River Flood Risk Management Strategy 2009
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1 Background and purpose

1.1 Introduction

River flooding is a significant hazard, being the most widespread and frequently occurring hazard within the Waikato region. Over time, many river systems within the region have been modified for the purposes of flood protection. River modification has:

- led to increased use of land in flood prone areas for both rural and urban purposes.
- reduced flood hazard risks to both rural and urban areas.
- greatly increased the economic productivity of land in flood prone areas.

While river modification has produced many benefits, it has not eliminated flood risks, and in some cases has encouraged the intensification of urban development within flood prone areas. River modification can also have significant adverse effects on natural river system characteristics, by altering the way in which rivers and flood plains would normally operate.

In recent years, issues such as population growth, land use change and the ever-increasing location of development within flood plains have compounded the risks associated with flooding. In addition, the frequency and intensity of extreme flood events appears to be increasing over time. This means that the provision of hazard information, land use policies and regulations, river and catchment management and related activities all need to be understood within the context of managing flood risks within a whole catchment\(^1\).

As a result of the 2004 floods in the Manawatu-Wanganui and Bay of Plenty regions, the Government has recognised the importance of flood risk management to New Zealand. A significant amount of work has been completed by the Government, Local Government New Zealand and other key stakeholders to confirm national directions for flood risk management. As a result of this, national directions have become much clearer since 2004.

In order to achieve a reduction in the risks from flooding, all stakeholders, including district and regional councils, need to integrate their respective responsibilities under different pieces of legislation.

\(^1\) It is recognised that catchment management for river flood risk outcomes is only one part of an integrated catchment management framework - integrated catchment management has multiple outcomes, including the reduction of flood risks.
1.2 Purpose and aim

The purpose of this strategy is to provide clear guidance on how river flood risks within the region will be managed into the future. This strategy will encourage better integration between the various stakeholders involved in flood risk management, and between the various strands of work that are currently occurring or need to occur in the future.

The aim of this strategy is therefore to strengthen the current approach to managing flood risks, by embedding a risk management approach and recognition of the nature and behaviour of river systems into all river flood work activities. It builds on the existing work that local authorities and other agencies currently undertake to address flood risks, and is closely aligned with and complementary to emerging national directions.

This strategy is set out in three parts, and provides the following:

1. Background and purpose: background information on river flood risk management, the purpose and aims of the strategy and the directions on flood risk management that are emerging at the national level. In addition, the key drivers for the strategy are identified, and the importance of engaging with Tangata Whenua is outlined.
2. Management framework: key principles for flood risk management within the Waikato region, a framework for integrating river flood risk management, and the proposed vision and outcomes for the Waikato region.
3. Action plan: identification of specific actions that will need to be undertaken by Environment Waikato to achieve the required outcomes, and the relationship of these actions to the work of other stakeholders.
This strategy will be used:

- to inform individuals, communities and key stakeholders about the principles and outcomes required in managing river flood risks.
- as a basis for decision making on activities related to river flood risk management.
- as guidance for integrating the work of individuals, communities and key stakeholders.

Figure 2 Damage to Horahora Road bridge - a result of the weather bomb event (June 2002). The bridge crosses the Pokaiwhenua Stream in the South Waikato District.

1.3 Why develop the strategy?

There are six key drivers for developing this strategy:

1 **Nature and behaviour of river systems**
   The fundamental nature and behaviour of river systems is not widely understood, and is not consistently taken into account in flood risk decision-making. By their nature, river systems are transport routes for water and sediment, and are subject to continual changes as a result of natural processes such as weather and erosion, and human intervention primarily by land use changes and physical works. The complexity of river systems and the implications of intervention in these systems needs to be recognised and well understood in order to effectively manage river flood risks.

2 **Catchment context and cumulative effects**
   The importance of catchment context and cumulative effects as drivers for flood risk are not well recognised or accepted. River flood risk management occurs within a broad catchment context – from mountains to the sea. Rivers and catchments change naturally over time, but these changes can be accelerated greatly by human intervention.

   Land use changes, such as deforestation in the upper catchments of river systems, can increase the quantity and speed of flood flows. The combination of land use
changes and increased flows of rivers have impacts throughout a catchment, which may cross several district council areas and affect many communities.

While individual developments in flood plains may have small impacts, the ongoing cumulative effects of many developments throughout the catchment may significantly alter the nature and behaviour of river systems, and increase flood risks in the long term.

3 Management framework in the Waikato region
The current river flood risk management framework within the Waikato region provides a sound basis for managing river flood risks. Despite this, the current framework does not consistently recognise and incorporate the principles of risk management into decision-making, and at times, the outcomes do not lead to risk reduction.

The management framework needs to be strengthened by:
• achieving a better awareness and understanding of flood risks for individuals, communities and key stakeholders.
• better integration of hazard and risk information into land use activity decisions in flood prone areas.
• a more coordinated approach to managing flood risks, which leads to risk reduction outcomes.

It is recognised that regional and district plans are key documents for strengthening the risk management approach, by providing a clear and integrated policy approach to reducing flood risks. In response to the weather bomb on the West Coast of the Coromandel Peninsula, Environment Waikato put in place a more integrated approach to managing flood risks. Environment Waikato is aiming to improve upon this approach, and apply it to all catchments within the region over time.

4 Increasing flood risks
The Waikato region has 20 major rivers and more than 1,400 streams. The region’s flood risks are significant due to its topography and weather, and flood risks are often exacerbated by human activities.

An increasing population coupled with changing economic uses of land may exacerbate risks to communities. It is recognised that there are significant costs involved in preventing floods, and that there are significant economic and social costs after floods have impacted on communities. However, in most flood-prone communities, there is an ongoing expectation that protection will be provided, and in some cases, a demand for increased protection standards.

