7 Natural Hazards

7.1 Introduction

Natural processes shape, change and form the natural environment which we live in. Human activities such as development have the potential to conflict with natural processes, resulting in natural hazards. Potential hazards which are important to recognise in the Kaipara District include land instability, flooding, coastal hazards, (including the impact of climate change) and fire.

The Plan seeks to manage activities to avoid hazards

The key to managing the potential effects of these hazards is assessing their risk to human life, property and the environment. Calculating the risk potential involves identifying and quantifying the potential hazard and then determining the area of land which is likely to be subject to natural hazards.

7.1.1 Flooding

Flooding occurs when natural and artificial drainage systems cannot cope with a particular rainfall event. The Kaipara District contains several major river systems, some of which pass through relatively low lying valley areas. In addition, Kaipara experiences a typically high intensity rainfall which falls within the District. As a result of the above features, there is a higher risk of flooding events within areas of the Kaipara District.

Most systems that cause flooding in Northland are small-scale intense rainstorms, for example, severe convection and thunderstorms, but widespread regional flooding can also occur as a result of other weather systems such as north Tasman lows and ex-tropical cyclones. Severe convection tends to cause localised damage, but as the events are often not well forecast, they can catch communities unaware.

The primary areas prone to flooding are adjacent to the lower reaches of the Kaihu, Manganui and Northern Wairoa Rivers which have generally been developed for farming purposes. However, some settlements are also affected with the most notable being Dargaville. The main commercial area of Dargaville is situated on the banks of the Northern Wairoa River immediately east of its junction with the Kaihu River.

Some land in Dargaville township is also prone to flooding from overflows of the Kaihu River. Floodwaters have on occasion breached stop banks in the Beach Road – Station Road area and have taken a more direct route to the Northern Wairoa River through adjoining properties.

Studies on flooding susceptibility have been undertaken by the Northland Regional Council. Maps contained Part E – Maps, Appendix C denote areas of the District that they consider to be susceptible to flooding. Due to the scale of mapping, these maps are considered to be for general information purposes only. It is recommended that Northland Regional Council be contacted for more accurate information if necessary. The reason for including these indicative maps is to alert people to a potential hazard, enabling any decisions on the development or use of the land to be made having due regard to the risks involved and to identify areas where further more detailed investigation on flooding susceptibility may be appropriate.

7.1.2 Mass Movement including Landslips

Kaipara District has varied land types and due to this some areas are prone to slippage, slumping and other forms of mass movement. The degree of instability is generally related to the topography of the land which is associated with soil type, geology and vegetation cover. Some of the soils present have become deeply weathered and lost much of their structure under the prevailing warm humid climate. Where these soils are present on relatively steep slopes with little or no vegetation cover then various forms of mass movement are likely to occur. This can include widespread soil slipping and slumping to more localised gully, hill or tunnel erosion. It is also noted that land instability issues can also arise from inappropriate earthwork activities and the removal of vegetation cover.

7.1.3 Coastal Erosion

The Kaipara District has an extensive coastline, parts of which are prone to erosion and other forms of natural hazards. The main areas affected are along the East and West Coasts where wave action associated with storms is a key hazard. Where these storm based events are combined with more gradual long term erosion then significant shoreline movements can also result.

The stream and estuary mouths along the two coasts are also particularly vulnerable to the movements outlined above. For example, the mouth of the Waihaupai Stream, situated south of Maunganui Bluff on the West Coast is estimated to have moved some 450m between 1880 and 1960. In addition, wind based erosion of sandstone cliffs and dune areas are particularly evident along the West Coast, with some associated encroachment of sand onto adjacent properties.

As outlined in the Northland Regional Council's State of the Environment Report, 2007, the above natural hazards are being exacerbated by further pressure from coastal subdivision and development which affects natural coastal processes. These physical influences combined with likely future climate change, may create increased periods of storminess and in some areas sea level rise, which will act to increase the threat of coastal hazards. As identified in this report, additional pressure from large subdivision has occurred in Mangawhai and Baylys in addition to a number of smaller subdivisions on the Kaipara Harbour.

7.1.4 Climate Change/Sea Level Rise

The warming of the earth's surface and atmosphere is caused by an increase in greenhouse gas emissions (including methane and carbon dioxide), from human activities including forest clearance, reclamation of wetlands and industrial air emissions. The result of these processes is predicted to result in changes in sea level, coastal inundation and erosion, higher local temperatures, and changes in rainfall patterns, and increase in flooding events. These changes would have a major impact on human activities within or adjacent to hazard areas within the District.

The New Zealand Coastal Policy Statement states that District Plans must identify areas subject to the effects of possible climate change and sea level rise and provide natural defence systems within the coastal environment that will mitigate the associated environmental effects. Subdivision, use and development will be discouraged from locating in areas that form natural defence systems.

