

## NOTES: WATER QUALITY TECHNICAL ADVISORY GROUP, 29 JUNE 2017

Bay of Plenty Regional Council – Te Wai Ariki, 1125 Arawa St, Rotorua, 9:30am

**Convener:** Andy Bruere  
**Present:** Andy Bruere, Grant Tempero, Kim McGrouther, Keith Hamill (left 3pm), Chris McBride, Max Gibbs, Piet Verburg, Warwick Silvester, Paul Scholes (left 3pm), David Hamilton, Stephanie Fraser (scribe)

### Action Summary:

*Action 1 - Item 2 – 4b – Andy Bruere – add agenda item for next meeting “cyanobacteria monitoring for Lake Rotoiti – area affected by Ohau Wall”. Discuss with Alastair Suren and arrange monitoring in the area for the 17/18 Summer.*

*Action 2 - Item 2 – 4b – Paul Scholes to assess existing data held for Phytoplankton samples in the area of the Ohau wall*

*Action 3 – Item 3a – David Hamilton to consider addition of a chart that shows nutrient load broken down by source and a map depicting where groundwater is going to in the Lake Rerewhakaaitu catchment report.*

*Action 4 – Item 3a – Andy Bruere to arrange for David Hamilton to present to Lake Rerewhakaaitu catchment farmers in September.*

*Action 5 – Item 3b - Andy Bruere to find out who is on the national group assessing the Overseer model for use in regulation and see how an approach could best improve access to the model workings so the outputs could be more clearly understood.*

*Action 6 – Item 5 – Piet Verburg to email Grant Tempero with feedback on the design of the research proposal on seasonal phytoplankton nutrient limitation in Lake Rotorua*

*Action 7 – Item 6 – WQTAG members to email Andy Bruere if they have any questions on the position paper.*

*Action 8 – Item 9 – David Hamilton to provide summary climate change statement by 29 July 2017 and supply to BOPRC*

*Action 9 – Item 11c - Chris McBride to calculate winter dose rate to DRP requirements in stream based on historical averages.*

*Action 10 – Item 11c – Niroy to look at protocols for dosing in each stream and report back to WQTAG. Look to switch dosing levels between streams.*

*Action 11 – Item 11c – Andy Bruere to engage with RLC on assessing and managing current and future alum dosing flows to address P at the wastewater treatment plant.*

*Action 12 – Item 11c – Niroy will report back to WQTAG after Chris’s Masters thesis is completed and consider inviting Chris to speak at next WQTAG meeting.*

*Action 13 – Item 11d – Andy Bruere to circulate draft confidential assessment of requirements of science review Terms of Reference to workshop attendees.*

*Action 14 – Item 11d – Andy Bruere to convene TAG sub-group workshop*

*Action 15 – Item 11d – Paul Scholes to share the data collected in the 2016 sampling with David Hamilton.*

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### Item 1: Welcome, apologies and minutes / actions from previous session (30 May 2016)

**Apologies:** David Burger, Clive Howard-Williams, Alastair Suren, Alastair MacCormick, Alison Lowe, Kit Rutherford, Nicki Douglas

### Item 2: Follow up on Action items from previous minutes:

Item Number	Action Point	Action or person responding
3a	Update levels in precipitation and check LIDAR for Lake Rerewhakaaitu modelling. Report close to completion. Refer item 3 in notes	See Agenda Item 3
4	Niroy to talk to Adam Hartland about potential location for another dosing point at Soda Springs. See agenda item 10.c	See Agenda Item 10c

