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Te Whare Wānanga o Waikato

Phosphorus loads to Lake Rotorua

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Anthropogenic Phosphorus Loads to Lake Rotorua

2015

ERI Report 66

Client report prepared for Bay of Plenty Regional Council
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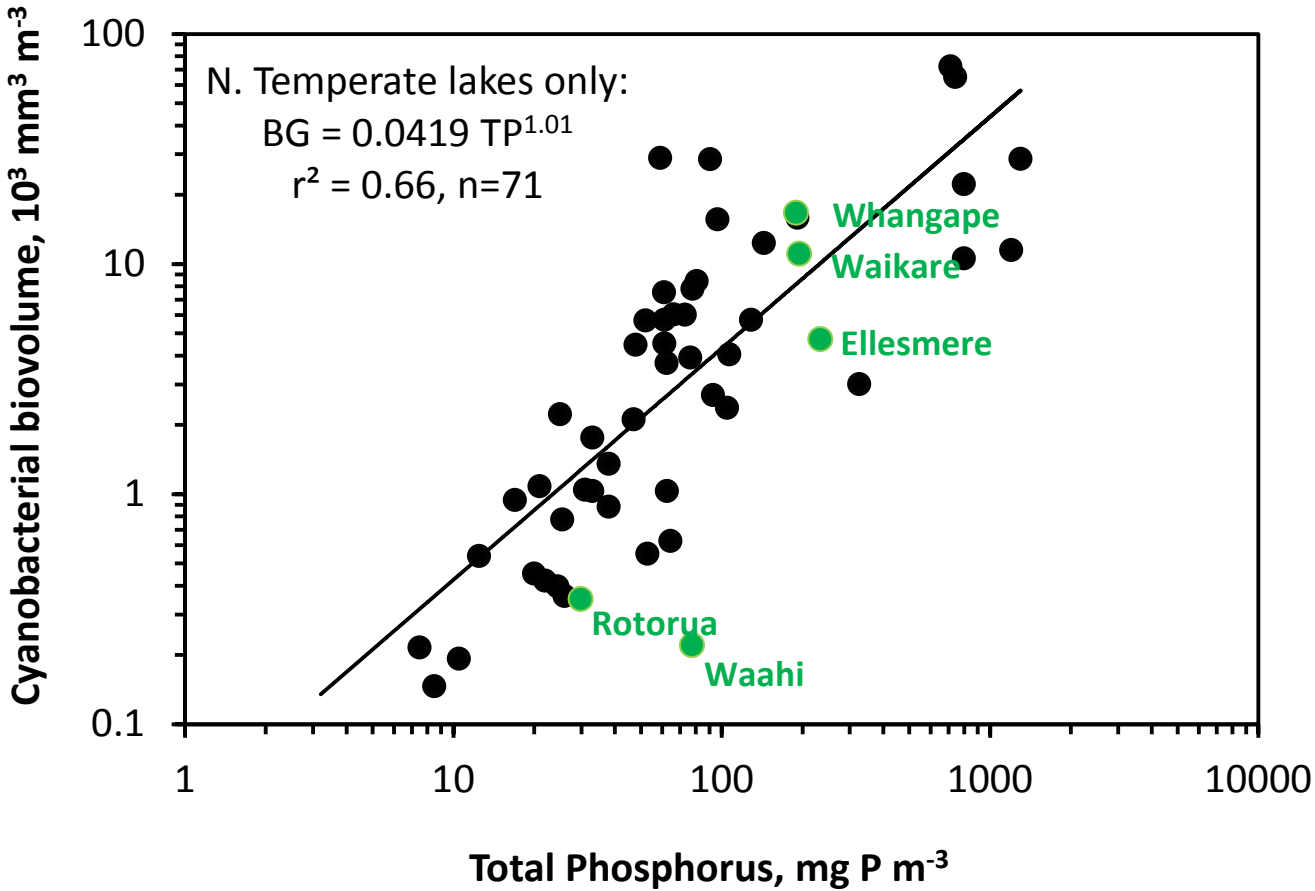
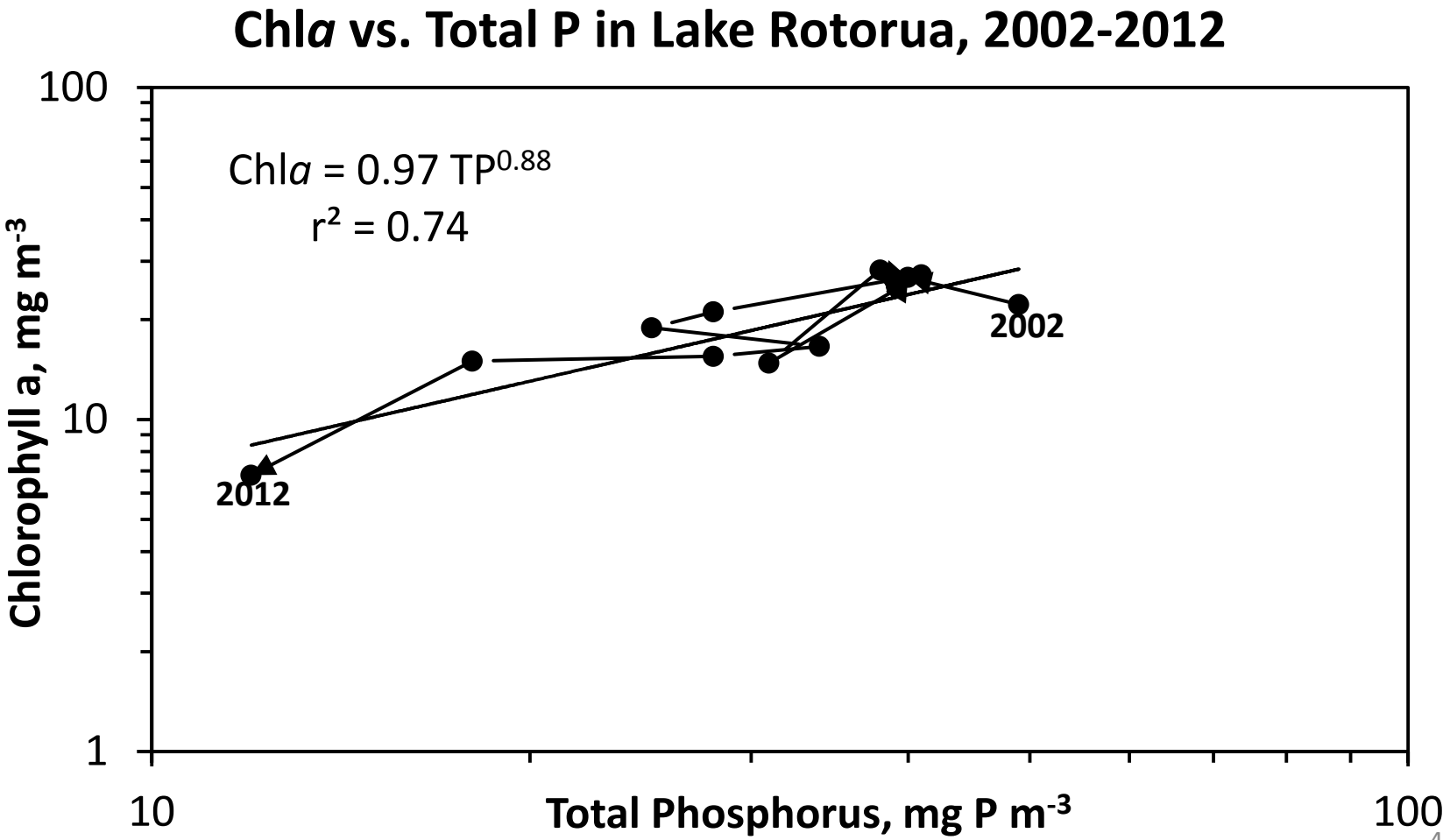
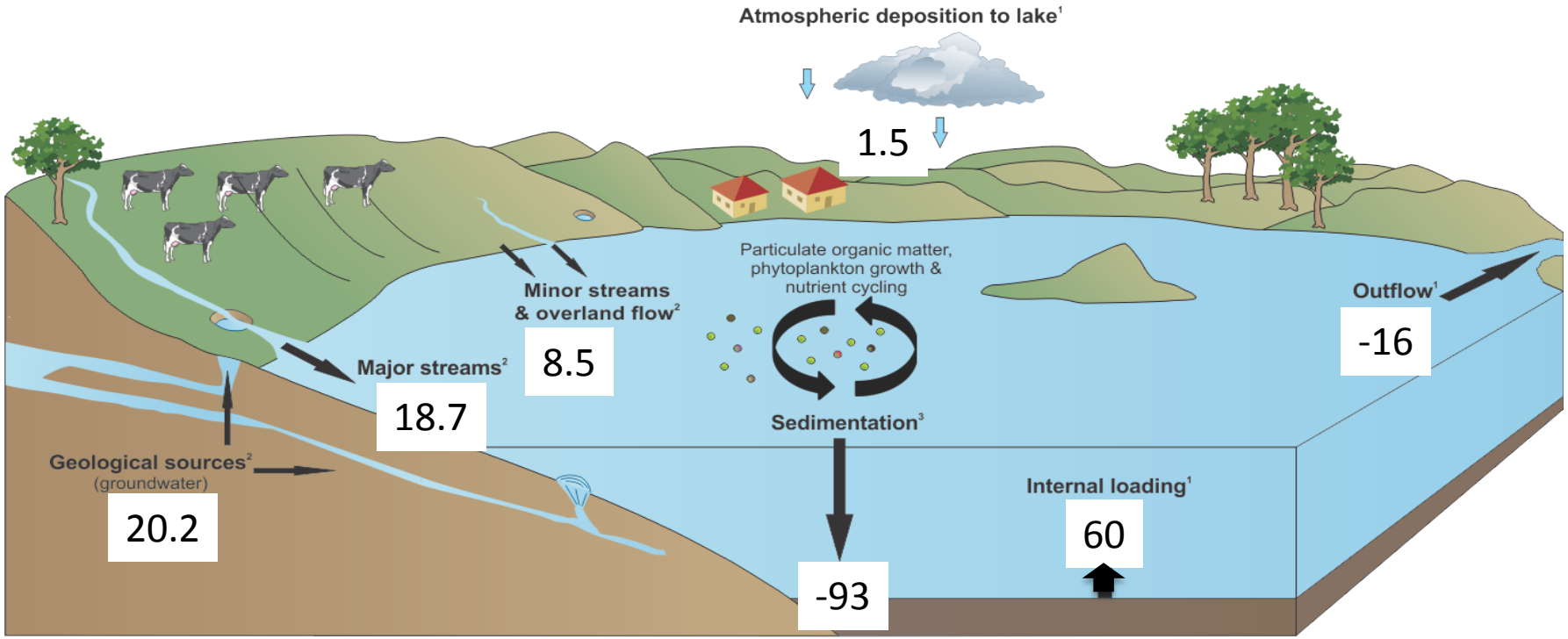
Cyanobacterial biomass in global and NZ lakes



