

# Contents

## Natural Hazards

<b>OBJECTIVES AND VISIONS</b>	<b>2</b>
<b>OVERVIEW</b>	<b>2</b>
<b>PRESSURES</b>	<b>3</b>
<b>KEY ISSUES</b>	<b>3</b>
<b>STATE</b>	<b>4</b>
Flooding	
Forest Fire	
Wind	
Earthquakes	
Volcanic Activity	
Erosion, slips, landslide	
Community Awareness	
<b>RESPONSE</b>	<b>6</b>
<b>WHAT YOU CAN DO TO HELP</b>	<b>7</b>
<b>CASE STUDY</b>	<b>8</b>
Te Aroha Flood 1985*	

# Natural Hazards

## OBJECTIVES AND VISIONS

- To minimise the risks of flooding affecting people and property in the District.
- To minimise forest fire hazard for people and property in the District.
- To minimise wind hazards for people and property in the District.
- To minimise hazards for people and property caused by erosion, slipping, slumping and land instability.
- To minimise the risks of earthquakes affecting people and property in the District as far as practicable.

## OVERVIEW

### FLOODING

Extensive flood protection schemes have been put in place to minimise the impacts of flooding on communities in the Matamata-Piako District.

### FIRE

Forest fire is a very rare event within the District, however funding is spent on managing the risk.

### WIND

Most residents along the Kaimai Range are well aware of the potential for high winds to cause property damage.

### EROSION, LANDSLIDE

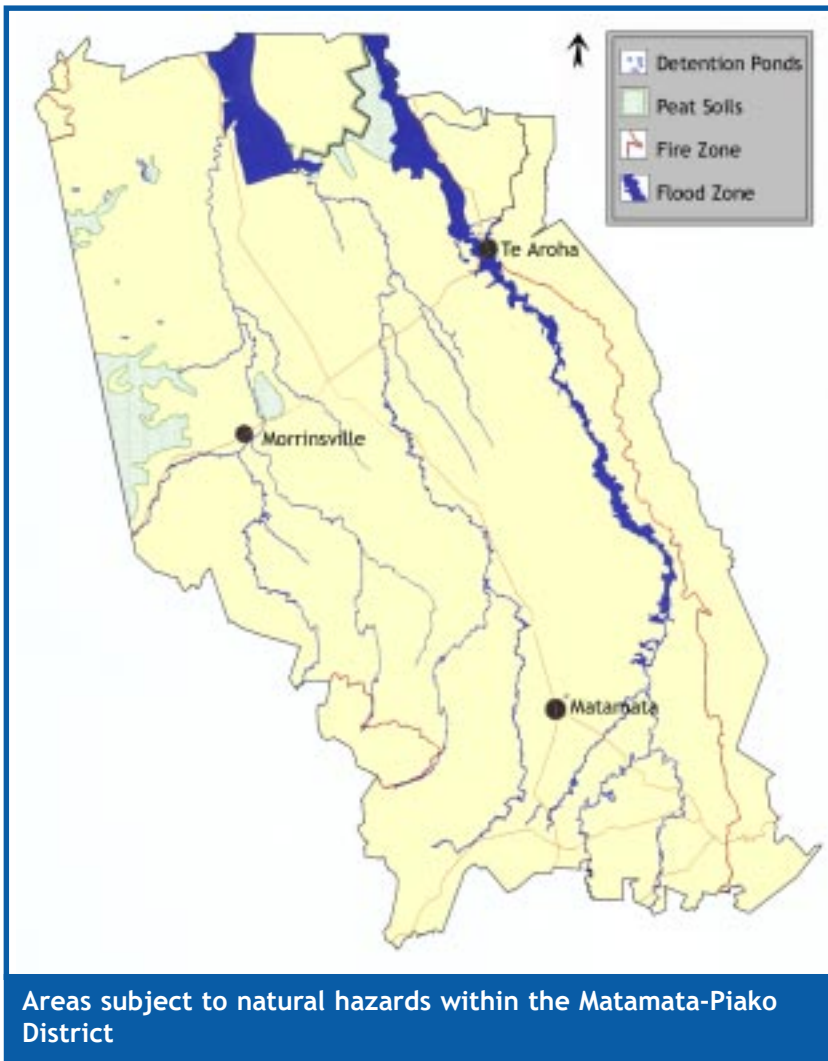
While most of the district is relatively flat and not subject to high erosion risk, of the areas that have a slope of 20° or greater, only 50% are vegetated. Vegetation stabilises slopes and reduces the risk of slips and erosion.

