NOTES OF ROTORUA PROJECT STEERING COMMITTEE WORKSHOP
HELD WEDNESDAY, 28 July 2015 AT 10am
AT THE ROTORUA LAKES COUNCIL COMMITTEE ROOM 1

PRESENT:	Warren Webber (Chair)	–	Lakes Water Quality Society Inc
	Geoff Rice	–	Tapuika Iwi Authority
	Peter Staite	–	Ngati Te Kahu/Ngati Hurunga Te Rangi
	Andrew Te Amo	–	Ngati Whakaue/CNI
	Geoff Palmer	_	Rotorua Lakes Community Board
	Fred Whata	_	Ngati Pikiao
	Tamara Mutu	–	Ngati Hurunga Te Rangi
	Marama Meikle	–	Ngati Hurunga Te Rangi
	Annaka Davis	–	Toi Te Ora – Public Health Services
	Joe Tahana	–	Ngati Pikiao
	Andy Bruere	–	Bay of Plenty Regional Council
	Manu Pene	–	Ngati Whakaue
	Gina Mohi	–	Ngati Rangiwewehi Iwi Authority
	Antoine Coffin	–	Te Onewa consultants
	Alamoti Te Pou	–	CNI Iwi Land Management Ltd
	Gareth Bowen	_	Timberlands
	Geoff Palmer	_	Lakes Community Board
	Roku Mihinui	_	Te Arawa Lakes Trust
	Leilani Ngawhika	_	Te Arawa Lakes Trust
	Shane Gibbons	_	Tuhourangi Tribal Authority
	Antoine Coffin	_	Te Orewa Consultants
	Jim Bradley	–	TAG Chairperson
	Wally Lee	–	Tuhourangi/NgatiWahio (arrived 12.00)
STAFF PRESENT:	Hilda King	_	RLC, Administrator
	Dave Donaldson	–	RLC, Deputy Mayor, Councillor
	Alison Lowe	_	Environmental Scientist, Solid Waste & Sustainability
	Greg Manzano	–	RLC, Manager, Water Planning, Water Solutions
	Andy Bell	_	RLC, Director, Water Solutions (arrived 11.00am)
APOLOGIES:	Jimi McLean	_	Ngati Makino
	Pia Bennett	_	Ngati Makino
IN ATTENDANCE	Prof David Hamilton	_	University of Waikato
	Chris McBride	_	University of Waikato

1. MIHI/KARAKIA

Opening of Workshop - Karakia by Fred Whata

2. APOLOGIES

Resolved

Warren Webber Geoff Rice	))	***That the apologies be received.***

CARRIED

3. SUMMARY OF THE CURRENT CONCENTRATIONS OF CONSTITUENTS IN LOCAL SURFACE WATERS INCLUDING SPRINGS.

Alison Lowe spoke to the following table on concentrations

Rotorua Surface Waters

		Sewage	Treated discharge water				Springs and Streams			
			Bardenpho	MBR	Current discharge	Future targets	Hemo (below spring)	Waipa Spring	Waipa M5 below LTS	Puarenga RLC site 1
DRP	g/m3	3.8	2.5	1.7	2.2		0.06	0.07	0.05	0.05
Particulate-P	g/m3	2.3	0.6	0	0.5					
Total P	g/m3	6.1	3.3	1.7	2.7	0.34	0.07	0.08	0.08	0.08
Total-N	g/m3	52	6.1	4.0	5.4	5.4		0.8	1.4	1.1
Suspended solids	g/m3	514	22	<1	15		3	0.5	6.2	7.6
pH	pH units	7.3			7.3		7.0	6.8	7.1	6.1
E. coli			5500	<1	4300		20	9	93	

DESTINATION ROTORUA

Shaping Rotorua

2

4. Prof. David Hamilton spoke to a power point presentation about the Report "Environmental Effects Study". (Attachment 1)

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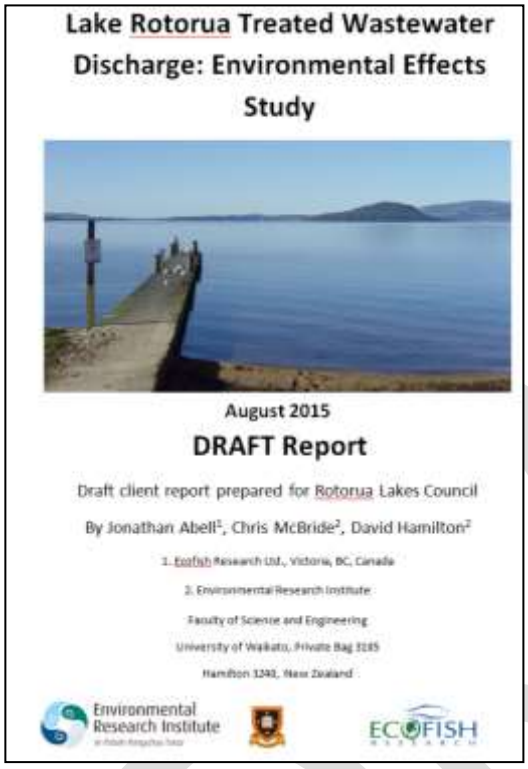
Lake Rotorua Treated Wastewater Discharge: Environmental Effects Study

August 2015

DRAFT Report

Draft client report prepared for Rotorua Lakes Council

By Jonathan Abell[1], Chris McBride[2], David Hamilton[2]

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2. Environmental Research Institute
Faculty of Science and Engineering
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Hamilton 3240, New Zealand

Environmental Research Institute

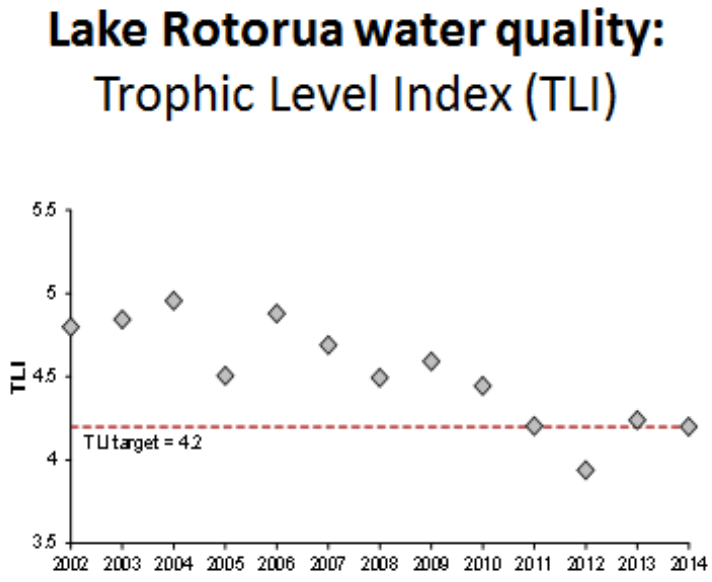
ECOFISH RESEARCH

Pro Hamilton started with a historical perspective on Lake Rotoruas water quality.