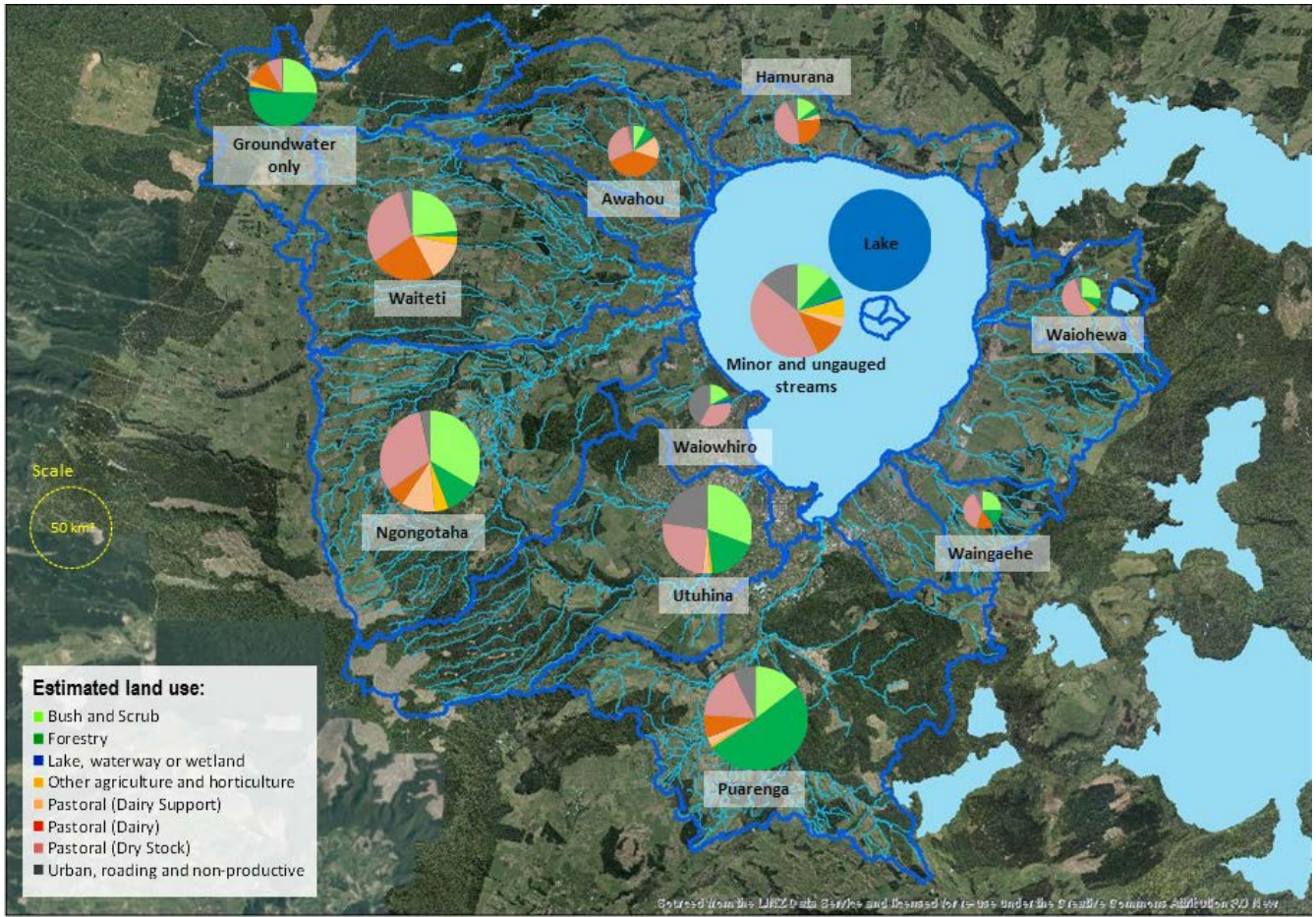

Chl*a* vs. Total P in Lake Rotorua, 2002-2012
Chl*a* = 0.97 TP^0.88
r² = 0.74
2002
2012
Chlorophyll a, mg m-3
Total Phosphorus, mg P m-3
100
10
1
10
100

Phosphorus loads (t P y^{-1}) to Lake Rotorua



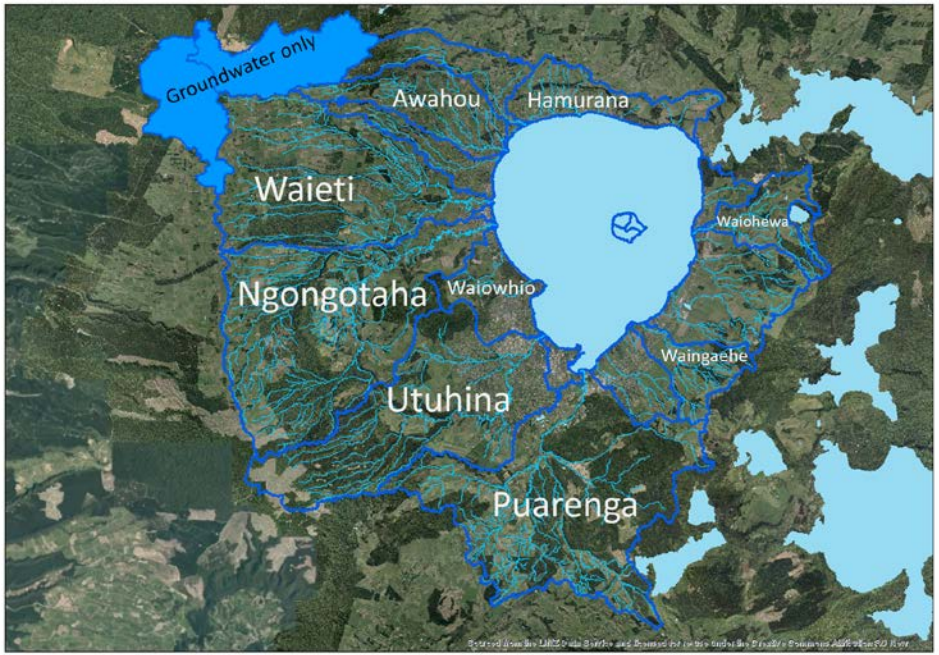
Land use within the Lake Rotorua sub-catchments

