

## **5 Land**

### **5.1 Scope and Background**

Land management issues stem mainly from the effects of human activities on land. Potential for adverse environmental effects depends upon two factors: the capability of the land and soil to support particular uses and the effects of a given activity on different land and soil types. Mismanagement of the land resource has major implications for water quality and aquatic biodiversity in terms of sediment and nutrient inputs. These implications stem from the very strong links that exist between the land and water resources.

Agriculture, particularly pasture-based farming is the foundation of the Region's economy and is one of the key elements that have defined our social and visual landscape. However, in some areas, past and present agricultural practices have damaged the very resource upon which the agricultural sector is based – the land and soil. Future agricultural practices have the potential to increase the rate of damage if they do not take the natural limitations of the land into account.

#### **5.1.1 Chapter Content**

This chapter covers accelerated erosion, including the management of vegetation clearance\*, land disturbance\* and agricultural practices on Highly Erodible Land\* (HEL).

Activities related to land management which are covered in other chapters, include:

- (a) discharges of agrichemicals\*, agricultural wastes and other contaminants onto or into land, addressed in Chapter 6
- (b) activities involving the beds of rivers and lakes, addressed in Chapter 6
- (c) clearance of indigenous vegetation and drainage of significant wetlands, addressed in Chapter 7.

#### **5.1.2 Accelerated Erosion**

Accelerated erosion is caused by historical and current clearance of woody vegetation and earthworks such as tracking, particularly on land-use capability classes VII and VIII land. The Region has approximately 300,000 ha of hillcountry land at risk of moderate-severe erosion (Figure 5.1), 100,000 ha of which were affected by the storms of 2004. Approximately 200 million tonnes of soil was eroded during the February 2004 storm, causing approximately 30 million tonnes of sediment to enter the Region's rivers. The sediment discharged by rivers in the Region during this single storm event was likely to be several times the average annual sediment discharge for the Region.

The Region's western coast, particularly the foredune and associated inland soils, is easily eroded when the protective vegetation cover is removed as part of coastal development, and as a consequence of activities such as land recontouring and vehicle movement. Vegetation clearance\* and land disturbance\* expose these fragile soils to wind erosion.

The present extent of erosion has occurred despite the work by catchment boards and other individuals and organisations to manage soil erosion since the 1940s. Where these activities brought about meaningful land-use change, the results



have been successful in decreasing erosion rates. For instance, in steep hill-country, tree cover has reduced erosion rates by approximately 75% when compared with grass (Horizons Regional Council, 2005). However, the size and scale of the erosion issue is such that to date no agency has been able to deal with all erosion-prone land. Further, in some areas, large-scale land-use changes are likely to be required, to which there is understandable landowner resistance.

Accelerated erosion can cause a number of on-site and off-site impacts:

