

Exploring the uncharted: Can we estimate groundwater takes?

Groundwater takes by bores for domestic needs and stock drinking needs

- Aucklanders were asked to cut water usage by 20L per day per person to avoid water boiling notice
- Water usage target - below 400 million litres per day

Aucklanders face largest water crisis in 23 years

10 Mar, 2017 2:22pm

🕒 7 minutes to read

Auckland's water situation (as of 25th June, 2017)*

Total last seven days: 2,702,375,000 litres

Approximately 1081 standard Olympic swimming pools,
or 154 pools on a daily basis

* Data source: WaterCare

Purpose of this study

- Request from Resource Consent Team
- Investigate bores used for domestic water supply and animal drinking water across the region
- Develop a tool to estimate amount of groundwater takes by these types of bores

Reprint
as at 19 April 2017



Resource Management Act 1991

Public Act 1991 No 69
Date of assent 22 July 1991
Commencement see section 1(2)

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Section 14 Restrictions relating to water

(3) A person is not prohibited by subsection (2) from taking, using, damming, or diverting any water, heat, or energy if –

...

(b) in the case of fresh water, the water, heat, or energy is required to be taken or used for –

(i) an individual's reasonable domestic needs; or

(ii) the reasonable needs of a person's animals for drinking water, -

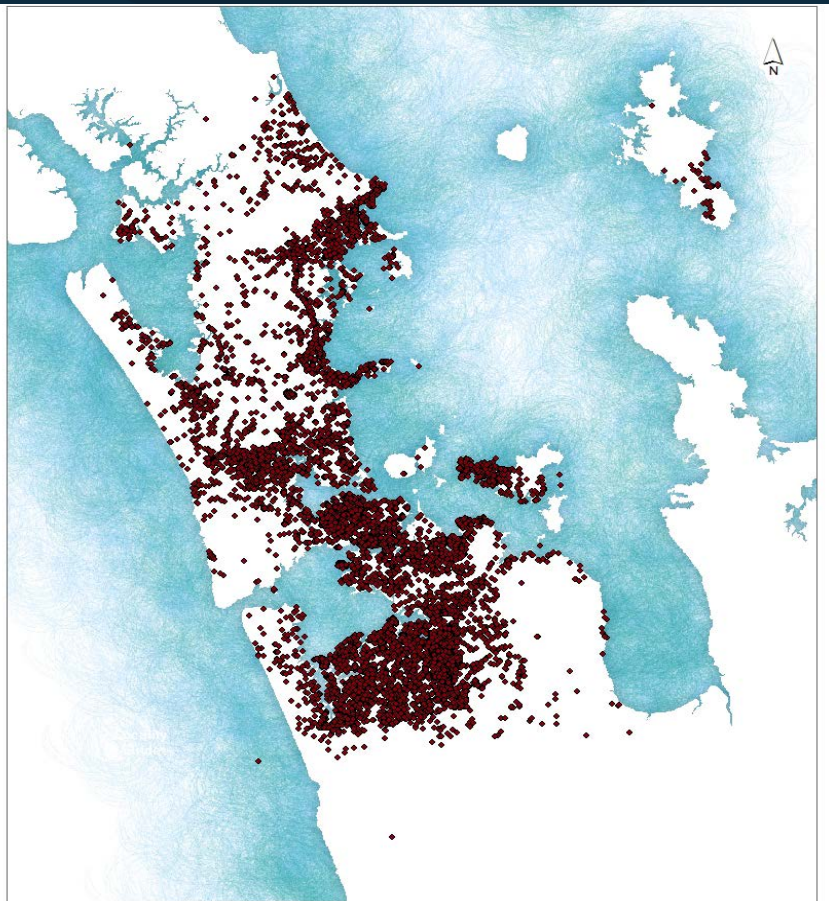
and the taking or use does not, or is not likely to, have an adverse effect on the environment; or ...

How is Auckland's groundwater managed?

