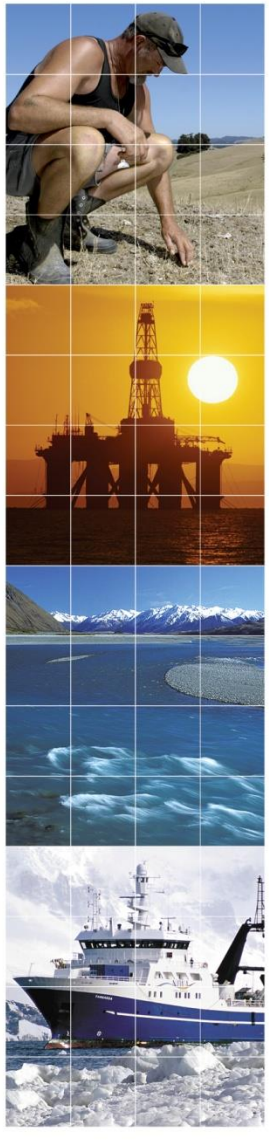

Emergent exposure of flood inundation hazards under future climate change in New Zealand

Ryan Paulik, NIWA Wellington
Scott Stephens, NIWA Hamilton
Daniel Collins, NIWA Christchurch
Rob Bell, NIWA Hamilton
Gabriella Turek, NIWA Wellington
Sanjay Wadhwa, NIWA Hamilton

UNDERSTANDING AND ADAPTING TO FUTURE CLIMATE IN AOTEAROA/NEW ZEALAND, 4 – 6 September, Wellington

National and regional risk exposure in low-lying coastal areas

Preparing New Zealand for rising seas: Certainty and Uncertainty

19 November 2015

Like other countries, New Zealand needs to prepare for rising seas.

Over many millennia, the Earth's climate has cycled between ice ages and warm 'interglacial' periods. Over the last seven thousand years the climate has been relatively stable, but this is now changing. Increasing concentrations of carbon dioxide and other greenhouse gases in the atmosphere are trapping heat and the climate has begun to respond. One of the major and certain consequences is rising sea level.

Nowhere in our island nation is far from the sea, and most of us live within a few kilometres of the coast. Houses, roads, wastewater systems, and other infrastructure have been built in coastal areas with an understanding of the reach of the tides and the recognition that storms will occasionally combine with high tides to cause flooding.

However, with rising seas, tides, waves and storm surges will reach further inland than before, resulting in more frequent and extensive flooding. Along some coasts, erosion will increase and

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Preparing New Zealand for rising seas

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Preparing New Zealand for rising seas Overview te reo Maori

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Research Aims, Tasks and Timelines

Key Research Aims:

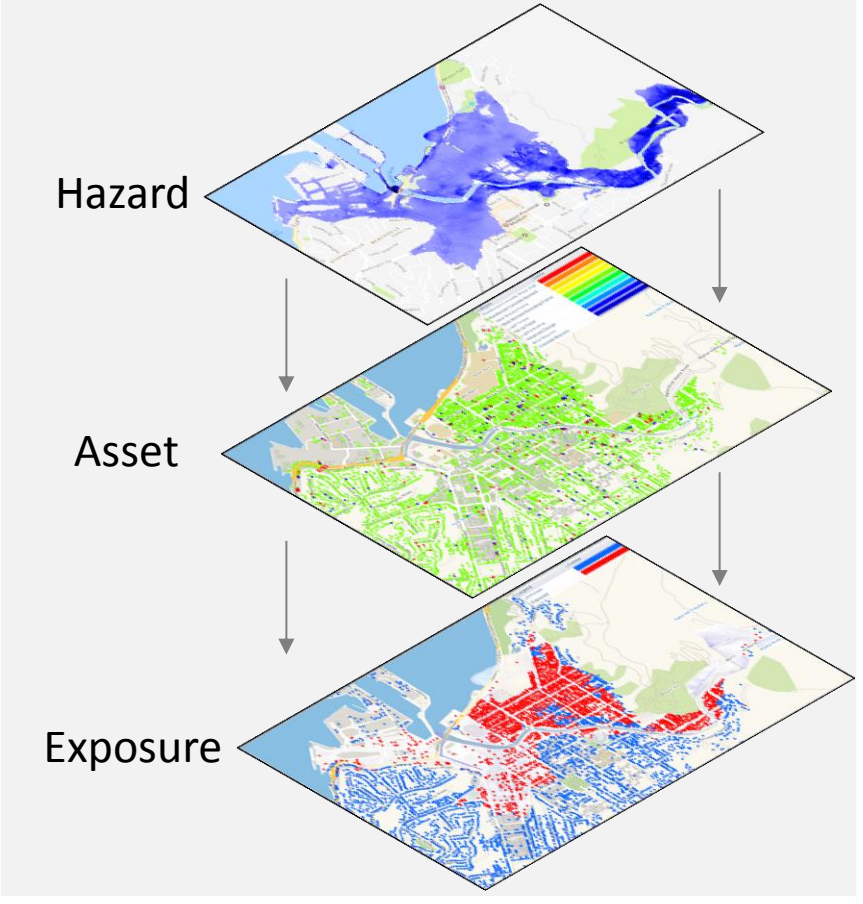
- *Develop asset exposure risk model framework, datasets and support resources in an open access software platform for researchers and practitioners to profile inundation hazards under present day and future climate conditions.*