## OVERVIEW

### EARTHQUAKES

Few earthquakes are experienced in the Matamata-Piako District, despite several active fault lines running adjacent to communities.





## Pressures

While natural events such as floods and earthquakes cannot be prevented from occurring, their effects can be minimised by preventing and controlling development in the most hazard-prone areas. Where development occurs in hazard-prone areas, engineering works such as construction of stop banks or strengthening of buildings can mitigate the effects of natural hazards. A crucial role for the Council in areas affected by natural hazards is raising public awareness and ensuring that the public is prepared for emergencies, to reduce the risk to lives and property.

**T**he occurrence of a natural hazard is not generally influenced by human activity, however the effects of the hazard can be reduced or increased as a result of human activities. The key to the management of the effects of natural hazards is the management of human activities in the environment<sup>1</sup>. In other words, the easiest way to control effects is to carefully manage development.

Natural hazards can occur with little warning and cause significant damage to property and the environment and put lives at risk. Natural hazards are only a concern if they have the potential to affect people or property. For example, if a river system floods land that is not used or populated, then the flood is simply a natural event rather than a natural hazard. Increased development will result in a corresponding increase in the hazard associated with natural events that affect the district.

<sup>1</sup> Eriksen, N, 1986: Creating Flood Disasters New Zealand's need for a new approach to urban flood hazard, Water and Soil Miscellaneous Publication No 77, Wellington.

## KEY ISSUES

- The threat of stopbank breaches, which present a significant hazard in rural areas, and the considerable amount of effort required to remedy flood hazard in the District which affect farming and therefore the economic well-being as well as the physical safety of people and communities.

- The threat of hazards from slips, landslides and erosion, particularly on the steep slopes of Mt Te Aroha and along the Kaimai Range.
- The need to address erosion along stream and river margins in the District.
- The threat of forest fire, which could significantly increase if the intensified development is permitted in forested hill country areas.
- The threat of wind hazards, particularly in areas adjacent to the Kaimai Ranges and in known wind tunnelling areas.
- The threat of earthquake and volcanic hazards where risks need to be more clearly identified and defined.
- The requirement to avoid, remedy or mitigate the effects of natural hazards in line with the Regional Policy statement.

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## State

The Matamata-Piako District is prone to a variety of natural hazards including

- Flooding
- Forest Fire
- Wind
- Earthquakes
- Volcanic activity
- Erosion, Slips and Landslide

### Flooding

Flooding is the most significant natural hazard that affects Matamata-Piako as the district has two major river systems, the Piako and the Waihou flowing through populated areas and prime agricultural land. The removal of forested areas in upper catchments (outside the Matamata-Piako District) and the drainage and development of swamp land within the District together with ageing of flood protection works has led to an increased flood hazard.

Over the past year five resource consents have been granted for development within the flood protection area.

### Forest Fire

While forest fires have not been a regular occurrence in the district, they are a recognised risk within the Kaimai Ranges and other forested areas. This risk needs to be controlled.

### Wind

Areas of the Matamata-Piako District adjacent to the Kaimai Range are particularly prone to high winds. There are also other areas within the District that are subject to local wind tunnelling. In these areas what can appear to be a mild storm event can in fact result in quite substantial wind damage to property.

