

1. Natural Hazards

1.0 Introduction

- 1.0.1 A natural hazard is any atmospheric or earth or water-related phenomena that may adversely affect human life, property or other aspects of the environment. Natural hazards can include earthquakes, tsunamis, erosion, volcanic and geothermal activity, snow, frost, hail, landslips, subsidence, sedimentation, wind, drought, fire, flooding, marine inundation and rising sea levels.
- 1.0.2 Natural hazards within New Zealand can be easily linked to the country's location. New Zealand lies in a geographically unstable zone, straddling two moving sections of the earth's crust, the Pacific and the Australian plates. The natural forces that create New Zealand's environment present many hazards, including earthquakes, volcanic eruptions, tsunamis, storms, floods and landslides. The country's mountainous terrain can increase the rainfall produced by frontal storms and tropical cyclones and so flooding is by far the most frequent and costly disaster in New Zealand. New Zealand also lies in the path of the roaring forties weather system. Being prepared to deal with these hazards and constructing our built environment to minimise their effects is the price of living in a dynamic environment.
- 1.0.3 The vulnerability of any site to natural hazards is the sum of its vulnerability to one or several specific hazards. An assessment of the probability of those hazards and their potential effects on the proposed activity provides an assessment of risk. The aim is to reduce vulnerability to hazard events and build resilient communities to cope with them should they occur. Several agencies have a role in achieving this aim, including local and central government, the Earthquake Commission and Crown Research Institutes. The new Civil Defence Emergency Management arrangements under the Civil Defence Emergency Management Act 2002 also encourage individuals and communities to take responsibility for managing risks.
- 1.0.4 Our understanding of natural processes and how they have the potential to affect the built environment continues to grow over time. This knowledge becomes incorporated into the planning processes and allows us to obtain a better understanding of the risks involved and how or if it is necessary to mitigate potential effects to the built environment.
- 1.0.5 An accepted level of risk that balances private property rights against public good is achieved through the application of an integrated package of measures that focus on the readiness, reduction, response and recovery aspects of national hazard management.
- 1.0.6 To some degree these hazards may be able to be addressed by individual landowners, other legislation, such as the Forest and Rural Fires Act 1977, or other mechanisms available to local authorities, for example, the promotion of soil conservation measures. Remedial measures to address the adverse effects of natural hazards are available at national level and an Adverse Events Relief Program is administered by the Minister of Agriculture and Fisheries. In addition, Disaster Damage Reserves are also held by regional and territorial

authorities. This combination of approaches taken to avoid, mitigate or remedy the adverse effects of natural hazards represents a natural hazard loss reduction strategy.

1.0.7 The activities of people combined with the random and uncertain nature of hazard events can make the effects of natural hazards more severe than would otherwise be the case. Given the uncertainty surrounding the magnitude and frequency of natural hazards it is appropriate to adopt a precautionary approach when considering new development in areas identified as being vulnerable to actual or potential hazards.

1.0.8 Hazard management can take four forms:

1. ***seeking to ensure that the hazard itself does not arise*** - given the unpredictability of hazards and the natural forces that give rise to them this is not always possible. The exception to this is with regard to some flooding and landslip hazards where land use practices can be modified to reduce the possibility of the hazards occurring. For example, retaining vegetation cover on upland catchments, and maintaining wetlands in mid-catchment areas can assist in reducing flood risks. Planting and retaining trees in areas of known instability can also assist in reducing the likelihood of landslips;
2. ***undertaking physical works to reduce the severity or frequency of natural hazards and their adverse effects on people and property*** - such works would include flood management schemes, coastal erosion protection and planting of shelter belts;
3. ***reducing the effects of hazards*** by:
 - avoiding certain forms of development in areas subject to, or likely to be affected by, hazards, for example, preventing development in areas subject to coastal erosion or flooding;
 - managing the way land subject to hazards is used and managing buildings erected in such areas, so as to reduce the impacts of the hazards when they do occur;
 - purchasing hazard prone property to manage it in a manner that mitigates adverse effects and minimise community liability.
4. ***taking action to reduce the social and economic costs of hazards when they occur*** - this can include flood warnings, civil defence, response, recovery, taking out insurance cover and generally being prepared for the occurrence of natural hazard events.

1.0.9 The overall strategy employed to avoid, mitigate or remedy the adverse effects of natural hazards will use all four methods to a greater or lesser degree. Given the Regional Policy Statement is mandated by the Resource Management Act the measures included herein will have an avoidance, reduction or mitigation focus.

1.0.10 Impacts of giving natural hazards inadequate consideration include:

- loss of or damage to property and potentially loss of livestock and human life;
- interference with the ability of people to undertake economic and social activities, or

- altering the manner in which resources can be sustainably used, either in the short or long term.

1.0.11 Natural hazards are relatively infrequent and randomly occurring events, so their potential adverse effects may go unnoticed for a long period of time. Furthermore, where the hazard is exacerbated by human activity it may be a considerable period of time before the level of this activity reaches a “trigger” point or point of additional significance.

1.0.12 The effects of natural hazards may arise from cumulative activity or from low probability events, both of which are significant, but not immediately obvious influences. Assessment of the adverse effects of natural hazards also needs to take into account the interaction that occurs between natural hazards and the use of resources. Virtually any land modification will have either positive or negative or both effects on the impact of a natural hazard event.

2.0 Relevance of Existing Regional Policy Statement and Existing Southland District Plan Issues

2.1 Regional Policy Statement

2.1.1 The purpose of this paper is to assess whether existing issues relating to natural hazards contained in the operative Regional Policy Statement and Southland District Council District Plan are still relevant to the management of natural hazards in Southland and whether the objectives, policies and rules that are presently contained in the Regional Policy Statement address these appropriately.

2.1.2 There are 14 issues contained in the existing Regional Policy Statement with respect to Natural Hazards in Southland. A detailed analysis of each Regional Policy Statement’s issues, objectives, policies and methods is included in Appendix 1. For the purposes of this section a brief summary of the key points raised in Appendix 1 follows. Staff at Southland District Council have provided input into this paper by way of this section, which provides a Southland District Council perspective on the natural hazards.

2.1.3 The issues (in summary) within the Regional Policy Statement are:

- the extent to which the frequency and intensity of natural hazards should be reduced by the management of bush clearance, drainage and land use practices;
- structures within floodplains may over confine and redirect natural water flows to the detriment of natural ecosystems, people and property;
- the extent to which development on land subject to actual and potential natural hazards should be managed to reduce flood losses and health hazards in the event of the risk becoming an eventuality;
- people owning or buying property often do not appreciate their vulnerability to the adverse effects of actual or potential natural hazards;
- the extent to which individuals should be allowed to manage their own risk or be protected from their own lack of knowledge or foolhardiness;
- some activities may reduce the structural soundness of protection works;
- the identification of land subject to actual or potential natural hazards, particularly inundation (which is identifiable and avoidable) and those hazards that apply to some coastal areas;

- structural means of hazard mitigation can have positive effects, but they can also give rise to adverse effects;
- the extent to which the wider community should take any financial responsibility for those who choose to live in area identified as being more hazardous than others;
- alternative means of adjusting or adapting to living with natural hazards and their relative cost and benefits have not been fully explored in the past;
- the pollution of floodwaters by sewerage and the subsequent contamination of property and water supplies is a significant cost to the community and a risk to health;
- the storage of hazardous substances, bulk chemicals and other materials, particularly floatables, can significantly increase the adverse effects of inundation;
- the lack of sustainable and adequate financial planning can increase the economic impact of natural hazards on individuals and the community;
- hazard alleviation works do not provide absolute protection and in the event of their design criteria being exceeded or the work in any way failing greater levels of damage can occur than would have in their absence. Their vulnerability needs to be recognised and taken into account.

2.1.4 Land use practices will continue to be an issue as long as land continues to be developed and is managed using different methods and intensities. In recent times land management practices have focused on small issues that are part of larger land management plans. This allows regulators to monitor for specific indicators within the environment.

2.1.5 There are evolving ideas about how to manage floodplain corridors. However, due to changing land management techniques and ideas concern over the effects of structures within floodplains is an issue that requires ongoing management.

2.1.6 Southland has a number of natural hazards that we are able to plan for, such as, areas of potential inundation. The use of historical information enables restrictions to be placed on developments so they are unlikely to be affected if natural hazards do occur. This will continue to be a key planning tool that can help create resilient communities.

2.1.7 It is imperative for property owners and potential purchasers to know the risk of natural hazards so they can plan and prepare to help ensure that if a natural hazard event does occur they will not be caught out. They also need to understand why territorial authorities will in some circumstances impose conditions on different activities on the property.

2.1.8 The extent to which individuals should be allowed to manage their own risk or be protected from their own lack of knowledge could be considered an issue. However, it goes against local authority's requirements to provide relevant hazard information to the community. There appears to be a trade off of individual rights against overall community expectations in terms of what are acceptable risks, what activities should be allowed and what needs to be managed.

2.1.9 Activities that may reduce the structural soundness of protection works is still a very relevant issue, for example, grazing of cattle on stop banks. Activities such as this have the potential to lessen the ability of protection works to function as they were designed to. Cattle grazing on stopbanks can result in slumping and erosion of the stopbanks. This issue could be expanded out to explain the risks that are involved with different activities

on protection works and include an explanation surrounding the integrity of these works and their design capability. This would give land managers more certainty as to what they are and are not allowed to do.

- 2.1.10 Areas of land that have the potential to be inundated (which is easily identifiable and avoidable), coastal areas subject to hazards such as coastal erosion, land that may be subject to tsunami and or land subject to the adverse effects of sea level rise should be identified to help mitigate the potential effects of natural hazards. This information must also be easily accessible.
- 2.1.11 Structural means of hazard mitigation can have positive effects and reduce the frequency or intensity of natural hazards. However, structures can also have adverse effects. Structures are a traditional method of hazard mitigation and are in line with the traditional belief that humans can force nature to do what we want. The use of the word “structures” is perhaps too specific, as there are many activities that potentially have the same effects. This issue could be included in a wider land management issue or could just be reworded to give it some more scope. The use of structures for hazard mitigation is not likely to change in the future, but the science and technology employed in these structures may. These changing methods need to be addressed within this issue.
- 2.1.12 There is still considerable debate surrounding hazard alleviation measures and the protection that they afford to certain areas. There is also debate around the subsequent development of those areas. There is no set process in terms of community interest as to how properties/proposals should be assessed when looking at who should have financial responsibility when natural hazards occur in areas that have been identified as being potentially more hazardous.
- 2.1.13 Alternative means of adjusting or adapting to living with natural hazards and their relative costs and benefits have not been fully explored in the past. While this statement is true it is not really an issue. It is more a potential option that needs to be explored in a more depth.
- 2.1.14 The pollution of floodwaters by sewage and the subsequent contamination of property and water supplies is a significant cost to the community and a risk to health. This issue could be expanded to include other major contaminants, such as effluent on farms that have the potential to be washed into flood waters. However, as currently worded it remains a regionally important consideration.
- 2.1.15 The storage of hazardous substances, bulk chemicals and other materials, particularly floatables, can significantly increase the adverse effects of inundation. It would also be possible to include, an ongoing issue, sewage and other major contaminants that increase the adverse effects of inundation.
- 2.1.16 A lack of sustainable and adequate financial planning, for example, insurance, disaster reserves and disaster pools, can increase the economic impact of natural hazards on individuals and the community. When a natural hazard event occurs individuals and communities may look for assistance to address damage and losses. Individual insurance is also an important part of this issue, as it is a reflection of the necessary individual responsibility.

2.1.17 Hazard alleviation works do not provide absolute protection and in the event of their design criteria being exceeded or the works in any way failing, potentially greater levels of damage can occur than would have occurred if no protection measures had been in place. There is often a false understanding within the community that because they have alleviation works they are now immune from any future damage. However, this is certainly not the case. If a big enough hazard event was to occur then some alleviation methods have the potential to cause more damage than would have otherwise incurred.

2.2 Southland District Plan

2.2.1 Staff at Southland District Council have provided input into this paper by way of this section which provides a Southland District Council perspective on issues relating to natural hazards.

2.2.2 Section 3.8 of the Southland District Plan details the Southland Districts Council's significant resource management objectives and policies relating to natural hazards. The following natural hazard issues are identified:

- several areas of the District are susceptible to flooding;
- some locations in the District may be susceptible to land instability, but there is a lack of accurate information on this issue;
- land use activities can increase the incident and severity of natural hazards in the District;
- several areas of the District's coast are under threat from sea level rise and coastal erosion;
- people owning or buying property often do not appreciate their vulnerability to the adverse effects of actual or potential natural hazards;
- other Coastal Processes.

