

4 Land

4.1 Scope and Background

Land management issues stem mainly from the effects of human activities on land. Erosion is a naturally occurring process which can contribute sediment to *water bodies*[^], but can also be exacerbated by human activities. This chapter focuses on the impacts of human activity and accelerated erosion. 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 biological diversity 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 has defined the Region's 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 land management practices have the potential to increase the rate of damage if they do not take the natural limitations of the land into account.

4.1.1 Chapter Content

This chapter covers *accelerated erosion*^{*}, including the management of *vegetation clearance*^{*}, *land disturbance*^{*}, *forestry*^{*} and *cultivation*^{*}.

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 5
- (b) activities involving the beds of rivers and lakes, addressed in Chapter 5
- (c) clearance of indigenous vegetation and drainage of significant wetlands, addressed in Chapter 6.

4.1.2 Accelerated Erosion^{*}

Accelerated erosion^{*} is often 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 274,000 ha of hill country land at risk of moderate-severe erosion (Figure 4.1), 116,000 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. 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**, fences 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 water is the result of sediment run-off), reduced water 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 river beds 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. Some soil types may never fully recover. Efforts to maintain farm productivity on land that has been affected by slipping generally increase 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.

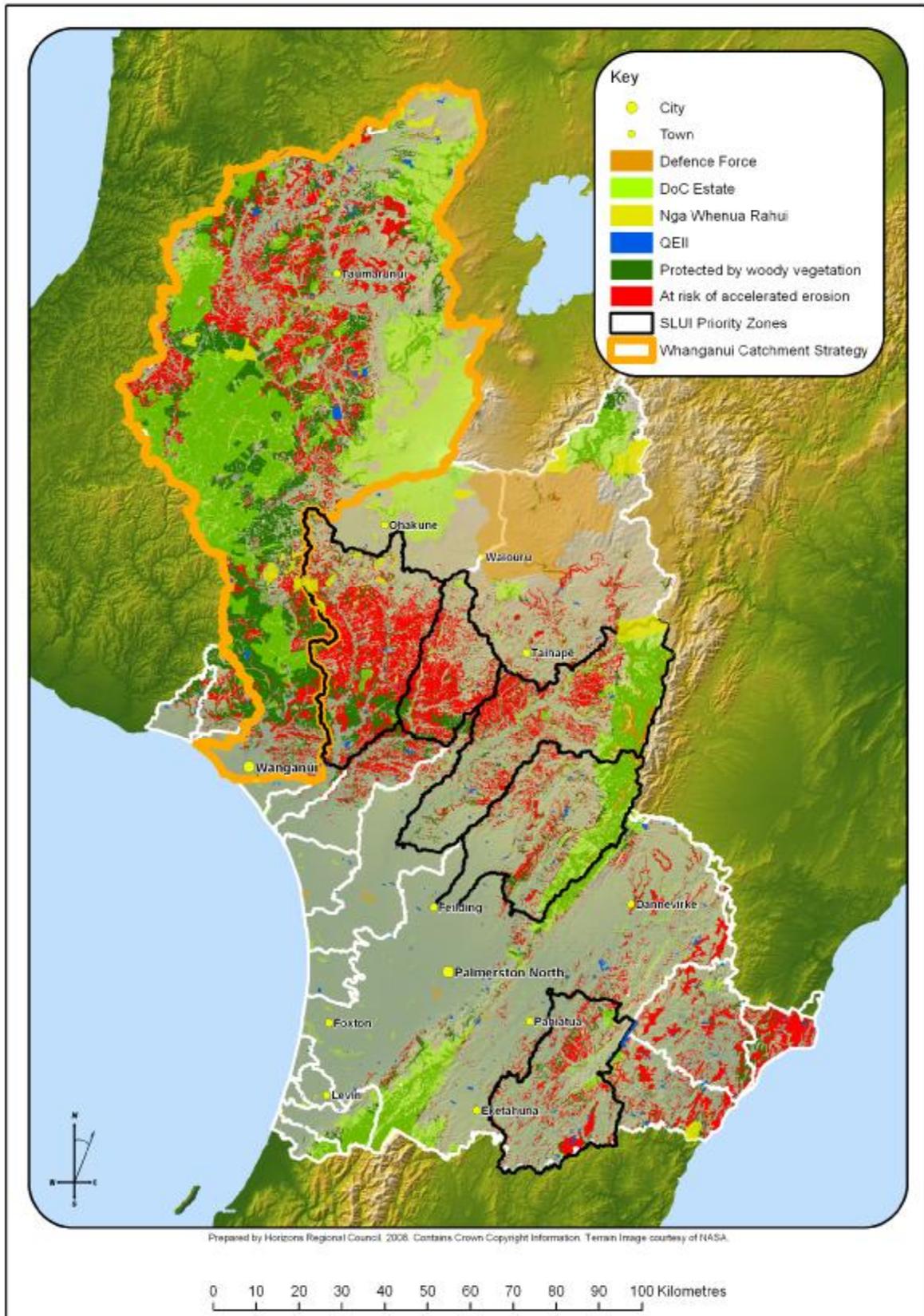


Figure 4.1 Distribution of hill country land subject to an elevated risk of *accelerated erosion**



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 clearance** and *land disturbance**. Such activities are typically involved with major infrastructure 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, overburden containment, debris clearance and revegetation can significantly increase sediment loads in adjoining streams or sediment discharges onto neighbouring properties.

4.1.3 Land and Soil Management

This section focuses on reducing *accelerated erosion**.

The Regional Council's focus continues to be largely non-regulatory, with the Council's Sustainable Land Use Initiative and Whanganui Catchment Strategy programmes being critical components of this approach.

The Regional Council's regulatory focus for land centres on protecting the stability of the Region's soil and maintaining or enhancing water quality.

This regulatory focus recognises that under s9(2) of the RMA, the use of land can occur as of right unless a rule in a plan states otherwise. Therefore, the Regional Council does not require rules allowing the use of land unless it wishes to control the way in which that use of land occurs.