- *Produce national, region and territory asset exposure risk profiles for coastal and river inundation hazards under present day and future climate conditions in New Zealand.*

Research Aims, Tasks and Timelines

Key Research Tasks:

- Coastal and river flood inundation hazard model development (Year 1 – Year 2).
- National exposure dataset development (Year 1 – Year 2).
- RiskScape software system configuration of model framework (Year 2).
- National scale flood inundation hazard risk assessment (Year 2).
- Research output dissemination (Year 2).



Research Tasks

Hazard Modelling:

- Model development for LiDAR locations only.
- Storm-tide Inundation model development.
  - Extreme sea level analysis to derive 1% AEP storm-tide levels.
  - 1% AEP storm-tide event plus sea-level rise increments of 0m, 0.1m, 0.2m, 0.3m, 0.4m, 0.6m, 0.8m, 1m, 1.5m and 2m.
- River flood inundation model development.
  - Selection of an appropriate model for national river flood inundation modelling.
  - Test catchment to trial 1D and 2D models.
  - 1% AEP river flood inundation modelling for 1% AEP and 4 RCPs.

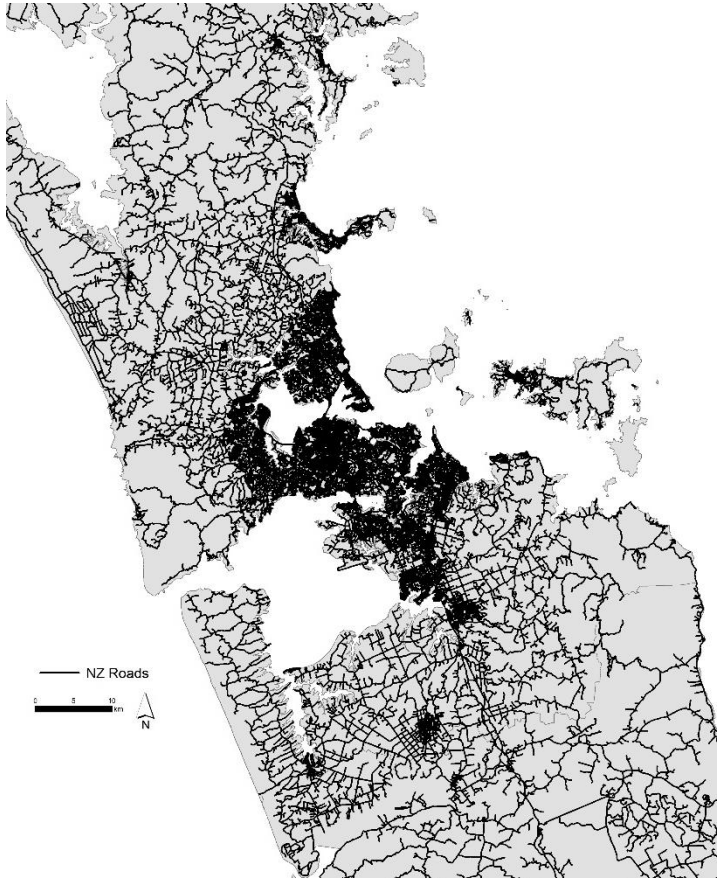
Research Tasks

Asset Databases:

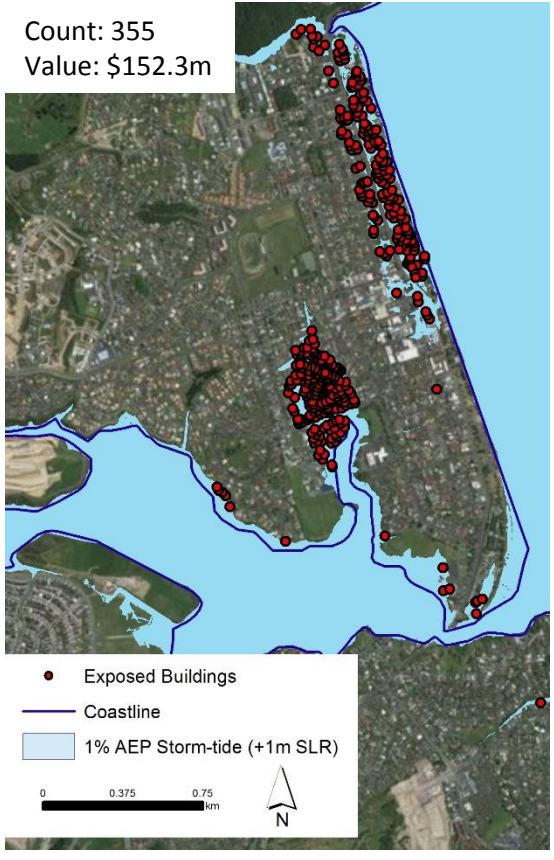
- Extend RiskScape NZ building asset inventory to include LINZ national building footprint dataset.
- Compile spatial dataset for population, infrastructure and land use assets.

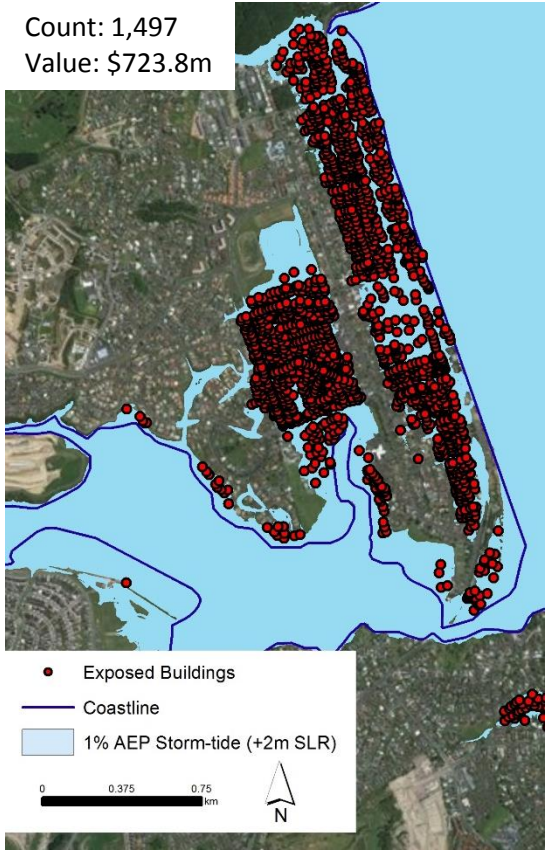
Software Development:

- Development of exposure modelling and template reporting functionality in RiskScape.