The TLI (Trophic Level index) brings together 4 different variables

- Total P
- Total N
- ??(16.39)
- ??? clarity

2006 BOP RC started alum dosing
2012 showed extra alum dosing



Q – How much is extra alum dosing.
A – Approximately 380kilos per day at its peak, but would drop back to about 200k per day.

We took 3 main approaches:

Three main approaches used

1) **Mass balance calculations.**

Effects on the following environmental aspects in the Puarenga Stream were assessed in the context of Attribute State values defined in the National Policy Statement for Freshwater Management 2014: nitrate nitrogen (toxicity), ammoniacal nitrogen (toxicity), dissolved oxygen, E. coli and periphyton.

2) **One–dimensional (1–D) lake modelling.**

Simulation of water quality effects of discharging treated wastewater, relative to a baseline period (2007–2014). A range of scenarios to examine effects on lake trophic state as a consequence of changing nutrient loads to the lake. Measured and modelled concentrations of TN, TP and chl *a* were compared with Lake Ecosystem Health Attribute State values defined in the National Policy Statement.

3) **Three–dimensional (3–D) lake modelling.**

To examine mixing processes that control how simulated treated wastewater inputs are diluted and dispersed within the lake. Comparison of different environmental conditions and with discharge simulated to the Puarenga Stream, a lake shoreline site and the proposed offshore lake bed site.

TREATMENT: 6 main options with sub-options = 10 options in total

Option	Description	Sub-options	Details	Source
1	Base option	-	Upgrades to current tertiary treatment by addition of flow balancing, P removal with chemical addition (alum) and UV disinfection.	Mott MacDonald (2014)
2	Base option + basic filtration	a. Disk filter b. Sand filter c. Membrane filter	Addition of filtration to remove solids, including particulate N and P.	Mott MacDonald (2014)
3	Base Option + filtration + denitrifying filter/bed	a. Denitrifying sand filter b. Sand filter + denitrifying carbon bed	Addition of filtration to remove solids, in addition to final denitrification step to convert dissolved inorganic N to atmospheric N gas.	Mott MacDonald (2014)
4	30 t N/y and 3 t P/y	-	Treatment processes configured to achieve minimum release permitted under current Resource Consent conditions.	J. Bradley, pers. comm. 2015
5	30 t N/y and 1.5 t P/y	-	Treatment processes configured to achieve minimum N release and 50% of P release permitted under current Resource Consent conditions.	J. Bradley, pers. comm. 2015
6	Membrane bioreactor system rebuild	a b	No additional P treatment. + additional P treatment	K. Brian, pers. comm. 2015 a

The 6 main treatment options form the foundation of the level of treatment

Treated wastewater loads by treatment option

Scenario/Option	Description	TN (t/y)		DIN (t N/y)		TP (t/y)		PO_4-P (t P/y)	
		Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
1D_0_Stream	Baseline Puarenga Stream loads (PO_4-P attenuated by alum)	70.1	16.4	58.1	11.7	6.0	1.6	1.4	1.1
1D_0-LTS	Baseline Puarenga Stream loads with LTS loads removed	34.0	8.4	22.0	3.5	4.8	1.3	1.1	0.9
1D_0 - Alum	Baseline Puarenga Stream loads with no alum dosing	70.1	16.4	58.1	11.7	6.9	1.9	2.3	0.5
Option 1	Loads in treated wastewater	47.3	0.1	28.5	0.0	6.3	0.0	0.9	0.0
Option 2a		42.3	0.1	28.5	0.0	3.2	0.0	0.9	0.0
Option 2b		40.2	0.0	28.5	0.0	1.7	0.0	0.9	0.0
Option 2c		38.0	0.0	28.5	0.0	0.9	0.0	0.9	0.0
Option 3a		22.9	0.0	11.2	0.0	1.7	0.0	0.9	0.0
Option 3b		31.6	0.0	19.9	0.0	1.7	0.0	0.9	0.0
Option 4		30.0	0.0	28.5	0.0	3.0	0.0	0.9	0.0
Option 5		30.0	0.0	28.5	0.0	1.5	0.0	0.9	0.0
Option 6a		30.7	0.0	22.6	0.0	3.0	0.0	3.0	0.0
Option 6b		30.7	0.0	22.6	0.0	1.5	0.0	1.5	0.0

