw a slight increase in water quality over the last year from 3.28 to 3.25 this year.

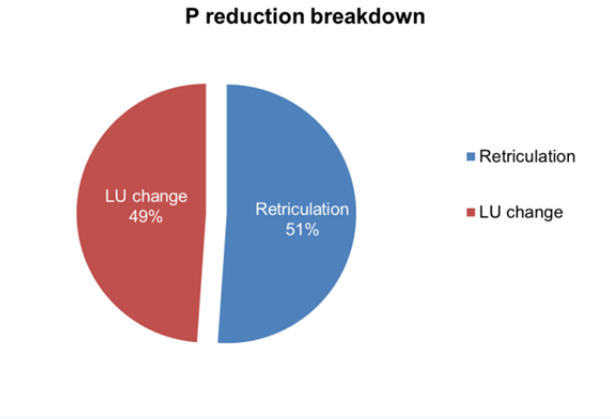
However, water clarity is at its worst annual average since 1992 being recorded at 2.9 m.

The long-term water quality trend in Ōkareka is stable.









Programme update – Lake Ōkareka							
Project	**Deed funded**	**Total target**	**Annual target**	**Annual result**	**Variance**	**Comments**	**Project status**
Sewerage reticulation	Yes	2.4 T N .02 T P	2.4 T N .02 T P	2.83 T N 0.23 T P		Project complete.	
Land use change	Yes	.9 T N .06 T P	.9 T N .06 T P	1.18 T N 0.22 T P		Project complete.	
Wetland enhancement	Yes	0.30 T N	0.30 T N	0.30 T N		Completed in prior years.	
Total		**3.6 T N** **0.08T P**	**3.6 T N** **0.08 T P**	**4.31 T N** **0.45 T P**			

Actions and outcomes for all other lakes

Lake Tikitapu	
2015 TLI 2.9 2014 TLI 2.8 Target 2.7	The main action of sewerage reticulation was completed in October 2010. There was no change in the water quality result for Tikitapu, and the long-term water quality remains stable although water clarity declined compared to the past four years. Lake Tikitapu stormwater upgrade was delayed further and is on track for completion in October 2015 (refer change request 33).
Lake Ōkataina	
2015 TLI 2.9 2014 TLI 2.7 Target 2.6	Water quality continues to improve in Ōkataina, despite this year's result it is expected to even out over the next few years. Implementation of the Action Plan has begun. A PhD study is continuing with the aim of understanding the long-term and short-term changes in water quality of Lake Ōkataina and the underlying causes, particularly in relation to the introduction exotic fauna and their impact on the local environment.
Lake Ōkaro	
2015 TLI 4.5 2014 TLI 4.5 Target 5.0	The TLI in Lake Ōkaro in 2014/2015 has remained below the objective of 5.0 units, for the second year in succession. The three-year average TLI is therefore also below the TLI objective for the first time since restoration actions have been undertaken for this lake. Chlorophylll-a concentrations have remained relatively low possibly due to the low phosphorus concentrations. This may in part be due to alum dosing in June 2014, although cyanobacteria were present at alert levels for just over two months over the 2014/2015 summer. Nitrogen concentrations have also decreased in the past two years, which may also have led to the decrease in chlorophyll-a. Water clarity has shown an improving (i.e. increasing) trend.
Lake Rotomā	
2015 TLI 2.6 2014 TLI 2.3 Target 2.3	Increasing phosphorus levels have been the main driver for marked increase in the annual average TLI for Lake Rotomā. Annual average phosphorus concentrations were the highest recorded with peak concentrations occurring over summer. Chlorophyll-a concentrations were also some the highest observed at winter turnover but returned to typically low levels in spring. Nitrogen levels were also elevated, with ammonium concentrations increasing in bottom waters just before mixing. Ammonium may have been released from the bottom sediments as dissolved oxygen levels were less than 2 g/m^3 at near to the sediment water interface. The key action at Lake Rotomā is sewerage reticulation. An approval to extend the funding deadline was granted this year by the Ministry of Health and construction will occur in 2018/2019.

Lake Rerewhakaaitu	
2015 TLI 3.3 2014 TLI 3.4 Target 3.6	Trophic indicators continue to show improvement over the past six years at Lake Rerewhakaaitu and the three-year average TLI was below the RWLP TLI objective. Water clarity and nitrogen levels continue to be the main driver for an improving trophic state. Rerewhakaaitu farmers have taken the lead to develop their own catchment plan to improve lake water quality, with support from the programme. The primary focus is to prepare and implement a nutrient management plan for each farm. Each farm now has a Nutrient Management Plan and auditing of the implementation of these is undertaken by an independent party showing good progress is being made. Staff have been working with landowners to develop phosphorous detainment bunds in the catchment also.
Lake Tarawera	
2015 TLI 3.1 2014 TLI 3.0 Target 2.6	Lake Tarawera experienced cyanobacteria blooms and health warnings were issued in 2014-2015. The annual average TLI increased from 2.99 in 2013-2014 to 3.07 in 2014-2015. This is almost 0.5 TLI units above the RWLP objective of 2.6 TLI units, with the three-year average rising to 3.00. Like other lakes, phosphorous concentrations have been elevated in Lake Tarawera, particularly after winter turnover. Annual average nitrogen decreased in 2014-2015 compared to 2013-2014, but as might be expected with the presence of cyanobacteria blooms chlorophyll-a concentrations increased and water clarity declined. Should these observations be repeated in this year then the TLI is likely to be similar or possibly rise in the forthcoming year. The Lake Restoration Plan was notified for public submissions this year and staff are now working through collating those submissions and looking at the next steps for the plan. The plan has aspirational actions including sewerage reticulation.
Lake Rotokakahi	
2015 TLI 4.0 2014 TLI 4.0 Target 3.1	Lake Rotokakahi (as measured at the outflow) showed a decline in trophic status compared to the previous four years. The annual average TLI increased to 4.0. The late summer cyanobacteria blooms contributed to low water clarity and elevated chlorophyll-a concentrations at Te Wairoa and in the main body of the lake. Work continues with the Tuhourangi Tribal Authority to progress the draft Action Plan. There are complicated information gaps for this lake largely related to establishing nutrient sources and groundwater interactions which staff are working on.
Lake Rotomahana	
2015 TLI 4.0 2014 TLI 3.8 Target 3.9	The TLI for Rotomahana increased to the same value as for 2012. It was 4.02 compared to 3.81 TLI units the previous year. This was largely due to the annual total phosphorus concentration increasing from an annual average of 45.0 mg/m^3 to 58.9 mg/m^3, the increase occurring after winter turnover. Dissolved reactive phosphorus displays a recent increasing trend in the hypolimnion. Winter levels of dissolved reactive phosphorus may be an important determinant of surface levels in summer and in turn, levels of chlorophyll. The three-year average TLI was 3.96, just above the target of 3.9 TLI units. A draft Action Plan has been developed for this lake. There are complicated information gaps largely related to establishing nutrient sources and groundwater interactions which staff are working on.

Communications and stakeholder engagement

In December 2015 an Integrated Marketing and Communications Plan was developed to sit alongside the Communications and Stakeholder Engagement Plan. The reason for developing the plan was to establish a strategy to serve the information needs of people when they go looking, inform people about the issues and activity that directly affects them and influence people to adopt behaviours that assist in achieving water quality targets. To deliver this strategy all activity and information must be in a manner that is palatable for the respective audiences in the Rotorua communities.