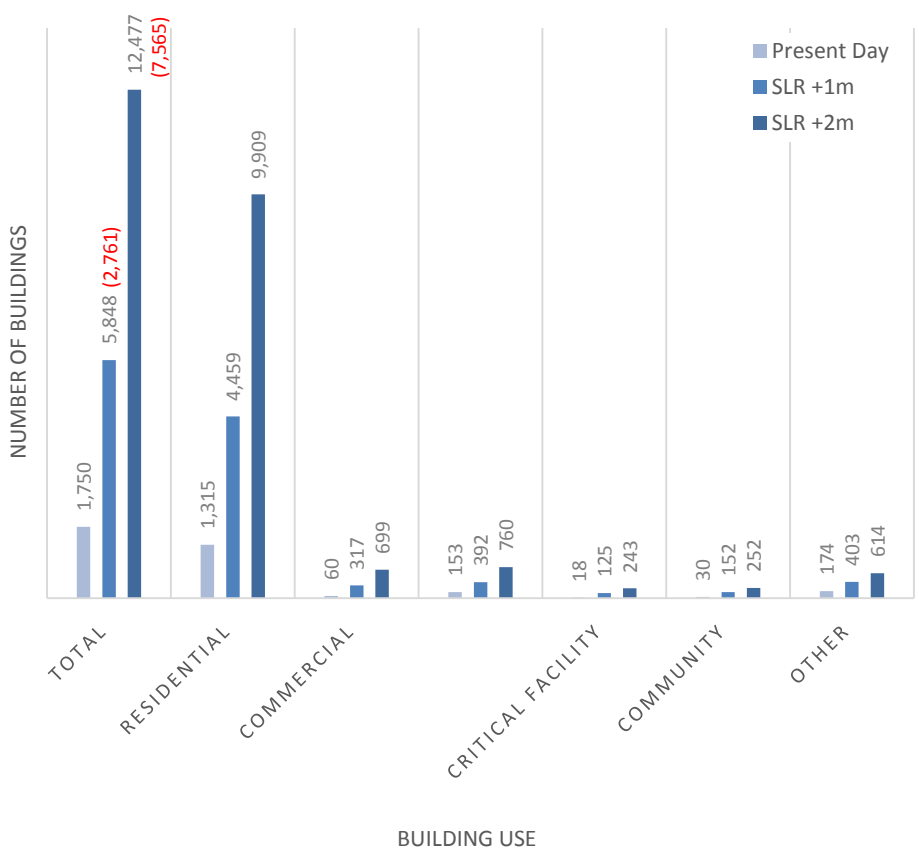


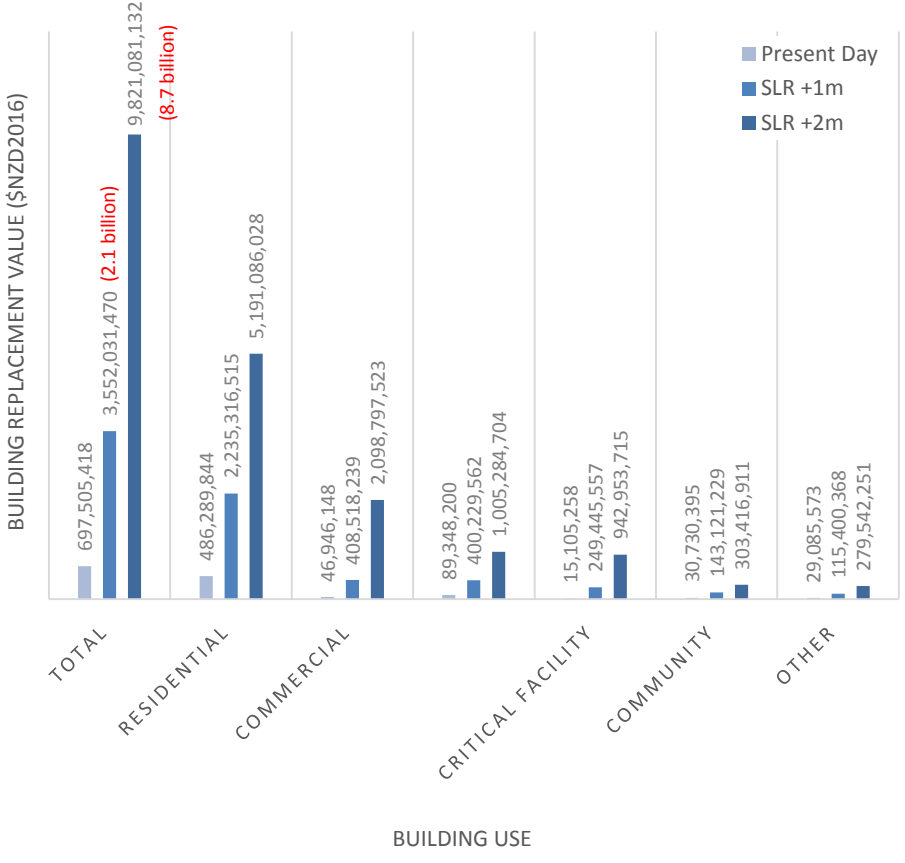
Auckland Storm-tide Building Exposure



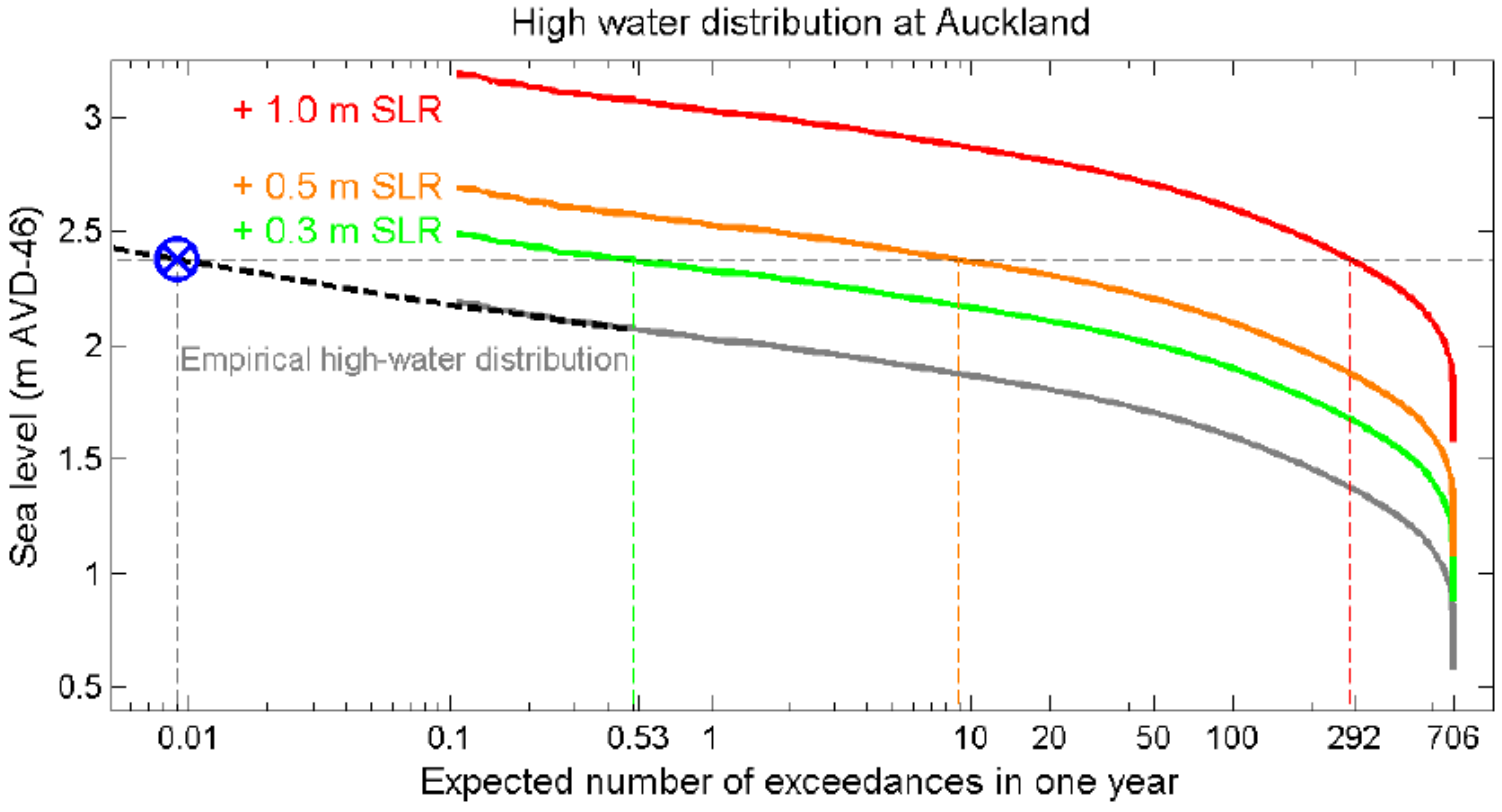