1D_0-LTS means LTS loads are removed
1D_0-Alum means Alum is removed

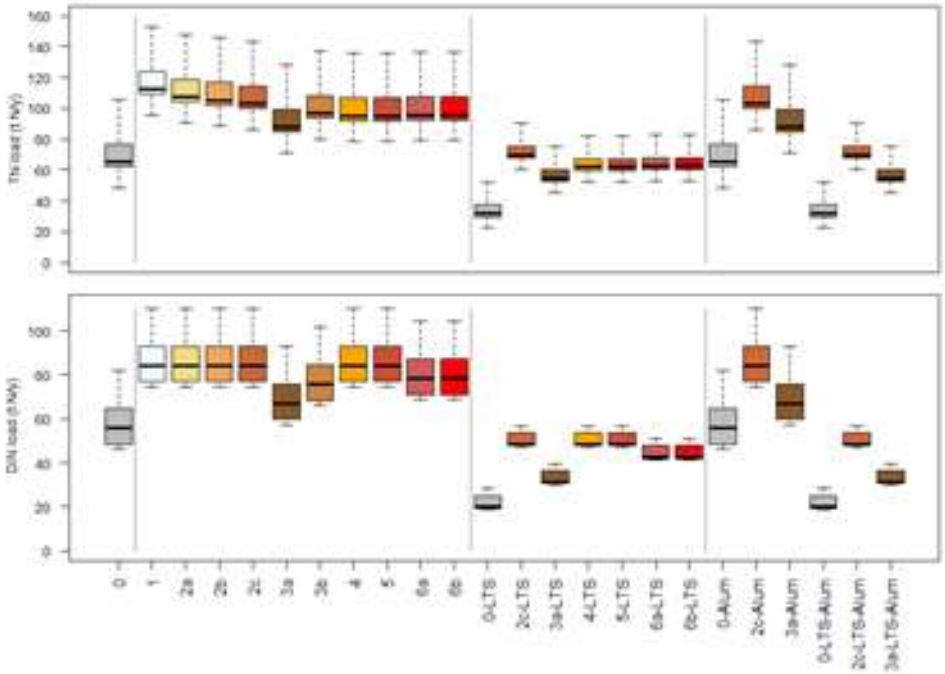
#	Code	Scenario	Details
1	1D_0	Baseline with no wastewater discharge simulated.	Eight year period (2007-2014). Alum dosing effects represented.
2	1D_1_Surface	Treatment option 1, discharge to surface waters	
3	1D_2a_Surface	Treatment option 2a, discharge to surface waters	
4	1D_2b_Surface	Treatment option 2b, discharge to surface waters	
5	1D_2c_Surface	Treatment option 2c, discharge to surface waters	
6	1D_3a_Surface	Treatment option 3a, discharge to surface waters	
7	1D_3b_Surface	Treatment option 3b, discharge to surface waters	
8	1D_4_Surface	Treatment option 4, discharge to surface waters	
9	1D_5_Surface	Treatment option 5, discharge to surface waters	
10	1D_6a_Surface	Treatment option 6a, discharge to surface waters	
11	1D_6b_Surface	Treatment option 6b, discharge to surface waters	
12	1D_2c_Surface - DO	Treatment option 2c, discharge to surface, no dissolved oxygen in wastewater	Option 2c has the 'best' P treatment (TP = 0.10 mg/L) and 'moderate' N treatment (TN = 4.37 mg/L)
13	1D_3a_Surface - DO	Treatment option 3a, discharge to surface, no dissolved oxygen in wastewater	Option 3a has the 'best' N treatment (TN = 2.63 mg/L) and 'moderate' P treatment (TP = 0.20 mg/L)
14	1D_2c_Bed	Treatment option 2c, discharge to lake bed	
15	1D_3a_Bed	Treatment option 3a, discharge to lake bed	
16	1D_0 - LTS	Baseline, Land Treatment System loads removed from the Puarenga Stream	
17	1D_2c_Surface - LTS	Treatment option 2c, discharge to surface, Land Treatment System loads removed from the Puarenga Stream	
18	1D_3a_Surface - LTS	Treatment option 3a, discharge to surface, Land Treatment System loads removed from the Puarenga Stream	
19	1D_4_Surface - LTS	Treatment option 4, discharge to surface, Land Treatment System loads removed from the Puarenga Stream	
20	1D_5_Surface - LTS	Treatment option 5, discharge to surface, Land Treatment System loads removed from the Puarenga Stream	
21	1D_6a_Surface - LTS	Treatment option 6a, discharge to surface, Land Treatment System loads removed from the Puarenga Stream	
22	1D_6b_Surface - LTS	Treatment option 6b, discharge to surface, Land Treatment System loads removed from the Puarenga Stream	
23	1D_0 - Alum	Baseline, alum effects (in-lake and in-stream) not simulated	
24	1D_2c_Surface - Alum	Treatment option 2c, discharge to surface, alum effects (in-lake and in-stream) not simulated	
25	1D_3a_Surface - Alum	Treatment option 3a, discharge to surface, alum effects (in-lake and in-stream) not simulated	
26	1D_0 - LTS - Alum	Baseline, Land Treatment System loads removed from the Puarenga Stream, alum effects (in-lake and in-stream) not simulated	
27	1D_2c_Surface - LTS - Alum	Treatment option 2c, discharge to surface, Land Treatment System loads removed from the Puarenga Stream, alum effects (in-lake and in-stream) not simulated	
28	1D_3a_Surface - LTS - Alum	Treatment option 3a, discharge to surface, Land Treatment System loads removed from the Puarenga Stream, alum effects (in-lake and in-stream) not simulated	
29	1D_0 + 'pure' wastewater	Baseline with discharge of wastewater to surface waters that contains no nutrients	Not proposed but simulated to quanity potential flushing effects

Prof Hamilton gave a verbal broad summary of the above treatment options.

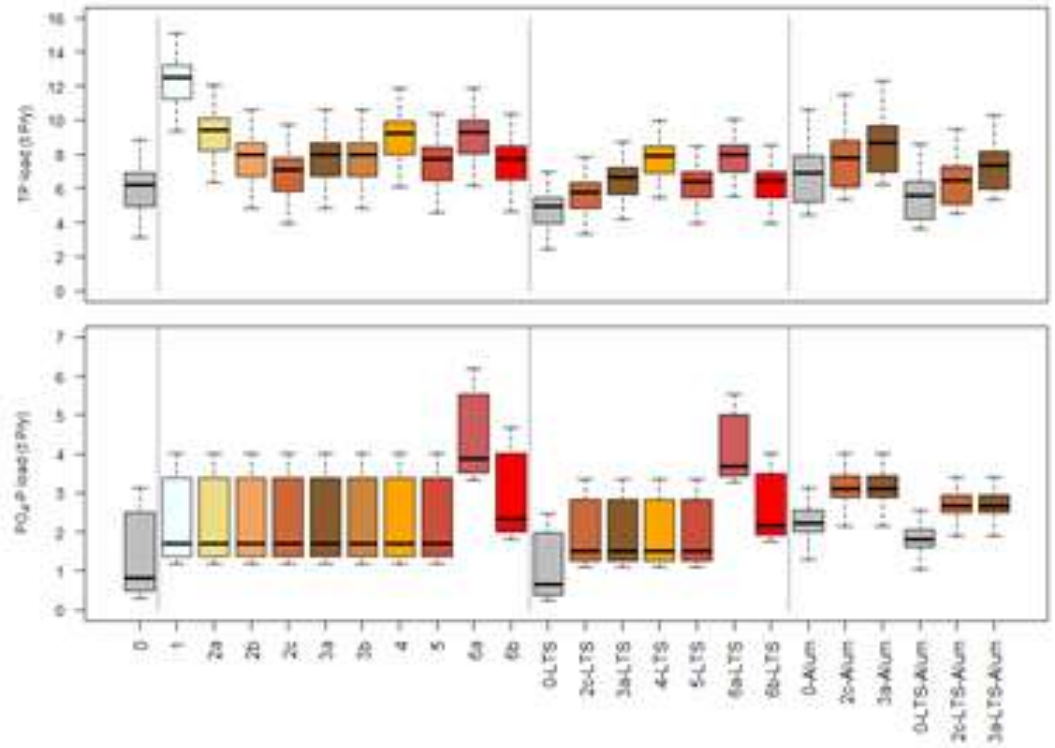
1-D modelling

29 scenarios tested to assess long-term chemical and biological effects of treated wastewater nutrient loads to Lake Rotorua. Best estimates suggest a c. 5-year lag time for legacy LTS loads to 'work their way through' Waipa groundwater. Thus, scenarios included consideration of treated

