

Waikato



REGIONAL COUNCIL

Te Kaunihera ā Rohe o Waikato

WRC Update

Katherine Luketina

Katherine.luketina@waikatoregion.govt.nz

Jim McLeod

Jim.McLeod@waikatoregion.govt.nz

Healthy environment

Strong economy

Vibrant communities

WRC Restructure

- Fit for Purpose Review 2014 -2106
- Both Geothermal Scientist roles still under review (no timeframe)
- Greater integration with BOPRC?

Regional Plan Review

- Statutory requirement to review every 10 years
- Rolling review, geothermal last - 2018
- No major changes expected but some tweaking
- Review drives science projects

Subsurface Challenges

Ranked Priorities

1. Extent and capacity of resource (regional indicator)
 - IGA Geothermal methodology
 - Test on Ohaaki (+ 2) / Leapfrog
2. Definition and Determination of system boundaries – 3D?
3. Integrated mgt between fresh and geothermal ground and surface water resources
4. Natural dynamics of geothermal systems

Large Development Systems

Issues

- Effects Management
- System Management Plans
 - Structure prescribed?
- Data, information, model regs
 - Greater prescription?
 - (Rotokawa extension?)
 - (Cf CMA and overseas requirements)
- System boundaries
 - What data / information needed?
 - Robust science – how?
- Sustainability
 - Renewable resource
 - Intergenerational Allocation?
 - Recovery period / recruitment
 - Robust science – how?
- PRP optimisation
 - Common info needs
 - Practice efficacy
 - Regional panel
- Waikato Geothermal Forum

Waimangu Valley

Drivers

- A testing ground
 - Minimal politics
- Collaboration
- Remote sensing
 - Flumes
 - Met. Stn
 - Cameras
- Online / SOS / GitHub
- Open Research
 - Energy & mass flows
 - Coupled lakes
- Large Dataset Analysis
 - Jonathan Leaver
 - *Characteristic Periodic Variations of Surface Geothermal Features A study of springs and geysers*
 - *Wavelet Transforms =>*
 - Nathan Kutz
 - *Data driven modeling & scientific computation*
 - *Matlab => Python => ipython*
 - *SVD, PCA, LDA, =>*

Surface Features ID and Description

Current

- Most geothermal features (ca 2,000) in the region have been identified and given a unique code as per Scott (2012)
- Some features are monitored quarterly by in-house staff

Plans

- Purchase tablet for field data entry
- Ground-truth locations and enter descriptions (with or without GNS App)
- Enter into database – GNS database?
- Enter into WRC database – currently not configured for that information type – spreadsheet or locational database
- Timeframe – as staff and budget allow – no immediate plans to progress

