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Authors Dr Iain Dawe, Hazards Analyst
Tim Park, Biodiversity Restoration Advisor

Hazards - in the coastal marine area and beds of lakes and rivers - and coastal restoration

1. Purpose

This paper discusses the issues and options for hazards management in the Wellington Region. The issues surrounding hazard management are complex, and include a number of pieces of central government legislation and involve a range of groups and jurisdictions. These issues are incorporated to a greater or lesser degree into all of Greater Wellington regional plans; however the main regional plans that address natural hazards are the freshwater plan, the coastal plan and the soils plan.

The paper briefly outlines the natural hazard issues affecting the Wellington region and discusses the main issues and options for managing these. The main pieces of central government legislation that provide a mandate to Greater Wellington for managing natural hazards are outlined, with an in-depth review of the newly gazetted New Zealand Coastal Policy Statement (2010). A brief review of the requirements for hazards management in the proposed regional policy statement is provided.

The importance of natural systems in controlling hazards and the role that restoration projects have in hazards management is discussed. This leads to discussion of coastal restoration projects and the role that Maori world views of natural resources management and kaitiakitanga can have in managing natural hazards.

The paper finishes by summarising the main issues that need to be addressed in the review of the regional plans for better management of natural hazards in the Wellington region.

2. Natural hazard issues in the Wellington region

With the exception of geothermal activity, the Wellington region is subject to all form of natural hazards defined under the Resource Management Act 1991

(RMA). A natural hazard is defined as “any atmospheric or earth or water-related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding) the action of which adversely affects or may adversely affect human life, property or other aspects of the environment”.

On their own, natural processes do not constitute a hazard. Natural events become hazardous when they may adversely affect human lives. The Wellington region has one of the most physically diverse environments in New Zealand. It is also one of the most populous regions and, consequently, our communities are affected by a wide range of natural hazards. Commonly, there are two or more hazards associated with a given event. For example, a storm event may cause river flooding and associated coastal erosion.

People’s actions, including ongoing development in areas at high risk from natural hazards and in some cases mitigation measures, can cause or increase the risk from natural hazards. For example, seawalls or groynes can cause localised erosion of the adjacent shoreline. Stopbanks and seawalls can also create a sense of security and encourage further development, increasing the extent and value of the assets at risk.

Much of the development in the Wellington region has occurred in coastal areas and on floodplains. Some of this development has been located in places that are vulnerable to flooding, coastal erosion and/or inundation. In recent years, coastal development and associated infrastructure has intensified, and property values have increased rapidly. As development and property values increase, the potential impacts and consequences (cost of property damage) of natural hazards also increase.

Climate change effects have the potential to increase both the frequency and magnitude of natural hazard events that already occur in the region. A major consequence of climate change is sea level rise. Sea level is expected to rise by at least one metre by 2100. The main impacts associated with a rise in sea level are coastal erosion and inundation. Dealing with the larger costs associated with risks of coastal hazards and increased flooding caused by climate change presents a significant challenge for Greater Wellington, over the coming decades. Flood management is currently the most costly hazard that Greater Wellington must deal with, both in terms of direct impacts from flood events and in the provision of mitigation measures.

3. Management issues and options for natural hazards

Under the RMA the management of natural hazards encompasses both events that have occurred and those which have the potential to “adversely affect or affect human life, property or other aspects of the environment”. This has implications for natural resource management and hazards planning, because it directs local authorities to consider events that may occur in future. It is especially important when considering the impacts that climate change will have on the natural environment and communities of the Wellington region.

Hazard risk is a combination of both the *likelihood* and *consequences* of a hazard event. The consequences of a hazard event depend on how many people and assets are exposed and the vulnerability of those people and assets. The relationship between likelihood and consequence for many natural hazards, such as earthquakes or tsunamis, mean that low probability, large impact events are often not represented within a 10 or even 100 year time frame. This creates planning challenges in how we can reasonably manage the impacts from future hazard events without being overly restrictive in allowing development to occur.

Ideally, hazard risk management is responsive to local conditions, based on good information and sound decision making by local authorities in partnership with an informed community aware of the risks.

Management options to reduce the risk from natural hazards include:

- Policy and planning measures that seek to control land use and activities in areas that are subject to natural hazards.
- Mitigation measures that seek to control natural processes, either through natural or engineering methods.
- Designing and adapting infrastructure to withstand hazard events.
- Emergency management planning to enable communities to respond to and recover from hazard events.

Often a mixture of options is used to manage hazard risk in an area. This means using measures to control hazards, as well as managing people and assets to reduce a community's vulnerability to natural disasters. Thus, it is important that all matters relating to hazards management are carefully considered, taking into consideration the longer term implications of allowing development in hazard prone areas.

4. Resource Management Act requirements

The Resource Management Act (1991) provides a mandate in parts 2 and 4 for regional councils to manage natural hazards, climate change impacts and the effects of hazard mitigation measures on the environment. A clear direction for Greater Wellington to manage the effects of natural hazards, conduct natural hazards research and maintain information on the effects of natural hazard events is provided for under the RMA. Sections 35(1) and 35(5)(j) both state that local authorities have a duty to gather information, undertake or commission research and keep records of natural hazards, as is necessary to carry out its functions under the RMA.