Puarenga Stream nitrogen loads for all scenarios



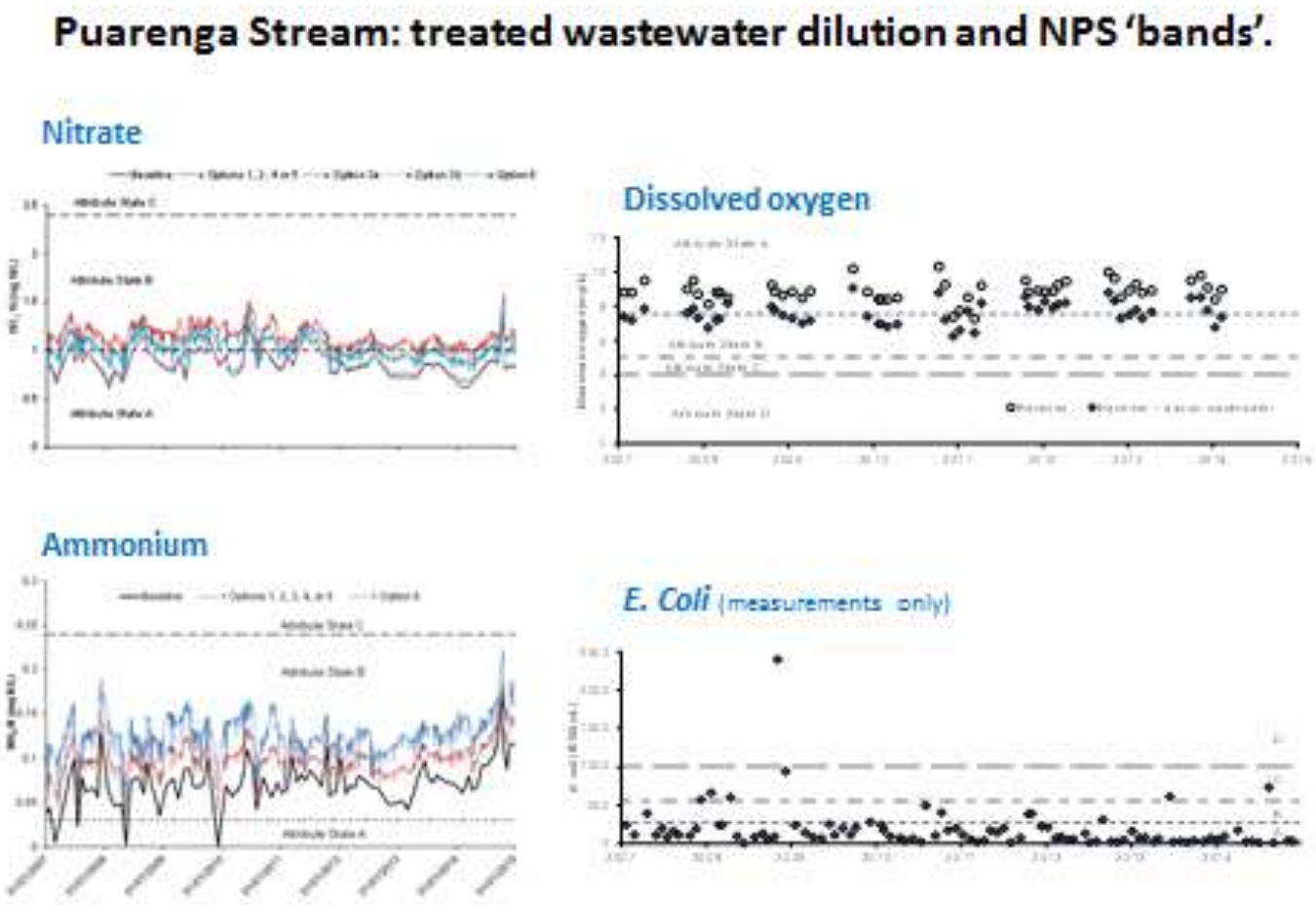
Puarenga Stream phosphorus loads for all scenarios



Assessment of in-stream effects (Puarenga)
Dave talked on what would happen if we discharged into stream.

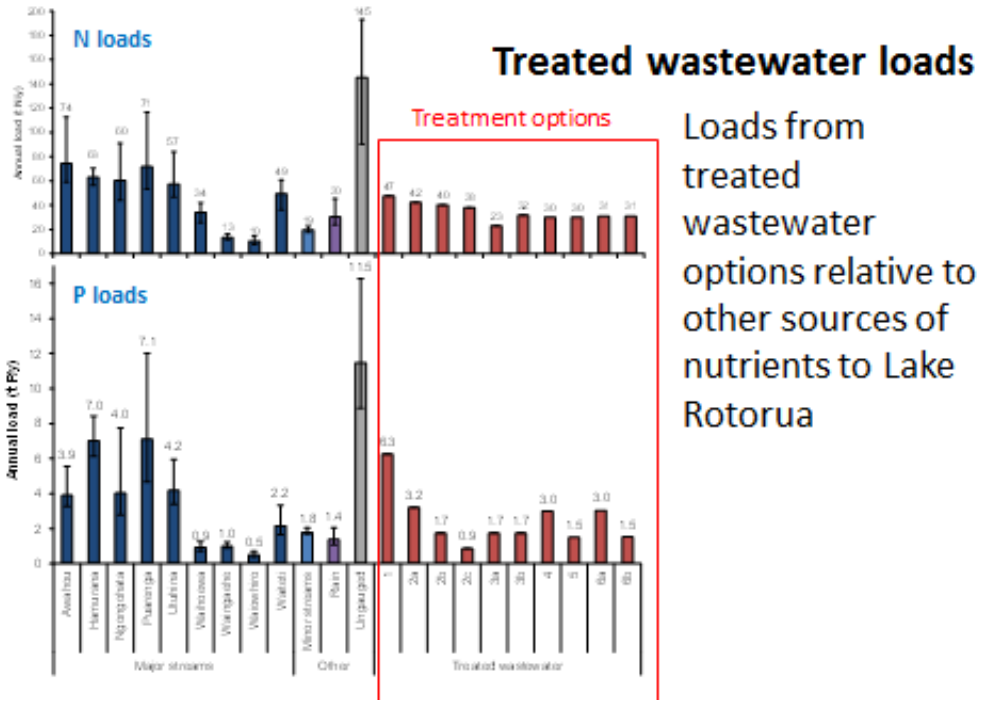
At the moment Puarenga is close to an A. Interesting