### Earthquakes

There are several active fault lines within the District, the most prominent being the Kerepehi fault line which runs in a southeast - northwest direction between Matamata and Te Aroha. This fault line is thought to be responsible for both of the Districts largest earthquakes on record which measured between 6 and 6.9 in magnitude. The latest of these earthquakes occurred on 8 January 1972 near Te Aroha.<sup>1</sup>

### Volcanic Activity

The only volcanic activity within the Matamata-Piako District is the geothermal hot springs and geyser located at the Te Aroha Domain and the Opal hot springs near Matamata. The district is also located in the volcanic ash deposition zone from the Tongariro Volcanic Centre which encompasses the National Park mountains. The most recent volcanic event, the eruption of Mt Ruapehu in 1995 forced millions of tonnes

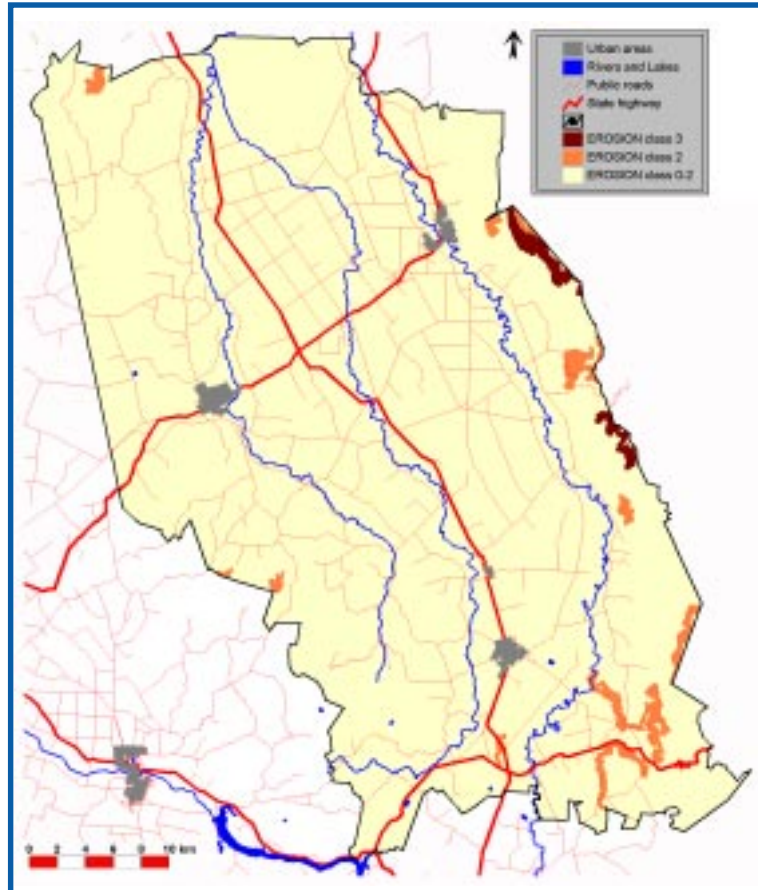
of volcanic ash into the atmosphere to eventually settle over an area covering hundreds of square kilometres. Some volcanic ash settled within the Matamata-Piako District.

**Erosion, slips, landslide**

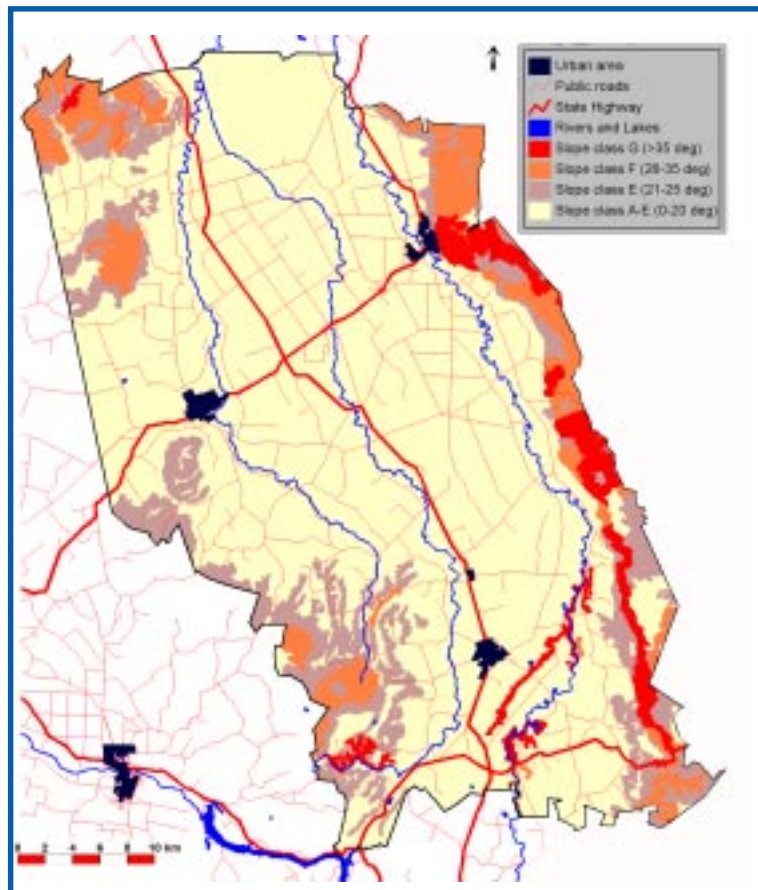
While only 2% of the district, (or 3,282.73 hectares) has an erosion potential of moderate or severe, the adjacent map "Erosion potential" shows that one of the most severe of these areas is in the Kaimai Ranges above Te Aroha. Movement in this area could cause severe effects in Te Aroha which is located on alluvial fans between the Kaimai Ranges and the Waihou River. These alluvial fan deposits are very unstable and prone to landslide, slips and erosion.