In some instances, the community expectations for flood protection will not be able to be met at a practical or affordable level. Communities and individuals do not always understand the risks they are subject to, nor do they necessarily understand the residual risks associated with flood protection or mitigation activities. Engaging with communities to convey the ‘risk’ and ‘residual risk’ of an area in order to reduce risks will be essential. Likewise, more emphasis will need to be placed on managing cumulative effects.

5 Climate change
Climate change is expected to increase river flood risks in the future, due to increases in both the frequency and intensity of severe weather events. This not only intensifies the direct impacts of flooding by raising flood flows and levels, but alters the nature of river systems by increasing erosion and sedimentation.

The impacts of intense storm events will likely be exacerbated by land use changes in the catchments – particularly by large scale land clearance. Predicted rises in sea level will also have an impact on river flooding in coastal areas through
increased flood levels and changes to the functioning of natural systems in their lower reaches.

6 National directions for flood risk management

As a result of the 2004 floods, the Government decided to review flood risk management, with the aim of ensuring that the current framework for flood risk management in New Zealand is robust. The results from both this review and from the work done by central and local government since 2004 – in particular the New Zealand Standard for managing flood risk - provides clear national directions for flood risk management.

1.4 National flood risk management directions

In 2004, the Manawatu-Wanganui and Bay of Plenty regions suffered major flooding impacts. These flood events, and other recent flood events across New Zealand have highlighted community vulnerability to the impacts from flooding as an issue of national significance.

Following the 2004 floods, the Government decided to review flood risk management, with the aim of ensuring that the current framework for flood risk management in New Zealand is robust. The results from both this review and from the work done by central and local government since 2004 provides clear national directions on flood risk management. These directions are briefly outlined below.
1.4.1 Central government review of flood risk management

The primary aims of the review were to ensure that New Zealand has a robust approach to managing flood risk. The review covered three key topics.

1. The roles of communities and local and central government.
2. Funding and affordability – who benefits, who pays and who can afford flood risk mitigation.
3. Current flood risk management practices, and whether these practices are appropriate.

The Ministry for the Environment led the review, starting in March 2005. Throughout the review, a Steering Group comprising both central and local government representatives provided direction and guidance, and the review was completed in June 2007. In August 2008, the Ministry for the Environment published the findings of the review in the report “Meeting the Challenges of Future Flooding in New Zealand.”

In brief, the findings of the report were that:

“...the current flood risk framework is not fundamentally flawed but that important issues need to be addressed. The current practices of central and local government need to improve to manage current flood risk and adapt to future climate change. Funding and affordability are very real concerns for smaller, less wealthy communities. The roles of communities, central and local government are broadly right, although central government could be more active in reducing flood risk.

Flood risk will increase with climate change. Central government currently spends most of its investment in flood risk management on the response and recovery phases. Investment in the reduction phase – to provide information, guidance and assistance, as well as resources – would help local government to more effectively manage flood risk and prepare for climate change.

The review developed a vision and principles for flood risk management in New Zealand as shown in Figure 4.
A vision for flood risk management in New Zealand

New Zealand needs to have the best possible flood risk management framework to minimise the distress and disruption that floods have on communities. We need to understand how the factors contributing to flood risk can best be managed by central and local government, in partnership with the community. Accordingly, the Steering Group’s vision for flood risk management in New Zealand is:

**Individuals, communities and New Zealand society will understand and take responsibility for actively reducing the consequences of flooding by:**

- accepting that natural processes in the wider catchment determine long-term solutions
- managing our activities, lands and waters to reduce damages and losses to an acceptable level
- considering people’s social, cultural, environmental and economic wellbeing
- integrating climate change and variability into decision-making.

**Principles to guide future flood risk management policy**

To reduce the consequences of flooding, decisions made on flood risk management need to:

- take a long-term risk management perspective, including climate change, residual risk and having a ‘no regrets’ precautionary approach to risk and uncertainty
- respect environmental limits and natural processes, including river and catchment processes, and protecting the life-supporting capacity of water, soil and ecosystems
- integrate flood risk management with sustainable land management and catchment management policies and decisions that affect the magnitude of flooding and/or the consequences of flooding
- consider the consequences of flooding, including the resilience and vulnerability of communities and infrastructure as well as the risk to life and property
- ensure individuals and communities take primary responsibility for their safety and livelihoods
- take a partnership approach with, and between, central government, local authorities, communities and Māori
- recognise that local, regional and national perspectives are different and may require different inputs with different goals and outcomes
- be made at the appropriate level of government that maximise the outcomes sought in flood risk and catchment management, and that are based on the robust evaluation of options, costs and benefits over time and across the community
- include informed communities as part of decision-making about levels of acceptable risk and mitigation measures for those communities
- take an adaptive management approach that is responsive to change over time and that optimises sustainable structural, non-structural and emergency management solutions.

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3 Residual risk is the risk that remains after an action is taken to manage that risk; for instance, the risk to a community that a stopbank is overtopped in a flood that is larger than the stopbank is designed for.

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Figure 4 Vision and principles for flood risk management in New Zealand
Other key findings from the central government review are:

- The **central government vision will be achieved through**\(^4\):
  - decision-making principles (to guide decision-making)
  - a national policy statement (what to take into account)
  - a central government-led forum/symposium (partnership)
  - a monitoring framework (progress towards the vision)
  - monitoring regional flood frequencies (knowing what our risk is)
  - targeted assistance and safety net funding (enabling councils to fulfil their roles and manage flood risk)
  - guidance (helping councils, practitioners and professionals)
  - central government contributing as beneficiaries (leading by example).