1. Asessment of in-stream effects (Puarenga).



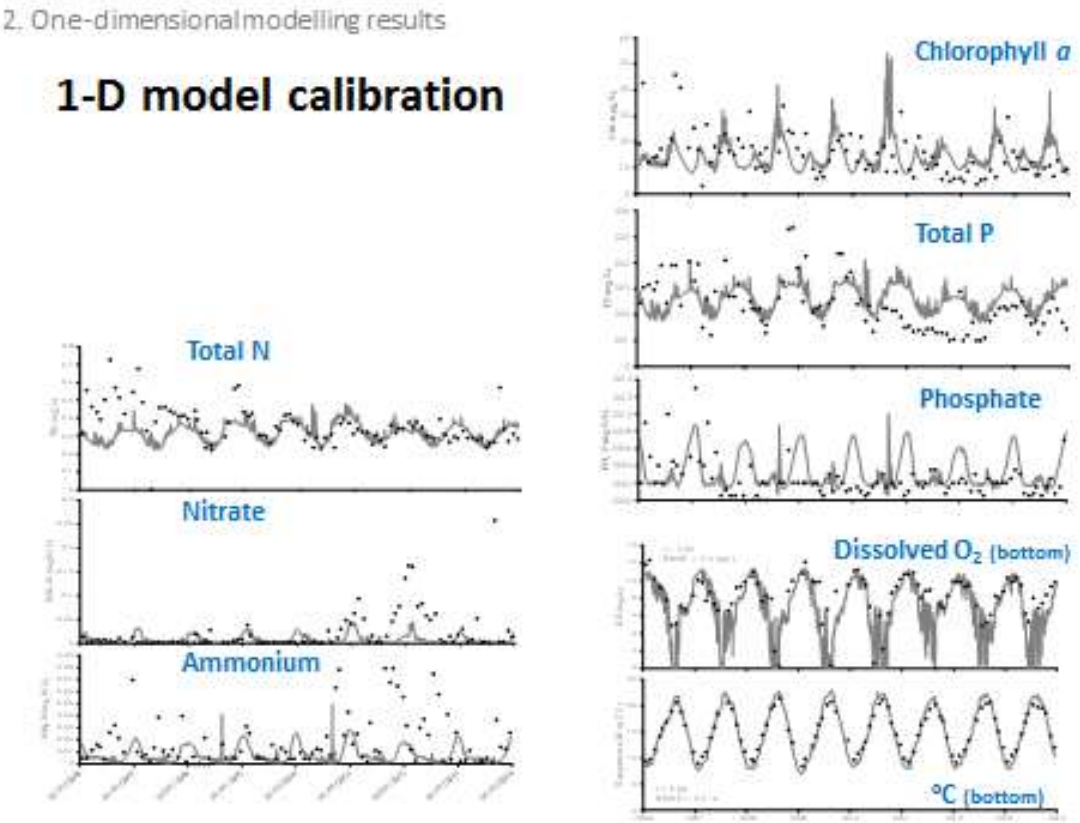
E Coli is a human health measure.
Prof Hamilton talked more about this measure.

2. One-dimensional modelling results



Treated wastewater loads

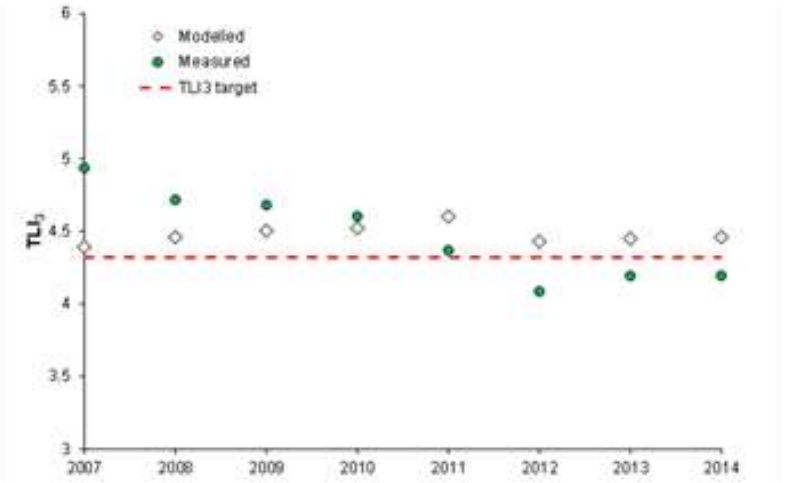
Loads from treated wastewater options relative to other sources of nutrients to Lake Rotorua



One-dimensional modelling results – 1D model calibration
Professor Hamilton gave an explanation of model