Size of the pie charts is scaled to the area of the catchment

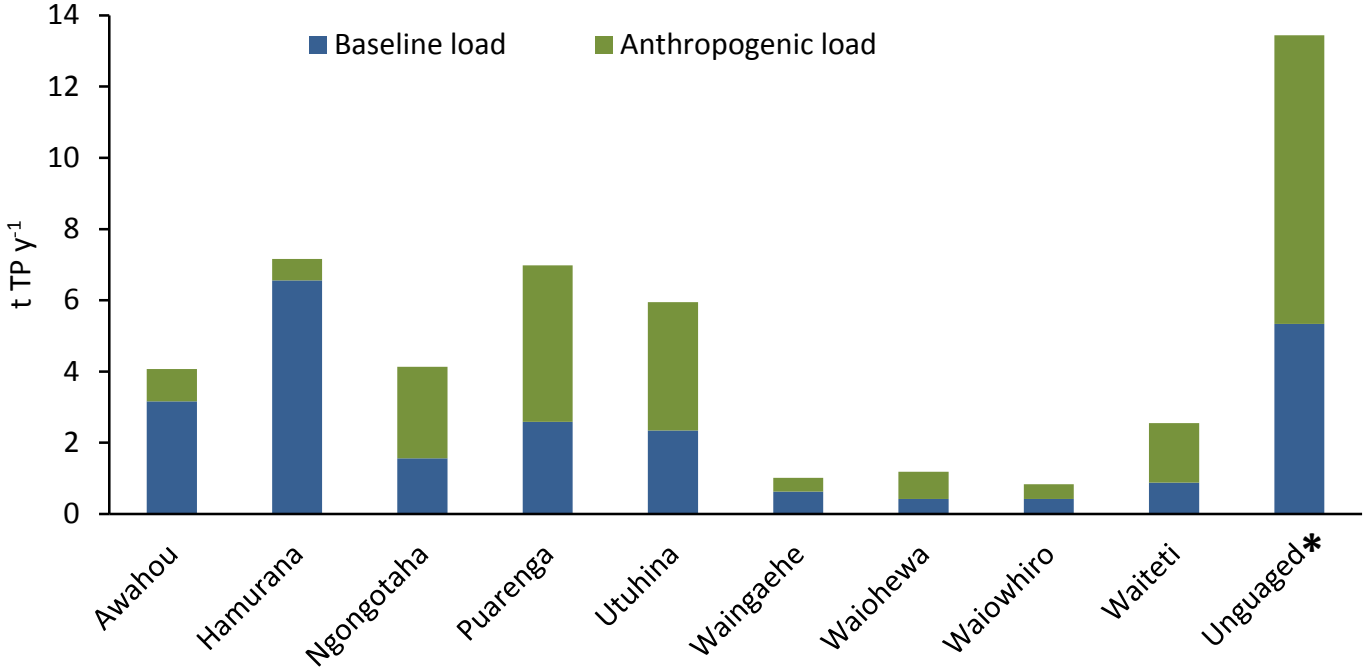


Sub-catchment features

- Agriculture and groundwater dominated:
  - Awahou
  - Hamurana
- Forestry and surface water dominated:
  - Puarenga
  - Utuhina – also has large urban area
- Geothermal/geological features
  - Waiohewa