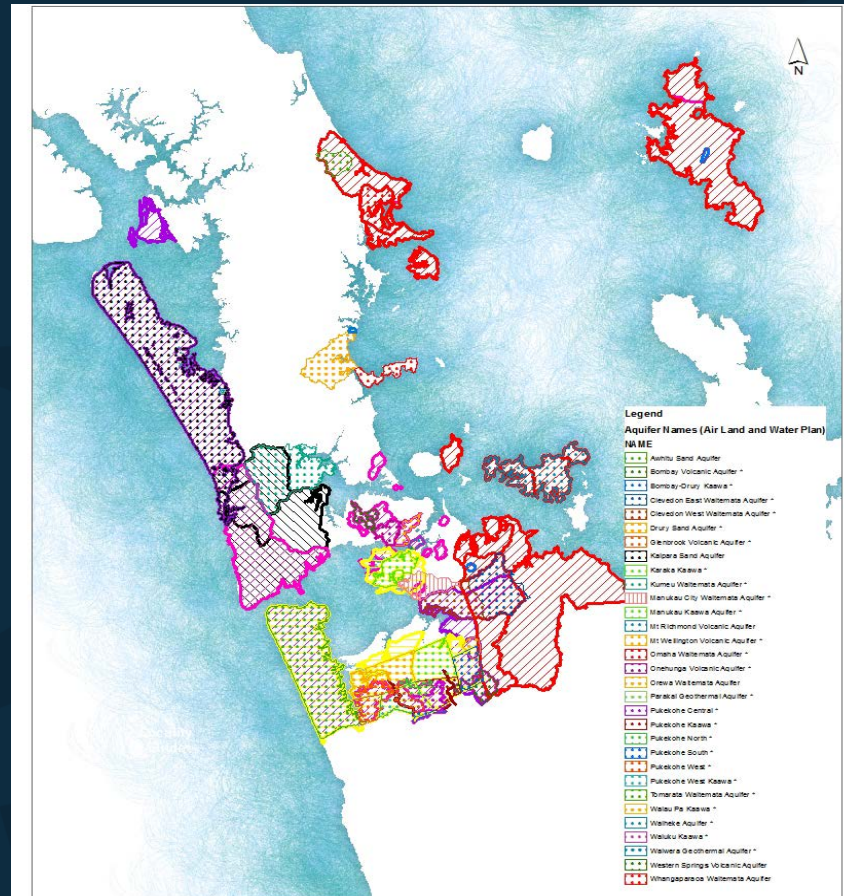
What we know:

- Bore location and some drilling consent records
- Snapshots of farm types, stock count, stock drinking rates, dwelling numbers and household population estimates
- Indicative aquifer coverage at various locations

Bore Location



Aquifers from GeoMaps

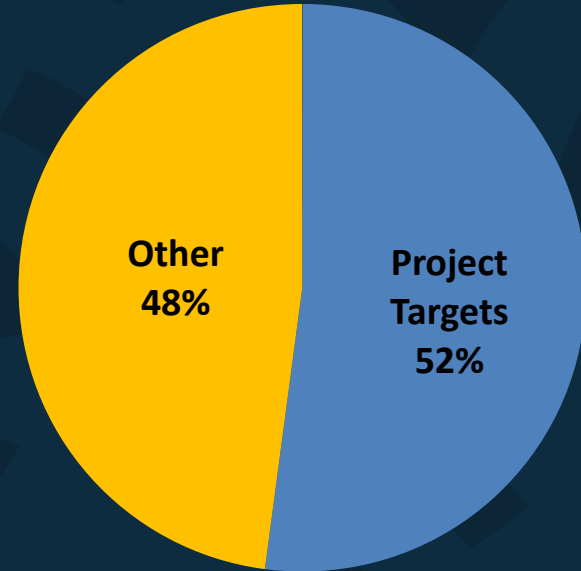


Developing a model which pieces together these correlated but disjointed information

- Step 1 – Assessing types of bore use
- Step 2 – Generate aquifer coverage maps and fill in the data gaps
- Step 3 – Create water consumption base map
- Step 4 – Allocating groundwater takes data to individual bores by bore type

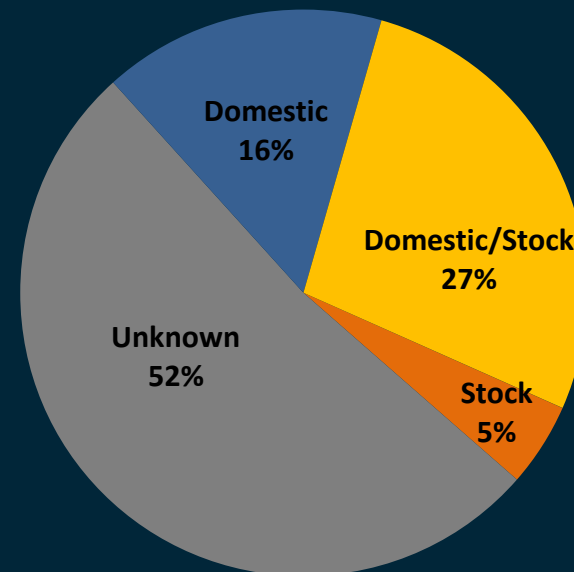
Results - Bore types

Type of Use	Grand Total
Domestic	975
Domestic/Stock	1644
Stock	288
Unknown	3132
Other	5551
Not Used	301
Grand Total	11891