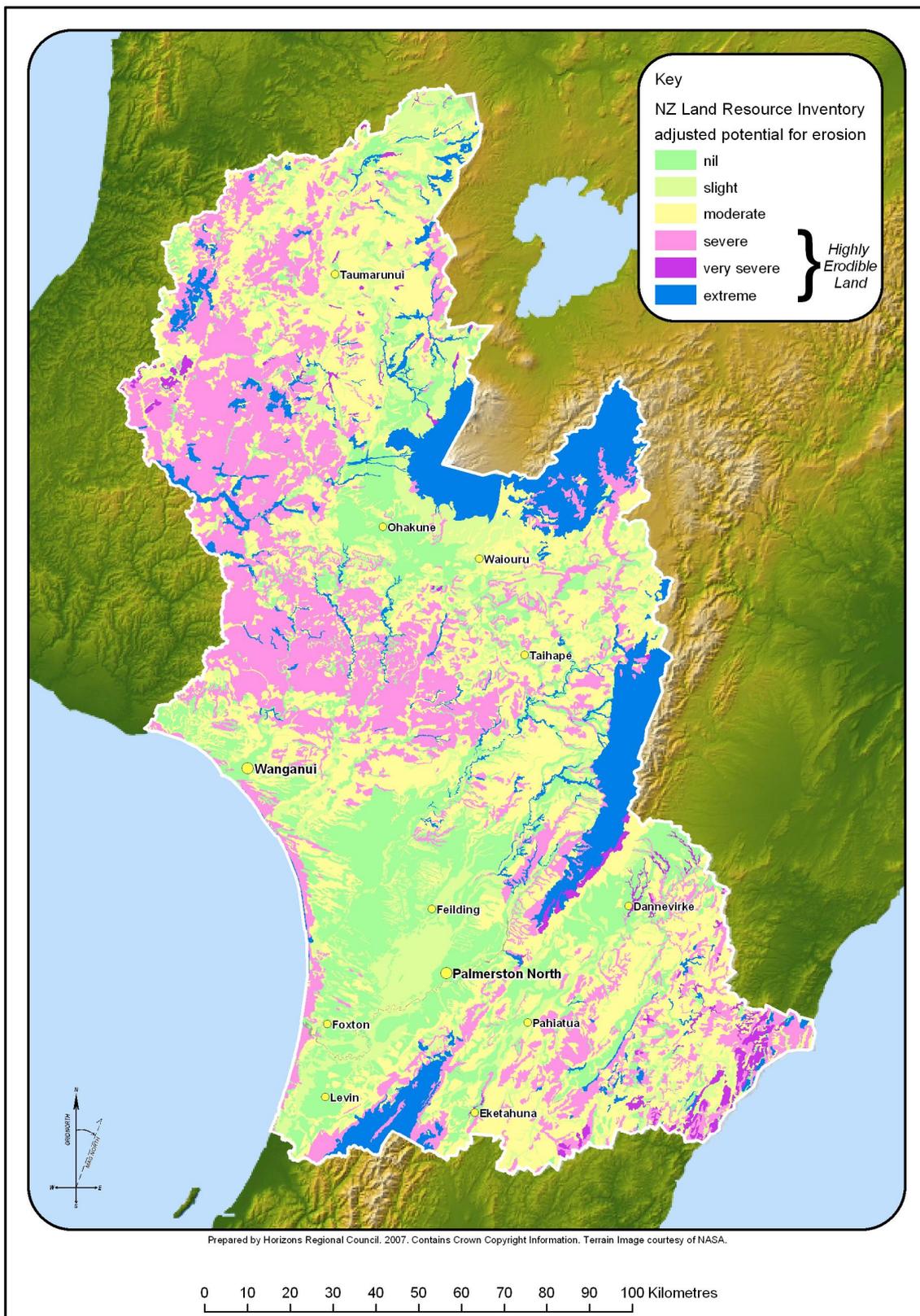
- (a) to the landowner – loss of soil and productive capability, reduced stock-carrying capacity, impacts on property and assets such as tracks and buildings, and the costs of carrying out repairs
- (b) to the environment – reduced water quality in terms of nutrient loads (much of the phosphate load in waterways is the result of sediment run-off), reduced water turbidity/clarity, and major impacts on instream life
- (c) to others in the Region – damage to infrastructure\* and loss of flood protection to lowland communities as riverbeds within river and drainage schemes fill up with silt.

Soils that are damaged by slipping take a very long time to recover. Studies have shown it can take in the order of 20 years to regain 80% of pre-erosion productivity levels, and more than 100 years to achieve near-full recovery (Blaschke *et al.*, 1992)\*. Some soil types may never fully recover. Efforts to maintain farm productivity on land that has been impacted by slipping generally increases pressure on less damaged parts of the property, thereby increasing the likelihood of further erosion and the loss of nutrients from increased fertiliser use.

Disturbed sandy soils can take many years to revegetate and stabilise naturally. In the interim, large quantities of sand can be eroded by the wind, threatening buildings and property and causing the inundation of productive land.

In addition to the damage that can be caused to the Region's fragile land types and soils discussed above, erosion rates and sediment run-off from other parts of the Region can be increased through activities that involve significant vegetation and land disturbance. Such activities are typically involved with major infrastructural development (for example, road construction and upgrades or energy projects such as windfarm development), land development (such as new residential or industrial subdivisions on the edge of urban centres or recontouring of land associated with dairy conversions or intensification), or aggregate extraction (for example, gravel pits or quarries).

Insufficient attention to batter slopes, stormwater management, fill compaction, spoil/overburden containment and site regressing/revegetation can significantly increase sediment loads in adjoining streams or sediment discharges onto neighbouring properties.