6b	Matt Liddicoat to check the remote sensing to see if a record of collision(s) into Tarawera buoy can be identified. Item closed, only one possible collision reported by Chris McBride.	<i>Closed</i>
7	URGENT - Paul Scholes and Rob Donald to set up a group to plan the approach and expert advice to address the issue of step change in TP and TN. Matter passed to Rob Donald. This is not a lakes programme issue; it is a matter for the regional monitoring programme to consider. Closed. Note: Andy to get duplicate monitoring of Tarawera samples for modelling project.	<i>Closed</i>
9	Andy Bruere to provide Rerewhakaaitu sub catchment boundaries to David Burger once they come from Rerewhakaaitu modelling work.	<i>Closed</i>
11a	Niroy to do alkalinity testing prior to Ōkaro alum dosing and get advice on buffer usage. Jar tests being undertaken to assess dose rate and buffer requirements. Autumn dosing delayed until September to ensure dosing is safe.	<i>Closed</i>
11d	Niroy to alter the protocol to reflect agreed changes in alum dosing rate and timing. Done manually, closed.	<i>Closed</i>
11d	Niroy to provide Chris McBride with numbers for antecedent correlation for Rotorua and Rotoehu alum dosing protocol. Done.	<i>Closed</i>
<b>Incomplete actions from previous meeting:</b>		
4b	<p>Include cyanobacteria monitoring for Lake Rotoiti to see if there is separation between Rotorua and Rotoiti water quality</p> <p><i>Discussed:</i></p> <ul style="list-style-type: none"> <li>• <i>Cyanobacteria monitoring in area affected by wall. To be an agenda item for next meeting.</i></li> <li>• <i>Sampling data may be in existence for the area. Paul Scholes to assess if data does exist and to what extent for Phytoplankton samples.</i></li> <li>• <i>Arrange monitoring in the area for summer 17/18 with Alastair Suren</i></li> </ul>	<i>Agenda item for next meeting</i>
5	<p>Lead a small working party to look into the management and investigations of the three urban sources of P. (Stream inputs managed by alum dosing, Rotorua sewage and urban catchment)</p> <p>Progress update.</p> <p><i>Noted:</i></p> <ul style="list-style-type: none"> <li>• <i>This item covers ‘ungauged sources’ rather than just ‘urban’ sources of P.</i></li> <li>• <i>A project assessing gaps in data information is underway and being conducted by Keith Hamill.</i></li> <li>• <i>Item links to agenda item 11(d) – Plan Change 10</i></li> </ul>	<i>Ongoing</i> Andy

Action 1 - Item 2 – 4b – Andy Bruere – add agenda item for next meeting “cyanobacteria monitoring for Lake Rotoiti – area affected by Ohau Wall”. Discuss with Alastair Suren and arrange monitoring in the area for the 17/18 Summer.

Action 2 - Item 2 – 4b – Paul Scholes to assess existing data held for Phytoplankton samples in the area of the Ohau wall

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### Item 3: Model updates

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**(a) Rerewhakaaitu (David/Chris)**

Discussion covered the following topics [as paper](#) “Modelling water quality of a quasi-perched lake subject to intensive agricultural development” was presented:

- The area around the lake is high producing grassland so the lake remains mesotrophic.
- Model is informed by Paul White’s flow work were applied to the lake which varied a lot in terms of water level. High levels connect a small deep crater basin and probably activate some surface outflow at about 15m. There is vegetation across the gap.
- Overview of the catchment was shown in maps (figures 4 & 5) – Only two surface inflows, all the rest goes to groundwater. Other than very heavy storm events water is going to other catchments. Mangakino stream sits incised and groundwater contributes a pretty small amount to Lake Rerewhakaaitu
- Model simulations – in general confident in the modelling. Questioned data variability and it was noted that the historical data variability seen may well be valid as there were some reported fish kills in the lake about that time.
- The intensification of land use is thought to be driving up the nutrient levels in the catchment. Control of the riparian margins appears to be the key tool to achieve control of inputs. Graphs show that nitrate is increasing
- Contribution from Mangakino stream could be getting up above NPS limits.
- Forest harvest work being done elsewhere will provide some good results for decisions on actions for the Rerewhakaaitu catchment.
- Awaroa is basically a boggy wetland now and has had a denitrification wall installed however low flows mean low ability to monitor the impact of wall.
- Recent buoy data – small stratification events – water temp variability impact on stratification events which drop DO right down which is a cause for concern. Surface DO is fine. Model doing a good job of reproducing measurements.
- Five model scenarios –a base case, climate change case, intensification (empirical trajectory of the nutrient loads) case, intensification combined with climate change case and nutrient reduction case. In the climate change case temperature increase (+2.7°) drives stratification. No wind included in modelling. Page 6 shows summary of data for scenarios run.
- There may be some aspects/ influences of lake level that are uncaptured in model.
- Making catchments resilient is the key to managing climate change influences. It is very important to reduce loads to land as while the groundwater may not be going to Lake Rerewhakaaitu it is going to another lake. A very internally driven system (a polymictic lake) therefore climate change has a big impact – if you get complete loss of O<sub>2</sub> three times a year instead of once. Lake Rerewhakaaitu is high in iron sediments so holds P until lake goes anoxic and then releases the P.
- A suggestion was made that a chart that shows nutrient load broken down by source would be a useful addition to the report, as would a map depicting where groundwater is going to.
- It was agreed that David Hamilton would present the findings of this report to the Lake Rerewhakaaitu farmers in September 2017.