7.1.5 Fire

Wild fire is a hazard in the Kaipara District, especially during dry summer periods. Wild fires can put lives at risk, destroy property, and devastate natural areas; putting at risk natural, cultural, historical and recreational values of the District. The changing weather patterns expected from climate change (as discussed above), including the increasing intensity of droughts, are expected to increase the risk of wild fire. Providing and maintaining adequate 'defensible space' (or the separation of buildings (particularly dwellings)) and bush and shrubland areas is one example of how land use planning can manage the risk to property and life as a result of wild fire.

Slip Repair Works

A helicopter dousing Northland forest fire (DOC)

7.2 Resource Management Act Requirements

In Section 31(1)(b)(i) of the Resource Management Act 1991, one of the functions of a territorial authority is the control of any actual or potential effects of the use, development, or protection of land, including for the purpose of avoidance or mitigation of natural hazards. Further references to natural hazards are provided in the Resource Management Act 1991 in Section 2 and also in Schedule 1.

Territorial authorities have a responsibility to consider and where appropriate provide for District Plan provisions which relate to the use, development and protection of hazard prone land.

The Northland Regional Council also has a responsibility, under the Act, to control the use of land for the purpose of the avoidance or mitigation of natural hazards. The Northland Regional Council addresses this responsibility through its Regional Policy Statement, Regional Coastal Plan and Regional Water and Soil Plan.

7.3 How to Use This Chapter of the District Plan

This Chapter contains Issues, Objectives and Policies relating specifically to recognising and managing Natural Hazards. While this Chapter contains methods, it does not contain 'Rules'. The Outcomes sought for the use, development and protection of land with respect to natural hazards will be achieved through Land Use and Subdivision Rules and Performance Standards in the Zone Chapters.

Figure 1-2 in Chapter 1 provides a summary of how to use this District Plan

As long as the performance standards in the relevant Zone are met, landowners have flexibility on what they do on their property and do not need to consider this Chapter. However, if a proposed development or new land use would not meet a performance standard that relates to natural hazards, you will need to apply to do the work (lodge a Resource Consent). If you are applying for such a consent, you should give consideration to this Chapter, particularly on how your development contributes to achieving the Objectives and Policies. Issues, Objectives and Policies within each Chapter of the Plan are presented in no particular order of importance.

Before you use this Chapter of the Plan, check:

- ☑ That the proposed use or development does not meet the performance standards relating of the relevant Zone.
- ☑ That the consent application has considered the matters for assessment with respect to the performance standard non-compliance.

The 'Rules' to implement this Chapter are in the Zone Chapters (Part B)

It is also noted that you may want to look at this Chapter if you are seeking a major Resource Consent or Plan Change, particularly in areas adjoining the coast or in proximity to waterways.

In summary, if your proposal is for an activity (development) that meets the performance standards in the relevant Zone Chapter, you do not need to give consideration to this Chapter of the Plan.

7.4 Natural Hazards Issues

7.4.1 There is risk to life, property and the environment from hazards including fire; flooding in low lying areas; coastal erosion; landslips; and storm damage.

The Kaipara District is susceptible to a range of natural hazards many of which have the potential to cause significant property damage along with social and economic disruption to communities (e.g. wildfire). Climate change has the potential to exacerbate these hazards in some areas (e.g. coastal locations and adjacent to waterways). Minimising the adverse effects of the various hazards, particularly on people, property and associated infrastructure, is an important part of sustainable resource management.

7.4.2 Kaipara District has a large proportion of coastal area which gives rise to increased potential for natural hazards, particularly where inappropriate development occurs.

Coastal erosion, landslips and flooding are natural processes that can be initiated or exacerbated by human activities particularly in the dynamic coastal environment. Coastal hazards can arise where communities have constructed buildings too close to the Coastal Marine Area, especially on dunes, spits or near wetlands.

7.4.3 Inappropriately located activities and development increase the likelihood of significant property damage caused by hazards, such as wild fire, land instability and subsidence.

Human activity and development can increase this risk when they occur in or near areas prone to natural hazards. Certain natural features (such as sand dunes and wetlands) function to absorb the effects of natural hazards but may lose their protective role due to human intervention, thereby exacerbating the risks from natural hazards, e.g. draining wetlands may lead to increased downstream flooding.

Certain activities can contribute to increasing the hazard threat especially in high risk areas. Such activities include:

- *Clearance of vegetation by mechanical or other means in areas exposed to the elements and/or with poor soil structures;*
- *Earthworks, in sensitive foreshore and riparian areas;*
- *Erection of structures, especially buildings, in flood plains; and*
- *Locating structures (especially dwellings) in close proximity to bush or shrubland areas or conversely allowing forestry activities close to existing residential buildings (locating property and residential activity in proximity to wild fire hazard areas).*

7.4.4 Climate Change has the potential to adversely affect coastal development.

Climate Change is occurring, and dunes and wetlands will provide an increasingly important natural hazard buffer as impacts of this are realised (including increased storminess, changes in sea level, coastal inundation and erosion). Subdivision, use and development require management, and natural ecosystems require protection in a coastal situation.