Under this Plan, the majority of activities involving the use of land can continue to occur as of right provided they are not within a *rare habitat**, *threatened habitat** or *at-risk habitat**. However, four specific activities can only continue to be undertaken without the need for a resource consent if conditions are met. These activities are:

- (a) Small-scale *land disturbance**, including earthworks,
- (b) *forestry**
- (c) *cultivation**, and
- (d) *vegetation clearance**.

These activities are permitted by Rules 13-1, 13-3, 13-4 and 13-5 respectively.

*Vegetation clearance**, *land disturbance** and *cultivation** require a resource consent if they are undertaken adjacent to water bodies, in *Hill Country Erosion Management Areas** or *coastal foredune** areas subject to an elevated risk of *accelerated erosion*. These specific activities are the subject of Rule 13-6 and 13-7.



4.2

Significant Resource Management Issues

Issue 4-1: *Accelerated erosion**

- (a) **Farming and other land uses in hill country**
Some aspects of current farming and other land use practices in the Region's hill country and adjacent to water bodies are unsustainable. Where *vegetation clearance**, roading, tracking or other types of *land disturbance** (including filling) are carried out in hill country or adjacent to water bodies, there is potential to destabilise slopes, causing *accelerated erosion**. *Accelerated erosion** is often causing:
- (i) a significant reduction in the productive capability of land
 - (ii) increased sediment loads in water bodies 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 hill country, which threaten people, buildings and infrastructure.
- (b) **Coastal foredune***
Vegetation and soil disturbance associated with vehicle movement, tracking, coastal protection works and land recontouring have the potential to destabilise fragile *coastal foredunes** if not well managed.
- (c) **Large-scale land disturbance* including earthworks**
Most other land use activities are not of a sufficient scale to have significant regional adverse effects. However, large-scale earthworks related to urban expansion and other development can have significant adverse effects on water bodies if sediment from these earthworks is poorly managed. Large-scale land disturbance activities can also destabilise sandy soils in coastal areas which can cause significant adverse effects associated with wind-blown sand.
- (d) **Forestry***
*Forestry** is considered to be a generally beneficial land use in the Region's hill country due to its ability to facilitate the long-term stabilisation of land subject to an elevated risk of *accelerated erosion**. However, *forestry** needs to be prudently managed, in a manner consistent with industry best practice, to ensure that sustainable land use is realised and off-site adverse effects are minimised.
- (e) **Cultivation***
*Cultivation** does not generally cause soil erosion problems within the Region. However, the potential for increased sediment loads to water bodies can increase as the slope of the land being cultivated increases and when undertaken adjacent to water bodies. Therefore *cultivation** should be appropriately managed, including by the use of appropriate industry best practice sediment run-off control measures.