Part 4 of the RMA has a number of sections and subsections that directly require regional and district councils to manage the effects of natural hazards. Section 30(1) states "Every regional council shall have the following functions for the purpose of giving effect to this Act in its region; ... (c) the control of the use of land for the purpose of ... (iv) the avoidance or mitigation of *natural*

hazards;... (d) in respect of any coastal marine area in the region ... (v) any actual or potential effects of the use, development, or protection of land, including the avoidance or mitigation of *natural hazards* and the prevention or mitigation of any adverse effects of the storage, use, disposal, or transportation of hazardous substances and;... (g) in relation to any bed of a water body, the control of the introduction or planting of any plant in, on, or under that land, for the purpose of ... (iv) the avoidance or mitigation of *natural hazards*.

5. Central government directions

Since the regional plans were made operative in 1999 and 2000 there have been some legislative changes that need to be taken into account in the plans review, these include

- the introduction of the Civil Defence Emergency Management Act (2002)
- the development of the Wellington Region Civil Defence Emergency Management Group Plan (2005) (currently under review)
- changes to the Resource Management Act (1991) and;
- the second generation New Zealand Coastal Policy Statement (2010).

Currently there is only one national policy statement that directs regional councils to consider natural hazards; the New Zealand Coastal Policy Statement (2010). However, there are several other national policy statements (NPS) and national environmental standards (NES) in various stages of development that will have sections dealing with natural hazards, including an NES on sea level rise and an NPS on flooding.

The review of the regional Civil Defence Emergency Management (CDEM) group plan will result in a greater focus on hazard planning for the *reduction* principal (1st R of the four R's) of hazard management, something that was lacking in the first plan. The regional policy statement is required to take the CDEM group plan into consideration, which consequently informs the regional plans. The four R's principals of hazard management are; Reduction, Readiness, Response, and Recovery. Reduction involves avoiding or minimising the impacts of natural hazards by sound planning.

Regional councils also manage rivers and catchments under the Soil Conservation and Rivers Control Act (1941). Some activities conducted under these acts also serve to manage hazard risk.

5.1 New Zealand Coastal Policy Statement

There are a number of policies in the New Zealand Coastal Policy Statement 2010 (NZCPS), which comes into force on 3 December 2010, that address the management of coastal hazards. Decision makers, consents officers and hearing commissioners must have regard to the NZCPS. The second generation NZCPS places additional emphasis on identifying:

- areas at high risk from natural hazards
- avoidance of high risk
- a preference for soft engineering methods; and
- the need to take climate change impacts into account.

The natural hazards provisions in the Greater Wellington’s proposed Regional Policy Statement are consistent with the NZCPS policies.

There are four coastal hazards policies:

Policy 24 requires councils to; “identify areas in the coastal environment that are potentially affected by coastal hazards (including tsunamis), giving priority to the identification of areas at high risk of being affected”. Hazard risks, over at least 100 years, are to be assessed, having regard to a range of factors including physical processes, short and long term erosion cycles, climate change impacts and sea level rise.

The 100 year planning horizon of the NZCPS is important, as it potential conflicts with requirements of the Building Act (2004) which requires a 1:50 year planning timeframe. In this regard best practice hazard planning is increasingly at odds with the current Building Act. This is important when considering future impacts of natural hazards. The RMA explicitly includes *potential* impacts in the definition of natural hazards.

Climate change is becoming increasingly important as estimates of future sea level rise are revised upwards in light of current research and ongoing measurements that indicate that sea level rise is accelerating.

There is a method in the proposed Regional Policy Statement for research to be conducted into identifying hazard areas and to provide information for regional and district plan purposes. Currently, a region wide storm surge and coastal inundation project is underway to identify vulnerable coastal locations.

Policy 25 addresses subdivision, infrastructure placement and development in areas of coastal hazard risk and focuses on avoiding increases in the risk of social, environmental and economic harm from coastal hazards, encouraging redevelopment in a manner which reduces hazard risk and the use of alternative to hard engineering in hazard mitigation.

The policy includes managed retreat as a possible management strategy. Managed retreat while a politically and socially charged issue in coastal areas it will become an option that requires genuine consideration as sea level rises and as such is provided for in the NZCPS. .

The policy also discourages the use of hard protection structures by recognising that hazard protection works can have an adverse impact on the coastal environment and that the capital outlay and maintenance cost of these works is expensive for the community. Hard engineered structures encourage

ongoing development behind the works, thereby increasing the residual risk and heightening the cost of damages if the protection works fail.

Policy 26 encourages the use of natural defences against coastal hazards by;

- (1) providing where appropriate for the protection, restoration or enhancement of natural defences that protect coastal land uses, or sites of significant biodiversity, cultural or historic heritage or geological value, from coastal hazards; and
- (2) recognise that such natural defences include beaches, estuaries, wetlands, intertidal areas, coastal vegetation, dunes and barrier islands.

These features can provide natural protection from coastal hazards and should be preserved, maintained and protected from development that acts to diminish this capacity. This is further supported by policies in the document that address indigenous biodiversity, restoration of natural character and the protection of natural features and landscapes.