- **Ways forward** from the overall findings\(^5\):
  - Improvements are needed to meet the challenge of future climate change and to satisfy communities and central government that an acceptable level of risk remains. Improving practice requires the **following actions**:
    - an active and engaged risk management approach by central and local government in meeting their respective roles and responsibilities
    - the goal of risk reduction being embedded within the policy framework
    - appropriate resources, including sufficient information, guidance and funding, being made available to promote good practice in the daily management of flood risk
    - central and local government monitoring to understand the levels of flood risk and inform future policy and management practices.

The **expected outcome**\(^6\) is:

The consequences of flooding are reduced in communities across the country

- With respect to roles and responsibilities, regional authorities should\(^7\):
  - show leadership regionally and adopt a risk management approach to implement risk reduction policies, methods and regulation
  - identify and manage residual risk
  - work together with communities, iwi, Territorial Authorities, beneficiaries and exacerbators in decision-making and agreeing on roles
  - sustainably manage water and land to reduce the flood risk
  - manage civil defence and emergency management regionally
  - build stakeholders’ awareness of risk.

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\(^4\) Refer to Ministry for the Environment “Meeting the Challenges of Future Flooding” report, p. 47.
\(^5\) Refer to p. 6.
\(^6\) Refer to p. 6.
\(^7\) Refer to pp. 7-8, and see Appendix 3 for recommendations on other roles and responsibilities.
1.4.2 Local government input into national directions

A core group of regional councils began looking at approaches to managing flood risks following the 2004 flood events. This work included development of the draft New Zealand Protocol and the New Zealand Standard for managing flood risk. The New Zealand Standard provides local authorities with an improved framework for managing flood risk management responsibilities.

Local Government New Zealand has also developed a position statement on flood risk management for the Government. Local government’s aim for flood risk management, as identified within the position statement is:

“Sustainable river and catchment management that achieves the particular level of flood hazard protection desired and accepted by each distinct community of interest, with residual risks fully understood and taken into account”.

This will be achieved through:
- statutory roles, functions, and exercising powers under the Local Government Act, the Resource Management Act, the Soil Conservation and Rivers Control Act and the Civil Defence Emergency Management Act.
- adopting good practice.
- taking into account the national policy statement.
- central government assistance.
- training practitioners and improving capacity.
- the New Zealand Standard (NZ Protocol).
- working with communities, central government, exacerbators and beneficiaries.

1.4.2.1 New Zealand Standard for Managing Flood Risk

The New Zealand Standard for Managing Flood Risk\(^8\) (NZS 9401) is a process standard that provides a risk-based approach for the comprehensive management of flood risk.

The NZS states that the effective management of flood risk requires a clear understanding of both the natural and social systems in which flood risk management occurs. This involves:
- an understanding of the interaction between the natural and social systems and the opportunities and constraints of this interaction
- a robust and comprehensive risk management process that addresses all the key aspects of flood risk management such as consideration of all mitigation options, adaptive management, and the management of residual risk
- an ongoing monitoring and evaluation process to ensure appropriate outcomes are being achieved\(^9\).

Objective

The overall objective of NZS 9401 is to provide guidance to enable the public, private and community enterprises, and stakeholders to participate in a common approach to managing flood risk. In order to achieve the overall outcome, NZS 9401 requires:
- a broad understanding of the natural and human systems from catchment headwaters to the sea, their interactions, and the significant factors that affect flooding and its impact on society
- a rigorous basis for managing flood risk, within broadly defined and evolving concepts of sustainability and the behaviour of natural systems
- comprehensive assessment of risks associated with floods, and their management
- involvement of all stakeholders

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\(^9\) Refer to NZS 9401, p. 7.
- definition and agreement on the roles, responsibilities, and functions for flood risk management among individuals and organisations from the local to national levels.

NZS 9401 creates a unifying framework that is required to ensure effective management of social, cultural, economic and environmental risks created by flood hazards. The framework is built around the following five elements and six principles:

**Elements of flood risk management**

The five elements are:
- **catchment-based management** to provide a natural scope within which to consider and manage flood risk;
- **sustainable management** to provide a context for flood risk management decisions that consider natural and social systems together and over the longer term achieve sustainable outcomes;
- **adaptive management** to ensure that changes in natural processes, hazards, exposed values, and their vulnerability are identified by monitoring and that management strategies reflect these changes so that appropriate actions are instigated in a timely manner;
- **risk management** to deal with uncertainty and complexity, and encourage a broad assessment of strategies and treatment options, the anticipation of change, and an awareness of residual risks; and
- **comprehensive risk treatment strategies** are applied through a combination of risk reduction, event readiness, event response, and event recovery planning.

**Implementation principles**

The six implementation principles are:
- **engaging communities and stakeholders** throughout the process is essential to ensure that decision-makers understand cultural factors, social values, infrastructure needs, and community aspirations and needs while the community understands the benefits, risks, consequences, and costs of the various options and that all parties commit to the risk treatments required
- **an understanding of natural systems and catchment processes** and associated interactions is fundamental to managing flood risk. River systems are sensitive to intervention and the consequences of intervention need to be understood
- **an understanding of the catchment-wide interaction of natural and social systems** and the effects of human interventions on the catchment is necessary to provide optimum sustainable solutions
- **decision-making at the local level** contributes to finding the most suitable approach to managing flood risk and to ensuring that solutions balance private and public, as well as local and national interests
- **all possible forms and levels of management** are considered for existing assets within flood risk areas, and preference shall be given to avoidance where new development is proposed inside flood hazard areas
- **residual risk** remaining after mitigation (such as physical works and planning controls) shall be explicitly recognised and managed by readiness, response and recovery activities, and planning. A level of residual risk will remain. This should be monitored to ensure the level remains tolerable and that other opportunities are taken to reduce this should they become evident.

