**Water Quality Technical Advisory Group Meeting Notes**

**Held in the Rotorua Office of Bay of Plenty Regional Council
on 30 May 2016 from 9:30 am-4:30 pm**

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| **Apologies:** | Chris Palliser, Pete Verburg  |
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| **Attendees:** | Andy Bruere, Max Gibbs, Kim McGrouther, Paul Scholes, Paul White, Chris McBride, David Hamilton, Roku Mihinui, Alistair McCormick, Max Gibbs, Kim McGrouther, Warwick Silvester, Kit Rutherford, Rob Donald, Clive Howard-Williams, David Burger, Alison Lowe, Part attendance: Andy Woolhouse, Ian Morton, Greg Corbett, Richard Mallinson, Shane Grayling and Hamish Lass, Theo KpodonuJacqui Kaai (scribe) |

# Item 1- Apologies and Welcome – Andy Bruere

Andy welcomed the group to the meeting.

# Item 2 - Matters from last meeting

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| **Action Point** | **Notes** | **Action or person responding** |
| David/Andy and Paul to discuss plan to get monitoring in place for Rotokakahi. | Bathymetry underway, other work being planned. Katie Noakes will progress the WQ modelling.*Presentation - Katie making reasonable progress – doing groundwater work in this area. Has put down a couple of temporary loggers for groundwater inputs into the lake. Also looking at GNS output which gives rated discharge in various points around the lake for groundwater. Looking at circulation patterns within the lake. Working with Paul White to refine the groundwater inputs to lake model.* | Andy/David |
| Alison to pass this idea to sewage TAG (outlet proposal – iron gravel pad). | Could enhance P removal, experience from Horowhenua.*Done* | Alison |
| Send Sewage Options Modelling Report on a confidential basis to the TAG Group for review. | *Done – circulated – to finalise report.* | David |
| Send Tarawera GW report out and get feedback with a deadline. | *Done – see summary notes attached.**Circulated – some feedback. David still to provide feedback.* | Andy |
| Circulate by email options report for comments back to Max in a couple of weeks. | *Done – circulated and finalised.* | Andy |
| Discuss with SCION focussed monitoring plan for harvest storm run-off for Lake Rotomā. | *Done, project in place, report later.* | Andy Woolhouse  |
| Chris McBride to get draft Rotorua external loads budget ready for distribution and also work with Alastair to get version with groundwater boundaries. | *Done for ROTAN.* | Chris and Alastair |
| Release sewage statement without sustainable load numbers for nitrogen or phosphorus. | *Done. The statement has not yet been publicly released. Due to go to the next RTALSG in August.* | Andy  |
| David: complete phosphorus source report to set manageable loads of phosphorus. | *Done*<http://www.rotorualakes.co.nz/vdb/document/1409> | David |
| Send sediment proposal to Max to finalise the proposal to Bay of PlentyRegional Council. | *Done, sampling has taken place. MBIE synergies.**ACTION 2(i): David, Andy, Max and Piet to discuss overlap of sampling and opportunity for linking to MBIE Lake Resilience project.* | David |
| Andy to put both draft Rotoehu de-stratification reports on web for circulation and feedback. | *Done and reports now finalised.*<http://www.rotorualakes.co.nz/vdb/document/1435>http://www.rotorualakes.co.nz/vdb/document/1434*Need to present to Tautara Trust and Rangiwewehi.* | Andy/David |
| Paul Scholes to complete memo on inter-lab comparison taking account of TAG feedback. | *Done**Paul informed group that he will be taking protocol to SWIMM agenda.* | Paul Scholes |
| Advised to add alkalinity monitoring to Rotorua, Rotoehu and Ōkaro (with relevance to alum dosing). | *Done* | Paul Scholes |
| David Burger to follow up Overseer budgets from Martin Hawke. | *David B has provided notes as to how voluntary land use change achievements are being measured in Waikato examples. Circulated to group.* *ACTION 2(ii): David B is to follow up OVERSEER budgets and report back to next meeting.*  | David Burger  |

# Item 3 – Bay of Plenty Regional Council Freshwater Futures

***Addressing National Policy Statement FM Requirements (Ian Morton)***

[Circulated paper](http://www.rotorualakes.co.nz/vdb/document/1462) and PPt Presentation – what are the water programme requirements? What can we do for it?