Policy 27 outlines strategies for protecting existing development from coastal hazard risk by; “promoting and identifying long-term sustainable risk reduction approaches including the relocation or removal of existing development or structures at risk.” It also recognises that hard protection structures may be the only practical means to protect existing infrastructure but that approaches should focus on risk management that reduce the need for hard protection structures and similar engineering interventions.

In addition there are also a number of policies in the NZCPS (2010) that support coastal hazard management. These include policies 1, 2, 3 and 4. Under Policy 1 natural hazards are seen as a natural part of the functioning coastal environment. This is an important because past views of natural hazards and the processes that drive them were considered as something which needed to be prevented, not as a natural process of value. In order to manage the effects of coastal hazards, we need to understand the natural processes of the coastal system and work with these rather than trying to fight against them. This approach is akin to the Maori worldview of natural resources management.

Policy 2, that addresses Treaty issues and Māori heritage and broadly states in relation to the coastal environment we must take into account of the principles of Te Tiriti o Waitangi/Treaty of Waitangi and kaitiakitanga and provide for opportunities for tangata whenua to exercise kaitiakitanga over waters, forests, lands, and fisheries in the coastal environment. There will be instances when this applies to natural hazards management, particularly in situations where the need for hazard mitigation measures are being considered and the options involve either hard engineered structures or natural restoration. In this instance one worldview is to fight against nature, and the other is to work with the natural environment and allow coastal processes room to operate, even if this involves natural fluctuations of the shoreline.

Policy 3 outlines the precautionary approach and states that a precautionary approach must be adopted towards proposed activities whose effects on the coastal environment are uncertain, unknown, or little understood, but potentially significantly adverse. This applies particularly around the use and management of coastal resources potentially vulnerable to effects from climate change, so that:

- i. avoidable social and economic loss and harm to communities does not occur
- ii. natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur

Finally, Policy 4 addresses the need for integration across administrative boundaries, recognising that particular consideration to situations where, activities above the mean water springs can have an impact on the coastal marine area. Decision makers will need to be aware of this and plan to minimise this occurrence. An example is the effect that stormwater outfalls draining above the mean high water springs have on the foreshore by increasing the erosion risk.

5.2 National Policy Statement on Flooding

Local Government New Zealand (LGNZ) recently released a discussion paper putting forward the case from regional and district councils for a national policy statement (NPS) on flooding. The essence of the LGNZ argument is that all of New Zealand will benefit from the provision of an NPS on flood hazards because it offers the potential to reduce the heavy financial and social burden it places on local communities and the wider economy.

There is strong push from LGNZ and local authorities to develop an NPS on flooding and if and when it is developed, regional plans will need to give it effect. Judging by the direction of the NZCPS, it would be fair to expect an NPS on flooding to have a similar emphasis on hazard identification and avoidance and a move to reduce reliance on engineered hazard mitigation works. In this respect the proposed Regional Policy Statement is well placed to be consistent with an NPS on flooding and this direction should be followed in the hazard policies of the regional plans.

5.3 National guidance documents

A number of guidance manuals published by Ministry for the Environment address hazards management and provide guidance for local authorities in the planning and decision making process. Many of these provide specific advice that can be incorporated into regional plans. In particular there are three documents that address coastal hazards, flood hazards and climate change effects.

These documents are designed to support local authorities in managing coastal hazards and they contain a lot of guidance that is relevant to policy development for regional plans. In particular, they outline risk assessment

frameworks for incorporating coastal hazards and climate change considerations into the decision making process and promote the development of long term adaptation strategies for managing coastal hazard risk.

There are four main planning principals expounded in the documents:

1. *Precautionary approach:* A precautionary approach is adopted when making planning decisions relating to new development, and to changes to existing development. Decision making takes account of the level of risk, utilises existing scientific knowledge and accounts for scientific uncertainties.
2. *Progressive risk reduction:* New development is not exposed to, and does not increase the levels of, natural hazard risks over their intended lifetime. Progressively, the levels of risk to existing development are reduced over time.
3. *Importance of natural features:* The dual role of the natural environment as the fundamental form of defence and as an environmental, social and cultural resource is recognised in the decision making processes and, consequently, the margins of coasts, rivers and lakes are protected and/or restored to provide a buffer from natural hazards.
4. *Integrated, sustainable approach:* An integrated and sustainable approach to the management of development and natural hazard risk is adopted, which contributes to the cultural, social and economic wellbeing of people and communities.

To achieve these principles Greater Wellington will need to:

- Identify and effectively account for natural hazards, vulnerabilities and potential consequences in coastal areas and on floodplains.
- Communicate effectively to build community awareness, and public and political support for activities associated with hazard risk planning.
- Engage the community in consultation and participation in achieving effective community planning outcomes.
- Take an adaptive management approach that is responsive to change over time and that balances sustainable structural, non-structural approaches.

6. Proposed Regional Policy Statement

The proposed Regional Policy Statement contains policies that the regional plans must give effect to. The proposed Regional Policy Statement identifies three regionally significant resource management issues for natural hazards:

- Natural hazard events in the Wellington region have an adverse impact on people and communities, businesses, property and infrastructure.