**Figure 5.1** Distribution of land with a high potential for accelerated erosion (Highly Erodible Land)



### 5.1.3 Land and Soil Management

This section focuses on the reducing accelerated erosion.

The Regional Council's focus continues to be largely non-regulatory, with whole farm business plans\* being critical components of this approach.

The regulatory focus for land centres on protecting the stability of the Region's soil and water by controlling elements of:

- vegetation clearance located on Highly Erodible Land (HEL) in both coastal and hillcountry areas
- forestry production
- large-scale land disturbance
- land or vegetation disturbance near water bodies.

However, the Regional Council has sought to permit activities that:

- have only minor environmental impacts, or
- are carried out in accordance with a recognised/Horizons'-endorsed industry-developed code of practice or similar.

## 5.2 Significant Resource Management Issues

### Issue 5-1: Accelerated erosion

#### (a) Hillcountry Farming

Some aspects of current farming practices in the Region's hillcountry and along streams are unsustainable. Where vegetation clearance\* (forestry or scrub), roading, tracking or other types of land disturbance\* (including filling) are carried out in hillcountry or adjacent to waterways, there is potential to destabilise slopes, causing accelerated erosion. Accelerated erosion is causing:

- (i) a significant reduction in the productive capability of land
- (ii) high sediment loads in waterways which are reducing water quality, smothering aquatic ecosystems, infilling rivers, lakes and estuaries, and increasing flood risk to lowland communities
- (iii) land stability hazards, particularly in steep hillcountry, which threaten people, property and infrastructure\*.

#### (b) Coastal activities

Vegetation and soil disturbance associated with vehicle movement, tracking, coastal protection works and land recontouring as part of agricultural development have great potential to destabilise fragile sand soils if not well managed.

#### (c) Land disturbance from urban development

Most other land-use activities are not of a sufficient scale to have significant regional adverse effects. However, earthworks related to urban expansion and development can have significant local adverse effects on waterways if sediment from these earthworks is poorly managed.



## 5.3 Objectives

### Objective 5-1: Accelerated erosion

Land is used in a manner that ensures:

- (a) 50% of farms with Highly Erodible Land\* (see Schedule A) are either being sustainably managed, or have a whole farm business plan\* in place by 2017
- (b) sediment loads entering waterways as a result of accelerated erosion are reduced to the extent required to be consistent with the water management objectives and policies set out in Chapter 6 of this Plan and the targets established in Schedule D for those water management zones with elevated sediment levels
- (c) accelerated erosion caused by vegetation clearance\* and land disturbance\* is minimised
- (d) the damage to roads and other infrastructure\* caused by landslides and sediment run-off from hill country is minimised
- (e) the damage to property, infrastructure\* and significant habitat areas caused by accelerated wind erosion of coastal sand is minimised.

### Whāinga 5-1: Te tere whakahoro whenua

*Ka whakamahia te whenua kia hua ai:*

- (a) *hei mua mai i te tau 2017 e 50% o ngā pāmu whenua horo nui (tirohia Schedule A) ka āta whakahaeretia i runga i te tikanga tauwhiro rānei, e whai ana rānei i tētahi mahere pāmu katoa*
- (b) *ka whakaitingia ngā kuhunga paru, nā te tere whakahoro whenua, ki roto i ngā rerenga wai kia hāngai tonu ki ngā whāinga whakahaere wai, pūrongo hoki kei roto i Chapter 6 – Water o tēnei mahere me ngā keonga i whakatauria i roto o Schedule D e pā ana ki aua rohe whakahaere wai nui kē ngā taunga paru*
- (c) *ka whakaitingia te tere whakahoro whenua nā te whakapara tipu me te rāweke whenua*
- (d) *ka whakaitingia te pakaru o ngā huarahi me kaupapa o raro kē nā te horowhenua me te rerenga parataiao i ngā puke, ā*
- (e) *ka whakaitingia te pakaru o ngā rawa, ngā kaupapa o raro, me ngā wāhi noho whakahirahira nā te tere whakahoro ā-hau o ngā oneone takutai moana.*

## 5.4 Policies

### 5.4.1 Accelerated Erosion

#### Policy 5-1: Sustainable management of Highly Erodible Land – whole farm business plans

The Regional Council will encourage the adoption of sustainable land management practices on all farms identified as Highly Erodible Land\* (as shown in Schedule A) by working with relevant landowners/occupiers to prepare a whole



farm business plan\* identifying sustainable land management practices for each farm and programmes for implementing any required changes.