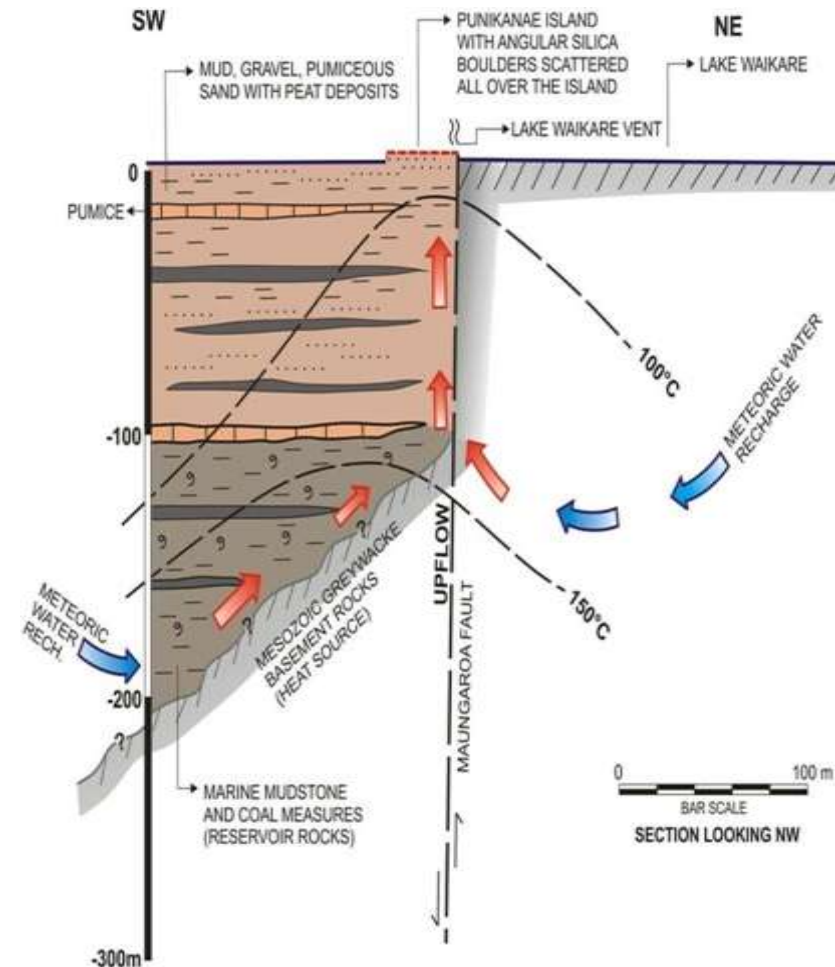
Small Geothermal Systems

Current

- AUGI student projects
- Miranda, Te Aroha, Waikare, Ohinewai, Okauia, Matamata, Waitoa, Motuoapa and Kaiua

