

# Environment Bay of Plenty

## Rotorua Lakes TAG (No 8)

**Date:** Thursday 6 October 2005

**File Reference:** 3365 04

**Venue:** Rotorua Office

**Attendance:** *EBOP:* Paul Dell, John McIntosh, Andrew Wharton  
*RDC:* Greg Manzano, Peter Dine  
*TMTB:* Bella Tait (12.30pm)  
*NIWA:* Clive Howard-Williams, Julie Hall, Max Gibbs  
*UoW:* David Hamilton, Warwick Silvester  
*GNS:* Paul White

**Apologies** Kit Rutherford, Roku Mihinui

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### 1 **Action Sheet**

Went through the Action Sheet and checked off various actions.

### 2 **Zeolite to Remove Ammonia**

Warwick outlined the background to the field investigation of removing the high ammonia concentration in the Tikitere outflow. Original bench testing showed the zeolite to remove high levels of ammonia.

The loading of nitrogen on the Zeolite in the field trial was 0.8%. Bench testing suggested a maximum of 1.2% uptake.

The Kinetics look good, but the process is relatively slow. The practicality of the proposal would depend on a number of issues.

The major issue with using Zeolite is what to do with the waste product. One suggestion was whether Balance could use it for their "N-Care" product. At this time it was agreed to not undertake further trials at least until options for the waste product was given more thought.

Paul noted that there could be four options for treating/diverting the Tikitere discharge. These were:

- Pipeline diversion
- Treatment – zeolite
- Treatment – sewage plant
- ReInjection as part of a geothermal power development

**Action:** Paul to talk to Craig Mowatt on the TAG's views at this time.

**Action: Paul to talk to Wawick Catto of Balance re possible use of waste for “N-Care”.**

### 3 Presentation of Minerals Report

Nick Millar gave a presentation on his report “Locally Available Adsorbing Materials, Sediment Sealing and Flocculants for Chemical Remediation of Lake and Stream Water”

The major minerals examined, were:

- Allophane
- Bentonite
- Calcium Carbonate
- Steel Slag
- Zeolite

Nick discussed each of these in detail. He felt that Zeolite was one of the more promising products. Nick also noted some other lesser known possible nutrient removal processes.

The Group then discussed the various chemicals and possible research issues. The following work is currently being done:

<b>Mesocosms</b>	<b>In Lake</b>	<b>Stream Treatment</b>	<b>Treatment</b>
Allum	Phoslock-Okareka	*Alum dosing	Zeolite Removing
Phoslock		Utuhina/Puarenga	Ammonium
Z <sub>2</sub>		*Steel Slag	
Steel Slag		Rerewhakaaitu	
		Hamarana/Awahoe	

The group noted that materials could be used for nutrient removal and/or capping. Concern was expressed over the aluminium dosing in the Puarenga Stream and concerns over toxicity issues. John McIntosh noted the monitoring we would be doing to assess this.

Warwick noted that allophane could be distributed into the lake by the being applied to inflowing streams. The group discussed the Mesocosm trial and noted it would be repeated starting early November 2005.

**Action: Current Mesocosm Trial to end at end of October 2005.  
Reset and re-run trial with early dosing in November 2005.**

**Action: In Lake capping – Lake Rotorua. Clive and David to discuss possible chamber work in Lake Rotorua. Paul White would also be consulted.**

**Action: Further evaluation of Allophane, Lime and Steel Slag could be done; including, capacity, impact of suspended solids, etc. Look at a desk top and possible bench top tests: Nick would be approached. Could use NIWA/UOW/SCION Labs**

#### 4 **Phoslock Trial – Lake Okareka**

John McIntosh gave a presentation on the results of the Phoslock trial on Lake Okareka. He noted the next application would be in April 2006. Fish were sampled pre and post application.

Discussion took place on the option of applying 40 tonnes in one application having regard to the cost of application. The group agreed that a 40 tonne application would be appropriate unless the fish monitoring showed any concerns.

The application would be as a slurry and would be done before the Lake remixed following the Summer stratification.

**Action: John to plan to do a 40 tonne application of Phoslock in Okareka in 2006.**

**Action: John to check the Resource Consent.**

#### 5 **Fact Sheets**

Max gave an update on progress since the presentation of his report to the last TAG meeting.