- (a) The Regional Council aims to have 50% of farms with Highly Erodible Land\* covered by a whole farm business plan\* by 2017.
- (b) The Regional Council will monitor the implementation of sustainable land management practices on Highly Erodible Land\* and report this information on a two-yearly basis.
- (c) A non-regulatory approach has been adopted to encourage the use and uptake of whole farm business plans\* to achieve sustainable land use on Highly Erodible Land\*. If, however, monitoring indicates that this approach is not achieving sustainable land use, other methods to achieve the outcome will need to be considered.

#### **Policy 5-2: Sustainable management of other land – whole farm business plans**

The Regional Council will respond to requests from owners/occupiers of land that is not Highly Erodible Land\* to prepare a whole farm business plan\*, provided this does not impede the achievement of Policy 5-1.

#### **Policy 5-3: Regulation of vegetation clearance and land disturbance on Highly Erodible Land**

- (a) Vegetation clearance\* and land disturbance\*, including excavation, filling, tracking and soil cultivation, shall generally not be allowed on Highly Erodible Land\* unless:
  - (i) the activity will result in an environmental benefit, including improved land stability, enhanced water quality, or the establishment of indigenous plant species, or
  - (ii) the activity is undertaken in accordance with a whole farm business plan\*, or
  - (iii) the activity is for the purpose of establishing or maintaining a fenceline or other infrastructure\* and there is no reasonable alternative location, or
  - (iv) the activity is for the purpose of harvesting trees that were planted for commercial purposes prior to this plan becoming operative and the area will be replanted in production forestry species, or left to revert to indigenous vegetation cover, or
  - (v) the activity is for the purpose of establishing a commercial forestry operation that will operate in accordance with accepted industry standards, or
  - (vi) other exceptional circumstances apply.
- (b) Any vegetation clearance\* or land disturbance\* that is allowed on Highly Erodible Land\* shall not significantly increase the risk of erosion or land instability.

#### **Policy 5-4: Regulation of significant land disturbance on land that is not Highly Erodible Land**

Land disturbance\* on land that is not Highly Erodible Land\* shall be regulated in order to avoid any significant increases in the risk of erosion, land instability, or sediment discharges to waterways.



## 5.4.2

### Codes of Practice and Best Management Practices

#### Policy 5-5: Codes of practice and best management practices

- (a) The development of codes of practice and other sector-based initiatives targeted at achieving sustainable land use will be supported.
- (b) Where possible, appropriately developed and administered codes of practice targeted at achieving sustainable land use will be recognised and incorporated within the regulatory framework.
- (c) Information describing best management practices for reducing erosion and maintaining water quality and soil health will be made available to all relevant landowners, occupiers, asset owners, consultants, developers and contractors.

## 5.5

### Methods

Managing activities on land is a mix of regulatory and non-regulatory approaches. Part II of this Plan contains regional rules relating to the activities described in this chapter.

Project Name	Sustainable Land Use Initiative – Hill Country Erosion
<b>Project Description</b>	The aim of this project is to reduce accelerated hill country erosion. While the emphasis will be on Highly Erodible Land*, all land at risk of erosion will be eligible for assistance under this programme. Staff from Horizons Regional Council and other agencies will work with landowners to develop whole farm business plans*. These plans will provide the blueprint for long-term environmental, economic, and social sustainability. Research, publicity, education, information, incentives, joint ventures and land purchase will be used to encourage the landowner/occupier to change to more sustainable farming practices.
<b>Who</b>	Government departments and ministries, Horizons Regional Council and District Councils, Federated Farmers, Crown Research Institutes, Farm Forestry Association, and farm consultants will work together to develop, manage, fund and implement this programme.
<b>Links to Policy</b>	This project links to Policy 5-1.
<b>Targets</b>	50% of properties with Highly Erodible Land* will have an operative whole farm business plan* in place by 2017.