4.3

Objectives

Objective 4-1: *Managing accelerated erosion**

By the year 2017, 50% of farms within hill country *land*[^] subject to an elevated risk of *accelerated erosion** will have in place, or be in the process of putting in place, farm-wide sustainable *land*[^] management practices to minimise *accelerated erosion** and to provide for the Surface *Water*[^] Management Values set out in Schedule B by reducing sediment loads entering *water bodies*[^] as a result of *accelerated erosion**.



Whāinga 4-1: Te whakahaere horo whenua tere

Ā te tau 2017 kia 50% o ngā pāmu kei ngā puke teitei ka whai tūponotanga nui ka pāngia pea e te horo whenua tere kua whakarite kē – kei te whakarite rānei – i ētahi tikanga whakauka mō te whakahaere whenua kei te pāmu katoa hei whakaiti i te horo whenua tere, ā, hei taunaki hoki i ngā Uara Whakahaere Wai Mata kua whakatakotoria i roto i te Pukapuka Āpiti B mā te whakaiti i te nui o te parakiwai e uru ana ki ngā wai e hua mai ai i te horo whenua tere.

Objective 4-2: Regulating potential causes of *accelerated erosion**

Land[^] is used in a manner that ensures:

- (a) *accelerated erosion*^{*} and increased sedimentation in *water bodies*[^] (with resultant adverse *effects*[^] on people, buildings and *infrastructure*[^]) caused by *vegetation clearance*^{*}, *land disturbance*^{*}, *forestry*^{*}, or *cultivation*^{*} are avoided as far as reasonably practicable, or otherwise remedied or mitigated, and
- (b) sediment loads entering *water bodies*[^] as a result of accelerated erosion are reduced to the extent required to be consistent with the *water*[^] management objectives and policies for *water*[^] quality set out in Chapter 5 of this Plan.

Whāinga 4-2: Te whakahaere pitomata e takea mai ai horo whenua tere

Ka whakamahia te whenua kia hua ai:

- (a) *te horo whenua tere, ā, ka piki haere te parahanga ā-matū i roto i ngā wai (me te hua ko ngā pānga kino ki te tangata, ngā whare, me ngā kaupapa o raro) nā te whakapara tupu, te raweke whenua, te mahi rākau, te mahi māra – i ngā wā e tika ana ka pareā, ka whakapaingia rānei, ka whakamemehatia rānei ēnei, ā,*
- (b) *ka whakaitingia te nui o te parakiwai e uru ana ki roto i ngā wai e takea mai ana i te tere horo o te whenua kia taea ai te hāngai ki ngā whāinga, ki ngā kaupapa here mō te kounga o te wai kua whakatakotoria ki Wāhanga 5 o tēnei Mahere.*

4.4

Policies

Policy 4-1: Encouraging and supporting sustainable *land*[^] management

The Regional Council will encourage and support the adoption of sustainable *land*[^] management practices by:

- (a) working with relevant owners and occupiers of farms within hill country *land*[^] subject to an elevated risk of *accelerated erosion*^{*} to prepare voluntary management plans under the Council's Sustainable Land Use Initiative or Whanganui Catchment Strategy, which identify sustainable *land*[^] management practices for each farm and work programmes for implementing any agreed changes,
- (b) monitoring the implementation of voluntary management plans and sustainable *land*[^] management practices within hill country *land*[^] subject to an elevated risk of *accelerated erosion*^{*} and reporting this information on a two-yearly basis, and reviewing the effectiveness of the sustainable land management practices, and



- (c) responding to requests from owners or occupiers of *land*[^] that is not within hill country *land*[^] subject to an elevated risk of *accelerated erosion*^{*} to prepare a management plan, provided this does not impede the achievement of (a).