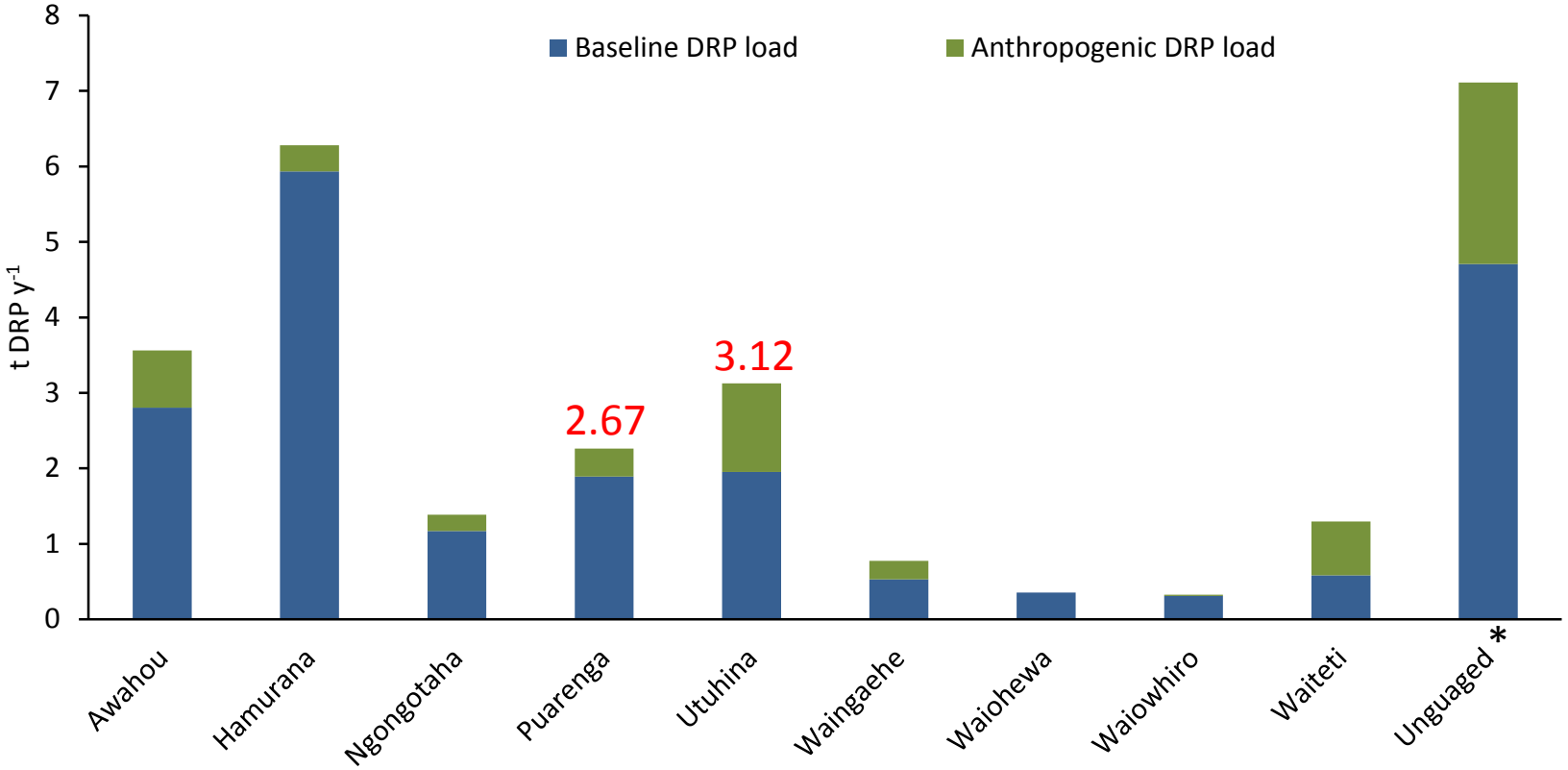
Total phosphorus loads by sub-catchment



***Ungauged refers to minor and ungauged streams within the Rotorua sub-catchment.