Land TAG 26 Nov 2014

Issues and Policies for Other Lakes
Eg Rotomā and Tarawera
Background and Context
Andy Bruere: Lake Operations Manager

Topics to cover

- Lake Rotomā, nutrient status and WQTAG statement/Redfield ratio
- Sewage TAG Rotomā statement
- Forest harvesting/land conversion risks
- Lake Tarawera Nutrient budget
- Tarawera Restoration Plan
- Nutrient reductions by sewage treatment

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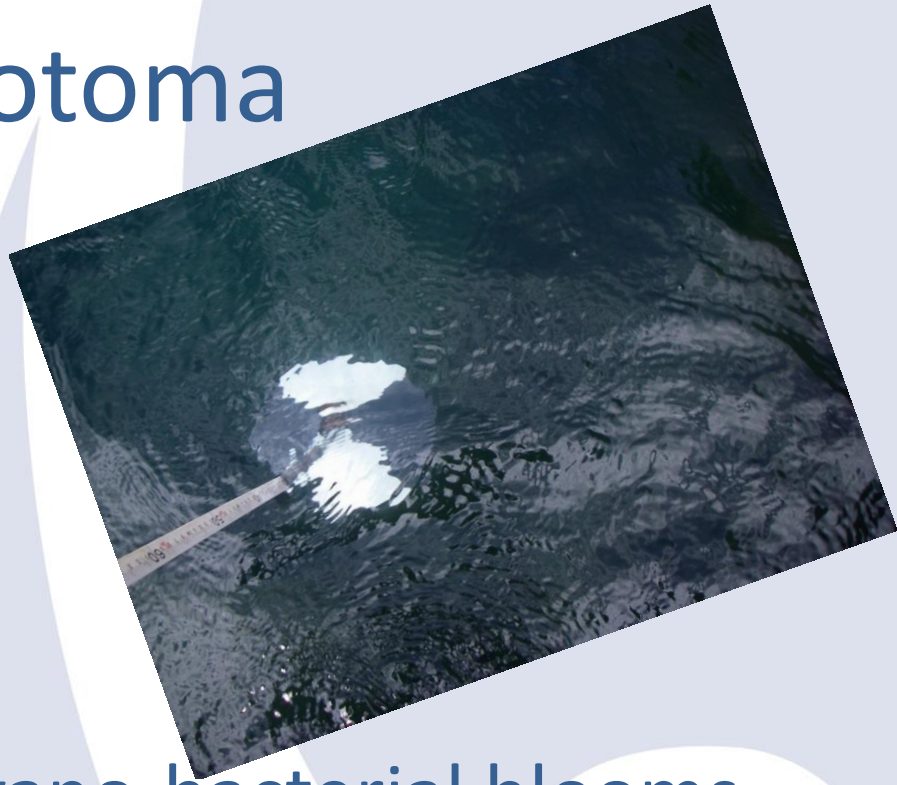
Lake Rotoma



- P-limited
- Redfield ratio
- < 7:1 N limited
- > 15:1 P limited
- N-limited lakes risk cyano-bacterial blooms

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WQ TAG statement 2014

- Compared in-lake and areal method of budget
- Currently N below target, P above
- Sewage reticulation will get most of P target
- 160- 240 cf. 140 kg P
- Cost $13M

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Risks

- Sewage load calculations
- Community growth
- Not reticulating
- Forest to farm conversion
- Forest to farm 1kg/haP- 0.18 = 0.82 kgP/Ha
- 140kgP/0.82 = 175Ha forest conversion could remove the gains!

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Lake Tarawera Nutrient budget

- 7 Contributing lakes
- Attenuation
- Variable estimates
- N-Limited lake ie Redfield ~ 4
- Cyano risk
- Analytical uncertainty over historic results
- Awaiting GNS GW model

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Tarawera Restoration Plan

- Complex nutrient interactions
- Await GW model
- First cut at getting some actions done
- Reduction Targets
  - 1200 kg P
  - N no increase

