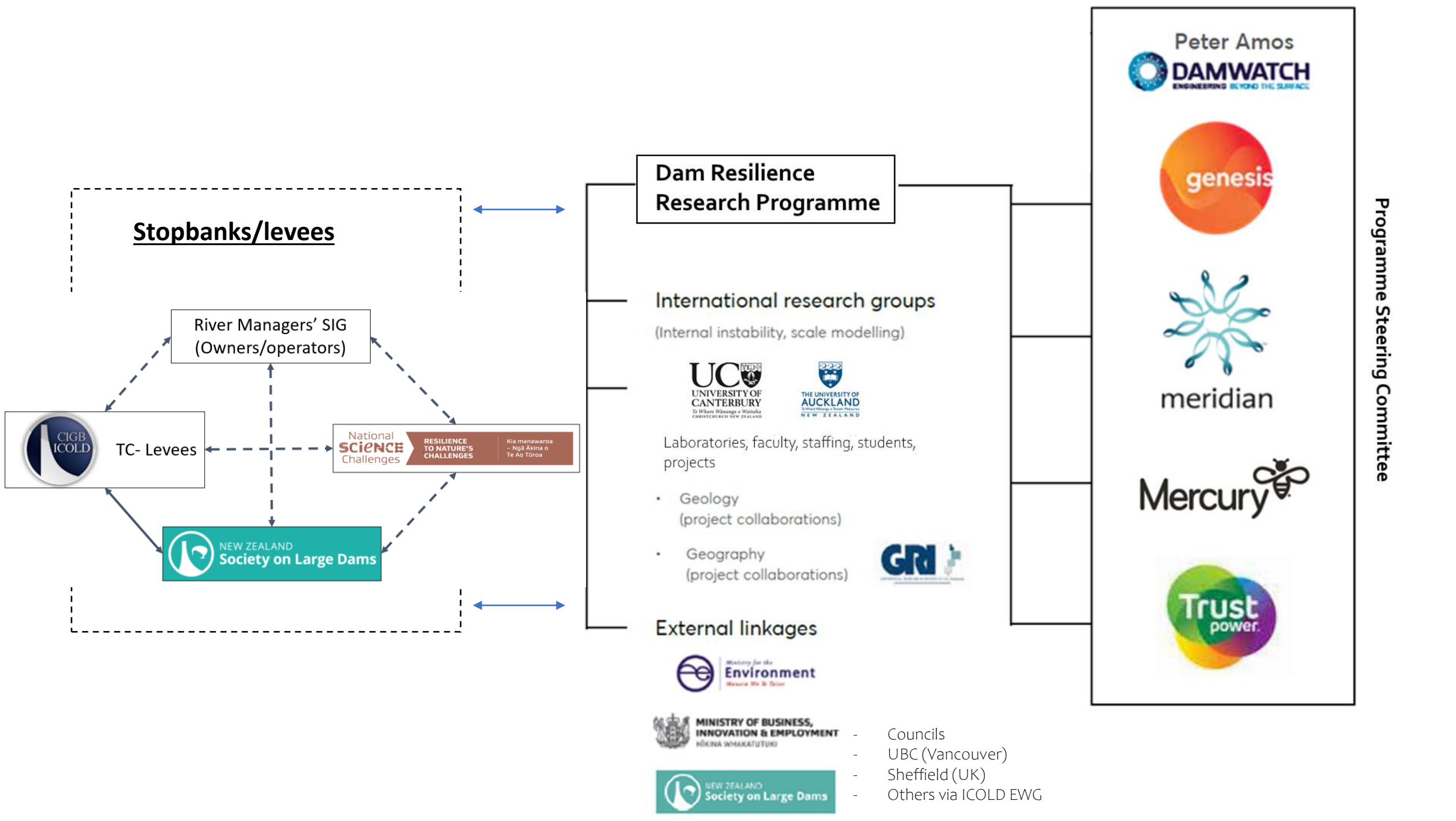


Aotearoa dam and stopbank resilience

-

Dam Resilience Research Programme (DRRP)