Bay of Plenty Regional Council’s approach to delivering fresh water and what’s coming up over the next 18 months.

* Have increased pressure on resources. Seeing some decline in water quality. Kaituna and Rangitāiki nutrient loads increasing 2-3% pa. Generally, Bay of Plenty region water quality is within the B-C band - reasonable water standard across region.

Programme approach - putting in place a regional plan change for the National Policy Statement. Will work with the community groups in all of the nine areas. Will be working through limit setting for the areas over the next ten years. Working on two water management areas currently –Rangitaiki Catchment and the Kaituna, which are high risk areas.

* Have been monitoring periphyton, water quality of tributaries and also working on a freshwater accounting system.
* Who we’re dealing and engaging with:
* **National Influence –** MfE, MPI, Iwi Leader’s Group and other regional councils.
* **Regional Advice –** Regional Advisory Panel, Bay of Connections, Technical Advisory Groups and Territorial Authorities.
* At a local level – freshwater community groups, tangata whenua (held a hui), engaging directly at a marae level. Need to do a bit more work on engagement there.
* Need consistency on limit setting.

**Key steps over next 18 months**

* Values.
* Scenario building.
* Issues.
* Water bodies.
* Analysis around costs, benefit and then draft plan with set of limits.

**Ian - Where can we get help? – see Ian’s table (circulated)**

* Need help with determining issues.
* Technical advice.
* Identifying attributes.
* Scenario development – need to get in place a set of credible scenarios.
* Advice on models.
* Suggest expansion of TAG to provide regional advice.

Rob Donald - being quite cautious on our modelling currently. Maybe need catchment models for each area. Decision with this is a little way off.

Clive – there are two things going on:

* Typology of New Zealand Estuaries.
* Conjunction with Surface Water Information (SWIM) group - analysis of the state of water quality information for coastal areas. Regional councils around the country have provided information with this.
* The Ministry for the Environment have just put out a contract for NOF estuaries – this will take three years.
* May have to call in some experts to help with our work. Need to think how big we want the group to be.

**ACTION 3: Ian to send out his Actions (help) table.**

David H – there is a risk of intensification while doing priority WMAs

Paul W – problem with water crossing WMAs, such as Pongakawa/Waitahanui from Rotorua Lakes

Clive – Important we think about sediment issues in estuaries – need other river expertise, and then how will this affect the size of the group?

Kim – Maybe need to get Land TAG involved.

# Item 4 – Model Updates

1. **Ōkataina (Theo Kpodonu - completed PhD) - presentation**

A [PPT presentation](http://www.rotorualakes.co.nz/vdb/document/1464) was given by Theo - Managing New Zealand Lakes – potential challenges.

Theo has been working on Lake Ōkataina for three years. He thanked people who had worked with him on this.

* Noticed that catchment was pristine but landslide was one of the main problems around the catchment. He noticed differences in plant density in the forest.
* Eruptions, invasive mammals, sediment issues.
* Research approach – paleolimnology and long term monitoring.
* Historical change identified by sediment cores – Kaharoa Eruption, Tarawera Eruption, introduction of possum, deer and wallaby. Nineteen percent of forest cleared by Polynesian settlers.
* Talked about climate and catchment disturbance. Looked at sediment phosphorus speciation.
* Cyanobacteria and green algae changes began before the Tarawera Eruption.
* Looked at changes in water quality and invasive mammal populations in the Lake Ōkataina Catchment. Erosion has increased after the Tarawera Eruption and has not returned to pre-erosion conditions. Organic matter has increased since 1900.
* Phosphorus retention capacity of the sediment reduced after 1932.
* Mammals are the “new normal” in our catchments. Need to look at how they impact the catchments.
* Need to identify properly, the amount of nitrogen into the lake and monitor sedimentation and erosion rates.

