2022 National Seismic Hazard Model: Hawke’s Bay region

The National Seismic Hazard Model (NSHM) combines the best available scientific knowledge to estimate future earthquake shaking in Aotearoa New Zealand.

The NSHM considers possible earthquakes that could affect a location and then estimates the severity of the related shaking that might occur.

Knowing the likely impact of future earthquakes on New Zealand’s land, structures, and people is essential to help us be as safe and prepared as we can be.

Hawke’s Bay regional information

The NSHM calculates multiple levels of potential shaking forecast to occur across the region.

In Hawke’s Bay, earthquake shaking is forecast to be more severe in the south of the region as well in the north east.

These two example maps display the level of ground shaking (PGA) that has either a 10% chance or a 2% chance of being exceeded within the next 50 years.

Hazard curves are one way of showing the results for one location. Below is an example for Napier.

Anywhere in New Zealand can experience earthquakes and regions can be affected by earthquakes from far away.

Significant past earthquakes which have affected the Hawke’s Bay region

Earthquakes shown: Mw ≥ 5.8 and since 1840 in upper 250 km

Source: Rollins et al (2022)

Don’t just think about your local or known faults.

Damaging shaking can occur from earthquakes outside of the region.

For detailed results for your region, go to: www.gns.cri.nz/nshm

Be prepared

For more information visit
Hawke’s Bay Emergency Management group’s website: hbemergency.govt.nz
National Emergency Management Agency: civildefence.govt.nz
Toka Tū Ake EQC: eqc.govt.nz

Need to know

The Hawke’s Bay region lies upon several faults, such as the Poukawa fault (that produced the Napier 1931 earthquake), and the Mohaka fault. The Whakatane and Waimana faults also extend into this region.

The shaking is forecast to be greatest in the south of the region, and higher towards the north east.

Anywhere in New Zealand can experience earthquakes and regions can be affected by earthquakes from far away.

On average, around 250 earthquakes are felt in Aotearoa New Zealand each year and thousands more are measured.

Knowing how strong future earthquake shaking might be can help us to understand the potential risks.

Various tools including computer modeling, the latest knowledge of how earthquakes occur, and understanding our turbulent past can help us prepare, make good decisions, and increase our resilience to earthquakes.

Source: Rollins et al (2022)
National Seismic Hazard Model

The NSHM provides a scientific estimate of the likelihood and strength of potential earthquake shaking which might occur in different parts of the country. It is detailed science, produced over several years, and the end product is a model that helps decision makers manage risks to safety and the economy from earthquakes.

What happens next?
NSHM science informs future policy and practice.

www.gns.cri.nz/nshm

On the NSHM website you can see multiple maps, hazard curves and reports. All of this information must be considered together to understand hazard and its likely impacts. There is not one map which tells us what the hazard from earthquakes is.

Earthquakes
Ngā Rū Whenua

Earthquakes mostly occur on faults. A fault is a rupture in the Earth’s crust that enables the land to move independently on either side. When pressure builds up in a fault, it can cause an earthquake and ground shaking. Faults can be as short as a few metres or up to 1000 kms long and they can cause a variety of different land movements. Many faults can rupture together affecting multiple regions.

Peak ground acceleration (PGA) is a measure of earthquake shaking. It measures the maximum acceleration of the ground that occurred during shaking at a particular location. Acceleration describes how the ground moves from slower to faster shaking speeds, much like accelerating in your car.

Ground shaking will vary due to:
- the ground conditions
- the land deep beneath our feet
- earthquake location and magnitude
- the direction the earthquake fault ruptures

These all affect the way the seismic waves travel through the ground and how the ground will shake. So, for the same earthquake affecting one region, an area of reclaimed land will shake very differently to an area of more solid rock.

It is common to see a range of hazard results, even within one region.

Earthquake waves can be: short and fast OR long and slow

Fast ground shaking (higher frequency) might mostly affect shorter buildings.

Slow ground shaking (lower frequency) might mostly affect tall buildings.

This is why we have seen some buildings affected more than others in previous earthquakes. Buildings move as a result of the unique combination of earthquake source, ground shaking, soil type, and building design.

Be prepared

1. Keep your whānau safe: Practice Drop, Cover and Hold at least twice a year.
2. There’s a lot we can do to make our homes safer for earthquakes. The Toka Tū Ake EQC website has key steps that will help you prepare your home and protect your whānau.
3. Long or Strong? Get Gone. If you live near the coast, as soon as earthquake shaking stops, move immediately to high ground or as far inland as possible, in case of tsunami.

If you would like more support or advice, have feelings of heightened or prolonged anxiety, stress, fear, hopelessness, or anger, or if you just need to talk with someone, please text or free phone 1737 to speak to a trained counsellor in the National Telehealth Service.