The following activity occurred:

- Two science evenings in collaboration with lake operations. It was a great way to present to the community the science that underpins the programme and research in to topics that are relevant and can relate to lakes in the Rotorua district.
- Three hui held at Nukuteapiapi to engage iwi in rules consultation period.
- A stand and video played at the Rotorua Lakeside Concert to develop the appreciation of the lakes.
- A stand at the Home & Leisure show to provide an opportunity to engage the community in the actions of the Lakes Programme. #loveourlakes competition to build e-news database and also get entrants to reflect on why the lakes are important to them.
- The development of promotional material: Videos that are informative, engaging and entertaining, the lake display to show nutrient sources and mitigation actions (lake display to be present at key events or public places), pens, press adverts, flyers.
- Launch of Advice & Support with flyers, press ads and media briefing.
- Development of Tarawera Consultation Plan using press adverts, posters, press releases and working with key stakeholders.
- Promotion of the Land Use Opportunities Symposium through invitations to key influencers, press releases and programme.
- Phase One of the Lakes website upgrade completed to change to a responsive site for search engine optimisation purposes. Phase Two to work on design and user interface.
- Launch of a Facebook page as another communications medium. Fans built using the #loveourlakes competition.
- Presence across a wide range of national media. (Daily Post, Bay of Plenty Times, New Zealand Herald, Mangai Nui, Rotorua Review, community newsletters etc.).

Website

The website has been a key tool in communicating and collaborating with the Rotorua communities. The website was used to promote events, take registrations and provide feedback.

Web traffic to the www.rotorualakes.co.nz website continues to increase. 45% of visitors are returning visitors showing how the information has been helpful to users that lead them to return.

Number of visits	Unique visits	Pages viewed	Average time spent per visit
19,915	11,488	68,046	3.31 minutes

The most viewed pages throughout the year have been:

Page	Number of visits
Home page	9,519
Lake events	2,697
Draft Rules	2,629
Latest News	2,013
Rotorua Stakeholders Advisory Group (including sub-pages)	2,092
Lake Rotorua	1,131
Lake Closures and Health Warnings	917
Land Use Opportunities Symposium	889

Policy and planning

Lake Rotorua Rules and Incentives

Major milestones have been achieved for the Lake Rotorua Rules and Incentives Project.

Draft Rules Framework was consulted on and feedback was presented to RTASLG and the Regional Council in December 2014.

Staff continued the collaborative approach with the Lake Rotorua Stakeholder Advisory Group (StAG) for developing the rules. Key decisions around nitrogen allocation were made and economic analysis was undertaken to understand the impact of the allocation options. The Integrated Framework continues to be a cornerstone of the process.

The draft Section 32 report was prepared and presented to the Regional Council (through the Regional Direction and Development Committee) on 2 July 2015. The final report will document the option assessment process that StAG has contributed significantly to.

Following the Crown's approval to reallocate $45.5 million of programme funds to support the Lake Rotorua water quality solution, work has focused on three areas:

1 Establishing an Incentives Scheme ($40 million) to purchase permanent nitrogen reductions.

2 Providing an Advice & Support Service to those affected by the rules ($2.2 million).

3 Establishing a $3.3 million fund to promote low nitrogen leaching land use.

The Regional Council and RTASLG approved the Lake Rotorua Incentives Scheme Policy in August 2014 and initiated a process to set up the Lake Rotorua Incentives Board. Through a selection process an "arms-length" Board was established and had its inaugural meeting in November 2014. The Board's key task of appointing a Programme Director was successfully completed in March 2015.

Advice & Support

Following an agreement on the Advice & Support initiative by Council in August 2014 a project was formed to develop and understand the requirements and business change impacts. Business processes were designed and developed to implement Advice & Support Service. In line with the business design work a Request for Proposal was issued to identify and evaluate suitably qualified organisations to provide the Advice & Support Services to landowners on behalf of the Regional Council. The evaluation process was concluded in December with seven organisations being contracted to provide the service.

Implementation of the Advice & Support Service commenced in the latter half of the financial year. Focus on the next financial year will be to connect registered landowners with an independent Land Use Advisor who will work with the landowner to develop a Nitrogen Management Plan to show how the property's 2032 Nitrogen Discharge Allowance will be met. Where significant changes are required there is funding available to assist the landowner to make business decisions around land use change.

Other policy development

Work is continuing on reviewing the need for a nutrient management regulatory framework for all other Rotorua Te Arawa Lakes. This is both to protect existing water quality and to protect the gains being made by community and programme efforts (such as infrastructure and farming initiatives). The first phase of this project is to consider whether rules to cap land use change (intensification) in the Rotorua Te Arawa Lakes Catchments which are not currently protected by Rule 11 of the Regional Water and Land Plan are required.

Rural land use change and subdivision

The proposed Rotorua District Plan aims to improve water quality by enabling rural land use change that reduces nutrients entering the Rotorua Te Arawa Lakes. The intent is to encourage land use change from high nutrient intensive practices such as dairy farming to lower nutrient activities, including residential living. The proposed plan includes Transferable Development Rights and other provisions that enable land use change to residential development.

The District Plan is in the Appeals phase. Mediation between the parties is being held.

Cultural Values Framework

Te Tūāpapa o ngā wai o Te Arawa/Te Arawa Cultural Values Framework is a values-based policy statement developed by the Te Arawa Lakes Trust and Te Arawa people during February – May 2015.

The framework articulates Te Arawa values in relation to the long term aspirations for the Te Arawa Lakes. These values are intrinsic and recognise our inalienable relationship with the lakes, rivers, streams, groundwater aquifers and geothermal resources.

The Te Arawa Cultural Values are Wai, Waiariki, Waiora, Wairua and Waiata. They are based around Wai and are structured and layered like whakapapa, and reflect the voice of Te Arawa.

Two guiding principles have been developed to provide a bridge between the conceptual components of the cultural values and the tangible actions. These guiding principles enable the lakes (and surrounding land and waterways) to be seen, valued and managed through Te Arawa values. They can also identify potential changes required in perspective, mind-set, assumptions, behavior and/or practices. Principle 1 is “Value the role that the Te Arawa Lakes Trust and Te Arawa have to play regarding the Te Arawa Lakes” and Principle 2 is “Value Te Ao Māori”.

The framework will be finalised, formally lodged and presented to BOPRC Regional Council, Rotorua Lakes Council and RTALSG.

Science

The Rotorua Lakes Science Plan outlines the existing Science Programme, identifies information gaps and provides a clearer picture of the future research needs.

The Science Plan has a foundation of long-term monitoring managed by BOPRC staff as part of the NERMN Monitoring Programme. The University of Waikato along with other Crown Research Institutes and consultants are key service providers within the plan. They provide strategic direction for science research as well as undertaking the research needs.

The plan outlines current research, a method for identifying new restoration solutions and the direction for new research as our restoration work on the lakes progresses. One of the most significant changes signalled in the plan is the increased focus on long-term catchment land use and the need for science advice in that area to support management decisions and council policy formulation for rule development.

With the recent formation of the Land Technical Advisory Group information gaps and research needs for land use to support policy and incentives are being developed.

Land Technical Advisory Group

To provide strategic and technical advice on land-based nutrient management solutions for water quality a Land Technical Advisory Group (Land TAG) has been established.

The Land TAG will provides independent technical science and economics advice on existing and new catchment land uses, their effects on water quality and how to mitigate them.