Discussion:

Warwick S – suggested the need for directly monitoring vegetation changes rather than invasive mammals as indirect measure

David H – trout have a potential impact due to changes in trophic state, remove indigenous species,

Clive HW – suggested potential for modelling of trout removal impact using models

* Questioned why the changes have been climate driven?

Theo – erosion related to climate changes

ACTION 4a: Andy: set time for presentation to Rotorua community along with Paul White Tarawera GW work.

1. **Rotoiti Water Quality (David Hamilton) - presentation**
* Presentation - [3-D models](http://www.rotorualakes.co.nz/vdb/document/1474).
* The wall – simultaneous improvements in Rotorua and Rotoiti
* Abrupt shift down (wq improvement) in 2005 in Rotoiti, and post wall slower improvement.
* Oxygen levels have not returned to the bottom waters of Rotoiti as yet.
* Need to look at cyanobacteria information for Rotorua and Rotoiti.

Discussion:

* Possibly a lot of N-fixation during 2003/04
* Big decrease in the N and P load and residence time for Rotoiti goes up from 1.5 to 5 years.
* Suggested there may be some cyanobacteria extremes during some seasons – need to look at monthly data.
* David also commented that there is pressure on for a fish pass, bigger opening that needs consideration for effects on WQ.

ACTION 4b: David H to include cyanobacteria monitoring for Lake Rotoiti to see if there is separation between Rotorua and Rotoiti water quality.

# Item 5 – Sewage Update (Alison) - presentation

*Brief update on progress of both Rotorua and Rotomā/Rotoiti* [*sewage programmes*](http://www.rotorualakes.co.nz/vdb/document/1466)*.*

* Resource consent currently being developed.
* Rotomā/Rotoiti: Proposed discharge is to land, through a trench disposal system.
* Wastewater proposals for the Rotorua district:
* Main upgrade – finished collaborative engagement and have agreed on preferred upgrade. Cost for the upgrade is $25M – concentrating on phosphorus removal.
* Flow balancing over 24 hours,
* Change to series operation so all flow will travel through MBR filtration (0.4 μm membrane).
* Current plant will handle 47,000 to 57,000 m3 per day.
* Will start alum dosing and carbon dose less, followed by UV treatment.
* Aim to make the risk on human health as low as possible.
* Current plant output 35 t N and 20 t P per year, New design 26 t N and <3 t P per year depending on requirements,
* Irrigation rate to forest is now 10 mm per day approximately.
* Two proposals:
* First option - convert ponds to earth beds, discharge through earth beds and flow through channel – 1.5M.
* Second option – operate rapid infiltration beds. Additional $27 M.
* Want to make the water available for re-use. Council could look at putting in a re-use line and parties could take from there.

Discussion:

P issue with irrigation - high P loads to the Waipa Stream prior to 2003 due to high erosion from multiple forestry blocks

Chris McB – 2000-2002 shows increased P, how does that affect the lake blooms in early to mid 2000s?

General discussion on managing P from streams with alum, P from sewage plant and anthropogenic P from the urban environment that was highlighted in the recent UoW report.

Clive – what anthropogenic sources are you looking at?

David Hamilton – stormwater and diffuse flows appear to be quite important – these sources aren’t particularly well gauged.

Andy – propose a small working group to start discussion – Andy, Alison, David B and Paul Scholes to come back with feedback before next meeting.

ACTION 5: Andy to lead a small working party to look into the management and investigations of the three sources of P. (Stream inputs managed by alum dosing, sewage and urban catchment).