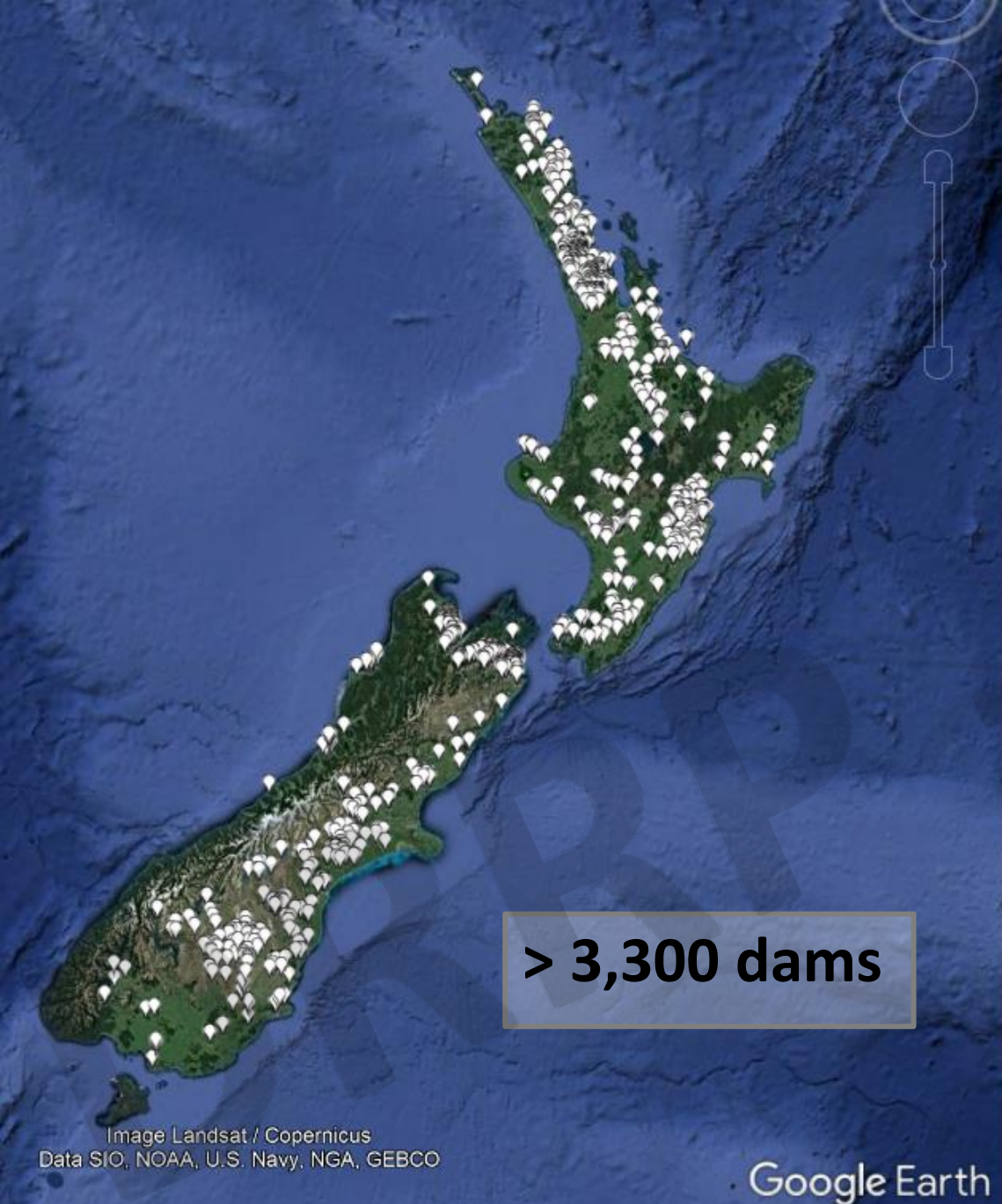
Understanding the whole-life performance of our dams and stopbanks in a seismic setting