Project Name	Whanganui Catchment Strategy
<b>Project Description</b>	The aim of this project is to reduce accelerated hill country erosion within the Whanganui catchment. Whilst the emphasis will be on Highly Erodible Land*, all land at risk of erosion within the catchment will be eligible for assistance under this programme. Staff from Horizons Regional Council and consultants will work with landowners to develop whole farm business plans*. These plans will provide the blueprint for long-term environmental, economic, and social sustainability. Research, publicity, education, information, and incentives will be used to encourage the landowner/occupier to change to more sustainable farming practices.  The Whanganui Catchment project is a pilot for the much larger



	Sustainable Land Use Initiative – Hill Country Erosion project. Eventually, the Whanganui Catchment Strategy project will be integrated with this project.
<b>Who</b>	Horizons Regional Council, Ruapehu and Wanganui District Councils, Whanganui iwi, and Whanganui River Enhancement Trust will work with landowners to fund and implement this programme.
<b>Links to Policy</b>	This project links to Policies 5-1 and 5-2.
<b>Targets</b>	50% of properties within the Whanganui catchment with Highly Erodible Land* will have operative whole farm business plans* in place by 2015.

<b>Project Name</b>	<b>Sustainable Land Use Initiative – Soil Health</b>
<b>Project description</b>	The aim of this project is to reduce the impact of horticulture, cropping and intensive farming activities on soil health, and the consequent off-site environmental impacts. Education on best management practices will be made available to landowners through a variety of means to encourage the adoption of sustainable land use practices. Research and monitoring will be used to identify and fine-tune best practice. This project includes the provision of advice and information to owners of land in the fragile sand country along the Region's west coast.
<b>Who</b>	The Regional Council wishes to work with Landwise, VegFed, Dexcel, Federated Farmers, agricultural contractors, fertiliser companies and research institutes to develop a programme of action.
<b>Links to Policy</b>	This project links to Policy 5-5.
<b>Targets</b>	<ul style="list-style-type: none"> <li>• All major croppers/horticulturists in the Region are operating under best management practice regimes by 2017.</li> <li>• All major agricultural contractors are operating under industry standards regimes by 2010.</li> <li>• All pasture-based farms are being managed in accordance with the relevant sector-based best management practice, by the agreed target dates.</li> </ul>

<b>Project Name</b>	<b>Sustainable Land Use Codes of Practice and Best Management Practices</b>
<b>Project Description</b>	<p>This project will provide support for the development of Codes of Practice, best management practices and other sector-based initiatives for sustainable land use, construction, production and operating methods on all types of land within the Region – hill country, plains, sand country and along the coast.</p> <p>This project will also recognise, and where appropriate support, initiatives that raise awareness of sustainable land use. Examples include the monitor farm programme, sustainable farming and management funds, and Ballance Farm Environment Awards.</p>
<b>Who</b>	Participation in this project is very much dependent upon approaches from industry and sector groups.
<b>Links to Policy</b>	This project links to Policy 5-5.
<b>Targets</b>	<ul style="list-style-type: none"> <li>• All approaches for Regional Council assistance are seriously considered.</li> <li>• Where proposals are aligned with Council objectives, assistance will be provided where possible.</li> <li>• Codes of practice are integrated into the regulatory framework, where appropriate.</li> </ul>



<b>Project Name</b>	<b>Land Research, Monitoring and Reporting Programme</b>
<b>Project Description</b>	The aim of this project is to develop an integrated research, monitoring and reporting programme that supports delivery and refinement of existing policies and methods, guides implementation planning, and allows implementation effectiveness to be assessed. A key area includes: <ul style="list-style-type: none"> <li>• A five-yearly assessment of the effectiveness of the above projects, particularly the Sustainable Land Use – Hill Country Erosion project.</li> </ul>
<b>Who</b>	Predominantly Horizons Regional Council, with assistance from research institutes, universities and non-government agencies and community groups as required.
<b>Links to Policy</b>	This project links to Policies 5-1 to 5-5.
<b>Target</b>	A research, monitoring and reporting programme that supports delivery and refinement of existing policies and methods, and guides and assesses implementation.