Policy 4-2: Regulation of *land*[^] use activities

- (a) In order to achieve Objective 4-2 the Regional Council must regulate *vegetation clearance*^{*}, *land disturbance*^{*}, *forestry*^{*} and *cultivation*^{*} through *rules*[^] in this Plan and decisions on *resource consents*[^], so as to minimise the risk of accelerated erosion, minimise discharges of sediment to water, and maintain the benefits of riparian vegetation for *water bodies*[^].
- (b) *Territorial Authorities*[^] may regulate, through *rules*[^] in *district plans*[^] and decisions on *resource consents*[^], the actual or potential *effects*[^] of the use, development, or protection of *land*[^], in order to achieve Objective 4-2. However, *Territorial Authorities*[^] must not have *rules*[^] that are contradictory to the *rules*[^] in this Plan that control the use of *land*[^].
- (c) The Regional Council will generally allow small scale *vegetation clearance*^{*}, *land disturbance*^{*}, *forestry*^{*} and *cultivation*^{*} to be undertaken without the need for a *resource consent*[^] if *conditions*[^] are met. *Vegetation clearance*^{*} and *land disturbance*^{*} require a *resource consent*[^] if they are undertaken adjacent to some *water bodies*[^] (including certain *wetlands*[^]) in *Hill Country Erosion Management Areas*^{*} or in *coastal foredune*^{*} areas. Any other large scale *land disturbance*^{*} will also require a *resource consent*[^].

Policy 4-3 Supporting codes of practice, standards, guidelines, environmental management plans and providing information on best management practices

The Regional Council must, and *Territorial Authorities*[^] may:

- (a) support the development of codes of practice, standards, guidelines and other sector-based initiatives targeted at achieving sustainable *land*[^] use,
- (b) recognise appropriately developed and administered codes of practice, standards, guidelines or environmental management plans targeted at achieving sustainable *land*[^] use, and incorporate them within the regulatory framework where applicable, and
- (c) make information describing best management practices for reducing erosion and maintaining *water*[^] quality and soil health available to all relevant landowners, occupiers, asset owners, consultants, developers and contractors.



4.5

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.

Method 4-1	Sustainable Land Use Initiative – Hill Country Erosion
Description	The aim of this method is to reduce hill country <i>accelerated erosion</i> *. While the emphasis will be on hill country, all land at risk of erosion will be eligible for assistance under this programme. Staff from the Regional Council and other agencies will work with landowners and occupiers to develop voluntary management 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 or occupier to manage their land in a sustainable manner.
Who	Regional Council, central government, Territorial Authorities, Crown Research Institutes, landowners or occupiers, recognised organisations representing farmers, and farm consultants.
Links to Policy	This method implements Policy 4-1.
Targets	50% of properties within hill country land subject to an elevated risk of <i>accelerated erosion</i> * will have a voluntary management plan in place by 2017.

Method 4-2	Whanganui Catchment Strategy
Description	The aim of this method is to reduce hill country <i>accelerated erosion</i> * within the Whanganui catchment. Whilst the emphasis will be on hill country land subject to an elevated risk of <i>accelerated erosion</i> *, all land at risk of erosion within the catchment will be eligible for assistance under this programme. Staff from the Regional Council and consultants will work with landowners and occupiers to develop management 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 or occupier to manage their land in a sustainable manner. The Whanganui Catchment method is a pilot for the much larger Sustainable Land Use Initiative – Hill Country Erosion method (Method 4-1). Eventually, the Whanganui Catchment Strategy method will be integrated with this method.
Who	Regional Council, Ruapehu and Whanganui District Councils, landowners or occupiers, relevant <i>hapū</i> * and <i>iwi</i> *, the Whanganui River Enhancement Trust, Department of Conservation, recognised organisations representing farmers and farm consultants.
Links to Policy	This method implements Policy 4-1.
Targets	50% of properties within hill country land subject to an elevated risk of <i>accelerated erosion</i> * in the Whanganui Catchment will have a voluntary management plan in place by 2015.



Method 4-3	Soil Health
Description	The aim of this method 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 method includes the provision of advice and information to owners of land in the fragile sand country along the Region's west coast.
Who	Regional Council, landowners or occupiers, Landwise, Horticulture New Zealand, Federated Farmers, agricultural contractors, <i>fertiliser</i> * companies and research institutes.
Links to Policy	This method implements Policy 4-3(c).
Targets	<ul style="list-style-type: none"> • All major croppers/horticulturists in the Region are operating under best management practice regimes by 2017. • All major agricultural contractors are operating under industry standards regimes by 2010. • All pasture-based farms are being managed in accordance with the relevant sector-based best management practice by the agreed target dates.