2.2.3 Natural hazard issues listed above are all still relevant and will need to be addressed in the second generation Southland District Plan.

2.2.4 Parts of the Southland District have experienced significant levels of growth since the existing District Plan was adopted in 2001. These levels of growth were not envisaged at the time the existing District Plan was written. Increased development pressure has been experienced within the Coastal Resource Area, in Fiordland, on Stewart Island and in and around the townships of Riverton, Winton and Te Anau. Some of the areas that have experienced the highest levels of growth are prone to natural hazards events. These natural hazard events include riverine inundation, sea level rise, erosion, land instability, earthquakes and storm surge events.

2.2.5 Flood events still have the potential to affect large parts of the district, as demonstrated by the January 1984 floods. Susceptible areas that are listed in the existing District Plan include rural land adjacent to the Aparima, Waiiau, Mararoa, Matāura, Oreti, Makarewa and Waihopai Rivers and the townships of Otautau, Tuatapere, Lumsden, Riversdale, Winton and Wyndham.

2.2.6 The existing District Plan notes that several areas of the district's coast are under threat from sea level rise and coastal erosion. These areas are not listed but a 1999 report from

The Royal Society of New Zealand entitled '*Climate Change*' is quoted. This report predicts that sea levels are likely to rise between 7 and 17 cm by the year 2025 and between 17 and 35 cm by the year 2050. As this report was written in 1999 there is likely to be a considerable amount of new scientific information available that could be utilised when assessing this hazard.

- 2.2.7 Other potential coastal hazards listed in the existing Plan include storm surges, tsunamis, river mouth migration and liquefaction. These hazards are all still relevant in terms of the second generation District Plan.
- 2.2.8 The existing District Plan recognises that land use activities can increase the incidence and severity of natural hazards within the district. Examples of activities that are listed include the clearance of bush in headwaters, drainage of swamps, mining or disturbance of sand dunes and the straightening of natural watercourses. The existing District Plan also lists a number of specific areas where certain natural hazards have arisen. These include coastal erosion at Colac Bay, Porpoise Bay, Ringaringa and Oreti Beach and land instability in Stewart Island. Former underground coal mining sites are also listed as a potential source of natural hazards in the form of subsidence. These issues are all still considered relevant in terms of the second generation District Plan.
- 2.2.9 Public awareness and perceptions of natural hazards tends to alter over time as noted in section 4 of this report. As the time between hazard events increases public awareness and knowledge of these events can decrease. Currently, maps in the District Plan detail the following natural hazards: floodable areas, earthquake epicentres and geological faults. Areas that have been subject to mining (open cast and underground) and filled sites are also mapped as these areas could be particularly susceptible to seismic hazard events.
- 2.2.10 The planning maps in the second generation District Plan will need to be updated to reflect new cleanfill and landfill sites that have been developed since the original maps were formulated.
- 2.2.11 The current District Plan also recognises that people who own or are purchasing property often do not appreciate the vulnerability of some properties to natural hazards. The maintenance of up to date hazard maps is an important tool that can increase awareness of natural hazards.

3.0 Emerging Natural Hazard Issues in Southland

3.1 Regional Issues

- 3.1.1 Natural Hazards do not change; their potential effects on the built environment change. However, knowledge of the extent and effects of natural hazards does change over time and this needs to be recognised, adapted to and reflected in a reviewed Regional Policy Statement. The following outlines areas of change or issues that influence the management of potential effects caused by natural hazards at a regional level.

3.2 The Civil Defence Emergency Management Act 2002

- 3.2.1 The Civil Defence Emergency Management Act 2002 promotes an all hazards integrated management approach to emergency management (this is a big part of the response to

potential natural hazard events). The North Island floods of 2004 have led to ongoing reviews of flood management. These reviews will lead to some changes in the management of natural hazards. However, under the Act there is a very clear emphasis on reduction. This is starting to become the focus of how we deliver on Civil Defense Emergency Management activities.

3.2 **Building Act 2004**

3.2.1 The Building Act 2004 has direct effects on the standard of the built environment and its ability to withstand natural hazards. Local the completion of flood alleviation schemes have had an effect on the ability for a natural hazard to affect the built environment. There is also the draft New Zealand flood management standard with a focus on managing the residual risk. There is a proposed flood management national policy statement currently being written. This will have flow on effects for the region.

3.3 **Climate Change**

3.3.1 Climate change is probably the single biggest issue that has the potential to effect natural hazards. Climate change will, by and large not create any new risks, but it may change the frequency and intensity of existing risks and hazards. Adapting to the long-term implications of climate change will contribute to our resilience to natural fluctuations in climate. Particularly important are infrastructure and building developments that will need to cope with climate conditions in 50-100yrs time.

3.3.2 Climate change may affect and accentuate existing hazards. Coastal hazards in many areas are expected to increase as a result of the effects of climate change. Coastal development may increase coastal hazard impacts and affect communities and properties.

3.3.3 Sea level has risen in New Zealand by about 0.25m since the mid – 1800s (historical sea level rise has been approximately 0.16m per century) and this rise is expected to accelerate. It is now advised by central government to adopt a base value sea-level rise of 0.5m relative to the 1980-1999 average. An assessment of the potential consequences from a range of possible higher sea level rises is also advised. At the very least, all assessments should consider the consequences of a mean sea-level rise of at least 0.8m relative to the 1980-1999 average (Coastal Hazards and Climate Change: Guidance Manual 2008)

3.3.4 The mean westerly wind component across New Zealand is expected to increase by approximately 10% of its current value in the next 50 years. However, it is not yet possible to quantify the likely change in the extreme wind hazards.

3.3.5 It is expected that snow cover will decrease, the snow line will rise and the length of the snow season will decrease with climate change. However, snowfall could still be a hazard though perhaps less frequently.

3.3.6 Climate change is expected to shorten the interval between high intensity storms. By the end of the 21st century an extreme rainfall event might occur twice as often or up to four times as often in worst case scenarios than presently. There is little certainty of the magnitude of the changes.

- 3.3.7 This Century some increases in the drought and fire hazards could occur with climate change in eastern parts of Southland. However, changes are expected to be small compared to those in most other parts of New Zealand.
- 3.3.8 We are constantly learning more about natural hazards and how they have the potential to have a negative effect on the built environment. It is important to keep pace with this knowledge to plan and make well informed decisions. It will be an ongoing task to ensure that new information about natural hazards is incorporated into any established decision making processes.
- 3.3.9 Increased coordination between agencies on hazard research and the establishment of priorities and responsibilities for communicating information and advice is necessary. The Engineering lifelines project has started this for key and major infrastructure. However, little has been done to build resilience at a business level and only ad hoc work done in the wider community to ensure that they can recover quickly from any natural hazard event.
- 3.3.10 Hazard mitigation works may be necessary but works and associated structures can have adverse effects on the environment. Conversely, people don't always recognise that some landforms and ecosystems (such as wetlands) provide a degree of protection against natural hazards. The relationships between hazard mitigation measures and environmental processes need to be more explicit when assessing hazards and their management.
- 3.3.11 The period of hazard re-occurrence significantly influences the community's perception of the dangers and effects caused by different natural hazards. The unpredictable and potentially long cycle between natural hazard events, (measured in years and often decades) means there is a real problem with a loss of knowledge and understanding of the consequences natural hazards for the region and local communities. For example, the 1984 flood is unknown to many new Southland residents who did not witness the devastation this event caused.
- 3.3.12 Hazard mitigation works have an effect on the environment, but they also have an effect on the way communities think about a particular natural hazard. Often communities feel that they are immune to a natural hazard once physical works have been constructed. This has the potential adverse effect of creating a situation where dangers are ignored and a community will continue to develop in such a way that increases its exposure to a natural hazard rather than decreases or limits that danger.
- 3.3.13 Underpinning all legislation that deals with Natural Hazards to some degree is a "duty of care to the original and subsequent owners". The duty is to exercise a reasonable care and skill when processing building or subdivision consents. It is most frequently referred to in court decisions when matters of liability are addressed. The reference to future owners is important, but is often overlooked by developers.
- 3.3.14 'Duty of Care' has been described as a duty to protect property owners and intending purchasers from their own lack of knowledge. There appears to be a public expectation of exactly that, given that it is the authorities (more often than not, a local authority) that people look to blame when things go wrong. This is both a regionally and nationally significant.

3.3.15 There is increasing support within the hazard management community for the idea that individuals and communities need to ensure that they take primary responsibility for their safety and livelihoods. Regarding natural hazards individuals, communities and private sector business should take responsibility for their personal and family safety, responsibility for business decisions, understand their level of risk (including residual risk), accept liability for their decisions and be informed and active in decision making.

3.4 **Local Issues – Southland District Council**

3.4.1 Staff at Southland District Council have provided input into this paper by way of this section which provides a Southland District Perspective on issues relating to natural hazards.

3.4.2 Levels of scientific knowledge about natural hazards and the processes that can influence them has increased since the current District Plan became operative. Information and knowledge about climate change is one example and climate change is expected to influence sea level rise, flood event frequency and coastal erosion hazards. The second generation District Plan will need to develop appropriate natural hazard objectives and policies based on this new knowledge.

3.4.3 ***Flooding***

3.4.3.1 Some of the District Council's floodable hazard area information is outdated and will need to be amended for inclusion the second generation District Plan. Some structural flood protection works have been undertaken in parts of the district since the maps were formulated and planning maps will need to be updated to reflect the altered susceptibility of these areas to flooding

3.4.3.2 Pressure for development on flood prone land is still being experienced within the district and residential growth on the fringes of Winton is a good example of this. Increasing demand for rural/residential 'lifestyle blocks' on the outskirts of Winton has resulted in a number of subdivision applications within flood hazard areas.

3.4.3.3 Similar development pressure in flood hazard areas has also been experienced on the fringes of some smaller towns such as Riversdale. Demand for commercial and industrial development within flood hazard areas also occurs and assessing the potential impact of flood events on these uses is also important for example, ensuring that certain products such as chemicals that may be stored on these premises are not washed away in flood events. Changes and development in rural landuse in the district have also resulted in an increased number of building consents for farm buildings being received and some of these are located in flood hazard areas.

3.4.3.4 The establishment of building platforms on higher parts of properties and minimum floor levels are flood hazard mitigation measures that the Council currently makes use of. For example, the Council frequently imposes minimum floor level requirements for new residences in new subdivisions following consultation with Environment Southland. The Council also frequently requires elevation of key plant in non-residential developments such as dairy sheds and industrial premises. New developments within flood hazard areas are referred to Environment Southland for expert advice and this information is used in the resource consent decision making process when applications are made. Consultation is

also undertaken with Environment Southland when processing building consent applications for development within flood hazard areas where no resource consent is needed.

- 3.4.3.5 Climate change has the potential to influence the incidence of flood events in the district with predicted increases in temperatures expected to result in increased rainfall.

3.4.4 ***Geological Hazards***

- 3.4.4.1 Environment Southland has noted that the highest risks for the Southland region in terms of natural hazards come from floods and earthquakes. Geological hazards such as earthquakes were not highlighted in the current plan in any individual section and this may be one natural hazard that the second generation plan will need to cover in more detail.

- 3.4.4.2 Fiordland and the western parts of the district are particularly susceptible to seismic activity due to their proximity to the Alpine Fault. The increasing growth of the tourism industry within Fiordland and the growth of Te Anau are relevant issues to consider in terms of potential earthquake hazards. The popularity of Milford as a tourist destination and its relative isolation also needs to be considered. Milford can only be accessed by one road (State Highway 94) which is subject to landslide and avalanche hazards particularly around the Homer Tunnel. Seismic events could potentially create access problems along this road and people could become isolated along the road or at Milford itself. Increasing awareness of the potential of earthquakes by listing the hazard and the damage they can cause may help raise awareness.

3.4.5 Land Instability

- 3.4.5.1 The current Plan notes that some locations in the District may be susceptible to land instability, but also notes that there is a lack of accurate information on this issue. One specific example of land instability is listed in the current District Plan (the Jobs Ford slip in the Nokomai Valley) and the information on this slip will need to be updated. Rather than listing one specific example of land instability, recognition of the potential for land instability hazards to occur throughout the District may be more appropriate. Reference to particular areas that are the most susceptible could still be made. This could include areas such as Stewart Island, highland and coastal areas.

