

Coastal Hazard and Climate-Change Risk Exposure in New Zealand: Comparing Regions and Urban Areas

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SUMMARY

Despite its hilly and mountainous terrain, New Zealand is nevertheless exposed to long-term risk from sea-level rise and coastal hazards in pockets of low-lying coastal areas (only 0.6% of NZ land area) where urban and peri-urban settlements are concentrated. The national NZ Coastal Policy Statement requires land-use planning out for “at least 100 years” and to avoid redevelopment or land-use change that would increase the risk from adverse effects of coastal hazards (including tsunami).

There has been no national overview of the coastal risk exposure New Zealand faces nationally and in each region to coastal weather-related hazards, long-term sea-level rise (SLR) and climate change. Such an analysis has previously been hampered by access to high-resolution topography datasets (e.g., LiDAR) and a national database on assets and infrastructure to complement population census data. This presentation sets out the background risk exposure to sea-level rise and coastal hazards from a study undertaken for the Parliamentary Commissioner for the Environment using available topography and asset information.

High-resolution spatial modelling and mapping of coastal inundation from storm-tide and waves for present-day and with projected SLR, has only been undertaken in a few regions (e.g., Auckland, Otago, Waikato), so the national scale coastal risk exposure has been determined based on a stocktake of demographics and assets within land-elevation bands above mean high water spring (MHWS) e.g. 0.25, 0.5, 1, 1.5, ... 3 m above MHWS using LiDAR topographic data where available - otherwise the national DEM (based on the Shuttle Radar Topography Mission). Demographics and assets such as buildings, km of road/rail, land-use and other infrastructure have been enumerated regionally and aggregated nationally from the NZ RiskScape database to derive the risk exposure in relation to the coastal elevation profile.

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The findings from this risk-exposure analysis will inform national and regional conversations about adaptation to climate change in low-lying margins, particularly the legacy of existing development, and identifying the priority regions or areas based on the highest risk magnitude for both population and assets.

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