The direction, support and advice provided by the Land TAG will be instrumental for the implementation of the Lake Rotorua Incentives Scheme. They will provide advice to Landowners and farmers in Rotorua catchments that are facing major and complex decisions on land use change and land management investment.

Environmental modelling

Environmental modelling is an important part of the science support the programme. During 2014-2015 the following modelling projects progressed:

- Lake Rotorua model to determine the reasons behind the significant improvement in Lake Rotorua's water quality with a focus on identifying the role of alum dosing.
- Review of Tarawera nutrient budget.
- Review of Lake Rotomā nutrient budget and WQTAG statement.
- Commenced re-coding of ROTAN catchment model to support the rules for Lake Rotorua.
- Completed Lake Rotokakahi model identifying information gaps to identify sources of nutrients.
- Completed model for Lake Tikitapu.
- Tarawera geological model completed by GNS as a precursor to developing the ground water model.
- Completed the development of the INCA catchment model for use in scenarios for Lake Ōkaro.

- Initiated catchment model and coupling to the Ōkāreka Lake model to provide advice on the longer term impact of the completed catchment interventions.
- Initiated forest-farm integration modelling project with SCION to establish economics and practical implications of farm forestry.

Research and reviews

A range of research projects were progressed during the last year, including:

- Review of lake interventions and risks.
- Lake Rerewhakaaitu sediment study.
- Installation of monitoring buoy on Lake Rerewhakaaitu.
- Complete bathymetric surveys of Lakes Rotomā, Ōkataina and Ōkaro.
- Initiated literature review into the environmental impacts of alum dosing.
- Initiated specific review of phosphorus sources in the Lake Rotorua Catchment.
- Initiated complete review of the 12 lakes nutrient budgets in a joint project with Waikato University and NIWA.
- Initiated a long koura monitoring programme for the 12 lakes with the support of the Te Arawa Lakes Trust.
- Continue ecotoxicological monitoring around the Puarenga and Utuhina Streams in Lake Rotorua to support the Alum Dosing Programme.
- Initiated project with SCION to evaluate the impact of acacia tree removal on nitrogen leaching in the Tarawera Catchment.
- Continue PhD study focussing on the impact of land use and introduced species on the water quality of Lake Ōkataina.
- Continued to support the Parekarangi Farm Nutrient Research Project, investigating land use and fertiliser options on the Lake Rotorua Catchment.
- Undertook special research project with Waikato University and Professor Gang Pan of Beijing into the use of nano-bubbles and modified local soils for the renovation of degraded lake water.
- Completed the three-year aeration trial work on Lake Rotoehu.
- GNS completed Lake Rotorua Catchment boundary for planning needs in a joint project with NIWA.
- On-going fisheries studies of Ohau Diversion Wall to evaluate impact.
- Alum dosing protocol for three dosing plants on Lakes Rotorua and Rotoehu reviewed by Water Quality Technical Advisory Group.
- Staff and University of Waikato advice to the Rotorua and Rotomā/Rotoiti Sewage Technical Advisory Group.
- Masters study of Ōkaro Catchment land use, using the INCA model and connection to the lake model to assess the effects of land use.
- Development of nutrient accounting record and confirmation from Water Quality Technical Advisory Group that assessment estimates are reasonable.
- Application of SWAT catchment model to the Puarenga Catchment to identify the relative impact of the sewage irrigation.

Financials

Rotorua Te Arawa Lakes Programme - Report B
Annual Programme Financial Progress Statement for the Year Ended 30 June 2015

	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		
Interventions	**(A) Council Annual Plan Budget 2014/15**	**(B) Actual expenditure 2014/15**	**(B - A) Variance over/(under) spend 2014/15**	**(B / A) Progress to date**	**Financial progress indicator ($)**	**Intervention progress indicator**	**(D) Council Funding excluding Crown grants**	**(E) Approved Crown funding 2014/15**	**(F) Crown funding Received 2014/15**	**(G) = (50% B - F) Crown funding surplus / (deficit)**	**(H) Reserve interest accrued**	**(I) Other funding sources**	**(D + E + H + I) Total funding pending received 2014/15**	**Comment**
Lake Rotoehu	**$000**	**$000**	**$000**	**%**			**$000**	**$000**	**$000**	**$000**	**$000**	**$000**	**$000**	
Weed Harvesting	149	176	27	118%	✓	✓	88	75	75	(13)	0	0	0	CR029 + $30,000, PSG approved, 14/4/15.
Land Management Change	0	14	14	0%	✓	✓	7	0	0	(7)	0	0	0	CR18 was approved by RTALSG March 2015, to pay the Lake Rotoehu Land Use Change agreement in14/15, this did not eventuate. Change Request to RTALSG in October to move to 15/16. CR034 Approved June WSL for 13k legal fees
Phosphorus Locking Soda Springs	138	205	67	149%	M	✓	103	68	68	(35)	0	0	0	CR024 + $65,000, PSG approved, April 2015
Aeration	52	129	77	248%	✓	✓	65	26	26	(39)	0	0	0	CR025 + $38,000, PSG approved, April 2015 , CR017 + 35,000, PSG approved, December 2014.
Sediment capping	0	0	0	0%	✓	✓	0	0	0	0	0	0	0	
Wetlands	0	0	0	0%	✓	✓	0	0	0	0	0	0	0	
Total Lake Rotoehu	**339**	**524**	**185**				**262**	**169**	**169**	**(93)**	**0**	**0**	**0**	
Lake Okareka														
Sewerage Reticulation	0	0	0	0%	✓	✓	0	0	0	0	0	0	0	
Land Management Change	0	0	0	0%	✓	✓	0	0	0	0	0	0	0	
Total Lake Okareka	**0**	**0**	**0**				**0**	**0**	**0**	**0**	**0**	**0**	**0**	
Lake Rotorua														
Advice and Support	278	303	25	109%	M	✓	152	261	261	109	0	0	0	No change request required within 10% of budget.
Phosphorus Locking Puarenga	346	381	35	110%	✓	✓	191	172	172	(19)	0	0	0	No change request required within 10% of budget. Utuhina alum dosing substantially under which covers slight overspend here.
Phosphorus Locking Utuhina	358	236	(122)	66%	M	✓	118	179	179	61	0	0	0	CR017 less $35,000 to deed Aeration, approved WSL, 3/12/15. Underspend covers overspend in Puarenga.
Tikitere Diversions	3,015	258	(2,757)	9%	✓	M	129	0	0	(129)	0	0	0	No funds approved by Minister as part of the Annual Work Programme - CR016 approved deferral RTALSG, December 14. Continuing with consenting and accessway construction - CR031 $219k endorsed to Oct RTALSG and CR032 $39k approved WSL June.
Gorse	373	68	(305)	18%	✓	M	34	206	206	172	0	0	0	CR026 confirming underspend and reasons for not reaching nitrogen target confirmed by PSG 14/4/15.
Wetlands	0	0	0	0%	✓	✓	0	0	0	0	0	0	0	
Land Incentive Payments	3,000	0	(3,000)	0%	✓	M	0	0	0	0	0	0	0	No funds approved by Minister as part of the Annual Work Programme here, only in Regional Council LTP.
Land Incentive Board Administration	495	326	(169)	66%	✓	✓	163	175	175	12	0	0	0	$350,000 only approved by Minister as part of Annual Work Programme.
Sewerage Treatment and Disposal	350	366	16	105%	M	✓	183	175	175	(8)	0	0	0	Rotorua Lakes Council Expenditure - within 10%. RLC to amend Crown approved funding $350k (MfE $175k)
Total Lake Rotorua	**8,215**	**1,937**	**(6,278)**				**968**	**1,167**	**1,167**	**199**	**0**	**0**	**0**	
Lake Rotoiti														
Sewerage Reticulation	442	224	(218)	51%	✓	✓	112	221	221	109	0	0	0	Construction delayed until 2018/19 due to Landowner discussions
Total Lake Rotoiti	**442**	**224**	**(218)**				**112**	**221**	**221**	**109**	**0**	**0**	**0**	
Rotorua District														
Treatment and Disposal	0	0	0	0%	✓	✓	0	0	0	0	0	0	0	
Total Lake Rotoiti	**0**	**0**	**0**				**0**	**0**	**0**	**0**	**0**	**0**	**0**	
Total Programme														
Rotorua Lakes Council	792	590	(202)	74%	M	✓	295	396	396	101	0	0	0	
Bay of Plenty Regional Council	8,204	2,095	(6,109)	26%	M	✓	1,047	1,161	1,161	114	0	0	0	
	8,996	**2,685**	**(6,311)**	30%	M	✓	**1,342**	**1,557**	**1,557**	**215**	**0**	**0**	**0**	
Total Programme Expenditure	**8,996**	**2,685**	**(6,311)**				**1,342**	**1,557**	**1,557**	**215**	**0**	**0**	**0**	
Programme reserve account interest accrued														
Rotorua Lakes Council	0	0	0				0	0	0	0	132	0	0	
Bay of Plenty Regional Council	0	0	0				0	0	0	0	29	0	0	
	0	**0**	**0**				**0**	**0**	**0**	**0**	**161**	**0**	**0**	
Total Programme	**8,996**	**2,685**	**(6,311)**	**0**			**1,342**	**1,557**	**1,557**	**215**	**161**	**0**	**0**	