- People's actions including mitigation measures and ongoing development in areas at risk from natural hazards can cause, or increase, the risk and consequences from natural hazards.
- Climate change will increase the risks from natural hazard events that already occur within the region, particularly:

Three regulatory policies are proposed to deal with these issues that will have implications for the regional plans hazard policies and rules.

Policy 28 directs regional, city and district councils to avoid inappropriate subdivision and development in areas at high risk from natural hazards. District Plans are required to;

- identify areas at high risk from natural hazards; and
- include policies and rules to avoid inappropriate subdivision and development in those areas.

Policy 50 directs regional, city and district councils to minimise the risks and consequences of natural hazards when considering resource consent applications, a notice of requirement or district or regional plan reviews. The policy requires that the risk and consequences of natural hazards on people, communities, their property and infrastructure shall be minimised by considering a range of factors including; the frequency and magnitude of natural hazards; climate change and sea level rise; potential future need for hazard mitigation works; potential for injury or loss of life and; any civil defence emergency management implications.

Finally, Policy 51 directs regional, city and district councils to minimise the adverse effects of hazard mitigation measures when considering an application for a resource consent, a notice of requirement, or a plan review. The policy requires a range of factors to be considered so that mitigation works do not increase the risks of natural hazards, including; the need for structural protection; whether soft engineering methods are more appropriate; avoiding structural protection works unless it is necessary to protect existing development from unacceptable risk; cumulative effects and; residual risk.

7. Regional Plans

There is no regional plan for natural hazards, but there are hazard related objectives, policies and rules in the coastal, freshwater and soils plans. The coastal plan has hazard policies relating to occupation, use and disturbance of the foreshore, the freshwater plan policies relating to flood hazards and mitigation and the soils plan policies relating to soil erosion.

7.1 Regional Soil Plan

The Regional Soil Plan has been operative since 2000. It does not have policies and rules that specifically mention landslip hazards, but some of the objectives, policies and rules address natural hazards indirectly. The regional soil plan contains provisions to mitigate hillslope erosion, and by default landslides.

The issues in the soil plan relating to natural hazards can be summarised as:

- Vegetation disturbance can cause erosion leading to adverse effects on soils and water quality.
- Removal of riparian vegetation may exacerbate riverbank and stream bank erosion and reduce effectiveness of river margins to trap sediment and nutrient runoff.

Enhanced erosion and sediment runoff from hillslopes or riverbanks following vegetation clearance can cause aggradation of river and stream beds, which may increase the flood hazard and reduce the effectiveness of flood protection works.

Objectives, policies and rules in the soils plan direct activities to avoid, remedy or mitigate the adverse effects of accelerated erosion and to maintain vegetative cover in erosion prone areas, or where this is not practical, to employ other slope/bank stabilisation methods.

There are also policies and methods to promote land management practices that recognise the inherent susceptibility of some landforms to erosion and ensure that practices are adopted to reduce erosion rates and control sediment runoff to water bodies.

In addition to the provisions of the Regional Soil Plan, Greater Wellington's Land Management Department provides advice and funding for hillslope planting, slope stabilisation and the reduction of sediment runoff. These activities also serve to reduce the landslide risk on slopes prone to landslips. This co-benefit needs to be explicitly recognised in the review of the Regional Soil plan.

Climate change is also expected to bring changes to the regions rainfall patterns. In the upper catchments the erosion risk may increase, as a result of high intensity rainfall events. Modelling suggest that in the eastern Wairarapa hill country there is the potential for an overall reduction in rainfall, an increasing risk of drought and an increase in intense rainfall events. This combination of factors can strip soils off hillslopes, as the rain falling onto hard, parched ground is not easily absorbed, leading to sheet flow of water and sediments.

7.2 Regional Freshwater Plan

The Regional Freshwater Plan contains provisions to mitigate flooding and erosion hazards and has been operative since 1999. Of all the plans it is the most comprehensive in its treatment of natural hazards and risks, however there is a focus on the need for flood protection works and the maintenance of those structures. The second generation plan needs an equal focus on objectives and policies that encourage hazard planning and avoiding development in high hazard flood areas, in addition to soft engineering methods.

7.2.1 Regional Freshwater Plan issues

There are two main areas that freshwater issues relate to natural hazards. The first set of issues relate to general flood hazard planning. The second set of issues relates to the use of rivers and lakes and development on the floodplain, including flood mitigation structures.

The plan recognises that flooding is a natural hazard that people and communities need to avoid or mitigate but which can never be completely eliminated. One way to mitigate this hazard is to build stopbanks. Many of the issues identified in the plan relate to the maintenance and construction of flood protection works such as stopbanks and the effects of structures and activities in river beds on the flood hazard.

7.2.2 Regional Freshwater Plan objectives, policies and rules

The general objectives of the plan, as they relate to hazards, are to reduce the risk of flooding to an acceptable level and that the adverse effects of the use and development of freshwater resources are avoided, remedied, or mitigated.

These objectives should also contain a statement about ‘minimising’ the adverse effects for new developments, to be consistent with the new direction of the proposed regional policy statement.