- 3.4.5.2 Recently there have been a number of Council roads damaged by coastal storms including the Papatotara Coast Road (the road to the Hump Ridge Track) and a number of coastal roads on Stewart Island. If the number and scale of offshore storm events increases in the coming years there is likely to be an increase in the number of coastal roads being damaged by these storm events. Sourcing accurate information on land instability may be problematic due in part to instability issues arising sporadically or new issues arising through land development or storm events. However, it does appear that certain areas of the district have experienced and are likely to continue to experience instability issues and these areas should be noted. A strategic approach to this issue whereby roads and other infrastructure is designed and located so as to avoid susceptible coastal areas is appropriate.

- 3.4.5.3 Recognition of the district wide potential for land stability issues is important. The issue was highlighted after the Fiordland 2003 earthquake as a large number of landslips occurred throughout Fiordland National Park. These landslip events mainly occurred in

remote regions of the Park, but they highlight the potential of earthquake events to cause land instability issues, particularly on steeper slopes.

3.4.5.4 The Council has recently experienced land stability problems on Stewart Island. These were caused by inappropriate excavation works associated with the construction of a new building. In situations such as this land that was previously stable can become hazardous. The clearance of native bush and forestry activity on steeper areas of land can also cause stability problems. As levels of development in certain areas of the district increase so does the potential for land instability issues. The Southland Catchment Board's 1988 report 'Half Moon Bay Urban Land Use Capability Survey' noted that erosion was occurring on the steeper slopes of Halfmoon Bay. The report also noted that these slopes are vulnerable during high intensity rainfall events, where devegetation has occurred and where steep slopes have been cut into during urban development.

3.4.5.5 The exposed coastline of Stewart Island particularly Halfmoon and Horse Shoe Bays along with Te Wae Wae Bay west of the Waiau River, the Orepuki/Monkey Island Coast, Otara, Colac and Porpoise Bays are all experiencing coastal erosion/land instability issues.

3.4.6 ***Sea Level Rise***

3.4.6.1 The existing District Plan notes that several areas of the district's coast are under threat from sea level rise and coastal erosion. These areas are not listed, but a 1999 report from The Royal Society of New Zealand entitled '*Climate Change*' is quoted. This report predicts that sea levels are likely to rise between 7 and 17 cm by the year 2025 and between 17 and 35 cm by the year 2050. As this report was written in 1999 there is likely to be a considerable amount of new scientific information available that could be utilised in assessing this hazard.

3.4.6.2 The Ministry for the Environment's '*Preparing for climate change' a guide for local government in New Zealand (2008)* for instance predicts at least a New Zealand average sea level rise of 18 – 59 cm between 1990 and 2100. This report shows an increase in sea level rise predictions that the second generation District plan will need to reflect. The 2008 report also notes that it is very unlikely that these estimates will be substantially revised as scientific knowledge progresses. There is perhaps more scientific evidence in 2008 that can help assess the potential of this hazard than there was in the 1990s. Lower lying areas of the district that could be susceptible could be listed on the Council's Hazard register. However, given the extensive length of the district's coastline logistically this may not be feasible.

3.4.6.3 Other potential coastal hazards that are listed in the existing Plan include storm surges, tsunamis, river mouth migration and liquefaction all of which would still be relevant hazards in terms of the second generation District Plan.

3.4.7 ***Coastal Development***

3.4.7.1 Demand for coastal property in Southland and development within coastal areas particularly residential development has increased significantly since the late 1990's. The Southland District Council has seen this reflected in the number of resource consent applications it has processed for new residential sub-divisions in recent years. The residential development of land within coastal areas potentially increases the risks of certain natural hazards namely coastal erosion, tsunamis and sea level rise. The second generation

Southland District Plan needs to formulate relevant objectives, policies and rules that address these potential hazards.

3.4.7.2 This could include a continuing focus on requirements for set backs or the establishment of building platforms on higher areas of properties for new sub-divisions. Subdivision is currently a discretionary activity within the Coastal Resource Area of the District Plan. New buildings and structures within the Coastal Resource Area that are not permitted activities under Rule PRA.3 are also considered discretionary activities. This current approach enables the Council to assess the site of buildings and building platforms along with the location of new lots in relation to coastal hazards. Expert hazard advice can then be obtained from Environment Southland and applicants can also be requested to provide their own expert information to support their application. Amendments to applications for hazard avoidance and mitigation can also be requested. Furthermore, the District Council can, in terms of Section 106 of the Resource Management Act, refuse applications that do not avoid remedy or mitigate adverse natural hazard effects.

3.4.7.3 New developments within coastal areas need to be assessed on their particular characteristics and the natural hazard risks of each specific site. Discretionary activity status means that resource consent applicants are required to provide hazard assessments for proposed developments. These assessments can ensure appropriate hazard avoidance and mitigation measures are taken for each site. Noting the need for these assessments for coastal development in the second generation District Plan could be a valuable tool in terms of increasing awareness of coastal hazard issues. Maintaining discretionary status for new buildings and subdivisions within the Coastal Resource Area in the second generation District Plan is considered appropriate.

3.4.7.4 The Boffa Miskell Southland Coastal Study 2006 identified sites within the district that may be suitable for future residential development as well as those that are less suitable from both a landscape and natural hazard perspective. Certain areas in this study were noted as being susceptible to coastal erosion processes. Avoiding potential damage to property and buildings from coastal hazards is important. A need for structural approaches to hazard mitigation should ideally be avoided. The Coastal Study 2006 identifies areas susceptible to coastal hazards in which development would be inappropriate. Planning maps could also be updated to highlight areas susceptible to coastal hazards. This could focus on those areas most likely to experience development pressure (as large areas of the Coast such as Fiordland are unlikely to experience development pressures). Through such a mechanism it may be feasible to direct developers away from more hazard prone areas.

3.4.8 ***Land Use Activities***

3.4.8.1 The existing District Plan recognises that land use activities can increase the incidence and severity of natural hazards within the district. Examples of activities that are listed include the clearance of bush in headwaters, drainage of swamps, mining or disturbance of sand dunes and the straightening of natural watercourses. Other examples listed are coastal erosion at Colac Bay, Porpoise Bay, Ringaringa and Oreti Beach and land instability in Stewart Island. Former underground coal mining sites are also listed as a potential source of natural hazards in the form of subsidence. These issues are all considered relevant in terms of the second generation District Plan and will require addressing in policy formation.

3.4.9 *Raising Awareness/Education/Information*

3.4.9.1 Public awareness and perceptions of natural hazards tend to alter over time as noted in section 4 of this report. An increase in the time between hazard events decreases public awareness and knowledge of these events. Currently the District Plan maps detail the following natural hazards: floodable areas, earthquake epicentres and geological faults. Areas that have been subject to mining (open cast and underground) and filled sites are also mapped as these areas could be particularly susceptible to seismic hazard events.

3.4.9.2 The planning maps will need to be updated to reflect new clean-fill and landfill sites that have been developed since the original maps were formulated.

3.4.9.3 The current District Plan also recognises that people who own or are purchasing property often do not appreciate the vulnerability of some properties to natural hazards. Maintaining up to date hazard maps will be required and some hazards not currently covered should also be listed. Areas of the district that could be susceptible to sea level rise or land instability hazards could be delineated on the hazard maps. However, as noted earlier given the size of the District this may be difficult.

3.4.10 *Lifelines*

3.4.10.1 The Southland Lifelines project reviewed the potential resilience of the Southland region's engineering lifelines during natural hazard events. Key pressure points within the District, such as electricity transmission lines, the roading network and hydro-electric power schemes were identified. The potential threat of hazard events to these lifelines was then assessed. The Southland Lifelines project is a useful source of information for determining natural hazard risks.

4.0 **Options for Addressing Issues**

4.0.1 This section identifies potential options for addressing issues identified in section 3 of this paper and builds on some of the points raised by Southland District Council.

4.1 **Hazard Awareness and Information**

4.1.1 The biggest constraint in managing natural hazards is the lack of a consistent long term view or vision and a lack of commitment to account for natural hazard events particularly at a political level. As time passes between hazard events, populations change and new generations with little natural hazard experience come along. This is especially true of large earthquakes and flood events. This situation is exacerbated by property booms and development pressure.

4.1.2 Southland has a history of frequent flooding so preventative measures have been put in place in many of the larger towns. This has predominantly been achieved by building stopbanks. Given the size and frequency of flood events in the intervening period, stopbanks have proved their worth. However, their effectiveness does have a down side. Communities have continued to develop behind the banks with a sense of security.

- 4.1.3 However, flood events of a larger scale than current flood banks have been designed to cope with may occur and in addition there is also potential for structural failure of flood banks. This means that the community's feeling of security is, in some degree false.
- 4.1.4 Up-to-date, reliable information is an essential first step when making decisions about new developments and assessing risks associated with their location. This information is also important for managing the risk from hazards within existing developed areas. To be effective, this information generally needs to be transferred to lines on a map. We need to know where events might happen, where effects might be felt, where to place appropriate controls and where people can feel confident about living. We also need confidence that the community is going to be able to respond to any natural hazard event with the appropriate action necessary.
- 4.1.5 Comments from Southland District Council recognise that an approach to updating flood hazard areas and delineating these areas on the hazard maps within the Second Generation District Plan will need to be taken with Environment Southland. This will recognise the increase in knowledge and best practice that has occurred since the current District Plan was developed. This should be readily achievable as the Southland District Council has an established and collaborative arrangement with Environment Southland in relation to regional natural hazard management.
- 4.1.6 Furthermore, ensuring that hazard information relating to specific properties is clearly noted on Land Information Memorandums (LIMs) needs to be recognised as a useful tool in raising hazard awareness in the second generation District Plan.
- 4.1.7 Consent notices issued under Section 221 of the Resource Management Act 1991 are already used frequently and are a useful legislative mechanism through which awareness of hazards can be improved and future structures on new allotments can be managed to mitigate the effects of natural hazards.
- 4.1.8 Hazard information is often less than ideal and if hazards are to be mitigated Councils need to take a precautionary approach and make decisions on what information they do have. We can't wait for, or afford, "Rolls Royce" information and even then it probably won't provide an absolute, unchallengeable answer. Sustainable floodplain management will not be progressed by ignoring the issue either.

4.2 **Structural and Non-structural Hazard Mitigation**

- 4.2.1 For 30-40 years now there has been a realisation that a reliance on structural means of flood protection alone is insufficient. As such, a range of non structural measures have been applied to manage the residual flood risk. Such an approach is based on a realisation that firstly, larger floods will almost inevitably occur and overtop or breach existing structures and secondly, that flood alleviation works sometimes fail.
- 4.2.2 The above approach is probably more valid now than ever, given the predicted effects of climate change. The latest climate change predictions are for a 2°C temperature increase by 2090. Each degree increase in temperature equates to a potential 8% increase in rainfall, which in turns equates to an even greater increase in floods (given all the extra rainfall becomes runoff).

- 4.2.3 Without a complementary non-structural approach, the result of bigger floods is larger losses, an inevitable demand for even greater flood protection and associated costs to communities.
- 4.2.4 Given the infrequent nature of large floods, a non-structural approach needs to be underpinned by long term strategic thinking and persistence over time. Within Southland flooding has traditionally been considered to be the natural hazard most likely to occur so it has been given priority over other potential hazards. Flooding has the potential to be especially prevalent in Southland due to the combination of the topography of the region and the land use practices. It is easy to take one's eye off the ball and adopt a less resolute approach in the absence of significant flooding for a generation or two.
- 4.2.5 However, that does not mean that other hazards may not occur. If they do, it is possible that their effects could be more severe than previously experienced.

4.3 **Hazard Risk**

- 4.3.1 The Southland region is vast and contains many isolated communities. This isolation can increase vulnerability to natural hazards and extreme events.
- 4.3.2 The highest risks for the region come from floods, earthquakes and associated tsunamis. However, the implications of climate change and any potential changes that it may cause to our natural hazards provide long term risks to our social and economic well-being. Climate change may not create any new risks, but as a region we need to continue to build up our resilience to short and long term natural fluctuations in climate. For example, land instability is a potential hazard to parts of the region including Stewart Island. Coastal areas are vulnerable to a set of hazards additional to those experienced by inland areas. Coastal property prices have risen significantly in the past decade, giving rise for more weight to be given to the careful attention and planning needed in the coastal margin. This planning is needed to firstly, protect the current environment (which is highly dynamic), but also to take into account the potentially significant pressures that rising sea levels and climate change factors may produce along the coastal margin.
- 4.3.3 This point is further recognised by the Southland District Council, which notes that the current District Plan recognises that some areas of the district may be susceptible to land instability, but also notes there is a lack of accurate information on this issue. The District Council also notes that it may be appropriate in the second generation Plan to reference particular areas within the region that are more susceptible to land instability hazards and this could include areas such as Stewart Island, highland and coastal areas.
- 4.3.4 Further points raised by the District note that if the number and scale of offshore storm events increases in the coming years, there is likely to be an increase in the number of coastal roads being damaged by these storm events. Sourcing accurate information on land instability may be problematic due to the sporadic nature of these events. The District Council recognises that a strategic approach to land instability issues is required. Roads and other infrastructure should be designed and located so as to avoid coastal areas susceptible to these types of hazards. Listing of these susceptible areas in the second generation District Plan and/or in the hazard register may highlight the problem and help decision making for new infrastructure projects that could be at risk. The Council will need to determine the extent of listings in the hazard register particularly with respect to low lying

coastal areas as it may be logistically difficult given the extent of the coastline. The community will need to discuss this aspect during consultation.