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10 Refer to NZS 9401, p. 14.
11 Refer to NZS, pp. 14-15.
Applying this framework to flood risk management encourages a broader, longer term, more integrated and adaptive approach that aims to comprehensively and effectively lead to a lowering of flood risk over time.

### 1.4.2.2 Climate change adaptation

Changes in climate are expected to cause more extreme weather events, many of which may lead to an increase in the frequency and intensity of severe weather events. Central Government is engaging with local government, industry and communities on the importance of preparing for the impacts of a more variable climate. Integrating climate change variability into decision-making is an important component of central Governments’ vision for flood risk management.

Local government has been identified as a key sector to prepare and adapt New Zealand communities to the impacts of climate change. Local government carries the primary responsibility for river flood risk management and key local infrastructure such as roads, water and sewerage reticulation.

Achieving a good understanding of the likely impacts of climate change is an important consideration for river flood risk management because climate change:

- plays an important part in the understanding of natural systems, particularly with respect to long-term changes
- has a significant influence on the ability to undertake adaptive management
- is likely to exacerbate risks, including residual risks over time.

There is a growing need to identify and plan for the impacts of climate change related to river flood risk management in the Waikato region, and its potential effects on:

- the frequency and intensity of extreme flood events
- river and catchment schemes
- other at-risk infrastructure such as road and electricity networks.

### 1.5 River flooding and tangata whenua

Tangata whenua have indicated very strong interest in working with EW in respect to river flood risk management. EW welcomes and appreciates the opportunity to involve iwi in this process.

EW is presently working closely with the region’s iwi through the co-management process. Further consideration with EW’s co-management team and the Tai Ranga Whenua unit is therefore required to confirm a future (collaborative) approach for flood risk management with iwi.
2 Management framework

This part sets out a regional framework that will be used to guide the management of river flood hazards. The framework comprises the:
- philosophy and principles
- vision
- outcomes expected.

2.1 Philosophy

The fundamental philosophy of this strategy is to develop an approach that recognises and allows for the nature and behaviour of river systems, and puts in place a risk management framework that reduces river flood risks over time. This philosophy draws upon the results of the central government review of flood risk management and the New Zealand Standard for managing flood risk.

2.2 Principles

Environment Waikato is taking a leadership role in developing and implementing the regional river flood risk management framework.

The key principles underlying this strategy in relation to river flood risk management are that individuals, communities and organisations will:
- recognise and seek to understand the nature and behaviour of river and catchment systems, and wherever possible, allow room for natural processes
- take a whole of catchment approach to managing land use change and the subsequent effects of river behaviour
- recognise the probable impacts of climate change and undertake appropriate mitigation measures
- recognise the importance of making local flood risk management decisions within a catchment context, and take into account cumulative effects
- recognise the unique status of Tangata Whenua, and engage with Tangata Whenua to work towards protection of natural and cultural heritage
- engage communities, Territorial Authorities and other key stakeholders in:
  - understanding river systems and the risks associated with them
  - actively managing the risks associated with river flooding – including long-term risks and residual risks.
- ensure avoidance, mitigation and response management options are sustainable, are a part of community outcomes and are affordable
- recognise flood risk management in the broader context of sustainable development at both the regional and district level by encouraging sustainable intensification of existing development, and avoidance of new developments within flood plains.

The above principles underpin the framework for river flood risk management as outlined in Figure 5.
Figure 5  Regional Framework for river flood risk management

Visions
NZ society understands and takes responsibility for reducing the consequences of flooding

Sustainable communities that recognise and understand the nature and behaviour of river systems within a catchment context, recognise and manage risks (including residual risks), and seek to avoid increasing risks

Regional level
Environment Waikato
Hazard and risk information
Regional policy – RMA, LGA, SCRCA, CDEMA
River and catchment management
Emergency mgmt.
Other activities – biodiversity, pest management

Local level
Territorial Authorities
District policy – RMA, LGA, BA
Growth plans
Works and services

Local community visions for managing river flood risks

* Proposed

New Zealand Standard
Directions from central government review

Hazard management guidance

National Policy Statement*

Crown entities

Regional infrastructure providers

Legislation

Outcomes
The consequences of flooding are reduced in communities across NZ

The regional flood risk management strategy leads to a recognition of the nature and behaviour of river systems and a reduction in river flood risks

Local community aspirations and outcomes

Local infrastructure providers

Individuals and communities
Community outcomes
Development needs

Regional flood risk management strategy

Outcomes

* Proposed
2.3 Vision

The vision for river flood risk management within the Waikato region is:

Sustainable communities that:
• recognise and understand the nature and behaviour of river systems within a whole of catchment context
• recognise the level of flood risk and residual risk which may affect them
• manage existing risks, and seek to avoid increasing the risks.

The vision recognises that there is an existing level of risk from river flood hazards that many communities are subject to at present. Avoiding all risk will not be possible, however we can aim to avoid decisions that exacerbate the risk, and seek to better manage existing risks.