National resilience

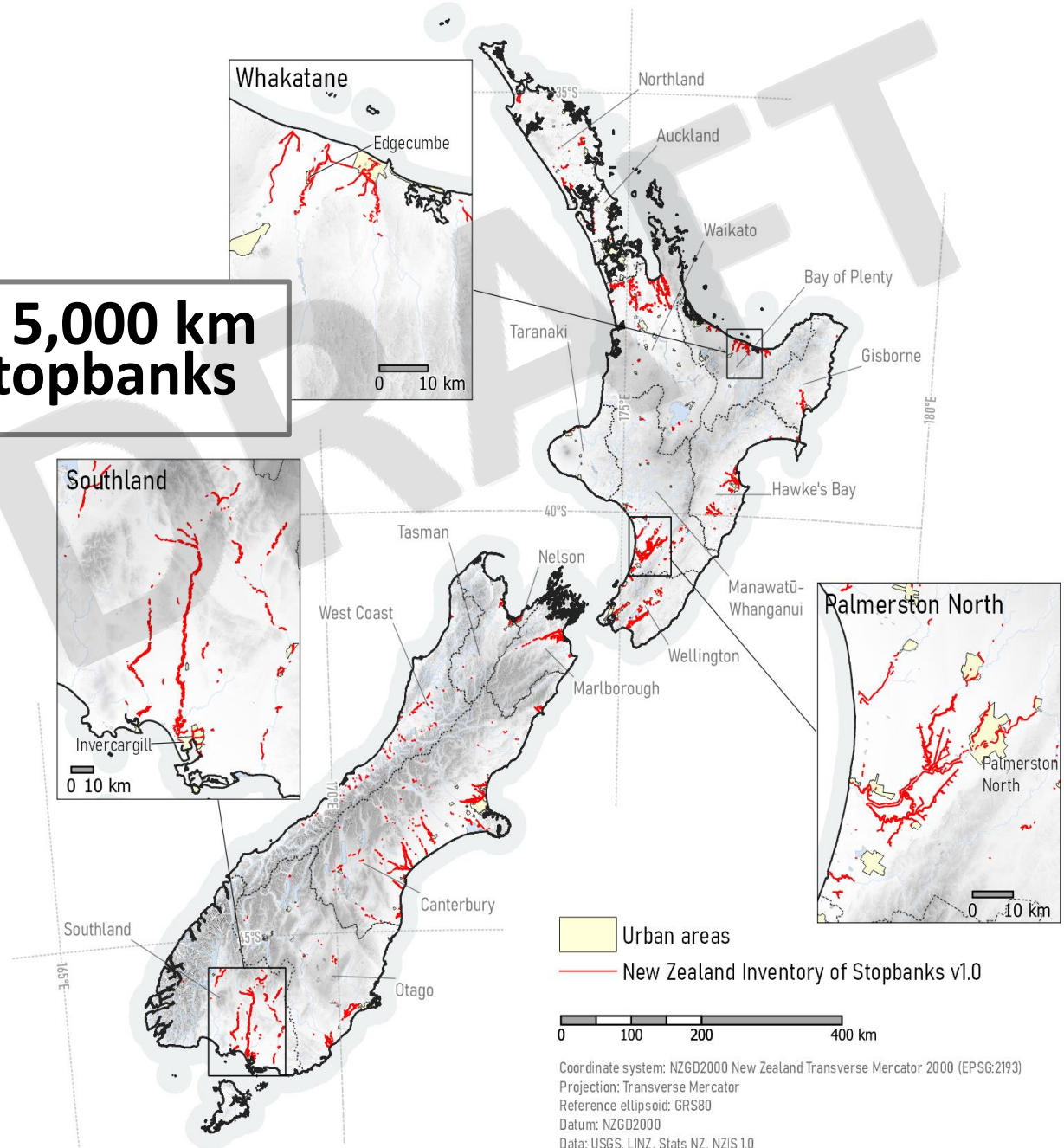
NZID and NZIS: dams and stopbanks in
Aotearoa New Zealand

Combined dam-stopbank systems



> 3,300 dams

> 5,000 km stopbanks



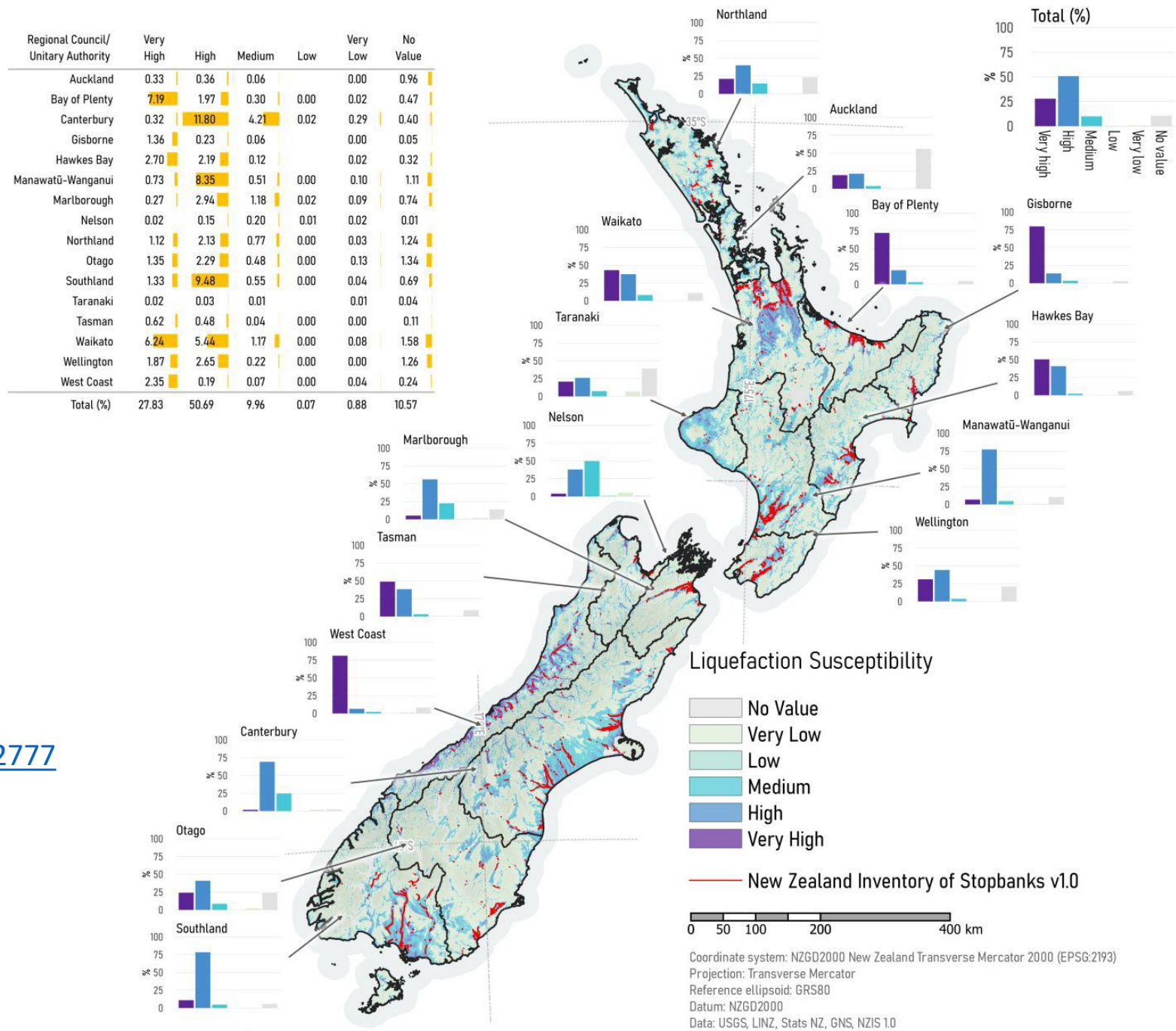
Crawford-Flett, Blake, Pascoal, Wilson, Wotherspoon (forthcoming) *A standardised inventory for New Zealand's stopbank (levee) network and its application for natural hazard exposure assessments*

