

12.1 Introduction

Soil resources have made an important contribution to the growth, prosperity and diversity of the Auckland Region. The Region's variety of agricultural and horticultural uses and its rich natural heritage are based on the continued availability of these resources. In the Auckland Region, moderate to high value soils form a higher proportion of the Region's area than is the case for New Zealand as a whole. The New Zealand Land Resource Inventory (NZLRI) includes 25% of the area of the Auckland Region in Land Use Capability (LUC) Classes 1, 2 and 3,¹ compared with 15% for New Zealand as a whole. When Class 4 (moderate value) land is included, the Auckland Region's proportion rises to 40%, compared with 25% for New Zealand.

In the Auckland Region, the presence of New Zealand's largest metropolitan area has led to a significant loss of prime agricultural land. The total area of prime agricultural land was 115,000 ha of which 27,000 ha or 24% has been urbanised. A significant portion of the rest has been lost under roads and structures or compromised by an intense subdivision or development pattern.

For all practical purposes soils are a non-renewable resource. Soil forming processes occur over thousands of years to produce a suitable medium for plant growth. Soil resources are very difficult to replace. Once soils are lost they may be gone forever. It is therefore of key importance to prevent soil loss; that is, to conserve it in the first place.

For these reasons it is essential to protect soils from both natural and induced forms of degradation, and ensure that they are managed in a sustainable way so that their productivity and versatility can be preserved for future generations. Sustainable management of soil implies the utilisation of that resource for a variety of purposes, while maintaining its inherent physical, chemical and biological properties. This includes the pattern of subdivision and development imposed on the land.

Soil conservation may be defined as "the management of land to maintain New Zealand's soil and water resources to provide the widest range of sustainable benefits for the needs and aspirations of present and future generations" (See Appendix D). It aims to maintain the versatility of the land, maximise the benefits derived from intrinsic values of the land, and maximise the sustainable present and future production from the land.

Regional councils have responsibility for establishing and implementing objectives, policies and methods for achieving the integrated management of the natural and physical resources of a region (Section 30(1)(a) of the RM Act). In addition, Section 30(1)(c) enables regional councils to control the use of land for the purpose of soil conservation, and Section 31 enables territorial authorities to establish, implement and review objectives, policies and methods to achieve the integrated management of the effects of the use, development and protection of land and associated natural and physical resources in the district.

12.2 Issues

12.2.1 The Region must manage the soil resource to ensure versatility and productive potential is not further compromised by inappropriate land use and development

It is essential for the future wealth and wellbeing of the Region that this trend does not continue to diminish this finite resource.

12.2.2 The ability of the Region's soils to sustain a variety of uses is being diminished due to soil degradation

Degradation is the loss of soil's physical, chemical or biological properties by one or more of a number of processes. The loss of any of these properties may seriously compromise a soil's productive capability. Degradation is caused by, or accelerated by, inappropriate land management practices.

Soil degradation can be very rapid, and while it can be reversed this is usually difficult and slow to achieve. Once deterioration becomes irreversible, it renders the resource unavailable, or suitable for only a smaller range of uses for current or future production.

Soil degradation processes include the following:

1. Soil erosion

Soil erosion is a natural process by which soil is gradually eroded by water or wind from the earth's surface, then replaced in the soil forming process. Accelerated soil erosion, however, is due to inappropriate land management activities and will result in a rapid loss of soil, far in excess of the slow soil forming process. The net result is depletion of the soil resource. While the soils

¹ For a description of the Land Use Capability Classes, see Appendix D – Definitions.

of the Auckland Region are less erodible overall than most regions of New Zealand, half of the Region's agricultural land is erosion prone.

2. Loss of soil structure

Soil structure, or the way soil particles are held together, is critical to soil properties such as drainage and fertility. Soil structural degradation is the breakdown of the soil's physical structure by frequent saturation, surface crusting, sub-surface pan formation or structural disintegration. These processes are accelerated by inappropriate land management practices such as excessive cultivation, vehicle compaction or stock trampling (pugging).

3. Loss of soil fertility

Soil nutrient decline occurs through physical removal of nutrients by soil erosion or runoff, leaching of nutrients from the profile, chemical bonding such as phosphate fixation, immobilisation of nitrogen and phosphate within soil's organic matter, harvesting of plant or animal products, and the transfer to other sites, e.g., via dung or urine and volatilisation to the atmosphere of, e.g., nitrogen.