Action 3 – Item 3a – David Hamilton to consider addition of a chart that shows nutrient load broken down by source and a map depicting where groundwater is going to in the Lake Rerewhakaaitu catchment report.

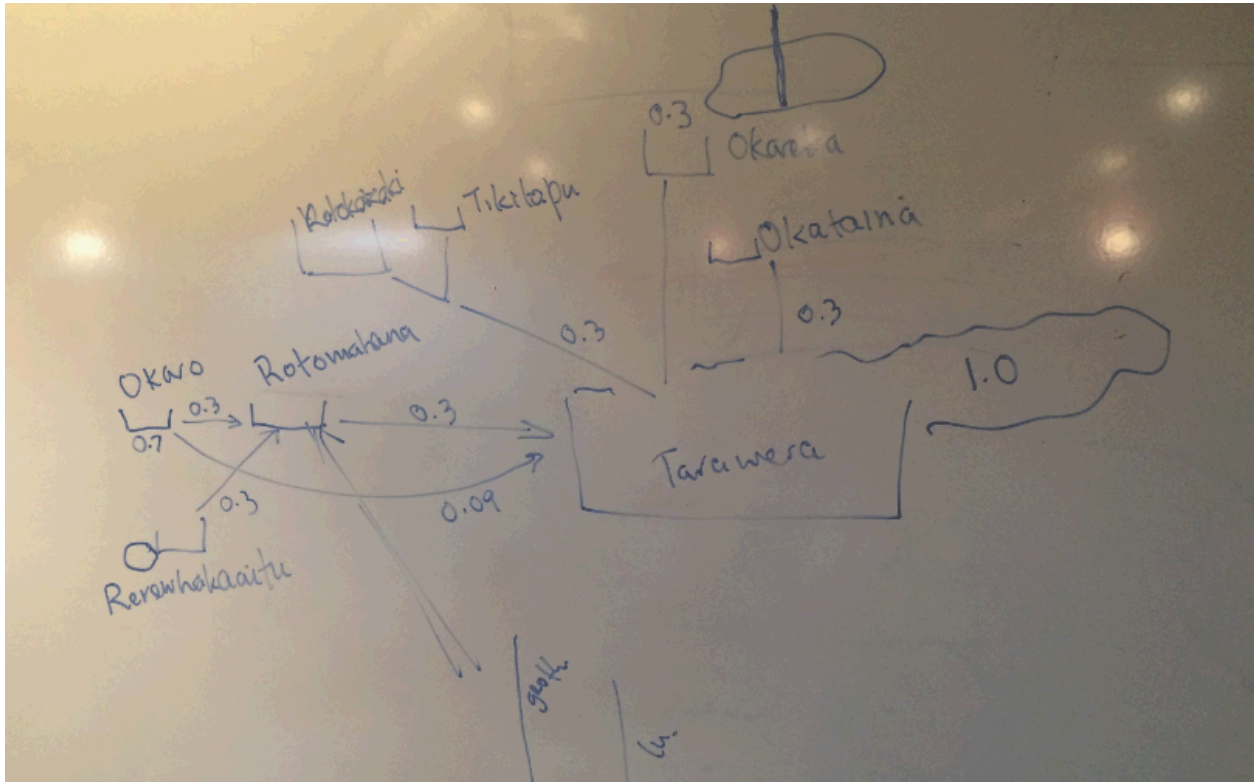
Action 4 – Item 3a – Andy Bruere to arrange for David Hamilton to present to Lake Rerewhakaaitu catchment farmers in September.