Auckland Storm-tide Building Exposure





Auckland Storm-tide Building Exposure



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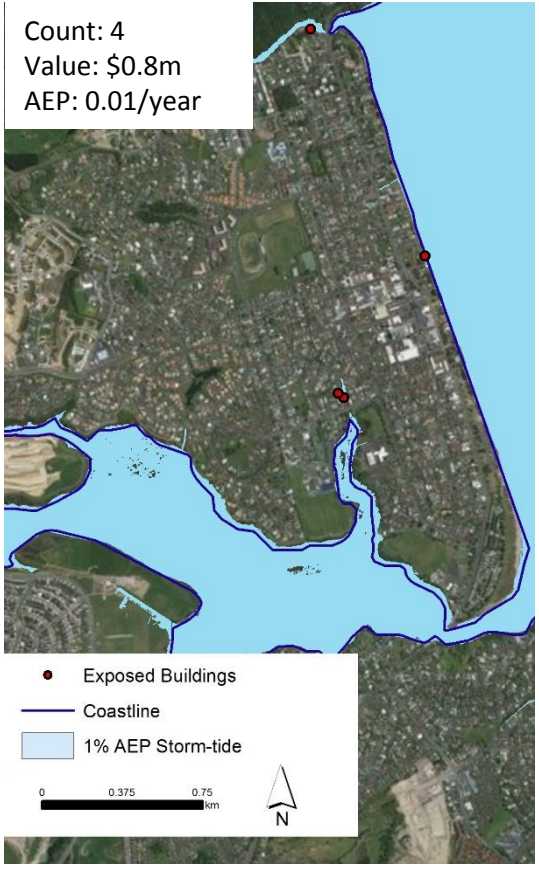