4. Chemical contamination

Chemical contamination of soil resources can occur as a result of the manufacture, storage, use and disposal of chemicals and hazardous substances, particularly cumulative and non-biodegradable substances, including pesticides, heavy metals and hydrocarbons. Where contaminant levels are excessive, the ability of soils to support healthy ecosystems may be compromised and off-site effects, including the contamination of receiving environments, may occur.

Policies and methods relating to the location, investigation and remediation of contaminated land are stated in Chapter 17 – Contaminated Sites.

5. Topsoil removal

This includes the removal of topsoil from areas where the soil was formed and its relocation to other areas. This is normally done in order to sell high quality topsoil for urban uses.

6. Off-site effects

Three forms of soil degradation; namely soil erosion, chemical contamination and nutrient loss, have significant off-site effects in the Auckland Region. These

processes result in the discharge of sediment, chemical contaminants and excess nutrients to receiving water.

Sediment is the single largest pollutant of Auckland's waterways. It is eroded from the earth's surface then discharged into streams, rivers, estuaries and harbours where it is either deposited or suspended within the water column. The effect of sediment on biota, amenity and commercial values of the water degrades the water resource.

Chapter 8 – Water Quality deals with this issue in more detail.

12.3 Objectives

1. *To protect the versatility and productive potential of the region's soil resource.*
2. *To protect the natural long-term health, stability and potential productivity of soils in the Region.*
3. *To avoid, remedy, or mitigate adverse effects of activities that result in soil degradation. To minimise the effects of soil degradation on the water quality of receiving environments.*

12.4 Policies, Methods and Reasons

12.4.1 Policies

The following Policies and Methods give effect to Objective 12.3-1. See also Chapter 2 – Regional Overview and Strategic Direction.

1. *The use and development of the soil resources of the Region shall be managed so as to protect and maintain their versatility and productivity so far as practicable.*

12.4.2 Methods

1. *Regional and district plans will give effect to the above policies.*
2. *The ARC will take a lead role in co-ordinating the development and updating of a regional database which will identify the versatility and productive potential of the Region's soil resources.*

12.4.3 Reasons

Elite and prime land (as defined in Appendix D) is an important resource in the Region due to its high versatility and productive potential. Auckland already has lost significant areas of this soil resource to inappropriate use and development.

Soils are a primary resource in the rural area. There are some activities which are appropriately located in a rural area, but which do not depend on soils. Rather they seek the other qualities of a rural area such as being free of settlement for a utility or having high amenity for a tourist activity. Activities which do not depend on soil resources should be discouraged from locating on land of high versatility or productive potential.

There are also some activities which depend on soil resources but do not require elite or prime land such as golf course greens. Such activities should also be directed away from elite or prime land, onto land of lesser versatility. This approach will ensure that the versatility and productive potential of the Region's soil resource remain.

It is recognised, however, that circumstances still arise where it is necessary, in the regional or national interest, to compromise areas of elite or prime land by activities which are not dependent on the primary production potential of the soil resource. Justification for such uses should demonstrate that a particular location is necessary to meet the requirements of the RM Act.

The above policies are also designed to quantify the soil resource, and ensure instruments are implemented in both regional and district plans to give the greatest protection to the most versatile and productive soils.

12.4.4 Policies

The following Policies and Methods give effect to Objectives 12.3-2 and 3.

1. *The clearance of protective vegetation from land identified as having a moderate to severe erosion potential shall be controlled to avoid soil erosion. See also Chapter 6 – Heritage.*
2. *The excavation and transfer of topsoil shall be controlled to minimise soil degradation.*
3. *The adverse effects of soil degradation will be avoided where practicable. Where complete avoidance of the adverse effects of activities that result in soil degradation is not practicable, those effects shall be remedied, or mitigated.*
4. *Sustainable land use practices shall be encouraged and promoted in order to avoid, remedy or mitigate soil degradation in the Region and to minimise adverse effects on the water quality of the receiving environment.*

See also Chapter 8 – Water Quality.

5. *When addressing issues of soil conservation, management of those issues shall be co-ordinated between adjoining regional councils.*

12.4.5 Methods

1. *Regional and district plans will give effect to Policies 12.4.4-1.*

Methods 12.4.5-2 through 8 give effect to Policy 12.4.4-3.