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**(b) Tarawera and the Tarawera Farm Plan project (David/Andy)**

It was reported that:

- The first stage of the project is to reconfirm targets for Lake Tarewera project through development of a lake model. The next step is to identify where in the catchment work can be done to make a big reduction to Phosphorus in the catchment.
- Duplicate sampling - Lake Tarawera sampling is to be sent to two different labs as part of the project to provide confirmation of Total P and DRP results.
- Project data – a verbal outline of the data currently collected and to be collected for the project was:
  - o Meteorological data is obtained from Rotorua airport, the buoy in the lake and a met station near the lake.
  - o Paul White modelling work indicated 80% of water that enters lake is from groundwater.
  - o Terry Beckett currently does quarterly monitoring of the lake. UoW analyses these samples.
  - o A couple of new instream flows have occurred. Rotomahana pipeline activated at few years ago – ismuth between Rotomāhana and Tarawera. The pipeline takes from Rotomahana to Tarawera and a consequence could be input of higher nutrient levels – the area of discharge is close to hot water beach where summer blooms have occurred in recent years(also near geothermal flows).
  - o Geothermal inputs are relatively unknown and whether from surface or subsurface flows – may need more work in this area. Geothermal sources could be up to 50% of P to lake.
- 3D vs 1D modelling – Discussion covered the advantage of 3D modelling is to see influence of the two areas of the lake. It was suggested two 1D models could be used instead and treat as two lakes.
- Next phase is to work with the community to figure out what changes that can be made to reduce inputs to lake. Project Rerewhakaaitu incorporated society agreed to get all farmers to complete farm plans for all lakes there. This includes farm environment plans for current state Overseer files, then in future work with farmers to look at changes
- Most of the contributing lakes retain 70% of nutrients in lake.
- Rotomahana and Tarawera should be thought of as a system. Drew image on board – A conceptual model for lake management was drawn to present to community to understand what is required to achieve change.



- All parcels will be done in Overseer 6.2 or above.
- The transparencies of the parameters of the Overseer model were discussed. For Lake Rotorua BOPRC has to track Lake Target of 435T and other modelled inflows against the changing aspects of the Overseer model. The issue of climate change being incorporated into Overseer was also raised. Overseer assumes best management practices on all farms. Noted there is a forestry nutrient model NuBalm. Ideally each update of Overseer would come with a complete algorithm of the changes to the model.

Action 5 – Item3b - Andy Bruere to find out who is on the national group assessing the Overseer model for use in regulation and see how an approach could best improve access to the model workings so the outputs could be more clearly understood.

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**(c) Ōkāreka (Andy) – deferred to next meeting.**

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**(d) Rotoiti (Andy)**

Discussion covered:

- Would like to get Lake Model for Rotoiti to test scenarios with and without wall and test the impact of sediment nutrient releases. Currently business as usual at present as have just secured a new resource consent for the Ohau wall, so this work is not highest priority.
- The second part of Rotoiti is to be reticulated (south eastern end).
- Alum dosing – started in 2006 and happened to coincide with a big improvement in P levels in Rotoiti, then the wall went in. Some question as to how much impact this alum had on the improving lake water quality.
- Nano plankton – recent research external to the Rotorua Lakes programme indicates the increased prevalence of nano plankton is linked to a reduction of Phosphorus.