- 4.3.5 Recognition of risks and risk reduction, readiness for and response to emergencies and post-impact recovery as a continuum is an important community first step that will require greater consideration within a revised Regional Policy Statement to ensure that Natural Hazards do not have the potential to adversely affect our communities in the long term. Furthermore, the Southland Lifelines project as noted by the Southland District Council has reviewed the potential resilience of the region's engineering lifelines and has noted key pressure points. This project will enable improved planning as a source of information for determining natural hazard risks.

4.4 **Discretionary Activity Status**

- 4.4.1 Another area of consideration required during the District Plan review is the continued focus and heightened need for requirements on set backs or the establishment of building platforms on higher areas of properties for new subdivisions. Natural hazard risk assessments are a valuable tool for the consenting process. Maintaining a discretionary status for new buildings and subdivisions as with the Coastal Resource Area of the existing District Plan would enable this existing approach to continue.

4.5 **Earthquake Hazard**

- 4.5.1 An assessment of the earthquake hazard has recently been undertaken on behalf of Southland local authorities as a basis for future planning to reduce the adverse effects of earthquakes. This study has shown that those areas most prone to inundation are also most vulnerable to earthquake shockwaves because of the unconsolidated nature of alluvial sediments. It has also shown there is a real likelihood that the alpine fault is due to shift approximately 6m horizontally.
- 4.5.2 Further growth of the tourism industry in the Fiordland region has occurred since the Regional Policy Statement became operative. The isolated location of Fiordland is exacerbated by its location along the Alpine Fault. Any significant movement of the Alpine Fault poses risks to this area and future planning needs to reflect this situation. Milford Sound, for example, is an area where it could be reasonably envisaged that future development and growth will occur within the lifespan of a reviewed Regional Policy Statement. A large scale earthquake event would have serious implications for this area.
- 4.5.3 The Southland District Council have noted that geological hazards such as earthquakes were not highlighted in the current District Plan in an individual section and that this may be one natural hazard that the second generation plan will need to cover in more detail. This is in terms of identification of particularly earthquake prone areas and development of relevant objectives, policies, rules and/or methods. Increasing awareness of potential earthquakes by listing the hazard and the potential damage they can cause in the second generation District Plan may help raise awareness.

4.6 **Landuse Change**

- 4.6.1 The Southland region as a whole is currently undergoing significant land use changes from sheep/deer farming to dairy farming due to the current economic drivers. This is further

supported by comments from the Southland District Council that recognises that land use activities can increase the incidence and severity of hazards within the district for example mining and disturbance of sand dunes and drainage of wetlands. Such activities will need further consideration in terms of the second generation District Plan.

5.0 Questions for Further Discussion

5.0.1 The Regional Policy Statement sets the tone for resource management across the region of which a District Plan must give effect to. The review processes enables the community to reflect on how natural hazards are addressed and whether the current provisions reflect the issues facing Southland. The following are a series of questions on which feedback is being sought:

5.1 Regional Policy Statement Questions

1. Do you think we have identified the right natural hazards issues? Are there other issues and aspects of natural hazard management that we should be recognising for the region?
2. How do you feel about the approach to managing Natural Hazards over the life of the Regional Policy Statement to date?
3. Would it be helpful if the Regional Policy Statement was more specific and directive in its provisions, identifying priorities and specifying responsibilities and timescales for action?

5.2 Southland District Plan Questions

1. Has the approach towards natural hazards in the existing Southland District Plan been successful? Has the District Council dealt appropriately with new development in areas subject to natural hazard events?
2. Are all relevant natural hazards covered and/or given an appropriate level of emphasis in the existing Southland District Plan?
3. Are there any comments/suggestions you would like to make in terms of the District Council's management of natural hazard issues?
4. Is there a need for a more proactive approach towards educating the public about natural hazard issues?

Appendix 1 – Analysis of Existing Regional Policy Statement Issues

- 1.1 **Step two:** How relevant are the existing ‘issues’ in the current Regional Policy Statement? This is not an exercise to measure their success or otherwise. It is an exercise whereby those issues listed are used as a starting point with respect to their relevance in today’s environment. Take note of how they link to the objectives and policies and have a look at some of the rationale behind the explanations (the relevance of legislative and policy change needs to be taken into account).
- 1.2 The following are considered to be the resource management issues within Southland relating to natural hazards-
- 1.3 **Issue 1** The extent to which the frequency and intensity of natural hazards should be reduced by the management of bush clearance, drainage and land use practices. Activities such as clearance of bush in headwaters, drainage of swamp, mining or disturbance of sand dunes and straightening and/or over confinement of natural watercourses can contribute to an increased risk of natural hazards, for example, coastal erosion at Colac Bay, Porpoise Bay and Oreti Beach, or land instability at Stewart Island.
(Refer Objectives 4.2, 4.3, 6.4, 8.2, 13.2, 15.2, 15.3; Policies 4.2, 6.8 - 6.10, 8.1, 8.3, 13.8, 13.12, 15.1 - 15.3, 15.5, 15.10; Methods 15.1 - 15.17)
- 1.3.1 This is still a relevant issue; it will continue to be an issue as long as land is developed and is managed using different methods and intensities. This issue could perhaps be reworded to reflect changing land management practices. Often land management practices focus on small issues that are part of a larger land management plan (catchments based or natural ecosystem protection and enhancement) allowing regulators to monitor for specific indicators within any given environment.
- 1.3.2 It seems logical that issues should be numbered in rank, in accordance with their current and potential future importance so that the all readers of the Regional Policy Statement read the most important issues first. As the above issue is not high on the list of priorities (because it is not a very effective way of dealing with natural hazards) it should be moved down the list of issues in the future.
- 1.3.3 *Objective 4.2 – To manage the use and development of water and land resources so as, wherever practicable, to maintain and enhance flow regimes.*
- 1.3.3.1 This objective does link with the above issue, but the link between the management and development of water and land resources to natural hazards is not strong. It is not clear as to the effectiveness of such an objective in terms of natural hazards. It would be almost impossible to quantify changes in land-use or the effect of developing land on the frequency and intensity of natural hazards. Flooding hazard, for example, is not considered a normal part of a flow regime on a particular river. Most instances flow regimes refer to times of low flow with the normal flow in the river being seen by most as an important resource. This resource is then allocated to different uses. Flood waters have no part in the regulation of a flow regime, as it is not a resource that can be allocated because of its infrequency and uncertainty.

- 1.3.4 *Objective 4.3 – To ensure the taking, use, damming and diversion of water does not compromise environmental standards established for the Region.*
- 1.3.4.1 This objective does not link well with the above issue. Environmental standards of water are not considered when there is a natural hazard event, unless the natural hazard has the ability to affect the drinking water supplies of a location.
- 1.3.5 *Objective 6.4 – To avoid wherever practicable, remedy or mitigate, the adverse effects of activities in, on, under, adjacent to, or over the beds of lakes, rivers and wetlands.*
- 1.3.5.1 This objective links well with the above issue. The reason for this is even though activities associated with lakes, rivers and wetlands have no impact on the frequency of natural hazards they can have a small and localised effect on the intensity of a natural hazard. For example, activities that have an effect on wetlands might alter the wetlands' ability to store flood water over a differing period of time altering the downstream effects of flooding event.
- 1.3.6 *Objective 8.2 – To avoid, wherever practicable, adverse effects arising from sedimentation and nutrient runoff from land into water bodies.*
- 1.3.6.1 This objective does not link well with the above issue, as the stated objective of avoiding the effects of sedimentation and runoff into water bodies has almost nothing to do with frequency and intensity of natural hazards.
- 1.3.7 *Objective 13.2 – To avoid, wherever practicable, remedy or mitigate any adverse effects from the use and development of the natural and physical resources within the coastal environment.*
- 1.3.7.1 This objective does not link well with the stated issue above as it contains nothing to do with the frequency or intensity of any natural hazards.
- 1.3.8 *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*
- 1.3.8.1 This objective links well with the stated issue as it is linked to reducing social and economic costs which can be achieved by land management.
- 1.3.9 *Objective 15.3 – To ensure all options to reduce the risk of natural hazards are considered in an unbiased way.*
- 1.3.9.1 This objective links very well to the stated issue above as there is a continued need to consider all land management/development options that might help to reduce the risk of natural hazards.
- 1.3.10 *Policy 4.2 – Continue to recognise and provide for minor permanent and temporary takes and uses of water, as permitted activities where there are no adverse effects.*
- 1.3.10.1 This policy does not link with the stated issue, as it has no bearing on flood events.

- 1.3.11 *Policy 6.8 – Provide a water management regime for Waituna Lagoon and its catchment.*
- 1.3.11.1 This policy is too specific to be an effective policy to deal with land management issues for the whole region.
- 1.3.12 *Policy 6.9 – Provide for the continued maintenance of community drains to facilitate drainage and prevent damage to community assets while avoiding, remedying or mitigating adverse effects on water quality and stream flora and fauna.*
- 1.3.12.1 This policy links to land management practices. These tie in with the ability of changes in land management practices to change the intensity of flood events. For example, if the drains are maintained up to the required standard then the flood waters are able to move through catchments a lot faster and water ponding is less likely to occur as a result of a lack of maintenance.
- 1.3.13 *Policy 6.10 – Recognise and provide for existing structures including hydro-electric installations and flood alleviation and river management works, and allow for their maintenance, upgrading or enhancement, while avoiding wherever practicable, mitigating or remedying any adverse effects.*
- 1.3.13.1 This policy does not link with the focus of land management in the above issue.
- 1.3.14 *Policy 8.1 – Maintain and enhance Southland’s soil resource by avoiding, remedying or mitigating the adverse effects of activities.*
- 1.3.14.1 This policy can be loosely linked to the stated issue, as adverse effects can occur due to certain activities on land and these can be amplified during natural hazard events, for example, a flooding event washing away large areas of top soil.
- 1.3.15 *Policy 8.3 – Develop indicators of land sustainability to measure soil resource trends in partnership with landowners, land occupiers, communities and agencies.*
- 1.3.15.1 This policy does link with land management, but it does not link with the current issue; the mitigation measures relating to the frequency or intensity of natural hazards.
- 1.3.16 *Policy 13.8 – In cases where an activity results in the physical disturbance of the seabed and/ or foreshore, including mining or reclamation, impose appropriate management regimes to avoid wherever practicable, or mitigate any adverse effects.*
- 1.3.16.1 This policy does not link well with the current issue as it has nothing to do with the frequency or intensity of natural hazards.
- 1.3.17 *Policy 13.12 – Avoid wherever practicable, or mitigate natural hazards in the coastal environment caused by the interaction of coastal processes and development or activities, by – (a) managing the use of land; (b) managing subdivision and the actual and potential effects of the use, development, or protection of land; (c) managing the actual or potential activities in relation to the surface of coastal waters; (d) taking into account the effect of coastal processes on use and development within the coastal marine area; (e) managing use and development within the coastal marine area to avoid unintentional interference with coastal processes.*

- 1.3.17.1 This is still a very relevant policy, as it refers to the restrictions that need to be put in place in some instances to reduce the risk of natural hazards affecting coastal development. By managing the land practices you potentially manage the frequency by which coastal developments are affected by natural hazards.
- 1.3.18 *Policy 15.1 – In managing natural hazards, the following implementation priorities are to be adopted – Priority 1, Avoid exposure to natural hazards where practicable. Priority 2, Reduce the effects of hazards, by managing activities in areas subject to, or likely to be affected by, those hazards. Priority 3, Undertake physical works to divert the hazard, or stop it from impacting upon people. Priority 4, Implement flood warning systems, insurance measures, and adopt civil defence procedures.*
- 1.3.18.1 This is still a very relevant policy as it contains all the elements that are needed to address the issue above.
- 1.3.19 *Policy 15.2 – Prepare and update hazard registers for inclusion in District Plans and the Regional Coastal Plan to show – (a) land subject to actual or potential inundation. (b) areas of land instability. (c) areas prone to the effects of actual or potential coastal erosion. (d) areas prone to the actual or potential effects of sea level rise. (e) information that identifies area most vulnerable to the effects of earthquakes. (f) areas prone to other identifiable actual or potential hazards considered to be significant, for example, wind, snow and tsunami and prepare information to explain the hazard registers.*
- 1.3.19.1 This is still a relevant policy as currently including natural hazards in District Plans and Regional Coastal Plans is the most effective way in which to deal with the issue of land management with respect to natural hazards.
- 1.3.20 *Policy 15.3 – Promote an understanding of natural hazards and an awareness of areas that could be affected, and encourage people and communities to avoid wherever practicable, or remedy or mitigate the effects natural hazards.*
- 1.3.20.1 This is still a relevant policy in relation to the above issue as it encourages communities to make land management decisions that may lessen the intensity of a natural hazard's impact on a community.
- 1.3.21 *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*
- 1.3.21.1 This is still a relevant issue as it directly relates to what should be regulated in terms of natural hazards, their potential effects and the anticipated intensity of effects due to different land management practices.
- 1.3.22 *Policy 15.10 – Protect the integrity of landforms that provide protection from significant adverse effects of natural hazards.*
- 1.3.22.1 This is still a very important policy, as changes to the integrity of landforms have the potential to change the frequency and the intensity of some natural hazards. This is the crux of the above issue.

