



HOW TO CREATE A DIGITAL TWIN OF WATER IN AOTEAROA NEW ZEALAND

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ABSTRACT

What if we knew everything there was to know about water in New Zealand? The quality of every drop from every tap; the flow rate in every river at every moment; the size and position of every crack in every pipe. And what if you also knew the exact cost for every riparian planting or treatment plant update - and the overall impact that these would have on the health of our waters and people?

We are now able to provide these types of answers by combining multiple data sources with real time data streams and complex models to create "Digital Twins". We have an opportunity to develop a Digital Twin of water in New Zealand. The Ministry of the Environment's River Environment Classification and Land Use Map provide a good baseline, which is complemented by the aggregation of environmental monitoring data by Land and Water Aotearoa, WaterNZ's Waste Water Treatment Plant Inventory and the Drinking-Water Online solution which the Beca have implemented for the Ministry of Health.

As part of the Three Waters Review, some of this data is already being brought together to inform policy decisions. There is further opportunity to support better decision making at a regional and local level, by investing in a platform to continually integrate and analyse all water data in New Zealand. Collectively pooling our data, will support the development of statistical models, which could be continually tuned and refined to deliver a Digital Twin of water in New Zealand. Although this is technically complex, the greatest challenges will be political, organisational and cultural. Exceptional governance would be required to ensure that national standardised did not ignore local features or priorities or inhibit innovation.

Beca have been working with Kapiti Coast District Council to display real time water level sensors with their public Local Maps solution. The ongoing development of the National Environmental Monitoring Standards will also make it easier to integrate data. Standardisation can deliver immediate gains, by reducing development and training costs.

The exponential growth of technologies, from remote real time sensors to BIM models of treatment plants makes this challenge more important to tackle. The threat is a cacophony of different tools that do not talk to each other. The opportunity is that we work together to develop a Digital Twin, integrating these new technologies to provide more accessible and holistic insights.

We can all start by talking to each other. A simple data stocktake can identify inefficiencies or gaps and identify easy wins. This can start conversations around opportunities to share learnings, solutions or work together on initiatives. Success will depend on our ability to collaborate rather than compete, and realise the benefits in finding the common ground amongst our unique contexts. The dividend will be the shared knowledge we need to get past the politics and take the action required to improve our national water quality.

KEYWORDS

Digital twins, data, drinking water, freshwater, water quality, data analysis, data integration, data modelling, remote real-time sensors, BIM, GIS, collaboration, governance