There are policies to promote the avoidance or mitigation of the adverse effects of flooding; maintenance of flood mitigation works; provision of information; restoration of freshwater resources; and to adopt a precautionary approach to flood planning when there is limited information.

There could also be an emphasis on avoiding high hazard flood areas, rather than just avoiding the adverse effects of flooding, which could be viewed as promoting the use of hard structures to reduce the risk.

The rules relate to maintenance of structures and flood protection works, gravel extraction activities and other works in the beds of lakes and rivers. The rules that relate to these policies largely set out what is a permitted activity. If an activity is not permitted it is controlled, discretionary, non-complying or restricted discretionary. In these instances a resource consent is required.

7.2.3 Regional Freshwater Plan effectiveness and issues

The objectives, policies and rules in the Regional Freshwater Plan have been effective for allowing the work of flood protection. There is a growing awareness of the need to strengthen the flood planning policies to allow greater emphasis on non-structural controls of flood hazard mitigation.

Flooding is a natural process and communities are placed at risk when they are built on floodplains. The proposed regional policy statement advocates avoiding inappropriate development in high hazard areas. Flood protection works are extremely expensive and require significant investment by local authorities. There is a growing recognition that ongoing development in flood hazard areas may be unsustainable.

The plan states that in some cases structural flood mitigation works may be more appropriate than non-structural options.

One result of the current method of flood mitigation is a legacy of development on floodplains and in flood hazard areas that means we are locked into a cycle of continual upgrading of flood protection works. This work is costly and occurs in a number of places around the region to protect significant infrastructure, for example in the Hutt Valley. Structural options involve the use of engineered structures such as stopbanks, groynes or training walls at river mouths. Flood mitigation using structural options are always going to be a central feature of flood management, but can be complimented by non-structural approaches.

It is acknowledged that non-structural options for flood mitigation have less potential to alter the natural character of a water body than structural flood mitigation options. Non-structural options may involve hazard planning, development restrictions, community preparedness, flood warning systems and emergency planning. These options can also include restoration of wetlands, lakes and rivers and current thinking is that such options offer a cost effective and environmentally more sympathetic approach in some circumstances.

Building new structures or carrying out other activities within river and lake beds, and on the floodplain, can increase the risk of flooding and/or cause erosion in river and lake beds. New development on a floodplain has the potential to cause a diversion or retention of flood flows with consequent effects in other locations, and needs to be carefully managed.

Similarly, activities in river and lake beds involving disturbance, deposition, reclamation or planting, can increase erosion and flood risk. Activities in river and lake beds can reshape the bed, change hydraulic processes, and alter the distribution of material that makes up the bed. These changes in a river or lake can in turn cause erosion and instability of river banks or the shorelines of lakes.

There is often inadequate knowledge of the risks associated with flooding. Flooding is a natural process that is largely controlled by rainfall and this can be extremely variable over time. As such, a precautionary approach is

advocated when planning and developing in flood risk areas where records are not sufficient to provide future flood probabilities.

Reclamation of lakes and wetlands has adverse environmental effects. Furthermore, it removes habitats available to support aquatic species and reduces regional biodiversity. Wetlands and lakes can act as buffers to flood hazards because they are water retention areas, and can slow the velocity of flood waters and reduce erosion. They also act as sediment sinks, collecting fine materials that would otherwise be transported to the coast. The draining of wetlands needs to be heavily discouraged and restoration policies be given a high priority.

7.3 Regional Coastal Plan

7.3.1 Regional Coastal Plan issues

The main hazard issues identified in the Regional Coastal Plan relate to use and development in the Coastal Marine Area that may be affected by natural hazards; poorly designed reclamations and structures; disturbance of the foreshore or seabed; deposition of materials on the foreshore and; exotic weed species altering natural processes.

A growing understanding of the impacts of human activities and climate change on the coast means the plan review needs to consider including issues recognising climate change impacts; an issue explicitly recognizing the impact that human use and development can have in interfering with natural coastal processes and exacerbating the impacts from coastal hazards; and the encroachment and cumulative impacts of development on the coastal environment.

One of the issues identified in the operative plan was that disturbing the foreshore and seabed can affect the mauri (life essence) of the coastal marine area. In particular, disturbance can affect the physical and economic values of mahinga maataitai or taonga raranga and spiritual values of waahi tapu and other characteristics of significance to tangata whenua. It can be argued from a Maori natural resources management point of view, that adverse alteration of the natural processes may increase the risk from coastal hazards, which could consequently degrade the mauri of a beach. For example, waahi tapu sites may have increased pressures from coastal erosion that is caused or exacerbated by human activities. This may become an issue with accelerated sea level rise and there would be merit in including this in the next plan.

7.3.2 Regional Coastal Plan general objectives and policies

The general objectives and policies in the Regional Coastal Plan relate to reducing adverse effects from natural hazards to an acceptable level; recognising the impact of cumulative effects; the need to adopt a precautionary approach and; the need for use and development to take account of natural hazards

The direction in the proposed Regional Policy Statement is to ‘minimise’ the risk from natural hazards, which is a stronger directive than ‘reduced to an acceptable level’. This change in emphasis needs to be picked up in the second generation plans.