1.3.23 Relevant Methods - 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17

1.3.23.1 Refer to the end of the issues section for more details on methods.

1.4 **Issue 2** Structures within floodplains may over confine and redirect natural water flows to the detriment of natural ecosystems, people and property.
(Refer to Objectives 15.1 - 15.3; Policies 15.1, 15.5, 15.8, 15.12; Methods 15.1, 15.7, 15.8, 15.10 - 15.13)

1.4.1 This is still a very relevant issue. There are evolving ideas about how to manage floodplain corridors, but concern over the effects of structures within the floodplain is one of the issues that has been identified as needing ongoing management.

1.4.2 *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*

1.4.2.1 This objective links well with the above issue. The community awareness of how natural hazards can affect the environment links well with structures being placed in floodplains. Some common activities involve structures and the changes structures could potentially have to natural hazard events needs to be understood.

1.4.3 *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*

1.4.3.1 This objective links very well with the above issue. Some of the structures that get placed in flood plains have large social and economic cost implications in times of natural hazards. Bridges for example are a social and economic necessity, but their design often means that they get affected by flood events.

1.4.4 *Objective 15.3 – To ensure all options to reduce the risk of natural hazards are considered in an unbiased way.*

1.4.4.1 This objective still links very well with the above issue, as it remains imperative that all available options are considered in an unbiased way to ensure that exposure to natural hazards is reduced as much as possible.

1.4.5 a *Policy 15.1 – In managing natural hazards, the following implementation priorities are to be adopted – Priority 1, Avoid exposure to natural hazards where practicable. Priority 2, Reduce the effects of hazards, by managing activities in areas subject to, or likely to be affected by, those hazards. Priority 3, Undertake physical works to divert the hazard, or stop it from impacting upon people. Priority 4, Implement flood warning systems, insurance measures, and adopt civil defence procedures.*

b *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*

- c *Policy 15.8 – Avoid inundation hazard to other property from activities that are undertaken within riverbeds, floodway’s and floodplains.*
- 1.4.5 d *Policy 15.12 – Seek the inclusion of design features in buildings in flood-prone areas which minimise the potential for future losses from flood damage to the building or its contents.*
- 1.4.5.1 The policies above are all still very relevant to the above issue.
- 1.4.6 Relevant Methods - *15.1, 15.7, 15.8, 15.10, 15.11, 15.12, 15.13*
- 1.4.6.1 Refer to the end of the issues section for more details on methods.
- 1.5 **Issue 3** The extent to which development on land subject to actual and potential natural hazards should be managed to reduce flood losses and health hazards in the event of the risk becoming an eventuality, for example, restrictions on density of subdivision, floor levels of buildings and types of development.
(Refer to Objective 15.1, 15.2; Policies 10.4, 13.12, 15.3, 15.5 - 15.8, 15.11 - 15.14; Methods 15.1 - 15.17)
- 1.5.1 This remains a big issue. Southland has a number of natural hazards that we are able to plan for, for example flood events. Use of historical information enables restrictions are placed on developments so they are unlikely to be affected if natural hazards do occur.
- 1.5.2 *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*
- 1.5.2.1 This remains a relevant objective for the above issue. It remains an important tool for regulating authorities to use to keep the community aware of issues so the community understands the regulatory decisions that are made with respect to new developments.
- 1.5.3 *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*
- 1.5.3.1 This remains a relevant objective that links well with the above issue.
- 1.5.4
 - a *Policy 10.4 – Recognise and minimise the risks of natural hazards on the built environment.*
 - b *Policy 13.12 – Avoid wherever practicable, or mitigate natural hazards in the coastal environment caused by the interaction of coastal processes and development or activities, by – (a) managing the use of land; (b) managing subdivision and the actual and potential effects of the use, development, or protection of land; (c) managing the actual or potential activities in relation to the surface of coastal waters; (d) taking into account the effect of coastal processes on use and development within the coastal marine area; (e) managing use and development within the coastal marine area to avoid unintentional interference with coastal processes.*
 - c *Policy 15.3 – Promote an understanding of natural hazards and an awareness of area that could be affected, and encourage people and communities to avoid wherever practicable, or remedy or mitigate the effects natural hazards.*

- d *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*
- 1.5.4.1 The above policies remain relevant to the issue of the management of development on land subject to actual and potential natural hazards.
- 1.5.5 *Policy 15.6 – Mitigate the adverse environmental effects that could arise from the construction of defences against inundation and erosion from the sea or rivers.*
- 1.5.5.1 This policy does not link very well with the above issue. This policy deals with defences against hazards, whereas the above issue deals with hazard avoidance mitigation by way of restrictions at the development stage.
- 1.5.6
 - a *Policy 15.7 – Mitigate adverse environmental effects arising from widening, narrowing, deepening, damming, diverting or altering or watercourses.*
 - b *Policy 15.8 – Avoid inundation hazard to other property form activities that are undertaken within the riverbeds, floodway’s and floodplains.*
 - c *Policy 15.11 – Where subdivision takes place on land which is subject to actual or potential inundation the consent authority shall give consideration to the need to – (a) impose conditions to mitigate or remedy the adverse effects of actual or potential inundation; and/or (b) restrict the activities that take place on the land; and/or (c) require the undertaking of flood alleviation works.*
 - d *Policy 15.12 – Seek the inclusion of design features in buildings in flood-prone areas which minimise the potential for future losses from flood damage to the building or its contents.*
 - e *Policy 15.13 – To ensure that the legal liability of local authorities is not increased by activities undertaken in areas prone to actual or potential inundation which have no incorporated design features recommended by the territorial authority.*
- 1.5.6.1 The above policies are still relevant to the issue of the management of development on land subject to actual and potential natural hazards.
- 1.5.7 *Policy 15.14 – Plan for a sea level rise of 35cm by the year 2050, until such time that there is evidence that the rate of rise is higher or lower.*
- 1.5.7.1 This is still a relevant policy for the above objective. However, an amendment to the level of the sea level rise is recommended by the Ministry for the Environment. A base value sea-level rise of 0.5m relative the 1980-1999 average should be used, along with an assessment of the potential consequences from a range of possible higher sea-level rises (particularly where impacts are likely to have significant consequences or where additional future adaptation options are limited). At the very least all assessments should consider the consequences of a mean sea-level rise of at least 0.8m relative to the 1980-1999 average.
- 1.5.8 Relevant Methods - *15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17*

- 1.5.8.1 Refer to the end of the issues section for more details on methods.
- 1.6 **Issue 4** People owning or buying property, often do not appreciate their vulnerability to the adverse effects of actual or potential natural hazards.
(Refer to Objectives 6.4, 15.1, 15.2; Policies 10.4, 13.12, 15.2, 15.3, 15.5, 15.11 - 15.13; Methods 15.1 - 15.17)
- 1.6.1 This remains an important issue. However, a rewording of the statement “often do not appreciate their vulnerability” is needed, as currently the scope of the statement does not encompass the entire issue of understanding of actual or potential natural and human-induced effects to a property. There are numerous reasons that people want or need the hazard information for a given property. Further to this, there is an obligation under the Civil Defence Act to communicate natural hazards information, but the issue of who is to communicate those risks and in what form they should take is not clear in the Civil Defence Management Plan. Therefore, it gets left to those communication channels as outlined under the RMA and under the Local Government Official Information and Meetings Act 1987. For this reason there needs to be more communication with property owners and buyers about natural hazards when the information is requested or there is an opportunity for the local authorities to share any information that they have available. It is imperative for property owners and intending purchasers to understand the risk of natural hazards so that they can plan and prepare to minimize their personal risk. They will also need to understand why territorial authorities will in some circumstances impose conditions on different activities on the property so that this is not seen purely as “bureaucratic obstruction,” but rather is perceived more positively as protecting people and their assets.
- 1.6.2 *Objective 6.4 – To avoid wherever practicable, remedy or mitigate, the adverse effects of activities in, on, under, adjacent to, or over the beds of lakes, rivers and wetlands.*
- 1.6.2.1 This is a relevant objective to the above issue. To enable communities to mitigate the eventuality of natural hazards people need adequate information to make informed decisions about their properties and the activities they choose to undertake. Risks need to be understood as part of their decision making process.
- 1.6.3 a *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*
- b *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*
- 1.6.3.1 The above objectives are still relevant to the issue of understanding one’s potential vulnerability to actual or potential natural hazard risks.
- 1.6.4 a *Policy 10.4 – Recognise and minimise the risks of natural hazards on the built environment.*
- b *Policy 13.12 – Avoid wherever practicable, or mitigate natural hazards in the coastal environment caused by the interaction of coastal processes and development or activities, by – (a) managing the use of land; (b) managing subdivision and the actual and potential effects of the use, development, or protection of land; (c) managing the actual or potential activities in relation to the surface of coastal waters; (d) taking into account the effect of coastal processes on use and development within the*

coastal marine area; (e) managing use and development within the coastal marine area to avoid unintentional interference with coastal processes.

- c *Policy 15.2 – Prepare and update hazard registers for inclusion in District Plans and the Regional Coastal Plan to show – (a) land subject to actual or potential inundation. (b) areas of land instability. (c) areas prone to the effects of actual or potential coastal erosion. (d) areas prone to the actual or potential effects of sea level rise. (e) information that identifies area most vulnerable to the effects of earthquakes. (f) areas prone to other identifiable actual or potential hazards considered to be significant, for example, wind, snow and tsunami and prepare information to explain the hazard registers.*
- d *Policy 15.3 – Promote an understanding of natural hazards and an awareness of area that could be affected, and encourage people and communities to avoid wherever practicable, or remedy or mitigate the effects natural hazards.*
- e *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*
- f *Policy 15.11 – Where subdivision takes place on land which is subject to actual or potential inundation the consent authority shall give consideration to the need to – (a) impose conditions to mitigate or remedy the adverse effects of actual or potential inundation; and/or (b) restrict the activities that take place on the land; and/or (c) require the undertaking of flood alleviation works.*
- g *Policy 15.12 – Seek the inclusion of design features in buildings in flood-prone areas which minimise the potential for future losses from flood damage to the building or its contents.*
- h *Policy 15.13 – To ensure that the legal liability of local authorities is not increased by activities undertaken in areas prone to actual or potential inundation which have no incorporated design features recommended by the territorial authority.*

1.6.4.1 The above policies are still relevant to the issue of understanding one's potential vulnerability to actual or potential natural hazard risks.

1.6.5 Relevant Methods - 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17

1.6.5.1 Refer to the end of the issues section for more details on methods.

1.7 **Issue 5** The extent to which individuals should be allowed to manage their own risk or be protected from their own lack of knowledge or foolhardiness.
(Refer to Objective 15.1, 15.2; Policies 15.2, 15.3, 15.5 - 15.13; Methods 15.1 - 15.17)

1.7.1 This could still be considered an issue, but it goes against issue 4 and against local authorities' requirements to provide relevant hazard information to the community. There appears to be a trade off of individual rights against overall community expectations in terms of what are acceptable risks, what activities should be allowed and what needs to be managed. Perhaps the issue of balancing individual responsibility could be included as part of issue 4.

