

## 1. Introduction

Northland Regional Council contracted NIWA to undertake a modelling-based assessment of tsunami hazard for the Northland region. The focus of the initial study (Lane et al., 2007) was to model maximum wave heights at the shoreline for selected districts in the Northland region for credible regional and remote sources, and to undertake inundation modelling for two specified communities. In the present study, potential inundation of a further fifteen Northland communities is investigated. Based on a tsunami source study (Goff et al. 2006) the following sources were identified as likely to cause significant tsunamis in the area of interest:

- Distant – Eastern: South America (Chile). A distant tsunami comparable to either the 1868 Peru (now Chile) earthquake ( $M_w9.0$ ) event or the 1960 Chile Earthquake ( $M_w9.5$ ) event (Note that although the 1960 event was larger it was directed more to the north of New Zealand where the 1868 can be considered an almost direct hit on New Zealand). This represents the most probably tsunami in the 50-100 year timeframe.
- Regional – Eastern source: Tonga Kermadec trench. Two tsunamigenic earthquakes were studied: a  $M_w8.5$  subduction zone event located just to the north of the Rapuhia Scarp (i.e. in the central portion) and a  $M_w9.0$  subduction zone event in the central and southern portion. These are identified as worst - case scenarios.

For each of these events NIWA modelled wave propagation up to the Northland shoreline and inundation of the following communities:

1. Ruakaka
2. Paihia
3. Marsden Point (after Ruakaka)
4. Russell
5. Mangawhai
6. Tutukaka
7. Ngunguru
8. Tokerau Beach

9. Waitangi
10. Matauri Beach
11. Waipu Cove
12. Pataua South
13. Matapouri
14. Whananaki
15. Oakura and Ohawini Bays

Inundation modelling at the above locations was performed assuming that the waves arrive at Mean High Water Springs (MHWS) at present day sea level; model runs were also performed with a sea level rise scenario of 50 cm, which represents the 100 year projection defined by the IPCC Fourth Assessment Report.