7.4.5 While it is recognised that areas of the District are susceptible to hazard, there is uncertainty regarding detailed geographic areas of impact. The costs of mapping hazard areas needs to be balanced with the potential risks of hazard impacts, particularly given the low levels of growth and development pressure for large areas of the District.

Kaipara acknowledges the direction provided in the Northland Regional Council Policy Statement to map hazards within the District. Notwithstanding this, Kaipara District Council needs to balance the cost implications to the community in undertaking such mapping in relation to the actual hazard areas within the District. It is also important to consider this task in relation to the effective and efficient management of Council resources.

7.5 Natural Hazards Objectives

7.5.1	**To control subdivision and development so that it does not induce natural hazards or exacerbate the effects of natural hazards.**	Issues 7.4.1 and 7.4.3
7.5.2	**To ensure, that the role in hazard mitigation played by natural features is recognised and protected.**	Issue 7.4.2
7.5.3	**To improve public awareness of natural hazards as a means of helping the community to avoid such hazards.**	Issues 7.4.1, 7.4.2 and 7.4.3
7.5.4	**To consider natural hazards at the time of any subdivision, land use or development or when there is a significant change in land use proposed (for example a new Growth Area).**	Issues 7.4.1, 7.4.3 and 7.4.5

7.6 Natural Hazards Policies

7.6.1 By considering the potential for development, subdivision and land use activities including: Objectives 7.5.1 and 7.5.4

a) Vegetation clearance;

b) Draining of wetlands;

c) Changes in overland flow paths and storm water;

d) Changes to riparian margins;

e) Earth works;

f) Buildings and building setbacks; and

g) Land reclamation;

to exacerbate any natural hazard on-site or off-site, and avoiding such activities, unless it can be demonstrated that the adverse effects can be mitigated, remedied or avoided.

Natural hazards are often exacerbated by development, subdivision and land use activities through the clearance of vegetation, increase in impervious surfaces, changes in overland flow paths, changes to riparian margins, earthworks, failure to maintain adequate 'defensible space' or separation distances between activities and hazards, draining of wetlands and reclamation of land. The adverse effects often occur off-site and downstream of the activities (e.g. flooding downstream as a result of vegetation clearance). Although there is some understanding of natural processes, it is often difficult to pin-point the exact causes of the changes in the natural systems and therefore, what causes the worsening of the hazard. This is compounded when the changes in natural hazards are the cumulative result of development and activities, and not just the result of a single development or subdivision. Therefore, development, subdivision and land use should be assessed on the basis that they may exacerbate hazards and this should be taken into account when developing sites.

7.6.2 By controlling the location, intensity, design and type of new coastal subdivision land use and development and by providing, where appropriate, for the protection, restoration or enhancement of natural defences to protect land, so that the need for protection work is avoided. Where hard protection works are necessary, their form, location and design should minimise any adverse effects on the coastal environment. Objectives 7.5.2, 7.5.3 and 7.5.4

In many instances, the use of coastal hazard protection works is futile and does not achieve acceptable environmental outcomes. Effective hazard management would be to avoid the hazard. In the coastal environment this can usually be achieved by setting back subdivision and development from the coast, thus allowing natural processes to continue without endangering people and property.

Defences against coastal hazards should provide, where appropriate, for the protection, restoration or enhancement of natural defences (e.g. beaches, estuaries, wetlands, intertidal areas, coastal vegetation dunes and barrier islands) in preference to hard protection structures, (e.g. walls, rip rap/gabion baskets and groynes). Hard protection structures should be permitted only where people, property infrastructure and the environment are subject to unacceptable risk from hazards, the works are the best practicable option, and their form, location and design minimises adverse effects on the coastal environment. This is particularly important as physical protection works can have adverse unintended consequences.

7.6.3 By considering the potential adverse impacts of development on flood flow paths of rivers and the efficient functioning of natural drainage systems in subdivision, land use and development. Objectives 7.5.2 and 7.5.4

Activities located in the flood paths of rivers and streams have the potential to interfere with the flow of floodwater. This may increase the adverse effects of the flooding upon human health and safety, property and infrastructure. To reduce the degree of flooding hazards development in natural flood plains should be avoided.

There should be protection of existing natural processes and features that have the potential to minimise the effects of natural hazards. As such, riparian margins including associated vegetation act to mitigate the effects of flooding and therefore should be retained in their natural form.

