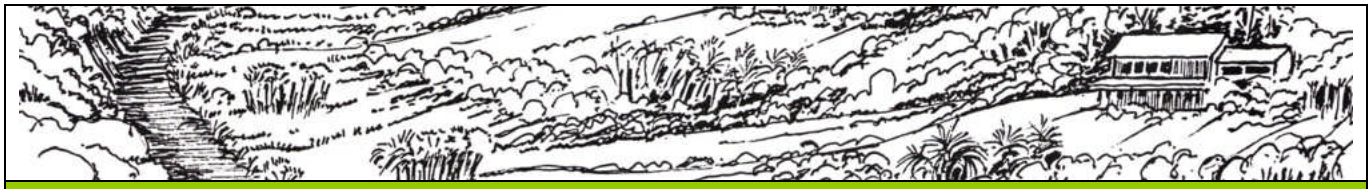

# Steepland Soil Protection

## Introduction

Steep slopes without tree cover can be vulnerable to soil losses through erosion. Vast quantities of soil can be lost through slipping and other erosion during intense rainfall events. Recent reminders of this are Cyclone Bola, the February 2004 Manawatu/Wanganui storms.

In catchments such as the Waikanae and Pauatahanui Basin, this soil loss not only results in a major loss of production on site, it discharges sediment into downstream waterways and impacts on flood channels.

Tree root systems and other impacts of woody vegetation cover can make steepland soils relatively resistant to surface erosion and slipping. This results from:

- Tree roots reinforcing the soil as the roots penetrate through the upper soil layers and bond them to more stable sub soils.
- The root mass that is created by trees covers the erodable soil and helps to hold the soil layer in place.
- Trees reduce soil moisture through interception and evaporation on vegetation surfaces and transpiration, where water is taken up and used in the plants growing process.
- Trees provide a permeable forest floor that can aid water adsorption and storage. The litter and leaf matter on and around trees helps prevent the impact from water droplets hitting open soil and limits the effect of water washing away the surface soil particles as it passes over

The impact is most significant with larger vegetation and greater vegetation cover.

## Some Key Approaches

There are different approaches to stabilising soils with vegetation – the approach you take will depend on your property and particular approach to farming. Three general approaches are identified below. Where to go for support and information about these types of works is identified in "help is available" and "extra information".

**Soil Conservation Pole Planting**

This is most commonly undertaken using spaced poplar or willow poles. It provides the opportunity to maintain ongoing grazing, while stabilising the site.

There are many benefits of planting poplar or willow poles.

- Erosion prone hillsides can be stabilised and sustained as farmland, because the extensive root systems of these trees bind and hold the soil in place.
- Poles can protect farm assets like fences and tracks prone to slip damage. They work as wind shelterbelts, reduce damage to watercourses, provide shade and shelter for stock, and can sometimes be cropped as timber.
- Poplars and willows produce useful stock feed, which can be an extra reserve during droughts. For example, about 1.4 kg of fresh poplar leaves maintains a ewe for a day.

### Afforestation for timber production

Establishment of plantation forests on steep slopes utilises the beneficial effects of trees on slope stability, while also giving the opportunity to obtain a commercial timber harvest from the land. Soil stability is reduced for a period after harvest as the second crop or "rotation" establishes, but does not drop to the original level without tree cover.

Key points such as species, area, location and access need to be carefully considered to ensure that small timber plantations or "woodlots" willl be practical to manage and provide good returns.

If you want to keep steep land in production and not lose it to possible soil loss in the future then forest plantings are a good solution.

### Reversion to native forest cover

Encouraging reversion of some areas of a property to native forest cover may be the best option where values such as wildlife and landscape are important to you. It is a good option where steep areas in need of protection don't provide significant grazing and aren't practical for afforestation.

Early stages of native regeneration may already be occurring, and it may be just a matter of fencing to exclude stock to speed up reversion to forest. Where regeneration is not occurring and seed sources are not present close to or on the site, planting will be required (see "Restoration Planting").