Plans

- Continue as students become available



Waikare conceptual model

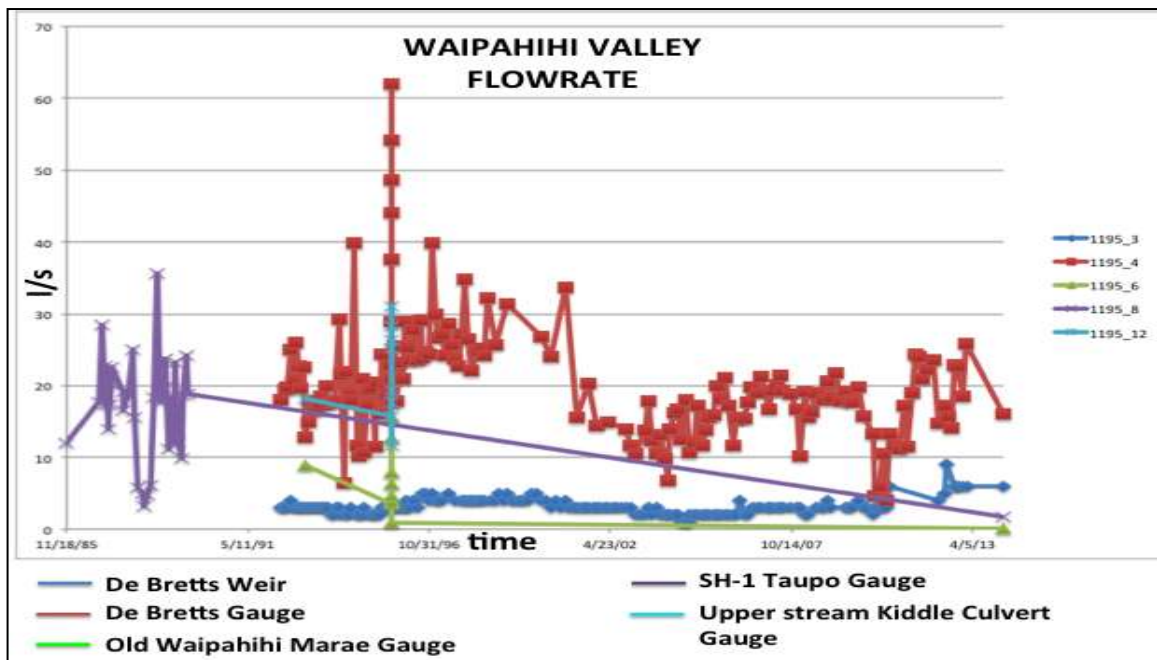
Other AUGI Student Projects

Current

- Waipahihi historical changes
- Mangakino

Plans

- Continue as students become available



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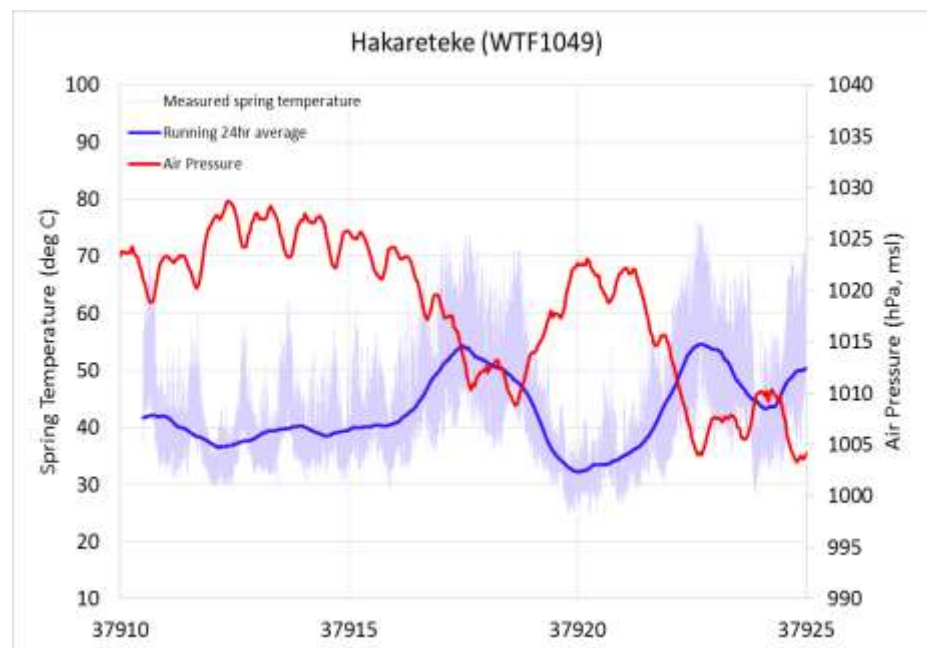
Geyser recordings

Current

- Massey students analysed recordings (Davidson et al 2015, Newson 2015)
- 26 geysers studied between 1996 and 2011
- Rainfall, temperature, air pressure, earthquakes, Waikato lake levels

Plans

- Continue monitoring
- Obtain multi-sensor monitors



New Techniques under evaluation

- Drone use for TIR, High-res photography – Waikite, Graveson Rd
 - Locate springs
 - Survey vegetation
- CO2 ground-discharge monitor to locate subsurface resource – Ohaaki
- Mark Harvey paper yesterday



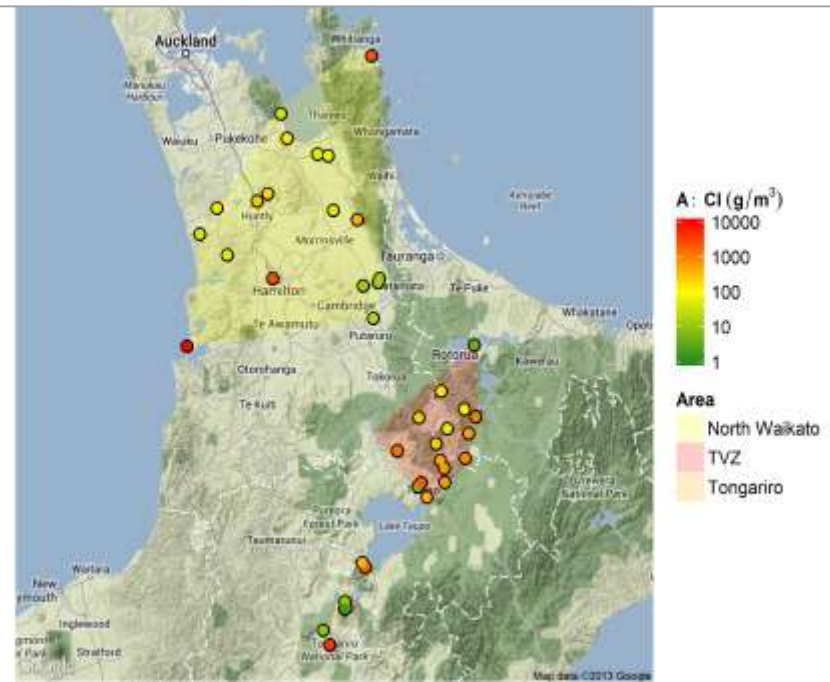
Regional Geochemistry

Current

- Latest survey 2013 (Golder 2013)
- Records for 267 features
- Some old, some recent, some partial histories, some full histories
- Many data sources
- Suite of ca 30 features across region sampled every 4 yrs.

Plans

- Re-survey 2016-2017
- More features
- Dating?