5.4.2 (a) Note 1: Funding detail - Council

RLC reserves	295
BoPRC reserves	524
Targeted rates	262
General funding	262
Total funding detail - Council	**1,342**

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

Miscellaneous income	
Total funding from any other source	

Key to progress indicators

- Progress to date on track ✓
- Progress to date moderate risk M
- Progress to date at risk

Rotorua Te Arawa Lakes Programme - Programme Reserve Funding - Report E

Financial Reserve Detailed for the Year Ended 30 June 2015

	Opening Balance 2014/15						Closing Balance 2014/15				2015/16 Onwards				
	5.2.2 (b)	5.2.2 (e) (g)		5.2.2 (f) (ii)	5.2.2 (i) (ii)	9.3					Forecast of Programme Funding				5.4.2/5.43
	A) Project Operative Date Expenditure to 30 June 2014	B) Project Operative Date Crown Funds Received (Note 1) to 30 June 2014	C) Project Operative Date to 30 June 2014 *Application of MfE Funding 50%*	D) Programme Reserve Interest Applied 13/14	E) MfE Funding contributions - Other Sources	(B - C + D + E) Project to Date Reserve Closing Balance surplus / (deficit)	F) Programme Funding surplus / (deficit)	Project Operative Date Expenditure to 30 June 2015	Project Operative Date Crown Funds Received to 30 June 2015	Project Operative Date to 30 June 2015 *Crown funding (50%)*	G) Commitment to Deferred Works	H) Commitment to Future Interventions	I) Amount available for Reinvestment	(F + G + H + I) Total Forecast	Additional Information
Lake Rotoehu	$000	$000	$000	$000	$000	$000	$000	$000	$000	$000	$000	$000	$000	$000	
Weed Harvesting	986	200	493	0	0	(293)	(13)	1,162	275	581	0	0	0	0	
Land Management Change	1,069	250	535	0	0	(285)	(7)	1,083	250	541	1,069	0	0	1,069	LUC Agreement - deferred from 2013/14 expected agreement to be completed Dec 2015
Phosphorus Locking Soda Springs	1,020	425	510	0	0	(85)	(35)	1,225	493	613	0	0	0	0	
Aeration	645	0	323	0	0	(323)	(39)	774	26	387	0	0	0	0	
Sediment capping	10	0	5	0	0	(5)	0	10	0	5	0	0	0	0	
Wetlands	728	300	364	0	0	(64)	0	728	300	364	0	0	0	0	
Total Lake Rotoehu	**4,458**	**1,175**	**2,229**	**0**	**0**	**(1,054)**	**(93)**	**4,982**	**1,344**	**2,491**	**1,069**	**0**	**0**	**1,069**	
Lake Okareka															
Sewerage Reticulation	7,889	4,850	3,945	0	0	906	0	7,889	4,850	3,945	0	0	0	0	
Land Management Change	449	500	225	0	0	276	0	449	500	225	0	0	0	0	
Total Lake Okareka	**8,338**	**5,350**	**4,169**	**0**	**0**	**1,181**	**0**	**8,338**	**5,350**	**4,169**	**0**	**0**	**0**	**0**	
Lake Rotorua															
Advice and Support	0	0	0	0	0	0	109	303	261	152	0	0	0	0	
Phosphorus Locking Puarenga	2,511	1,485	1,256	0	109	339	(19)	2,892	1,657	1,446	0	0	0	0	
Phosphorus Locking Utuhina	1,694	990	847	0	0	143	61	1,930	1,169	965	0	0	0	0	
Tikitere Diversions	1,562	1,775	781	0	0	994	(129)	1,820	1,775	910	0	0	0	0	
Gorse	1,240	1,000	620	0	0	380	172	1,308	1,206	654	0	0	0	0	Rebudgeted in 2013/14. Funding available reduced as programme reserves committed to other interventions - LMC Lake Rotoehu
Wetlands	454	0	227	0	0	(227)	0	454	0	227	0	0	0	0	
Land Incentive Payments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Land Incentive Board Administration	0	0	0	0	0	0	12	326	175	163	0	0	0	0	
Sewerage Treatment and Disposial	22,904	9,675	11,452	0	0	(1,777)	(8)	23,270	9,850	11,635	0	0	0	0	
Total Lake Rotorua	**30,365**	**14,925**	**15,183**	**0**	**109**	**(149)**	**199**	**32,302**	**16,092**	**16,151**	**0**	**0**	**0**	**0**	
Lake Rotoiti															
Sewerage Reticulation	12,333	11,075	6,167	0	0	4,909	109	12,557	11,296	6,279	3,159	0	0	3,159	Project delayed because of resource consents. Funding committed to deffered works.
Total Lake Rotoiti	**12,333**	**11,075**	**6,167**	**0**	**0**	**4,909**	**109**	**12,557**	**11,296**	**6,279**	**3,159**	**0**	**0**	**3,159**	
Rotorua District															
Treatment and Disposal	412	0	206	0	0	(206)	0	412	0	206	0	0	0	0	RLC to confirm. Approval sought for transfer of funds of $906k from Lake Okaraka sewerage reticulation as project complete. Crown approved funding for $350k 2014/15
Total Rotorua District	**412**	**0**	**206**	**0**	**0**	**(206)**	**0**	**412**	**0**	**206**	**0**	**0**	**0**	**0**	
Total Programme	**55,906**	**32,525**	**27,953**	**0**	**109**	**4,681**	**215**	**58,591**	**34,082**	**29,295**	**4,228**	**0**	**0**	**4,228**	
Programme by:															
Rotorua Lakes Council	43,538	25,600	21,769	0	0	3,831	101	36,239	25,996	18,120	3,159	0	0	3,159	
Bay of Plenty Regional Council	12,368	6,925	6,184	0	109	850	114	22,352	8,086	11,176	1,069	0	0	1,069	
Total Programme by Council	**55,906**	**32,525**	**27,953**	**0**	**109**	**4,681**	**215**	**58,591**	**34,082**	**29,295**	**4,228**	**0**	**0**	**4,228**	
Programme reserve interest accrued															
Interest accrued - RLC	0	0	0	116	0	116	132								
Interest accrued - BoPRC	0	0	0	41	0	41	29								
	0	**0**	**0**	**157**	**0**	**157**	**161**								
Total Programme Reserve interest	**0**	**0**	**0**	**157**	**0**	**157**	**161**								
MfE Programme Reserves held by:															
Rotorua Lakes Council	21,874	16,925	10,937	116	0	3,947	233								
Bay of Plenty Regional Council	34,032	15,600	17,016	41	0	891	142								
Total Programme Funding Reserves	**55,906**	**32,525**	**27,953**	**157**	**0**	**4,838**	**375**								