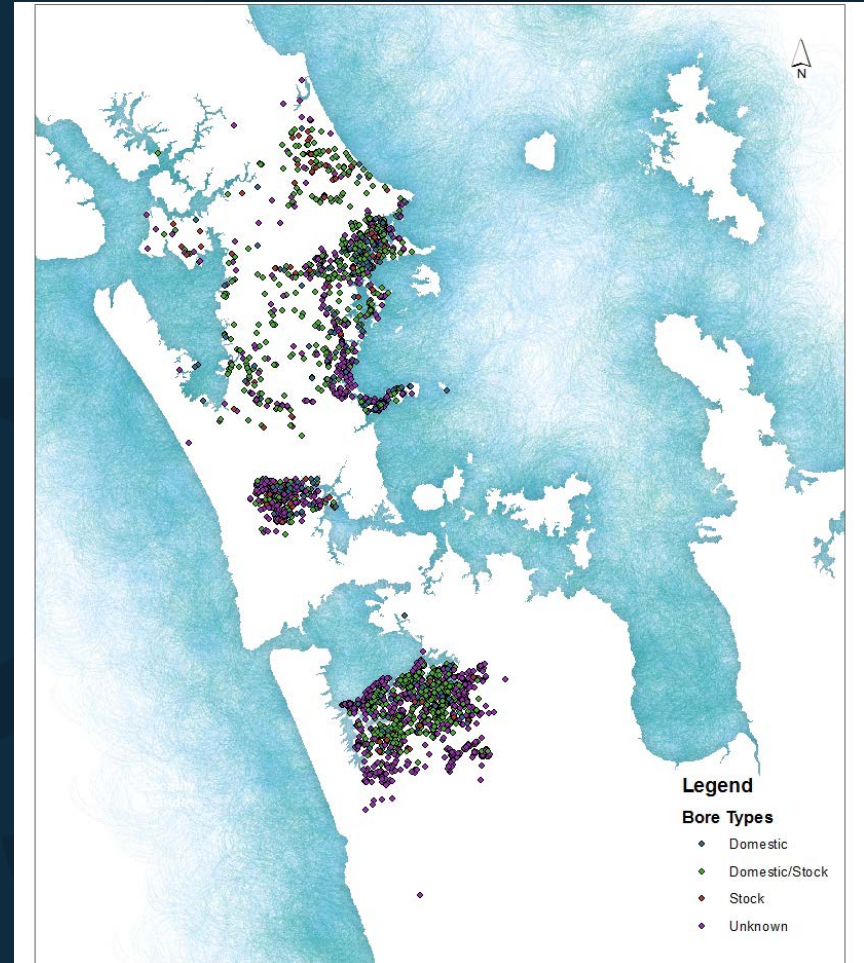
Findings - Groundwater takes estimates

Bore Type	Grand Total (litres/day)
Domestic	363,620.01
Domestic/Stock	1,994,568.04
Stock	575,462.74
Unknown	1,679,789.33
Grand Total	4,613,440.13