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#### Item 4: Next Buoys

It was noted that:

- A profiler buoy is going in during July to Lake Rotokakahi.
- Lake Tarawera has the original buoy back on lake. There is potential to move the original buoy to hot water beach and put a new profiler buoy in the existing location.
- There is a proposal to be compiled for building and installing buoys at other lakes or sites to present to BOPRC. It will include a plan for the logistics of managing the increased pool of buoys being proposed.
- Buoys at 7 sites at present :
  - Lake Rotokakahi (to be installed)
  - Lake Okaro (currently being rebuilt)
  - Lake Rerewhakaaitu
  - Lake Rotoehu
  - Lake Rotoiti at Narrows
  - Lake Rotorua
  - Lake Tarawera
- It was agreed that Rotoiti was to receive the next buoy at the eastern basin. Rotomahana would be next so assessment of geothermal heating could be done. Ōkāreka deferred to third on list. Rotomā and Ōkataina still to be considered at a future date. (Tarawera and Rotoiti during 2017/18). (Rotomahana and Ōkāreka 2018/19 or when funding allows).

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#### Item 5: Phytoplankton nutrient limitation in Lake Rotorua

A proposal was shared with the TAG pre-meeting with the objectives of:

1. Determine the limiting macronutrient (N or P) or macronutrients (N and P) of the phytoplankton community assemblage in Lake Rotorua on a seasonal scale.
2. Determine the concentrations of inorganic and total nutrients in relation to phytoplankton community composition at a seasonal scale.
3. Based on the findings of objectives 1 and 2 contribute to recommendations as to the alum dosing rates of the Utuhina and Puarenga stream inflows

Grant Tempero spoke to the proposal and key messages were:

- The process needed to be simple and reproducible.
- Will be done in lab so that temp and light can be controlled.
- Three replicates with P, N and P&N spikes.
- A balance between cost and limitations noted in proposal.
- Cawthron laboratory to do phytoplankton analysis.

A thorough discussion of design of proposal ensued. The first question to answer before moving forward with the research is what are we hoping to achieve by doing this? It was agreed Piet Verburg would provide written feedback on the design to Grant Tempero. There was discussion about whether the trials should be spiked with nutrients or nutrients removed. Comment that the lake TN and TP were close to the in lake targets of 300 and 20 and so a further reduction of N or P may not be appropriate.

It was also noted that:

- There has been no detectable increase of alum at any of the sampling sites (except the closest site to Utuhina) therefore no evidence of a 'cap' of Lake Rotorua sediments.
- Sediment sampling has been done, in 2016, report yet to be received.

- Cores out of Rotoehu – all alum appears to be dropping right there in the bay, however outside of bay almost at background.
- A recommendation is to come in the report regarding a change in sampling sites to better assess where alum may be going. Need to consider also if the sampling method is suitable to sample very low Al concentrations in this environment.
- Note that alum dosing consents will be expiring during 2018 and 2019 for Lake Rotorua and the consent application will be prepared prior to March 2018.

It was agreed:

- To wait until the PC10 science evaluation workshop had been held so that a definitive answer on what data needs to be captured now and into the future;
- Value in these phytoplankton assessments being done.

[Action 6 – Item 5 – Piet Verburg to email Grant Tempero with feedback on the design of the research proposal on seasonal phytoplankton nutrient limitation in Lake Rotorua](#)

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### **Item 6: NIWA aquatic plant: Position paper on aquatic plants in the Rotorua Te Arawa Lakes (Clive/ Andy)**

The position paper had been pre-circulated to WQTAG members. There have been concerns that if algae are controlled then weeds may proliferate creating other issues; such as as they die down consuming oxygen in the bottom of lakes. So this investigation into aquatic vegetation has been commissioned to form the basis of a statement on aquatic plants from the TAG. The technical report will be received by TAG on completion by NIWA.

