



# ENVIRONMENT TOPICS

## LAND MANAGEMENT

### SUSTAINABLE LAND Repairing Slip Damage

#### Main Points

- Despite appearances, pasture production is very slow to recover from storm damage.
- Fertiliser, over-sowing and spelling for a season can greatly improve the rate of pasture recovery.

#### What is the cost of lost pasture?

The immediate cost of storm damage is the inability to manage the property through loss of fences, dams and tracks as well as a large area of bare ground, consisting of slip scars and debris.

A severe storm can cause about 5% bare ground over a whole farm. This does not sound like much, but some areas may appear to be devastated, with others suffering little damage.

A 400 hectare farm with 5% slipping in a severe storm equals 20 hectares of land without production in the short term, and reduced production afterwards.

#### How long does it take for slips to recover?

There are two types of bare ground on hill country after a storm: slip scars and slip debris.

Slip scars are usually very hard and steep, and will grass over very slowly. How fast pasture establishes depends on moisture, fertility and weathering of the surface.

Slip debris, although very rough, is easily converted back into high production. Slip debris will grass over very quickly, but initially will include many weeds, especially thistles.

Pasture growth only reaches 70 to 80% of original production after 30 years on slip scars. Most of this recovery takes place

within the first 10 years. After 100 years of farming some hill country, 20 to 30% of the full production potential is lost forever.

Research has shown recovery time can be shortened by 20 years with the right management.

#### What is the risk of a storm happening?

Hawke's Bay hill country farmers can expect storms causing erosion every five years, and storms causing severe erosion every 10 years.

The present trend to intensify hill country farming increases the risk of the damage from such storms. But when the soils are fertile and good management is used, the opportunity to recover pasture production is good.

#### What can be done to improve recovery?

Storms often remove all topsoil and much subsoil, leaving a very poor surface for pasture growth. Hardy pasture species, fertiliser and careful management are needed.



Severe slipping removes topsoil and some subsoil.

Trials on Wairarapa hill country show the recovery rate of pasture on slips can be improved by over-sowing and top-dressing. Pasture production on these areas was 2.5 times greater after five years than on untreated slips.

Slower-establishing pasture species were more productive than faster-establishing species.

Excluding livestock helps pastures establish. Paddocks rested from grazing for three seasons, as well as given seed and fertiliser treatment, eventually produced almost as much pasture as the surrounding land without slips. This production measured 3.5 times more than the untreated slips.

#### **What is the best way to treat damaged paddocks?**

- Top-dress annually with at least maintenance rates of superphosphate but not nitrogen
- Over-sow with a pasture seed mix including white clover, and possibly Lotus pedunculatus and cocksfoot

A more successful but expensive option is:

- Top-dress and oversow as above
- Exclude livestock for at least one growing season from October to May
- Establish soil conservation plantings using poles

Application rates used in the trial work were:

- Sulphur-fortified superphosphate at 200kg/ha a year for three years
- Cocksfoot (Grasslands Wana and Kara) at 6kg/ha
- Tahora white clover at 3kg/ha
- Lotus pedunculatus (Grasslands Maku) at 2kg/ha

#### **Is it economic to over-sow slips?**

These examples may help to decide:  
Assume a 400 hectare property, 20 ha of bare ground. (See Table 1)

Case 1: With normal grazing pasture production on slipped areas will be about 2.5 tonnes of dry matter per hectare per year after five years. Production will gradually improve each year for 20 to 30 years to a maximum of about 6.5 tonnes of dry matter per hectare per year.

Case 2: The slipped areas are over-sown and top-dressed annually. After five years production on the slips is 6.25 tonnes of dry matter per hectare per year or an extra 75 tonnes of dry matter per year over the whole 20 hectares. Production is already 20 years ahead of Case 1.

Case 3: Livestock are removed for at least one growing season. Slips are over-sown and top-dressed annually. After five years production is 8.5 tonnes of dry matter per hectare per year, or an extra 120 tonnes of dry matter per year over the whole 20 hectares. Production has already exceeded the normal maximum for slip scars and is about the same as on noneroded ground.

**Table 1: Summary of dry matter production on slip scars after treatment**

Treatment	Production/ha/yr after five years	Production over 20ha/yr after five years	Extra feed/ha/year after five years
None	2.5 tonnes	50 tonnes	-
Fert + Seed	6.25 tonnes	125 tonnes	4.25 tonnes
Fert + Seed + Rest	8.5 tonnes	170 tonnes	6.0 tonnes

#### **Summary**

Over-sowing and top-dressing with careful management helps to improve the recovery of slip scars on East Coast hill country. Resting an erosion area for at least a season may be difficult to achieve when feed demand rises. However the results of this work are very worthwhile, as well as providing an ideal opportunity to establish soil conservation poplar and willow poles.

#### **Where can I find more information?**

Contact your stock and station agent for pasture seed information.

This environment topic was based on two research papers:  
Lambert M.G., Costall D.A., Foote A.G.,

and Trustrum N.A., 1991, Revegetation of erosion scars in Wairarapa hill country.  
Douglas G.B., Trustrum, N.A., and Brown I.C., 1986, Effect of soil slip erosion on Wairoa hill pasture production and composition, N.Z. Journal of Agricultural Research 29: 183-192.

#### **For further information**

For further information on sustainable land management issues ask for the other titles in this series or contact Land Management Officers at the Hawke's Bay Regional Council for advice:

Wairoa	06 838 8527
Guppy Road, Napier	06 844 2495
Waipukurau	06 858 8636
TOLL FREE	0800 108 838