# Item 6 – Lunch

# Item 7 – Update on Rotomā Forest Harvesting and Rotokakahi Monitoring Programme (Andy Woolhouse)

“Presentation to TAG Group 30 May 2016” - report circulated to meeting.

* Lake Rotomā forest harvest monitoring programme set for four years.
* Monthly sampling – nutrients and quantity.

Discussion around surface runoff from harvest roads. Andy WH to progress this part.

ACTION 7: Andy WH to discuss with SCION and Paul Scholes monitoring of the forest harvest roads during storm events and include in the monitoring programme

# Item 8 – ROTAN re-programme and attenuation work

1. **ROTAN Situation Update (Andy) –** document circulated
2. **Update on ROTAN annual progress and issues (Kit/Alistair) -** [**see presentation**](http://www.rotorualakes.co.nz/vdb/document/1468)
* ROTAN Annual model is up and running – has been tested and is providing output that aligns with previous model.
* Still a few issues with Overseer – waiting for signoff, then can fine tune calibration and run scenarios.
* ROTAN Annual has some advantages over ROTAN Version 2.
* Three attenuation processes:
* Root zone to stream (QUICKFLOW attenuation).
* Groundwater (SLOWFLOW) attenuation).
* Stream (STREAM attenuation).

Going into Environment Court, we should all be working off the same rainfall map – or say what data sets we’ve used. Data sets received from people were all different. Kit suggests Andy gets one data set together that has been audited and is available to anybody for this project.

* Internal catchment boundaries discussed with Paul W.
1. **Update on ROTAN re-code (David) –** [**see presentation**](http://www.rotorualakes.co.nz/vdb/document/1469)
* User Interface/ArcMap Plugin complete.
* Continuing work on catchment model to align output with previous version.
* Model will need to be calibrated.

ACTION 8c(i): Kit will require information on scenarios to model (Andy).

ACTION 8c(ii): Andy to organise review of a single audited data set.

# Item 9 – Rerewhakaaitu and Rotorua SMP and Farm Plans

***Update on this project and methodology (David Burger)***

* Impact of the farm environment plan on water quality – attempting to quantify by auditing later. Upper Waikato, Rotorua and Rerewhakaaitu.
* One hundred and fifty action types on the farms.
* Rotorua has done first round of SMP process – no audit yet. Can calculate for Rotorua Catchment.
* Don’t have access to data for Rerewhakaaitu as yet – following up for next meeting
* Implemented farm plans on 640 farms – Karapiro project, nutrient gains quantified.
* Achieved 8% N reduction and 17% P reduction on each farm.

Discussion:

David H – could these be conservative since OVERSEER assumes best practice and therefore does not adequately reward farmer improvements?

David B – OVERSEER may be underestimating,

David H – OVERSEER needs to provide a range of outputs.

David B mentioned the good practice matrix MGM used by CRC.

# Item 10 – Other matters (that have been on hold)

***Aquatic weeds and Lake SPI Position paper (Clive) –*** [***ppt presentation***](http://www.rotorualakes.co.nz/vdb/document/1472)

* Lake SPI is a lake health monitoring tool.
* Do we want a general paper or specific to each lake?
* Who is the paper for? – the community or yourselves? – what is the purpose of it?
* Clive has a set of questions to be circulated for the group, to come up with other questions so we can define the SPI Position Paper.

Greg – in the process of kicking off this project and has done negotiation with the supplier – hoping to sign up next week.

* Clive talked about recognising the importance of littoral zone vegetation.
* Need Oxygen Model for Lake Rotoiti.
* Rotoiti species succession issues.
* Mentioned Hydrilla risk - reached up to 11 m in Lake Tutira (Hawkes Bay),
* Need for vegetation mapping
* Suggests weed decay only contributes 2-3% DO load, suggest model to identify load, doesn’t think it is such a big issue.
* Recommends weed mapping and oxygen modelling, distribution of weeds and basic numbers.
* Mentioned detailed mapping in 1979 FORLD report edited by W Silvester.