A standardised inventory for New Zealand's stopbank (levee) network and its application for natural hazard exposure assessments.

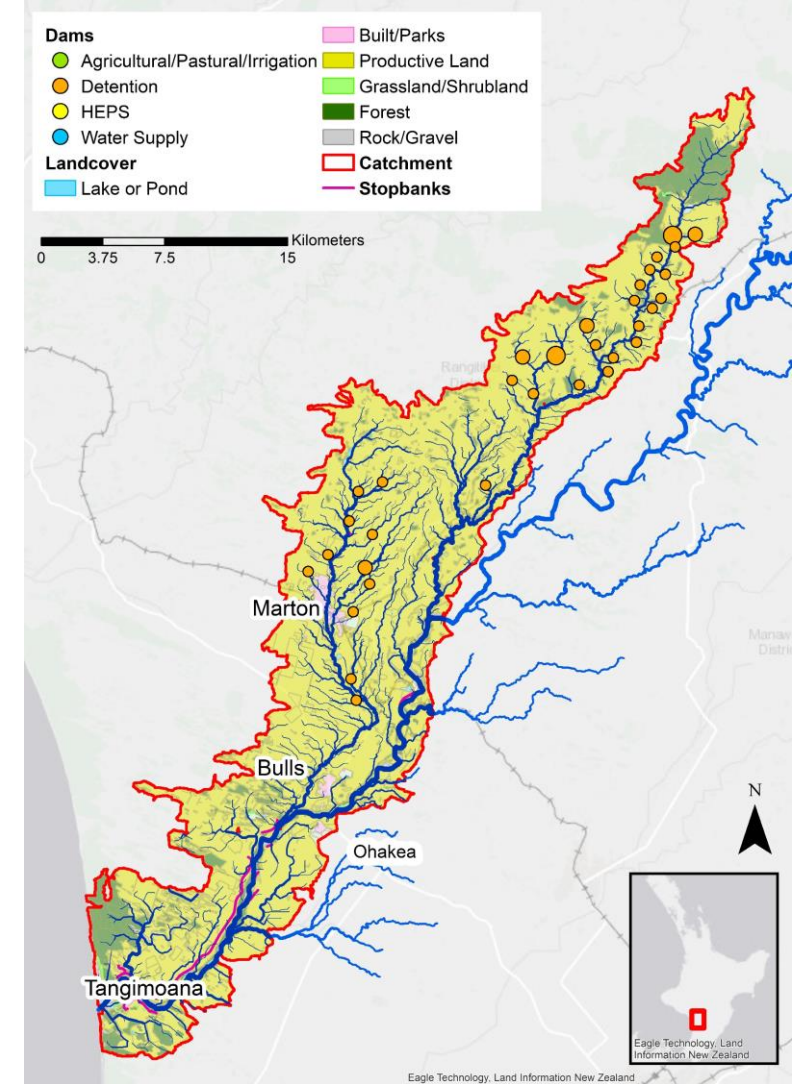
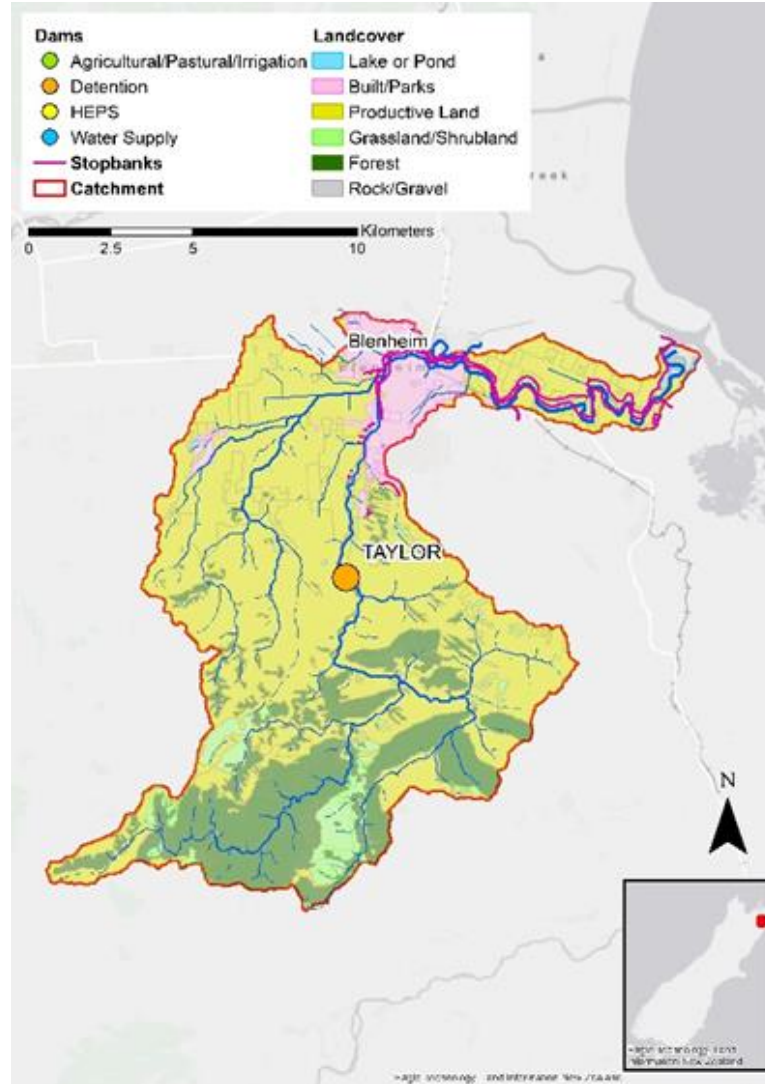