This does not mean stopping development or eliminating all risk, but ensuring community and individual decisions are made with full knowledge of the constraints of natural processes and constraints of river systems, and the levels of risk, including residual risk. It also means that management activities need to focus on working within river systems to reduce risks across the region while also recognising community aspirations.
2.4 Outcomes expected

The **overall outcomes expected** for river flood risk management within the Waikato region are:

<table>
<thead>
<tr>
<th>That the regional river flood risk management framework leads to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• the recognition and understanding of the nature and behaviour of river systems</td>
</tr>
<tr>
<td>• a reduction in river flood risks.</td>
</tr>
</tbody>
</table>

The overall outcomes are supported by the following expected outcomes:

- the nature and constraints of river systems are understood by communities, local authorities and other key stakeholders, and are a key driver for decision making
- rivers are managed in full recognition of water and sediment flows, and natural flow pathways in a whole of catchment context
- hazard risk information is widely available and empowers communities, local authorities, organisations and individuals to make informed flood risk management decisions
- flood risk management decision making occurs within a risk management framework where long-term risks, residual risks, catchment management and cumulative effects are key drivers
- the policy framework at national, regional and local levels is complementary and delivers sustainable flood risk management outcomes
- all councils and key stakeholders involved in flood risk management have clear responsibilities and are working together within a common framework to achieve shared outcomes
- river flood risk management decisions lead to appropriate development within a community outcomes and sustainable development framework.

These expected outcomes guide part 3 of this strategy - the action plan. The outcomes recognise the changes in direction that need to be incorporated into river flood work areas to ensure that the vision can be achieved.
Figure 6  Road damage and debris deposition from the Te Puru Stream (Thames Coast) following the June 2002 weather bomb event.
3 Action plan

3.1 Overview of action plan

The purpose of this action plan is to identify actions which will assist in delivering the vision and outcomes expected outlined in part 2.

This action plan identifies the specific goals and actions required by Environment Waikato and partner organisations, communities and individuals in order to achieve the vision. It does this by building upon Environment Waikato’s existing work programme and directions, and identifying where new work may be required help achieve the vision and outcomes. The plan also outlines the areas of work where Environment Waikato wishes to work closely with Territorial Authorities and other partner organisations to support the directions and expected outcomes of this strategy.

The work activities associated with river flood risk management can be broken down into five key work areas:

- river systems information
- hazard and risk information
- policy
- river and catchment management
- emergency management.

This section contains the following for each work area:

- a brief overview of the work area
- issues with achieving the vision and outcomes
- the relationship of the work area to the outcomes required
- goals and actions that are specific to the work area
- a brief description of how the actions will be implemented.
3.2 River systems information

River systems information underpins good decision making. This work area is fundamentally about understanding the nature and behaviour of river systems and processes. Achieving a good understanding of the nature and behaviour of river systems and processes is important to enable informed decisions about river flood risk management.

Issues
At present, the nature and behaviour of river systems is not widely understood, and is not consistently taken into account in flood risk decision-making. Within the Waikato region, the nature and behaviour of river systems varies greatly from one area to another, and the role of rivers as sediment transport systems is not widely understood.

Links to outcomes expected

The key relevant outcomes from part 2 of this strategy that relate to river systems information actions are:

- the nature and constraints of river systems are understood by communities, local authorities and key stakeholders, and are a key driver for decision making
- rivers are managed in full recognition of water and sediment flows, and natural flow pathways in a whole of catchment context.
**Actions**
The following actions have been identified to help deliver the vision and expected outcomes. Environment Waikato will:

- seek to improve regional knowledge and understanding of long-term land use and catchment changes by:
  - focussing on broad, long-term catchment changes, and the impacts of social, economic and environmental drivers
  - work with Territorial Authorities to ensure that this information is taken into account in planning and development activities
  - widely communicating the results and providing updated information.

- increase regional knowledge of the likely effects of climate change, and implement this by:
  - engaging with other organisations (particularly Territorial Authorities) on the outcomes
  - interpreting regional climate change predictions to determine likely sub-regional impacts where possible
  - consistently incorporating climate change information into the design and operation of river and catchment management work programmes.

- recognise and make explicit the uncertainties involved with river systems information including:
  - increasing the understanding of the role of sediment, erosion and morphological changes within river systems
  - differences between river systems across the region
  - allowances for climate change in influencing future flood events.

**Implementation**
The actions will be implemented via Environment Waikato's Long-Term Council Community Plan, primarily within annual plans for the river and catchment management and regional hazards programmes.

### 3.3 Flood hazard and risk information

Information about flood hazards and risks underpins good decision making. This work area is fundamentally about identifying flood hazard areas, and developing robust hazard and risk information that provides a sound basis for risk management.

**Issues**
While there is a good understanding of broad flood hazard areas within the region, there is a lack of information on flood risks. Detailed information on flood hazards is often not easily accessible, and there is not always a good level of integration between the information held among organisations – particularly between Environment Waikato and Territorial Authorities.
Links to outcomes expected

The key relevant outcomes from part 2 of this strategy that relate to flood hazard and risk information actions are:

- hazard risk information is widely available and empowers communities, local authorities, organisations and individuals to make informed flood risk management decisions
- flood risk management decision making occurs within a risk management framework where long-term risks, residual risks, catchment management and cumulative effects are key drivers.

Actions

The following actions have been identified to help deliver the vision and expected outcomes. Environment Waikato will:

- Improve the quality and accessibility of regional flood hazard maps by:
  - Making regional flood hazard maps available online to all individuals, communities and organisations
  - Progressively updating and improving the 1:50,000 scale flood hazard maps
  - Prioritising regional flood hazard information development based on growth, hazards and risks
  - Continuing to provide information and advice on flood hazards
  - Working closely with Territorial Authorities to integrate flood hazard information, and ensure that information provided is useful, understandable and informative.

- Seek to improve the integration of flood hazard and risk information between Environment Waikato and:
  - Territorial Authorities – especially in relationship to the review and redevelopment of District Plans, growth strategies and structure plans
  - Lifelines utilities, with respect to the reduction of risks associated with utility failures from flood events.

- Improving flood information management systems to move towards the creation of a regional flood hazard and risk database.

