

# Pāpāmoa tsunami inundation modelling

an example of land use planning

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# North Island New Zealand





# Case study:

## SmartGrowth

SmartGrowth is a plan for managing growth in the western Bay of Plenty to ensure that as the area grows, it will continue to be a great place to live, work and play.



# Pāpāmoa - Wairakei



# Te Tumu



# Why 'risk management'?

Plan Change 44 (Wairakei) 2008 decision:

Tauranga City Council declined to consider the tsunami hazard on the basis that

“its risk is difficult to quantify and it is outside the 100-year planning horizon for hazard risk commonly accepted under the RMA”.



# Resource Management Act

... avoid or mitigate natural hazards ...

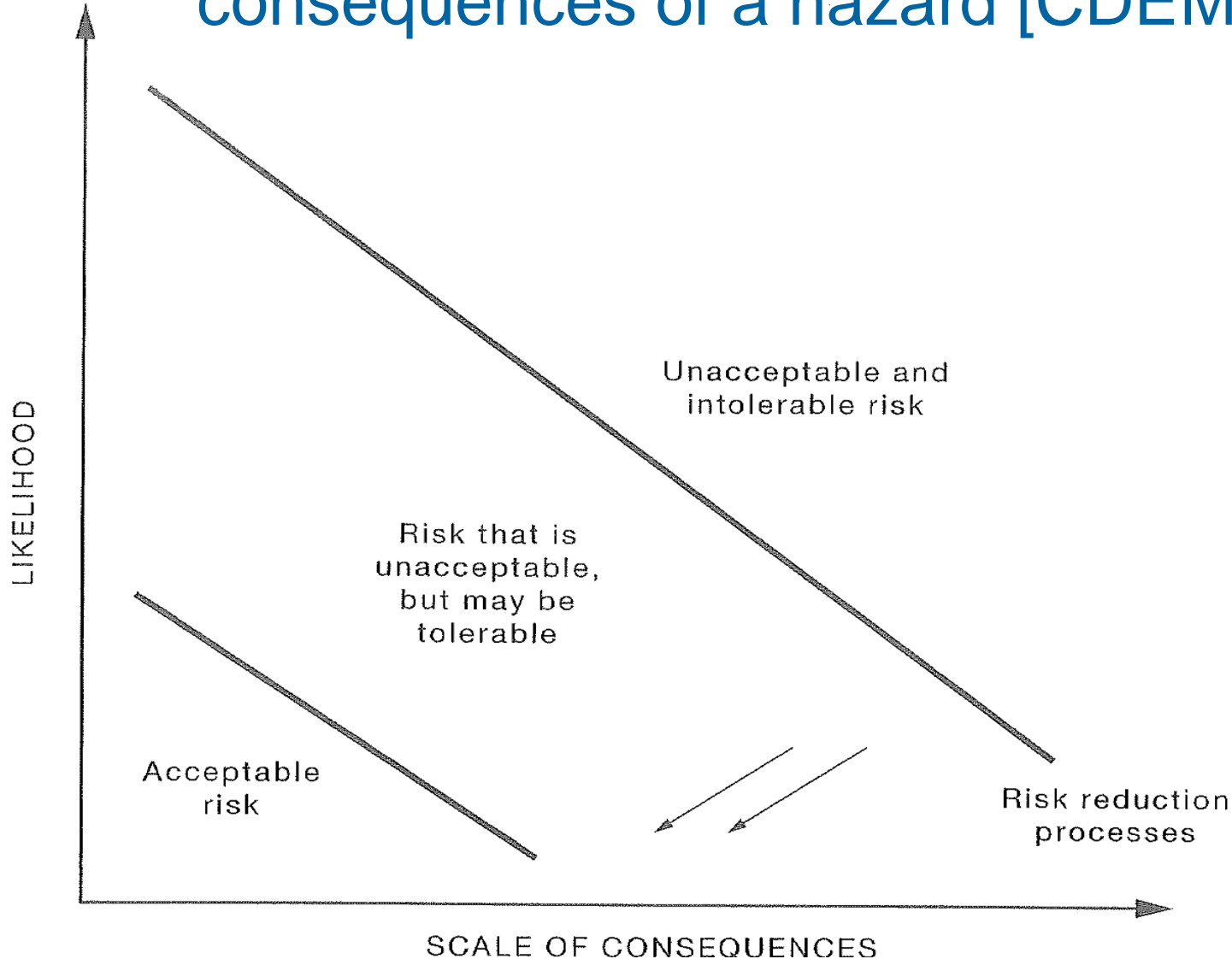
4 November 2010: NZ Coastal Policy Statement:  
includes tsunami,  
takes a risk approach,  
“over at least 100 years”