Max and Warwick had discussed aspects of the report.

Hamurana Spring puts in 70kg/d DIN and 8.5kg/d into the Hamurana Stream. This flows over an area of 600,000m<sup>2</sup> of the Lake. An issue was what impact did the benthic organisms have. If you separate into day/night (16hrs/8hrs) you could get  $\frac{2}{3}$  and  $\frac{1}{3}$  separation. Based on benthic uptake of 113 mg m<sup>-2</sup> d<sup>-1</sup> N and 6.2mg m<sup>-2</sup> P then overall 66% of N is taken up and 30% of P. This will remain in the Lake but will not feed blooms in that year.

Max also noted that the current cold water habitat on the shelf is about 24,000m<sup>2</sup>. If the diversion was done this could become 210,000m<sup>2</sup>. If the flow could be maintained at 0.2m/s then the flow would be 9 – 10 hours. Temperature would raise by  $\approx 4^{\circ}$  C from 12<sup>o</sup> C to 16<sup>o</sup> C. This would still be fine for trout.

Max also noted that the cold water habitat at the Awahou outlet could be increased by  $\approx 30\%$ .

Paul also noted that the fish tagging work was programmed.

**Action: Max to produce final report.**

**Action: Paul to organise reporting of findings to Focus Group, Fish and Game and Ngati Rangiwehehi.**

#### 6 **Prioritisation for Future Action Plans**

Andrew tabled his draft Risk Assessment Report and following discussion the group started to try a weighting/ranking of the draft criteria: Through the discussion the Group deleted some criteria, added new ones and refined the definition of others.

**Action: Andrew to update the Risk Assessment material.**

## 7 **Maori Knowledge Development Project**

Clive outlined the project to evaluate methods to improve Mahinga Kai in the Lakes.

- Characterise the current Mahinga Kai
- Assessing likely impacts on Mahinga Kai
- Identify Restoration Actions

The contract is also about empowering Maori to undertake monitoring. It may lead to adding to environmental indicators.

**Action: Meeting to be organised between TMTB, NIWA, Environment Bay of Plenty to discuss the research and cooperation.**

## 8 **Lake Rotorua Modelling**

David gave a presentation on the initial modelling that David Burger had done on Lake Rotorua. It showed the major impact that sediment releases were having on nitrogen and phosphorus loads. As much as 3 times the annual sediment load is released from the sediments as flows in.

The model showed stratification and the loss of oxygen pretty well. The field data did show a lower oxygen level than the model. The model enables an understanding of what's driving the bloom events to be gained.

A number of scenarios had already been run and showed the importance of reducing the nutrient release of N & P from the Lake sediments. It was agreed that the group needed to consider different scenarios and agree a number for David and his team to run.

Warwick noted that understanding the role of carbon in de-oxygenation was important.

**Action: Group members to think of various nutrient reduction scenarios for discussion at the next TAG meeting to identify a number to be modelled.**

## 9 **Rotorua Groundwater Study Update**

Paul White gave an update on his groundwater work.

## 10 **Melter Slag Update – John**

2 tonne of melter slag has been placed in the Mangakino Stream at Rerewhakaaitu in 12kg 'socks'. Provisional results show that at flows below 20l/sec phosphorus uptake rates of up to 5g/day are being achieved. Above 20l/sec surface runoff from the catchment in the region of the trial overwhelms the capacity of the socks. The daily load of phosphorus in the Mangakino Stream is 35 – 70g/day at flows less than 20l/sec.

11      **Any other Business - Clive**

Clive raised the concept of ploughing the lakebed. This could result in de-nitrification if nitrogen could be transformed to the nitrate form. Ploughing would take place when the lake was fully mixed to nitrify the ammonium nitrogen to the nitrate form. Sediment processes would then de-nitrify the nitrate to nitrogen gas which would vent to the atmosphere. Clive will circulate notes on this proposal. May be trialled in conjunction with sediment capping experiments.

**NEXT MEETING:                      Wednesday 30 November 2005**

Paul Dell  
**Lakes Project Coordinator**