- Erosion potential is classed as
- 0-1 negligible/slight
  - 2 moderate
  - 3 severe
  - 4-5 very severe/extreme

The adjacent map "Slope Class" shows the areas within the district that have a slope of 20° or greater which could potentially become erosion prone and cause slips.



Erosion potential within Matamata-Piako District

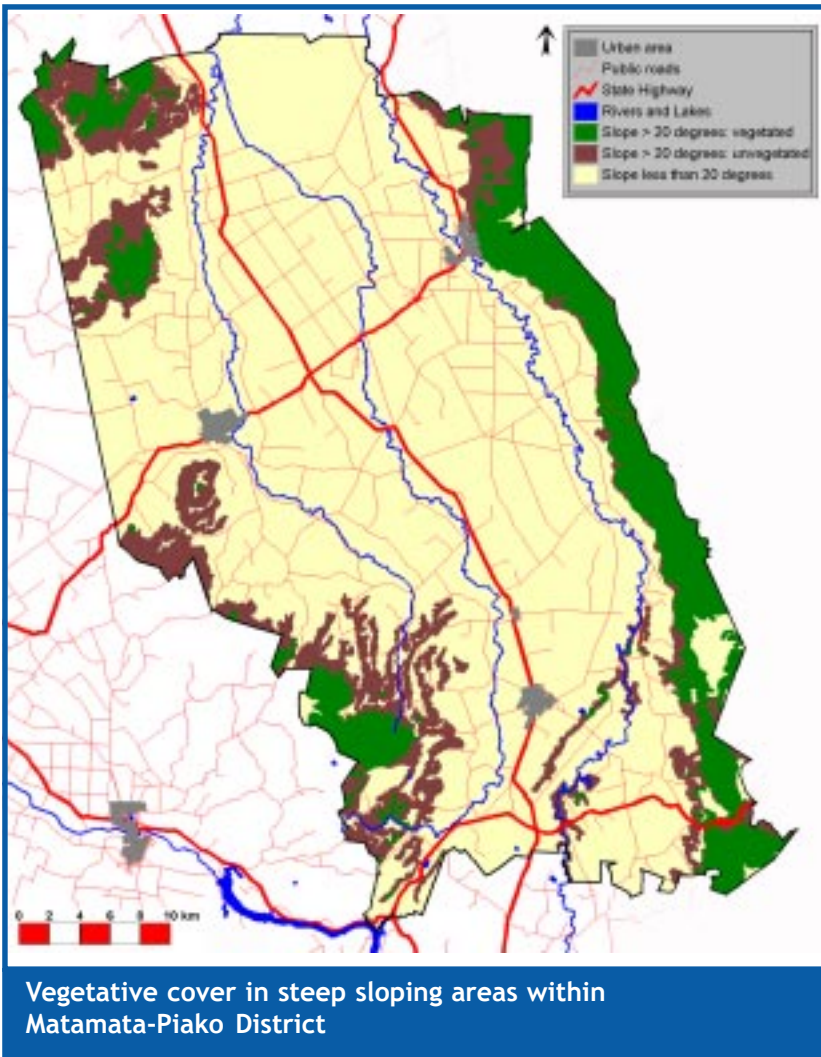


Slope Classes within the Matamata-Piako District

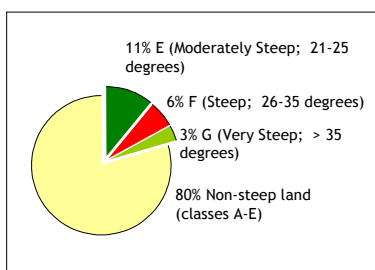
Data extracted from Environment Waikato's GIS on 9/7/99  
Data Source: NZ Land Resources Inventory (LRI) . Copyright Landcare Research Ltd.

Data extracted from Environment Waikato's GIS on 9/7/99  
Data Source: NZ Land Resources Inventory (LRI) . Copyright Landcare Research Ltd.





The map above shows the areas with slope greater than 20° that are vegetated. Vegetation cover (trees, or scrub not pasture) improves slope stability. 50% of slopes over 20° are vegetated, and 50% are not.



Over the past year four applications have been

granted for development on potentially unstable land.

### Community Awareness

The effect of natural hazards and the ability for people to cope with hazards when they do occur is determined to a large degree by the level of community awareness and preparedness for a hazard event. People are far better able to cope with a hazard event if they are prepared.

A 1998 survey<sup>2</sup> concluded that 76% of the Districts population are not prepared for a natural hazard event with over half of all residents surveyed not being able to identify a natural hazard that could

affect them or their property. The hazards most frequently mentioned, in order of priority, were flooding (19%), winds and earthquakes (both 8%).

The map on page 54 identifies the areas within the District subject to various natural hazards.

## Response

Council has developed planning controls through the District Plan to ensure that new developments are not located in high hazard areas. Civil Defence co-ordinate disaster planning and relief during events and also provide education material to the community on emergency preparedness.

Environment Waikato works closely with other organisations to manage the threat of natural hazards. Extensive monitoring processes are in place along the Waihou River to provide advanced warning of potential flood events.