The Government intends to include “the management of the significant risks of natural hazards” in the RMA as a section 6 matter of national importance to be recognised and provided for.





# risk means the likelihood and consequences of a hazard [CDEM]



# Tsunami Research

## Bay of Plenty research 2001 – 2010

2002: paleotsunami evidence of large BOP events

[2004: Indian Ocean tsunami]

2006: modelling could not explain BOP evidence

2010: BOP evacuation maps published

[2011: Japan tsunami]



# Tsunami Research continued

## CDEM initiated GNS Science research

- Review of tsunamigenic sources within the Bay of Plenty Region, Report 2011/224
- Tsunami inundation modelling for Tauranga and Mount Maunganui, Report 2011/193
- Tsunami inundation modelling for Whakatāne, Ōhope, and Opotiki, Report 2011/194
- Modelling of the tsunami risk to Pāpāmoa, Wairakei and Te Tumu and implications for the SmartGrowth Strategy, Report 2011/294



# Tsunami Research continued

## SmartGrowth initiated GNS Science research

- Modelling of the tsunami risk to Papamoa, Wairakei and Te Tumu assuming an altered ground level due to development of Wairakei and Te Tumu, and the implications for the SmartGrowth Strategy, Report 2012/54
- Modelling of the evacuation rates required to achieve an acceptable level of health and safety risk in Te Tumu from the Variation to the Southern Kermadec Scenario, Report 2012/291

[2011 – 2012 modelling matched BOP paleotsunami evidence]



# Risk Assessment

Proposed Bay of Plenty RPS required intolerable risk to be avoided, existing tolerable risk to be reduced and new development to not be subject to risk that exceeds acceptable levels

The consequences 'death' and 'cost of building damage' were assessed



# Risk Findings

Pāpāmoa – several scenarios have intolerable levels of risk

Wairakei and Te Tumu – several scenarios have tolerable or intolerable levels of risk

Deaths found to be intolerable

Building damage found to be acceptable



# Response

What if?

Focus on saving lives:

Modelling assumed no evacuation:

**50 minutes, no formal warning, physical setting**

Can risk at Te Tumu be reduced to 'acceptable'?

Existing high ground: vertical evacuation?



# Finding and assumptions

## Finding

In principle: research found that provision for vertical evacuation in the development at Te Tumu could reduce tsunami risk to an acceptable level.

## Assumptions: evacuation response

- individuals must act to reduce their own risk
- respond to natural signals: damaging quake
- sustained tsunami education and evacuation training





# What is Tauranga City Council doing?

## Response to risk in existing developed areas

1. Mass evacuation plan; “Tsunami Survive”
2. Detailed inundation plans:  
    accessible safe/safer zones
3. Tsunami sirens: considered and discarded
4. Roading upgrades planned
5. Walkway bridges being installed
6. Ongoing engagement with the community

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# What is Tauranga City Council doing?

## Areas not yet zoned for development

To achieve 'acceptable' risk and retain in settlement pattern:

- Te Tumu: combine vertical evacuation areas/facilities, land use/building design rules/subdivision layout, CDEM measures
- Wairakei: combine subdivision layout (e.g. routes for evacuation), CDEM measures
- Other new urban growth areas: assess risk and mitigation measures in future planning processes; CDEM / BOPRC research helps local detail

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# Issues Arising

Alignment of recently published tsunami risk review with previous research, especially “likelihood”

Regional Policy Statement operative 1 October 2014 without natural hazards provisions.

Proposed Change 2 inserts new natural hazards provisions:

submissions close on 13 November 2014



Thank you

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