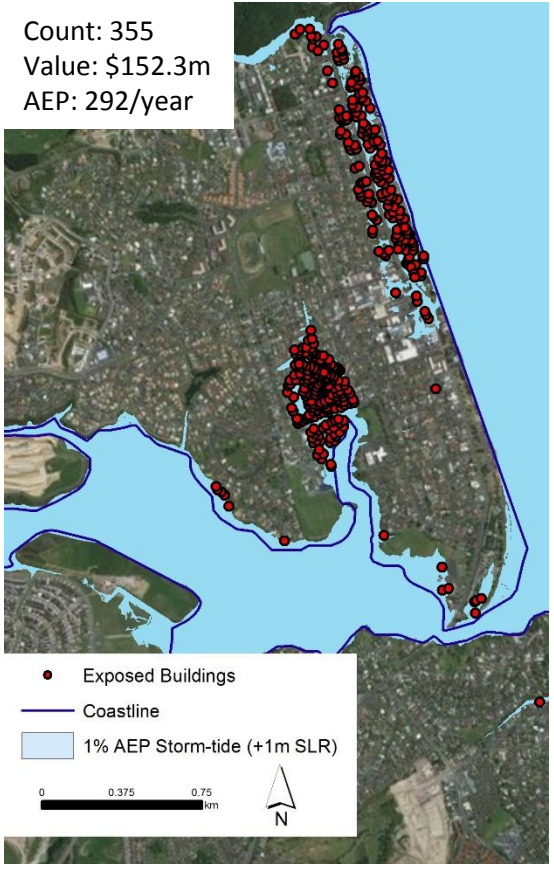
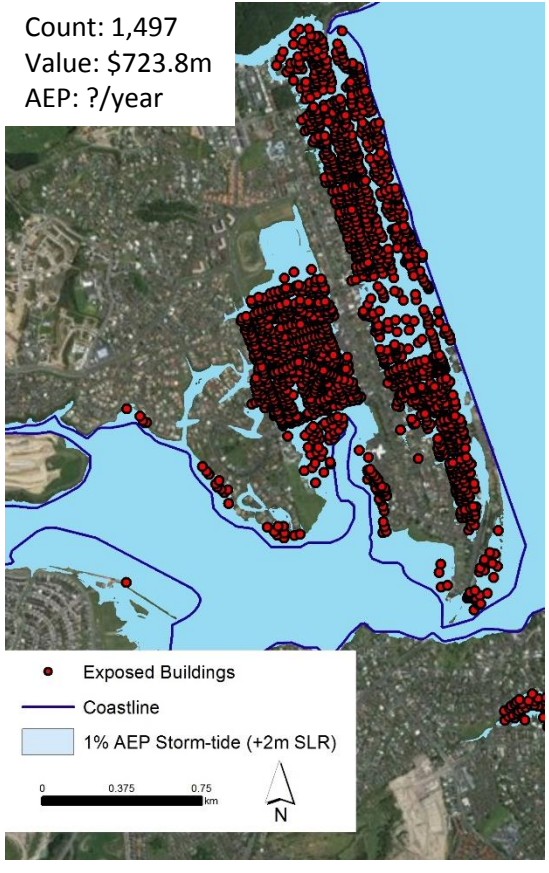
Auckland Storm-tide Building Exposure







Nga mihi nui

Thank you for your time and attention