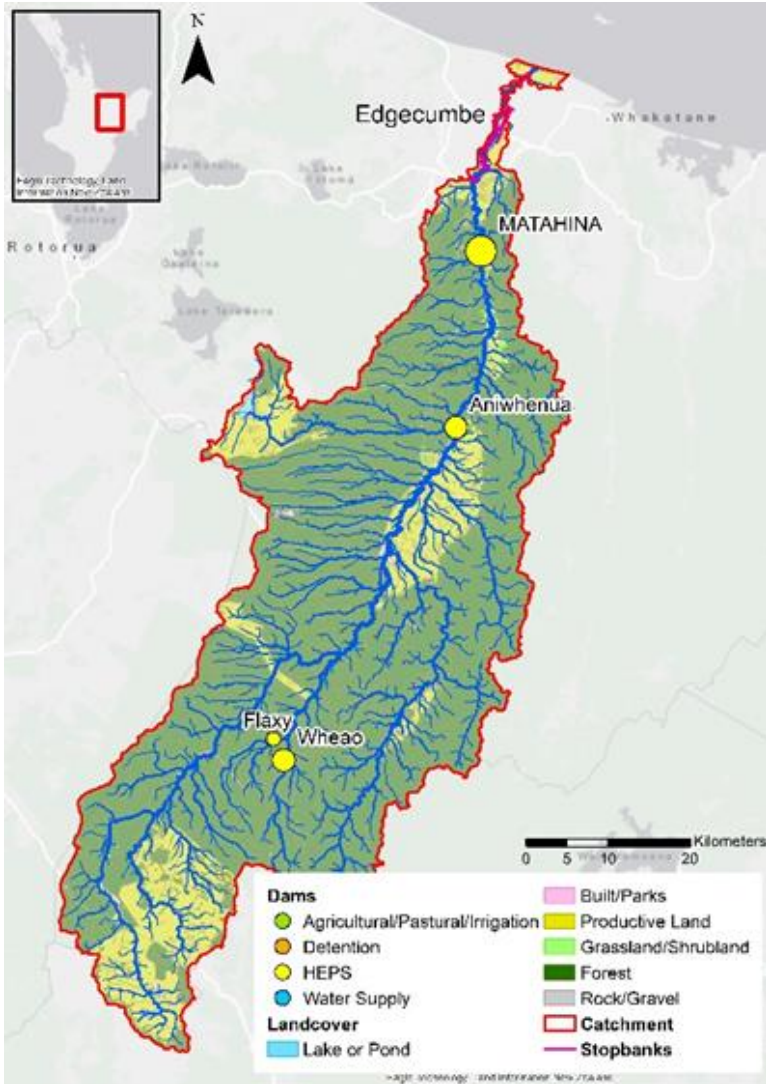
Journal of Flood Risk Management, 15(2), e12777

Crawford-Flett, K., Blake, D. M., Pascoal, E., Wilson, M., & Wotherspoon, L. (2022).