- Increasing the level of knowledge and understanding of regional flood risks by:
  - Developing a regional methodology for river flood risk assessment, based on the New Zealand Standard for managing flood risk
  - Undertaking regional risk assessments to determine the impacts of risks to people, the built environment and infrastructure, starting with the areas most prone to growth in risks
  - Utilising regional risk assessments to increase knowledge about the consequences from flood hazards within the Waikato region.

Implementation

The actions will be implemented via Environment Waikato’s Long-Term Council Community Plan, primarily within annual plans for the regional hazards programme. It is anticipated that Territorial Authorities will continue to work with Environment Waikato proactively on the development of flood hazard and risk information.

3.4 Policy

Plans and consent decision-making under the Resource Management Act 1991 are critical means for achieving reductions in river flood risks, by helping to ensure that informed and consistent land use activity decisions are made. Environment Waikato and Territorial Authorities need to work together to ensure that policies and rules are in place to manage land use activities in a way that recognises the risk and residual risk from flood hazards.
Both Environment Waikato and Territorial Authorities have obligations under the Resource Management Act to avoid and/or mitigate the effects of natural hazards, including river flooding. The Regional Policy Statement and District Plans are the primary policy mechanisms for managing river flood risks.

This action plan has been developed to incorporate the directions that have emerged from flood risk work at the national level. It is clear that while the legislation governing river flood risk activities will not be reviewed in the short-term, there will be significant ongoing work in implementing the outcomes of the national flood risk management review and the New Zealand Standard for managing flood risk.

If policies are to be effective at national, regional and district levels, they must be supported by robust information that is being continually improved through time.

Issues
Regional Plans and District Plans may not be well aligned, and may not contain strong enough policy drivers to prevent ongoing increases in flood risks. The need to adopt a risk-based approach may not be explicit enough, or not well enough aligned to growth strategies. Many of the key issues that are emerging from national directions are not recognised or incorporated into existing policies, such as the importance of understanding the nature and behaviour of rivers, long-term catchment changes, cumulative effects and residual risks. In addition, some existing policies do not place an emphasis on hazard and risk avoidance.

Links to outcomes expected
The key relevant outcomes from part 2 of this strategy that relate to policy actions are:

- flood risk management decision making occurs within a risk management framework where long-term risks, residual risks, catchment management and cumulative effects are key drivers
- the policy framework at national, regional and local levels is complementary and delivers sustainable flood risk management outcomes.
- all councils and key stakeholders involved in flood risk management have clear responsibilities and are working together within a common framework to achieve shared outcomes
- river flood risk management decisions lead to appropriate development within a community outcomes and sustainable development framework.

Actions
The following actions have been identified to help deliver the vision and expected outcomes. Environment Waikato will:

- Retain an active involvement in helping to formulate national policy and directions by:
  - working with the Government and with national river flood management groups to develop and review flood risk management directions
  - ensuring that new policy directions and/or information is widely communicated to regional stakeholders.

- Review the Regional Policy Statement to ensure that:
  - regional directions for flood risk management are clear
  - national directions for flood risk management are embedded
- directions for issues such as assessment of cumulative effects, directions for new development and existing development and post-flood event recovery are clarified
- roles and responsibilities for flood risk management are confirmed
- monitoring and evaluation of the effectiveness of the strategy is undertaken
- the views of all stakeholders are taken into account (refer to Figure 5).

- Assess the potential for the Regional Plan to support the delivery of outcomes via flood risk management rules.

- Increase the focus on working with Territorial Authorities during District Plan reviews to ensure:
  - alignment of flood risk management directions with national and regional directions
  - that alignment occurs between Territorial Authority flood hazard and risk information and growth strategies/structure plans, and Environment Waikato flood management work programmes
  - that flood risk management decision-making takes into account important issues such as catchment changes, cumulative effects and residual risk
  - that the critical role played by Territorial Authorities in community engagement is recognised, and a joint approach to engagement is undertaken where possible.

**Implementation**

The actions will be implemented via Environment Waikato’s Long-Term Council Community Plan, primarily within the natural hazard policy and regional hazards work programmes. It is anticipated that Territorial Authorities will continue to work with Environment Waikato proactively on flood risk management issues during District Plan reviews and variations.

### 3.5 River and catchment management

This area of work is fundamentally about delivering river and catchment works and services to communities, in order to manage river flood risks. These works and services fall into three main categories:

- **Flood protection** – minimising the potential social, economic and environmental impacts of floods.
- **River management** – managing natural processes that affect rivers and streams, such as blockages that may cause erosion, flooding or changes in the waterway’s course.
- **Catchment works** - soil conservation activities to reduce the effects of accelerated erosion, and to effectively manage existing protection schemes.

Environment Waikato manages several major rivers including the Waihou and Ohinemuri river system, the Piako and Waitoa river system, the Waikato and Waipa river system, as well as a large number of smaller rivers and streams. Works and services are provided within eight zones, being the Coromandel Peninsula, Waihou/Piako, Lake Taupo, Upper Waikato, Middle Waikato, Lower Waikato, Waipa and West Coast zones.

**Issues**

There are opportunities to improve the alignment between river and catchment management and flood risk management. Risk management is a key driver for river and catchment management, and needs to be consistently built into regional river and catchment management programmes. Improving linkages between river and catchment management activities and risk management will also help to improve community understanding about the broad, long-term catchment nature of flood risk management.
Figure 8  Convergence of flood waters at the Waikato-Waipa rivers confluence at Ngaruawahia during the 1998 flood event

Links to outcomes expected

The key relevant outcomes from part 2 of this strategy that relate to river and catchment management are:

- the nature and constraints of river systems are understood by communities, local authorities and key stakeholders, and are a key driver for decision making
- rivers are managed in full recognition of water and sediment flows, natural flow pathways and whole of catchments
- flood risk management decision making occurs within a risk management framework where long-term risks, residual risks, catchment management and cumulative effects are key drivers
- all councils and key stakeholders involved in flood risk management have clear responsibilities and are working together within a common framework to achieve shared outcomes
- river flood risk management decisions lead to appropriate development within a community outcomes and sustainable development framework.