**

48.1% (23.4 t y^{-1}) of the total phosphorus load is anthropogenic

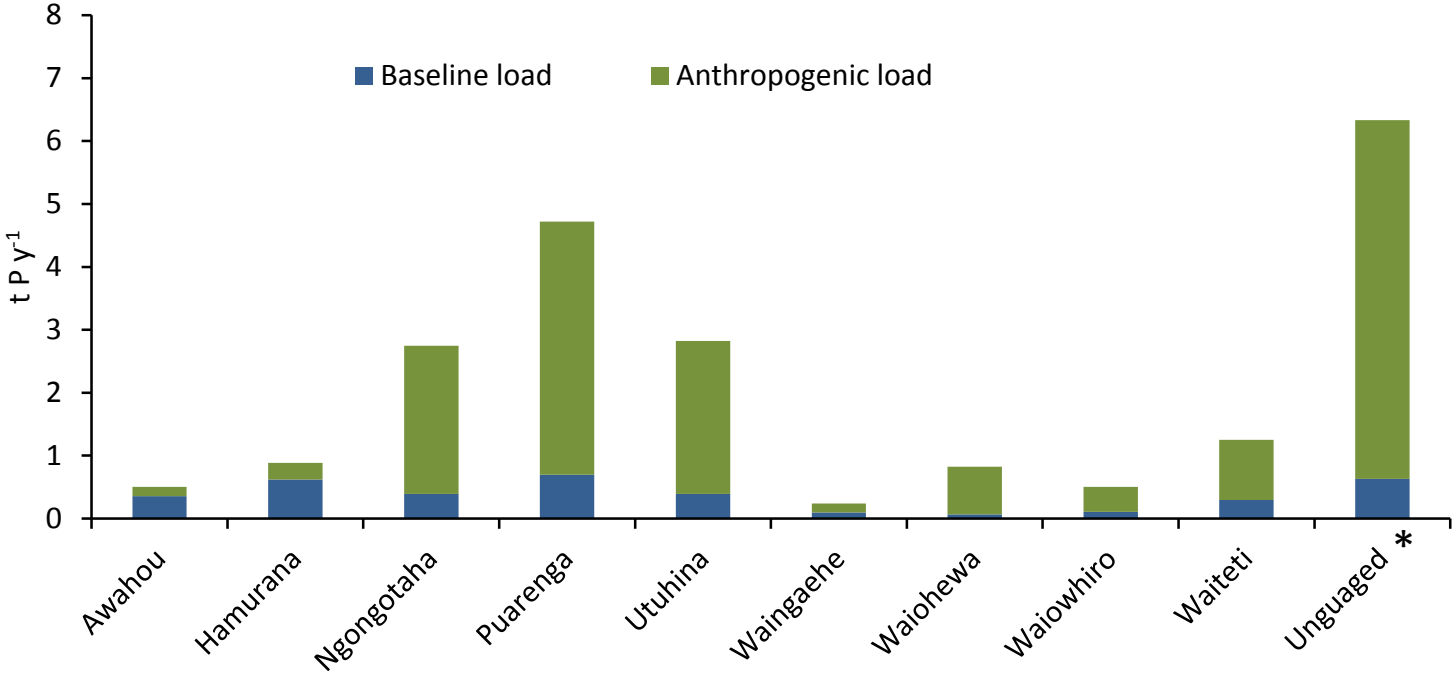
Dissolved phosphorus loads by sub-catchment