<sup>1</sup> Environment Waikato State of the Environment Report, 1999

<sup>2</sup> Environment Waikato and Research Solutions. 1998: Environmental Awareness, Attitudes and Actions.



## What you can do to help

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- Keep your insurance cover up-to-date.
- Ensure that your family has an emergency plan.
- Know whether you live near potential hazard areas.
- Have an emergency kit and drinking water ready at all times.

## CASE STUDY

# Te Aroha Flood

## 1985\*

Te Aroha experienced severe flooding on 17 February 1985 when floodwaters and debris inundated the township. The flooding occurred after a period of high intensity rainfall in the Kaimai-Mamaku Range catchment area behind Te Aroha.

Prior to the flood event, it had been very dry with no rainfall for the previous three weeks. The ground was very dry and cracking had allowed water to infiltrate and 'grease' the slopes making them very unstable. Steady rain for 24 hours prior to the flooding had saturated the ground increasing its weight on underlying slopes.

After the initial period of rain, an unpredicted 600mm fell between 6pm and 6am on the 16/17 February. Strong winds which characterise storms in the Te Aroha area added to the potential hazard by uprooting large trees on the upper slopes of the catchment.

As the level of the streams draining out of the catchment, through Te Aroha and into the Waihou River increased, the trees felled by the strong winds acted as bulldozers and pushed tonnes of mud and debris down the overflowing streams and through the township.

In 1988 Council commissioned a flood hazard assessment of Te Aroha which made a number of suggestions for reducing the flood hazard risk. These included additional drainage works and a





## CASE STUDY

recommendation to implement some planning controls on development in flood hazard areas. The district plan identifies areas of Te Aroha that are subject to flood hazard and has developed standards for these areas such as minimum height for floors, to mitigate adverse effects on economic well-being and life.

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\* Howarth, Merle, 1986: Town in Trouble, Te Aroha, Thames,