2. *The ARC will take a leading role in co-ordinating the development of a regional database to identify those areas susceptible to soil degradation using the New Zealand Land Resource Inventory as base information and other information as it becomes available.*
3. *The ARC will promote and assist land care and other self-help programmes in the Region to better achieve wise land management techniques.*
4. *The ARC will provide a soil conservation advisory service to landowners and other relevant parties to promote soil conservation and associated sustainable land use practices.*
5. *The ARC will undertake an education programme to inform relevant parties of the land use practices that cause soil degradation, the effect of that degradation on the environment, and the alternative options available to remedy, or mitigate these problems.*
6. *Incentives will be used, where appropriate, to promote and implement soil conservation remedial, or mitigation activities.*
7. *The ARC will:*
 - (i) *carry out assessments of the soil conservation issues within a catchment or subcatchment, and produce management plans as required;*
 - (ii) *develop a prioritising system, such that high risk catchments can be identified and addressed first;*
 - (iii) *promote integration of soil conservation with other resource management issues within the Region.*
8. *Where the results of the monitoring programme proposed in 12.6(i) indicate that the methods outlined above are not adequately achieving the objectives of this RPS, the ARC will incorporate*

provisions in a regional plan to ensure soil degradation and associated adverse effects on water quality are avoided, remedied, or mitigated.

12.4.6 Reasons

Soil erosion is a major source of soil degradation within the Auckland Region. The objectives, policies and methods contained in this Chapter aim to identify those areas most susceptible to soil erosion, then encourage a commitment from landowners and the community to control it.

The most effective form of control is prevention. Where vegetation such as indigenous forest already exists on identified erosion-prone areas, then it should be retained. As the primary land use planning and control documents, it is appropriate that regional and district plans invoke instruments to control the removal of protective vegetation on steeper LUC Class 6, 7, and 8 land. These instruments are also appropriate for the control of the excavation and transfer of topsoil.

Where vegetation has already been removed, appropriate land management activities, such as indigenous revegetation, or planting with exotic species, will be encouraged. These strategies particularly apply to steeper LUC Class 6 land exhibiting a moderate erosion potential, and Class 7 and 8 land, which exhibit a severe erosion potential.

On gentler land, encouragement of appropriate land management activities, such as erosion control planting of critical areas, open planting of susceptible areas, and appropriate grazing and other land management practices, will assist sustainable land management objectives.

It is envisaged that a largely educational/advisory approach will be used to address these issues.

The Regional Landcare and other self-help programmes recognise the importance of encouraging landowners to assume ownership of their own soil conservation problems. It will involve the provision of technical support, facilitation and co-ordination of services. The educational programme will complement landcare and advisory services by preparing and distributing guidelines, conducting workshops, etc. to promote soil conservation and sustainable land management.

The Soil Conservation Advisory Service will promote wise land management techniques by informing landowners about the land use practices that cause soil degradation, and alternative management programmes.

A total catchment approach is considered to be an appropriate way to achieve integrated resource management. It is considered that for most catchments the current approach of provision of education, advocacy and advisory services will be sufficient. The Landcare approach, whereby landowners take ownership of the problem and implement solutions, is considered to be more effective in the long run. Should such methods not adequately achieve the objectives of this Regional Policy Statement, a more regulatory approach is signalled, in the possible implementation of regional plans. The incentives possible include Regionally funded subsidy assistance (where a Regional benefit is demonstrated) joint ventures and cost sharing. Non-financial incentives, such as administrative support, may also be appropriate. It is recognised that whilst these tools are not appropriate in every instance, there will be circumstances where they will be very effective. Full consultation with all affected parties will be required prior to introduction of any such incentives.

Land development has been identified as a source of accelerated surface erosion, leading to the generation of sediments and their discharge to receiving waters. A Regional Plan for sediment control already exists to regulate these activities in terms of erosion and sediment control requirements, as required in Chapter 8 – Water Quality 4.8-3.

12.5 Environmental Results Anticipated

- (a) Conservation of the versatility and production potential of the Region's soils, particularly high quality soils, for sustainable productive use.
- (b) The more efficient use of the Region's soil resource to ensure sustainability.
- (c) The avoidance or mitigation of soil erosion, soil structure and fertility decline, and soil contamination processes.
- (d) A reduction in the amount of sediment being discharged to the Region's waterways.

12.6 Monitoring

- (i) The ARC will monitor changes in the use and condition of the soil in the Region, particularly the extent and severity of soil degradation. The monitoring programme will also identify any changes in the sustained productive capacity of soil resources which will result in updating of the database established in 12.4.2-2.
- (ii) Through its baseline water quality monitoring programme, the ARC will monitor impacts of off-site products of soil degradation processes in the Region's waterways.