

Navigating New Zealand's Seismic Landscape: Preparing for Increased Earthquake Risk

Summary

- The 2022 update of the Aotearoa New Zealand National Seismic Hazard Model has revealed a significant increase in earthquake hazard across the country, especially in the lower North Island and upper South Island.
- The heightened seismic hazard means organisations could face much higher projected damage and financial losses, requiring improved risk assessment and resilience strategies.
- RiskScape is an advanced risk modelling platform, enabling organisations to accurately quantify their earthquake risk using the latest scientific data, helping inform insurance decisions and resilience planning.

In the realm of organisational risk management, understanding seismic threats is not just a necessity, it's a strategic advantage. The 2022 update of the Aotearoa New Zealand National Seismic Hazard Model (**2022 NSHM**) marks a pivotal shift in our understanding of seismic hazard, offering business leaders and risk managers a unique opportunity to redefine resilience strategies. This revision estimates an increased likelihood of future earthquake shaking hazard across New Zealand, with some regions experiencing more than double the previous estimates. On average, results have surged by 50 percent or more, underscoring the imperative to bolster national resilience and readiness.





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Decoding the Updated Seismic Hazard Model

The 2022 NSHM update integrates the latest scientific advancements, improved data, and a comprehensive understanding of seismic processes. Developed by Earth Sciences NZ (formerly GNS Science) with contributions from leading earthquake scientists and engineers, this model highlights heightened hazard levels, particularly in the lower North Island and upper South Island. These changes are driven by new fault discoveries, improved subduction zone modelling, and updated ground motion predictions.

Understanding the Implications for Insurance and Risk Management

The heightened earthquake hazard across New Zealand has profound implications for organisations of all sizes. Increased seismic hazard levels typically translate to higher projected damage to buildings, infrastructure, and lifelines, resulting in elevated insurance costs and the need for stricter building codes and greater resilience investments. However, the relationship between hazard and risk is complex; simply looking at changes in hazard does not provide an accurate understanding of the change in risk. This is where sophisticated risk modelling becomes essential, enabling organisations to quantify their risk with the latest earthquake hazard understanding.

RiskScape: A Powerful Tool for Quantifying Earthquake Risk

RiskScape is a powerful risk modelling platform that can help to navigate this complex landscape. By utilising RiskScape, Aon provides clients with a comprehensive view of New Zealand's risk landscape, informed by the latest science and granular local hazard and vulnerability data. This enables organisations to make informed decisions, optimise their insurance strategies, and enhance their resilience against seismic threats.