Method 4-4	Sustainable Land Use Codes of Practice and Best Management Practices
Description	<p>This method 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 method 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>
Who	Participation in this project is very much dependent upon approaches from industry and sector groups.
Links to Policy	This method implements Policy 4-3.
Targets	<ul style="list-style-type: none"> • All approaches for Regional Council assistance will be considered. • Where proposals are aligned with Regional Council objectives, assistance will be provided where possible.



Method 4-5	Land Research, Monitoring and Reporting Programme
Description	The aim of this method 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. This will include a five-yearly assessment of the effectiveness of the above methods, particularly the Sustainable Land Use Initiative – Hill Country Erosion Method.
Who	Regional Council, landowners and occupiers, research institutes, universities, and non-government agencies and community groups.
Links to Policy	This method implements Policies 4-1, 4-2 and 4-3.
Target	A research, monitoring and reporting programme that supports delivery and refinement of existing policies and methods, and guides and assesses implementation.

Method 4-6	Infrastructure Protection
Description	The aim of this method is to reduce the erosion risk to, and caused by, the provision, <i>maintenance*</i> or <i>upgrade*</i> of infrastructure. Advice and information will be provided to infrastructure owners in the planning stages of new works, the carrying out of <i>maintenance*</i> or <i>upgrade*</i> , and protection of existing networks from erosion risks.
Who	Regional Council, Territorial Authorities and owners of major infrastructure.
Links to Policy	This method implements Policy 4-3.
Target	The Regional Council will have formed working partnerships with all major infrastructure owners for the purposes of assessing and identifying options to manage erosion risks.

Method 4-7	Education in Schools – Land
Description	The aim of this method is to implement a range of initiatives to raise awareness amongst the youth of the Region of the significance of the 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.
Who	Regional Council, national and local environmental education providers and youth organisations.
Links to Policy	This method implements Policy 4-3.
Targets	The Regional Council will develop and implement a land and soil related environmental education programme.



4.6 Anticipated Environmental Results

Anticipated Environmental Result	Link to Policy	Indicator	Data Source
<p>By 2017, there will be a net reduction in the adverse effects on water quality, people, buildings and infrastructure caused by <i>accelerated erosion*</i>, and hill country and <i>coastal foredune*</i> wind erosion in the Region.</p> <p>Advice Note: There are linkages from this AER to the AERs within s5.6</p>	Policies 4-1, 4-2, 4-3, 5-1, 5-2, 5-3, 5-4 and 5-8	<ul style="list-style-type: none"> • Water quality monitoring results, especially for "muddy waterways" in the Whanganui and Rangitikei Rivers • Rate of deposition of sediment in coastal river reaches, focusing on the Whanganui, Rangitikei and Manawatu Rivers • Costs of storm damage • % of Region's land being used in accordance with sustainable use guidelines • Level of achievement of deposited sediment, visual clarity and phosphorus <i>water quality targets*</i> specified in Schedule E. • Changes to long-term mean sediment discharges of rivers to sea. • % of farms within the SLUI priority catchments that have voluntary management plans in place and are being implemented. 	<ul style="list-style-type: none"> • Regional Council's state of environment water quality monitoring programme • Regional Council's and Territorial Authorities' incidents databases • Regional Council's river bed level survey results • Regional Council's and Territorial Authorities' storm damage reports • Land use mapping • Regional Council's Sustainable Land Use Initiative monitoring and implementation reports

4.7 Explanations and Principal Reasons

Objectives for land management are presented in this Plan to encourage sustainable land use and minimise erosion. These focus on responding to the fact that 65% of the Region consists of gullies and hillsides subject to *accelerated erosion**. A target has been introduced into Objective 4-1 to ensure that the progress toward sustainable hill country land use can be measured. This is particularly important because the policy platform that underpins this objective is largely non-regulatory.

Policy 4-1 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 involving the landowner's active participation. Policy 4-1 and associated methods acknowledge that the achievement of sustainable farming practices on hill country land subject to an elevated risk of *accelerated erosion** 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 water bodies.



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 hill country farming will probably fail.

Policy 4-2 recognises that *vegetation clearance** and *land disturbance** are two of the main contributors to *accelerated erosion**. It also recognises that *vegetation clearance**, *land disturbance** and *cultivation** within or close to water bodies have a high risk of causing discharges of sediment to water. The policy describes the regulation of land use activities to provide guidance to regional and district plan preparation.

Policy 4-3 states the Regional Council's support for codes of practice, standards, guidelines and environmental management plans as these can assist with reducing *accelerated erosion**.