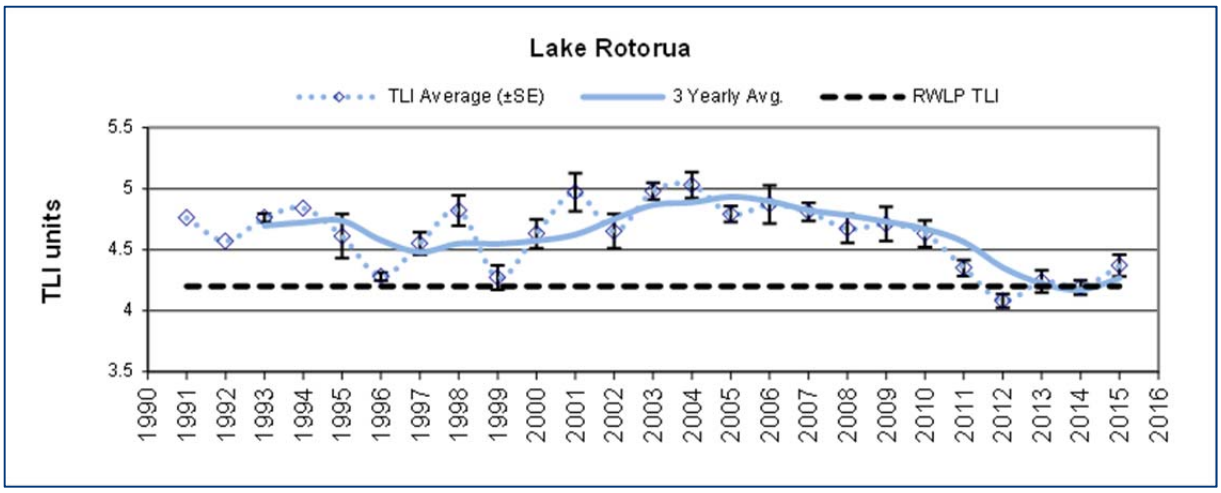
Forecast Opening Balance by Year	Opening Balance 14/15	Movement 14/15	Opening Balance 15/16	Forecast Movement 15/16	Opening Balance 16/17	Forecast Movement 16/17	Opening Balance 17/18
Rotorua Lakes Council	3,947	233	4,180	1,120	3,060	0	0
Bay of Plenty Regional Council (9270)	891	142	1,033	6,937	(5,904)	0	0
Total Programme Funding Reserves	**4,838**	**375**	**5,213**	**8,057**	**(2,844)**	**0**	**0**

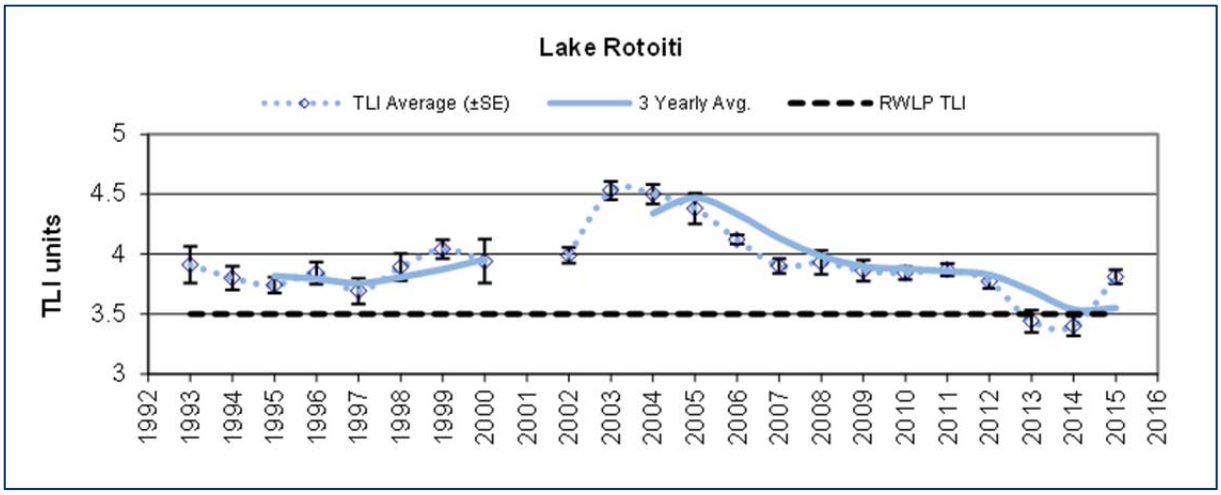
** Future years forecast movement as per the Annual Work Programme 2015/16*

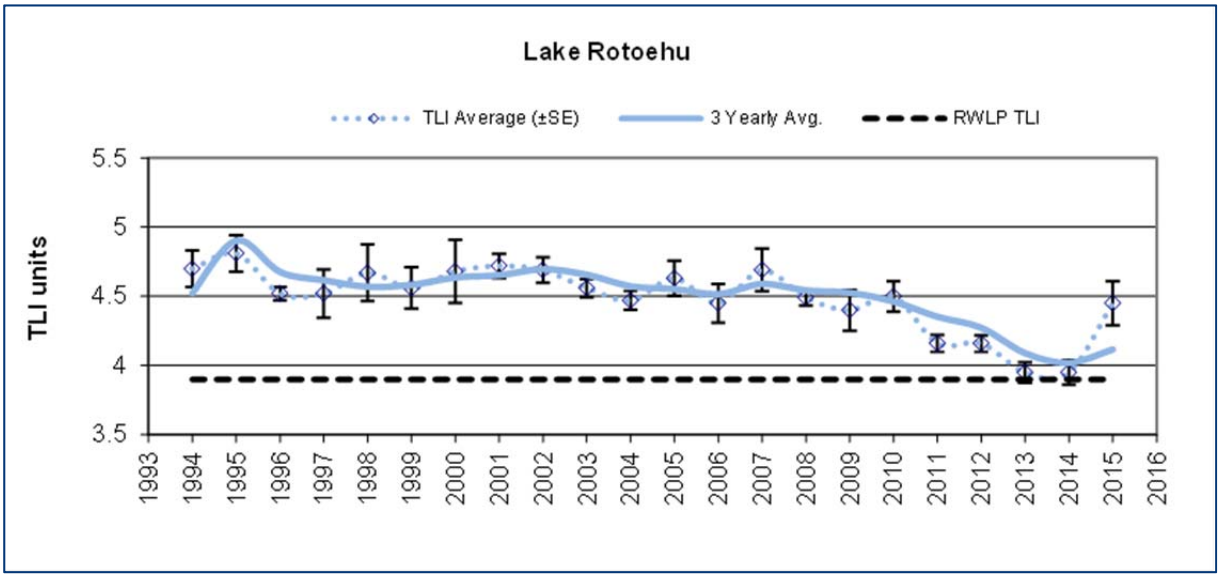
** No crown funding recevied 2012/13 or 2013/14*