[Action 7 – Item 6 – WQTAG members to email Andy Bruere if they have any questions on the position paper.](#)

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### **Item 7: Sewage update (Alison Lowe)**

A [word document](#) was presented on behalf of Alison Lowe and discussion noted:

- Rotoiti/Rotomā - A consent application has been lodged. Hearings are scheduled for the second week in July 2017.
- Rotoehu – a recommendation for Rotoehu to be reticulated has been put forward.
- Tarawera – the next lakeside community to be reticulated.
- Rotorua – the MOU between RLC and BOPRC indicates that the discharge will not exceed the overall load to the lake from the 2003/4 baseline loads of 30 and 3, with a treatment process (alum followed by ultra-filtration) that has the potential to achieve a lower DRP discharge. MBR filtration will be used on all sewage before it is discharged to a tributary of the lake. Plan to achieve TN in the range of <5 ppm. RLC are planning Alum dosing of treated water before discharge . Looking at options for discharge including a cascade for stream discharge . BOPRC pushing to keep the P discharge at current levels rather than at 3T as per current consent to forest. Savings will be made in operational costs when current discharge is no longer being pumped up to the forest. No attenuation (treatment) is factored into the rock/soil contact cultural bed. There will be an increased nutrient load reaching the lake for a period of time as nutrients held in the soil at the land disposal area leach out in parallel with the discharge at the new point of disposal. Current sewage discharge is 5% of load to lake therefore effect would be in the margins of weather variability in any given year.
- Tikitere (BOPRC) plant will be commissioned by the time that the treated water will stop going to the forest and that will offset the short term additional load. Tikitere plant and sewage reticulation are real (not modelled) N removal processes.

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**Item 8: In-lake N reduction study (Alastair McC) - deferred til next meeting**

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**Item 9: TAG statement on climate change (David).**

*It was reported that:*

- The BOPRC Long Term Plan wants to have regard to climate change. It is likely that BOPRC and community may see climate change as minimal on the lakes and seen more as coastal a issue. This is an opportunity to highlight the risk to water quality of the lakes as a result of climate change.
- Seven factors were outlined that climate change could impact:
  - o Rainfall and storm intensities will increase to major extent. E.g. 20 year events are going to be akin to current 40 year events;
  - o More frequent large rainfall events will bring higher runoff velocities and cause more erosion, (bringing higher P loads which are typically dominated by storm events),
  - o This will also lead to higher stream velocities and associated stream erosion and sediment transport,
  - o An increase in ambient temperatures will lead to increase in lake water temperatures,
  - o This is likely to affect timing and duration of lake stratification. The most likely impact is longer stratification events, providing longer periods when nutrients from the lake sediments will be released back to the water column and available to drive algal blooms, in particular cyano blooms driven by excess P.
  - o Both these key impacts of climate change are likely to make reaching lake TLI targets significantly more difficult and could mean even greater reductions from land use change are necessary.
  - o Lake level changes, high winter due to storms and low summer levels, resulting in high and low downstream flows.

*Key points noted in discussion were:*

- Stratification –lake stratification duration may increase because of warming in summer in a monomictic lake. An alternative view was that this could result in a shorter winter period where mixing period becomes less or none, bringing less nutrient from the bottom water back to the surface. In summer stratification dissolved oxygen levels drop at the sediment level, until the lake reaches an anoxic state. The question is how will Rotorua lakes respond? Depth (with exception of highly degraded shallow lakes), temperature and how eutrophic a lake is already are the three key parameters for consideration when assessing potential lake reaction to climate warming. Another component is inflow water temperatures and volumes from rivers/streams and will impact mixing period duration.
- Aim is a statement to alert community to the issues that are likely to be experienced i.e. how the lakes may be react to climate change. Achieving TLI targets may well be more difficult to achieve as climate change impacts are felt. It was suggested that the TLI for Lake Rotorua may have to move from 4.2 to say 4.0 to provide a nutrient target that compensates for the impacts of climate change. (Note after meeting: Why would the TLI target change, wouldn't we simply reassess our nutrient targets based on models that take account of the change in climate?)
- Climate changes will also impact native and invasive aquatic species due to potentially shifting environmental conditions outside of their natural and optimum e.g. Eel, trout, koi, carp and catfish.