# Steepland Soil Protection - Help is Available

## Direct Support & Funding

| Services | Who | Contact | Criteria | Notes |
|---|---|---|---|---|
| Support for soil conservation planting | **GWRC** | David Cameron Masterton Office, phone | • Erosion prone land defined by Land Use Capability map. Various subsidy rate apply (25-45%) | • Limits on budget and staff resources |
| Support for native forest restoration & covenanting.<br>– Fencing<br>– survey | GWRC & QE2 | Tim Porteous GWRC<br>Robyn Smith QE2 | • Owner wants to covenant area<br>• Area is accepted for covenanting by QE2 | • 70k annual fund |
| Incentives for native forest restoration on steep slopes | **KCDC** | Braden Rowson | • Currently investigating incentive options | • Under consideration |

## Free advice

| Services | Who | Contact | Criteria | Notes |
|---|---|---|---|---|
| Soil Conservation Advice<br>– Planting<br>– Soil health<br>– Land management? | **GWRC** | David Cameron Masterton Office, phone | • Available to all ratepayers | • Not limited |
| Forestry advice and service delivery | **GWRC** | David Cameron Masterton Office, phone | • Consultation service provided for regional ratepayers. | • Limits on budget and staff resources |
| Native forest restoration & biodiversity advice | GWRC | Tim Porteous GWRC | • Available to all ratepayers | • Not limited |
| | KCDC | Braden Rowson | • Advice from biodiversity coordinator available to all Kapiti ratepayers | • |

## Paid Services

| Services | Who | Contact | Criteria | Notes |
|---|---|---|---|---|
| Sale of planting material | GWRC | Akura Conservation Centre, Masterton | • Sourced through Akura Conservation Centre | • Some limits on poles |

# Steepland Soil Protection - Extra information

## Pole Planting

| | | |
|---|---|---|
| *Pole varieties and their attributes* (poplar & willow guide?) | *Greater Wellington Regional Council – Land Management, Masterton* | Two page guide on pole species and planting guidelines. |
| *Poplar & Willow Management* | *Greater Wellington Regional Council* | In print June 2006 |
| *Taranaki Regional Council Sustainable Land Management Info Sheets* | *Taranaki Regional Council, Land Management Section*.<br>No 20.Poplars & willows for fodder<br>No 31: Poles – why plant them?<br>No 32: Pole planting – what are the benefits?<br>No 33: Pole planting – general principles & practices<br>No 34: Pole planting – maintenance<br>No 35: Poplar & Willow varieties available from the Taranaki Regional Council<br>No 36: Poplars for timber production.<br>http://www.trc.govt.nz/ACTIVITIES/LANDMAN/DEFAULTA | Brief 2-3 page information sheets. Can be downloaded from website. |

| | | |
|---|---|---|
| | CT.HTM | |
| **Afforestation** | | |
| Radiata pine handbook | Piers McLaren | |
| Native Trees – Planting & Early Management for Wood Production | David Bergin & Luis Gea<br>Forest Research, Rotorua, 1995<br>NZ Indigenous Tree Bulletin No3 | |
| Trees for the NZ Countryside – a planters guide. | John & Bunny Mortimer<br>Silverfish 1984 | |
| TRC Sustainable Land Management Info Sheets | *Taranaki Regional Council, Land Management Section*.<br>No 6: Radiata Pine<br>No 8: Douglas Fir<br>No 13: Eucalyptus<br>http://www.trc.govt.nz/ACTIVITIES/LANDMAN/DEFAULTACT.HTM | |
| MAF – small forest series? | | |
| Ex forest research guides for cypress, eucs etc | | |
| **Native forest restoration** | | |
| "Managing your Bush Block: A guide to looking after indigenous forest remnants in the Wellington region" | *Greater Wellington Regional Council* | |
| "Restoration Planting: A guide to planning restoration planting projects in the Wellington region" | *Greater Wellington Regional Council* | |
| "Restoring our natural heritage: A guide to Greater Wellington's biodiversity assistance for private landowners" | *Greater Wellington Regional Council* | |
| "Native Forest Restoration; A practical guide for landowners" | QEII National Trust, Wellington<br>Also available on QEII website? | Currently being revised |
| **Other Information** | | |
| NZLRI sheets & Key | | |
| TRC Sustainable Land Management Info Sheets | *Taranaki Regional Council, Land Management Section*.<br>No 7: Land Resource Inventory Mapping<br>http://www.trc.govt.nz/ACTIVITIES/LANDMAN/DEFAULTACT.HTM | Brief 2-3 page information sheets. Can be downloaded from website |
| Soil Conservation Technical Handbook | Ministry for the Environment 2001 | |