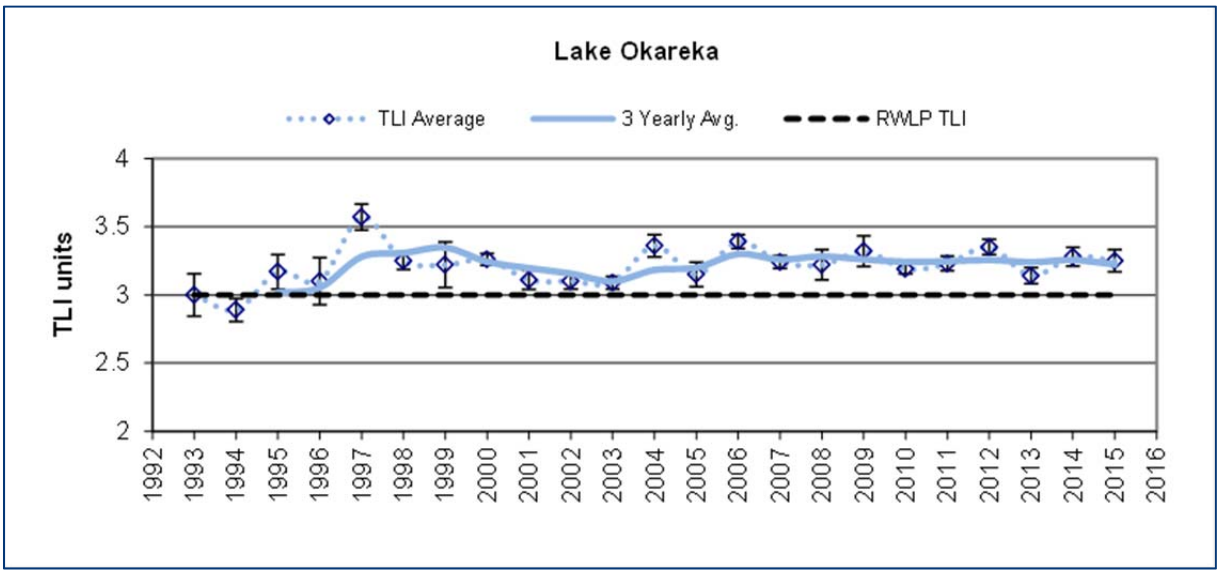
RLC - Forecast reserve funding of $3,268 comitted to Lake Rotoiti Reticulation (application dates to be advised)
BoPRC - Forecast reserve funding 2015/16 application includes $534,500 (50% $1.069 million) for LUC agreement.

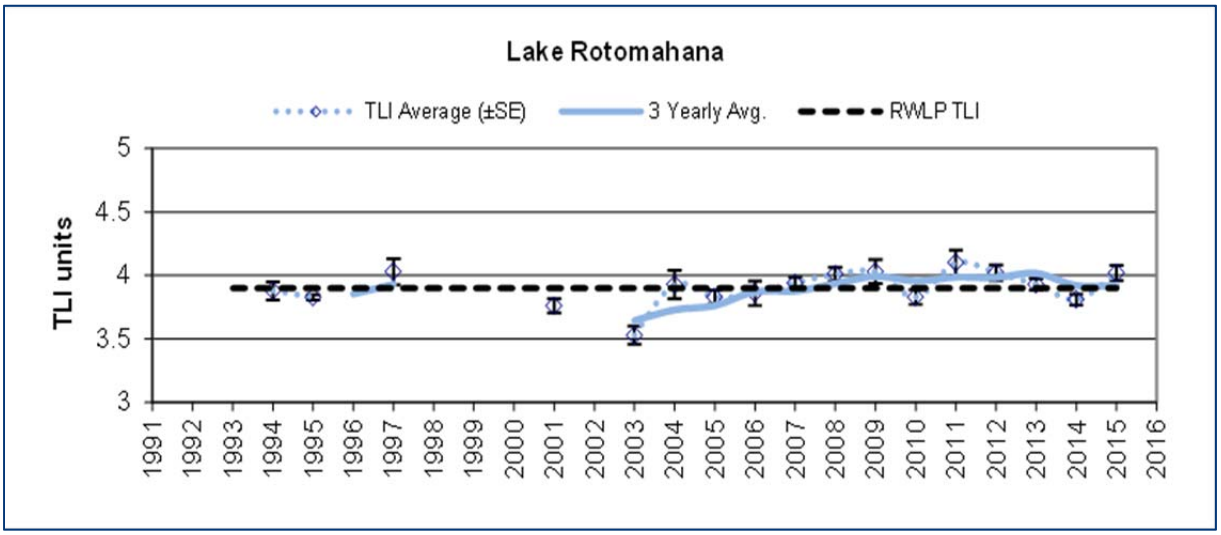
Appendix 1 – Water quality TLI graphs by lake