***Ungauged refers to minor and ungauged streams within the Rotorua sub-catchment.**

22% (6.1 t y^{-1}) of the dissolved phosphorus load is anthropogenic

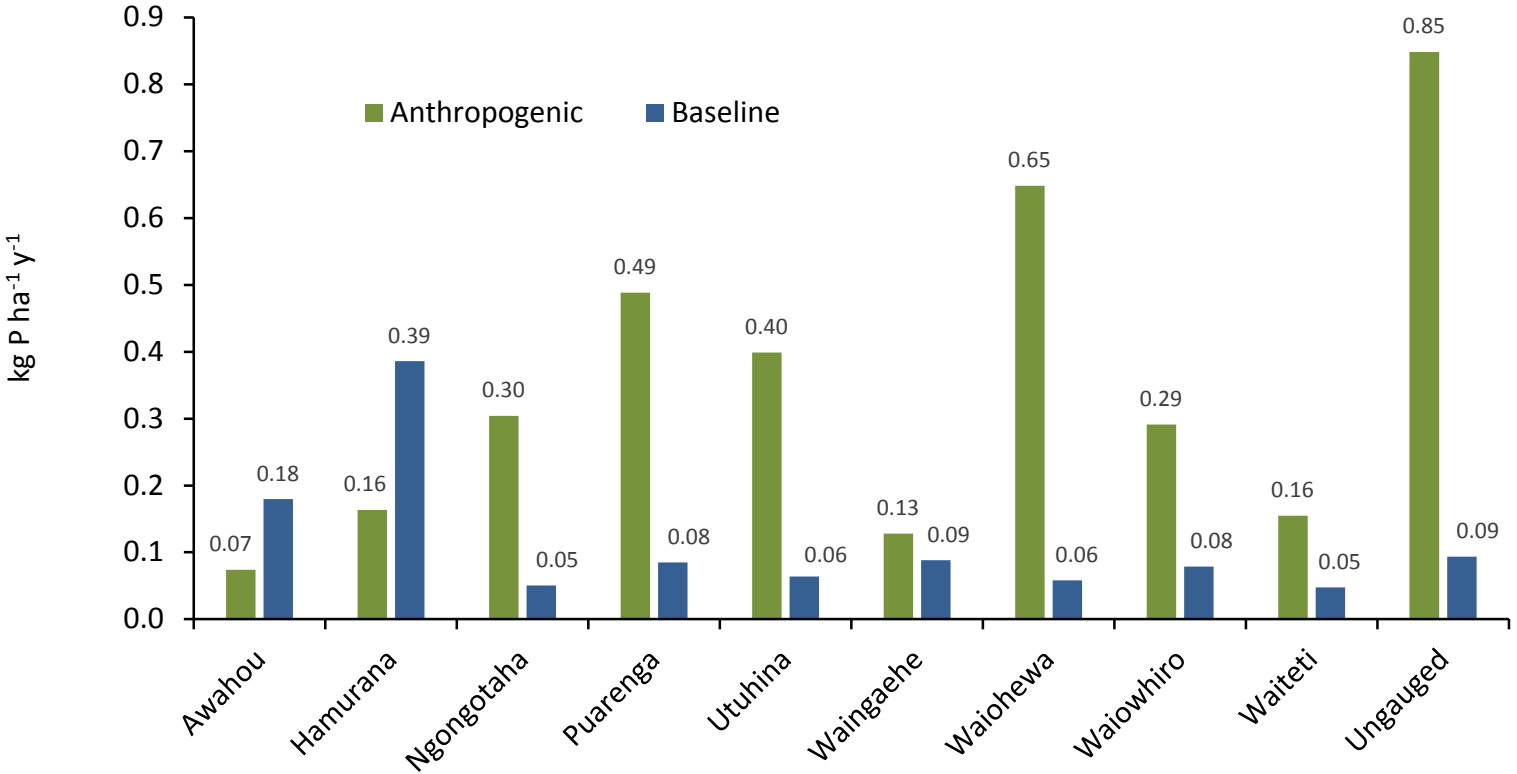
Particulate phosphorus loads by sub-catchment



***Ungauged refers to minor and ungauged streams within the Rotorua sub-catchment.**

82.5% (17.3 t y^{-1}) of the particulate phosphorus load is anthropogenic

Area-specific particulate phosphorus



Summary of annual phosphorus loading to Lake Rotorua

	Annual loading t P y^{-1}		
	Total	**Anthropogenic**	**Baseline**
Dissolved reactive phosphorus	27.7	6.1	21.6
Particulate phosphorus	21.0	17.3	3.7
Total phosphorus	48.7	23.4 (43-64%)	25.3

- To achieve a TLI target of 4.2 would require an estimated reduction in TP of 10–15 t y^{-1}
- Anthropogenic TP loading would need to decrease from c. 23.4 t y^{-1} to 8–13 t y^{-1}.
- Some reductions (<5.79 t y^{-1}) already achieved through alum dosing.