**Actions**

The following actions have been identified to help deliver the vision and expected outcomes. Environment Waikato will:

- Integrate flood risk management into river and catchment management work activities by:
  - developing strong linkages between flood risk management and the development of zone management plans\(^\text{12}\) – the primary means of ensuring on-the-ground implementation of risk management and all other river and catchment\(^\text{13}\) work within a zone
  - ensuring that zone management plans drive best practice in flood risk management via the New Zealand Standard for managing flood risk
  - ensuring that communities understand the nature of river and catchment hazards and risks to the extent that this is practicable, and that levels of service are based upon levels of risk that are acceptable to local communities
  - working with Territorial Authorities to ensure that river and catchment scheme designations are in place, and that activities that may affect flood risk management are appropriately controlled
  - encouraging strong linkages between flood risk management and integrated catchment management programmes.

**Implementation**

The actions will be implemented via Environment Waikato’s Long-Term Council Community Plan, primarily within annual plans for river and catchment management. It is anticipated that regional communities, Territorial Authorities, infrastructure providers and tangata whenua will continue to work with Environment Waikato to address flood risk management issues in relationship to river and catchment management programmes.

### 3.6 Emergency management

Emergency management refers to those activities that help to prepare for, respond to and recover from the effects of emergencies – including those that arise from river flooding. Emergency management is partially aimed at proactive risk avoidance, but has an important role to play in:

- providing warnings and information about possible flood events
- responding to events “on the day”
- helping to guide community regeneration after an event.

**Issues**

There are opportunities to improve the alignment between emergency management and river flood risk management. The linkages between emergency management programmes and hazard and risk management programmes could be improved, along with emergency management input into policy development. Stronger linkages to emergency management could also help to raise community awareness and engagement in flood risk management, due to the presence and relationships that emergency managers have with local communities.

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\(^{12}\) Zone Management Plans are an overall guidance document for zones, and are the link between the Long-Term Council Community Plan and on-the-ground work programmes such as flood protection, river management and catchment management works.

\(^{13}\) Catchment Management Plans sit within Zone Management Plans.
Links to outcomes expected

The key relevant outcomes from part 2 of this strategy that relate to emergency management are:

- hazard risk information is widely available and empowers communities, local authorities, organisations and individuals to make informed flood risk management decisions
- flood risk management decision making occurs within a risk management framework where long-term risks, residual risks, catchment management and cumulative effects are key drivers
- the policy framework at national, regional and local levels is complementary and delivers sustainable flood risk management outcomes
- all councils and key stakeholders involved in flood risk management have clear responsibilities and are working together within a common framework to achieve shared outcomes
- river flood risk management decisions lead to appropriate development within a community outcomes and sustainable development framework.

Actions

The following actions have been identified to help deliver the vision and expected outcomes. Environment Waikato will:

- Promote the integration of flood risk management information into emergency management work activities by:
  - developing stronger linkages between river flood risk management and work programmes undertaken by the Waikato Civil Defence Emergency Management Group and Territorial Authorities, infrastructure providers via the Waikato Engineering Lifelines Group and local communities via community resilience work programmes.

Implementation

The actions will be implemented via Environment Waikato’s Long-Term Council Community Plan, primarily within annual plans for the emergency management programme. It is anticipated that the Waikato Civil Defence Emergency Management Group, Territorial Authorities and infrastructure providers will continue to work jointly in partnership with Environment Waikato to address flood risk management issues in relationship to emergency management.
References


Appendix 1  Definitions

The following terms and definitions\(^{14}\) are commonly used in this strategy:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptive management(^{15})</td>
<td>Management of river flood risks over time by active, ongoing recognition and management of changes in risks, that may be driven by social, economic or environmental changes.</td>
</tr>
<tr>
<td>Catchment-based management</td>
<td>Management that acknowledges the intrinsic behaviours of the management catchment-river system and of human society, and their consequent responses to imposed modifications</td>
</tr>
<tr>
<td>Flood</td>
<td>A flow that overtops the natural or artificial banks in any part of a stream or river; this includes high sediment concentration events (such as debris flows) that are triggered by landslides</td>
</tr>
<tr>
<td>Flood hazard</td>
<td>The potential for damage to property or people from flooding and associated erosion and deposition</td>
</tr>
<tr>
<td>Hazard</td>
<td>A source of, or a situation with the potential to cause, harm or loss</td>
</tr>
<tr>
<td>Integrated Catchment (^{16}) Management</td>
<td>A process that recognises the catchment as the appropriate organising unit for understanding and managing biophysical processes in a context that includes social, economic and political considerations, and guides communities towards and agreed vision of sustainable resource management in their catchment.</td>
</tr>
<tr>
<td>Residual risk(^{17})</td>
<td>The risk remaining after implementation of risk treatment</td>
</tr>
<tr>
<td>Risk</td>
<td>The chance of something happening that will have an impact on objectives</td>
</tr>
<tr>
<td></td>
<td>NOTE -</td>
</tr>
<tr>
<td></td>
<td>1) A risk is often specified in terms of an event or circumstance and the consequences that may flow from it.</td>
</tr>
<tr>
<td></td>
<td>2) Risk is measured in terms of a combination of the consequences of an event and their likelihood.</td>
</tr>
<tr>
<td>Risk Assessment</td>
<td>The overall process of identification, analysis and evaluation of risk.</td>
</tr>
<tr>
<td>Risk Management(^{18})</td>
<td>The culture, processes and structures that are directed towards realising potential opportunities whilst managing adverse effects.</td>
</tr>
<tr>
<td>Risk Reduction(^{19})</td>
<td>Actions taken to lessen the likelihood, negative consequences, or both, associated with a risk.</td>
</tr>
</tbody>
</table>