Results - Some highlights

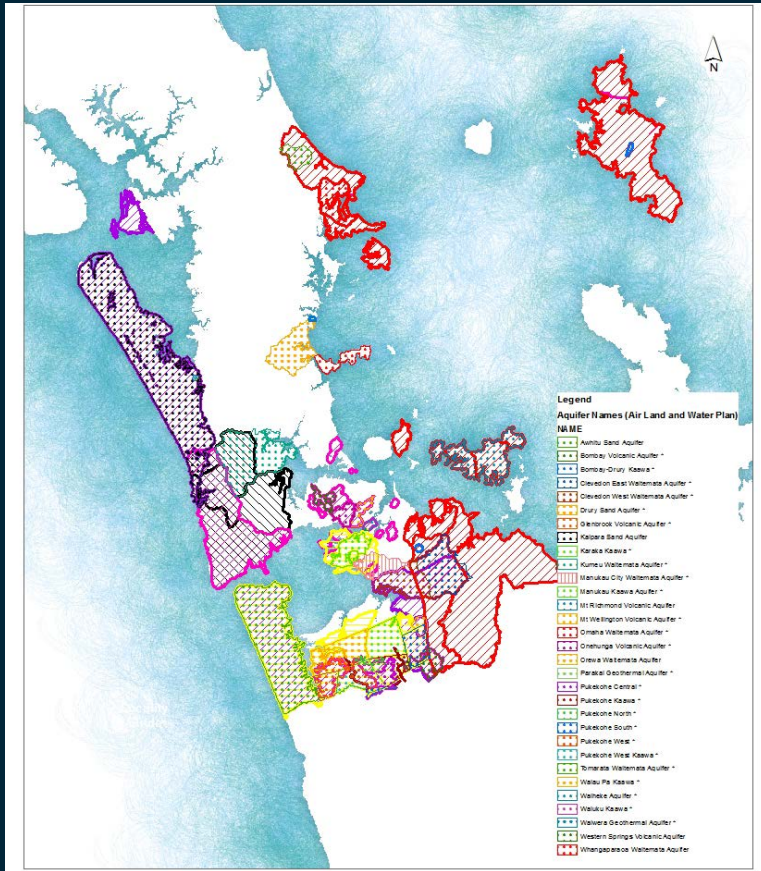
Aquifer Name	Grand Total
Franklin Kaawa	571,685.95
...	...
Franklin Waitemata	678,004.63
Kumeu Waitemata	450,142.25
...	...
Northeast Waitemata	486,260.89
Northwest Waitemata	504,819.04
Grand Total	4,613,440.13



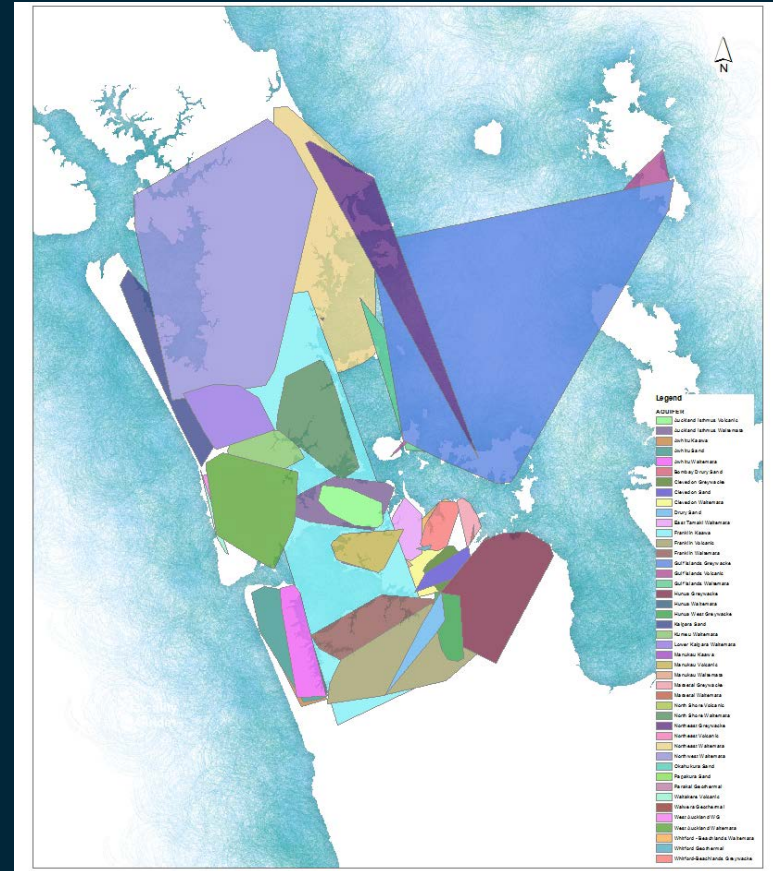
Findings

- Generated preliminary groundwater takes volumes through existing data
- Established a model which closes identified data gaps and offers easy and flexible adjustment for future improvements
- Able to provide visual clarity to existing datasets