Human activities can cause or exacerbate coastal hazards, and these activities need to minimise this effect is an issue which needs to be addressed in the plan review. These hazards and policies should be linked to policies that address conditions to avoid, remedy or mitigate effects in resource consents. Projected sea level rise and climate change effects need to be taken into account when addressing these issues.

7.3.3 Regional Coastal Plan activities related policies and rules

The Regional Coastal Plan has a series of policies addressing reclamation and draining of the foreshore and seabed, coastal structures, destruction or disturbance and deposition of substances on the foreshore or seabed and management of native and introduced vegetation.

In general, activities are allowed to occur in the Coastal Marine Area if their effects are short term, reversible and no more than minor or the effects can be avoided, remedied or mitigated. As a guide, a set of criteria must be complied with before an activity is deemed to have minor adverse effects. Two of these criteria partly relate to coastal hazards:

- the activity will not have any offsite adverse effects
- the activity will not adversely affect shoreline stability

Offsite effects refer to changes that occur away from the site as a result of the activity. An example would be sediment extraction activities that cause down coast erosion.

Specifically, there are policies to ensure that the following factors are taken into account when designing any reclamation or structure which is to be used for major public works:

- rising sea levels
- waves and currents
- storm surge
- major earthquake events

These policies are one of the few places where sea level rise is taken into account. However, they need to apply to any reclamation or structure, not just those to be used for major public works.

There are also policies to discourage the development of ad hoc shore protection structures and to not allow the development of seawalls, groynes, or other hard shore protection structures unless all feasible alternatives have been evaluated; and to not allow the use or development of structures in the coastal marine area where there will be adverse effects on:

- the risk from natural hazards
- coastal processes, including waves, tidal currents and sediment transport

These policies are consistent with the proposed Regional Policy Statement Policy 51 and should remain in the plan. In the context of the plan review added weight could justifiably be given to alternatives including soft engineering or coastal restoration as means to provide protection from coastal hazards.

The rules that relate to these policies largely set out what is a permitted activity. If an activity is not permitted it is controlled, discretionary, non-complying or a restricted coastal activity. In these instances a resource consent is required.

The consenting processes set out a series of criteria that need to be considered in the consent making decision. The criteria that relate to hazards can be summarized thus:

- A statement that the activity has been designed using current engineering practices, and appropriate allowance has been made for the effects of sea level rise, waves and currents, and earthquakes.
- An assessment of any actual or potential effects that the activity may have on the environment, and the ways in which any adverse effects may be mitigated.
- In respect of a shore protection structure, an evaluation of alternative means of mitigating the hazard.

7.3.4 Regional Coastal Plan effectiveness of rules

In general, the rules in the Regional Coastal Plan have worked sufficiently well and have been properly applied by decision makers. There are still strong pressures to continue developing in the and near the CMA and as our understanding of the coastal environment has increased over the past 10 years, especially in light of climate change, there is scope to review and modify the policies and rules in the plan.

Consent assessments should take into account the potential of an activity to increase the hazard risk and discuss methods to minimise this risk.

Natural hazards that should be added to list of considerations are storm surge and inundation, tsunamis, climate change effects and liquefaction.

Coastal structures can have major impacts on a shoreline and these need to be fully taken into account to minimise any increase in the risk from natural hazards. In the light of national policy and contemporary knowledge a review of the permitted activity maintenance trigger points is needed.

In the context of changes to the NZCPS one of the activities and associated rules where a review is warranted is the work that is involved in cutting river mouths. Cutting river mouths is sometimes necessary to prevent flooding, but it can have adverse effects on the coastal system. This issue needs to be addressed and investigated in greater detail. One of the effects commonly attributed to such activities is changed sedimentation and erosion patterns on adjacent beaches after a river mouth has been cut, for example on the Waikanae River.

Unless otherwise stated in a rule, an application for a resource consent for any activity involving the destruction, damage, or disturbance of foreshore or seabed is required. This requires a series of conditions to be considered in the application and decision making process. These considerations do not always explicitly mention natural hazards but hazards are, by proxy, part of the consideration, insofar as natural processes are required to be examined. There is scope for natural hazards to be considered as part of these criteria, in particular any ways in which the activities may increase the hazard risk on and off the site and ways in which this may be minimised.

One of the issues currently absent from the coastal plan is the effect that water discharges from stormwater outfalls have on a beach by scouring sediments from the foreshore, saturating beach sediments and exacerbating erosion of the foreshore. There is scope for an objective to minimise the impacts from stormwater discharges and a policy to encourage alternative methods of dispersing stormwater at the coast and to consider relocation of stormwater outlets away from the foreshore.

Another common material that is discharged into the CMA from stormwater outfalls is silt and clay particles. Fine materials act to block pore spaces in beach sediments and can enhance erosion of the foreshore in storm conditions. This issue is also not adequately addressed in the current plan. Whilst silt runoff is addressed in the soils plans, its impacts on the coastal system in exacerbating erosion hazards needs to be identified.

The value of coastal restoration projects has been demonstrated throughout the region in the past years. It brings ecological, amenity and hazard mitigation benefits. The applicability, utility and value of coastal restoration in other areas of the coast, incorporating policies that encourage restoration and the eradication of invasive weed is a further issue for consideration in the review; as a healthy functioning coastal system is also resilient to coastal hazards.