- 1.7.2 *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*
- 1.7.2.1 This objective does link with the above issue, but the above issue focuses on individuals rather than the stated community as in this objective.
- 1.7.3 *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*
- 1.7.3.1 This remains a relevant policy to the above issue. Letting people manage their own risk, results in saving of costs to the community as a whole during periods between natural hazards. However, there is a greater risk to the community in times of a natural hazard because of a larger associated level of risk due to individuals' potential inactivity or mismanagement of their land.
- 1.7.4 *Policy 15.2 – Prepare and update hazard registers for inclusion in District Plans and the Regional Coastal Plan to show – (a) land subject to actual or potential inundation. (b) areas of land instability. (c) areas prone to the effects of actual or potential coastal erosion. (d) areas prone to the actual or potential effects of sea level rise. (e) information that identifies area most vulnerable to the effects of earthquakes. (f) areas prone to other identifiable actual or potential hazards considered to be significant, for example, wind, snow and tsunami and prepare information to explain the hazard registers.*
- 1.7.4.1 This is a relevant policy to the above issue. A hazard register allows people to manage their own risk in respect to those known risks as outlined in the relevant plans.
- 1.7.5 *Policy 15.3 – Promote an understanding of natural hazards and an awareness of area that could be affected, and encourage people and communities to avoid wherever practicable, or remedy or mitigate the effects natural hazards.*
- 1.7.5.1 This remains a relevant policy to the above issue, but it also highlights the possible difference in interest between the community as a whole and the individual.
- 1.7.6 *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*
- 1.7.6.1 This policy appears to be in conflict with the above issue, as this policy deals with the community rather than the individual.
- 1.7.6.2 However, policies 15.5 and 15.3 could become relevant if the above issue is combined with issue 4 with its focus on the community, to create an issue that focuses on both communities and individuals.
- 1.7.7 a *Policy 15.6 – Mitigate the adverse environmental effects that could arise from the construction of defences against inundation and erosion from the sea or rivers.*
- b *Policy 15.7 – Mitigate adverse environmental effects arising from widening, narrowing, deepening, damming, diverting or altering of watercourses.*

- c *Policy 15.8 – Avoid inundation hazard to other property from activities that are undertaken within riverbeds, floodway's and floodplains.*
- d *Policy 15.9 – Protect hazard alleviation works from inappropriate activities.*
- e *Policy 15.10 – Protect the integrity of landforms that provide protection from significant adverse effects of natural hazards.*

1.7.7.1 The above policies are relevant to the above issue of individuals having responsibility for their own risk to natural hazards. It is imperative that individuals understand the consequences of inappropriate activities around hazard alleviation works and watercourses.

1.7.8 *Policy 15.11 – Where subdivision takes place on land which is subject to actual or potential inundation the consent authority shall give consideration to the need to – (a) impose conditions to mitigate or remedy the adverse effects of actual or potential inundation; and/ or (b) restrict the activities that take place on the land; and/ or (c) require the undertaking of flood alleviation works.*

1.7.8.1 This policy seems to be in conflict with the stated issue of giving individuals the right to manage their own risk from natural hazards.

1.7.9 *Policy 15.12 – Seek the inclusion of design features in buildings in flood-prone areas which minimise the potential for future losses from flood damage to the building or its contents.*

1.7.9.1 This policy seems to be in conflict with the stated issue of giving individuals the right to manage their own risk from natural hazards.

1.7.10 *Policy 15.13 – To ensure that the legal liability of local authorities is not increased by activities undertaken in areas prone to actual or potential inundation which have no incorporated design features recommended by the territorial authority.*

1.7.10.1 This is a relevant policy to the above issue.

1.7.11 Relevant Methods - *15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17*

1.7.11.1 Refer to the end of the issues section for more details on methods.

1.8 **Issue 6** Some activities may reduce the structural soundness of protection works, for example, grazing of cattle on stopbanks.
(Refer to Objectives 15.2; Policy 15.9; Methods 15.1 - 15.17)

1.8.1 This remains a relevant issue. However, it could be expanded out to explain the risks that are involved with different activities and also to include integrity of protection works or design capability of those works.

1.8.2 *Objective 15.2 – To reduce the social and economic costs that result form the occurrence, avoidance, mitigation and remedying of natural hazards.*

1.8.2.1 This remains a relevant objective to the above issue.

- 1.8.3 *Policy 15.9 – Protect hazard alleviation works from inappropriate activities.*
- 1.8.3.1 This remains a relevant policy to the above issue.
- 1.8.4 Relevant Methods - *15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17*
- 1.8.4.1 Refer to the end of the issues section for more details on methods.
- 1.9 **Issue 7** The identification of land subject to actual or potential natural hazards, particularly inundation (which is identifiable and avoidable), and those hazards that apply to some coastal areas, for example coastal erosion, tsunamis, and/or the adverse effects of sea level rise.
(Refer to Objectives 15.1, 15.2; Policies 13.12, 13.14, 15.2, 15.3, 15.5 - 15.14, 15.16, 15.18; Methods 15.1, 15.11 - 15.13)
- 1.9.1 This is an issue, but it is not well worded. An issue should be a matter of concern that needs to be addressed. The way this issue is worded at present does not clearly state the issue that is to be addressed.
- 1.9.2 A rewording of the issue could read along the lines of:
- Land needs to be clearly identified as to whether it is subject to actual or potential natural hazards, particularly land which could be inundated (which is easily identifiable and avoidable), and those hazards that apply to some coastal areas, for example coastal erosion or land that may be subject to tsunamis and/or the adverse effects of sea level rise.
- 1.9.3 a *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*
- b *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*
- 1.9.3.1 The above objectives are relevant to the above issue.
- 1.9.4 *Policy 13.12 – Avoid wherever practicable, or mitigate natural hazards in the coastal environment caused by the interaction of coastal processes and development or activities, by – (a) managing the use of land; (b) managing subdivision and the actual and potential effects of the use, development, or protection of land; (c) managing the actual or potential activities in relation to the surface of coastal waters; (d) taking into account the effect of coastal processes on use and development within the coastal marine area; (e) managing use and development within the coastal marine area to avoid unintentional interference with coastal processes.*
- 1.9.4.1 This is a relevant policy to the above issue.
- 1.9.5 *Policy 13.14 – Plan for a sea level rise of 35cm by the year 2050, until such a time as there is evidence that the rate of rise is higher or lower.*

- 1.9.5.1 This is still a relevant policy for the above issue. However, an amendment to the level of the sea level rise is recommended by the Ministry for the Environment. A base value sea-level rise of 0.5m relative to the 1980-1999 average should be used, along with an assessment of the potential consequences from a range of possible higher sea-level rises (particularly where impacts are likely to have high consequences or where additional future adaptation options are limited). At the very least, all assessment should consider the consequences of a mean sea-level rise of at least 0.8m relative to the 1980-1999 average (Coastal Hazards and Climate Change : Guidance Manual 2008)
- 1.9.6 a *Policy 15.2 – Prepare and update hazard registers for inclusion in District Plans and the Regional Coastal Plan to show – (a) land subject to actual or potential inundation. (b) areas of land instability. (c) areas prone to the effects of actual or potential coastal erosion. (d) areas prone to the actual or potential effects of sea level rise. (e) information that identifies area most vulnerable to the effects of earthquakes. (f) areas prone to other identifiable actual or potential hazards considered to be significant, for example, wind, snow and tsunami and prepare information to explain the hazard registers.*
- b *Policy 15.3 – Promote an understanding of natural hazards and an awareness of area that could be affected, and encourage people and communities to avoid wherever practicable, or remedy or mitigate the effects natural hazards.*
- 1.9.6.1 The above policies are relevant to the above issue of identification of land subject to actual and potential natural hazards.
- 1.9.7 *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*
- 1.9.7.1 This policy can be linked with the above issue if a wider perspective of potential of the implications is taken. However, given that the issue above is not worded very well then this policy in its current form is not relevant.
- 1.9.8 *Policy 15.6 – Mitigate the adverse environmental effects that could arise from the construction of defences against inundation and erosion from the sea or rivers.*
- 1.9.8.1 Currently with the above issue worded the way that it is this policy is not relevant. However, if the issue above is expanded through re-wording and the scope is widened then this policy will become relevant.
- 1.9.9 a *Policy 15.7 – Mitigate adverse environmental effects arising from widening, narrowing, deepening, damming, diverting or altering of watercourses.*
- b *Policy 15.8 – Avoid inundation hazard to other property from activities that are undertaken within riverbeds, floodway's and floodplains.*
- c *Policy 15.9 – Protect hazard alleviation works from inappropriate activities.*
- d *Policy 15.10 – Protect the integrity of landforms that provide protection from significant adverse effects of natural hazards.*

- 1.9.9.1 The above policies are not really relevant to the above issue of identification of land subject to actual and potential natural hazards.
- 1.9.10 *Policy 15.11 – Where subdivision takes place on land which is subject to actual or potential inundation the consent authority shall give consideration to the need to – (a) impose conditions to mitigate or remedy the adverse effects of actual or potential inundation; and/or (b) restrict the activities that take place on the land; and/or (c) require the undertaking of flood alleviation works.*
- 1.9.10.1 This policy is relevant to the above issue.
- 1.9.11 *Policy 15.12 – Seek the inclusion of design features in buildings in flood-prone areas which minimise the potential for future losses from flood damage to the building or its contents.*
- 1.9.11.1 This policy is not relevant to the above issue.
- 1.9.12 *Policy 15.13 – To ensure that the legal liability of local authorities is not increased by activities undertaken in areas prone to actual or potential inundation which have no incorporated design features recommended by the territorial authority.*
- 1.9.12.1 This could become relevant to the above issue if the issue is re-worded.
- 1.9.13 *Policy 15.14 – Plan for a sea level rise of 35cm by the year 2050, until such a time that there is evidence that the rate of rise is higher or lower.*
- 1.9.13.1 This policy is relevant to the above issue. Explanation above in Policy 13.14.
- 1.9.14 *Policy 15.16 – Develop Civil Defence Plans which include contingency measures for a range of natural hazards.*
- 1.9.14.1 This policy does not link with the above issue at present but if the issue above is re-worded then this policy may become more relevant.
- 1.9.15 *Policy 15.18 – Maintain a flood-warning network to cover the region.*
- 1.9.15.1 This policy does not link with the above issue at present.
- 1.9.16 Relevant Methods - 15.1, 15.11, 15.12, 15.13
- 1.9.16.1 Refer to the end of the issues section for more details on methods.
- 1.10 **Issue 8** Structural means of hazard mitigation can have positive effects, for example, reducing the frequency and intensity of natural hazards, but they can also give rise to adverse effects, for example, adversely affecting sites of cultural and spiritual significance to Maori, or altering ecosystems in cases of river diversion.
(Refer to Objectives 1.1, 1.2, 15.1, 15.2, 15.4; Policies 1.1, 1.2, 15.4, 15.6 - 15.9; Methods 15.5, 15.10 - 15.13, 15.16)
- 1.10.1 This is a big issue in the sense that this is traditional way hazard mitigation has been viewed and undertaken; the idea that humans can force nature to do what we want. While

structures used to help mitigate natural hazards are still a relevant issue, “structures” is perhaps too specific. There are many activities that potentially have these same effects. This issue could be included in a wider land management issue or could just be reworded to give it some more scope. The NZCPS emphasises a non-structural approach to coastal hazard management (the current review of this document is not likely to effect this).

- 1.10.1
 - a *Objective 1.1 – To protect wahi tapu from the adverse effects of resource use activities.*
 - b *Objective 1.2 – To recognise the importance of wahi tapu, wahi taoka, mahika kai and the customary use of water to Kai Tabu.*
- 1.10.1.1 The above objectives remain important to the above issue of structural means of hazard mitigation.
- 1.10.2 *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*
- 1.10.2.1 This objective is still relevant to the above issue, as the community needs to understand that some of the activities they undertake may have unintended consequences when a natural hazard occurs at the same location.
- 1.10.3
 - a *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*
 - b *Objective 15.4 – To recognise and protect cultural and heritage values from the adverse effects of activities which are designed to mitigate or remedy natural hazards.*
- 1.10.3.1 The above objectives remain important to the above issue of structural means of hazard mitigation.
- 1.10.4 *Policy 1.1 – Prepare and implement an Accord between the local authorities and the takata whenua o Muribiku which sets out a process for consultation.*
- 1.10.4.1 This policy is still relevant to the above issue.
- 1.10.5 *Policy 1.2 – Recognise “Te Whakatau Kaupapa O Muribiku” as a Kai Tabu resource management reference planning document for the Region.*
- 1.10.5.1 This policy does not link very well with the above issue, as it does not set out any specific relevance to structures.
- 1.10.6
 - a *Policy 15.4 – Have regard to the impacts that natural hazards and any works undertaken may have on sites of significant to the takata whenua.*
 - b *Policy 15.6 – Mitigate the adverse environmental effects that could arise from the construction of defences against inundation and erosion from the sea or rivers.*
 - c *Policy 15.7 – Mitigate adverse environmental effects arising from widening, narrowing, deepening, damming, diverting or altering of watercourses.*

d *Policy 15.8 – Avoid inundation hazard to other property from activities that are undertaken within riverbeds, floodway's and floodplains.*

e *Policy 15.9 – Protect hazard alleviation works from inappropriate activities.*

1.10.6.1 The above policies are still relevant to the above issue of structural means of hazard mitigation.

1.10.7 Relevant Methods - 15.5, 15.10, 15.11, 15.12, 15.13, 15.16

1.10.7.1 Refer to the end of the issues section for more details on methods.

1.11 **Issue 9** The extent to which the wider community should take any financial responsibility for those who choose to live in areas identified as being more hazardous than others.