<https://onlinelibrary.wiley.com/doi/full/10.1111/jfr3.12777>



Operational Factors – Integrated Catchments



Local resilience

Understanding geotechnical vulnerabilities

Understanding geotechnical vulnerabilities

Geophysical pilot studies Dr Andrew Stolte (Pseudo-2D MASW)



Figure 1. Plan of testing zone and array midpoint locations.

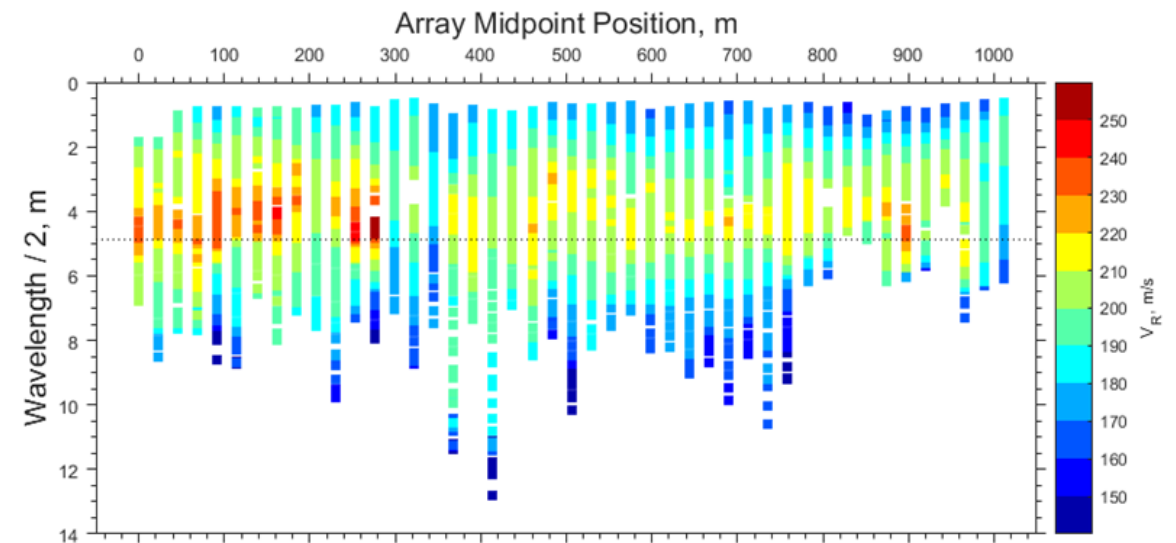


Figure 2. Pseudo velocity-depth data along testing zone. Wavelength/2 is a rough representation of depth. Variation in V_R provides an indication of how the soil modulus varies with depth and location along testing zone.

Asset resilience

Geotechnical resilience: internal erosion mechanisms and modes for NZ soils

Non-standardised laboratory testing for internal erosion mechanisms: path of research

Fully parameterised soil mechanics framework

TYPE 3: World-first dynamic testing at larger scales, improved methodologies.

