### Comparing Fibre-Optic Distributed Temperature Sensing to Hydrochemistry: Understanding Groundwater Inflows to Streams



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### Summary



Hydrochemistry provides information on source of inflows and DTS pinpoints the location and timing

DTS and radon measurements useful for understanding nutrient inflows to Hutt River

DTS and hydrochemistry useful for understanding nutrient inflows to Ngongotaha Stream in the Lake Rotorua catchment

### Hutt River, Wellington Region

- Toxic *Phormidium* benthic cyanobacteria blooms since 2005
  - Nitrogen input is a main driver
  - Around 40% of N load cannot be attributed to the four main tributaries





### Hutt River, Wellington Region – Rn Survey



- Grab samples analysed for Rn concentration in river under baseflow conditions
- Two reaches with high Rn (> 0.5 BqL<sup>-1</sup>) indicate groundwater inflows
- N concentrations in river increase over these reaches

### Hutt River, Wellington Region – DTS Survey



- DTS deployed by kayak over 2 km for 24 h
- Late summer baseflow conditions
- River ~ 16-17°C, groundwater ~ 14°C

### Hutt River, Wellington Region – DTS Results



## Harmful algal blooms are occurring more frequently in Lake Rotorua



www.thecomingcrisis.blogspot.com, www.sci.waikato.ac.nz

# Nutrient input to the lake is via streams that are fed by springs or distributed groundwater inflow



- Flowing streams
- Stream flow status not surveyed
- Dry streams
  - Groundwater catchment







### Left Bank

Right Bank



100 m

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### Summary



DTS, radon and hydrochemistry measurements should be used together

Hydrochemistry provides information on source of inflows and DTS pinpoints the location and timing

This can overcome limitations such as when temperature differences between groundwater and surface water are small