(Refer to Objectives 15.1, 15.2; Policies 15.3, 15.5, 15.13, 15.15, 15.17; Methods 15.1 - 15.17)

1.11.1 This remains a very relevant issue. There is still considerable debate surrounding hazard alleviation measures and the protection that they afford to areas and subsequent development in those areas. There is no set process in terms of the community interest as to how properties/proposals should be assessed when looking at who should have financial responsibility when natural hazards occur. However, this issue is similar to other issues above.

1.11.2 a *Objective 15.1 – To raise community awareness of the existence and risk or natural hazards in the environment and the interaction between those hazards and their activities.*

b *Objective 15.2 – To reduce the social and economic costs that result form the occurrence, avoidance, mitigation and remedying of natural hazards.*

1.11.2.1 The above objectives are still relevant to the issue of the extent to which the wider community should take responsibility for those that choose to live in areas more hazardous than others.

1.11.3 a *Policy 15.3 – Promote an understanding of natural hazards and an awareness of area that could be affected, and encourage people and communities to avoid wherever practicable, or remedy or mitigate the effects natural hazards.*

b *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*

c *Policy 15.13 – To ensure that the legal liability of local authorities is not increased by activities undertaken in areas prone to actual or potential inundation which have no incorporated design features recommended by the territorial authority.*

- d *Policy 15.15 – Implementation financial measures which lessen the economic impacts arising from the effects of hazards on community-owned infrastructure assets.*
- e *Policy 15.17 – Apply user pays principles to the capital cost and maintenance of hazard protection works, with appropriate contributions from those responsible for the creation of the hazard where this responsibility can be clearly identified.*

1.11.3.1 The above policies are still relevant to the issue of the extent to which the wider community should take responsibility for those that choose to live in areas more hazardous than others.

1.11.4 Relevant Methods – 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17

1.11.4.1 Refer to the end of the issues section for more details on methods.

1.12 **Issue 10** The alternative means of adjusting or adapting to living with natural hazards, and their relative costs and benefits, have not been fully explored in the past. (Refer to Objectives 15.1 - 15.3; Policies 15.1; Methods 15.1 - 15.17)

1.12.1 This statement is still true, but this is not really an issue. It is more a potential option that needs to be explored in a bit more depth.

1.12.2 a *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*

b *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*

c *Objective 15.3 – To ensure all options to reduce the risk of natural hazards are considered in an unbiased way.*

1.12.2.1 The above objectives are still relevant to the issue of alternative means of adjusting or adapting to living with natural hazards.

1.12.3 *Policy 15.1 – In managing natural hazards, the following implementation priorities are to be adopted – Priority 1, Avoid exposure to natural hazards where practicable. Priority 2, Reduce the effects of hazards, by managing activities in areas subject to, or likely to be affected by, those hazards. Priority 3, Undertake physical works to divert the hazard, or to stop it from impacting upon people. Priority 4, Implement flood warning systems, insurance measures, and adopt civil defence procedures.*

1.12.3.1 This policy is relevant to the above issue of alternative means of adjusting or adapting to living with natural hazards.

1.12.4 Relevant Methods – 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17

1.12.4.1 Refer to the end of the issues section for more details on methods.

- 1.13 **Issue 11** The pollution of floodwaters by sewage, and the subsequent contamination of property and water supplies, is a significant cost to the community and a risk to health. (Refer to Objectives 5.2, 5.3, 6.4, 15.1, 15.2, 15.4; Policies 5.2 - 5.5, 6.10, 15.1, 15.3 - 15.5, 15.11, 15.12, 15.16; Methods 15.1 - 15.3, 15.5 - 15.17)
- 1.13.1 This remains an important planning issue that needs to be kept in mind when preparing any regional or district plans. This issue could also be expanded to include other major contaminants, like effluent on farms that has the potential to be washed into flood waters.
- 1.13.2
- a *Objective 5.2 – To ensure that in the use and development of water and land resources, and the discharge of contaminants, water quality is maintained and wherever practicable enhanced.*
 - b *Objective 5.3 – To ensure the taking, use, damming, diversion of water and the discharge of contaminants into water does not compromise water quality standards established for the region.*
 - c *Objective 6.4 – To avoid wherever practicable, remedy or mitigate, the adverse effects of activities in, on, under, adjacent to, or over the beds of lakes, rivers and wetlands.*
 - d *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*
 - e *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*
- 1.13.2.1 The above objectives are relevant to the issue of pollution in floodwaters and the subsequent risk to the community.
- 1.13.3 *Objective 15.4 – To recognise and protect cultural and heritage values from the adverse effects of activities which are designed to mitigate or remedy natural hazards.*
- 1.13.3.1 This objective does not link with the above issue.
- 1.13.4 *Policy 5.2 – Require all point source discharges, after reasonable mixing, to comply with water quality standards.*
- 1.13.4.1 This policy is still linked with the above issue, even though ‘point source discharges’ implies that the discharge is ongoing and is not limited to natural hazard events. Therefore, a natural hazard event is going to have very little effect on the discharge, perhaps just increasing the potential mixing of the discharge and spreading the pollutant to areas that the natural flow of the river would not normally reach.
- 1.13.5
- a *Policy 5.3 – Prepare Regional Plan(s) for the management of water quality considering both point and non-point source discharges.*
 - b *Policy 5.4 – Utilise land treatment of liquid wastes where this can be undertaken in a sustainable manner and without significant adverse environmental effects.*
 - c *Policy 5.5 – In preparing, implementing and administering Regional and District Plans and in considering resource consents, local authorities shall assess the effects of land use and development on*

ground water and surface water quality, including both point and non-point source discharges, and provide for any adverse effects to be avoided, remedied or mitigated.

- 1.13.5.1 The above policies are still relevant to the issue of pollution in floodwaters and the subsequent risk to the community.
- 1.13.6 *Policy 6.10 – Recognise and provide for existing structures including hydro-electric installations and flood alleviation and river management works, and allow for their maintenance, upgrading or enhancement, while avoiding wherever practicable, mitigating or remedying any adverse effects.*
- 1.13.6.1 This policy is not relevant to the above issue.
- 1.13.7 a *Policy 15.1 – In managing natural hazards, the following implementation priorities are to be adopted – Priority 1, Avoid exposure to natural hazards where practicable. Priority 2, Reduce the effects of hazards, by managing activities in areas subject to, or likely to be affected by, those hazards. Priority 3, Undertake physical works to divert the hazard, or stop it from impacting upon people. Priority 4, Implement flood warning systems, insurance measures, and adopt civil defence procedures.*
- b *Policy 15.3 – Promote an understanding of natural hazards and an awareness of area that could be affected, and encourage people and communities to avoid wherever practicable, or remedy or mitigate the effects natural hazards.*
- 1.13.7.1 The above policies are still relevant to the issue of pollution in floodwaters and the subsequent risk to the community.
- 1.13.8 *Policy 15.4 – Have regard to the impacts that natural hazards and any works undertaken may have on sites of significance to the takata whenua.*
- 1.13.8.1 This policy does not link very well with the above issue. However, it could be considered to be loosely associated.
- 1.13.9 a *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*
- b *Policy 15.11 - Where subdivision takes place on land which is subject to actual or potential inundation, the consent authority shall give consideration to the need to – (a) impose conditions to mitigate or remedy the adverse effects of actual or potential inundation; and/or (b) restrict the activities that take place on the land; and/or (c) require the undertaking of flood alleviation works.*
- 1.13.9.1 The above policies are still relevant to the issue of pollution in floodwaters and the subsequent risk to the community.
- 1.13.10 *Policy 15.12 – Seek the inclusion of design features in buildings in flood-prone areas which minimise the potential for future losses from flood damage to the building or its contents.*
- 1.13.10.1 This policy links loosely with the above issue. Design features can be included when setting out sewerage disposal for a property so that it lessens its potential to be affected by natural hazards.

1.13.11 *Policy 15.16 – Develop Civil Defence Plans which include contingency measures for a range of natural hazards.*

1.13.11.1 This policy is still relevant to the above issue.

1.3.12 Relevant Methods – 15.1, 15.2, 15.3, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17

1.13.12.1 Refer to the end of the issues section for more details on methods.

1.14 **Issue 12** The storage of hazardous substances, bulk chemicals and other materials, particularly floatables, can significantly increase the adverse effects of inundation. (Refer to Objectives 15.1, 15.2, 17.1; Policies 15.1, 15.2, 15.5, 17.5; Methods 15.1, 15.3, 15.5, 15.8, 15.11 - 15.13)

1.14.1 This is still an ongoing issue. It could be possible to include issue 11 as part of this issue by treating effluent waste as a hazardous substance.

1.14.2 a *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*

b *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*

c *Objective 17.1 – To safeguard the environment from the adverse effects from the existing and past storage, use, disposal or transportation of hazardous substances.*

1.14.2.1 The above objectives are still relevant to the issue of storage of hazardous substances increasing the adverse effect of inundation.

1.14.3 *Policy 15.1 – In managing natural hazards, the following implementation priorities are to be adopted – Priority 1, Avoid exposure to natural hazards where practicable. Priority 2, Reduce the effects of hazards, by managing activities in areas subject to, or likely to be affected by, those hazards. Priority 3, Undertake physical works to divert the hazard, or to stop it from impacting upon people. Priority 4, Implement flood warning systems, insurance measures, and adopt civil defence procedures.*

1.14.3.1 This policy is still relevant to the above issue.

1.14.4 *Policy 15.2 – Prepare and update hazard registers for inclusion in District Plans and the Regional Coastal Plan to show – (a) land subject to actual or potential inundation. (b) areas of land instability. (c) areas prone to the effects of actual or potential coastal erosion. (d) areas prone to the actual or potential effects of sea level rise. (e) information that identifies area most vulnerable to the effects of earthquakes. (f) areas prone to other identifiable actual or potential hazards considered to be significant, for example, wind, snow and tsunami and prepare information to explain the hazard registers.*

1.14.4.1 Hazard registers have been included as part of relevant District and Regional Plans and have been used to manage hazards. These could be expanded and refined to make better use of higher quality information since these planning documents were previously prepared.