2. One-dimensional modelling results

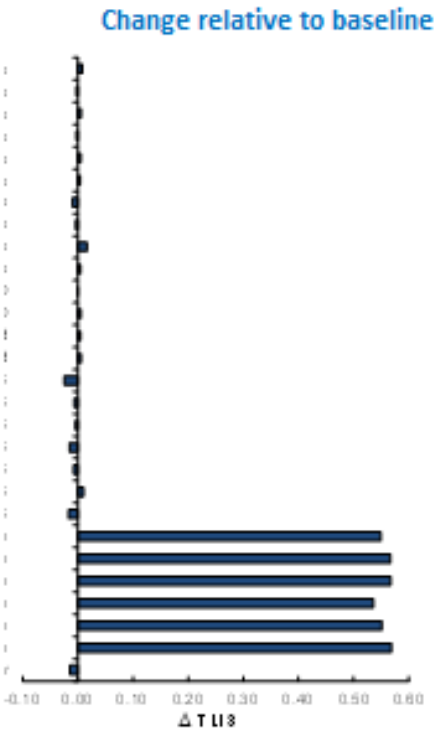
1-D model calibration



1-D modelling
Puarenga Stream nitrogen loads for all scenarios

Simulations: long-term effects on Trophic Level Index

#	Scenario	Treatment upgrade	Discharge depth (m)	Legacy LTS loads?	Alum dosing?	Mean annual TLI_3
1	1D_0 (Baseline)	None	n/a	✓	✓	4.68
2	1D_1_Scenario	1	0	✓	✓	4.67
3	1D_2a_Scenario	2a	0	✓	✓	4.68
4	1D_2b_Scenario	2b	0	✓	✓	4.67
5	1D_3a_Scenario	3a	0	✓	✓	4.68
6	1D_3b_Scenario	3b	0	✓	✓	4.67
7	1D_3c_Scenario	3c	0	✓	✓	4.67
8	1D_4_Scenario	4	0	✓	✓	4.67
9	1D_5_Scenario	5	0	✓	✓	4.68
10	1D_6a_Scenario	6a	0	✓	✓	4.69
11	1D_6b_Scenario	6b	0	✓	✓	4.67
12	1D_2a_Scenario - DO	2a	0	✓	✓	4.68
13	1D_2a_Scenario - DO	2a	0	✓	✓	4.67
14	1D_2a_Bed	2a	10	✓	✓	4.67
15	1D_2a_Bed	2a	10	✓	✓	4.67
16	1D_0 - LTS	None	n/a	n	✓	4.66
17	1D_2a_Scenario - LTS	2a	0	n	✓	4.67
18	1D_3a_Scenario - LTS	3a	0	n	✓	4.68
19	1D_4_Scenario - LTS	4	0	n	✓	4.67
20	1D_5_Scenario - LTS	5	0	n	✓	4.67
21	1D_6a_Scenario - LTS	6a	0	n	✓	4.67
22	1D_6b_Scenario - LTS	6b	0	n	✓	4.66
23	1D_0 - Alum	None	n/a	✓	n	5.02
24	1D_2a_Scenario - Alum	2a	0	✓	n	5.05
25	1D_2a_Scenario - Alum	2a	0	✓	n	5.05
26	1D_0 - LTS - Alum	None	n/a	n	n	5.02
27	1D_2a_Scenario - LTS - Alum	2a	0	n	n	5.02
28	1D_2a_Scenario - LTS - Alum	2a	0	n	n	5.05
29	1D_0 - 'pure' restoration	None	n/a	✓	✓	4.67
-	Measured			Mean of annual TLI3, 2007-2016		4.67

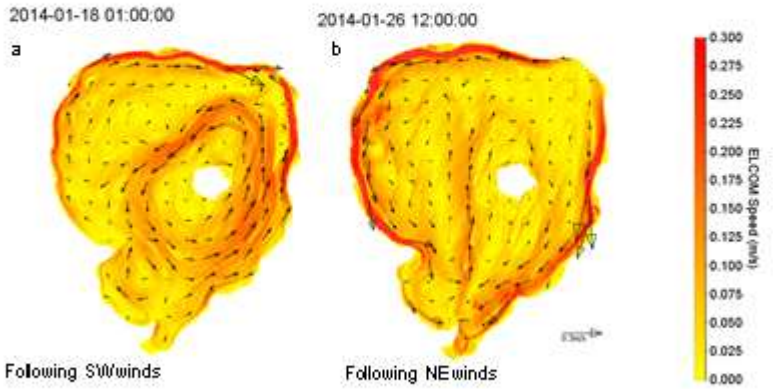


Simulations': Long-term effects on Trophic Level Index
Explained how the TLI increases when you remove alum dosing.

3. Three-dimensional modelling results

3-D model

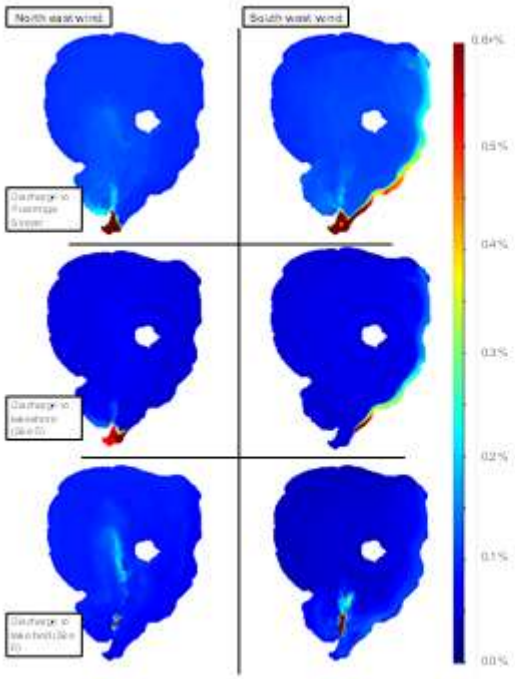
Alternate circulation patterns under prevailing winds (SW and NE).



3-D model:
So where would the treated waste water go?
Anything you discharge into shoreline areas will quickly distribute around the shoreline.
Professor Hamilton Continued to talk about the effects of the wind patterns.

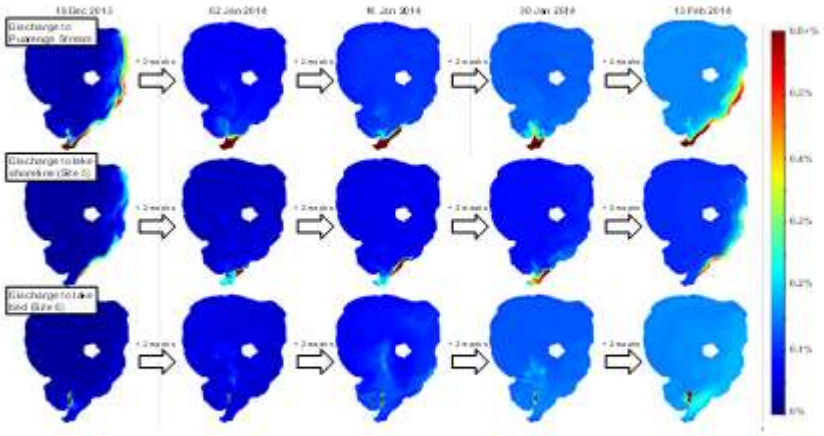
Discharge locations

- three sites in the lower reach of the Puarenga Stream;
- two sites along the shore of Lake Rotorua close to the mouth of the Puarenga Stream;
- one offshore site on the bed of the lake 2 km north of the mouth of the Puarenga Stream.