\(^{14}\) All definitions are sourced from the NZS 9401:2008 New Zealand Standard for Managing Flood Risk, unless otherwise referenced.
\(^{15}\) Definition developed by Environment Waikato.
\(^{16}\) Integrated Catchment Management Programme, Landcare Research, Nelson.
\(^{17}\) Definition sourced from AS/NZS 4360:2004 Risk Management.
\(^{18}\) Definition sourced from AS/NZS 4360:2004 Risk Management.
\(^{19}\) Definition sourced from AS/NZS 4360:2004 Risk Management.
| **River** | A naturally-formed watercourse of any size that transmits water (sourced originally from precipitation) and sediment (from erosion) through the catchment-landscape system to its base level (a lake or the sea). |
| **Stakeholder** | A person or organisation with a professional, personal, emotional, cultural, and/or financial interest in a community situation, action, or enterprise. |
| **Sustainable management** | As defined by section 5 of the Resource Management Act. Managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while:  
  a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and  
  b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and  
  c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment |
Appendix 2  Legislative background

There is a wide range of legislation that is applicable to managing flood hazard risks. The following table provides a brief overview. These Acts provide a range of mechanisms for managing flood hazards.

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Council responsible</th>
<th>Commentary</th>
<th>Approaches to managing flood risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Government Act, 2002</td>
<td>All councils</td>
<td>Is an enabling Act, which allows councils to undertake a range of activities that are aligned to the community outcomes and long-term planning for activities and capital investment.</td>
<td>Enables works and services (such as stopbanks) to be funded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confers specific powers in relation to land drainage and river clearance, and flood protection and control works.</td>
<td>Enables provision of information about floods.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Regional Policy Statement is required to establish which council is responsible for which activities (in relation to managing natural hazards).</td>
<td>Controls activities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Controls activities.</td>
</tr>
<tr>
<td>Soil Conservation and Rivers Control Act, 1941</td>
<td>Regional council</td>
<td>Focuses on minimising and preventing damage from flooding and erosion and drainage.</td>
<td>Enables works and services (such as stop banks) to be undertaken.</td>
</tr>
<tr>
<td>Building Act, 2004 (and Building Code 1992)</td>
<td>Territorial Authorities</td>
<td>Enables provision of information on land subject to hazards. Controls building standards in flood hazard areas.</td>
<td>Enables provision of information about floods (for example, through land information memorandum).</td>
</tr>
<tr>
<td>Civil Defence and Emergency Management Act, 2002</td>
<td>All councils</td>
<td>Establishes regionally based civil defence management groups and requires planning for emergency management (4 Rs).</td>
<td>Enables flood hazard preparedness, response and recovery measures.</td>
</tr>
</tbody>
</table>

Further detail on legislative background can be found in “Ministry for the Environment: Overview of Flood Management legislation in New Zealand”, Johnson McSweeney Ltd, 2006.
<table>
<thead>
<tr>
<th>Legislation</th>
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<th>Approaches to managing flood risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Drainage Act, 1908</td>
<td>Regional council</td>
<td>Controls water courses and drains to remove obstructions to the free flow of waters.</td>
<td>Enables water-logged land to be drained (for food production and urban purposes), which may contribute to modifying flood events.</td>
</tr>
</tbody>
</table>
Appendix 3  Roles and responsibilities

The Steering Group recommends the following community, local government and central government roles and responsibilities should be adopted to reduce the flood risk.

• Individuals, communities and the private sector should:
  – take responsibility for their family, personal safety, and the decisions they make
  – take responsibility for business decisions
  – understand their level of flood risk (including any residual risk) and accept liability for their decisions
  – be informed and active in decision-making.

• Territorial Authorities should:
  – show leadership locally and adopt a risk management approach to implement risk reduction policies, methods and regulation
  – identify and manage residual risk
  – work together with communities, iwi, regional councils, beneficiaries and exacerbators in decision-making and agreeing on roles
  – sustainably manage the effects of land use and people’s activities to reduce the flood risk
  – use the Building Act and Building Code as part of a comprehensive approach to risk management, including flood-proofing buildings
  – manage civil defence and emergency management locally
  – build stakeholders’ awareness of risk.

• Regional authorities should:
  – show leadership regionally and adopt a risk management approach to implement risk reduction policies, methods and regulation
  – identify and manage residual risk
  – work together with communities, iwi, Territorial Authorities, beneficiaries and exacerbators in decision-making and agreeing on roles
  – sustainably manage water and land to reduce the flood risk
  – manage civil defence and emergency management regionally
  – build stakeholders’ awareness of risk.

• Central government should:
  – show leadership and provide clear direction on reducing flood risk
  – adopt a risk management approach nationally and work with local government
  – ensure local government and communities have the necessary powers and tools to fulfil their roles and responsibilities
  – provide forecasts, weather warnings, science and research relevant to managing flood risk
  – contribute as a beneficiary towards reducing the flood risk, and be a ‘good neighbour’ by taking responsibility for Crown lands and assets
  – ensure that the policy of reducing the flood risk is integrated across all relevant government programmes
  – provide relief when an event has overwhelmed a community’s capacity to respond and recover from a flood.

Refer to MFE “Meeting the Challenges of Future Flooding in New Zealand” report, pp. 15-16.
Figure 9: Tairua River floodplain which was inundated during a heavy rainfall event in May 2005.