**ACTION 10(i): Clive to send around questions to group so that they can comment on the focus of the paper.**

**ACTION 10(ii): Andy and Greg Corbett to discuss a way forward to achieve mapping of weed distribution and changes.**

# Item 11 – Other business

1. Catfish find in Lake Rotoiti (Shane Grayling) – [see presentation](http://www.rotorualakes.co.nz/vdb/document/1473)
* Talked about points to consider, issues we face, the impact in Rotoiti ecology, presence in other lakes, impacts on water quality amongst other things and also, what is still to learn about these catfish.
* Introduced in 1877 in Auckland region – is in Waikato River system including Lake Taupō.
* Tough animals - can survive 72 hours out of water.
* Total of 331 catfish caught in this region – 330 in Te Weta Bay.
* No catfish caught in Lake Tarawera – this week setting in Lake Rotoehu.
* Had workshop with NIWA, University of Waikato, DOC and Fish & Game with key stakeholders.
* A consideration for eradication could be electric barriers.
1. Discussion of some recent papers on Rotorua (David)
* David spoke to a paper titled “Charophyte germination responses to herbicide application” – to be circulated.
* Three papers additional papers to be presented at next meeting and will be circulated. Hannah Mueller 1. Ecosystems Services, and 2. Lag Times and response to management actions on Lake Rotorua. Paper with Val Smith – P limitation in Rotorua and transition from cyanos. – to be circulated with other correspondence leading up to next TAG meeting
1. Land TAG update (Andy)
* Land TAG were hoping for better interaction between them and WQTAG. Maybe need a person to attend both meetings - Andy open to ideas on this.

ACTION 11c: Andy to discuss with LandTAG Chair who will attend WQTAG meetings.

1. Ohau Wall update (Andy)
* Going through resource consenting currently.
* Aiming for longer term consent,
* BECA is leading the consent project, major part is the community consultation.
1. Alum and P monitoring results (Niroy) – [see presentation](http://www.rotorualakes.co.nz/vdb/document/1479)
* Alum dosing currently at 170 litres per hour in Rotorua.
* Have increased dosed from 40 litres per hour since November 2015.
* Rotorua Lake –stratification- mixing period occurred in February when TP levels strongly elevated following the mixing event.
* Have purchased equipment to run monitoring at Soda Springs coming into Summer.

Meeting closed at 4:23 pm

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| Summary of actions from Water Quality Technical Advisory Group Meeting – 30 May 2016 |
| **Item Number** | **Action Point** | **Action or person responding** |
| 2 (i)  | Discuss overlap of sampling and opportunity for linking to MBIE Lake Resilience project. | David, Andy, Max and Piet |
| 2 (ii) | David B is to follow up OVERSEER budgets and report back to next meeting. | David Burger  |
| 3 | Send out Actions (help) table | Ian |
| 4a | Set time for presentation to Rotorua community along with Paul White Tarawera GW work | Andy |
| 4b | Include cyanobacteria monitoring for Lake Rotoiti to see if there is separation between Rotorua and Rotoiti water quality | David H |
| 5 | Lead a small working party to look into the management and investigations of the three sources of P. (Stream inputs managed by alum dosing, sewage and urban catchment) | Andy |
| 7 | Discuss with SCION and Paul Scholes monitoring of the forest harvest roads during storm events and include in the monitoring programme | Andy Woolhouse |
| 8c(i) | Provide Kit with information on scenarios to model | Andy |
| 8c(ii) | Organise review of a single audited data set. | Andy |
| 10 (i) | Send around questions to group so that they can comment on the focus of the paper.  | Clive |
| 10 (ii) | Discuss a way forward to achieve mapping of weed distribution and changes. | Andy and Greg Corbett |
| 11c | Discuss with LandTAG Chair who will attend WQTAG meetings | Andy |