Comparison of water column average simulated tracer concentrations for scenarios of discharge to the Puarenga Stream, the lake shoreline (Site 5) and the lake bed (Site 6; Map 2) during summer 2013/2014 with consistent wind forcing (4 m/s) from the NE or SW. Plots show concentrations six weeks after the simulations started.

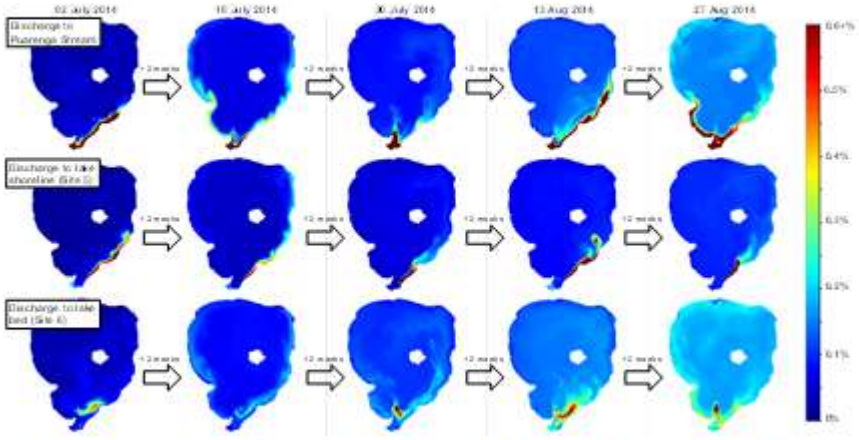
Treated wastewater dispersion: Summer



Comparison of simulated water column average tracer concentrations for scenarios of discharge to the Puarenga Stream, Lake Rotorua shoreline (Site 5) and the lake bed (Site 6; Map 2) during summer 2013/2014. Plots are at two–week intervals, commencing two weeks after the simulation started.

Colours show the effects of the wastewater.

Treated wastewater dispersion: Winter



Comparison of simulated water column average tracer concentrations for scenarios of discharge to the Puarenga Stream, Lake Rotorua shoreline (Site 5) and the lake bed (Site 6; Map 2) during winter 2014. Plots are at two-week intervals, commencing two-weeks after the simulation started.

After 6 weeks its still at a very low level

Q – what becomes of the sediment on the shoreline?
A- Its so small in comparison to other activities – fairly minor

Q – What effects will this have on Taonga Species?
A – Prof Hamilton advised that he is not a specialist in this area but believes the effects would be minor. Most of the impact on the Taonga Species would be too many nutrients going in.

Alum dosing has a hugh impact on the lake. But on the other hand there is potential for chronic long term effects.

Prof Hamilton continued to talk about the effects of Alum dosing and how it clots particles together forming tiny pin heads in the water.
A lesson learnt from Lake Okara, is that under high PH conditions those clots release P back into the water.
This can further fuel algae bloom.

Jim gave clarification around alum dosing strengths and alum dosing in the base options at the treatment plant.
A reminder that at the wastewater treatment plant we're taking out substantially all the clot particles.

Andy Bruere – talked about the amount of Nitrogen coming into the lake and its sources. RC has a program in place on how to reduce this.

Regional Council has no intention on long term alum dosing.

Discussion talk place regarding the different discharge points and the effects on the Lake and Professor Hamilton showed video clips of the different reactions.

Warren –
Again it comes back to the quality of treatment.
Human health is the main concern – So we need to make sure we do something to mitigate viruses, bacteria and micro pollutants as part of our treatment process.

Q - Is there over the years a possibility of accumulation effects to the water quality?

A – Prof Hamilton talked about how its taken up to 25 years to notice the affects of the water quality from pre 1991 treatments. Hence we need to get the nutrients to as low as possible so we don't end up with a similar situation. ie: stimulating algae growth.
Remember the more you filter the more you diminish.

Warren:
Generally we all want to optimize the quality of the water in the discharge:
What is the technological capability of getting to this point and what are the relevant costs are the caveats to this.

Discussion took place around setting and benchmarks of the allowable discharge and NPS levels.
Prof Hamilton was part of the lakes team involved with the NPS and they were very strict on it back then. It does require a review at the moment as the current approved levels don't quite stack up to what we actually have.
He continued to talk about the relative standards between Lakes and Streams.

Q – Do you know what category the Puarenga sits in?
A – It depends what you're looking at.

- Nitrate – a to b
- Amonima - b
- Disolve Oxygen – be category
- Ecoli – b category – this can be quite variable.

Prof Hamilton talked about the disadvantages of Reverse Osmosis.

5. SUMMARY OF WORKSHOP DISCUSSIONS AND OUTPUT

Warren asked for a technical overview of the options.

Greg: - Agree with Davids view of Puarenga as a safety valve and understand how it disperses into the shoreline. If it hugs the shoreline then we just have to care of the nasty stuff.

As an Engineer I'd love to do the discharge into the middle of the Lake. It would be the first in Rotorua. The problem with this is we cant bring N & P to zero which could possibly effect the algae bloom

Jim - We are still working on the RMA. RMA is about the effects on the environment.
Under the RMA there is a range of definitions of Effects.
This includes accumulative effects.
The purpose of the Local government in the Act is that something is proven to be efficient and affective. (Proven to do the job at the lowest overall cost)
As a scientist working on many projects throughout NZ we have about 70 to 80% treated waste water going into the Marine environment. The biggest driver here is public health, the pathogens and the viruses.

Back to this issue we have been evaluating technologies from a starting point of nutrient drivers and coming through this committee and the Cultural sub committee has been amongst other important things has been public health.

We have a good understanding of pathogens, viruses etc, what uv does and what membranes do.
Based on what we have to date I have support for a diffuse type discharge if we can meet the public health requirements and taking into account the bigger picture of costs.

From a social and cultural point of view, a diffuse discharge contacting land passing through some vegetation has gained support.
If we can get the treatment right, can a diffuse discharge to Puarenga be made to work and acceptable?

Alison – For me what's important is the treatment upgrade. I like the idea of the water going through the land but its sort of wasted money and the environment doesn't need that much water. If we're looking at passing through

land we need to look at how much land is required before we discharge. I believe the water will be of high enough quality to go with either option.

Annaka – Would like to study the videos of effects more as it's the first time I've seen them.

Andy Bruere – Its's important to remember the sustainable load to Lake Rotorua, and why reaching the target is imperative. Through the options that have been presented to us it will be possible.