- 1.14.5 a *Policy 15.5 – Take into account the effects of particular activities both off, and on, natural hazards when preparing District Plans and Regional Plans, considering resource consents and building permits, and manage those activities which may increase the probability of the wider community being adversely affected by natural hazards.*
- b *Policy 17.5 – Minimise the adverse effects on the environment from the storage, use, discharge, transportation and disposal of hazardous substances.*
- 1.14.5.1 The above policies are still relevant to the above issue of storage of hazardous substances increasing the effect of inundation.
- 1.14.6 Relevant Methods – 15.1, 15.3, 15.5, 15.8, 15.11, 15.12, 15.13
- 1.14.6.1 Refer to the end of the issues section for more details on methods.
- 1.15 **Issue 13** The lack of sustainable and adequate financial planning, for example, insurance, disaster reserves and disaster pools, can increase the economic impact of natural hazards on individuals and the community.
(Refer to Objectives 15.1, 15.2; Policies 15.1, 15.3, 15.13, 15.15, 15.17; Methods 15.1 - 15.17)
- 1.15.1 This is still a relevant issue. When a natural hazard strikes individuals and communities they look for assistance to overcome any misfortune caused. Individual insurance should also be considered in this issue, as the responsibility of individuals.
- 1.15.2 a *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*
- b *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*
- 1.15.2.1 The above objectives are still relevant to the issue of the need for adequate and sustainable financial planning to decrease the impact of natural hazards on individuals and communities.
- 1.15.3 *Policy 15.1 – In managing natural hazards, the following implementation priorities are to be adopted – Priority 1, Avoid exposure to natural hazards where practicable. Priority 2, Reduce the effects of hazards, by managing activities in areas subject to, or likely to be affected by, those hazards. Priority 3, Undertake physical works to divert the hazard, or to stop it from impacting upon people. Priority 4, Implement flood warning systems, insurance measures, and adopt civil defence procedures.*
- 1.15.3.1 This policy is still relevant to the above issue, with special regard to priority 4.
- 1.15.4 *Policy 15.2 – Prepare and update hazard registers for inclusion in District Plans and the Regional Coastal Plan to show – (a) land subject to actual or potential inundation. (b) areas of land instability. (c) areas prone to the effects of actual or potential coastal erosion. (d) areas prone to the actual or potential effects of sea level rise. (e) information that identifies area most vulnerable to the effects of earthquakes. (f) areas prone to other identifiable actual or potential hazards considered to be significant, for example, wind, snow and tsunami and prepare information to explain the hazard registers.*

- 1.15.4.1 This policy is not relevant to the above issue as it does not deal with the implication of financial planning.
- 1.15.5 *Policy 15.13 – To ensure that the legal liability of local authorities is not increased by activities undertaken in areas prone to actual or potential inundation which have no incorporated design features recommended by the territorial authority.*
- 1.15.5.1 This policy is still relevant to the above issue, because local authorities need to utilise available legislative powers under the Building Act and the RMA to ensure that their legal liability is not increased and so that their ratepayers do not incur additional liability.
- 1.15.6 a *Policy 15.15 – Implementation financial measures which lessen the economic impacts arising from the effects of hazards on community-owned infrastructure assets.*
- 1.15.6 b *Policy 15.17 – Apply user pays principles to the capital cost and maintenance of hazard protection works, with appropriate contributions from those responsible for the creation of the hazard where this responsibility can be clearly identified.*
- 1.15.6.1 The above policies are still relevant to the issue of the need for adequate and sustainable financial planning to decrease the impact of natural hazards on individuals and communities.
- 1.15.7 Relevant Methods – 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17
- 1.15.7.1 Refer to the end of the issues section for more details on methods.
- 1.16 **Issue 14** Hazard alleviation works do not provide absolute protection, and in the event of their design criteria being exceeded, or the works in any way failing, greater levels of damage can occur than would have in their absence. Their vulnerability needs to be recognised and taken into account.
(Refer to Objectives 6.4, 15.1, 15.2; Policies 5.5, 6.8 - 6.10, 15.1 - 15.3, 15.9, 15.13; Methods 15.1, 15.2, 15.10 - 15.12)
- 1.16.1 This remains a very important issue. There is often a community perception that because they have alleviation works they are now immune from any future potential damage. However, this is certainly not the case. If a big enough hazard event was to occur then some alleviation methods have the potential to cause more damage than would be incurred if they were not in place.
- 1.16.2 a *Objective 6.4 – To avoid wherever practicable, remedy or mitigate, the adverse effects of activities in, on, under, adjacent to, or over the beds of lakes, rivers and wetlands.*
- b *Objective 15.1 – To raise community awareness of the existence and risk of natural hazards in the environment and the interaction between those hazards and their activities.*
- c *Objective 15.2 – To reduce the social and economic costs that result from the occurrence, avoidance, mitigation and remedying of natural hazards.*

- 1.16.2.1 The above objectives are still relevant to the issue of the vulnerability of hazard alleviation works.
- 1.16.3 *Policy 5.5 – In preparing, implementing and administering Regional and District Plans and in considering resource consents, local authorities shall assess the effects of land use and development on ground water and surface water quality, including both point and non-point source discharges, and provide for any adverse effects to be avoided, remedied or mitigated.*
- 1.16.3.1 This policy does not link with the above objective, as it has nothing to do with the vulnerability of hazard alleviation works.
- 1.16.4 *Policy 6.8 – Provide a water management regime for Waituna Lagoon and its catchment.*
- 1.16.4.1 The RPS is probably not the appropriate forum for specific policy to deal with an issue for the Waituna Lagoon. There is now a granted consent to control the opening and closing of the lagoon. If there are future specific problems with this lagoon then perhaps a plan change would better suit the specific needs of this location.
- 1.16.5
- a *Policy 6.9 – Provide for the continued maintenance of community drains to facilitate drainage and prevent damage to community assets while avoiding, remedying or mitigating adverse effects on water quality and stream flora and fauna.*
 - b *Policy 6.10 – Recognise and provide for existing structures including hydro-electric installations and flood alleviation and river management works, and allow for their maintenance, upgrading or enhancement, while avoiding wherever practicable, mitigating or remedying any adverse effects.*
 - c *Policy 15.1 – In managing natural hazards, the following implementation priorities are to be adopted – Priority 1, Avoid exposure to natural hazards where practicable. Priority 2, Reduce the effects of hazards, by managing activities in areas subject to, or likely to be affected by, those hazards. Priority 3, Undertake physical works to divert the hazard, or to stop it from impacting upon people. Priority 4, Implement flood warning systems, insurance measures, and adopt civil defence procedures.*
- 1.16.5.1 The above policies are still relevant to the issue of the vulnerability of hazard alleviation works.
- 1.16.6 *Policy 15.2 – Prepare and update hazard registers for inclusion in District Plans and the Regional Coastal Plan to show – (a) land subject to actual or potential inundation. (b) areas of land instability. (c) areas prone to the effects of actual or potential coastal erosion. (d) areas prone to the actual or potential effects of sea level rise. (e) information that identifies area most vulnerable to the effects of earthquakes. (f) areas prone to other identifiable actual or potential hazards considered to be significant, for example, wind, snow and tsunami and prepare information to explain the hazard registers.*
- 1.16.6.1 This policy is redundant. Hazard registers have not and will not be used because hazards are put into District and Regional plans.
- 1.16.7
- a *Policy 15.3 – Promote an understanding of natural hazards and an awareness of area that could be affected, and encourage people and communities to avoid wherever practicable, or remedy or mitigate the effects natural hazards.*
 - b *Policy 15.9 – Protect hazard alleviation works from inappropriate activities.*

- c *Policy 15.13 – To ensure that the legal liability of local authorities is not increased by activities undertaken in areas prone to actual or potential inundation which have not incorporated design features recommended by the territorial authority.*

1.16.8 The above policies are still relevant to the issue of the vulnerability of hazard alleviation works.

1.16.8.1 Relevant Methods – 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11, 15.12, 15.13, 15.14, 15.15, 15.16, 15.17

1.16.8.2 Refer to the end of the issues section for more details on methods.

1.17 **Methods**

1.17.1 *Method 15.1 – Information, education and public awareness.*

1.17.1.1 This is a very important method for a number of reasons. If there are any changes in hazard management then the community needs to know and learn what they are and how that they may be affected. This is also a good method for dealing with the lack of knowledge in communities about how to deal with natural hazards. A lack of knowledge often occurs due to the time period between natural hazards events. It is also useful for outlining to communities why local authorities seek to mitigate the effects of these natural hazards through development processes under the Building Act and the Resource Management Act to prevent this being perceived negatively as obstructive.

1.17.2 *Method 15.2 – Promotion.*

1.17.2.1 This is a useful tool that can be used to highlight a whole range of different issues associated with natural hazards, or to advertise other methods to help alleviate the risks associated with natural hazards.

1.17.3 *Method 15.3 – Advocating.*

1.17.3.1 This is a relevant tool that can be used when trying to implement management techniques to deal with natural hazards or when trying to advise individuals and communities of the negatives/benefits of different actions.

1.17.4 *Method 15.4 – Negotiation, Facilitation, Mediation and Arbitration.*

1.17.4.1 These are still relevant tools that enable action/movement towards identified goals.

1.17.5 *Method 15.5 – Consultation.*

1.17.5.1 This is an important method that allows/ensures the many different perspectives the potential to be heard and weighed up. It is also useful to explain new plans that get released.

- 1.17.6 *Method 15.6 – Developing guidelines for resource users.*
- 1.17.6.1 This is still a relevant tool that helps resource users manage the different resources, for example Landslide guidelines.
- 1.17.7 *Method 15.7 – Protocols and Accords.*
- 1.17.7.1 This is a very relevant tool to create agreements with resource users, often providing consistency throughout land management practices.
- 1.17.8 *Method 15.8 – Environmental Monitoring.*
- 1.17.8.1 This is a very important tool used to create records, set bench marks and test different environments. Land can then be managed over time to gauge how differing land management practices are affecting the state of the environment.
- 1.17.9 *Method 15.9 – Investigations and Research.*
- 1.17.9.1 This is still a very important tool for gaining new information on interest areas or areas of concern.
- 1.17.10 *Method 15.10 – Prepare, implement and administer a Regional Natural Hazards Management Plan.*
- 1.17.10.1 This is not a relevant method, as regional natural hazard management plans have been discarded as a way of implementing hazard management in the region. What has occurred is that hazard management practices have been built into District plans and the Coastal plan. Therefore, natural hazard management has some weight under the Resource Management Act 1991.
- 1.17.11 *Method 15.11 – District Plans and Regional Coastal Plan.*
- 1.17.11.1 District Plans and the Regional Coastal Plans are probably the most important RMA tools available for the management of Natural Hazards. Within these plans you are able to regulate the content and the appropriate responses to differing situations.
- 1.17.12 *Method 15.12 – Plans, other documents, and action under other Acts.*
- 1.17.12.1 This is still a relevant method as there is a chance for alternative natural hazard documents and actions to be taken in the future, for example, CDEM Act.
- 1.17.13 *Method 15.13 – Resource Consents and Public Works.*
- 1.17.13.1 This is still a relevant method. Resource consents are able to regulate land management practices and new developments through appropriate resource consent conditions. Public Works is a great mechanism for the wider community to do work to benefit the greatest number of people.

1.17.14 *Method 15.14 – Economic Instruments.*

1.17.14.1 This is still a relevant method, as economics is and will remain a big driver of land management practices.

1.17.15 *Method 15.15 – Assistance.*

1.17.15.1 This is still a relevant method to many different areas of natural hazards where individual and communities need some help to get through the effects of hazards or to prepare for events, for example, Central Government assistance provided in Milford Sound for flood protection.

1.17.16 *Method 15.16 – Works and Services.*

1.17.16.1 This is still a relevant method widely used to complete necessary works that help mitigate the effects of a Natural Hazard event.

1.17.17 *Method 15.17 – Local Response Plans.*

1.17.17.1 This is still a relevant method that helps to minimise the effects to an area from the effects of a natural hazard event, for example, contingency plans.

Issue	Relevance Y/N	Relevant objective	Relevant policy	Relevant method
1	Y	4.2/6.4/15.2/15.3	6.9/8.1/15.1/15.2/15.3 /15.5/15.10	15.1-15.17
2	Y	15.1/15.2/15.3	15.1/15.5/15.8/15.12	15.1/15.7/15.8/15.10-15.13
3	Y	15.1/15.2	10.4/13.2/15.3/15.5/15.7 /15.8/15.11 /15.12/15.14	15.1-15.17
4	Y	6.4/15.1/15.2	10.4/13.12/15.2/15.3 /15.5/15.11/15.12/15.13	15.1-15.17
5	N - possibility to include as part of 4	15.1/15.2	15.2/15.3/15.6/15.7/15.8 /15.9/15.10/15.13	15.1-15.17
6	Y	15.2	15.9	15.1-15.17
7	Y – needs to be reworded	15.1/15.2	13.12/13.14/15.2/15.11 /15.13	15.1/15.11-15.13
8	Y	1.1/1.2/15.1/15.2/ 15.4	1.1/15.4/15.6/15.7/15.8 /15.9	15.1-15.17
9	Y	15.1/15.2	15.3/15.5/15.13/15.15 /15.17	15.1-15.17
10	N – not really an issue	15.1/15.2/15.3	15.1	15.1-15.17
11	Y	5.2/5.3/6.4/15.1/1 5.2	5.2/5.3/5.4/5.5/6.10/15.1 /15.3/15.4/15.5 /15.11/15.12/15.16	15.1-15.17
12	Y	15.1/15.2/17.1	15.2/15.5/17.5	15.1/15.3/15.5/15.8/15.11- 15.13
13	Y	15.1/15.2	15.1/15.13/15.15/15.17	15.1-15.17
14	Y	6.4/15.1/15.2	6.9/6.10/15.1/15.3/15.9 /15.13	15.1/15.2/15.10-15.12