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## Item 10: Other Business

### a) Rotoehu septic tank discharge numbers (Andy Bruere)

*A spreadsheet of septic tank use analysis was pre-circulated to WQTAG members. Key points noted were:*

- A resident has researched residents bach occupancy and the information was supplied to BOPRC. Where data was missing estimates used were based on known data. Similar assessments used in other lakeside communities. The three estimates are useful to demonstrate that there can be large ranges in occupancy and therefore the nutrient losses from septic tanks.
- Occupancy rates can change rapidly and the councils (BOPRC and RLC) have no control on say summer occupancy rates or full time occupancy that could be motivated by other events such as the Edgecumbe flooding. It was agreed therefore reticulation of household sewage is an essential part of any lake action plan as continued septic tank use will result in nutrients continuing to leach to the adjacent lake and even advanced wastewater treatment systems have a residual N and P load that will reach the lake. The decision should not be based on relative contributions of nutrient load. Lake Rotoehu has been the only lakeside community where sewage reticulation has not been a part of the action plan key actions. It should be based on reticulation being a key action in any lake restoration to reducing nutrients reaching the lake, without reticulation even advanced treatment systems continue to leach nutrients to the lake and sewage reticulation is likely to provide a better level of treatment than individual on site effluent systems.
- There is potential for Tarawera Residents Assn to contribute occupancy numbers toward action plan for that catchment. Likewise for Rotomā and Rotoiti.

### b) Ohau Wall update corrosion and fish pass (Niroy)

*It was reported that:*

- Wall – a structural management plan for a 50 year design life, which is 35 years from now, has been prepared. The plan includes:
  - A new structure (steel whaler) will be installed on top of the wall that will last 10 years and make the sheet pile strength redundant.
  - Monitoring of the corrosion rate of the new structure will take place every three years and a management plan will developed past the 10 year mark.
  - A membrane screen is looking likely to be the best option to prevent leakage through the wall as the sheet piles deteriorate. This will be reviewed as an option as monitoring data on the sheet pile is gathered and assessed over time.
- Fish pass – it has been agreed that a fish pass will be installed following community consultation (with involvement by Ian Kusabs):
  - Three locations have been selected for the passes – the current existing hole, at 245m from attachment, and another at 325m.
  - The current hole size will be reduced and armoured to prevent further erosion.
  - The design is a flap with a handle so that flow can be closed off in the event that the water quality of Lake Rotorua declines.
  - Installation will take place over next couple of months.

### c) Alum and P monitoring results (Niroy)

A [PowerPoint presentation](#) was given and matters arising in discussion were:

- Niroy requested an option to move away from the current dosing protocol and to hold dosing rate from Nov to April as it was felt efficiencies could be gained. (ie better control of P releases from stratification events and less alum dosed).
- Agreed: After significant discussion it was agreed to accept Niroy's proposal for the amendment to the summer dosing protocol and to drop winter dose rate to DRP requirements in stream based on historical averages (Chris McBride to calculate).
- It was noted that there is a difference between the pH of Rotoehu and Rotorua which influences the difference in reaction to alum dosing in each lake.
- There was a suggestion to look at dosing in the Puarenga stream and its efficacy. Dosing in Utuhina could probably sustain 90l p/hr. Trial if Utuhina is more effective. For a number of reasons dosing higher to Utuhina would make sense. In particular the outlet from Puarenga is through Sulphur Bay and it reaches some very low pH levels that could interfere with the reaction between Al and P. Discussion covered out flow differences between Puarenga and Utuhina.
- The new WWTP alum dosing proposal - output from new plant will be dissolved P, so suggestion to dose as low as possible at the plant. If significant amount of P was coming from forest irrigation it will reduce as the irrigation is stopped and the new discharge point is commissioned. The group suggested that there is potential to address with additional alum dosing at the plant, and adjust current stream dosing protocols accordingly.
- Rotoehu – the question was raised over whether Alum dosing is actually having an impact on the lake. If there was no weed harvesting it would possibly come back to an algal dominated lake. The question of whether water level and water quality are correlated for Rotoehu was raised noting that the higher P concentrations appear to correspond to low water levels. Lesser dilution and easier stratification in low lake levels could be contributing to P levels.
  - o Installation of pH monitoring at site 4 – outlet of soda springs – will be installed this coming summer.
  - o Chris Eagar is completing a Masters Thesis on the effects of alum dosing.
  - o Options to clear weed to let Alum get into lake have been stymied by lake levels and turbidity. The preference to dose outside weed bed.
  - o Hornwort having a massive impact and is critical as it is elevating pH to an extent where alum is not being effective.