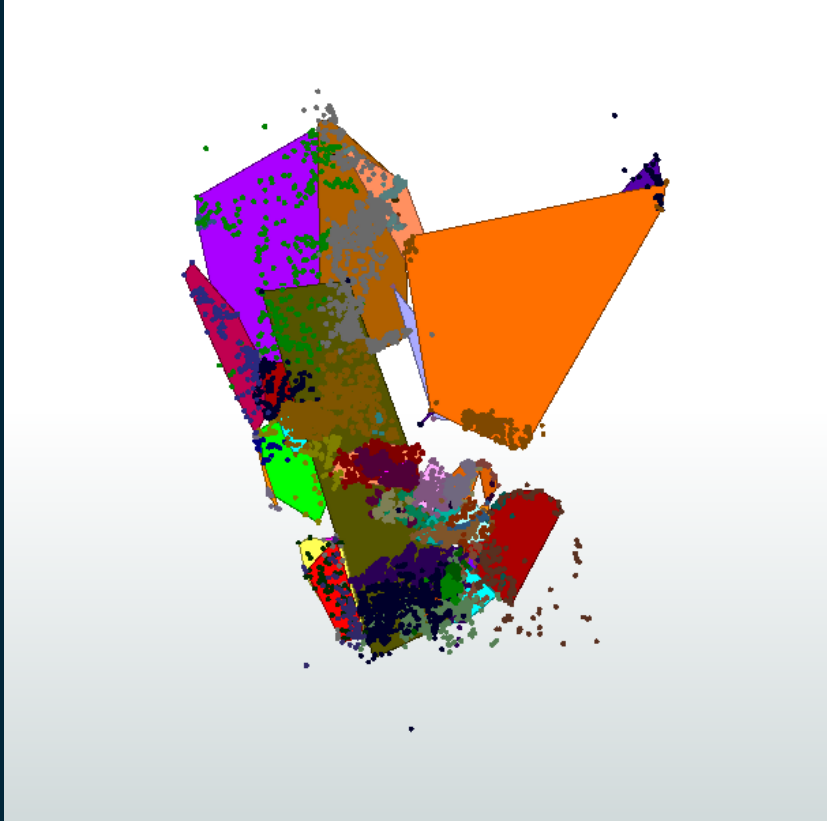
Aquifers from GeoMaps



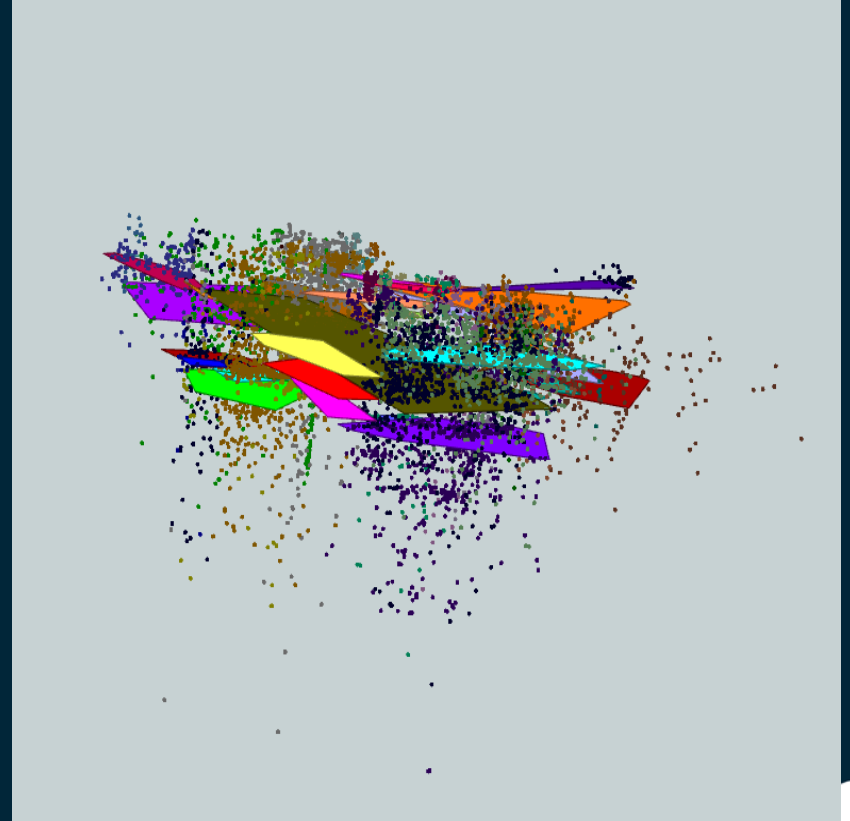
Aquifers Generated from Public Perception



Overlay bores on generated aquifer locations



Bore depth and average depth aquifer plains in 3D



What's next?

- Model improvements
- Better information for users
- Collective effort – better evidence, better decision making