Chris – Personal state of preference would be the conservative approach. By discharging to Puarenga you have a pre dilution before heading to the lake. Chris continued to talk about his reasons.

David – Good point about the dilution by discharging to Puarenga first.

Andy Bell – When talking about tradeoffs between N & P. Nitrogen removal costs us lots of money. We can deal with phosphorus. The 330 ton limit which is the max limit we have to keep too. If we go up we're breaking our consent. We need to consider future growth. ie: If Red Stag would to consider connecting to our waste water system this would increase to another 1000 cubic metres per day.
Summary: Not only do we need to consider the trade offs between N & P but we also need to consider how we might give some flexibility for growth.

Warren open the floor to the following question:

What variables would influence your decision about the best place for the discharge to go?

Manu Pene – I'm in the process of trying to understand the committee's lingo. Ultimate aim is to mitigate health.

Tamara – Discharge to water is still our least preferred option.
Really need to see the effects of discharge back to land in particular the effects on Taonga species on land and in the lake.
The cultural impact has to be presented back to our people. We haven't really looked at the environmental impact. There was discussion about adding some sort of land based discharge first. My question is how much land is required for waste water to touch the land to provide some kind of spiritual cleansing? This may be asked by Iwi once they have the full information about all the implications.
We've come a long way, but there's so much more information require before I can discribe the cultural impact.

Shane - Not in position to express opinion yet. If there is growth then wheres the flexibility?

Peter - Like Tamara I Cant make a decision as it needs to go before the hapu. I would like to see some work done on the aeration before going to discharge. For me close to heart, is the mauri (life sustainability) of the water. Tribal wellness is paramount.

Wally - Apologised for being late. I've missed vital information so I'm not ready to comment at this point.

Geoff: For me the discharge option is not the most critical point at this stage. Treatment of the waste water is more important to me. When I'm convinced we have this right, this will help me decide whether or not where we should discharge. I'd like the CAS group to invite David and Chris to the next hui. It would be good from our perspective to ask them questions and for them to understand our perspective too.

Joe Tahana – My focus is always on the treatment plant. In terms of discharge I'm of 2 views.

Fred – We have one of the best treatment plants in the world. The consent is the most important item that is holding everyone up. A consent we've been working on for the last 20 years. We cant get 100% decision due to all other issues. If we cant change consent then my option is discharge to Te Puaenga

Roku – A key issue for me is the discharge to Puarenga. All my life living at Whaka Puarenga has taken the brunt of discharges and has affected the health of our people consistently.
Im pleased we have more robust scientific information. At this stage I don't have a preferred option. The alum dosing which has highlighted the water flow patterns that David presented today have been interesting and helpful. Unless there is more certainty around the effects on Taonga species and the mauri of the water, then option close to achieving this would. Total environmental sustainability is what we need to achieve.

Alamoti – I believe its being summarized already and we're getting close to decision time.

Anaru – I support what Geoff said. We're here to try and achieve the best quality water. Regarding UV treatment this has been one of the most important things throughout all the discussions. As far as I'm concerned this has to be part of the upgrade of the system.
Another point, we've never explored other uses for this water other than discharging it to the lake. There could be other uses it could be used for ie: holding tanks that residents could turn to for uses like showers or gardens etc. If the quality of the water is suppose to be good, then why not?

Gareth – Introduced himself as an employee for Timberlands. This is only his 2nd meeting and is enjoying what he's learning and the process, which he believes is on the right track. Keep in mind that we are only a drop in the bucket in terms of the whole Rotorua catchment side.

Cr Donaldson - referred to a bit of history and urban occupation and how the city grew from that when the land was gifted. We've come a long way from long drops and septic tanks. I acknowledge that its offensive to take all the nutrients from urban waste water, chuck it up in the forest and then have it come down through Whakarewarewa thermal valley near the Puarenga. Its not logical.
I tautoko Peter and his message about getting beaten up if he takes option 1 back to the hapu and Ngapuna. For me the option 1 discharge straight back here, opposite the Ngapuna village raises a real problem for me. I Prefer option 2 out to Sulphur bay, bearing in mind that all the work will be done back at the treatment plant to kill the pathegons and restore the Mauri of the water. If we can have some touching of the land like a rock passage and steer it round the corner it could gets it right away from putting it into the Puarenga. This spiritually would be a big acknowledgement to make to the past treatment of the community of Ngapuna.

Anaru Te Amo – I'd be in support of Daves suggestion of putting in a rock passage way through the other side.
Geoff Palmer – I support option 2 as well. I'm involved with a lot of lakes and there is intensive farming going on around the area at this present time. The results of this in terms of pollution of lakes is going to be significant. I don't think the Regional Council is getting to grips about how serious this is going to be, but we'll keep talking to them. Regarding the growth, I believe some of the timber processing plants will expand and because of the resource that's available there'll be new plants. The locations of some of these plants I believe is not satisfactory. I don't believe it will be people growth it will be highly technical plant operations growth.

Marama – I'm in support of Tamara's point of view and Geoffs where the importance is to get the treated water to as clean as possible before discharging.

Leilani – I'm also in support of Tamara's view, and not prepared enough to choose and option right now. I'd like to acknowledge a bit of the history that Peter mentioned on the site visit this morning, around the accumulative loss that Ngapuna have experienced over generations. I think direct discharge into the Puarenga would be another kick in the guts for them.
Its essential that we get more barriers in place. The more barriers the better.

The TALT has the responsibility for the management of our Taonga species.
So to directly discharge the effluent into the lakes or Puarenga without out further research on the environmental effects or ecological impacts would not be responsible.

Gina - I'm in full support of all the korero that's going around the table today. Information around growth is information that hasn't really been bought forward and is an topic we need to keep an eye on. I believe this needs to be part of the option process, not an add on.

We really need to get the quality of water right before we can decide on the discharge. This will be a tough challenge. I support the whanau from Ngapuna and as Leilani said discharging to Puarenga will just be another kick in the guts.
As Tamara mention some type of assessment on the environmental effects needs to be completed so I suggest that some members from TAG be bought in to assist with this.
Regarding Geoffs suggestion to invite Professor Hamilton and Chris McBride to a CAS meeting, our next hui is 12th August. Hopefully you're available, but we can liase with you both.

Warren - Both Antoine and myself will save our comments for the meeting next.

Thank you all for your participation in todays workshop.

Workshop ended 12.37pm

Closed with Fred blessing Lunch with a karakia.

ATTACHMENT 1

Lake Rotorua Effects Study Report_DRAFT