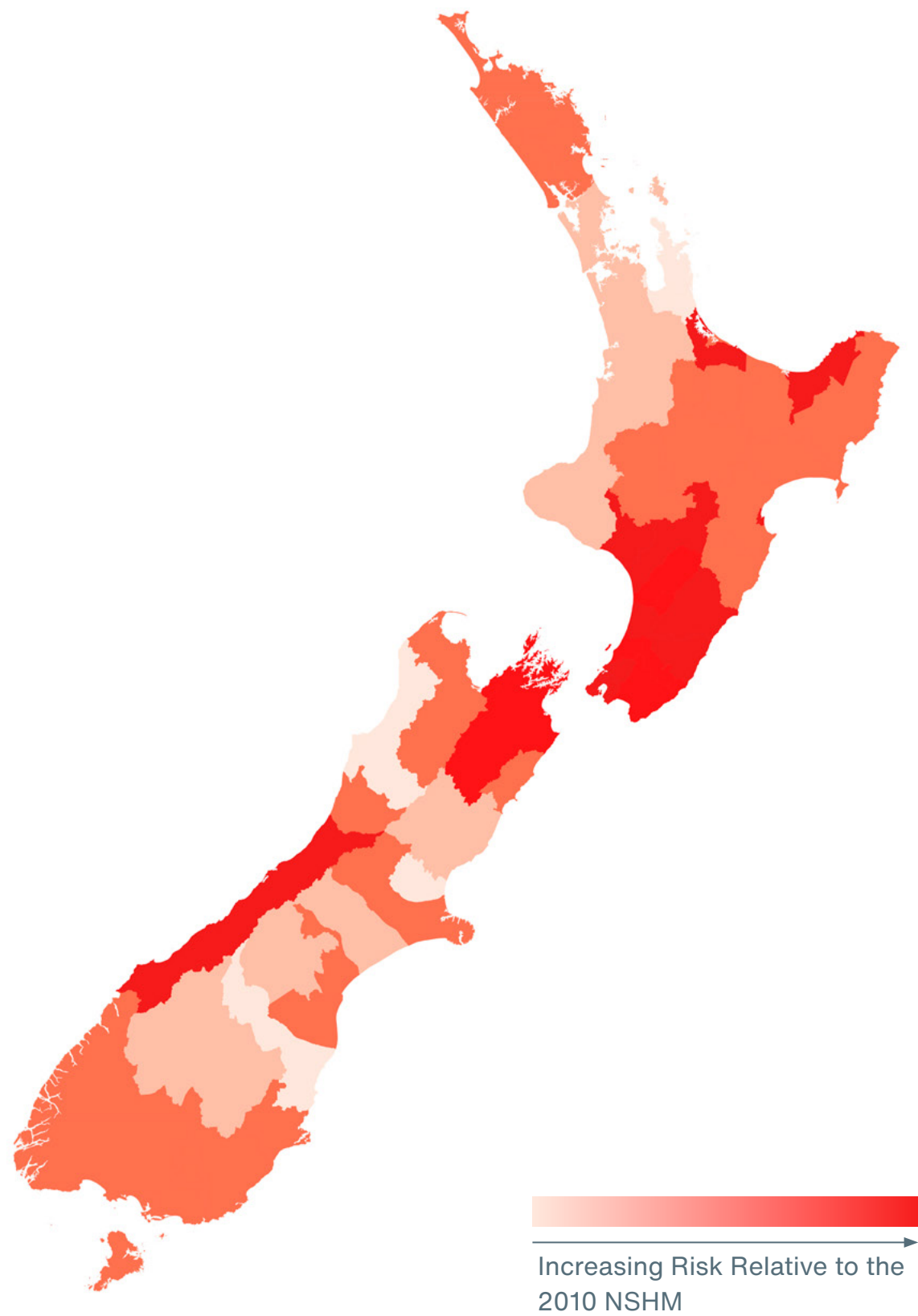


Case Study: Navigating Risk in New Zealand's Three Waters Infrastructure

We examined New Zealand's three waters infrastructure assets, focusing on the buried pipe networks across the country, to demonstrate the implications of 2022 NSHM in terms of financial losses and to illustrate the importance of proper risk modelling.

Using RiskScape, we compared the average 1,000-year losses estimated with the updated 2022 NSHM against similar estimates using the previous 2010 version. This comparison was done for all councils at an aggregate level. Key variables, such as asset vulnerability and local ground conditions were carefully aligned to ensure an accurate comparison.

The resulting 2022 over 2010 loss ratios ranged from less than one (indicating a reduction in risk) to over 10 times higher using the heightened hazard levels of the 2022 NSHM with the average across all councils being 4.5 times.



This map is developed in QGIS using the 2025 territorial authority boundaries by Stats NZ.

The analysis results show that much of the southern and eastern parts of the North Island, along with the top of the South Island have the most significant increase in expected loss. This is due to the improved modelling and increased shaking hazard contribution from the Hikurangi Subduction Zone. These areas were already considered high hazard in the 2010 NSHM, highlighting the significant risk these regions face.

A Proven Approach with RiskScape

RiskScape is an advanced, open-source risk modelling platform developed by Earth Sciences New Zealand (formerly GNS Science and NIWA), with financial backing from the New Zealand Natural Hazards Commission. It is specifically designed to quantify damage and loss resulting from various natural hazards, offering a flexible and customisable framework for assessing exposure, vulnerability, and the interactions between hazards through geospatial data integration. Aon has successfully utilised RiskScape in numerous projects across various sectors, including local government, demonstrating its effectiveness and reliability.

Who Can Benefit from RiskScape?

For business leaders and risk managers, the implications are clear: any entity with physical assets or operations in New Zealand stands to gain from an earthquake risk assessment using the latest hazard understanding. This includes government departments, councils, corporates, and other organisations seeking to enhance their resilience and preparedness against seismic risks. By leveraging RiskScape through Aon's expertise, these entities can make informed decisions to protect their assets and ensure continuity in the face of potential earthquake impacts.





About Aon

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Talk to Aon's Risk Management team today to discover how this innovative platform can redefine your approach to earthquake risk assessment and resilience.

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