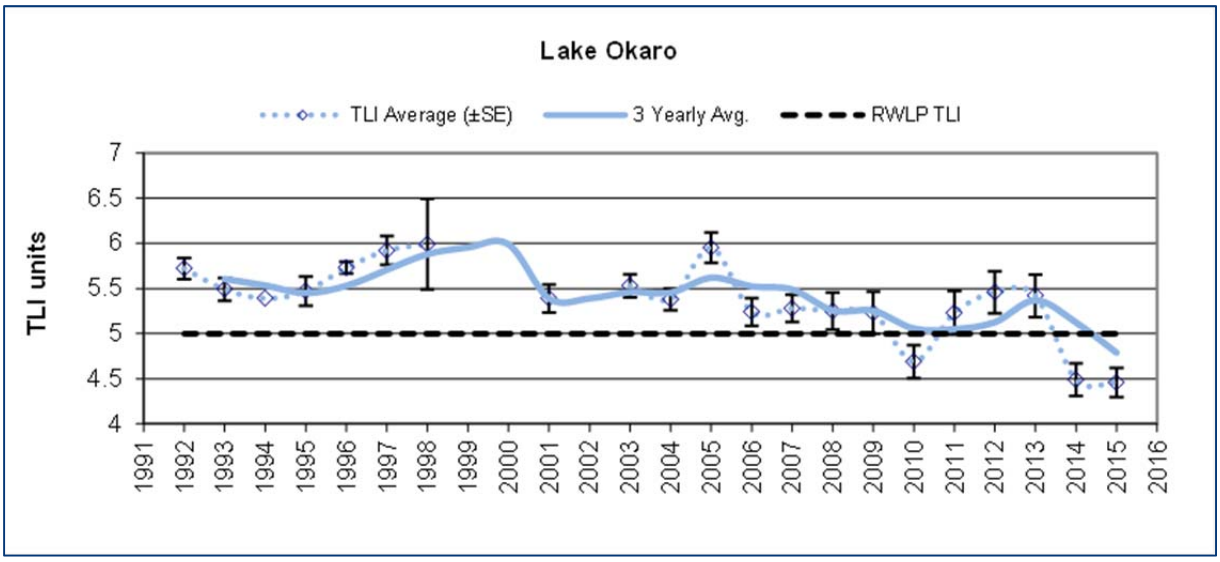


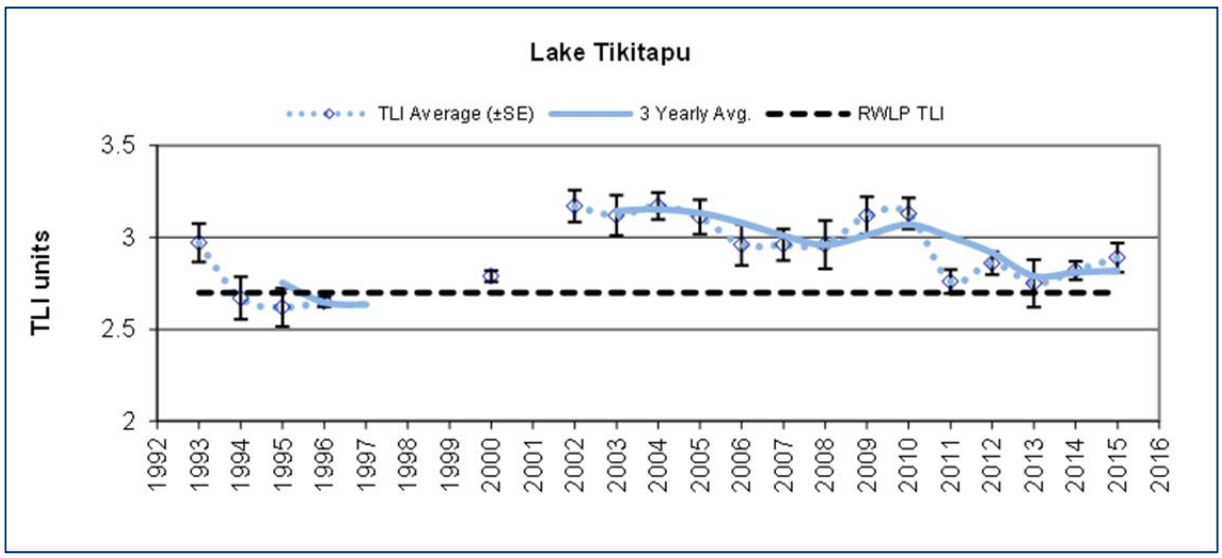


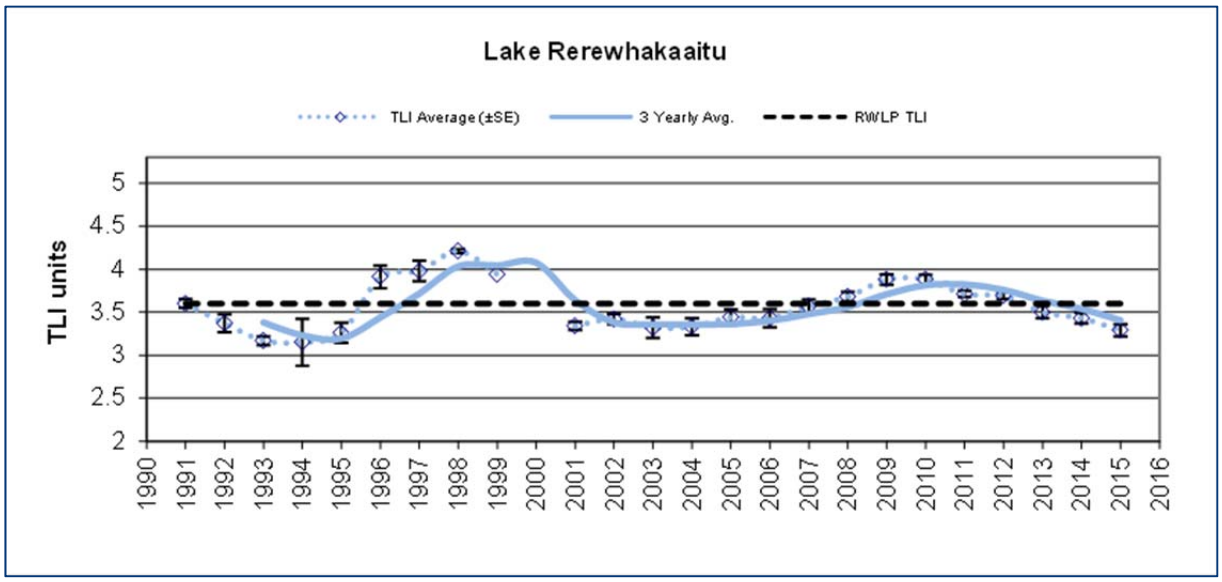


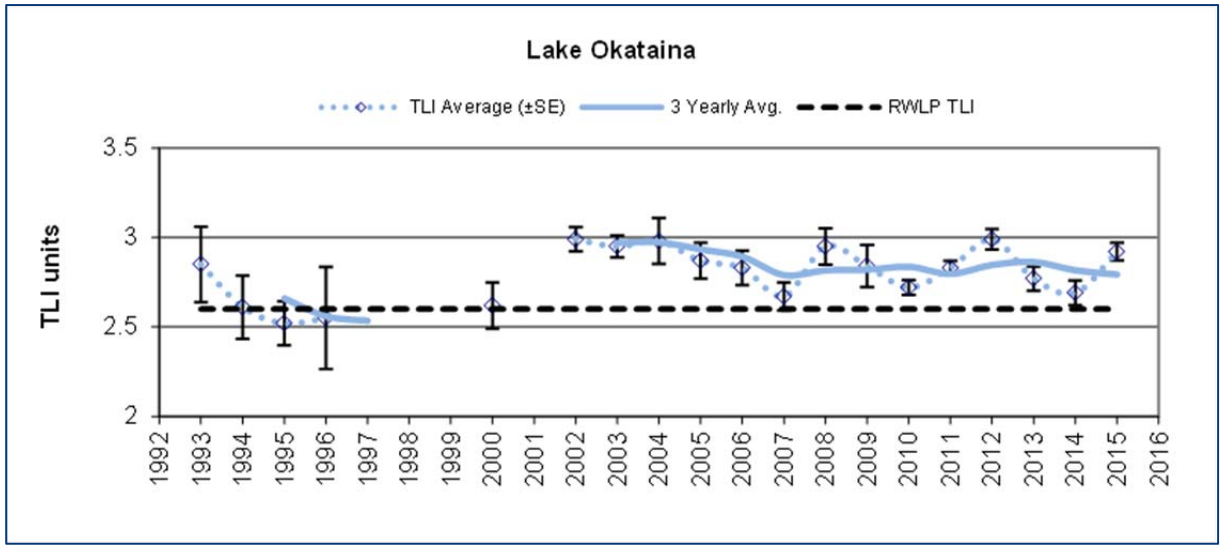

Lake Okareka
TLI Average
3 Yearly Avg.
RWLP TLI
TLI units
4
3.5
3
2.5
2
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

