

Sediment Advisory Group Meeting Notes

29 May 2014, Universality of Waikato

1. **Attendees:** Prof David Hamilton, Dr Max Gibbs, John McIntosh, Paul Scholes, Niroy Sumeran, Andy Bruere, Chris McBride.

2. **Matters from Last meeting:**

- a. Binding capacity of alum applications: Max stated that the estimates of John McIntosh between 5:1 and 7:1 Al:P are acceptable for the applications to Lake Ōkaro. These are the same as the TAG estimates for alum dosing at Utuhina and Puarenga. The method of dosing now involves multiple doses per year, the same estimate will be assumed for multiple doses.

Noted that Deniz O summarised the range of binding capacities in the 2013 Report on Rotorua Sediments.

ACTION 1. Andy to check the Rotorua and Rotoehu sediment sampling timing.

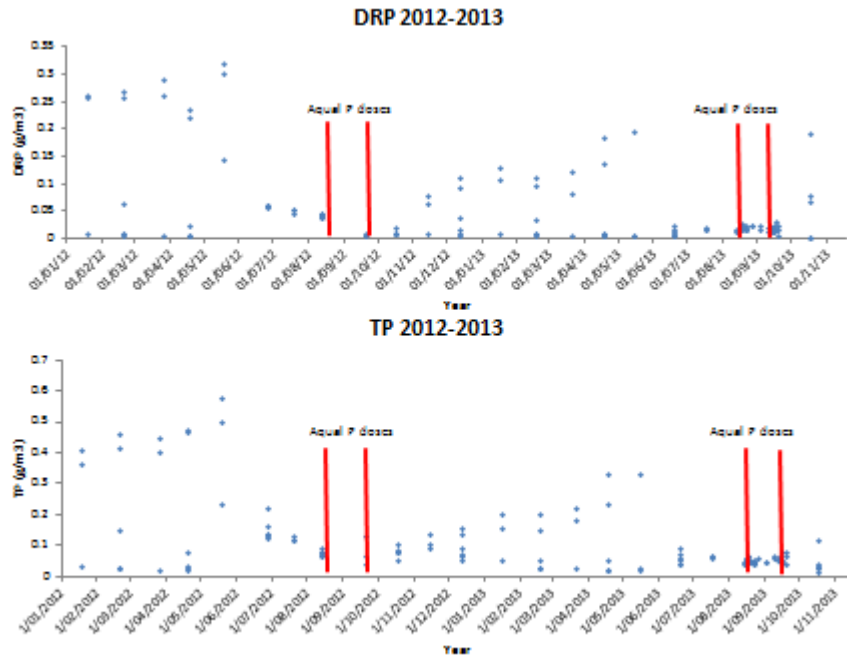
John also noted there are a number of different methods for Al extraction to measure concentrations. He would collate them and we should try the complete range of methods on Lake Rotorua and Rotoehu sediments, if Hills or another lab could perform the tests. This would provide information on which methods gave the most appropriate information for BOPRC.

ACTION 2. John to investigate the methods for Rotorua and Rotoehu tests.

Discussed possible repeat of all lake sediment work for the lakes previously sampled. David suggested Adam Hartland could lead this work.

ACTION 3. Include all sediment sampling last done in 2006, Andy and David to progress.

- b. Ōkaro Applications
John presented graph of alum doses: (note: all doses alum not equal P as shown on label).



There is still 5 t alum available for application before 31 August 2014. Noted the level of P June 2013 was the lowest level ever recorded for this time of year.

DH noted early Anabaena bloom → high surface water pH early in spring → dosing stopped due to high pH, leaving the 5 t alum.

Suggest dose to hypolimnion before lake mixes. Treat during anoxia and then only 30% of lake to treat.

ACTION 4. Aim to dose 5T if lake still stratified. If not stratified then hold the dose until August and dose early.

DH: raised concern about dosing in the epilimnion, but noted that the effects of dosing in the hypolimnion are reflected in the next season, after lake mixing.

ACTION 5: Dose at first stratification Aug/Sept 2014 5t alum, then do 2nd and 3rd dose April/May 2015 while lake stratified.

3. Ōkaro alum dosing covered in item 2(b) above.
4. Ōkaro application plan covered in item 2(b) above.
5. Okawa Bay alum dosing

Concern re: weed spraying dates for 2011 and 2013. Still significant areas being sprayed.

ACTION 6: Andy to check spray dates and spray areas and report back.

Note: After meeting confirmed that 2.5 ha had been sprayed in October/Nov 2013

DH commented that Clive HW has release rates for nutrients from weed die off. Andy to check. That P levels in bay show P peaking late in 2013 and 2011, aligning with weed spray events.

DH suggested model for Okawa Bay to see if there is weed removal or spraying effect. John commented that the 5 t alum dose was not sufficient to remove all DRP, suggested about 8 t needed to have captured all P at a 7:1 ratio.

