

Factsheet 01

Te Whakaheke o Te Wai

SkyTEM aerial aquifer mapping

Aerial Electromagnetic (AEM) surveying involves sending signals underground and measuring the behaviour (resistance) of the returning signals. Once data is processed into maps, we can gain a better understanding of what's under the ground, such as:

- aquifer structure (up to 300 m deep)
- areas of high and low water flow (hydraulic conductivity)
- inflow and outflow boundaries (such as coastal boundary)
- variability of aquifer properties (which influences uncertainty of predictions).



SkyTEM data was collected as part of the Hawke's Bay Regional Council 3D Aquifer Mapping Project*. Data access was provided to Te Whakaheke o Te Wai (TWOTW) Programme. Our research specifically aimed to incorporate SkyTEM data into groundwater models.

*The HBRC 3D <u>3D Aquifer Mapping</u> <u>Project</u> was funded by the Provincial Growth Fund, HBRC, and GNS Science.

SkyTEM aerial mapping

SkyTEM data gives us a better understanding of how water flows through the aquifer, how much water there is, and processes at the coastal boundary. This allows us to make more informed water management decisions regarding:

- allocation (irrigation, town supply)
- stream depletion (surface water loss to groundwater)
- source protection zones for drinking water supplies
- planning for changes to our climate.

Within TWOTW we have explored ways of incorporating information from SkyTEM data into groundwater models, such as:

- mapped data to inform the conceptual model (including disposition of the aquifer basement - see figure)
- estimates of hydraulic conductivity to inform initial parameter estimates
- history matching to resistivity data and pre-processed hydraulic conductivity estimates.



Overall, the input of SkyTEM data has allowed us to reduce the uncertainty of decision making for the Heretaunga Plains area. This allows stakeholders to have greater trust in the model and the decisions that the model is used to inform.

Hemmings et al., 2024. Te Te Whakaheke o te Wai Heretaunga Plains regional groundwater model update: Age and flow predictions and uncertainty. SR 2024/44

Rawlinson, Z.J.; Hemmings, B.J.C.; Moore, C.R. 2024 Hawke's Bay 3D aquifer mapping project : Heretaunga Plains numerical groundwater model updates using SkyTEM data. GNS Science consultancy report 2024/10LR. 14 p.