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Geothermal Vegetation

Current

- 2015 inventory (Wildlands 2015)
- 64 sites, 750 ha
- 3 areas of International Significance, 12 National, remainder Regional and Local
- Ecological indicators developed (in press)
- SNA Ranking
- Intervention priorities – immediate, high, medium, lower, none
- Current survey does not take into account new kanuka speciation work (de Lange)

Plans

- Re-survey 2021
- Dependent on WRAPS flight schedule



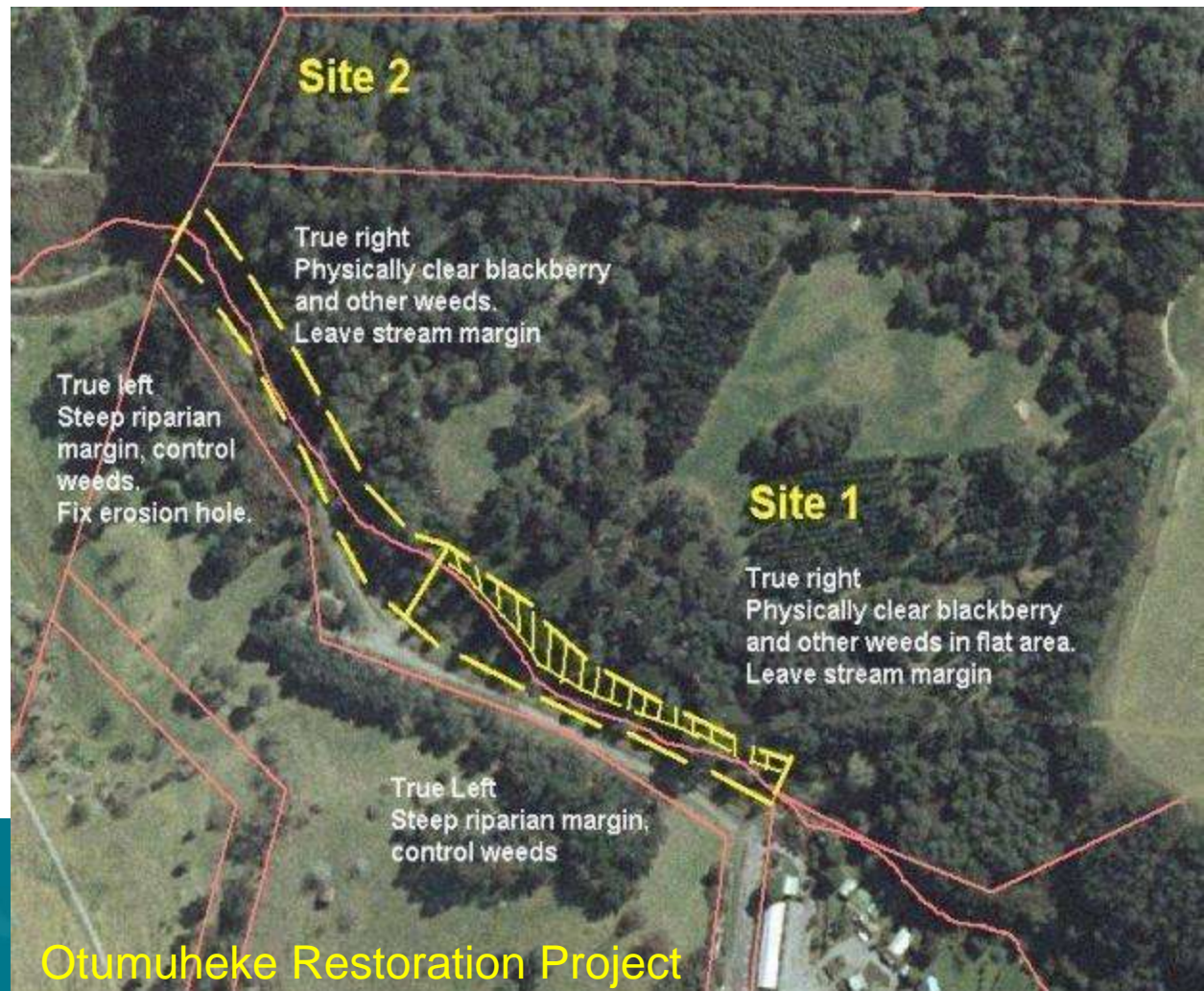
Geothermal Vegetation Management

Current

- All-new biosecurity staff, getting up to speed with vegetation management requirements

Plans

- Continue to work on highest priority sites



Invertebrate/Ecosystem Studies

Current

- 2015 report on beetle species and lifecycle needs (Willoughby and Beard 2015)
- Leaf litter vital for plant and invertebrate diversity and resilience
- Native vegetation buffer needed for complete life cycle
- GEORGA – Ecosystem health assessment tool

Plans

- Native bee displacement?
- Harboring of economic pests (climate change, land use change)



Economic values

Current

- 2015 survey of visitor numbers (results being processed)
- Include iwi values, off-market valuation, natural capital value

Plans

- Complete report 2016



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Other matters

- Waiootapu – working with NTNW on scientific study, vegetation care and sustainability