<b>Project Name</b>	<b>Infrastructure* Protection</b>
<b>Project Description</b>	The aim of this project is to reduce the erosion risk to, and caused by, infrastructure* construction and maintenance. Infrastructure*, such as roading, is a contributor to erosion, particularly through poor stormwater management, and is put at risk from erosion.  Advice and information will be provided to infrastructure* owners in the planning stages of new works, the carrying out of maintenance, and protection of existing networks from erosion risks. This project applies to all land types – hill country, plains, sand country and the coast.
<b>Who</b>	Horizons Regional Council, network owners (eg., Transit), District Councils, forestry owners, landowners, power generators, and developers.
<b>Links to Policy</b>	This project links to Policies 5-4 and 5-5.
<b>Target</b>	The Regional Council will have formed working partnerships with all major infrastructure* owners for the purposes of assessing and identifying options to avoid, reduce or mitigate erosion risks.

<b>Project Name</b>	<b>Education in Schools – Land</b>
<b>Project Description</b>	The aim of this project is to raise awareness amongst the youth of the Region of the significance of our land and soil resource, the threats to it, and what they can do to protect/restore it. This will be achieved through various environmental education programmes/initiatives eg., Green RIG, Trees for Survival etc.
<b>Who</b>	Horizons Regional Council, and various national and local environmental education providers
<b>Links to Policy</b>	This project links to Objective 5-1 and Policy 7-5.
<b>Targets</b>	The Regional Council develops and delivers a land and soil related environmental education programme



## 5.6 Anticipated Environmental Results

Anticipated Environmental Result	Link to Policy	Indicator	Data Source
By 2017, there will be a net reduction in the damage to water quality, property and critical infrastructure caused by hillcountry and coastal wind erosion in the Region.	Land Policies: 5-1, 5-2, 5-3, 5-4 and 5-5	<ul style="list-style-type: none"> <li>Water management zone standards, especially indicators for “muddy waterways” in the Whanganui and Rangitikei Rivers</li> <li>Rate of deposition of sediment in coastal river reaches, focusing on the Whanganui, Rangitikei and Manawatu Rivers</li> <li>Costs of storm damage</li> <li>Costs of wind erosion in coastal environment</li> <li>% of Region’s land being used in accordance with sustainable use guidelines</li> <li>% of Highly Erodible Land identified in Schedule A being used in accordance with sustainable use guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Horizons’ state of environment water quality monitoring programme</li> <li>Horizons’ and Territorial Authority incidents databases</li> <li>Horizons’ riverbed level survey results</li> <li>Horizons’ and Territorial Authority storm damage reports</li> <li>Land use mapping</li> <li>Horizons’ Sustainable Land Use Initiative implementation reports</li> </ul>

## 5.7 Explanations and Principal Reasons

A single objective for land management is presented in this Plan to encourage sustainable land use and minimise erosion. This focuses on responding to the fact that 65% of the Manawatu-Wanganui Region consists of highly erodible hillsides and gullies (HRC 2004b). A target has been introduced into the objective to ensure that the progress toward sustainable hillcountry land use can be measured. This is particularly important because the policy platform that underpins this objective is largely non-regulatory.

Policy 5-1 recognises that regulation is not the appropriate tool to encourage change toward sustainable land management practices. Instead it uses non-regulatory farm plans that contain a programme of works requiring the landowner’s active participation. Policy 5-1 and associated methods acknowledge that the achievement of sustainable farming practices on highly erodible hillcountry is a complex task. There are three reasons for this.

1. Recognition that sustainable land use means changing from unsustainable farming practices. This may mean the introduction of new practices such as employing different stocking rates, introducing forestry or retirement of land and fencing waterways.
2. Commitment to implementing new land management practices will require capital outlay and most importantly require a willingness from the landowner to introduce change.



3. Sustainable land management practices need to be tailored to the specific land capability of an individual holding, which means a blanket approach introducing one solution for all hillcountry farming will probably fail.

Policy 5-3 recognises that vegetation clearance and soil disturbance are two of the main contributors to accelerating erosion. Accordingly, this policy seeks to address these matters for land holdings on highly erodible land without farm plans.

Policy 5-4 ensures that the effects of major earthworks on land outside of the highly erodible land area are managed through regulation.