Action 9 – Item 11c - Chris McBride to calculate winter dose rate to DRP requirements in stream based on historical averages.

Action 10 – Item 11c – Niroy to look at protocols for dosing in each stream and report back to WQTAG. Look to switch dosing levels between streams.

Action 11 – Item 11c – Andy Bruere to engage with RLC on assessing and managing current and future alum dosing flows to address P at the wastewater treatment plant.

Action 12 – Item 11c – Niroy will report back to WQTAG after Chris's Masters thesis is completed and consider inviting Chris to speak at next WQTAG meeting.

#### d) Update on Plan Change 10 (PC10) policy for Rotorua (Andy)

It was noted that:

- Agreed: A workshop is required to assess PC10 science review implications. TAG members to be involved are David Hamilton, Piet Verburg, Grant Tempero, Paul Scholes, Rob Donald, Chris McBride, Keith Hamill, David Burger and Andy Bruere. To be held in July 2017.
- PC10 – Awaiting decision from hearings panel.
- A science review in 2017 is scheduled as part of the PC10.
- An MOU was agreed with the Lakes Water Quality Society (LWQS) and the Lake Rotorua Primary Producers Collective (LRPPC) on how to go about the science review which includes a list of about 12 points that need to be reviewed.
- It was suggested that a methodology review with DairyNZ, and working in parallel with LRPPC and LWQS and their science advisors to ensure pre agreed standards for methods and data analysis will be beneficial to the review.

Action 13 – Item 11d – Andy Bruere to circulate draft confidential assessment of requirements of science review Terms of Reference to workshop attendees.

Action 14 – Item 11d – Andy Bruere to convene TAG sub-group workshop

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#### Item 11: Matters that have been on hold

<i>White: Undertake simple GW work to establish GW catchment boundaries for Rotomā.</i>	<b>On Hold</b>	<i>Not commissioned yet, monitoring started McIntosh</i>
<i>Bruere: Recommend development of methodology for establishing P loads from land use. Take to Land TAG and talk to Sandy Elliott</i>	<b>On Hold</b>	<i>Andy refer to new Land TAG Workshop in November 2016.</i>
<i>Repeat the NIWA monitoring work around septic tanks at Ōkāreka and install a shallow water bore at Steep Street for ongoing monitoring. One round of piezo monitoring done.</i>		<i>Paul Scholes progressing – see report below</i>

#### Ōkāreka ground water study – one round of repeat of monitoring data capture (Paul Scholes)

A PowerPoint presentation was provided to support the following key messages:

- This project is a repeat of earlier work undertaken by NIWA pre-sewage reticulation. Looked at similar sites around Ōkāreka (Shallow groundwater) and a summary chart was provided in the PowerPoint presentation.
- Sampling was undertaken in April 2016 using temporary piezometers. Locations are not all the same for sampling between the two studies.
- The NIWA study was done in 2001. It is believed sampling was taken at the same time of year between both studies.
- Reticulation was the reason for the reduction in N in Ōkāreka.
- The Boyes Beach results were noted and hypotheses for the high result were the public toilet, gorse or farmland above the site. (Although the public toilet is reticulated).
- Max Gibbs report for Taupō with similar sampling took 15 years to see 50% reduction.
- Data will be included in an On-site Effluent Treatment report.

Action 15 – Item 11d – Paul Scholes to share the data collected in the 2016 sampling with David Hamilton.

**Meeting closed: 4.45pm**