ACTION 7: DH/CMcB to model Okawa Bay to see is weed impact on WQ.

ACTION 8: Get weed spray programme and biomass/weed coverage (Paul/Andy).

6. Aeration Rotoehu

University completing the last monitoring of the summer programme next week. Max to add NIWA flow monitoring info for the 2012/13 year.

DH commented 1st year of monitoring (machines not operating) was hot summer, second year was cold summer. Has confounded the comparison assessment but will be accounted for.

ACTION 9: Max to add NIWA data to the report.

Chris reported machine operating better 2013/14. Report will be completed 31 July.

ACTION 10: Chris to complete the report on aeration by 31 July.

Chris commented that DO at the profiler buoy was never below 5mg/l but that it can stratify for 1-2 weeks typically. Appears to be more oxygen around the machines at depth.

Andy suggested to undertake further year of trial with only one machine connected, doubling the air flow. Agreed further current monitoring required during stratification period.

ACTION 11: Undertake one more year of de-stratification with all the air flow through one machine.

7. Alum dosing plant performance.

Niroy presented alum dosing graphs for Rotoehu and Rotorua. Presently 40L/hr and 150L/hr for Rotoehu and Rotorua respectively. He commented that there is a time delay between sampling and receiving the analyses that is affecting the dose adjustment decision.

There was some comment that the % of Al in alum should be confirmed.

ACTION 12: Niroy to check with Adam Hartland the alum %.

John mentioned that the alum % is affected by the rinse from the truck wash and that he used a 4% rather than the 4.2% from Orica.

DH suggested that the increased P in Lake Rotoehu could be a result of the weed breakdown. Chris commented that stratification periods around January could be the cause of increased TP.

Max commented that possible pH increase from lake weed effects in Rotoehu could also be affecting pH profile and causing alum release.

ACTION 13: Paul Scholes to check pH profiles in weed beds to see if possible pH release of alum P in summer period.

There was some discussion on compliance with the Rotoehu alum dosing, being at a point after complete mixing in the stream. That would put the compliance location D/S of the confluence and make the compliance with maximum dose less complex. Max and David suggested that it would be important to get long term monitoring of the receiving stream for pH, Al, P and conductivity.

ACTION 14: Set up ongoing monthly monitoring of the receiving stream for pH, Al, P and conductivity (Niroy/Paul Scholes).

ACTION 15: Re-consider compliance location for alum dose concentration and get compliance approval for the compliance location (Niroy),

ACTION 16: Get goldfish monitored in the stream between the dosing point and wetland if possible (Niroy) upstream of Manawahe Rd.

ACTION 17: Check Mat Allan's thesis for dispersion around the bay from the Soda Stream (Paul Scholes).

8. Other products for Sediment P Control

John circulated a paper that discussed the use of alum/lime to manage weed growth and P releases.

The discussion on sediment P control was limited because it appears that weed spraying may have been the cause of the algal issues in Okawa Bay this summer and so addressing blooms may be more appropriately managed by controlling weeds in a way that does not release nutrients at a critical time of the year, rather than trying to fix the algal bloom issue later.

DH suggested that lime could be used to control macrophytes → possible application to some plots in Waikato University lake (Oranga). John pointed out that need to use slaked lime as agricultural lime has higher TP levels. It would appear that more info on the reason why lime controls weed growth is necessary before applying this technique to our lakes. It could be effective in trial at Okawa Bay but if it acts the same as a herbicide then then it could impact P release. Note it could also have a beneficial effect on P by forming apatite. Seems to be effective on invasive plants from the research reported.

Max reported that NIWA were progressing a trial to test this technique. It seems that if a proposal is prepared BOPRC would consider supporting this work. DH suggested a number of trial treatments:

- Lime on weed to test light impact,
- Harvest then lime,
- Control,

- Seasonal effect of spring vs autumn application.

It appears further research has progressed with the Canadian work that would be worth pursuing to get understanding of why weed control actions have been successful.

ACTION 18: Max to discuss with Andy possible proposal with some support from BOPRC.

9. Sediment anoxia work.

Max presented a power point on the sediment anoxia work from Rerewhakaaitu and Rotorua. This has been commissioned as a direction from the Water Quality TAG and the results will be fully reported at the next TAG meeting. This work has highlighted the risk with potential sediment P release in Lake Rerewhakaaitu. The main mechanism for P retention in Rerewhakaaitu is from iron desorption. As the lake loses oxygen then P is released. The Lake Rerewhakaaitu sediment P load is now about 2/3 the P levels measured in Rotorua and Ōkaro.

The presentation from Max highlighted some interesting bathymetry for the lake. In preparation for the lake buoy deployment Chris wanted to get the best location for the buoy that is now being constructed for Rerewhakaaitu. It was agreed that the Raepuka basin is most likely area to go anoxic. Group agreed the location should be in the same area as the EDS monitoring site, in a depth of about 15 m.

Meeting finished at 1pm.