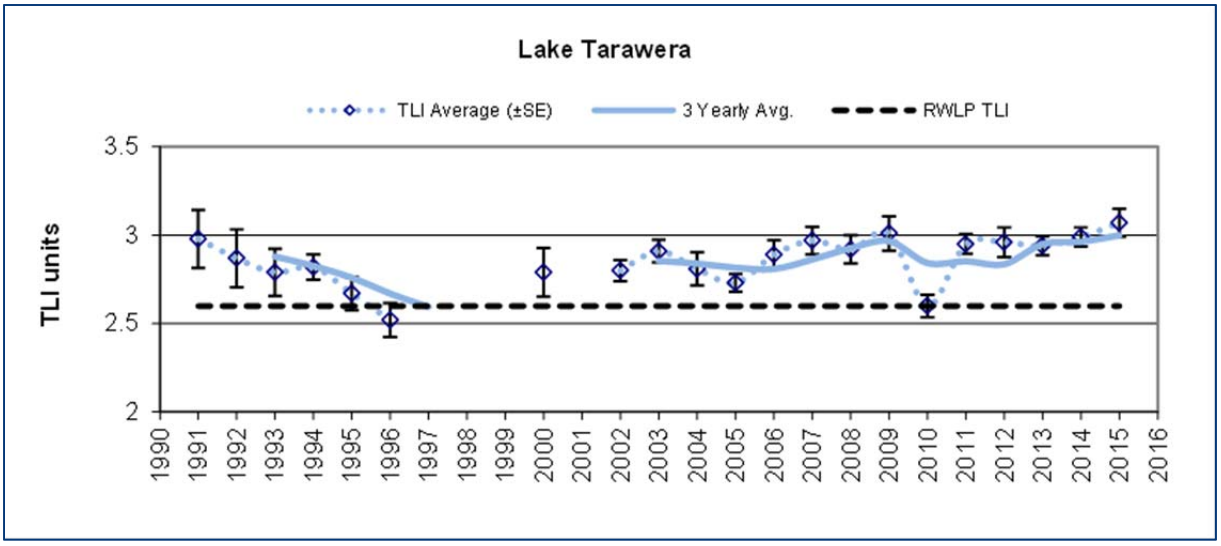

Lake Rotomahana
TLI Average (±SE)
3 Yearly Avg.
RWLP TLI
TLI units
5
4.5
4
3.5
3
1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

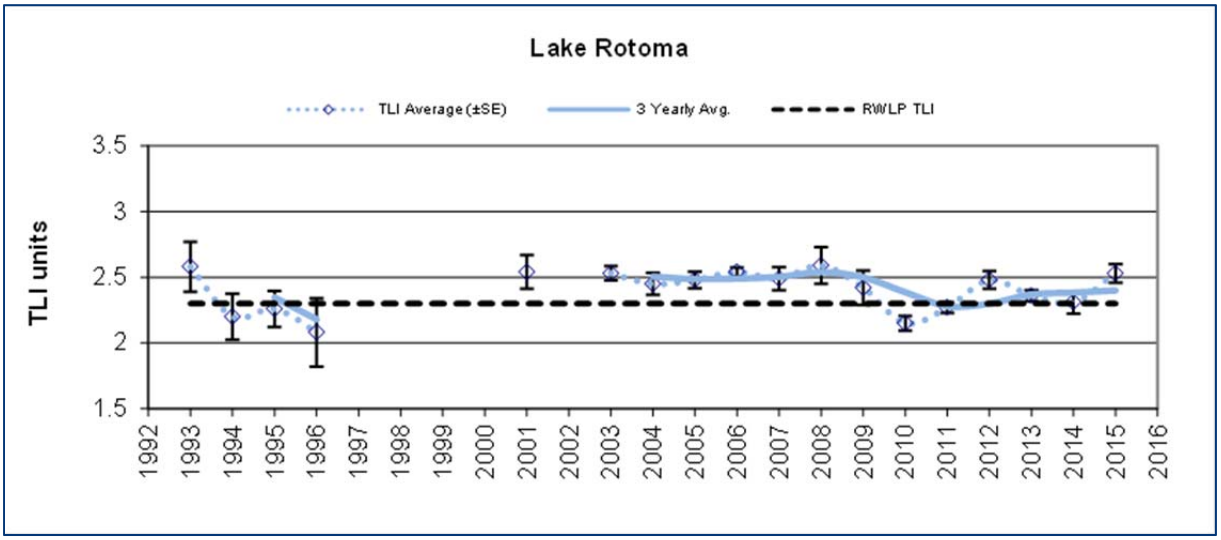

Lake Okaro
TLI Average (±SE)
3 Yearly Avg.
RWLP TLI
TLI units
7
6.5
6
5.5
5
4.5
4
1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

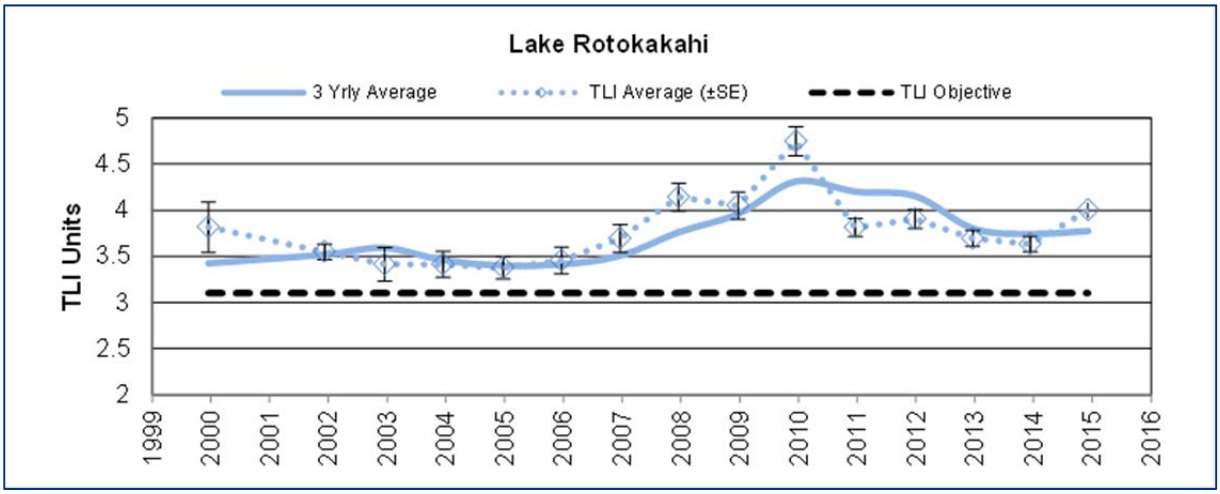

Lake Tikitapu
TLI Average (±SE)
3 Yearly Avg.
RWLP TLI
TLI units
3.5
3
2.5
2
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016


Lake Rerewhakaaitu
TLI Average (±SE)
3 Yearly Avg.
RWLP TLI
TLI units
5
4.5
4
3.5
3
2.5
2
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016


Lake Okataina
TLI Average (±SE)
3 Yearly Avg.
RWLP TLI
TLI units
3.5
3
2.5
2
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016


Lake Tarawera
TLI Average (±SE)
3 Yearly Avg.
RWLP TLI
TLI units
3.5
3
2.5
2
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016


Lake Rotoma
TLI Average (±SE)
3 Yearly Avg.
RWLP TLI
TLI units
3.5
3
2.5
2
1.5
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016


Lake Rotokakahi
3 Yrly Average
TLI Average (±SE)
TLI Objective
TLI Units
5
4.5
4
3.5
3
2.5
2
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016