8. Coastal Biodiversity

Greater Wellington's Coastal and Marine Biodiversity Action Plan is one of the Council's main responses to biodiversity issues in the coastal environment, along with the *Take Care* community care group and the Key Native Ecosystem (KNE) programmes. These programmes are part of Greater

Wellington's Biodiversity Implementation Plan. With the recent formation of a Biodiversity Department, a regional biodiversity strategy is being prepared and a review of all current biodiversity programmes undertaken.

The Biodiversity Implementation Plan, and associated programmes were developed primarily in response to the New Zealand Biodiversity Strategy (2000). They are also consistent with the Statement of National Priorities and the New Zealand Coastal Policy Statement (2010).

The New Zealand Biodiversity Strategy (2000) establishes a strategic framework for conserving and managing indigenous biodiversity and the conservation of the genetic resources of important introduced species as well. The strategy has four goals, focused on community understanding and action, tangata whenua values and partnerships, maintaining the genetic resources for introduced species, and halting the decline of indigenous biodiversity by 2020. It also contains action plans based on ten different focus areas or 'themes' and a strategic framework and priorities.

The Statement of National Priorities for protecting rare and threatened native biodiversity on private land was released in 2007. It states four national priorities for protecting biodiversity on private land:

- land areas with only 20 per cent of their original native vegetation cover left
- wetlands and sand dunes
- originally rare ecosystems (those that have always been limited in extent, such as in geothermal areas, rock stacks and on limestone formations)
- protection of the habitats of New Zealand's most threatened species.

The statement has information for landowners and councils on these national priorities and maps of national priority 1 areas by island, region, and district are available.

The New Zealand Coastal Policy Statement (2010) (NZCPS) contains two important policies that will support the work of the Coastal and Marine Biodiversity Action Plan. Policy 11 to protect indigenous biological diversity in the coastal environment and Policy 14 that promotes the restoration of natural character in the coastal environment.

Recently the Minister for the Environment has indicated that a National Policy Statement on Biodiversity is a priority for the current government. Our understanding is that it will align with both the Statement of National Priorities and the NZCPS.

The proposed Regional Policy Statement has a number of objectives, policies and methods that are relevant to coastal biodiversity.

Objective 16:

“Indigenous ecosystems and habitats with significant biodiversity values are maintained and restored to a healthy functioning state.”

Objective 3:

“Habitats and features in the coastal environment that have significant indigenous biodiversity values are protected; and habitats and features in the coastal environment that have recreational, cultural, historical or landscape values that are significant are protected from inappropriate subdivision, use and development.”

Objective 4:

“The natural character of the coastal environment is protected from the adverse effects of inappropriate subdivision, use and development.

Objective 5:

“Areas of the coastal environment where natural character has been degraded are restored and rehabilitated.”

Objective 6:

“The quality of coastal waters is maintained or enhanced to a level that is suitable for the health and vitality of coastal and marine ecosystems.”

Objective 7:

“The integrity, functioning and resilience of physical and ecological processes in the coastal environment are protected from the adverse effects of subdivision, use and development.”

Policy 22 ensures regional and district plans identify indigenous ecosystems and habitats with significant biodiversity values in their district plans.

Policy 23 directs regional and district plans to protect indigenous ecosystems and habitats with significant biodiversity value.

Policies 36, 39 and 46 are considerations to ensure that life-supporting capacity, ecosystem health and areas of significant values are taken into account when decisions are being made to manage effects.

Policy 64 supports restoration and environmental enhancement initiatives.

Method 28 of the PRPS is for Wellington Regional Council to prepare a Coastal and Marine Biodiversity Action Plan.

The current coastal and marine biodiversity action plan has focused on providing advice, restoration plans and practical protection works (fencing, environmental weed control, pest animal control, along with some support

planting in critical sites) to land holders, land managers, and coastal communities. Greater Wellington staff been working with private landowners and local councils that own high value sites in the coastal environment to deal with some of the more serious problems that these sites face.

To date the coastal and marine biodiversity action plan has completed restoration plans for parts of the region as follows:

- Entire Kapiti Coast (coarse scale to identify priorities)
- Lyall Bay, co-funded by WCC
- Island Bay, co-funded by WCC; also a *Take Care* group
- Titahi Bay, co-funded by PCC
- Onehunga Bay, Whitirea, also a *Take Care* group
- Waikanae Beach, Boat Club Area, also a *Take Care* group
- Marram Way, Pekapeka, also a *Take Care* group
- Plimmerton South Beach and Ngati Toa Dunes, co-funded by PCC
- Waitohu North, Otaki, also a *Take Care* group
- Riversdale Beach Advisory notes
- Porirua Stream Mouth Estuary
- QE Park foredunes, co-funded by Parks & Forests, also a *Take Care* group

A restoration plan for Paraparaumu Beach (boat club south to revetment) is being drafted in partnership with Kapiti Coast District Council. KCDC currently has a draft restoration plan open for consultation.