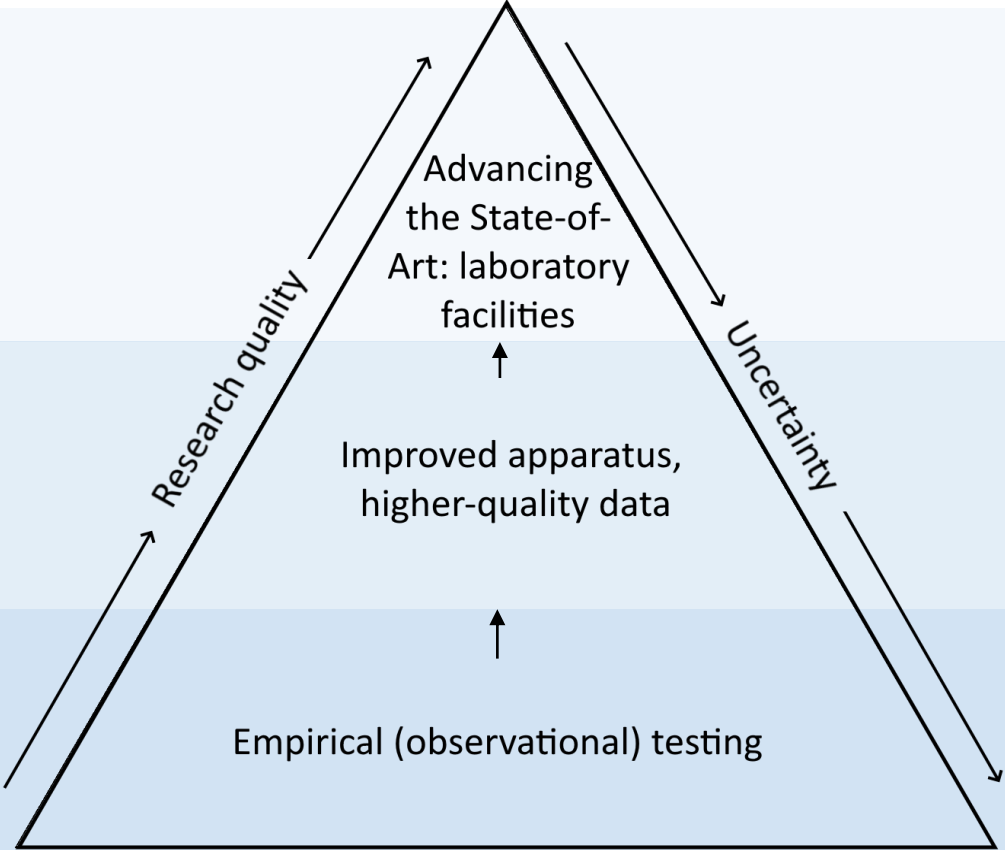
High quality, site-specific, dynamic conditions.
Precise results, real-world applicability.

TYPE 2: Larger scale, improved instrumentation, internationally-benchmarked.

Greater confidence, site-specific.
Improved applicability.

TYPE 1: Basic, small scale

International State-of-Practice. Initial observations.
Limited parametric understanding.