7.6.4 By taking into account climate change and sea level rise, as predicted by the Intergovernmental Panel of Climate Change or Royal Society of NZ, when assessing development in areas potentially affected. Objective 7.5.1

A rise in global sea level of about 50cm by the year 2100, as forecast by the Intergovernmental Panel on Climate Change (1996), will exacerbate both erosion and flooding from the sea, providing a cumulative threat to buildings or structures situated within close proximity to the sea. The policy adopts a precautionary approach to this hazard by ensuring that sea level rise is considered for all development in close proximity to the sea.

7.6.5 By making information on known natural hazards available to the public to assist them with making informed resource management decisions. Objective 7.5.3

Information provision can provide a better understanding of the potential threats from natural hazards. It is anticipated that more informed decision making will occur if information is provided.

7.7 Methods

The above Policies will be implemented through the following Methods:

7.7.1 District Plan Methods

7.7.1.1 Inclusion of flooding susceptibility mapping provided by the Northland Regional Council as an Appendix to the District Plan Maps.

7.7.1.2 There are no Rules in this Chapter relating to natural hazards. However, there are Rules to manage the effects of land use and subdivision activities in hazard prone areas in the Part B – Zone Chapters. These Rules include:

a) Performance standards to control earthworks, vegetation clearance and setbacks of buildings and structures from water bodies and areas of bush and shrubland (areas of higher wild fire risk).

b) Performance standards which enable the setting aside of esplanade reserves or strips at the time of subdivision, along sections of coastline (which may be prone to erosion).

c) Assessment criteria for all Land Use and Subdivision Resource Consent Applications within the above Zones will include the consideration of effects on natural hazards. Specialist engineering reports may be required on the subdivision and use of land likely to be affected by coastal erosion, rising sea levels, flooding or stability sensitive land.

d) Rules relating to the design and construction of hazard protection works on land adjacent to the Coastal Marine Area, rivers and lakes.

7.7.2 Other Methods

7.7.2.1 Council will maintain a Land Information Register which will contain information on the location and nature of identified or potential:

- **Areas prone to flooding;**
- **Areas of land instability;**
- **Coastal areas susceptible to erosion; and/or**
- **Areas prone to inundation by the sea.**

Council will allow the public to have access to the register. Applicants will be required to consult the Land Information Register prior to making an application for Building Consent or Resource Consent for subdivision or development. Information from this register will also be provided in Land Information Memoranda and Project Information Memoranda.

Where new information is to be placed on the Land Information Register from Council commissioned reports, the Council will prepare an Implementation Plan. The Implementation Plan will include a public information programme and an opportunity for the community to provide feedback to the Council.

7.7.2.2 Carry out studies with respect to natural hazards in conjunction with Northland Regional Council, and feed the results of these into the Land Information Register.

7.7.2.3 Prepare and distribute publicity material related to hazard investigations and related monitoring systems.

7.7.2.4 Investigate and provide for the management of the risks associated with atmospheric natural hazards such as drought, fire, wind, tornadoes and cyclonic storms and other such natural atmospheric phenomena.

7.7.2.5 Undertake flooding hazard mapping of high risk areas in partnership with the Northland Regional Council and investigate options for minimising flood damage.

7.7.2.6 The Council will jointly establish a monitoring programme with Northland Regional Council to monitor both the effects of identified natural hazards and the effectiveness of policies that apply to Coastal Hazard Areas aimed at reducing risk to life, property and the environment within such areas.

7.7.2.7 Section 71 of the Building Act 2004 requires the Council to refuse to grant a Building Consent involving the construction of a building or major alterations to a building. This would apply where the land is at risk of inundation by the sea, flooding, erosion, avulsion (i.e. the sudden removal of land by flooding), falling debris, subsidence, slippage or where the building will accelerate or worsen the natural hazard. Therefore Council can use the Building Act to refuse consent for the erection of new buildings or major alterations to buildings in areas subject to natural hazards, or where the building work could exacerbate the hazard.

7.7.2.8 Providing access to geological databases:

- Inventory and Maps of Important Geological Sites and Landforms in the Northland Region shown on the NZ Land Inventory NZMS 290 (1996); and
- Use of Climate, Soil, and Crop Information for Identifying Potential Land-Use Change in the Hokianga and Western Kaipara Region (2003).

7.8 Natural Hazard Outcomes

7.8.1 Reduced risk to life, property and the environment from natural hazards Issue 7.4.1 Issue 7.4.2

7.8.2 Appropriate control of new development in locations where there is a high risk of significant damage from natural hazards Issue 7.4.3 Issue 7.4.4

7.8.3 Increased public awareness of the risks of natural hazards and the role of natural features in natural hazard mitigation Issue 7.4.5

7.9 Natural Hazard Rules

Activities affected by this Chapter of the District Plan must comply with the relevant standards applying to the Zone in which the activity is located (refer to Part B - Land Use), and with other relevant provisions in Part C – Sites, Features and Units.