Practical protection to date has included assistance with fencing at Whangaimoana, Lyall Bay, Kinoull Station and Terawhiti Station (Karori Estuary) and North Waitohu. Weed control has been undertaken at Otaki estuary, Ureiti, Te Humenga, and Te Kawakawa Point. Limited planting has been done at Paekakariki Surf Club, Plimmerton South Beach, Lyall Bay, Pekapeka, and Whangaimoana. Greater Wellington has assisted in establishing predator control on the Paekakariki escarpment and a trial of predator control with locals at Whangaimoana Beach.

As noted earlier, implementation of the Coastal and Marine Biodiversity Action Plan is supported by two other biodiversity programmes.

The Key Native Ecosystem programme provides a high level of plant and animal pest control to the region's highest value ecosystems. Four coastal escarpments and two dune systems are managed as KNEs. Some of the 10 wetlands and the 40 native forests also managed as a part of this programme are also in the coastal environment.

Fourteen of the 35 *Take Care* community care groups are mainly coastal, representing a significant community effort and ongoing investment from Greater Wellington in facilitating and funding community restoration on the coast.

Work is also being undertaken to prepare a dune restoration guide for use by practitioners and the public.

9. Management in other councils

All regional councils have policies and rules in their regional plans to deal with natural hazards. Like Greater Wellington, these policies and rules are spread across all the plans for coastal, freshwater and land management. Some of the second generation plans have more directive policies for managing natural hazards than Greater Wellington, for example the Auckland coastal plan. This is a reflection of the changing planning environment towards a strengthening of natural hazards policies. The proposed regional policy statement has more directive hazards policies and this will inform the plan review.

Many councils have specific chapters and sections devoted to natural hazards. There is some benefit to this, in that it highlights the importance of natural hazards management, but conversely it can lead to problems of integrating the policies into the decision making process. How Greater Wellington proceeds with this will depend on the structure of the plans.

Regional councils have jurisdiction over the coastal marine area and the beds of lakes and rivers. This means that regional councils can set policies and rules governing activities and the use of resources in these areas, but it cannot set rules for land unless specifically allowed. This creates some issues when it comes to managing the effects of land based activities that impact on the CMA or in the beds of lakes and rivers. For example, stormwater outfalls on beaches have an adverse effect on the foreshore. Regional councils may have little ability to manage this if the outfall ends above the mean high water mark.

Some councils have developed, in conjunction with the territorial authorities, coastal hazard management zones that control some types of land based development, for example Environment Canterbury and Hawke's Bay Regional Council. This approach provides clarity when planning for development as it sets out a series of coastal hazard zones with rules covering what type of development is allowed in those zones. This approach integrates across the mean high water mark. How such a model would be developed for the Wellington Region is yet to be fully explored.

10. Conclusions

Greater Wellington is required to have policies and rules in the regional plans to address hazard management. Natural disasters are costly to the community and require enormous resources to respond and recover from. It is often more cost effective to use sound hazard planning than to rely on expensive mitigation works, although it is acknowledged that this is unavoidable in places. There are now a number of pieces of central government legislation and guidance documents that are providing a clear directive for stronger hazard management policies. The most important of these have been discussed in this paper. This direction has been picked up by the regional policy statement, which regional and district plans must give effect to.

Overall, the way in which natural hazards have been addressed in the plans has been reasonably successful. There has been good identification of the issues backed up with objectives and policies that aim to reduce the impacts of natural hazards. Often, however, policies have been more ‘aspirational’ than instructive. This is partly due to policies having a general weighting towards mitigation rather than a precautionary approach, limited tools to manage cumulative effects and development in hazard prone areas. Another reason is that natural hazard management is a multi-jurisdictional issue and it can be difficult to manage responses across multiple organisations.

There is a perception that hazard mitigation measures have been overly focussed on structural methods, despite the policies and rules in the freshwater and coastal plan to discourage this approach. This was also an issue identified in the review of the regional policy statement. There was a concerted effort to strengthen hazard planning policies in the RPS, in order to give strength to rules in the new plan to address this problem.

There are many policies in the plans that deal indirectly with managing natural hazards and this could be made more explicit. Some of the policies and rules produce additional benefits in managing two issues through the one measure, a clear efficiency. In this way it provides additional strength to the policy. For example, slope planting for erosion control, also helps reduce the landslide hazard; biodiversity restoration projects frequently help natural hazards mitigation.

In light of the growing awareness of climate change and sea level rise, there is an urgent need for the second generation plans to take this into account and include policies and rules to address the effects that will come to bear on the region over the next decade.

The issues centre on the need for:

- Clearer explanations in the issues and objectives around the adverse impacts of natural hazards
- More directive policy for natural hazard management
- More explicit rules for hazard mitigation
- The need to include climate change and sea level rise impacts across all issues, policies and rules
- Clarity of jurisdictional and cross boundary issues
- The need for ongoing research to back up stronger policies and identify high hazard areas, especially with a climate change focus.

11. Recommendations

That the Committee:

1. ***Receives the report.***
2. ***Notes the content of the report.***

Report prepared by:

Report prepared by:

Dr Iain Dawe
Hazards Analyst

Tim Park
Biodiversity Restoration
Advisor

Report approved by:

Report approved by:

Jonathan Streat
Manager, Environmental
Policy

Nigel Corry
General Manager,
Environment Management
Group