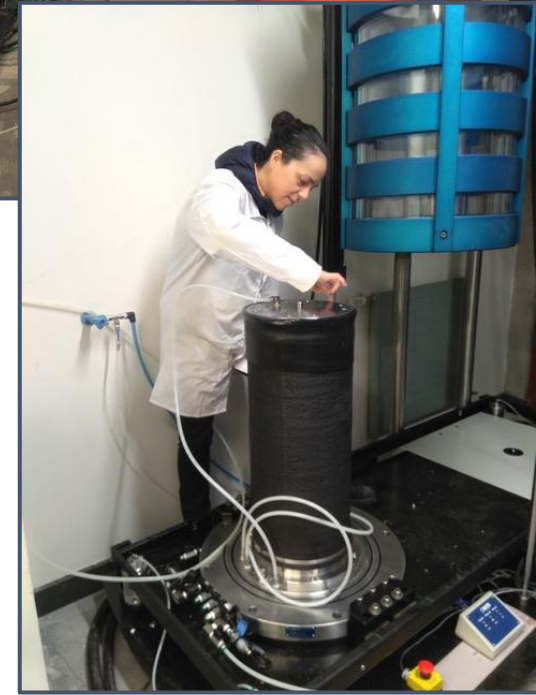
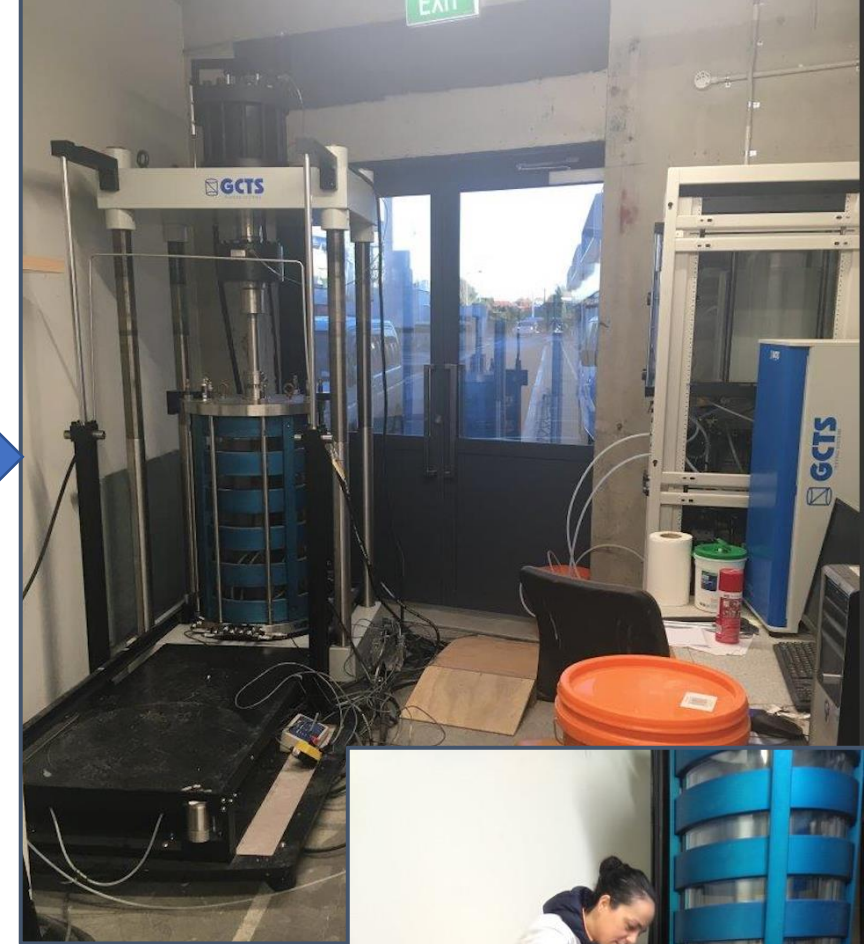
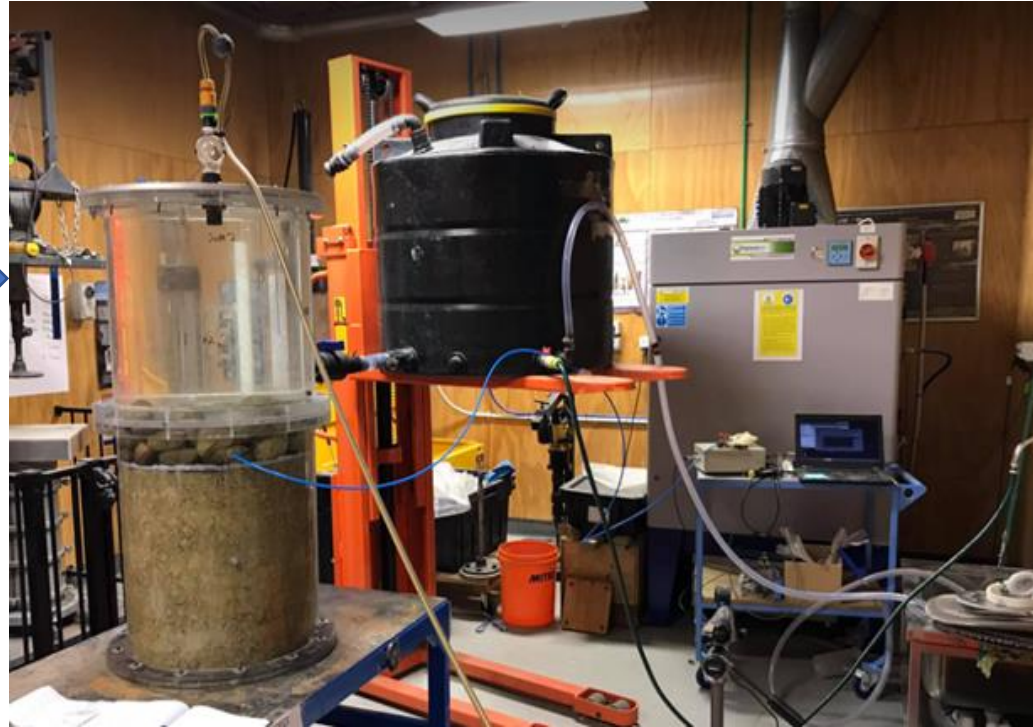
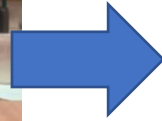


Experimental laboratory testing

Current state-of-practice for deficiency identification:

- Limited characterisation of earthfill soils
- Application of empirically-derived screening methods (unverified in NZ applications)

Contribution



TYPE 1: Basic, small scale



TYPE 2: Larger scale, improved instrumentation, internationally-benchmarked.



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TYPE 3: World-first dynamic testing at larger scales, improved methodologies.



Researchers

Stopbanks

Assoc Prof Liam Wotherspoon
(UoA)

Assoc Prof Asaad Shamseldin
(UoA)

Dr Andrew Stolte (UoA)

Prof Matt Wilson (UC)

Dr Tom Logan (UC)

- Various PhD/ME/undergrad projects

ALUMNI

- Thomas Wallace (ME)
- Eduardo Pascoal
- Dr Daniel Blake

Stopbank-dam systems

Thomas Wallace (UC PhD student)



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CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Dams

- **Dr Kaley Crawford-Flett (Senior Industry Research Fellow)**
- Dr Katherine Yates (UC Postdoc Researcher)
- Katie Vincent (UoA PhD student)
- UoA undergrad research assistants
- Other aligned/part-time (Dr Sean Rees)

ALUMNI

- Ross Waters (ME)
- Various undergrad projects
- Various PMEG projects