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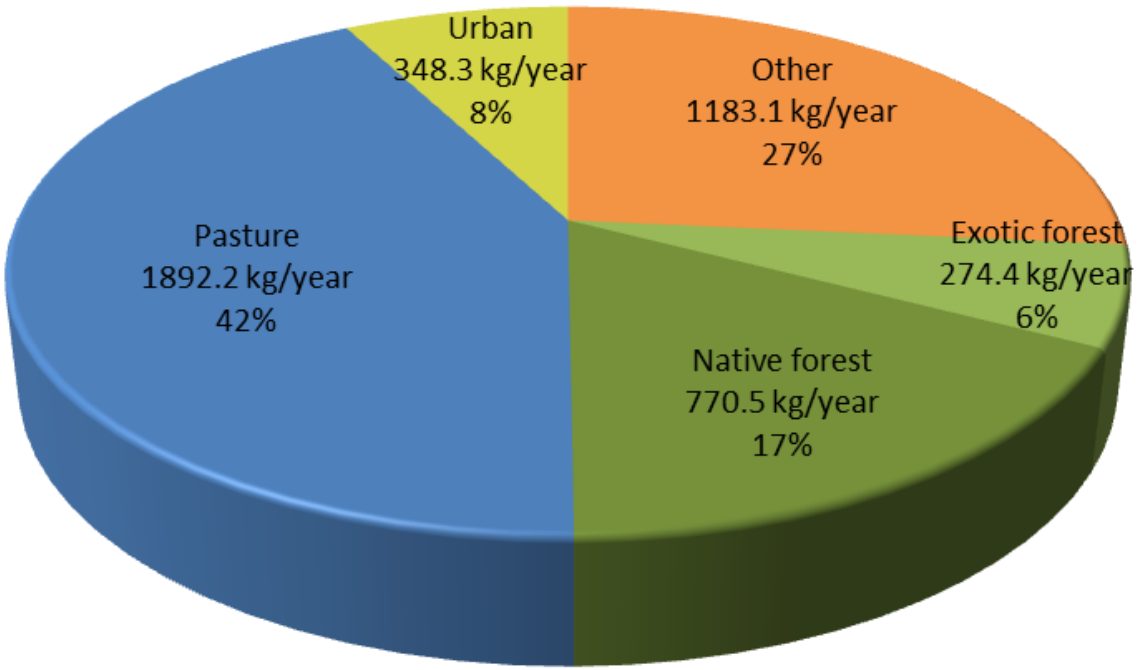
Inner Catchment - Total Phosphorus



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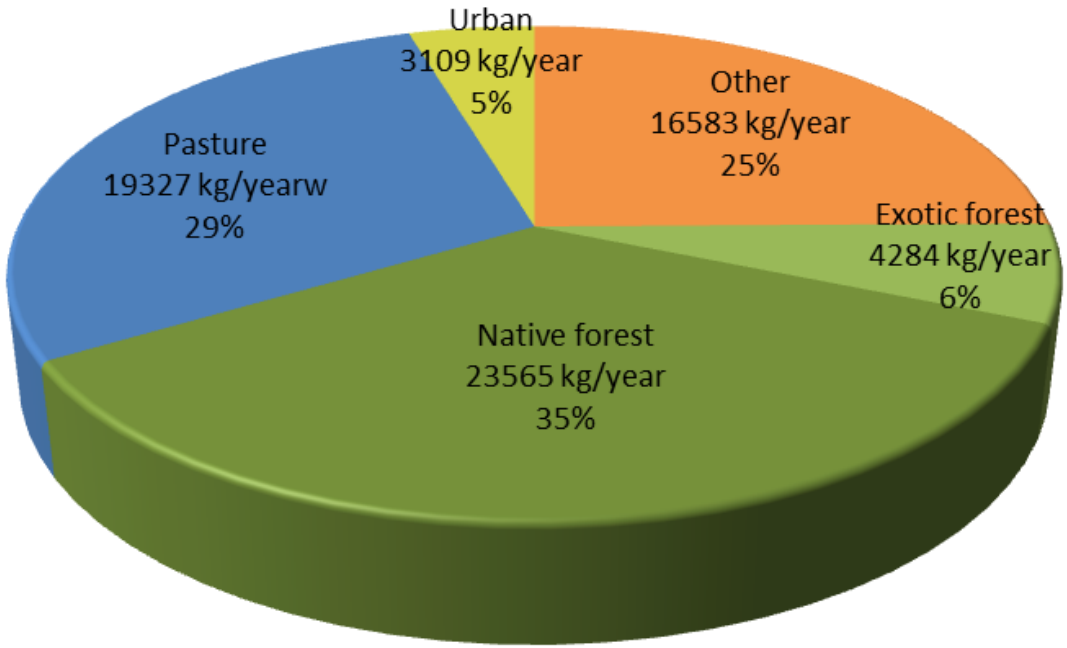
Inner Catchment - Total Nitrogen



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Actions

Actions to reduce nutrients				
Action	Nitrogen reduction kg/year	Phosphorus reduction kg/year	Cost	Cost per kgN and kgP
Action 1 – Sewage	2,829	283	$12,400,000	$43,816/kgP $4,383/kgN
Action 2 –Inner catchment farm nutrient plans by 1 December 2016	n/a	400	$60,000*	$154/kgP
Action 3 – Control nitrogen fixing pest plants	230	n/a	$161,000	$700/kgN
Action 4 –Outer catchment to have farm nutrient plans by 1 December 2020	n/a	528	$120,000*	$227/kgP
Total Reduction	3,059	1,200	$12,741,000	$10,618/kgP $4,165/kgN

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Sewage Reticulation

- Lake Rotomā
- 432 houses ~ 140kg P
- Capital scheme $16M
- Subsidy reduces to ~$16K/house
- Cost/kg P ~ $114K
- Cost if 50:50 N and P $5.6K and $57K/kg res
- Need to div by plant lifecycle

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Why do sewage at this cost?

- Subsidy available to householder
- Lakeside communities → short travel to lake
- Potential growth issues
- Measurable~ vs modelled
- Other benefits
- Need to upgrade old technology → sunk cost

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Land use change for targets

- For 160kg P reduction
- 195 Ha of land use change → forest
- Say 1 kg P → 0.18 Kg P
- @ 7,500 – 10,000/ Ha
- → $1.5 - $2.0 M

- Options for say 90 kg P redn.?

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